



**OKLAHOMA**  
Transportation

**2024 PIDP Grant Proposal**

**LEAD APPLICANT: OKLAHOMA  
DEPARTMENT OF TRANSPORTATION**

Joint Applicants: Muskogee City-County Port Authority  
and City of Tulsa-Rogers County Port Authority



**PORT MUSKOGEE**  
SUCCESS FLOWS FROM MUSKOGEE



**TULSA PORTS**  
BARGE · RAIL · INDUSTRIAL PARK  
CATOOSA · INOLA

**PROJECT DESCRIPTION:** The project will remove and replace six dolphin structures at the Tulsa Port of Catoosa, 20 dolphin structures at Port Muskogee, and construct two additional mooring dolphin structures at Port Muskogee to support an alternative fueling project and allow for future increases in throughput.

**McClellan-Kerr Arkansas River Navigation System (MKARNS)  
Barge Safety & Efficiency Improvement Project**

Is this a planning project?	No
Is this a project at a coastal, Great Lakes, or inland river port?	Inland River
Is this project located in a noncontiguous state or US territory?	No
GIS Coordinates:	Latitude 35.997263/Longitude -95.543508
Is this project in an urban or rural area?	Rural
Project Zip Code:	74429
This project is in two Historically Disadvantaged Communities.	
Project components were submitted for PIDP funding in FY22 and FY23.	
At this time, applicants have not and do not plan to apply for other discretionary programs in 2024 for the same or related scopes of work.	
Port Muskogee has previously received FY18 BUILD and FY22 PIDP grants. Tulsa Ports has previously received FY15 TIGER and FY20 INFRA grants.	



PIDP Grant Amount Requested	\$13,220,000
Total Project Cost	\$18,220,000
Total Federal Funding	\$13,220,000
Total Non-Federal Funding	\$5,000,000
No RRIF or TIFIA funds will be used for financing.	

## Table of Contents

Project Description.....	1
Project Scope of Work.....	3
Project Location.....	6
Grant Funds, Sources, and Uses of Project Funds.....	9
Merit Criteria.....	10
Achieving Safety, Efficiency or Reliability Improvements.....	10
Supporting Economic Vitality at the Regional or National Level.....	13
Leveraging Federal Funding to Attract Non-Federal Sources of Infrastructure Investment.....	166
Port Resilience.....	17
Selection Considerations.....	19
Climate Change and Sustainability.....	19
Equity and Justice <sup>40</sup> .....	22
Workforce Development, Job Quality, and Wealth Creation.....	24
Project Readiness.....	266
Determinations.....	29
List of Attachments and Supporting Documents.....	31

## List of Figures

Figure 1: Regional Overview of Project Location.....	1
Figures 2 and 3: Specific Project Locations.....	4
Figure 4: Historic Flooding at Port Muskogee.....	5
Figure 5: Port Muskogee Tribal Jurisdiction Boundary Map.....	7
Figure 6: Port of Catoosa Map.....	8
Figure 7: Photo of Existing Mooring Dolphin Structures.....	11
Figure 8: Inland Waterway Safety as Compared to Other Modes.....	11
Figure 9: Additional Photos of Historic Flooding at Port Muskogee.....	18
Figure 10: National Ranking of Minority Health Equity.....	24
Figure 11: Project Schedule.....	27

## List of Tables

Table 1: Mooring Dolphin Elevation with 100-Year Storm Elevation.....	6
Table 2: Funding Sources and Project Census Tracts.....	10
Table 3: Detailed Project Costs.....	10
Table 4: Benefit-Cost Analysis Summary.....	15
Table 5: Project Risks and Mitigation Strategies.....	27

## Project Description

Rural transportation networks are critically important for the domestic production and export of agriculture, energy commodities and manufactured goods.<sup>1</sup> The McClellan-Kerr Arkansas River Navigation System (MKARNS) originates at the City of Tulsa-Rogers County Port Authority (Tulsa Ports) Port of Catoosa (TPOC) and flows southeast to the Mississippi River. The Muskogee City-County Port Authority (Port Muskogee) is strategically located at the confluence of the Arkansas, Grand, and Verdigris Rivers south of TPOC. The MKARNS waterway links Oklahoma to a 12-state service area with various domestic ports along the US inland waterways system and connects to foreign ports by way of New Orleans and the Gulf Intracoastal Waterway.



Figure 1. Location of the Tulsa Port of Catoosa and Port Muskogee, two rural ports on the MKARNS inland waterway system. Base map courtesy of the [Oklahoma Department of Transportation 2022 Annual Report](#).

<sup>1</sup> <https://www.transportation.gov/rural>

The **MKARNS Barge Safety & Efficiency Improvement Project** (the Project) **will replace obsolete anchors by constructing new mooring structures** in the waterway at TPOC and Port Muskogee. Together, these improvements will enable safe harbor for mariners and barges, increase the reliability of critical structures in the event of a flood, and ensure the Oklahoma segment of the MKARNS can continue to support the over 22,000 full and part-time jobs it provides. The Oklahoma Department of Transportation (ODOT) serves as the Project's lead applicant and requests \$13.22 million in PIDP funding to deliver the \$18.22 million project.

ODOT has the authority to plan and construct this project per Oklahoma Statutes Title 69. Port Muskogee and TPOC (the ports) have the authority to own, operate, and maintain this project. The ports, located within the Federally-recognized Cherokee and Muscogee Tribal Nations, are Oklahoma's most robust multimodal transportation hubs, providing barge, rail, and truck freight options. TPOC is one of two industrial sites controlled and operated by Tulsa Ports with a 2,500-acre industrial park. Consisting of both public and private port terminals, Port Muskogee consists of more than 500 acres of industrial land along more than 3,000 feet of navigable waterfront. These ports serve offsite industries well beyond their geographic location, with users located across multistate regions touching both coasts. Both ports support this region's multimodal freight movement and local economy.

A resilient domestic transportation system contributes to more efficient supply chain networks, which increase domestic manufacturing capacity, maintain America's competitive edge in research and development, and create good-paying jobs. These ports directly support the movement of over 4.9 million tons of annual waterway freight moved along the US inland waterway system to locations throughout the country and to global markets. In 2021, Oklahoma's waterborne commerce on the MKARNS had an estimated value of \$2.3 billion dollars. In addition, over 10.7 million tons traversed the entire MKARNS waterway with a value of over \$3.7 billion dollars. To facilitate the movement of these goods, which are projected to increase by 35% through 2045 according to analysis conducted for the ODOT Freight Plan,<sup>2</sup> the Project replaces structurally deficient mooring structures with waterfront infrastructure engineered to be more resilient, thereby improving the safe and efficient movement of waterborne freight.

Shipping cargo by water is the safest, most energy-efficient, and economically competitive form of freight transportation. By facilitating a greater modal shift to barge, the Project will reduce fuel consumption and greenhouse gas emissions, both of which are leading contributors to climate change. Data from the National Oceanic and Atmospheric Association (NOAA) shows the highest historical probability of severe weather in the nation primarily in Oklahoma and northern Texas.<sup>3</sup> **Further, the annual cost of damage from inland floods is higher than any other severe weather event.**<sup>4</sup> The Project will replace existing barge tie-down structures that were not designed for the type of major flood events experienced in the region in recent years.

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<sup>2</sup> [Oklahoma Freight Plan 2018-2022](#), Table 7. Long-Term Oklahoma Freight Growth. Oklahoma Department of Transportation.

<sup>3</sup> [Historical Probability of Severe Weather](#). National Oceanic and Atmospheric Association's Climate.gov.

<sup>4</sup> [Inland Flooding](#). U.S. Climate Resilience Toolkit. April 12, 2022.

The monopile waterway infrastructure supporting barge shipments at the Tulsa Port of Catoosa and Port Muskogee should be viewed in the context of larger infrastructure needs throughout the MKARNS system. To provide context for the breadth of these needs throughout the MKARNS system, the Tulsa and Little Rock Districts of the U.S. Army Corps of Engineers (USACE) have identified a critical backlog of maintenance needs on federally-owned MKARNS assets. Any one of these critical maintenance items has a 50% probability of failure within the next 5 years – these failures will greatly constrain the use of and movement of goods on the MKARNS. USACE lacks a sufficient budget to maintain the infrastructure of the inland waterway system.

The current cost of the **critical backlog of maintenance needs on the MKARNS alone is now approaching \$160.4 million dollars on the Oklahoma segment and approximately \$302 million dollars system-wide.**<sup>5</sup> The backlog analysis, which was limited to Federal projects, is not eligible for Federal funding opportunities given the jurisdiction of ownership of the infrastructure. However, this backlog illustrates the scale of need along the MKARNS and how the proposed improvements included in this application would start to address much-needed system improvements. It is imperative that investments be made to begin addressing the critical infrastructure necessary for the safety of barge movement along the waterway in Oklahoma. The Oklahoma Department of Transportation seeks Port Infrastructure Development Program (PIDP) grant funding for the Project to address critical infrastructure deficiencies at the state's largest two public ports, increasing safety and the state of good repair, ensuring supply chain resiliency, and promoting good-paying jobs.

### Project Scope of Work

The proposed mooring modernizations will allow the ports to increase safety measures, greatly reduce the risk of a barge becoming loose, and increase the capacity of loading and unloading operations. This additional capacity will allow multiple barges to dock simultaneously, decreasing congestion within the waterway and preparing for the previously described projected increases in barge volumes within the MKARNS. New mooring infrastructure will be an investment in long-term strength, security, and resiliency, allowing Oklahoma to continue its role as a major contributor to national and global markets. As the applicant, ODOT will be responsible for competitively bidding and letting the Project.

The Project includes the following improvements:

- Tulsa Port of Catoosa – The Project will remove and replace 6 dolphin structures with new mooring structures, associated gangway and platforms.
- Port Muskogee – The Project will remove and replace 20 dolphin structures with new mooring structures, associated gangway and platforms.
- Port Muskogee – The Project will construct 2 additional mooring dolphin structures, associated gangway and platforms that can accommodate larger vessels to support Project Goliath, an anticipated alternative fueling project.

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<sup>5</sup> [MKARNS Top 30 Critical Backlog Maintenance Items FY24 Budget](#)

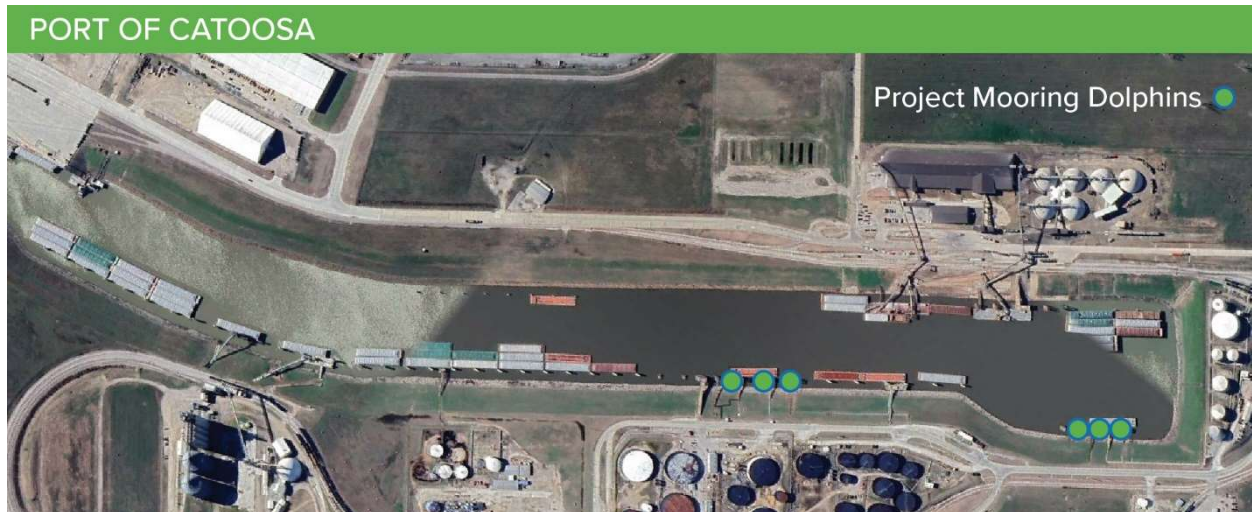


Figure 2. Mooring Dolphins at the Tulsa Port of Catoosa



Figure 3. Mooring Dolphins at Port Muskogee

The improvements for the mooring structures will consist of replacing the various types of mooring dolphins with steel pipe monopiles, 6-ft. in diameter with varying wall thickness throughout the length. The steel pipe will be embedded approximately 30 ft. into the bedrock and filled with concrete. There will be fenders installed on the entire length of the structure expected to contact various barge types, providing abrasion protection as well as energy absorption to prevent structural and barge hull damage. The mooring system will consist of rails along the sides of the monopile, allowing for flexible and secure tie downs. Typically, these types of monopiles are fabricated fully in the shop. This reduces field construction costs and allows for safer construction. Transportation of these structures is generally performed by heavy-haul barges. The lengths will vary based on the depth to bedrock and the high-water elevation given for the different ports.

The new mooring structures are designed to be more resilient to the impacts of severe weather events that produce high waters or floods; the existing monopile structures are not designed to keep barges adequately secure when the stress of high water becomes too great. Dolphin moorings in the waterway today at both ports consist of a combination of vertical and horizontal “batter” wood piles that are in poor, unsafe condition and nearing their end of useful life in 2027. In May 2019, Port Muskogee sustained significant damage when it was inundated by historic flooding that exceeded 30 feet in height. The existing mooring structures were below the water, and the barges’ tiedowns failed, resulting in loose barges that struck the nearby Webbers Falls Lock and Dam. **Operations on the river were delayed for four months, costing the State of Oklahoma daily losses of up to \$20.7 million in Gross Domestic Product (GDP).**



*Figure 4. Underwater for nearly two weeks, barges at Port Muskogee broke loose and damaged downstream infrastructure, portions of the dock and wharf collapsed, electrical systems stopped working, and water flushed out sediment beneath railways, rendering them unusable.*

As evidenced by recent barge strikes in Pittsburgh<sup>6</sup>, eastern Oklahoma<sup>7</sup>, and the collapse of the Baltimore bridge<sup>8</sup>, the impacts of these events can range from hours of travel delay and minor repair costs to devastating fatalities and complete infrastructure reconstruction.

Replacement studies at Port Muskogee and TPOC over the last three years affirmed these findings – all evaluated dolphin structures showed signs of deterioration, with some in need of immediate repair or decommissioning (Ref. Lanier 2019, Ref. M&N 2022). The existing mooring dolphins’ current top elevation does not support the design high water elevations for this region according to the US Geological Survey (USGS) water data gages throughout the area.

<sup>6</sup> <https://www.pbs.org/newshour/nation/barges-damage-a-marina-hit-a-bridge-after-breaking-loose-on-ohio-river-in-pittsburgh>

<sup>7</sup> <https://www.kiro7.com/news/trending/barge-strikes-bridge-arkansas-river-oklahoma-delays-traffic-several-hours/NNEDARHF3ZDS5DSAIBC4X4C2NU/>

<sup>8</sup> <https://apnews.com/article/baltimore-bridge-collapse-53169b379820032f832de4016c655d1b>

The flooding of 2019 shows an elevation of nearly 518 ft. reached in Port Muskogee. FEMA also updated the region’s risk maps for 100-year storms. The elevations below are based on the NAVD88 datum and FEMA 100-year storm water levels. A recent engineering report compiled by Lanier Consulting Engineers (Ref. 2019) addresses the future design elevations required to serve both locations. Consistent with design best practice, the report recommends the top design elevation of the mooring dolphin be 10 feet above the design high water elevation (FEMA Map, USGS Data).

*Table 1: Mooring Dolphin Elevation with 100-Year Storm Elevation*

<b>Location</b>	<b>100-Yr Storm Elevation (ft.)</b>	<b>Datum Elevation (ft.)</b>	<b>Existing Dolphin Elevation (ft.)</b>	<b>New Dolphin Elevation (ft.)</b>	<b>Height Change Required (ft.)</b>
<b>Port Muskogee</b>	519.65	471	517	529.65	12.65
<b>TPOC</b>	572	471	565	582	17

Table 1 shows these storm elevations are above the existing mooring dolphins at both ports, posing a danger to future barge mooring and public safety. Port Muskogee has a typical mooring dolphin top elevation of 517 feet, two feet below the 100-year storm value shown above. This would require new mooring dolphins that extend up to an elevation of 529.65 feet, which is more than 12 feet above the existing structures. For TPOC, the existing dolphin structures have an elevation of 565 feet, which would require an additional 17 feet to reach the recommended engineering elevation for 100-year storm data.

The existing anchorage structures at these port terminals cannot support the incoming growth of barges and vessels that move freight. The Project will provide mooring structures that are more supportive of the vessels and barges that move freight along the MKARNS. The components of this Project at Port Muskogee are a continuation of the Port’s waterfront infrastructure improvements, which include the reconstruction of the main dock and construction of a new heavy-lift dock, that received a 2022 PIDP award.

### Project Location

The MKARNS, also known as Marine Highway 40, is a 445-mile-long corridor within the nation’s inland waterway system. Freight movements along this system flow from various locations between TPOC in northeast Oklahoma and the Port of New Orleans at the mouth of the Mississippi River. The central location of the two inland waterway ports on the Verdigris and Arkansas Rivers as shown in Figure 1 provides connections to extensive transportation corridors across the nation. In 2015, the waterway’s designation changed from a “moderate” to “high-use” waterway, which upgraded Marine Highway M40 from a “Connector” to a “Corridor” due to its five-year average of more than 3.3 billion ton-miles traveled.



Port Muskogee is located near the City of Muskogee in Muskogee County, at River Mile 393.8 of the MKARNS (35.783552°, -95.299059°). The Port is centrally located off the Muskogee Turnpike, near US 64 and US 69 providing north-south access, and US 62 and OK 165 providing east-west access. The Port is within 20 minutes of I-40, 40 minutes of I-44, and has indirect access to I-35 via I-40 two hours to the west. The area also connects several freight rail networks, including service to the Union Pacific Railroad (UPRR) mainline by way of their Cherokee Subdivision, and is near the Muskogee-Davis Regional Airport. As shown in Figure 5, the Project work at Port Muskogee is located on tribal land within the Cherokee Nation directly adjacent to the Creek Nation.

Muskogee County, home to Port Muskogee, is located just over two hours to the east of Oklahoma City and works closely with the port and Muskogee City on infrastructure development projects. Muskogee County is home to 66,354 people, 19.2% of whom live in poverty. According to the United States Department of Transportation’s (USDOT) recommended Climate and Economic Justice Screening Tool (CEJST), the area immediately around the port is a disadvantaged area in five categories: climate change, clean energy and energy efficiency, sustainable housing, health burdens, and workforce development. Muskogee County Tract 4 experiences worse health outcomes (life expectancy, heart disease, asthma, diabetes) than 96% of the country and has a lower annual median income than 98% of the country at \$44,166.

The TPOC transportation network includes interstate highway I-44, US 66, OK 266 and OK 167, direct connection to the Burlington Northern Santa Fe (BNSF) Railway, connection to the South Kansas-Oklahoma Line (SKOL), which connects the Port to the Union Pacific (UP) in Coffeyville, Kansas, and direct access to the MKARNS waterway. TPOC’s location also benefits from a decreased level of traffic congestion relative to other proximate areas.

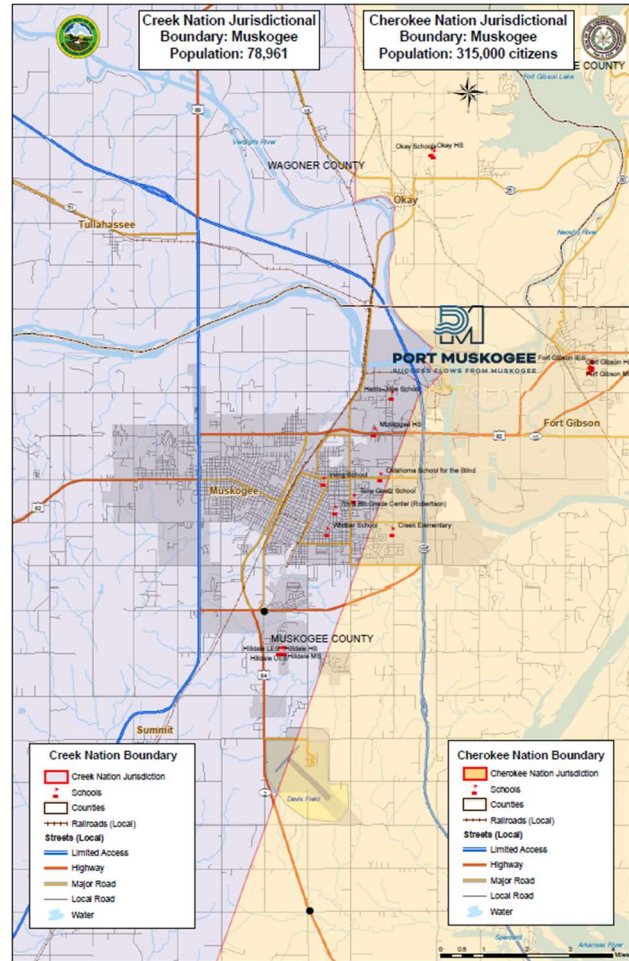


Figure 5. Port Muskogee is located within the Cherokee Nation’s jurisdiction, bordering the Creek Nation.

The Tulsa Port of Catoosa is situated within the Federally recognized Cherokee Tribal Nation in the western portion of Rogers County, northeast of Tulsa (36.234957°, -95.731722°). Over 98,800 people reside in the county, 9.7% of whom live in poverty. CEJST considers Rogers County Tract 504.08 disadvantaged as it is completely surrounded by disadvantaged tracts, meets the low-income threshold, and is completely covered by the lands of federally recognized tribes.

Two of four Foreign Trade Zones on the MKARNS are served by this Project, TPOC and Port Muskogee, which facilitate commercial transactions with over 44 or more countries via the MKARNS. Agricultural products (soybeans, wheat, fertilizer), lumber, steel, and other goods comprise large shares of Oklahoma’s domestic and international exports. In total, Oklahoma sized firms accounting for 84% of Oklahoma’s exporters.<sup>9</sup>

Both Project components are located in rural areas at inland river ports. The Project will construct 28 mooring structures at TPOC and Port Muskogee. All Project components are located in Northeast Oklahoma’s 2<sup>nd</sup> Congressional District. The Project will take place in the following two census tracts, which are both Historically Disadvantaged Communities (HDC), and include an Area of Persistent Poverty (APP) and Qualified Opportunity Zone:

- Rogers County Tract 504.08, Tulsa Port of Catoosa – HDC
- Muskogee County Tract 4, Port Muskogee – APP, HDC, Qualified Opportunity Zone (Zone ID 40101000400)

The Infrastructure Investment and Jobs Act (IIJA) of 2021 designated a portion of US 412 in Arkansas and Oklahoma as a future interstate on the National Highway System. US 412 directly serves TPOC on the MKARNS. Infrastructure investments like this interstate designation, a USACE plan to deepen the MKARNS channel from 9 to 12 ft., and the MKARNS Barge Safety & Efficiency Improvement Project will help attract new businesses and drive additional growth in cargo movement, improve safety and resiliency, enhance freight mobility, and support economic prosperity for underserved rural communities.

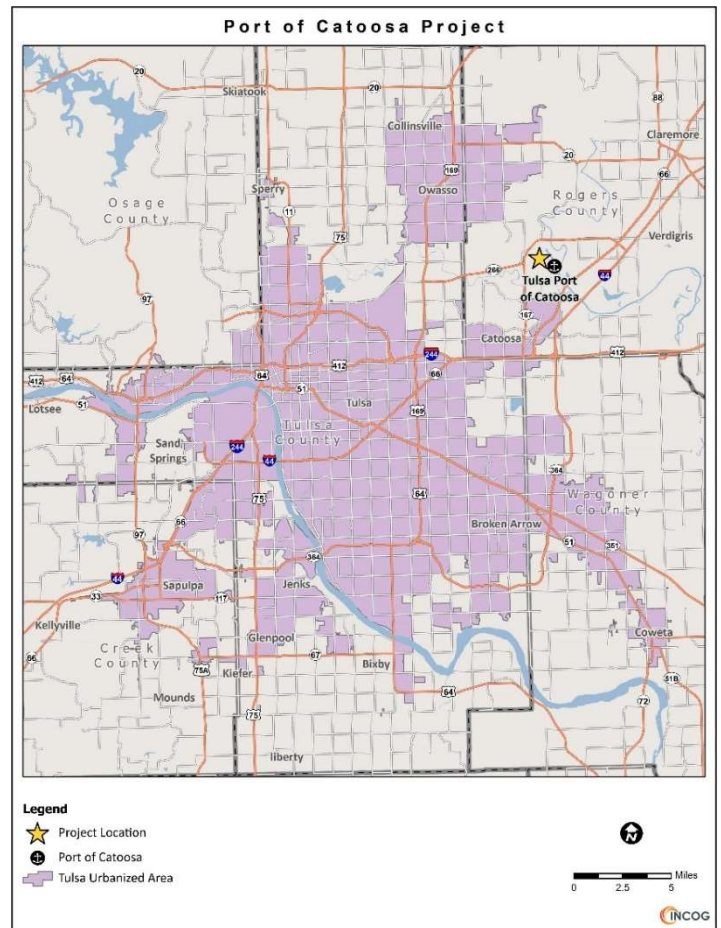


Figure 6. Tulsa Ports is located within the Cherokee Nation's jurisdiction.

<sup>9</sup> [Trade Report Highlights 2021](#). Oklahoma Department of Commerce.

## Grant Funds, Sources, and Uses of Project Funds

The cost of the Project is \$18.22 million dollars. The ports are contributing a \$5 million match, or 27.4%, with Port Muskogee providing \$4 million and Tulsa Ports providing \$1 million. All obligated PIDP funds would be used for project construction and construction contingency. In total, the ports request \$13.22 million dollars in PIDP funding, 72.6% of total project costs.

The Project budgets for TPOC and Port Muskogee are based on the Preliminary Monopile Design Report by Lanier Consultants (2022). Estimated construction costs were provided for the 20 mooring dolphins to be replaced at Port Muskogee and the 6 mooring dolphins to be replaced at TPOC. The original estimates have been updated to accommodate the increased lengths on the monopile structures due to water elevation data and the addition of 2 new mooring dolphins at Port Muskogee.

The preliminary estimate is based on the initial design phase for the mooring dolphins, and has a contingency included to account for unknown construction costs and permitting costs that may be incurred as the design progresses toward the final design submittal. The estimate includes these items as well as inflation rates of 10% to account for unknown market circumstances at the time of construction.

The requested federal funding, coupled with a 27.4% non-federal share of the total project cost totaling \$5 million dollars committed by Tulsa Ports and Port Muskogee, will accelerate the construction of this important project.

The tables below show how each funding source will share in the Project's major activities and include sufficient contingency amounts to cover unanticipated cost increases, though the ports remain committed to covering any potential cost overruns. The budget identifies the source of funds on each line item as PIDP (federal) or non-federal. No other federal sources will be used to fund the Project. While the cost for each component is shown separately, the safety, efficiency and resiliency benefits of the Project for the MKARNS system will be fully realized only if all components are completed.

Several entities have shown their support for the Project by providing letters of support including elected officials, Muskogee City and County, Rogers County, the Oklahoma Department of Transportation, and Cherokee and Muscogee Nations. Letters of funding commitment and proof of authority to carry out the Project from both Port Muskogee Director, Kimbra Scott and Tulsa Ports Director, David Yarbrough, P.E. are provided, as well. All funding commitments and endorsement letters are provided as attachments.

*Table 2. Funding Sources and Project Census Tracts*

	<b>Rogers County Tract 504.08, Port of Catoosa</b>		<b>Muskogee County Tract 4, Port Muskogee</b>		<b>Total</b>	
PIDP Funds (Federal)	\$3.67 M	78.6%	\$9.55 M	70.5%	<b>\$13.22 M</b>	<b>72.6%</b>
Local Match Funds (Non-Federal)	\$1.0 M	21.4%	\$4.0 M	29.5%	<b>\$5.0 M</b>	<b>27.4%</b>
<b>Total Project Cost</b>	<b>\$4.67 M</b>	<b>100%</b>	<b>\$13.55 M</b>	<b>100%</b>	<b>\$18.22 M</b>	<b>100%</b>

*Table 3. Detailed Project Costs*

<b>Item</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Total Cost</b>
Site & Environmental Permitting	1	\$440,000.00	\$440,000
Engineering Services During Construction	1	\$759,000.00	\$759,000
Mobilization & Demobilization	1	\$1,480,000.00	\$1,480,000
Excavation Overburden	290 cy	\$200.00	\$58,000
Rock Excavation	520 ft.	\$3,000.00	\$1,560,000
Tremie Concrete at Rock Embedment	709 cy	\$300.00	\$212,826
Rebar	141,809 lb.	\$1.00	\$141,809
Mooring Piles	28	\$209,207.00	\$5,857,789
Mooring Pile Coating	510,564 sf.	\$2.00	\$1,021,128
Mooring Pile Sleeves (2)	205,851 lb.	\$1.00	\$205,851
Mooring Pile Delivery	1	\$420,000.00	\$420,000
Mooring Rails	49,984 lb.	\$3.00	\$149,952
Fenders	28	\$20,000.00	\$560,000
Turbidity Curtain	1,250 lf.	\$27.50	\$34,375
Project Design Costs (7%)	1	\$903,051.00	\$903,051
Contingency (30%)	1	\$4,417,210.00	\$4,417,210
<b>Total Project Cost</b>			<b>\$18,220,992</b>

## Merit Criteria

### Achieving Safety, Efficiency or Reliability Improvements

#### Safety

Providing a safe harbor for mariners, barges, and vessels is a key purpose of the Project. Modernized moorings will improve worker safety and minimize risk during mooring tie-down procedures.

The water surface elevation at both ports changes constantly, in some cases drastically, each day. The ports need the ability to respond quickly to these elevation changes to mitigate the safety and climate risks described in Port Resilience. Reliable mooring infrastructure is critical to ensure that flooding and extreme weather events do not allow barges to break free. For this reason, mooring infrastructure is also critical to reduce the risk of goods lost to the water, especially environmental contaminants such as chemical fertilizer, which comprises significant tonnage at both ports.

Mooring infrastructure will allow captains and deckhands to secure barges more easily, requiring less physical force and technical skill than the dock's current mooring infrastructure. The modernized mooring infrastructure proposed by the Project for the dolphin replacements (monopile mooring) would allow captains to maneuver a barge alongside the mooring structure as the deckhand throws a line around the pipe to secure the barge, an easier and safer process than what is currently required to secure to a deadman anchor.

The Project contributes to the safety, efficiency, and resiliency of the 445-mile MKARNS, a navigable waterway transportation system that connects multiple states. Should the mooring infrastructure in poor state of repair at both TPOC and Port Muskogee become unusable in the next two to five years, a large volume of cargo – including oversized and overweight loads with greater safety risks – would need to be shifted to another mode.

According to the National Waterways Foundation and as shown in Figure 8, inland marine highways move freight more safely than trucks or rail. For each barge-related fatality, there are 26 rail-related fatalities and 120 truck-related fatalities; for each barge-related injury, there are 96 rail-related injuries and 1,145 truck-related injuries. In addition to increased risk of

injuries and fatalities if waterborne cargo were diverted to highway or rail, costs and traffic congestion would also increase, as discussed in Supporting Economic Vitality on page 14, as will diesel emissions, as discussed in Climate Change and Sustainability on page 21. When considering the movement of freight via the waterway (the key modal feature of TPOC and Port Muskogee), safe and reliable mooring infrastructure creates efficiencies in barge freight movements by reducing service disruptions as explained in the following criteria.



Figure 7. Existing dolphins at Port Muskogee (pictured above) and TPOC will be replaced with safer, more efficient monopile and dolphin mooring infrastructure.

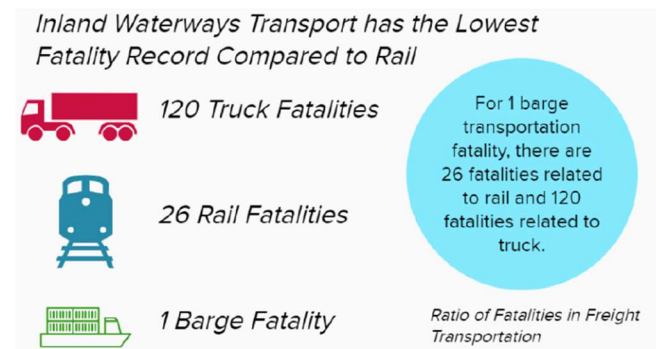


Figure 8. Ensuring freight is not diverted from the MKARNS inland waterway to rail and trucks will prevent fatalities and injuries. National Waterways Foundation, 2001-2019 Statistics.

## *Efficiency*

The MKARNS is a 12-state navigable waterway capable of handling barges that traverse the entire inland waterway system from New Orleans and Houston to Pittsburgh and Minneapolis. Shipping by water is the most cost-competitive form of freight transportation, and just about any type of cargo can be shipped by barge if there is a large enough volume to move.

From September 2019 to December 2021, the average door-to-door shipping time for waterway freight doubled from 40 to 80 days.<sup>10</sup> Increased shipping demands have contributed to record-breaking supply chain issues, resulting in out-of-stock products for stores, dealerships, grocery stores, and more. Traditional ways of doing business in ports are being challenged worldwide by demands for increased efficiency, customer responsiveness, and lower costs to move cargo. It is imperative that efficiency improvements, such as the modernized mooring infrastructure in this Project, are made to avoid further exasperating these challenges. Freight movement by barge provides the smallest carbon footprint of all modes of freight transportation – as social and policy changes drive companies to consider shipping methods that lower their carbon footprint, demand for efficient barge transportation will only increase.

The Project is designed to directly improve cargo throughput due to operational improvements at both ports, as further described in Supporting Economic Vitality on pages 15 and 16 as well as the attached Benefit Cost Analysis (BCA) spreadsheet and technical report. In the no-build scenario, over 46 million waterway tons, representing 30% of throughput at Port Muskogee and 100% of liquid cargo capacity at TPOC, are diverted to alternate ports, rail, and truck over the 20-year analysis period. In addition to the benefits described in Safety and Climate Change, barge transportation is incredibly efficient, with one barge carrying the equivalent of 15 railcars or 60 trucks.

In 2021, the Oklahoma segment of the MKARNS accounted for the transportation of 3.7 million tons of sand, gravel and rock; nearly 1 million tons each of wheat and soybeans; and 2 million tons of basic chemicals used in the production of fertilizer and consumer products which reached regional, national, and international markets.<sup>11</sup> TPOC facilitated over 42% of total shipments along the MKARNS in 2020, handling approximately 1,000 barges and accounting for over \$300 million in economic activity each year. Without the components included in the Project, it is anticipated some of this cargo would need to be diverted to other ports or modes, increasing the time needed to keep these goods moving.

The inland waterway system and barges are ideal for hauling bulk commodities and oversized and overweight equipment. In 2021, the MKARNS transported over 1 million tons of iron and steel and 32,000 tons of equipment and machinery.<sup>12</sup> Transporting these goods and commodities by barge provides greater efficiencies and cost-savings by eliminating the need for an overweight/oversized truck permit and allowing greater tonnages to be transported in each load. The new tie down structures will help the Project locations continue to safely accommodate

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<sup>10</sup> [Door to Door Average Shipping Time for Ocean Freight Shanghai-Los Angeles](#). Alcott Global. March 4, 2022.

<sup>11</sup> [MKARNS 2022 Inland Waterways Fact Sheet](#). Oklahoma Department of Transportation.

<sup>12</sup> Ibid.

oversized and overweight loads by barge, ensuring these critical elements can move as efficiently and safely as possible.

Existing tenants at the ports drive large shares of this demand and future expansion plans will only increase operational needs. With over 70 companies currently located at its industrial facility, TPOC is one of the largest intermodal terminals in a multi-state region. As many as 14 industries depend on access to Port Muskogee, which accounts for capital investments totaling more than \$2 billion with a combined annual payroll above \$125 million. Additionally, numerous businesses located outside the ports or even the state are able to directly access truck, rail, and barge transportation on site.

These efficiencies generate valuable cost savings for businesses, farmers, consumers, and shippers. As a result, the ports become part of the supply chain for farmers and manufacturers in Oklahoma and surrounding states. Reliable service provided through efficient, reliable mooring structures ensures schedules can be met and shipments delivered.

### *Reliability*

The Project is expected to significantly reduce the risk of service disruptions caused by high water or flooding events, barges coming loose, or loss of use of mooring structures. The 26 mooring structures this Project would replace at TPOC and Port Muskogee will reach their end of life in 2027.<sup>13</sup> Harbor infrastructure at both ports is experiencing critical failures that will continue to lower capacity to secure barges for loading and unloading if no updated infrastructure is provided. The ability for both ports to provide reliable transport of cargo is only as good as the ability for barges to tie off safely. The potential impacts of mooring infrastructure failure are further detailed in Port Resilience. The Project's investment will provide more reliable mooring and switching operations for decades to come due to the Project's replacement of 26 dolphins nearing their end of life, as well as added mooring capacity.

The infrastructure improvements included in Port Muskogee's successful 2022 PIDP application as part of the Muskogee Waterfront Recovery and Resiliency Project will only realize their full safety, efficiency, and reliability potential with updated mooring infrastructure. This Project expands on and enhances that critical project to continue improving the capacity of operations at Port Muskogee.

### *Supporting Economic Vitality at the Regional or National Level*

The strategic location of each port provides many economic advantages, such as proximity to rail and highways, decreased traffic congestion, and economic incentives as a location for industries. Both ports are designated Foreign Trade Zones and facilitate freight shipments to over 44 countries.<sup>14</sup> For these advantages to continue, however, reliable infrastructure is required to minimize service disruptions and mitigate the ports' competitive disadvantage of exposure to extreme climate events, as discussed in Port Resilience and Climate Change and Sustainability. The failure of the mooring structures in a no-build scenario will have major ramifications for

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<sup>13</sup> Lanier Consulting Engineers Mooring Dolphin Assessment, 2019 and Burns & McDonnell Waterfront Infrastructure Assessment, 2021.

<sup>14</sup> [2022 Annual Report](#). Oklahoma Department of Transportation.

both TPOC and Port Muskogee to efficiently and reliably move commodities, goods, and raw materials that contribute to the local, regional, and national economy.

### *Benefit Cost Analysis*

The MKARNS Barge Safety and Efficiency Improvement Project, with a total net benefit of over \$42 million (NPV) and benefit-cost ratio (BCR) of 3.6, will generate significant emissions reduction, safety, and avoided highway use externality benefits over its 20-year life as shown in Table 4.

The Benefit Cost Analysis assumes that in the No-Build scenario beginning in the year 2028, the first year the Project's reconstructed mooring infrastructure would become operational in the Build scenario if awarded an FY22 PIDP grant, the mooring infrastructure is no longer safe to use. Cargo is assumed to be diverted to other locations and modes: 35% to other ports, 52% to rail, and 13% to truck. While in many cases, these logistical and geographic shifts would result in additional truck-miles to complete shipments, this additional traffic was not monetized.

Emissions reduction comprises the largest Project benefit, with a total NPV of \$26,256,164. While the CO<sub>2</sub> emissions appear to be a dis-benefit of the Project, rail generates 43% more and trucks generate 832% more CO<sub>2</sub> than barge per million ton-miles.<sup>15</sup> The BCA uses USDOT methodology and recommended values per mile for truck and per idling and hauling hour for rail emissions. The assumptions for rail service were conservative: 2 total hours of idling per train across all loading, unloading and switching across the over 200-mile routes, and a 25 mile-per-hour hauling speed per train for 8.5 to 10 hours of hauling, depending on the port of origin. Absent USDOT guidance on calculating emissions for travel by waterway, barge emissions rates per million ton-miles were identified from a study completed by the Texas Transportation Institute and Center for Ports and Waterways prepared for the National Waterways Foundation to calculate anticipated metric tons of NO<sub>x</sub> and CO<sub>2</sub>.

Safety comprises the second-largest benefit. The highway use externality value was used to account for truck-miles traveled in the No Build scenario. A rate of average fatalities and injuries per ton-mile was calculated for both inland waterways and freight rail using data from the Bureau of Transportation Statistics and Federal Railroad Administration.

Avoided truck-miles also produces a significant avoided highway use externality benefit, accounting for reduced highway congestion and noise.

Benefits not quantified include time savings due to more efficient docking processes and reduced dwell time of vessels waiting to use the waterway, which would not only improve operations but reduce emissions.

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<sup>15</sup> [https://www.nationalwaterwaysfoundation.org/file/47/NWF%202022NewStudyInserts\\_FINAL.pdf](https://www.nationalwaterwaysfoundation.org/file/47/NWF%202022NewStudyInserts_FINAL.pdf)



Table 4. Benefit-Cost Analysis Summary

	NET PRESENT VALUE
<b>Discounted Capital Costs</b>	
Capital Costs	\$16,207,444
<b>Total Discounted Capital Costs</b>	<b>\$16,207,444</b>
<b>Discounted Benefits</b>	
Safety	\$21,761,509
Non-CO <sub>2</sub> Emissions Reductions	\$43,614,490
CO <sub>2</sub> Emissions Reductions <i>(The Project is anticipated to result in positive CO<sub>2</sub> emissions reductions: for this BCA, actual emissions were calculated for barge movements with conservative assumptions made for other modes)</i>	(\$17,358,326)
Avoided Highway Externality	\$10,382,706
Cargo Spillage	\$4,934
Project Operations and Maintenance	(\$35,431)
<b>Total Discounted Benefits</b>	<b>\$58,369,882</b>
<b>Total Benefit-Cost Ratio</b>	<b>3.60</b>
<b>Total Net Present Value</b>	<b>\$42,162,438</b>

*Regional Economic Impact*

The Tulsa Port of Catoosa is strategically positioned within a transportation network that can accommodate the exponential growth of supply chain freight volumes servicing existing and newly established manufacturing operations in a six-state region (Oklahoma, Kansas, Texas, Louisiana, Arkansas, and Missouri). Consistent with Executive Order 14017, these capacity and modal connection capabilities at the two Tulsa Ports industrial parks will allow for major shipments of raw materials, including to produce large capacity batteries. As the United States transitions away from fossil fuels for power generation and electrifies automotive and trucking fleets,<sup>16</sup> mid- to large-scale battery manufacturers<sup>17</sup> are shortlisting the Tulsa area.<sup>18</sup> These upstream raw material production, component assembly, and final assembly manufacturing facilities address critical gaps in the national upstream value chain for lithium batteries, according to the US Department of Energy Vehicle Technologies Office.

Port Muskogee offers 3,000 feet of navigable waterfront and 475 acres of industrial land, supporting a combined annual payroll above \$125 million. The port undertook a strategic planning process in 2022, with two of its six primary goals to “plan for future growth and development” and “improve throughput.” In pursuit of these goals, Port Muskogee has identified parcels totaling over 175 acres with opportunities for new rail service and is exploring future infrastructure, operational and site improvements to support additional capacity. If funded, the

<sup>16</sup> Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-Based Growth: 100-Day Reviews under Executive Order 14017. White House, June 2021 (page 9).

<sup>17</sup> [“Panasonic wants to build electric vehicle battery plant in Kansas or Oklahoma.”](#) Tulsa World. March 5, 2022.

<sup>18</sup> [“Mayes County TIF a must for company to choose to spend \\$6 billion for Oklahoma factory proponents say.”](#) Tulsa World. April 25, 2022.

Project would repair critical infrastructure to improve the services offered by the port and support the economic viability of regional businesses.

Currently, 14 industries rely on the port for raw materials, and those businesses represent 2,500 jobs in the Muskogee area. These modernized mooring dolphins are intended to have a net positive impact on job opportunities in Muskogee, with Project Goliath, a planned confidential alternative fuel project, directly benefiting from the two new mooring dolphins. Employees directly supported by the Port will invest in the local economy by re-spending on goods and services in the area, further improving the local economy.

In 2022, TPOC and Port Muskogee handled over 700 inbound barges, which carried nearly 400,000 tons of fertilizer to support a multi-state agricultural market and other commodities. Agricultural commodities have historically accounted for nearly three-quarters of the total product moved on the Oklahoma segment of the MKARNS.<sup>19</sup> The ports provide natural existing benefits to private industry, which is a major economic incentive. Benefits to the industry include multi-state linkages, modal connections, supplier clustering opportunities, master-planned industrial parks, leased-based property with security and maintenance included, and foreign trade zones.

Economic development is occurring at a rapid pace in northeast Oklahoma. Many of the projects contributing to growth in the region are mid- to large-scale manufacturing projects involving high volumes of inbound/outbound freight. TPOC and Port Muskogee's ability to receive large tonnage of raw materials can help mitigate supply chain bottleneck disruptions caused by a lack of truck and rail capacity, logistical issues at rail terminals, and nationwide service disputes with the Class 1 Railroads. However, the safe and efficient handling of these shipments will require reliable system of mooring structures.

While a constant one percent increase in tonnage based on historical five-year data was used for the BCA to take a conservative approach, the ports are anticipating significant growth in the coming decades. As mentioned in Project Location, the IJA designated a portion of US 412 – which directly serves TPOC on the MKARNS – as a future interstate on the National Highway System. The Army Corps of Engineers released their plans to utilize funding from the IJA to deepen the MKARNS channel from 9 feet to 12 feet. A deeper channel will allow for increased barge capacity up to 400 tons per barge. Additionally, the Port of Inola, approximately 20 miles southeast of TPOC, recently completed the Sofidel America Manufacturing facility, a \$360 million dollar investment employing over 400 people that will increase barge transportation.

### Leveraging Federal Funding to Attract Non-Federal Sources of Infrastructure Investment

The ports are contributing a \$5 million match, or 27.4%, with Port Muskogee providing \$4 million and Tulsa Ports providing \$1 million. Both the City of Tulsa – Rogers County Port Authority and Muskogee City-County Port Authority are non-appropriated state agencies. As a result of this classification and transportation funding disparities at the state level, the ports have limited access to funding. Being able to leverage federal funding opportunities allows the ports to maximize their contributions to address a growing list of critical port infrastructure needs. As

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<sup>19</sup> [2022 Annual Report](#). Oklahoma Department of Transportation.

shown by the previously mentioned \$302 million USACE critical infrastructure backlog, existing levels of funding are not adequate to maintain the safe and efficient use of this marine corridor.

This Project is part of an ongoing effort, since the formation of a legislatively created Port Task Force in 2015, at the state level to address the need for transportation funding related to waterways infrastructure. Port Muskogee has a proven track record of leveraging PIDP grant funding to secure additional investment. The port's successful 2022 PIDP Waterfront Recovery and Resiliency project leveraged the \$23.9 million grant award to secure an additional \$10 million investment from the Oklahoma State Legislature in an October 2022 special session. Tulsa Ports has a similar record, leveraging a \$22.3 million Economic Development Administration (EDA) grant to secure \$14 million in state funding and a \$6.1 million DOT INFRA grant to secure \$600,000 from ODOT. Both ports have previously leveraged local match to generate additional funding commitments from private entities.

### Port Resilience

A key purpose of the Project is to improve port resilience to high water or flooding events and potential port closures – whether caused by the cascading impacts of climate change or a human-induced event such as a barge coming loose and damaging waterway infrastructure. The unsafe conditions of mooring infrastructure and gangways currently pose an unnecessary risk of injury and loss of life to port workers as previously described in Safety; risk of infrastructure damage; and risk of closing the waterway completely for weeks or months, with the potential failure bottlenecking supply chains and costing hundreds of millions of dollars. Each time a vessel accesses a damaged mooring point, there is a risk a barge will come loose and damage waterway infrastructure. **During the 2019 flood, existing infrastructure was unable to safely anchor barges.** The event was devastating for ports and industries along the MKARNS. The waterway reached record river stages and elevations, with flows of more than 675,000 cubic feet per second (cfs), as compared to Port Muskogee's average 8,000 cfs. The existing anchorage system has not been changed since it was designed in the 1970's, when the current flooding risks at the ports were not yet imaginable. During this historic flood, **two barges at Port Muskogee broke free and struck the Webber's Fall Lock and Dam, causing \$266 million in losses due to a 104-day closure of the waterway,** repairs for the lock and dam, and dredging to recover the sunken barges. Hundreds of other barges were at-risk during this flood event because the deadman anchors and other fixed mooring structures were up to ten feet beneath the water's surface. The lock and dam are not the only critical infrastructure in the immediate port vicinity. Significant damage to the US 62 bridge crossing the waterway in Port Muskogee would require closure of the waterway for approximately four months, cost over \$20 million in repairs, and require a ten-mile detour impacting residents and businesses.

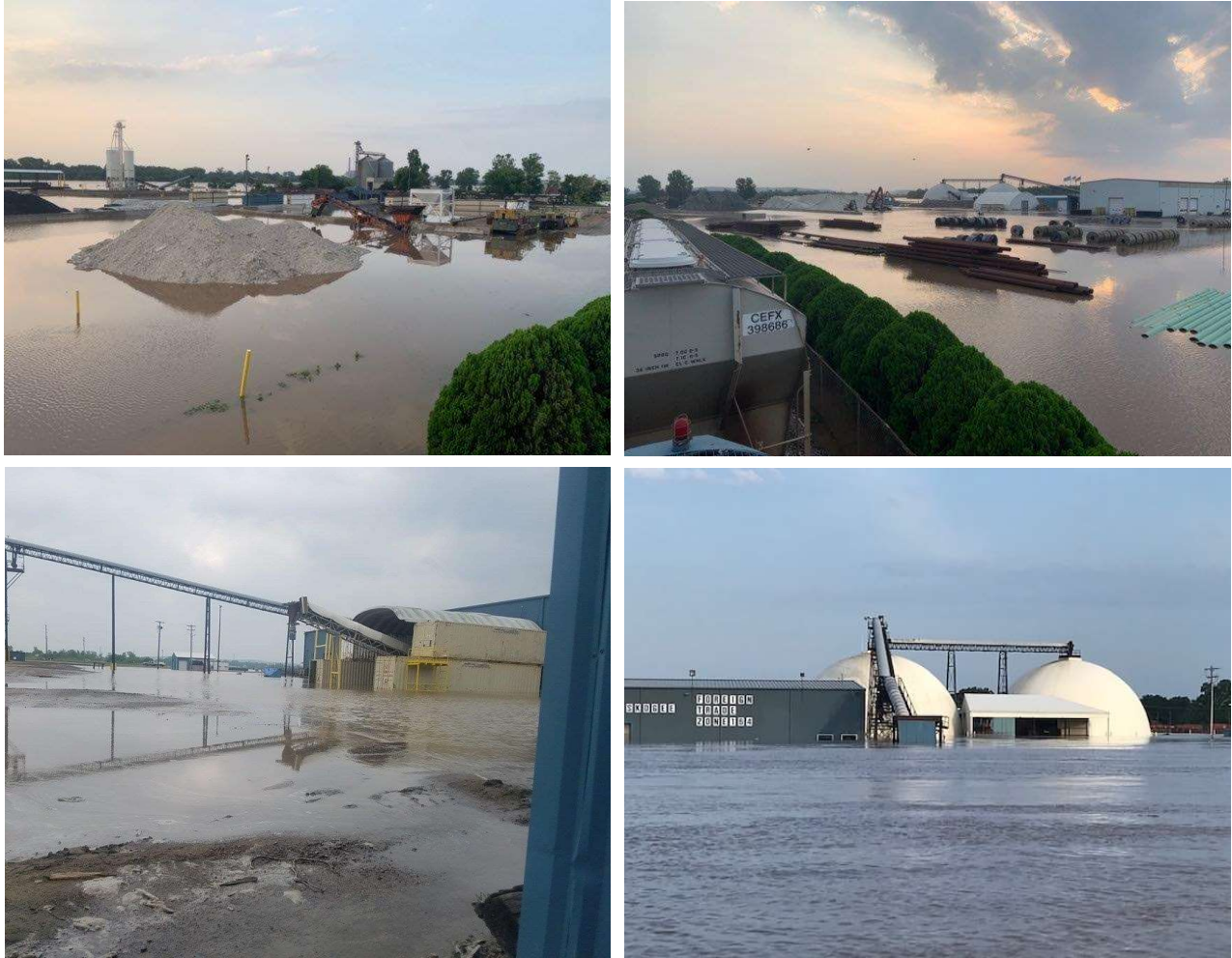


Figure 9. Photos from Port Muskogee showing the damage from the 2019 flood.

The Project’s design solution will improve port resiliency to these risks, considering recommendations by USACE for proper tie down infrastructure on navigable rivers to properly secure both loaded and unloaded barges. With an average two million short tons handled per year at TPOC, maintaining the existing level of service, along with supporting a forecasted growth of 35% over the next 25 years, becomes incredibly challenging if barges cannot safely tie off.

The alternative fueling project requiring the two new dolphins at Port Muskogee, which is itself a form of resiliency by providing fuel operations, supports Federal sustainable energy initiatives and the Oklahoma State Energy & Environment Plan, drafted in 2021, by “fostering a climate where new technologies and alternative fuels can drive environmental change.”<sup>20</sup> Ensuring the MKARNS remains functional in Oklahoma – a driving purpose behind the Project – means ensuring critical goods like food, fertilizer and building supplies reach our communities quickly and affordably, in addition to ensuring reliable employment for port employees and longshore labor.

<sup>20</sup> [Oklahoma State Energy & Environment Plan](#), 2021.

As mentioned throughout this application, these ports are critical to commerce in Oklahoma, the US, and abroad for a variety of goods and materials, including building materials, iron, steel, chemical fertilizer, and soybeans. Mooring infrastructure in a state of good repair enables the ports' basic maritime functionality, providing for strong supply chains and supporting over 9,000 good-paying jobs. According to a study published by the Texas Transportation Institute, the capacity of a loaded covered hopper barge carrying wheat carries enough product to make almost 2.5 million loaves of bread, or the equivalent of one loaf of bread for almost every person in the state of Kansas.

In addition to the risk mitigation strategies and resiliency described above, this project creates resiliency by protecting key freight assets from the very real risks of natural disasters in the region. These climate risks were described earlier but must be emphasized. Precipitation changes, high temperatures and drought are likely to increase the severity, frequency and extent of wildfires, which in turn will exacerbate flood risks through landscape change.<sup>21</sup> Rainfall during the wettest days of the year is likely to continue increasing, further increasing flooding and causing significant variability in river flows.<sup>22</sup> These ports are geographically well-positioned for the efficient movement of freight, but also geographically exposed to extreme climate events. Investing in resiliency at these ports ensures operational capacity in the likely event of natural and human-induced incidents.

## Selection Considerations

### Climate Change and Sustainability

TPOC and Port Muskogee have seen the effects of climate change. For these ports, disruptive, severe weather events exacerbated by climate change are not hypothetical – they can happen without much notice and cause extreme devastation. Removing and replacing mooring dolphins with structures that have adequate height to withstand a 100-year storm event will improve the safety of barges and vessels attached to these structures during high water events, supporting the Federal priorities included in Executive Order 14052.

According to the USDOT Equity Explorer tool, the area immediately surrounding Muskogee County Tract 4, Port Muskogee ranks 94th in social vulnerability and 49th in climate & disaster risk burden specifically ranking in the 73rd percentile for annualized disaster losses due to climate related hazards such as floods, hurricanes, and severe weather events as defined by FEMA.

In consultation with Metropolitan Planning Organizations (MPO) and other representatives of the transportation sector, including the ports, ODOT developed the [Oklahoma Carbon Reduction Strategy](#) in the fall of 2023 utilizing requirements and guidance of the federal Carbon Reduction Program (CRP), established through the Infrastructure Investment and Jobs Act (IIJA). The Carbon Reduction Strategy points to encouraging the increased use of the MKARNS system as a

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<sup>21</sup> [What Climate Change Means for Oklahoma. Environmental Protection Agency.](#) August 2016.

<sup>22</sup> Ibid.

significant mode for freight movement in order to reduce the amount of trucking freight and support transportation emissions reduction.

Additionally, ODOT is coordinating with the Oklahoma Department of Environmental Quality (DEQ) in a federally funded effort to quantify the state's greenhouse gas (GHG) reduction potential through development of a GHG inventory, emissions projections, and GHG reduction targets and goals. A statewide Priority Action Plan (PAP) to reduce statewide emissions was developed in February 2024. Tulsa Ports participated in a summit hosted by the Indian Nations Council of Governments (INCOG – serves as the MPO for the seven-county region around Tulsa, OK) to gather input in development of the Plan (which will serve as the state's Climate Action Plan) and shared plans including the Mooring Modernization project to improve the MKARNS and reduce mobile emissions through use of waterborne transportation instead of mobile on-road transportation.

Emissions inventories were developed as part of the plan, by sector and county, providing both ports a starting point for understanding their own baseline emissions. A Comprehensive Action Plan (CAP) is anticipated to be developed in 2025, to establish strategies that reduce emissions across all sectors.

The ports considered the data in the following section on environmental justice and the prevention, response and recovery from natural disasters to deliver a Project responsive to the unique climate risks they face.

### *Planning Activities*

TPOC and Port Muskogee are major employers in their communities and want to be good neighbors, driving economic development, improved quality of life and resiliency for communities along the inland waterway network. The results of a preliminary equity assessment for the Project are detailed in this section and under Equity and Justice<sup>40</sup>. While the Project is not included in a climate action plan or emissions inventory, the MKARNS Barge Safety & Efficiency Improvement Project will significantly reduce port emissions over the coming decades by restoring a state of good repair for critical infrastructure and preventing costly – in terms of both economic impact and the resources/materials required for repairs – infrastructure damage.

The ports, through the use of DOT's Disadvantaged Census Tract Tool, EJScreen, and CEJST, have collected demographic data related to environmental justice and emissions exposure in their surrounding communities. Rogers County Tract 504.08 at TPOC and Muskogee County Tract 4 are both HDCs that also experience transportation, health, economic, and environmental disadvantages. The Port Muskogee census tract **is at or above the 95<sup>th</sup> percentile for asthma, diabetes, heart disease, poverty, low income, and in the 99<sup>th</sup> percentile for low life expectancy**: the average life expectancy is 67.8 years, as compared to the national average of 76.1. The ports are located in Muskogee Creek and Cherokee tribal jurisdictional areas. Tribal populations in Oklahoma face a cancer mortality rate 1.5 times higher than the national average.<sup>23</sup>

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<sup>23</sup> [Native American Community Outreach and Engagement](#). Stephenson Cancer Center, OU Health.

Efforts to improve these health, climate and environmental justice indicators are of critical importance to the ports. As mentioned, barges have the smallest carbon footprint among other modes of freight transportation. To move an identical amount of cargo by rail generates 30 percent more carbon dioxide than barge; the same amount of cargo by truck generates 1000 percent more carbon dioxide. Without the Project, the northern portion of MKARNS is at high risk of economic disruption, extended waterway closures caused by unsafe mooring infrastructure –resulting in reduced operational capacity that could lead to a share of modal switch to rail and truck. The tonnage of one 15-barge tow would require either 216 rail cars or 1,050 large semi tractor-trailers, significantly increasing emissions and pollution, as well as expenses and shipping time. The Project helps keep costs low for energy, manufactured goods, and food for consumers in Muskogee and Tulsa, where 24 and 18 percent of residents are in poverty, respectively.

On the heels of the 2019 historic flood event, improving resilience to high water and flooding are key priorities for the ports. In 2021, Port Muskogee conducted a Waterfront Infrastructure Assessment which found the port’s infrastructure to be highly susceptible to flooding during large rain events. Many different areas within the port are below the 100-year flood plain, leading to flooding in the area during rain events. The Assessment recommended improvements to Port Muskogee’s waterfront, among other infrastructure at the port, that the port included in its successful 2022 PIDP application. Findings from that effort as well as a Mooring Dolphin Repair and Replacement Study completed for TPOC in early 2019 were used to inform this Project’s design.

Research from a team of Oklahoma University and National Oceanic and Atmospheric Administration researchers recently found that future rain systems in the state will cover nearly twice the area they are today, scaling the importance of the team’s previous findings that water levels during flash floods will rise faster and higher than before.<sup>24</sup> The modernized mooring designs adopted in the Project are consistent with the Federal Flood Risk Management Standard and will allow safer, more efficient height adjustments as water levels rise and fall.

The Project components are driven largely by tenant and user feedback, especially regarding poor state of repair and unsafe conditions. The community engagement plan for the Project and other environmental justice considerations are further detailed in the following section on Equity and Justice<sup>40</sup>.

### *Project Elements*

The planning considerations above informed the design of both Project components, which incorporate elements intended to continue and increase the use of the more energy efficient waterborne transportation through avoiding diversion to truck, reducing fuel consumption and emissions and improving air quality. The Project will avoid over 240,000 one-way truck trips and 4,800 one-way train trips over its 20-year life, resulting in avoidance of approximately 169,292 metric tons of CO<sub>2</sub> in alignment with the U.S. National Blueprint for Transportation

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<sup>24</sup> Wallis, Beth. [Oklahoma, NOAA researchers: Climate change will cause extreme flooding to become more widespread, frequent, unpredictable](#). StateImpact Oklahoma, National Public Radio. October 14, 2022.

Decarbonization's strategy to reduce GHG emissions through use of more efficient modes. The mooring infrastructure will also allow for quicker docking processes and reduce the dwell time of vessels waiting to use the waterway.

As mentioned in Port Resilience, inland and coastal ports alike will need to reconsider the design of their mooring structures as climate change continues to raise water levels and increase the frequency and severity of flooding. Through this Project expanding on successful USACE precedent, the ports can further accelerate the replacement of outdated mooring structures with updated designs that better protect and secure critical infrastructure during natural disasters. **A secure tie down method is important to reduce the risk of loss of goods to the water.** As mentioned, chemical fertilizer comprises a major share of commodities shipped on the MKARNS and is an environmental hazard to fish and other wildlife inhabiting the river if a barge were to come loose. Nutrient pollution, also known as eutrophication, can cause extreme algae growth, leading to low levels of oxygen in the water and killing other plants and aquatic animals. The Project will prevent these adverse environmental impacts to water quality and wetland habitat.

The MKARNS in Oklahoma provides clean energy benefits to approximately 700,000 end users. There are two hydropower plants in Oklahoma that include a total of seven power-generating units. Hydroelectricity is a key contributor to the quality of life for residents and businesses located in the Project area because it provides efficient, low-cost electricity to users. Operability of the MKARNS system is vital for Oklahoma's hydroelectric plants to continue to provide energy for local users that rely on the plants for jobs and to provide power to where they live, work, and play.

### Equity and Justice<sup>40</sup>

This Project makes a significant contribution to Justice<sup>40</sup>, as both census tracts included in the Project area are historically disadvantaged communities within tribal jurisdictions that will directly benefit from the Project improvements. As demonstrated in the Benefit Cost Analysis (BCA), it is anticipated the existing mooring infrastructure will no longer be useful in 2027, according to the Infrastructure Reports, resulting in a diversion of barge traffic to truck and rail. This modal diversion reduces pollutants over the life of the project with a value of over \$26.2 million (NPV) for these two disadvantaged communities, with anticipated reductions of 169,212 metric tons of CO<sub>2</sub>, 1,917 metric tons of NO<sub>x</sub>, 45 metric tons of PM, and 81 metric tons of VOCs.

As noted by the USDOT Climate and Economic Justice Screening Tool (CEJST), the area immediately around Muskogee County Tract 4, Port Muskogee and Rogers County Tract 504.08, Tulsa Port of Catoosa is a disadvantaged area in five categories: climate change, clean energy and energy efficiency, sustainable housing, health burdens, and workforce development. Muskogee County Tract 4 experiences worse health outcomes (life expectancy, heart disease, asthma, diabetes) than 96% of the country and has a lower annual median income than 98% of the country at \$44,166.



Despite the project’s contribution to supporting the substantial climate benefits that barge transportation delivers when compared to other modes of transportation, the proposed project is not incorporated in a state, county, or local climate action plan. However, as previously discussed, both ports, through coordination with the Indian Nations Council of Governments (INCOG - the federally recognized MPO encompassing TPOC) and ODOT, have participated in development of the state’s first climate action plan (DEQ’s Comprehensive Action Plan) and will continue to advocate the use of waterborne transportation to reduce mobile emissions through improvements to the MKARNS such as this Mooring Modernization project.

### *Economic Development and Collaboration with Rural and Tribal Partners*

Muskogee is located within the historic tribal boundaries of the Cherokee and Muscogee Nations, both of whom submitted letters in support of the Project. The Five Civilized Tribes Museum in Muskogee honors the unique history in Oklahoma of these two tribes in addition to the Chickasaw, Choctaw, and Seminole. In 1985, the Port entered into a lease agreement with the Cherokee Nation of Oklahoma, approved by the Department of Interior Bureau of Indian Affairs, to use the riverbed property in the navigable portion of the Arkansas River in Muskogee County. Currently, the Port has adopted a Workforce Development Plan 2022-2023 aimed to increase employment of underrepresented groups. The Port provides job seeker and employer resources to build skills and create job stability. The Port is also part of a Workplace Stability Pilot Program that includes the Indian Capital Technology Center to create curriculum that will meet the needs of employers and connect them with underrepresented talent pools.

TPOC is located adjacent to Cherokee Nation tribal jurisdiction. The port and local freight operators, among other parties of interest, provided input on INCOG’s Freight Movement Plan within the Transportation Management Area and the Long-Range Regional Transportation Plan (RTP).<sup>25</sup> Tulsa Ports applied the environmental justice screening method used for the RTP to plan for the tow boat dock to better understand potential project impacts. These Project analyses align with goals developed by the Tulsa Equality Indicators project, a partnership between the City of Tulsa and local non-profit Community Service Council.

### *Providing Good Jobs and Clean Air for Disadvantaged Communities*

The preliminary equity assessment, in part described in Climate Change & Sustainability, finds the Project will significantly reduce emissions in two HDCs. As described in the prior section and shown in Figure 10, the communities around the ports experience a high incidence of negative health outcomes like diabetes, heart disease, and cancer compared to the national average, with people of color bearing a much greater share of the burden: **Oklahoma ranked 46<sup>th</sup> in the nation for minority health equity** in 2021. The HDC and APP at Port Muskogee (Muskogee County, OK Tract 4) will accrue the greatest emissions and resilience benefit with the largest quantity of mooring structures being replaced. Flood risk reduction and increased job

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<sup>25</sup> [Connected 2050 Regional Transportation Plan](#). Indian Nations Council of Governments – Metropolitan Planning Organization.

reliability will benefit all communities surrounding the ports and rivers. Avoiding modal diversion improves safety and generates significant fuel and emissions reductions. Lower costs, faster travel times and greater availability of everyday goods will benefit communities across the state and country.

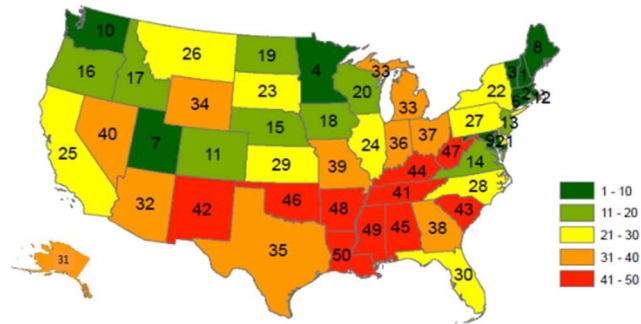


Figure 10. Oklahoma ranked 46th in the nation for minority health equity in 2021. Map by the [Oklahoma State Department of Health](#).

*Community Participation Strategy*

Tulsa Ports and Port Muskogee plan to undertake a meaningful public involvement process for the Project. This process will engage tenants, industry, the workforce, nearby residents, and other parties of interest early in the Project to allow for meaningful dialogue and input at the stage when changes can be made to the Project. Engagement will continue through construction and operation.

Port Muskogee collaborates with the City of Muskogee Foundation (the Foundation) to connect residents, visitors, and businesses to opportunities to ensure a thriving economy for current and future generations. The Foundation developed a community economic development strategy for the City in 2021 called Muskogee Forward. As part of the planning process, the Port coordinated discussions with parties of interest on strategies to recruit new businesses, attract and retain talent, develop the local workforce, and expand existing industry and business sectors. A key recommendation in Muskogee Forward is launching an accelerator program for area startups to receive technical assistance and potential investment while growing their businesses, giving special consideration to cohorts of entrepreneurs that are typically underrepresented in funding opportunities for startups, including in historically disadvantaged communities.

*Workforce Development, Job Quality, and Wealth Creation*

Diversity, equity, and inclusion are important to the Project’s design and execution. Port Muskogee and TPOC’s combined 3,000 acres of the industrial park support the employment of 11,000 port-related jobs statewide. The ports’ positions as economic development engines are essential assets to equitable regional growth strategies. Port Muskogee and Tulsa Ports view this Project as a means to address gender, racial, and socio-economic imbalances in the regional economy.

Many programs exist in both Rogers and Muskogee counties to educate, train, attract, and retain local workers to remove barriers and improve the economic standing of these disadvantaged communities. Bridges Out of Poverty in Muskogee focuses on empowering those in poverty to investigate the barriers that keep people from getting ahead and educate the entire community on the complexities of poverty. Indian Capital Technology Center is a technical school, preparing youth and adults to become productive and economically sufficient.

Muskogee’s stagnant population trends combined with low percentages of adults with educational attainment at a bachelor’s degree or higher create significant challenges for regional economic development opportunities. Roughly one in four of the City’s residents live below the federal poverty line. The MCCPA has an active workforce development effort and full-time staff devoted to ensuring that businesses located at port facilities and industry within City of Muskogee and Muskogee County have the resources they need to grow and expand. The Muskogee County Center of Workforce Excellence (CWE) in manufacturing focuses on deploying resources, leveraging existing programs and aligning curriculum with local and regional employment demand. The Muskogee County CWE brings together the Muskogee City-County Port Authority Industrial Development office’s grassroots workforce initiatives (including future pipeline and current workforce) and community and educational partners to formalize a comprehensive state-approved workforce plan.

As an authority of the City of Tulsa, Tulsa Ports will be using the City of Tulsa’s economic development incentives policy for guidance in establishing policies for diversity, equity, and inclusion. In this project, Tulsa Ports will target disadvantaged business entity (DBE) contracting of 10% in construction, with early outreach to ensure participant awareness and preparation. Tulsa Ports, in partnership with Partner Tulsa, will participate in online training exercises on how to prepare bid documents. In addition, Tulsa Ports will conduct a mandatory prebid meeting and site walk for interested prime contractors to provide an opportunity for DBE businesses to meet and interact with general contractors.

Both ports take their role as economic and workforce development drivers in their communities seriously and are committed to continuing and improving these efforts through the life of the project and beyond. In particular, they are committed to improving participation of disadvantaged workers in the job opportunities created through this project in both its construction and the indirect jobs that will be created due to tenant opportunities and future development created.

Metrics and measurable goals for the Project are as follows:

- Port Muskogee’s goal is to implement strategies and capture performance data consistent with the Port Muskogee Workforce Development Plan 2022-2023
- Both ports will work to expand existing programs for economic opportunity:
  - Expand compatibility of Tulsa Ports Port-Ability workforce development program with other regional workforce training programs including Tulsa Tech and Northeast Technology Center
  - Implement findings from the Workplace Stability Pilot Program Port Muskogee is participating in with the Indian Capital Technology Center to create curriculum that meets employers’ needs and connects them with underrepresented talent pools

## Project Readiness

### Technical Capacity

In accordance with Oklahoma state statute (82 O.S. § 1106), Port Muskogee and Tulsa Ports have the ability to carry out the Project given their power and authority to construct, reconstruct and otherwise contract concerning docks or transportation facilities within their jurisdiction and to apply for, receive, and participate in any grants from the State of Oklahoma or from the United States of America.

Port Muskogee and Tulsa Ports both have a strong history of successfully implementing federally funded maritime projects and working with the federal government, including USDOT, to undertake both maritime and non-maritime projects.

- In 2015, Tulsa Ports was awarded a \$6.4 million USDOT TIGER Grant for the rehabilitation of the main dock and adding a gantry crane with an over 100-ton capacity. This project was successfully closed.
- In 2018, Port Muskogee was awarded a \$5.7 million BUILD Grant for railroad access improvements, modernization of an existing highway/rail crossing on Oklahoma State Highway 16, and construction of 9,746 feet of new railroad tracks to reverse the direction and improve the interchange with the Union Pacific Railroad (UP) and other Port industries.
- In 2020, Tulsa Ports was awarded a \$6.1 million USDOT INFRA Grant for railroad improvements and new construction along a three-mile industrial lead track at its Port of Inola industrial property.
- In 2022, Port Muskogee was awarded a \$23.96 million PIDP Grant for the reconstruction of the wharf and on-dock rail and the construction of a new flexible-use warehouse and heavy-lift dock.

### Project Schedule

The Project will be constructed in a manner that minimizes any disruption to the ports' day-to-day activities but will also be sequenced such that any cost savings due to combining material shipments or limiting the contractor mobilization cost, can be recognized.

As shown in Figure 11, the project is anticipated to take approximately 39 months, beginning in the 4<sup>th</sup> Quarter of 2024 and ending in the 4<sup>th</sup> Quarter of 2027. The anticipated schedule accounts for weather, such as the rainy season, as well as holidays. Work will be conducted concurrently at the two separate locations.

### Risk Mitigation

Each port's engineers will conduct a thorough risk review of the Project as part of its final engineering design. This review can be expected to provide an analysis of the risks that include but are not limited to permit delays, procurement delays, technical challenges in design or construction, environmental uncertainties, and potential increases in project costs. When appropriate, the ports will provide this risk review to MARAD. It is anticipated the Risk Review Port Muskogee has developed for the Waterfront Recovery and Resiliency Project will also inform development of the risk review for the Project components at Port Muskogee.

# MKARNS Barge Safety & Efficiency Improvement Project

PIDP 2024

	2024		2025				2026				2027			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Grant Award														
Grant Agreement														
Stakeholder Outreach														
	ENGINEERING													
Permitting														
Environmental Permitting (NEPA)														
Prepare Bid Documents														
Construction Support														
	BIDDING													
Bidding														
	CONSTRUCTION													
Notice to Proceed														
Subcontracting/Mobilization														
Shop Drawings														
Demolition														
Fabricate Piles														
Dolphin Pile Installation														
Fender Installation														
Close-out/Demobilization														
Project Completion														

*Figure 11. MKARNS Barge Safety & Efficiency Improvement Project Schedule.*

## Domestic Preference Plan

ODOT and the ports understand Build America, Buy America (BABA) requirements of 2 CFR Part 184 and are tracking Office of Management and Budget guidance and have adopted policy manuals outlining compliance with BABA. Contractors will be required to certify compliance, as a condition of award.

The only iron and steel components of the project are steel monopiles and all steel will be melted in the United States. The fendering system is a manufactured product and all manufacturing processes for all elements comprising the system will occur in the United States. There are no compliance challenges expected with construction materials. All manufacturing processes for concrete, which is covered under Section 70917(c), from blending to delivery will occur in the United States.

Port Muskogee and Tulsa Ports have carefully assessed and documented the potential Project risks and identified mitigation strategies for each:

*Table 5: Project Risks and Mitigation Strategies*

Project Risk	Mitigation Strategy	Risk Category
Financial Risk, related to commitment of match	Port partners have committed sufficient funds for the local Project match. The Ports have historically been able acquire grants to fund port projects and even leverage federal funding to secure state funding for projects.	Low
USACE Coordination	DOT and the port partners have closely coordinated with USACE and will continue to throughout the design and construction process. Permits for the Project will be obtained through the U.S. Army Corps of Engineers.	Low

<p align="center">Environmental Risk</p>	<p>As a port improvement project, an environmental assessment (EA) is required; however, there are minimal environmental risks and/or resource impacts because the Project includes replacement of older existing mooring infrastructure in the same sites. The Project would also require State Historic Preservation Office (SHPO) review and concurrence with the adjacent Indian Nations. Flood events are always a risk to port operations as displayed by the historic 2019 flood and even less significant rain events. The construction of a new levee as part of Port Muskogee’s Flood Protection Improvement Project, as well as additional stormwater mitigation improvements, will help mitigate this risk to the Project.</p>	<p align="center">Medium</p>
<p align="center">Cost of Materials</p>	<p>The Russian invasion of Ukraine has created an increase in the cost of construction and materials. Completing this Project in a timely fashion will ensure the least amount of impact to costs over time.</p>	<p align="center">Medium</p>
<p align="center">Potential Contamination</p>	<p>Waterfront construction poses the risk of possible contamination of sediments into the water during the construction of the mooring dolphins. The necessary preventative erosion and sediment control measures, such as turbidity curtains, will be used to mitigate this issue.</p>	<p align="center">Medium</p>

**Environmental Risk**

An Environmental Assessment (EA) is required for the Project because the Oklahoma Department of Transportation’s programmatic language for categorical exclusion does not include a provision for mooring infrastructure. Construction will occur in the waterways at both ports, which will require coordination with the Department of Transportation Maritime Administration (MARAD) and United States Army Corps of Engineers (USACE).

Currently, no state or Federal environmental reviews (including NEPA) have commenced for the mooring dolphins at TPOC, and permits have not been issued from any regulatory authorities to analyze these improvements. Tulsa Ports owns all property and right-of-way where the Project will be constructed. The Project is consistent with all zoning and land uses and is not controversial. On May 5, 2022, Tulsa Ports contacted MARAD to inquire about the Project’s eligibility for categorical exclusion under the U.S. Maritime Administrative Order No. 600-1. As a portion of the Project will be constructed in the water at the slack-water harbor, Tulsa Ports was informed that MARAD does not have a Categorical Exclusion for such projects. Therefore, upon the obligation of funds, Tulsa Ports will undertake a full EA for the Project in accordance with Federal guidelines. Environmental review is anticipated to take approximately 12 months to complete.

Currently, the Environmental and Permitting (NEPA) process for the successful 2022 PIDP grant awarded to Port Muskogee is underway and will inform review for the Project components at Port Muskogee included in this application. A minimum Environmental Assessment is anticipated, including compliance with the National Historic Preservation Act and Endangered Species Act. However, it is anticipated that the Port will apply for and obtain all necessary permits prior to construction. The Project schedule accounts for the typical time period for acquiring these permits. Port Muskogee is prepared to begin this process immediately upon award and doesn’t foresee any delays associated with these permits.

As previously mentioned, the Project components will be sequenced such that any cost savings due to combining material shipments, or limiting the contractor mobilization cost, can be recognized.

Environmental Permits and Reviews

All construction work on the MKARNS is required to obtain a General Permit (GU) from USACE, which is controlled by Section 404 regulations of the Clean Water Act. The Regional GU permit application requires basic information about the Project, including the nature of the construction activity, project purpose, and the amount of material that will be discharged into the water. The process for the work at Port Muskogee has already begun since it is covered by the scope of work associated with the 2022 PIDP-funded Waterfront Recovery and Resiliency project. The Environmental Permitting process for the work at Tulsa Port of Catoosa has not yet been started but is anticipated to begin upon grant award in Q4 2024. Permits at both ports are anticipated to be secured by Q2 2025 with NEPA complete by Q3 2025 as shown in Figure 11 on page 27.

State and Local Approvals

Port partners involved in this project, Tulsa Ports and Port Muskogee, are committed to improving infrastructure conditions along the MKARNS to increase safety, reduce maintenance costs, and ensure operability of the waterway. The USACE Tulsa District provided a letter in support of the Project which identifies that the Project directly aligns with and maintains their mission to support and improve commercial navigation on the MKARNS. The port partners work closely with regional organizations and local municipalities, businesses, and freight stakeholders. Several entities have shown their support for the Project by providing letters of support including elected officials, Muskogee City and County, Rogers County, and Cherokee and Muscogee Nations. Port Muskogee is located within the historic tribal boundaries of the two tribal nations. The Cherokee Nation, in fact, owns the bed and banks of the Waterway at Port Muskogee and in 1985, the Port entered a riverbed use agreement which authorized use of the riverbed property.

Determinations

<p>1. The project improves the safety, efficiency, or reliability of the movement of goods through a port or intermodal connection to the port.</p>	<p>The Barge Safety &amp; Efficiency Improvement Project will rebuild critical infrastructure at the Port of Catoosa and Port Muskogee improving safety, efficiency, and reliability of movement of goods through each of the ports. Removing and replacing the existing mooring dolphins at each of the ports will increase safety by reducing the risk of a barge becoming loose; improve efficiency by increasing the ports’ capacity to hold multiple barges while they load and unload, improving barge maneuverability; improve efficiency and reliability by decreasing congestion at each port and preparing to accommodate the expected increase in demand through the Oklahoma MKARNS segment.</p>
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<p>2. The project is cost effective.</p>	<p>The Benefit Cost Ratio (BCR) for the Project is 3.6, with an NPV of \$42,162,438.</p>
<p>3. The eligible applicant has the authority to carry out the project.</p>	<p>Port Muskogee and Tulsa Ports are the respective owners of each ports’ assets described in the grant application and have the authority to receive state/Federal grants and carry out the Project in accordance with Oklahoma state statute (82 O.S. § 1106). The Project is within the Muskogee City – County Port Authority (Port Muskogee) and City of Tulsa – Rogers County Port Authority (Tulsa Ports), over which the ports exercise jurisdiction and/or geographic responsibility as provided at 82 O.S. § 1105.</p>
<p>4. The eligible applicant has sufficient funding available to meet the matching requirements.</p>	<p>Local match funding will provide 27.4% in contributions, with Port Muskogee providing \$4 million and Tulsa Ports providing \$1 million. Both ports are committed to funding any potential cost overruns as demonstrated in the attached letters of commitment and MOU.</p>
<p>5. The project will be completed without unreasonable delay.</p>	<p>The schedule provided in the application allows sufficient time for permitting, bidding, design, and construction at each of the ports. Based on the schedule provided in this application, the Project is expected to take approximately 39 months.</p>
<p>6. The project cannot be easily and efficiently completed without Federal funding or financial assistance available to the project sponsor.</p>	<p>As non-appropriated state agencies, both ports have very limited funding options and require support to deliver the Project’s necessary infrastructure improvements, which will allow port operations to continue safely and efficiently. With the \$302 million USACE backlog of critical MKARNS infrastructure – defined as having a 50% chance of failure in the next five years – only growing, Federal funding is needed immediately to preserve waterway transportation through the nation’s heartland. Outdated infrastructure combined with an increase in demand through the Oklahoma segment of the MKARNS will only inundate port operations, exacerbating safety issues, causing delays, and increasing both cost and emissions.</p>



## List of Attachments and Supporting Documents

- I. Project Narrative
- II. BCA Narrative
- III. BCA Spreadsheet
- IV. Funding Commitment Letters
- V. Project Engineering Drawings
- VI. Letters of Support