

Packer Avenue Marine Terminal Berth and Crane Rail Enhancements

Funding Opportunity: #DT0559-16-RA-TIGER8



Type of Project:	Maritime- New Capacity
Location:	Port of Philadelphia Philadelphia, PA
Total Project:	\$39,000,000
Local Match:	\$22,000,000 (56%)
Grant Request:	\$17,000,000



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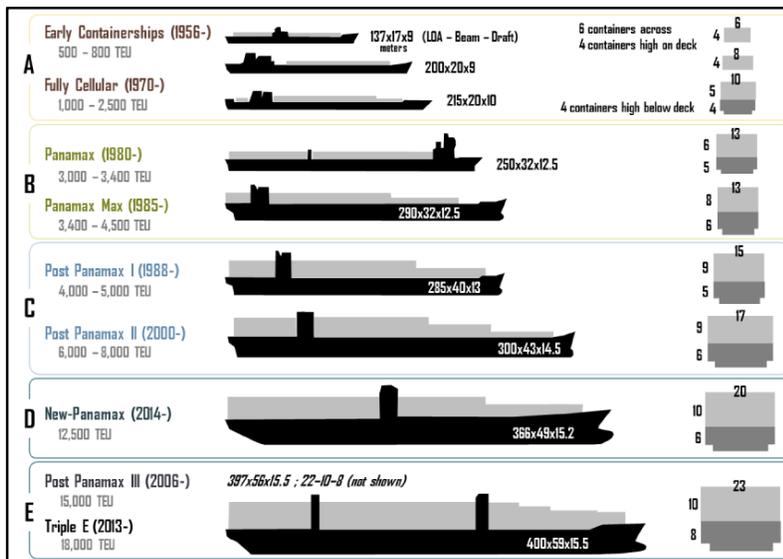
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1 Executive Summary

The Philadelphia Regional Port Authority (“PRPA” or “Authority”) is an independent agency of the Commonwealth of Pennsylvania, charged with enhancing waterborne trade and commerce in the Philadelphia area. In addition to managing an extensive international marketing program and overseeing the strategic growth and development of the Port of Philadelphia, the PRPA owns a portfolio of competitively-located real estate, including eight port facilities which are leased to privately-owned terminal operating companies.

The Packer Avenue Marine Terminal (“PAMT” or “Terminal”) is the largest marine terminal in the Port of Philadelphia. In the 2015 calendar year, the facility handled 251,697 container lifts encompassing 407,100 twenty foot equivalent units (TEUs) and a total of 374 container vessels. PAMT, leased to Astro Holdings Inc. (“Astro”), spans 112 acres and has 3,800 linear ft. of berthing space, including six berths with one being a Roll-On/Roll-Off (RO/RO) berth. Strategically located within a one day drive of 200 million people, which is approximately 65% of the U.S. population, PAMT is a vibrant economic engine for the City of Philadelphia and the region. The continued availability and efficient operation of this Terminal is vital to many regional industries. However, in order to sustain operations and ready itself for the forecasted market demand, integral upgrades are necessary to the PAMT.

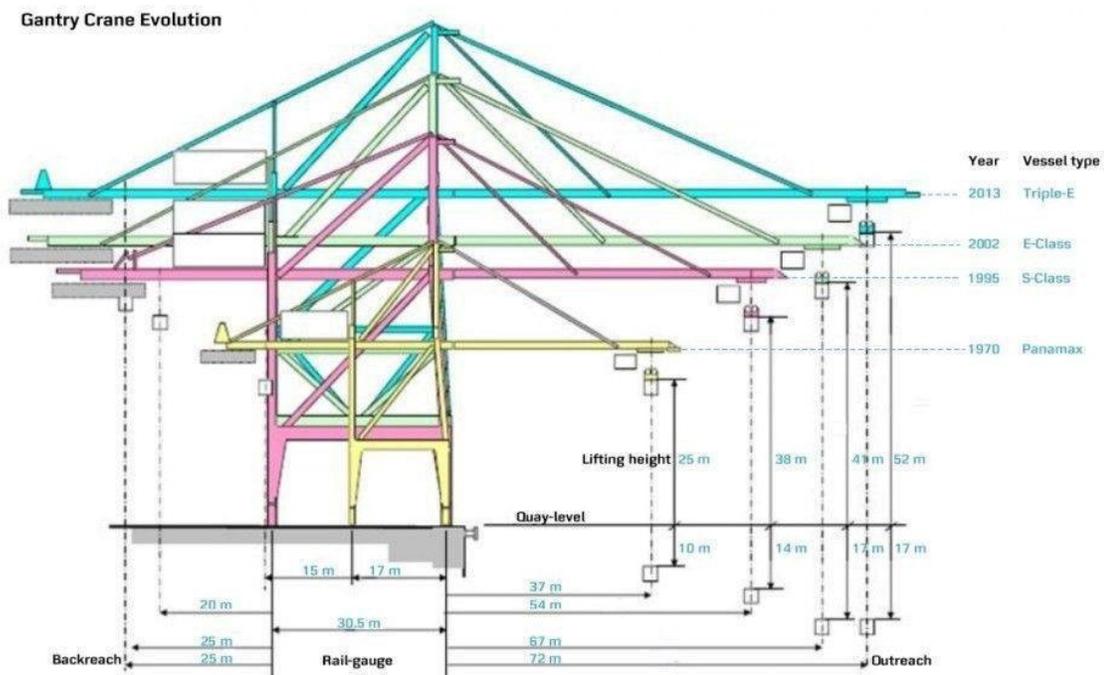


Graphic Source: Ashar and Rodrigue, 2012.

The maritime industry, like most others, is improving with technology advancements. Marine terminal equipment and information systems technologies enable increased productivity and throughput thereby increasing service speeds and lowering cost. Vessel operating and construction technology has a long history of improvement. Technology has enabled vessels to be built larger, to increase their carrying capacity and to operate more efficiently, all reducing overall transportation costs for imports and exports worldwide. As vessel size and carrying capacity increase the need for deeper navigation channels and higher and longer boom cranes continues. In 1985, the average required water depth of the world fleet was 33 feet; in 2004, it was 40 feet; in 2007, it was 44 feet and the trend continues. In the 1980’s and 1990’s, the typical vessel size for a containership was 4,200 TEU (13 containers wide across a vessel); in the 2000’s it was 5,500 TEU (18 containers wide across a vessel); today there are 18,000 TEU vessels (23 containers wide across a vessel) operating with designs available for 22,000 TEU. As transportation technology and services improve, the cost of goods worldwide decrease expediting the growth of the USA’s and global economy.

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The industry is well aware of this trend. The Panama Canal is in the process of expanding its capabilities to accommodate these advancements. The Canal's depth today is 40.5 feet and is in the process of a \$5.25 billion project to deepen to 50 feet enabling longer and wider vessels to transit through the channel. The Federal government and the Commonwealth of Pennsylvania are acting accordingly and deepening The Delaware River's navigational channel from 40 feet to 45 feet. Larger vessels continue to enter deployments on the United States East Coast (USEC). When the Panama Canal expansion project is complete in mid-2016, it is anticipated this trend of larger vessels utilizing the USEC will quicken. Ten years ago, the largest vessel PAMT stevedored was a 4,500 TEU vessel (13 containers wide across), today it is an 8,000 TEU class vessel (18 containers wide across). The market place demands PAMT to provide the same weekly reliable deployment services for the just-in-time inventory management. Containership operators need their larger vessels to be processed through the port just as quickly as their smaller vessels with less cargo. If it is to remain a viable marine terminal in the Port of Philadelphia PAMT needs faster, more reliable and cost efficient cranes.



Graphic Courtesy of APM Terminals

PRPA, in collaboration with Astro, has developed the PAMT Capital Plan to modernize the Terminal, ensuring that PAMT can more efficiently handle current operations and remain competitive for newer/expected port calls. The PAMT Capital Plan consists of six phases and has an estimated total cost of \$456 Million. The terminal operator has taken on the task of completing Phase 1; installation of a new truck gate. The installation was completed in September 2015 for a cost of \$5.7 Million. **PRPA is submitting this TIGER grant funding request to implement the second phase of the PAMT Capital Plan, known as the PAMT Berth and Crane Rail Enhancement Project (“PAMT Enhancement Project”), specifically to:**

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- ❖ **Add structural support to existing crane rail and add a third rail (100' gage) to Berths 2-5;**
- ❖ **Provide the electric infrastructure needed to support the electric cranes & Terminal; and**
- ❖ **Retrofit two existing cranes to accommodate electrical drives.**

Separate from the grant, but essential to the success of the PAMT Enhancement Project is the acquisition and installation of two new electric powered ship-to-shore gantry cranes. Currently, seven rail mounted diesel container cranes are operated at PAMT, however, the H-6 and H-7 Hyundai cranes are carrying 76% of the workload. This is due to the speed, height and efficiency of these two cranes to service the vessels that currently call at PAMT. In order to sustain operational efficiency, the installation of the two new electric powered ship-to-shore gantry cranes must occur prior to the retrofit of the older H-6 and H-7 cranes. The new cranes will then provide service to the existing customer base while the H-6 and H-7 cranes are being converted to electric drives. Additionally, with the expansion of the Panama Canal and completion of the Delaware River Main Channel Deepening Project, larger vessels with greater capacity are expected to call at PAMT. In order to efficiently service this new generation of ships and remain competitive, the acquisition of the new electric powered ship-to-shore gantry cranes, which offer more reliable and efficient operation and a longer reach, is essential to the PAMT Enhancement Project.

The PAMT Enhancement Project clearly aligns with the identified primary selection criteria.

- ❖ **State of Good Repair:** Electrification to H-6 and H-7 cranes will increase the useful life of the cranes. The upgrades will allow for the removal of old and inefficient container handling equipment from the Terminal (The “South” Crane and K-5) and instead, rely on state-of-the-art equipment to service a new generation of container ships. Additionally, the berth strengthening and crane rail upgrades will improve the infrastructure of the pier. Presently, there are operational restrictions in the area on which the two Hyundai cranes operate, due to their weight. The new ship-to-shore cranes will be even heavier. Once Berths 2 -5 are strengthened, they will no longer be restricted to support only Panamax cranes but instead have the ability to handle Post-Panamax and Super Post Panamax cranes, increasing infrastructure reliability and the overall efficiency of the Terminal operations.
- ❖ **Economic Competitiveness:** The conversion of the H-6 and H-7 cranes will reduce crane operating and maintenance expenses, reduce crane down time and reduce fuel costs. The conversion will also increase freight efficiency while reducing overall supply chain costs.
- ❖ **Environmental Sustainability:** Transitioning to electric cranes, as compared to the current diesel-powered cranes, will significantly reduce the need for diesel consumption at the Terminal. The reduction in diesel fuel combustion will in turn reduce air emissions of greenhouse gases, criteria pollutants and diesel particulate matter to the local community.
- ❖ **Safety:** The handling, storage, and combustion of diesel fuel present a potential risk to the terminal workers as well as to the local environment, specifically the Delaware River.

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Electrifying the cranes minimizes this risk because the amount of fuel stored and/or transported on the terminal is substantially reduced. Relocation of cargo to the Port of Philadelphia will also result in a reduction of miles traveled thereby decreasing the number of fatalities, injuries and property damage.

The proposed project has an economic benefit of \$336.3 Million and \$66.1 Million and benefit cost ratio of 3.1 and 9.3 based upon discount rates of 3% and 7% respectively. The total cost of the PAMT Enhancement Project is \$39 Million. PRPA is requesting \$17 Million in discretionary grant funds from the 2016 TIGER program for the upgrades of the PAMT. The remaining \$22 Million, a 56% match, will be provided by the Commonwealth of Pennsylvania and terminal operator.

This is a critical time for the Port of Philadelphia and PAMT. At this point, it is no longer a question of if, but when the PAMT Enhancement Project is implemented. Without the needed upgrades, operations at the PAMT will soon be impacted. The inability to service the larger ships that are anticipated could result in the loss of business, the loss of jobs and the weakening of a major economic engine in our local economy. However, if provided funding assistance to electrify, not only can PAMT sustain its current business and the transportation of important cargo to the region, but it is perfectly positioned to expand business, increase jobs and strengthen its role as a commercial driver in the region.

2. Project Description

2.1 Background

The Philadelphia Regional Port Authority is an independent agency of the Commonwealth of Pennsylvania, charged with enhancing waterborne trade and commerce in the Philadelphia area. In addition to managing an extensive international marketing program and overseeing the strategic growth and development of the Port of Philadelphia, the PRPA owns a portfolio of competitively-located real estate, including eight marine terminal facilities which are leased to privately-owned terminal operating companies.

PAMT, leased to Astro, spans 112 acres and has 3,800 linear ft. of berthing space, six berths including 1 RO/RO berth. In the 2015 calendar year, the facility handled 251,697 container lifts encompassing 407,100 twenty foot equivalent units (TEUS) and a total of 374 container vessels. Seven rail mounted diesel container cranes are operated at the PAMT terminal. In recent years, the only funding spent at PAMT has been for life safety repairs and maintenance repairs, inclusive of paving. Since 2011, the Commonwealth of Pennsylvania has invested approximately \$25 million in deferred maintenance improvements for the PAMT, with an additional \$31 million in ongoing and upcoming maintenance projects.

The PRPA's PAMT is designated as a strategic military port. The Port Planning Orders stipulates that the port is required to make available 40 acres of adjacent land and two 1,000 foot contiguous berths. PAMT has been utilized for numerous military load outs since its

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designation. The crane electric upgrade at PAMT will increase crane reliability and performance for military cargo operations.

2. 2 Project Specifications:

The PRPA is submitting this TIGER grant funding request to: (1) Add structural support to existing crane rail and add a third rail (100' gage) to Berths 2-5; (2) Provide the electric infrastructure needed to support the electric cranes & Terminal; and (3) Retrofit two existing cranes to accommodate electrical drives (collectively, the "PAMT Enhancement Project").

Below are the project sub-components that are proposed to be funded with this grant request.

- ❖ **Berth Crane Rail Enhancement (Total Cost - \$17M; TIGER Funds -\$12M)** - The current marginal berth is 3,000 linear feet. The existing cranes at PAMT are placed on an 83'-6" and a 90' rail gage. In order to maximize terminal operational flexibility and accommodate an increased wheel load imposed by larger cranes and stability considerations PRPA proposes to add a new landside crane rail to support 100' gage. The new standard in crane gage is 100' and in order to procure anything different would substantially increase the project costs and delivery. Furthermore, the addition of the 100' rail will be less disruptive to current operations than modifying the existing 90' rail. This improvement is proposed for the entire 2,400 feet of the berth (berths 2-5). To ensure safe placement of the proposed acquired cranes and to enable the existing Hyundai cranes to realize maximum operating speeds, designed outreaches, and rated load lifting capacity, it is necessary to add additional structural supports to the existing waterside crane beam which will be commonly shared by the 83'-6", the 90' and 100' gage cranes.
- ❖ **Terminal Electrical Upgrades (Total Cost- \$18M; TIGER Funds -\$4M)** - The existing electrical infrastructure at the PAMT supports current facility operations, including a 3.8 million cu. ft. freezer warehouse and 1,860 refrigerated container plug-ins among other electrical demands. This existing electrical system would need to be expanded to accommodate electrified crane operations. The local electrical utility provider, PECO, will upgrade the offsite distribution system to supply a dual feed 13.2kVA service. This would include new underground cables, and a new metered substation. The substation would be placed immediately outside the Terminal.

From the PECO substation a cable run of about 600' to a substation adjacent to the berth needs to be installed. The infrastructure would also include conduit structures, manholes, and a crane-trailing cable trough to transverse the 3,000' marginal berth. The system running along the berth needs to be modified to house trailing cable including vertical and horizontal supporters, roller and cable guides, and a large cable reel system. The planned electrical capacity will be sufficient to accommodate up to 10 electric drive cranes and cold ironing operations for ships to utilize shore power as opposed to their own diesel fuel during auxiliary operation at berth.

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- ❖ **Hyundai Crane Electric Drive Retrofit (Total Cost- \$4M; TIGER Funds -\$1M)** - In 2002, the PRPA purchased two new Hyundai cranes referred to as H-6 and H-7. The cranes are capable of lifting 66 metric tons each. They are currently powered by Cummins KTA50-GP diesel engines which are used to energize the crane. Depending upon the workload, fuel usage varies from 20 gallons per hour to a maximum of 100 gallons per hour. Historically, the terminal operator, Astro, has purchased approximately 153,361 gallons of fuel annually. The existing invertors, main hoist motors, trolley motor and centenary motor would remain and be connected to the new utility supplied electrical power. Additionally, the instrumentation and controls would require modification to accommodate the new changes.

PRPA seeks funding for the PAMT Enhancement Project in order to complete upgrades that will dramatically enhance the efficiency, environmental profile, and intermodal capability of the Port of Philadelphia's largest container terminal, PAMT. PAMT is the only major terminal in the United States using diesel cranes. In recent years, virtually every major port, and even some minor ports, have electrified and/or expanded relying in large part on federal and state funding, including federal funding for the Port of Providence, Port of Lewiston and Port of Duluth. Additionally, TIGER funds have been awarded for projects similar to the project presented before you. To date, the Port of Philadelphia has not received federal funding for this type of upgrade.

In order to maintain volumes and meet the demand forecasted in the chart provided in Attachment 3 (Cost Benefit Analysis), the PRPA and Astro are planning to **purchase two new electric powered ship-to-shore gantry cranes upon project inception**. Though not directly in the scope of this TIGER request, the purchase of two new cranes is essential to the project's success. Crucial to this grant is the reality that we cannot retrofit the Hyundai cranes unless there is an additional set of cranes to service the existing customer base while the Hyundai cranes are out of service. The new cranes will be configured to efficiently handle the larger vessels that are anticipated due to the Panama Canal expansion and completion of the Delaware River Channel Deepening project. The expansion of the Panama Canal is expected to be complete by mid-2016, and the deepening of the Delaware River is now approximately 85% complete and expected to be finalized by 2017. Once the deepening project is finalized, ships with substantially more capacity will require appropriate infrastructure at PAMT in order to continue the transportation of important cargo to the region. The cranes will be designed with electric drives and capable of enhanced productivity. Again, these cranes will need to be acquired and installed prior to the retrofit of the two existing Hyundai Cranes (H-6 & H-7) so not to disrupt current business operations. The cost to acquire and install these cranes is estimated at \$27 million. The procurement and delivery of new cranes takes about two years and time is of the essence. If awarded, PRPA would immediately begin the procurement process to ensure delivery and installation by year end 2020. **The two new cranes cannot be purchased without the essential infrastructure upgrades presented in this TIGER request scope. The industry standard is now electric powered cranes. Diesel powered cranes are outdated and difficult to procure. Moreover the existing terminal conditions would not support the size and weight of the new electric powered cranes.**

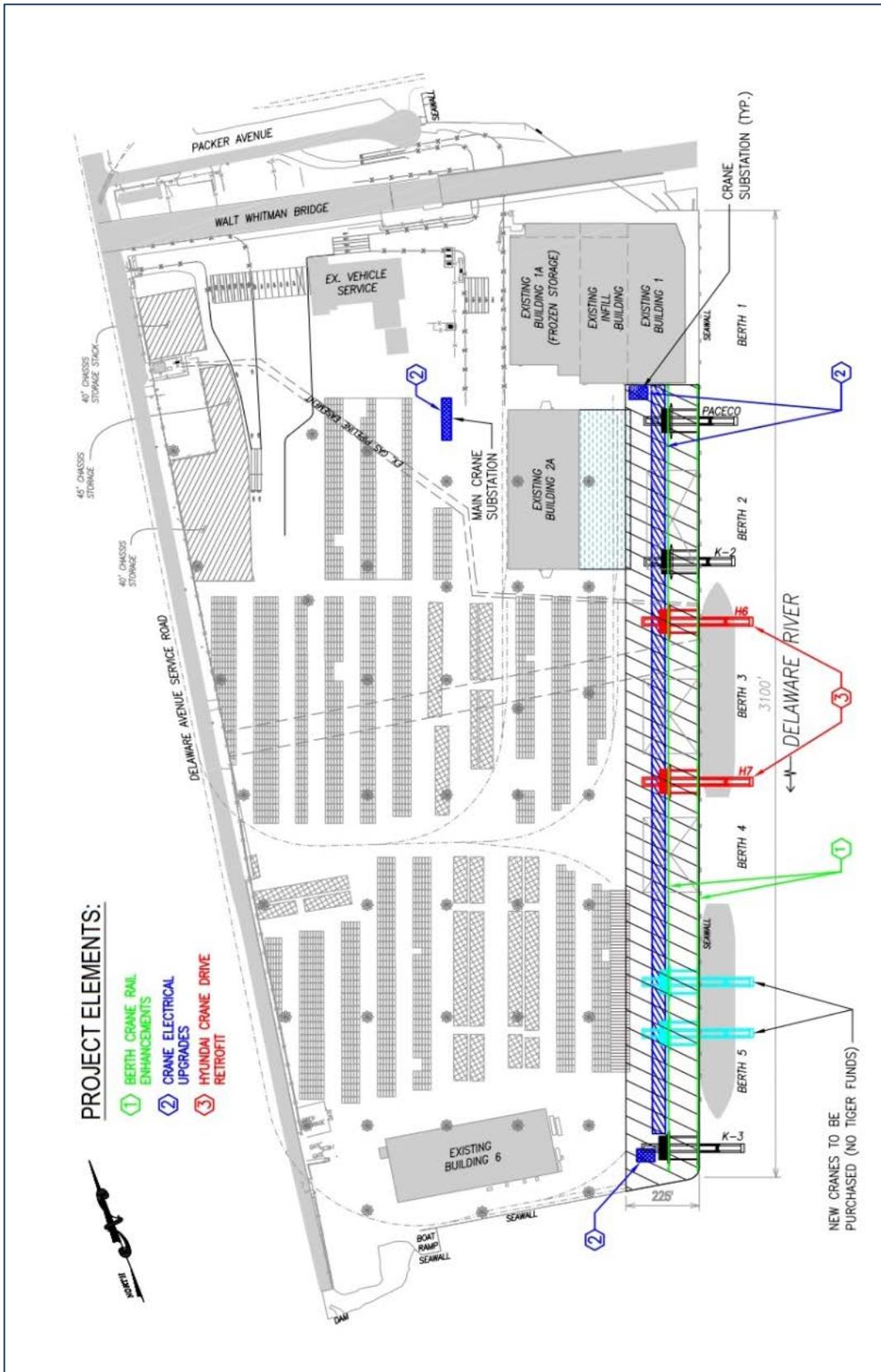
These upgrades will significantly reduce the need for diesel consumption at the Terminal. The primary benefits of electric cranes, as compared to the current diesel-powered cranes include: a more reliable and efficient operation; a reduction in operation and maintenance costs; a decrease in the cost of ocean carriers and a significant reduction in air emissions.

In order to take advantage of the benefits of a newly constructed 45' channel and to accommodate the additional forecasted demand due to the Panama Canal expansion, the PRPA, in conjunction with Astro, is developing a capital expenditure plan and budget to modernize and densify the existing operation to handle more container volumes. The total expenditures are anticipated to cost approximately \$456 Million and will increase container handling capacity by 200%. These enhancements include terminal electrification, the acquisition of four ship-to-shore cranes, and paving upgrades to support terminal container stacking Rubber Tire Gantry (RTG) cranes.

In reviewing ways to fund the PAMT Enhancement Project, Astro, the PRPA and the Commonwealth of Pennsylvania have identified a sub-project scope which is appropriate for funding through this TIGER grant opportunity. The benefits are derived from the new cranes which require the enhanced infrastructure. The initial project addresses upgrades to the electrical utility that services the Terminal, structural upgrades to crane support infrastructure, the retrofit of existing cranes to accommodate electrical drives, and the acquisition of two new electric powered ship-to-shore gantry cranes. The projected benefits resulting from the retrofit and addition of the two new cranes will include a lower crane maintenance cost and operating expense, reduced crane down time, a more reliable supply chain and substantially lower emissions. These upgrades will allow PRPA to remove old and inefficient container handling equipment from the Terminal and instead rely on state-of-the-art equipment to service a new generation of container ships. These benefits clearly address the primary selection criteria identified in the Notice of Funding Opportunity.

Figure 1 demonstrates the three proposed project elements; (1) the berth crane rail enhancements, (2) electrical upgrades and (3) the retrofit of the Hyundai cranes.

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2.3 Project Location

As previously described, PAMT spans 112 acres and has 3,800 linear ft. of berthing space, including six berths with one being a RO/RO berth. Located in South Philadelphia, approximately three miles south of Center City, the terminal is strategically located within a one day drive of 200 million people (65% of the U.S. population). As the largest container terminal at the Port of Philadelphia, PAMT is also critical to the efficient movement of commercial and industrial goods in the Mid-Atlantic region. Located within second day delivery distances of one-half of the country's heavy industry, PAMT is well suited to deliver products and raw materials to many urban centers, including Pittsburgh, Chicago, Memphis, Atlanta, Boston, Toronto and Montreal.



Interstate Route 95 and Interstate Route 76 are located within $\frac{1}{2}$ a mile of the PAMT. The site is also serviced by two Class 1 railroads, CSX and Norfolk Southern, both of which operate intermodal and conventional rail yards adjacent to the Terminal. Over 300 trucking companies, with 15,000 trucks are available to shippers that send goods through PAMT.



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According to the Bureau of Labor’s Statistics Quarterly Census of Employment and Wages for third quarter 2015, the average weekly wages for private trade, transportation, and utilities was \$823. The Philadelphia-Camden Wilmington Metropolitan Statistical Area average weekly wage was \$841. In third quarter 2015, total quarterly wages for this job sector was \$5.4 Billion with an estimated employment of 491,664.

As shown in Table I, the PAMT is a vibrant economic engine for the City of Philadelphia and the region. Table 1 reflect economic impact of containerized, RO/RO and breakbulk cargo through PAMT. PRPA staff and Astro forecast a substantial amount of organic growth as well as additional lines locating to the Port of Philadelphia as a result of the Delaware River Main Channel Deepening and the expansion of the Panama Canal. Utilizing a conservative growth estimate for existing carriers of 5% and assuming modest increase for new customer growth container volumes are projected to increase from 251,697 to 443,300 over the next ten years. During the same period TEUs will increase from 407,100 to 715,000.

Table I: 2015 Economic Impact

Source: PRPA Strategic Planning Dept. (ASW Inc.)

Jobs	
Direct	2,167
Indirect and Induced	4,496
Total	6,663
Federal Taxes	\$ 88,200,000
State and Local Taxes	\$ 41,900,000
Total Tax Revenue	\$ 130,100,000
Personal Income	\$ 494,800,000
Business Activity	\$ 1,587,200,000

3 Project Parties:

3.1 Lead Agency

Agency Name:	Philadelphia Regional Port Authority
Agency Executive:	John F. Dempsey <i>Deputy Executive Director</i>
Primary Contact/	Edward G. Henderson
Authorizing Official (<i>Grants.gov</i>):	<i>Director of Finance & Capital Funding</i>
Address:	3460 N. Delaware Avenue, Philadelphia, PA 19134
Phone Number:	1-215-426-2600

3.2 Partnering Agencies

Agency Name:	Pennsylvania Department of Transportation (PennDOT)
Primary Contact:	Leslie S. Richards, Secretary of Transportation
Address:	400 North St. 10 th FL, Harrisburg, PA 17120
Phone Number:	1-717-787-5574

Agency Name:	Astro Holdings Inc.
Primary Contact:	Tom Holt Jr., President
Address:	3301 South Columbus Blvd, Philadelphia, PA 19148
Phone Number:	1-215-551-2600

U.S .Senate Offices

Senator Robert Casey
Senator Pat Toomey

US Congressional Districts

Robert Brady
Pennsylvania’s 1st Congressional District

The PRPA, applicant for this TIGER grant submission, is an independent agency of the Commonwealth of Pennsylvania. PRPA, the Commonwealth of Pennsylvania and the Terminal Operator, Astro Holdings Inc., have developed a partnership to support the submission of this project for TIGER grant funding. The PRPA works closely with the Commonwealth to program capital funds to maintain existing infrastructure and provide for marine terminal capacity enhancements. Over the past five years, the Commonwealth has contributed almost \$200 Million to execute its capital maintenance program, provide for customer driven capacity enhancements, and to fund the Delaware River Main Channel Deepening project. The Commonwealth recognizes the importance of the PAMT Enhancement Project to the PAMT and is enthusiastic about participating as a partner on the local share of the project.

PRPA and Astro, the lessee of the PAMT are in preliminary negotiations to extend the lease term; Astro has leased the PAMT since 1990. All parties agree that a primal condition of any lease extension is the mutual development of the PAMT to enhance container terminal capabilities consistent with the growth in larger vessels and cargo volumes. Receiving a TIGER grant to project financing would allow the collective parties’ ability to fund this project. (See letter of support in Attachment 12). Attachment 5 is a PRPA board resolution providing authorization to submit the TIGER grant application and implementation.

4 Grant Funding Sources/Uses of Project Funds

4.1 Proposed Cost of Project (Sources and Uses of Funds):

Table 2 below presents the capital cost of both the complete project and those components which make up the scope of the TIGER grant application. As the Table shows, PRPA is proposing a substantial match for both scopes of work.

Table II: Project Costs and Proposed Uses

Project	Description	Total Project Cost	PAMT Project Costs	
			Local	Federal
Project Design	Project Design	\$2,500,000	\$2,500,000	
New Crane Acquisition and Installation	Acquisition of two new post Panamax cranes	\$27,000,000	\$27,000,000	
TOTAL NON-TIGER PROJECT COSTS		\$29,500,000	\$29,500,000	
			2016 TIGER Grant Request	
Berth Crane Rail Enhancements	Structural strengthening of the crane rail at berths 2 – 5 and the addition of a 100' gauge crane beam	\$17,000,000	\$5,000,000	\$12,000,000
Terminal Electric Upgrades	Local utility supply (Electrical)/PAMT terminal and berth distribution	\$18,000,000	\$14,000,000	\$4,000,000
Hyundai Crane Drive Retrofit	Retrofit of two existing Hyundai cranes from diesel to electric drives	\$4,000,000	\$3,000,000	\$1,000,000
TOTAL TIGER PROJECT COSTS		\$39,000,000	\$22,000,000	\$17,000,000
Percentage TIGER Grant			56.4%	43.6%
TOTAL PROJECT COSTS		\$68,500,000	\$51,500,000	\$17,000,000
Percentage Project Costs			75.2%	24.8%

5 Selection Criteria

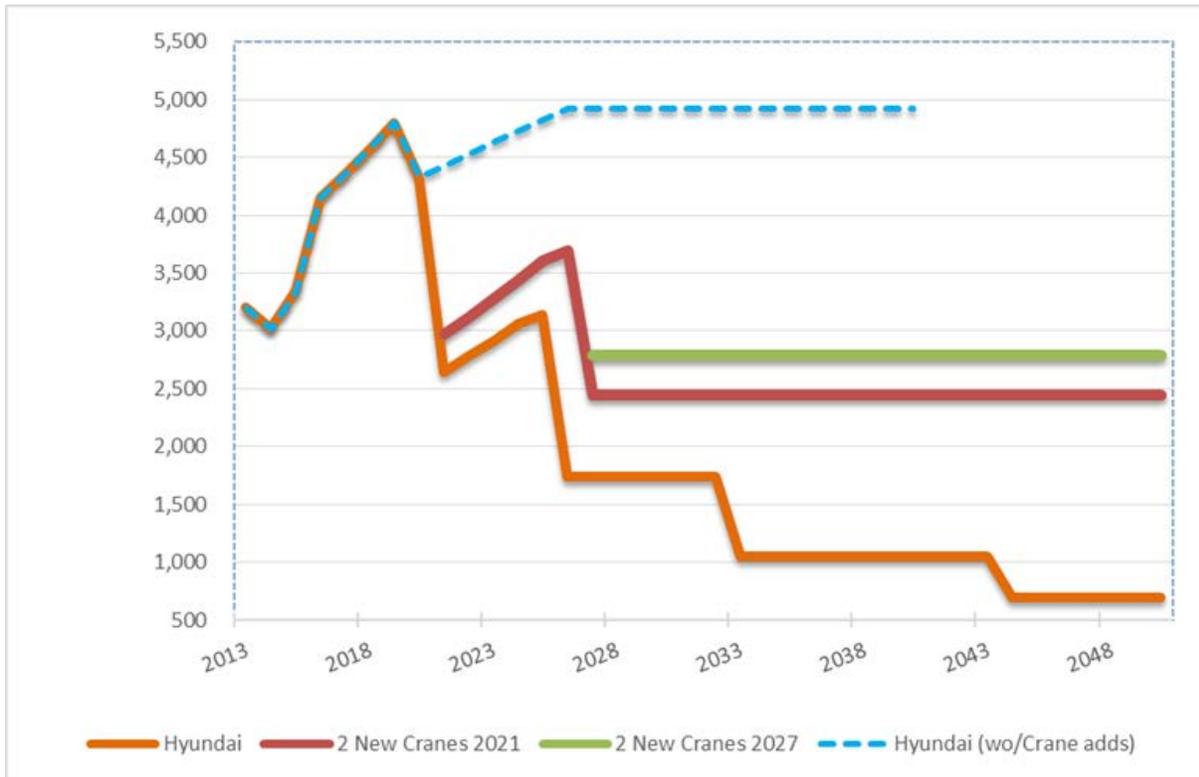
5.1 Primary Selection Criteria –

5.1.1 State of Good Repair:

The electrification of existing cranes H-6 and H-7 will ensure a more reliable utilization as well as extend the useful life of the cranes, primarily due to the reduction in crane hours. In 2015, the Hyundai cranes worked a total of 6,031 hours or an average of 3,015 hours per crane. The benchmark for maintaining the cranes in an appropriate state of repair is 4,500 hours, which assuming no new cranes are acquired, we forecast will be surpassed in 2019 and grow to 4,926 hours in 2026. Commissioning two new cranes in the later part of 2020 will immediately reduce the Hyundai crane hours to approximately 2,646 hours in the first year and with the increase in PAMT volumes grow to 3,063 hours in 2025. With the addition of a second set of cranes forecasted for 2027 Hyundai crane hours are projected to decrease to the 1,743 hour level for their remaining life. This will enable cranes to be serviced and proactively maintained on a periodic basis and extend the useful life of the cranes to 2050. We anticipate that the project will have a 30 year life.

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Figure 2: Annual Total of Operation Hours per Crane



The steamship and maritime industry is based on economies of scale. Sizing port operations is contingent upon the anticipated capacity provided by respective trade lanes and their optimal vessel sizes. Larger vessels with increasing payloads and thus improved economies-of-scale continue to be built. For many reasons, containerization has been the fastest growing freight transportation mode for the last fifty years and this growth continues world-wide. With the expansion of the Panama Canal and the newly constructed 45’ channel, it is anticipated that Philadelphia will soon see these larger vessels. Currently, the Panama Canal can handle containerships that stack 13 containers wide across the beam of the vessel. Upon completion of the Panama Canal expansion program, scheduled to be finished by mid-2016, higher, longer and wider vessels, stacking 23 containers across will be accommodated. Even today, several trade lanes are deploying containerships that stack containers 23 wide. Regardless of current limitations of the Panama Canal, the PAMT already services larger vessels that do not transit The Canal weekly; these vessels stack containers 18 across. The demand is evident. PAMT customers need more efficient, reliable port operations and demand that the PAMT have faster and larger cranes today. Servicing these vessels efficiently require cranes capable of reaching 23 containers across a vessel. While not included in the grant request, the acquisition of two new cranes is essential to handle the increase in trade and vessel size.

Crucial to this grant, is the reality that without TIGER funding PAMT will be unable to add structural support to the crane rails, make the needed electrical upgrades, and retrofit the existing Hyundai cranes. Furthermore, without those upgrades the current infrastructure cannot support two new cranes. Thus, without the needed upgrades PAMT will be unable to continue servicing the existing customer base.



MSC Judith Discharging Containers at PAMT

- ❖ PAMT already experiencing 8,089 TEU Vessel Calls (140'4 Beam, 1,065' LOA)
*AS SEEN IN PHOTO
- ❖ Two (2) cranes are not enough to work the vessel within schedule.
- ❖ Wharf strengthening is needed to support bigger cranes.
- ❖ Higher cranes with a longer outreach are needed.

5.1.2 Economic Competitiveness:

Freight Efficiency Improvements- Terminal Expense Reductions

Maintenance Expense Reductions: The conversion of the PAMT cranes from diesel to electric power will increase the efficiency, reliability, and cost-competitiveness of the movement of goods. Accordingly, they are less expensive to operate and maintain. The PRPA estimates that maintenance and repair cost savings will be approximately \$480,000 per year.

Down Time Expense Reductions: Increased reliability will allow the cranes to operate approximately 63 more hours per year, which translate into an additional savings of approximately \$474,871. Savings are realized from reduced crane detention and labor standby. These savings will be shared by Port customers and ultimately passed onto manufacturing and retail customers.

Cost Saving of Electricity versus Diesel:

In 2015, approximately 153,361 gallons of diesel were used by the two Hyundai cranes. The average cost per gallon during the year was \$3.12. The annual fuel costs for the cranes in 2015 were approximately \$479,141.

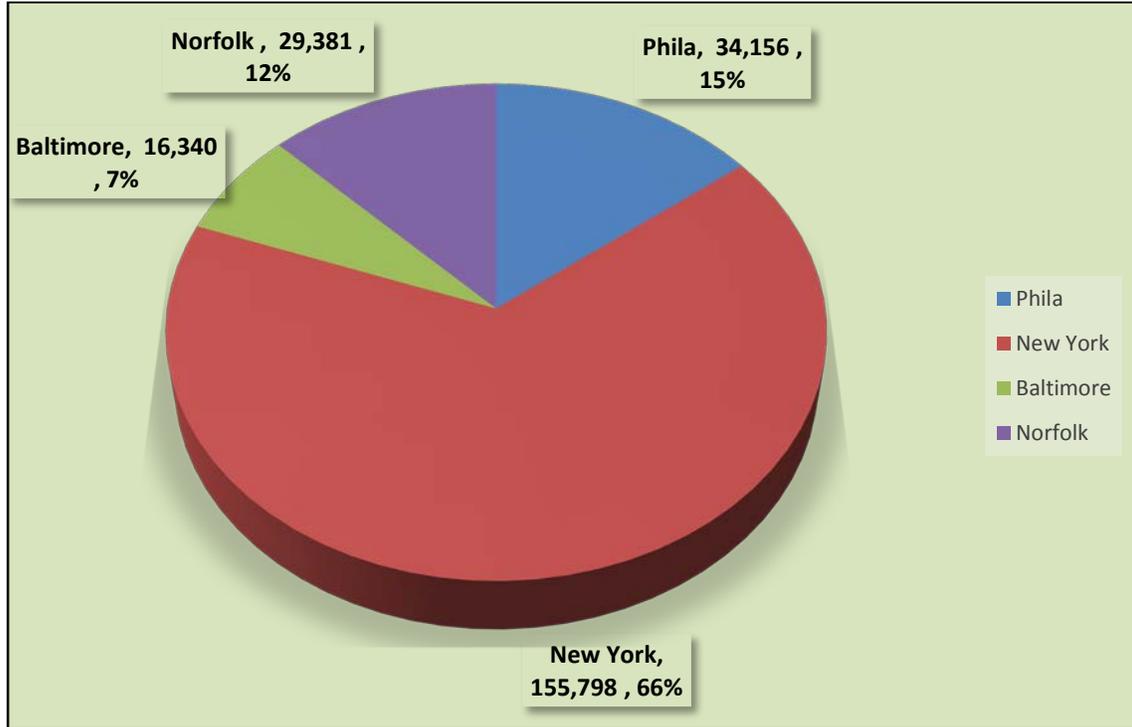
Table III: 2015 Terminal Expense Reduction Project Benefits (Undiscounted)		
Terminal Expense Reductions	2015 Expense	Total Projected Benefits
Maintenance	\$ 480,000	\$ 6,780,491
Crane Down time	\$ 474,871	\$ 6,708,043
Cost Saving of Electricity vs. Diesel	\$ 366,367	\$ 6,492,561
Total Expense Reduction	\$19,981,095	
Primary Selection Criteria Addressed	State of Good Repair Economic Competitiveness	

Electricity usage for the modified cranes is estimated at 1.634 Million kWh per year equivalent to the levels in 2015. At an average cost of electricity of \$0.069 per KWh the expected 2015 equivalent annual cost for electricity after the crane conversion is completed would be \$112,774. Therefore utilizing 2015 as a benchmark, a cost savings of \$366,367 would have been realized in operating expenses from the utilization of electricity versus diesel to power the cranes.

Freight Efficiency Improvements – Reduced Supply Chain Costs

The structural improvements to the berth and crane rail are required in order to increase the capacity of the PAMT. If improvements are not undertaken there will be ongoing inefficiencies in the supply chain specifically related to Philadelphia Hinterland cargo that continues to be handled at other North Atlantic Ports. Subsequently, additional cargo volumes moving over Philadelphia into the hinterland market will lead to substantial logistical savings. The Philadelphia hinterland is defined as those counties that have a logistical cost savings in being handled at Philadelphia’s PAMT. Utilizing 2014 PIERS (Port Import Export Reporting System) data we have forecasted that an estimated 235,675 container units move via the North Atlantic Port range (Norfolk to New York) destined to the Philadelphia hinterland. In calendar year 2014 the Port of Philadelphia handled 34,156 (15%) of the Philadelphia Hinterland market. With the proposed project benefits, we expect additional carriers to call at Philadelphia; displacing other North Atlantic Ports and allowing shippers to take advantage of the time logistics and/or cost savings.

Philadelphia Hinterland Shippers Utilization of North America Ports



Source: 2014 PIERS Data System

The BCA details the projects benefit of the reduction in supply chain costs as a result of cargo being moved over Philadelphia versus other ports in the North Atlantic Range. The initial benefit is taken in year 2021 utilizing the difference from the year prior due to the crane rail infrastructure and Hyundai improvements. Applying a conservative growth rate of 1.5% for Hinterland shippers and a .75% Philadelphia capture rate, the containerized market share via the Port of Philadelphia increases from 15% in 2014 to 41.5% in 2050. For the life of the project we anticipate that 1.6 million container units will be handled over the Port of Philadelphia to the hinterland market for a total undiscounted benefit of \$327 million.

The PAMT Enhancement Project will develop a safer, more reliable and economical freight transportation system and will help decrease industrial transportation and household costs. Food and other refrigerated cargo are easily accommodated at PAMT and nearby refrigerated warehouses, and efficiently distributed for availability to 200 million people that reside within one-day drive of PAMT. As the largest container terminal at the Port of Philadelphia, PAMT is also critical to the efficient movement of commercial and industrial goods in the Mid-Atlantic region. Located within second day delivery distances of one-half of the country's heavy industry, PAMT is well suited to deliver products and raw materials to many urban centers, including Pittsburgh, Chicago, Memphis, Atlanta, Boston, Toronto and Montreal. PAMT is served by two Class 1 railroads, CSX and Norfolk Southern, both of which operate intermodal and conventional rail yards adjacent to the Terminal. Over 300 trucking companies, with 15,000 trucks are available to shippers that send goods through PAMT.

This project will enhance the regional and national competitiveness by increasing business access to foreign markets through reduced costs and more reliable transportation systems due to decreased downtime for vessel operations and a substantial increase in productivity when vessels are in port. Today, Philadelphia has direct trade service with Europe, South America, Australia/New Zealand and the Caribbean.

Philadelphia does not have a direct trade connection with China, the United States' largest waterborne trade partner is China. Along with the Panama Canal expansion and Channel Deepening project, this project positions Philadelphia for a China service. The increased benefits to the regions competitiveness would be tremendous purchasing power and improved business for both commercial and residential consumers. This would also improve export and manufacturing potential.

5.1.4 Environmental Sustainability:

This Project fully meets the TIGER primary selection criterion of Environmental Sustainability because it will accommodate significant capacity growth at the PAMT while at the same time achieving a significant reduction of diesel fuel combustion. The reduction in diesel fuel combustion will in turn reduce air emissions of greenhouse gases and criteria pollutants and will reduce impacts to the local community. The Project is fully consistent with port sustainability measures identified by EPA, as well as state and local stakeholder groups. This includes, for example, EPA's recently announced Ports Initiative, see www.epa.gov/otaq/ports, and locally, the Clean Air Council Green Ports Initiative, see www.cleanair.org.

The need to reduce diesel emissions from cargo handling equipment at port facilities is well known and is encouraged by EPA and others. Port cargo handling equipment has typically been served by diesel-fired non-road engines which have long useful lives, and generally do not justify frequent engine replacement. Older models of these engines can be high-emitting sources that stay in service for several decades; negatively impacting local air quality. Many ports, including PAMT, are located in ozone or fine particulate matter non-attainment areas. Diesel exhaust gases are significant contributors to ozone non-attainment through emissions of nitrogen oxides (NOx) and to particulate matter non-attainment through emissions of NOx and PM 2.5. In addition, health risks associated with long term exposure to diesel particulate emissions are believed to include cardiovascular, cardiopulmonary and respiratory disease and lung cancer. See www.osha.gov/dts/hazardalters/diesel_exhaust_hazard_alter.html . Furthermore, many ports are located within or near urban centers with large numbers of disadvantaged persons.

Rail mounted ship to shore gantry cranes, including those at the PAMT, present a unique challenge in reducing diesel combustion emissions. While some types of cargo handling equipment may be retrofit with particulate emission controls such as diesel particulate filters or diesel oxidation catalysts, diesel engines used in rail mounted gantry cranes are not suited to retrofit with particulate matter controls because of the variable loads and high temperatures at which these units operate. Even if these controls could be utilized, they do not address NOx emissions from diesel combustion. Accordingly, in evaluating the options for reducing emissions from the PAMT gantry cranes, PRPA determined that the cranes should be repowered with new engines meeting EPA's latest non-road engine emission standards, or electrified as

presented herein. Repowering with new engines is not considered a viable operational alternative because the most heavily used cranes at the PAMT, H-6 and H-7, are equipped with relatively new model year 2003 engines. Accordingly, there is no overriding operational need for replacement engines at this time. Further, manufacturers of container cranes no longer make diesel engine cranes.

Additionally, engine replacement would not eliminate gantry crane emissions and would not decrease maintenance costs or improve terminal efficiencies in the same manner as the PAMT Enhancement Project would. Electrification is clearly the better option for both the economic and environmental sustainability of the PAMT. The same conclusion has been reached at virtually every other container terminal in the country, almost all of which have electrified their container cranes with funding assistance from federal and state sources. PAMT must follow suit, and federal funding is essential.

Emissions calculations were performed by Compliance Management, Inc. (“CMI”) based on baseline levels of diesel fuel consumption and manufacturers’ and/or EPA’s AP-42 emission factors. (The CMI Container Crane Conversion Analysis Report provided as Attachment 7 of the Application.) The CMI emission reduction estimates assume that the electrification of H-6 and H-7, along with the purchase of two additional electric cranes, will offset diesel fuel combustion for crane operation upon completion of the PAMT Enhancement Project.

Based on estimates of actual emissions associated with gantry crane operation in 2014 and increased for 2015 volumes, and utilizing the monetized savings benefits provided in the TIGER BCA guidelines, Table IV presents PRPA’s estimates of the Project’s emission reductions:

Table IV: Emissions Type and Related Project Savings

Emission Type	2013 Emission Quantity (TPY)	2015 Value of Emissions Benefit (\$/metric ton)	Total Projected Benefits of Reduced Emissions
Greenhouse Gas Emissions (CO ₂)	2,319.43	\$ 39	\$15,354,533
Nitrogen Oxide (NO _x)	28.47	\$8,014	\$4,601,270
Voluntary Organic Compound (VIC)	3.01	\$2,034	\$132,239
Particulate Matter (PM)	1.43	\$366,659	\$11,127,551
Sulfur dioxide (SO _x)	0.0006	\$47,352	\$97,106
Total Expense Reduction	\$31,312,698		
Primary Selection Criteria Addressed	Sustainability, Livability		

In addition to the diesel emission reductions associated with gantry crane electrification, the PAMT Enhancement Project will enable PAMT to implement cold ironing capabilities in the future by extending the electric infrastructure to the wharf. Cold ironing will enable ships at berth to “plug in” to the terminal’s power supply, and thereby reduce or eliminate diesel combustion emissions from ships’ auxiliary engines, which have been identified as a large contributor to port-related air emissions. See e.g., Port of Long Beach Shore Power Summit Presentation, available at www.polb.com.

The emission reductions that will result from the PAMT Enhancement Project are a continuation of other sustainability measures undertaken by PRPA at the PAMT, including the early use of ultra-low sulfur diesel fuel, the retrofit of thirty five (35) drayage trucks with diesel particulate filters (in partnership with the Clean Air Council), and a truck gate improvement. In the past, it took approximately ten (10) minutes or more to process an authorized truck entering PAMT. With the PAMT Capital Plan Phase I improvements completed, the time has been reduced to two (2) minutes. This reduces idle emissions substantially, improves the supply chain efficiency and cost of services. Each of these measures has positioned the PAMT to reduce impacts to the local community and the environment. The PAMT Enhancement Project will further that effort in a significant way.

Additionally, the PAMT Enhancement Project will coincide with a port emission inventory effort being undertaken by the Philadelphia Air Management Services (“AMS”) this year. The AMS port emission inventory is intended to support AMS’ ultimate goal of quantifying port emissions and identifying potential emission reduction measures that will move Philadelphia closer to attainment with National Ambient Air Quality Standards for ground level ozone and PM 2.5. As the largest container terminal within the Port of Philadelphia, the PAMT has a high potential for improving the overall impact of port operations to the community and the environment. In recognition of this potential and the importance of diesel emissions reductions, AMS has provided a letter of support (Attachment 12) for the PAMT Enhancement Project and has indicated its willingness to partner with PRPA as may be appropriate in completing the Project.

5.1.5 Safety:

As noted in the Benefit Cost Analysis, we forecast the potential reduction of 148, 509,194 truck miles due to additional cargo moving through the Port of Philadelphia over the life of the Project. Attachment 8 of the Benefit Cost Analysis (Attachment 3) outlines the consequences avoided in the event that these projected units move to the Port of Philadelphia. Table V below outlines these benefits.

Table V: Fatalities, Injuries and Damage Savings (Undiscounted)

	Fatalities	Injuries	Pavement Damage	Property Damage
Avoided costs	\$19,738,651	\$26,741,534	\$25,543,581	\$559,531
Incidents Avoided	2.1	58		140
Primary Selection Criteria Addressed	Safety		State of Good Repair, Economic Competitiveness	

The electrification of the cranes at the PAMT will also result in significant safety benefits. Currently, the cranes have fuel tanks that have a capacity of 1,500 gallons. Assuming typical cargo volumes and vessel arrivals refueling is required 1-2 times per week. The handling, storage, and combustion of diesel fuel present a potential risk to the terminal workers as well as to the local environment specifically the Delaware River. Electrifying the cranes minimizes this risk because the amount of fuel stored and/or transported on the terminal is substantially reduced.

In comparison to highway and rail transportation, marine transportation is a safer and more economized mode. However, a prevalent obstacle to moving containers over water as opposed to via rail is handling cost. The proposed project will reduce handling costs over the life of the project and improve purchasing power.

5.2 Secondary Selection Criteria – Long-Term Benefits

5.2.1 Innovation:

As noted throughout this Application, the PRPA’s long term goal is to increase the capacity of the Port of Philadelphia to handle the projected increase in containerized cargo. To meet this goal, the PRPA has carefully mapped out an innovative strategy, which will be supported, in part, by the TIGER funding.

The electrification of the PAMT cranes increases efficiency, reliability, and cost-competitiveness of the terminal, while simultaneously decreasing the PAMT’s impact on the local environment through the elimination of diesel fuel consumption.

The addition of electrical infrastructure at the PAMT lays the groundwork for cold ironing capabilities. Implementing cold ironing would allow the PAMT to be the first East Coast port to offer shore side power, which would significantly decrease fuel use and diesel emissions from hoteling ships.

The PRPA is looking to procure the necessary contracting through innovative mechanisms such as potential design build options and coordinating with our terminal operator for the acquisition of the ship to shore cranes.

5.2.2 Partnership:

- ❖ **Jurisdictional & Stakeholder Collaboration:** As an independent agency of the Commonwealth of Pennsylvania, the PRPA has many public and private stakeholders. The PRPA has provided supporting information to the local congressional delegation, its board of Directors, the Governor, and the Mayor of Philadelphia. The proposed project has a broad base of support from Local, State and Federal representatives. Please see attached letters from the City of Philadelphia’s Mayor Kenney, Pennsylvania Governor Wolf and Pennsylvania Secretary of Transportation, Leslie Richards. (Attachment 12).

The facility is leased to Astro under a long term lease agreement. A letter from Astro has been included in this grant submission indicating their support for the construction of the project and continued maintenance of the crane drives (Attachment 12).

- ❖ **Disciplinary Integration:** The PRPA is very proactive in regional and national environmental initiatives to improve air quality in the Port Region. These initiatives include: Green Ports, Clean Air Council, and Clean Port USA. In addition, PRPA has worked closely with the Delaware Valley Regional Planning Commission (“DVRPC”), which has confirmed that the PAMT Enhancement Project is consistent with the DVRPC’s long-range plan, Connections 2040, and it’s Long Range Visions for Freight. A letter of support from DVRPC is attached hereto in Attachment 12.

6 Results of Cost Benefits Analysis:

Table VI: Monetized Benefits and Cost Benefit Analysis Results

TOTAL PROJECT COST		\$ 39,000,000
Total Project Benefits	Grant Selection Criteria	Net Benefits (Before Discount)
Emissions Reductions / Greenhouse Gas Reductions	Environmental Sustainability & Livability	\$ 31,312,437
Freight Efficiency Improvements (PAMT Expense Reductions)	State of Good Repair, Economic Competitiveness & Safety	\$ 19,981,095
Freight Efficiency Improvements (Reduced Supply Chain Costs)	Economic Competitiveness	\$ 326,393,834
Reduced Pavement and Property Damage	State of Good Repair & Economic Competitiveness	\$ 26,103,112
Safety (Value of Statistical Life and Injuries)	Safety	\$ 46,480,185
TOTAL		\$ 450,270,663

Discounted Benefits of Project

	7%	3%
Total Benefits Discounted	\$ 97,089,945	\$ 377,094,592
Total Costs Discounted	\$ (30,966,508)	\$ (40,745,607)
NPV	\$ 66,123,436	\$ 336,348,985
BCR	3.1	9.3

A Benefit Cost Analysis was conducted for the PAMT Enhancement project, where the net present values of the benefits (excluding those produced via job creation) are compared against the values of the project grant.

Benefit cost ratios have been estimated on an annual basis for 34 years, beginning in 2017 and discounted to present value at the alternative rates of 3% and 7%. The proposed project has an economic benefit of \$66.1 million and \$336.3 million and benefit cost ratio of 3.1 and 9.3 based upon discount rates of 3% and 7%, respectively.

The value of the benefits resulting from the proposed PAMT Enhancement Project is made up of three principal categories arising from the difference in performance between the electric powered cranes and the diesel powered cranes and the economic factors in the efficient

movement of freight as it relates to the capacity enhancements of the Terminal. We believe that the implementation of the project will have the following benefits: (1) the monetized value of the reduced level of emissions and greenhouse gases, (2) the savings resulting from lower operating costs for the electric cranes and (3) freight efficiency improvements resulting in terminal and supply chain costs.

Table V below presents the net benefits for each specific selection criteria for the project overall Benefit cost ratio. A detailed Benefit – Cost Analysis is provided as Attachment 3. The analysis includes tabular calculations for each benefit described above. Additionally, each of the cost benefit calculations for these scenarios is provided for in an excel worksheet entitled Attachment 4- Cost Benefit Workbook. The worksheet is identified in each section.

7 Project Readiness

7.1 Technical Feasibility:

The proposed project budget and scope is the result of several feasibility studies and plans to enhance the container operation efficiencies and capacity at the PAMT. The analyses in these plans provide the support necessary to immediately move into a final design for the PAMT Enhancement Project. These reports are contained in Attachments 7-11.

Studies Performed:

- ❖ In 2006, PRPA hired CH2MHill who teamed with Shaw GBB to design the extension of the crane rail into berth 1 and crane electrification. Although the project was never constructed, PRPA obtained 90% design. It included construction cost estimates and schedules. During the process of the design CH2MHill/GBB arranged for meetings with the utility provider which allowed them to more clearly define the estimated costs to supply power to PAMT.
- ❖ In 2009, PRPA hired Urban Engineers, Inc., who teamed with Hamburg Port Consulting, and Halcrow, to prepare a densification study for the PAMT facility. The study included analysis of the terminal throughput (present and projected) and what modifications were needed to allow the facility to increase capacity. As part of this study they assumed that the facility was to be electrified and that the crane rails would be extended into berth 1 per the 2006 CH2MHill design.
- ❖ In 2013, Astro hired Boos Navarre to conduct a feasibility study of STS gantry cranes and dock infrastructure at the PAMT. The feasibility study identified the need for the additional 100' wide crane gage and additional deck strengthening.

- ❖ In 2013, PRPA hired Compliance Management, Inc. to conduct a feasibility study to convert PRPA port facilities from diesel to an alternate energy source. As a basis for their report they reviewed and verified the plan prepared by CH2MHill in 2006. The report looked at the benefits of reducing air emissions and provided updated costs for the alternatives. They also looked at electrification at PAMT and confirmed that it would be very beneficial for a variety of reasons.
- ❖ In 2014, Parsons Brinkerhoff was brought on to develop the PAMT Capital Plan, verifying and updating previous PAMT studies and costs estimates. This document is provided in Attachment 11.

Program Management Experience:

PRPA staff has significant project management and technical capabilities and, if awarded, will provide grant administration and project management. The PRPA has implemented rigorous internal controls to ensure compliance with grant award specifications, including financial and status reporting. The PRPA is also well versed in OMB circulars related to grant administration and cost principals. The PRPA has successfully implemented numerous State and Federal grant projects over the past several years and has several on-going grant projects.

- ❖ The PRPA is also the non-federal sponsor for the Delaware River Main Channel Deepening project. In this capacity, the PRPA is managing the \$353 million project in conjunction with the U.S. Army Corps of Engineers.
- ❖ Additionally, in 2008, the Commonwealth of Pennsylvania, PRPA and a private developer, Essington Avenue Partners, teamed up to form a private public partnership to construct the Philadelphia Wholesale Produce Market. The main building is 686,000 square feet and features the largest central refrigeration system in the United States, providing the 25 independent produce distributors with optimal efficiency and reduced operating costs. All parties contributed to the \$218 Million cost of the project. The projects also included several federal and state grant programs.

7.2 Financial Feasibility:

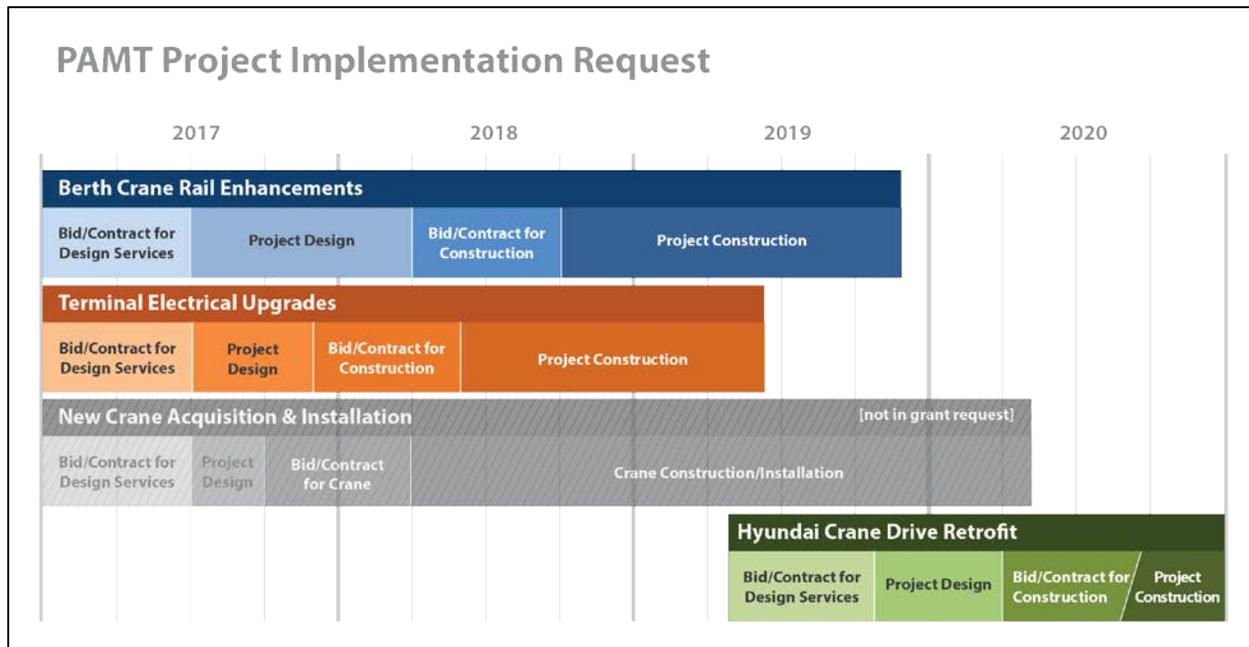
As previously mentioned, if successful in receiving TIGER grant funding, the PRPA will partner with its terminal operator and the Commonwealth of Pennsylvania to provide for the local share of the project. All parties are committed to expanding the capacity and efficient operations of the PAMT and will establish a cost sharing plan for the local match. The PRPA and Commonwealth, as owners of the PAMT, believe increasing the container handling infrastructure of the Terminal will add tremendous value to its asset portfolio. Additionally, the increased economic impact of the facility will have substantial long term benefits to the Commonwealth and its citizens. The Commonwealth has the ability to provide capital dollars for the PAMT Enhancement Project using previously authorized legislation. The tenant, Astro, has a vested interest in seeing the PAMT Enhancement Project proceed in order to realize

container handling efficiencies and reduced costs. Through increased business and savings they will be in position to partner with the PRPA and Commonwealth to fund the local match.

7.3 Project Schedule:

- ❖ PRPA has developed an aggressive yet realistic schedule for the PAMT Enhancement Project. We are confident that the Project will be completed well ahead of the September 30, 2022 deadline. Current estimates have the project being finished December 30, 2020. If awarded, PRPA will immediately approach the Delaware Valley Regional Planning Commission (DVRPC) to amend the Pennsylvania Transportation Improvement Program (TIP) to include this project. It is expected the TIGER grant will be administered by the Maritime Administration (MARAD). Once awarded, PRPA will coordinate with MARAD on all grant procedures. A detailed project schedule is provided in Attachment 2 and summarized in Figure III below.

Figure III: Project Schedule



- ❖ The PAMT Enhancement Project is of great importance to the PRPA. If awarded it would be a priority of both the agency and the terminal operator to expedite the procurement and construction for each phase of this project. Long lead items such as the procurement of two new electric powered cranes will commence immediately upon award notification.
- ❖ PRPA owns the PAMT and the portion of street directly outside the Terminal where the substation is to be located. Therefore, we do not anticipate any necessary right-of-way or land acquisitions. PECO already possesses the right-of-way/easement clearances to perform work along the site that leads to the PAMT.

7.4 Environmental Reviews & Approvals

❖ National Environmental Policy Act and Other Approvals:

- PRPA anticipates that the PAMT Enhancement Project meet the requirements for a Categorical Exclusion. The majority of the construction will take place on an industrialized terminal and should not significantly impact the surrounding natural, social and/or economic environment. As such, the project will qualify as maintenance and repairs under PRPA's existing Pennsylvania Department of Environmental Protection (PADEP) and the Army Corps of Engineers permits.
- PRPA facilities are exempt from obtaining permits from the City of Philadelphia. All constructions permits, inclusive of permits needed for warehouse demolition will be obtained through the Pennsylvania Department of Labor and Industry.

❖ Legislative Approvals: No Legislative approvals are required for this project.

❖ State and Local Planning: PRPA works closely with the Delaware Valley Regional Planning Commission (DVRPC). As indicated in their letter of support, see Attachment 12, the DVRPC will amend the Pennsylvania Transportation Improvement Program (TIP) to include this project. Furthermore, both the City of Philadelphia and the Commonwealth of Pennsylvania recognize the value of this project. A letter of support from the City of Philadelphia's Mayor Kenney and a letter of support co-signed by Pennsylvania Governor Tom Wolf and Pennsylvania Secretary of Transportation Leslie S. Richards are attached (Attachment 12).

8 Federal Wage Rate Certification

❖ Federal Wage Rate Certification- The Philadelphia Regional Port Authority agrees to comply with the requirements of subchapter IV of Chapter 31 of Title 40, United States Code (Federal wage rate requirements), as required by the FY 2015 Continuing Appropriations Act. See Attachment 6 for the signed Wage Rate Certification Letter by John F. Dempsey, Deputy Executive Director.

9 Conclusion

Absent TIGER funding, PAMT will not remain economically competitive in the years to come. If the upgrades described in the PAMT Enhancement Project are not implemented, PAMT will be unable to accommodate the anticipated market demand. This is because the magnitude of costs and timing of the project make it fiscally infeasible to outlay funds ahead of the additional volumes. As stated above, PRPA considers the PAMT Enhancement Project to be vital to sustain operations at the Terminal. If the proposed improvements, inclusive of the purchase of two new electric powered ship-to-shore cranes, are not made we believe the PAMT will reach capacity in 2019 at approximately 443,300 container units. Acquiring diesel driven cranes is an option that is

suboptimal to the current container handling industry. The additional funding level requested in this TIGER grant would enable the local sponsors to advance this vital project.

In the event that this project is not funded PRPA anticipates container movements diverting to other ports and entering into a new supply chain. This will have a significant impact of \$70 Million over the thirty year life. Without the needed improvements, PAMT will not be capable of accommodating larger vessels that are forecasted to call the North Atlantic Ports or sustain service to the existing customer base. Cargo being diverted to neighboring ports would have negative impact on our region inclusive of increased emissions, road damage, fatalities and injuries.

Furthermore, PAMT will not be able to fully accommodate the larger ships that are expected, which could result in the loss of business, the loss of jobs and the weakening of a major economic engine in our local economy. Please see Table VII below. The number of loss of 1,270 potential direct jobs as well as 2,393 indirect jobs would not be recognized if this project isn't implemented. Additionally, a potential loss of \$70 million in State and Federal taxes and \$841.2 million of Business activity would be lost.

Table VII: Economic Impact –PAMT Container Volumes

	2015 Actual	2050 Projected	Project Benefits
Container Units	251,697	443,300	191,603
TEUS	407,100	715,000	307,900
Jobs			
Direct Employment	1,679	2,949	1,270
Indirect Employment	3,164	5,557	2,393
Total	4,843	8,506	3,663
Federal Taxes (In Millions)	\$ 63.1	\$ 110.8	\$ 47.7
State and Local Taxes (In Millions)	\$ 29.4	\$ 51.7	\$ 22.3
Total Tax Revenue (In Millions)	\$ 92.5	\$ 162.5	\$ 70.0
Personal Income (In Millions)	\$ 354.9	\$ 623.3	\$ 268.4
Business Activity (In Millions)	\$ 1,112.2	\$ 1,953.4	\$ 841.2

Source: PRPA Strategic Planning Dept. & ASW Inc.

List of Attachments: As referred to in document and grants.gov. All attachments related to this TIGER grant submission can be found at: <http://www.philaport.com/grants-packer/>.

Attachment 1	Project Narrative (pdf)
Attachment 2	Detailed Project Schedule
Attachment 3	Cost Benefit Ratio Narrative
Attachment 4	Cost Benefit Ratio Workbook (Excel)
Attachment 5	PRPA Board Resolution #2016-P1
Attachment 6	Federal Wage Rate Certification Letter
Attachment 7	CMI Report (2014)
Attachment 8	SHAW GBB Cost Estimate (2009)
Attachment 9	Urban Engineers Report (2011)
Attachment 10	Boos Navarre Report (2013)
Attachment 11	Parsons Brinckerhoff –PAMT Capital Plan (2014)
Attachment 12	<p>Letter of Supports</p> <ul style="list-style-type: none"> • Astro Holdings, Inc. • PA Governor, Tom Wolf and PA Secretary of Transportation, Leslie S. Richards • City of Philadelphia, Mayor James Kenney • Delaware Valley Regional Planning Commission (DVRPC) • Maritime Exchange for the Delaware River and Bay • International Longshoreman’s Association • City of Philadelphia – Department of Public Health – Air Management Services • Additional Letters posted at http://www.philaport.com/grants-packer/.
Attachment 13	2016TIGERInfo
Attachment 14	BCA Supporting Documentation – Hinterland Country Analysis
Attachment 15	BCA Supporting Documentation – Worksheet PDF