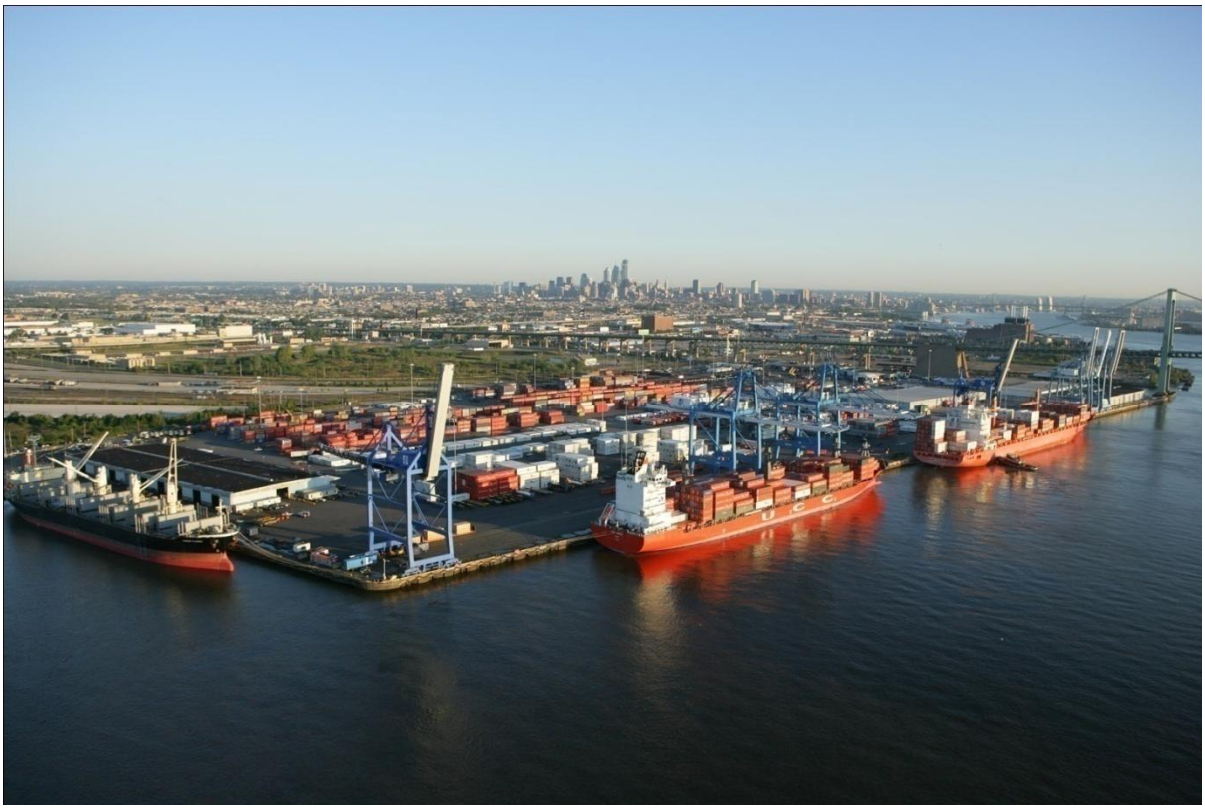
Philadelphia Regional Port Authority

PARSONS BRINCKERHOFF

PACKER AVENUE MARINE TERMINAL (PAMT)

CAPITAL PLAN



FINAL REPORT

MONDAY, JUNE 30, 2014

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1 EXECUTIVE SUMMARY

The maritime industry, like most others, continues to benefit from investments in technology and infrastructure. Marine terminal equipment and information systems technologies enable increased productivity and throughput resulting in quicker service speeds and lowered operating cost using the same amount of land. Vessels in operation are also continuing to modernize along with terminals as technology has resulted in increased payloads and reduced costs for vessel operators. At the same time, larger vessel sizes and payloads increase the need for deeper navigation channels. In 1985 the average required draft of the world fleet of container ships was 33 feet; in 2004 it was 40'; in 2007 it was 44 feet; and the trend continues. For containerships the typical size vessel in the 1980s and 1990s was 4,200 twenty foot equivalent units (TEU); in the 2000s it was 5,500 TEU. Today there are 18,000 TEU vessels being delivered with designs available for vessels for 23,000 TEU. As transportation technology and services improve, the impact to the cost of goods worldwide will decrease, expediting the growth of the global economy.

The container terminal industry has experienced this for the past 35 years and the Panama Canal is in the process of expanding its capabilities. The Canal's depth today is 40.5 feet and it is in the process of a $5.25 billion expansion project to deepen to 50 feet to enable longer and wider vessels to transit. 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 2017, it is anticipated this trend of larger vessels utilizing the USEC will quicken. All major USEC ports are preparing to handle larger vessels. The PAMT requires significant improvements to remain a viable marine terminal.

The Philadelphia Regional Port Authority (PRPA), an independent agency of the Commonwealth of Pennsylvania, is embarking on a modernization program for the Packer Avenue Marine Terminal (PAMT). The program includes the demolition of existing buildings; improvements to the existing wharf/berths; conversion of the container storage area from the current reach stacker operation to a full Rubber Tire Gantry (RTG)/empty-handler configuration; new maintenance facilities; and an improved truck gate. This capital plan summarizes the estimated infrastructure and equipment capital expenditures and the anticipated future timing of those expenditures required through 2030.

The Packer Avenue Marine Terminal ("PAMT" or "Terminal") is the largest marine terminal in the Port of Philadelphia, and ranks 3rd among ports in the Northeast region. Strategically located within a one-day drive of 200 million people, or approximately 65% of the U.S. population, PAMT is critically important to the import of food to the Northeast. Many regional industries rely on the continued availability and efficient operation of this Terminal.

The PAMT, leased to an independent terminal operator, spans 106 acres and has 3,800 linear feet of berthing space and six berths, including 1 RO-RO berth. Seven rail-mounted diesel container cranes are operated at the PAMT terminal. In the 2013 calendar year the facility handled 207,834 container lifts encompassing 353,318 TEUs and a total of 377 container vessels. This volume level is nearing the PAMT throughput capacity. Given this challenge, and changes to the import/export industry and increasing service standard demands, in order for the PAMT to maintain or grow its volumes, terminal modernization needs to commence soon.

The modernization of PAMT includes the removal of all existing break bulk, covered storage, truck gate, and maintenance buildings in order to enable the expansion of container handling area, development of a new maintenance building and an automated gate, and conversion to a higher density storage mode, increasing capacity. The development of an automated gate system is currently underway, developed by the terminal operator. This modernization plan to increase the PAMT capacity to over 1.1 million TEU was produced jointly by the PRPA and the PAMT terminal operator.

A copy of the existing terminal and full build diagram are represented in Figure 2-1 and Figure 3-1 respectively.

This document includes the following:

- Summary of existing conditions
- Description of the full build terminal plan
- Estimated cost of the full build plan
- Identification of permitting, design and development sequencing requirements
- Phased capital improvement plan

As shown in Figure 5-1, the modernization plan includes six phases to meet projected container cargo demand with an estimated development cost of $342 - $456 Million. Estimated development costs for each phase are summarized below:

- Phase 1: New Truck Gate (Not included)
- Phase 2: Wharf Improvements $62.6 – $81.0 Million
- Phase 3: Section B $112.4 – $147.9 Million
- Phase 4: Section A $82.3 – $111.5 Million
- Phase 5: Section C $57.4 – $77.6 Million
- Phase 6: Section D $27.6 – $38.1 Million

Designations of the terminal yard Sections A-D are shown in Figure 2-1 and Figure 3-1.

Numerous data sources were used to develop this capital plan. The following key data sources were reviewed and in most cases specific information from the sources are included in this report:

- Operational Analysis Report – Terminal Layout and Transition Plans, Cost Estimates: Existing terminal and full build RTG concept plans, general description of development phases, throughput capacity assumptions/rates, equipment quantities and operating assumptions

- 2014 USDOT TIGER Grant Application: Description of the Phase 1 wharf improvements and the 2025 container cargo demand forecast
- Packer Avenue Marine Terminal – Landside Improvements, Philadelphia PA Basis of Design, August 2010: for information on pavement design and asbestos-containing materials
- New Outbound Gate, Tenant drawings, 2/21/14
- Packer Avenue Marine Terminal Proposed Improvement Plan drawings, 2/25/14
- PAMT 1995-7-7 Substation and Reefer Receptacles drawings
- PAMT 1964-12-4 Packer Avenue Marine Terminal drawings
- PAMT 1968-11-1 Extension Phase I drawings
- PAMT 1969-5-13 Extension Phase II drawings
- PAMT 1970-11-29 Extension Phase III drawings
- PAMT 1971-7-2 Extension Phase IV drawings
- PAMT 1971-7-22 Extension Phase V drawings
- PAMT 1973-7-30 & PAMT 1973-7-1 Extension Phase VI drawings
- PAMT 1972-2-3 Extension Phase V drawings
- PAMT 1976-12-1 Craneway Extension drawings
- PAMT 1976-12-1 Craneway Extension drawings
- PAMT 1991-3-15 Cranerail Extension drawings
- 05-082.1 Building 3 Demolition drawings
- 03-195.4 Reefer Plug Project drawings
- Untitled "As Built" drawing CAD files showing the location of utilities
- Container Crane Conversion Energy Analysis Report, Packer Avenue Marine Terminal, April 2014
- Feasibility Study of STS Gantry Cranes & Dock, Packer Avenue Marine Terminal (PAMT), October 01, 2013
- Gantry Crane Rail Support Structure Study, Packer Avenue Marine Terminal, November 2005
- Lead-Based Paint Inspection, PAMT System Preservation Improvements, July 27, 2011
- Report on Asbestos-Containing Materials Survey, PAMT System Preservation Improvements, August 13, 2010
- City of Philadelphia Asbestos Inspection Report, Building 6, PAMT System Preservation Improvements, August 1, 2010

2 EXISTING CONDITIONS

The existing wharf has historically been divided into 5 berths of 600 feet. Since many of the ships calling the terminal are considerably longer than this length, the wharf operated as three berths of 1,000 feet. The nomenclature in common use at the terminal and many historic documents refer to the different sections of the wharf by the original berth numbers (1-5) and that convention is retained herein for discussion of the existing terminal features.

The current PAMT facility handles a mix of container and break bulk cargo. Most break bulk cargo is stored in warehouse buildings on the terminal and includes a mix of dry storage (Buildings 1, 2A and 6) and cold storage (Infill Building and Building 1A). Some break bulk cargo, consisting mostly of steel coils and other steel products, is stored in the yard at the southeast corner of the terminal. Container storage is provided adjacent to Berths 3-5 and throughout the full length of terminal's backlands. Loaded container storage is grounded and stacked using reach stacker container handlers. Refrigerated containers are stored on chassis in storage row parallel to the wharf and in the center of the terminal. Empty containers are grounded and stacked in the back of the terminal along the terminal boundary adjacent to the Delaware Avenue Service Road.

Heavy lift areas are provided on the wharf at Berths 2, 3 and 4. A rail loop track in the Berths 4 and 5 backlands provides access to the rail loading track along the wharf. Three rail spurs off the loop track provide access to the backlands behind Berths 1-3.

Chassis are stored in the northwest corner of the terminal adjacent to the employee parking area. Maintenance of container handling equipment and transport vehicles occurs in the Vehicle Service Building which is attached to the truck gate canopy and offices. Trucks enter the terminal from Packer Avenue, loop around the Walt Whitman Bridge abutment and are processed through the gate canopy. Outbound trucks pass through the gate canopy, make a left and exit directly onto Delaware Avenue Service Road.

A plan view of the terminal is provided in Figure 2-1 below and a more detailed plan is provided in Appendix A. Further descriptions of site infrastructure characteristics are provided below.

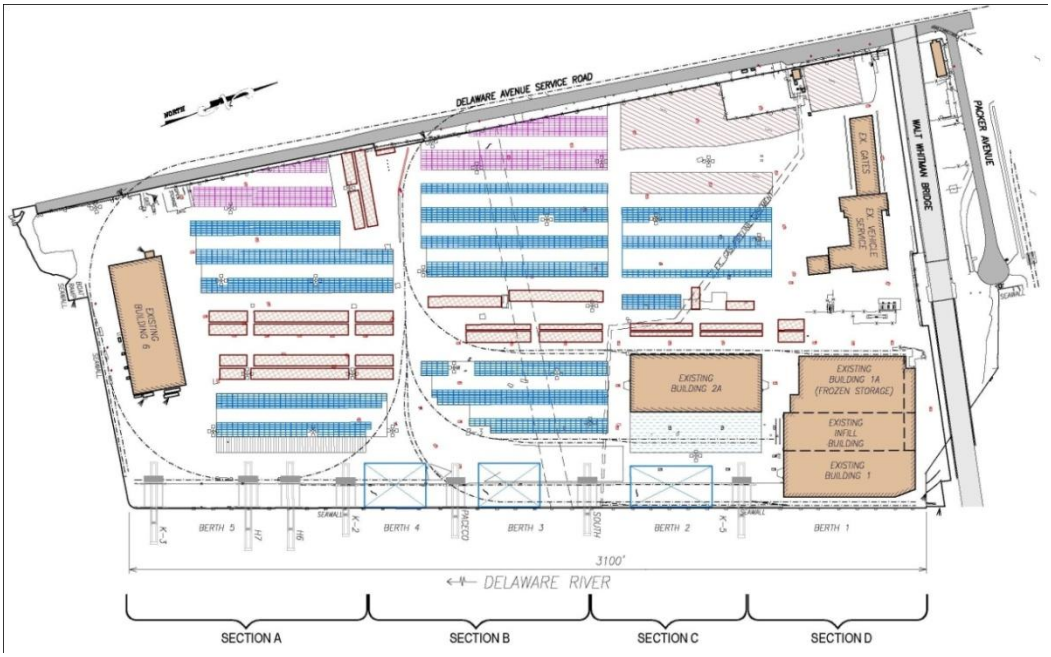


FIGURE 2-1: EXISTING PAMT PLAN

2.1 WHARF

The existing wharf structure is composed of steel sheetpile cells. Waterside and landside crane rail beams are supported on piles driven within and behind the cells respectively. The two crane rail beams are connected with concrete tie beams at regular intervals.

There are seven existing cranes of varying ages and specifications currently in use on the wharf. These include two Hyundai (H) cranes, four Kocks (K) Cranes and one Paceco crane. Specifications for each of these cranes are provided in Figure 2-2. Most existing cranes are not large enough to service the vessels that are expected to call at PAMT.

Specifications	K-3	H-7	H-6	K-2	Paceco	South	K-5 (CNTR)	K-5 (H Lift)
Date of Commissioning	1973	2004	2004	1969	1988	1984	1979	
Capacity under spreader	45 Tons	65 Tons	65 Tons	45 Tons	45 Tons	45 Tons	45 Tons	375 Tons
Capacity under hook	50 Tons	75 Tons	75 Tons	50 Tons	50 Tons	50 Tons	50 Tons	
Boom Height above dock	102' 06"	127'	127'	102' 06"	104' 04"	106'	106'	
Boom Height above M.L.W.	111'	135' 06"	135' 06"	111'	112' 10"	114' 06"	114' 06"	
Lift Height above dock	78" 06"	110'	110'	78' 06"	90'	82'	90'	
Boom Outreach (FT)	121' 06"	150'	150'	111' 06"	125'	115'	113' 06"	62'
Boom Outreach (Containers)	13	17	17	12	14	12	13	6
Total Lifting Height	130'	155'	155'	130'	140'	130'	130'	107'
Backreach Distance	94'	80'	80'	94'	50'	26' 03"	37' 06"	
Rail gauge	90'	90'	90'	90'	90'	83'	90'	
Overall width	86'	88'	88'	86'	84.5'	80'	110'	
Clearance between legs	62'	60'	60'	62'	55'	45'	62'	
Overall boom width (inc. all parts)	32' 09"	29' 6"	29' 6"	32' 09"	25' 04"	29'	33'	
Main Hoist (loaded) fpm	150 fpm	174 fpm	174 fpm	150 fpm	150 fpm	110 fpm	90 fpm	
Main Hoist (empty) fpm	300 fpm	558 fpm	558 fpm	300 fpm	360 fpm	220 fpm	180 fpm	
Trolley (loaded) fpm	480 fpm	787fpm	787fpm	480 fpm	500 fpm	410 fpm	400 fpm	
Trolley (empty) fpm	480 fpm	787fm	787fpm	480 fpm	500 fpm	410 fpm	400 fpm	
Twin 20'	Yes Empty	Yes-65T	Yes-65T	Yes Empty	Yes Empty	NO	NO	

Existing crane attributes that inhibit PAMT from accommodating larger vessels.

FIGURE 2-2: PACKER AVENUE MARINE TERMINAL CRANE SPECIFICATIONS

2.2 POWER AND LIGHTING

Electric power on the terminal is distributed from one main substation located near existing building 2A to unit substations throughout the terminal. These stations serve the approximately 1,180 existing reefer plugs and approximately 22 existing high-mast light poles. The existing power service on site will be inadequate to power the new cranes. New cranes may need to run on temporary diesel power until additional service can be provided. The PRPA and the PAMT terminal operator are currently planning power sourcing with PECO.

2.3 UTILITIES

The existing fire water system is distributed by means of underground piping to fire hydrants and building suppression systems throughout the terminal. Potable water, telecommunications and sanitary service are currently provided to all buildings on the terminal. Existing on-site utility services will be used during terminal reconstruction.

The existing storm drainage system collects storm water from inlets throughout the terminal yard and releases to the river. It is anticipated that the reconstructed storm system will be able to use the existing outfalls.

Two existing easements cross the terminal in roughly a west-to-east direction. These include an existing Williams Gas Pipeline and a Philadelphia Water Department storm sewer, both of which cross under the wharf at existing berth 3.

2.4 GRADING AND PAVEMENT

The terminal was designed for a chassis operation and the paving was designed/built accordingly. Existing yard pavement is typically a 1.5-inch bituminous wearing course over a 6" bituminous base course and a 2" sand sub base. Along the wharf apron, the existing pavement is typically a 1.5-inch bituminous wearing course over a 15" bituminous base course and 2" sand sub base. In some areas of the wharf apron an additional 6" undercut of granular material was also provided.

The existing grading of the site is incompatible with RTG operations as grades are too steep in most locations. The terminal will need to be re-graded. The existing rail loop and spurs will also interfere with RTG operations.

2.5 BUILDINGS

Buildings at the terminal are generally steel-framed structures with concrete and asphalt floors and knee walls, and corrugated siding and roofing. All buildings are pile-supported. Building 1A and Infill Building are used for cold storage. Buildings 1, 2A and 6 are used for dry storage. The Vehicle Service Building houses shop facilities with equipment and supplies for maintenance of chassis and container handling equipment. All of these buildings will soon become functionally obsolete and will be removed to allow densification of container storage as part of the terminal modernization.

2.6 HAZARDOUS MATERIALS

The presence of hazardous materials including asbestos and lead based paint has been noted in past studies conducted at the terminal. A visual assessment of the terminal was conducted on April 29, 2014, to verify the assumed presence of these materials, as well as hazardous materials and universal wastes (HM/UW) and underground storage tanks. Known and assumed asbestos containing material (ACM) was identified in several buildings (floor tile, roof flashing, etc.) to be demolished as part of this project. HW/UW materials including miscellaneous petroleum products, duct plugging materials and fluorescent light tubes, were encountered throughout the site.

All of the identified hazardous material conditions described above will need to be addressed during construction of the proposed project. For detailed findings and recommendations, see the Assessment Letter Report in Appendix B.

3 FULL BUILD TERMINAL PLAN

The full build development plan is shown in Figure 3-1 below. A more-detailed plan is provided in Appendix A. This plan includes all the modernization components required to completely develop the full build concept. This full build modernization plan will triple the current throughput capacity of the PAMT and enable it to handle larger vessels already accommodated at other USEC and global ports. The following summaries include a brief description of key attributes of the development program. While the new truck access gate is included in the plan, the cost of this improvement is not part of the estimated development costs since it is already under construction. The following summaries describe the key attributes of major development categories of the modernization plan to convert PAMT to a full RTG/Empty Handler operation.

3.1 DEMOLITION

The existing dry storage buildings will all be demolished to provide room for additional container storage and extension of crane rails into Berth 1. Almost all existing pavement will be demolished to allow regrading of the site to accommodate RTG operations. The majority of the existing drainage structures, fire water system and electrical distribution system on the terminal will need to be removed due to changes in grading and facility configuration. Over time, to continue expanding the terminal's container throughput capacity, the dry and cold storage warehouses will also be demolished.

3.2 WHARF

Existing crane rails at the wharf are 90-foot gauge at berths 2 through 5 with an additional landside crane rail at 83-foot, 6-inch gauge at berths 2 and 3. The new cranes will be 100-foot-gauge. To accommodate the new cranes, a new landside rail will be constructed 100 feet inboard of the existing waterside rail for the full length of the wharf. The existing waterside crane rail will be strengthened to accommodate the heavier wheel loads of the new larger cranes.

In order to accommodate continuous operation with the existing cranes during construction and until new 100–foot gauge cranes are purchased, the existing waterside rail and 90-foot gauge landside rail will be extended into Berth 1.

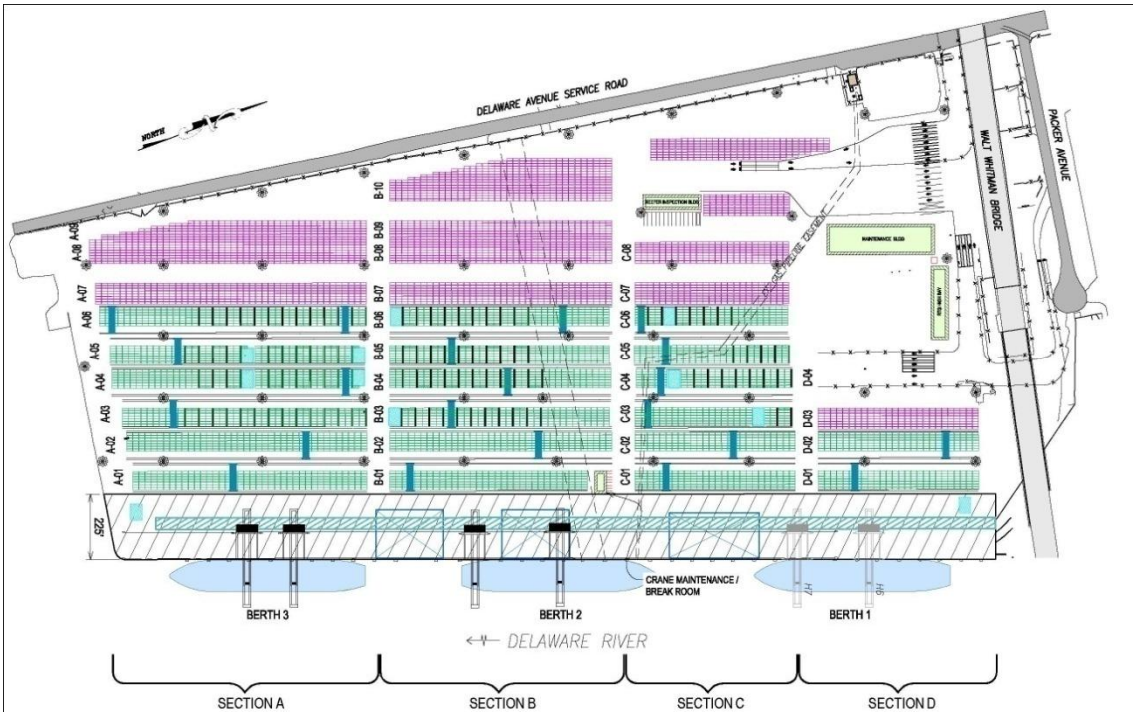


FIGURE 3-1: FULL BUILD PLAN

3.3 SITE WORK

Sitework for the full buildout will include regrading and new pavement and subbase for the entire site. Three types of pavements will be developed: a) for accommodating over-the-road trucks (OTR) at the gate / terminal entrance and circulation areas; b) for accommodating side pick / empty handler equipment; and c) RTG runways. New striping and signage for the proposed RTG blocks, wharf, terminal circulation lanes and building structures will be included.

3.4 UTILITIES

Utility work will include a new storm drainage system tied into the existing outfalls, required due to the site grading changes, and a new fire-water distribution system required for the changes in yard configuration.

3.5 POWER DISTRIBUTION

Additional electric service will be required to accommodate the increased load for the new cranes. The new service will feed a new main substation, which in turn will feed two new unit substations at either end of the wharf.

Another new main substation will be added to power the reefers and yard lights. Power will be distributed from there to new unit substations throughout the terminal. A total of 2,160 refer plugs will be provided to accommodate stacked refrigerated containers in 74 new refer racks.

3.6 BUILDINGS

The proposed buildout will include a new Maintenance and Repair Building for servicing smaller equipment, such as chassis and empty handlers, and an RTG High-Bay building for servicing RTG's. A Crane Maintenance and Break-Room building will also be provided along the wharf.

3.7 EQUIPMENT

Four of the seven existing ship to shore cranes will be replaced with new cranes. The two existing Hyundai cranes will be converted from diesel to electric power. The existing Paceco crane will remain diesel-powered. Thirty-two new hostlers, 32 chassis / bomb carts, 10 empty handlers / side picks and 21 RTGs will be acquired over the course of the modernization program.

Each piece of equipment has been sized to accommodate the terminal plan described above. The RTGs will stack containers seven-wide and five-high while providing a truck load lane. Empty handlers will be able to stack containers seven-high and the new ship-to-shore cranes will be able to load / unload a vessel with containers stowed 22-wide above deck. The existing cranes to be retained will be able to load / unload a vessel with containers stowed 18-wide above deck.

Terminal operating systems and associated hardware are not included in this estimate and are assumed to be provided by the terminal operator. Maintenance costs for equipment are likewise not included.

4 ESTIMATED CAPITAL IMPROVEMENT COSTS

Conceptual level development and equipment acquisition costs were estimated for the full build plan. These costs were developed using available data and assumptions required where site or design information was not available. The following assumptions were used during the development of the estimated costs:

- All costs are in 2014 $US
- All costs are conceptual and no design / study effort has been performed to date
- Only costs for developing primary infrastructure and acquiring major container handling equipment were estimated:

  - Specification, acquisition and delivery costs are included for container handling equipment
  - Building fit out and furnishings are not included
  - Maintenance equipment (i.e. tools, parts, overhead shop cranes) are not included
  - Office and building supplies are not included
- Potable Water and Sanitary tie-ins for new buildings are included with the building costs
- Electric Service assumed to be distributed by two new main substations, one serving lights and reefers and the one serving the cranes
- Since the full buildout will not result in any increase in impervious area on the terminal, it is assumed that storm water will continue to drain directly to the river without on-site detention or treatment
- Operating costs (power, energy, labor) are not included
- Ongoing annual maintenance costs are not included

The full build estimated costs are provided in Figure 4-1 below. These costs were estimated for defined items under each major cost category. Details of the cost items including unit costs, quantifies and assumptions are included in Appendix C.

Item	Estimated Cost
Wharf	$15,040,441
Site Work	$80,022,162
Utilities	$83,866,542
Buildings	$13,402,800
Equipment	$100,450,000
Demolition	$49,535,413
Total Construction Cost	$342,317,357
Contingencies for unknown Conditions	$89,676,075
Design Contingencies	$24,186,736
Total Cost	$456,180,000

FIGURE 4-1: FULL BUILD CAPITAL COST SUMMARY

5 DEVELOPMENT STRATEGY

The operating strategy and capacity analysis provided in the Operational Analysis Report and the container demand forecast included in the recent 2014 USDOT TIGER Grant Application, were used to identify the quantity of required infrastructure and major equipment as well as the timing and sequencing of terminal development through 2030. Permitting requirements were reviewed and identified for the full project and each phase.

5.1 PERMITTING REQUIREMENTS

5.1.1 REQUIRED PERMITS

In order to disturb earth in the City of Philadelphia, owners are required to obtain permits from several City agencies including the Philadelphia Water Department (PWD). In addition to a PWD Permit, State and federal permits may be required and should be confirmed during design efforts.

The Philadelphia Water Department requires specifications for stormwater detention and retention which are outlined in the Philadelphia Stormwater Management Regulations. The Regulations specify requirements for water quality and water quantity / flood control. Some areas of the PAMT will qualify for a Conditional Direct Discharge which waves the requirements for water quantity and flood control.

The project will not involve work within the Delaware River or in wetlands. Construction activities will be land-based including building and pavement demolition and other soil disturbing activities. Since construction of the project will involve soil disturbance, authorization under Pennsylvania DEP's NPDES General Permit for Discharges of Stormwater Associated with Industrial Activities (PAG-03) (3500-PM-WSFR0083) is required.

According to the Pennsylvania DEP Delaware Estuary Coastal Zone Boundary Map #9, the project is located within the Delaware Estuary Coastal Zone. Per the Pennsylvania DEP Coastal Resources Management website, coastal zone consistency review is required for federal financial assistance to State and local governments. Therefore, should the project be federally funded, a Pennsylvania DEP coastal consistency determination would be required.

5.1.2 NEPA COMPLIANCE

Should the project have federal funding or require federal permits or approvals, National Environmental Policy Act (NEPA) compliance would be required. NEPA requires an assessment of all potential impacts of the project. Federal agencies have NEPA implementing regulations which guide the determination of whether a project qualifies as a categorical exclusion (CE) or requires an environmental assessment (EA) or environmental impact statement (EIS).

5.2 DESIGN AND CONSTRUCTION

To minimize disruption to ongoing operations and cargo throughput, the PAMT terminal redevelopment is divided into six distinct design and construction phases. Each phase includes demolition of existing infrastructure, new construction and major equipment acquisition / refurbishment. Phases that include container yard improvements will commence with demolition of existing buildings, pavement and utilities within each yard section. New buildings will be constructed where applicable. The site will be re-graded and new utilities and pavement installed. Equipment will be procured / refurbished sufficient to operate the subject yard section. Each development phase will include permitting, study / design and construction efforts.

5.3 PHASING PLANS

5.3.1 DEMAND VS. CAPACITY

A comparison of the PAMT cargo forecast against the phased throughput capacity is represented in Figure 5-1. Throughput capacity values represent a combination of existing capacity that is out of service during construction and increased throughput capacity once each development phase is completed. During the Section B and Section A development in phases 3 and 4, potential container cargo volumes are anticipated to be constrained by throughput capacity. The PAMT terminal operator will have access to and use of the Publicker site to offset the temporary loss of PAMT container storage yard during construction phases. The Publicker site is directly adjacent and north of the PAMT.

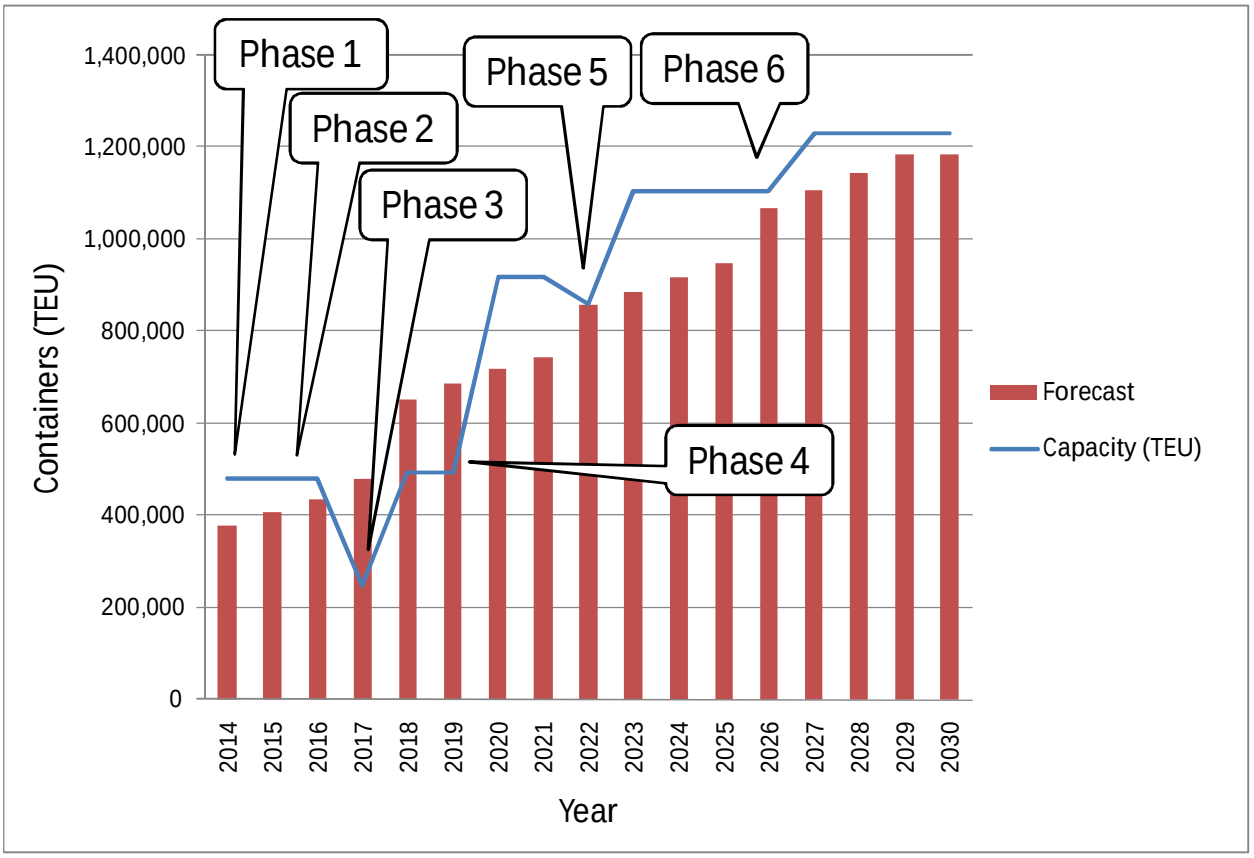


FIGURE 5-1: FORECASTED CONTAINER DEMAND VS. THROUGHPUT CAPACITY

5.3.2 PHASE 1 – TRUCK GATE

Phase 1 comprises the enhancement of the existing truck gate and gate canopy, and replacement with a new automated gate. This development of an automated gate system is currently underway and being constructed by the terminal operator. Costs for this work are not addressed in this report. Refer to Figure PH1 in Appendix A for a depiction of the entire terminal at the completion of Phase 1.

5.3.3 PHASE 2 – WHARF

This phase includes the demolition of Building 1, extension of the existing 90-foot gauge landside crane rail into Berth 1, construction of a new 100-foot gauge landside crane rail for the full length of the wharf, and strengthening of specific portions of the existing waterside crane rail. Two exiting quay cranes (K5 and South) will be removed and two new quay cranes will be purchased. PAMT at completion of this phase is shown in Figure PH2 of Appendix A.

5.3.4 PHASE 3 – SECTION B

Improvements during this phase comprise the reconstruction of approximately 24.5 acres of the central portion of the container yard, construction of the wharfside Crane Maintenance / Break Room building, and the purchase of two new quay cranes and six new RTGs. This phase also includes the demolition of the existing vehicle service building and construction of the new Maintenance Building, RTG High Bay building, Fuel Station and Open Maintenance Area to accommodate the operation of this initial and all follow on reconstructed sections. Figure PH3 in Appendix A provides a diagram of the terminal at completion of Phase 3.

5.3.5 PHASE 4 – SECTION A

Phase 4 consists of demolishing Building 6, electrifying two existing quay cranes (H6 and H7), purchasing seven new RTGs, and reconstruction of approximately 25.7 acres of the southern portion of the container yard. See Figure PH4 in Appendix A includes a depiction of the terminal at the completion of Phase 4.

5.3.6 PHASE 5 – SECTION C

Demolition of Building 2A, removal of two existing quay cranes (K-2 and K3), purchase of six new RTGs, and reconstruction of approximately 18.5 acres of the container yard to the north of Section B, comprise Phase 5 improvements. PAMT at the completion of Phase 5 is shown in Figure PH5 of Appendix A.

5.3.7 PHASE 6 – SECTION D

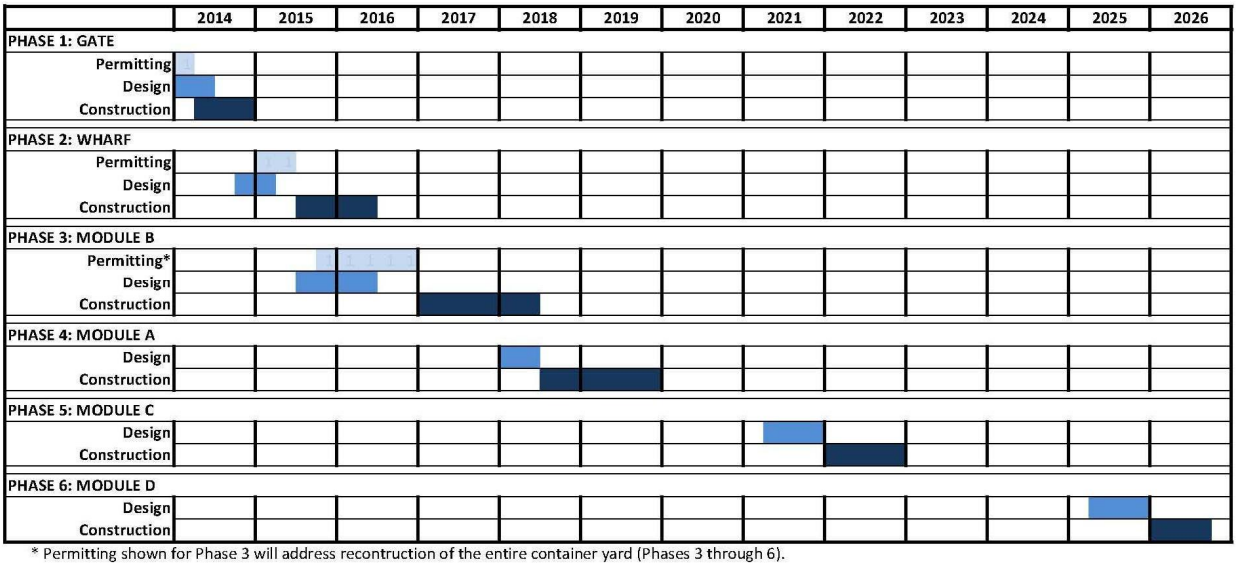
The improvements in this phase include the demolition of existing Buildings 1A and Infill, then reconstruction of the final 8.7 acres of the at the north end of the terminal and the purchase of two RTGs. The Full Build Plan in Figure 2-1 shows the completion of this phase and the full project. A more detailed view is provided in Figure FB1 in Appendix A.

6 CAPITAL IMPROVEMENT PLAN

Considering the permitting requirements, development phases and their related sequencing described in Section 5, a Capital Improvement Plan (CIP) was developed for the modernization of PAMT. The following sections comprise the CIP by describing the development schedule timing of capital improvements.

6.1 PROGRAM SCHEDULE

The anticipated development schedule is presented in Figure 6-1 below.



* Permitting shown for Phase 3 will address recontruction of the entire container yard (Phases 3 through 6).

FIGURE 6-1: CONCEPTUAL DEVELOPMENT SCHEDULE

6.2 PHASED COSTS

Conceptual level development and equipment acquisition costs were estimated by phase based on the assumptions included in Section 4 and the cost estimates tables provided in Appendices D through H. The costs by phase are presented in Figure 6-2 below. Note that costs for the new truck gate (Phase 1) are not included herein.

PHASE	Permit, Planning, Design	Construction	Equipment	Contingency	TOTAL
2: Wharf	$3,832,086	$38,320,859	$24,300,000	$14,627,301	$81,080,000
3: Section B	$7,463,929	$74,639,285	$37,800,000	$28,013,750	$147,917,000
4: Section A	$6,275,796	$62,757,958	$19,500,000	$22,940,285	$111,474,000
5: Section C	$4,330,012	$43,300,122	$14,100,000	$15,860,043	$77,590,000
6: Section D	$2,284,913	$22,849,132	$4,750,000	$8,234,696	$38,119,000

FIGURE 6-2: DEVELOPMENT COSTS BY PHASE

APPENDIX A – DRAWINGS

NORTH

DELAWARE AVENUE SERVICE ROAD

EX. STORM DRAIN EASEMENT

EX. RAILROAD GATE

EX. SOUTHGATE "BREAKBULK"

EX. GUARD HOUSE

EX. YARD HUSTLER PARKING

EX. RAILROAD GATE

EX. FIRE PUMP STATION

EX.IST CUSTOMS RADIATION SCANNING PORTALS

40' CHASSIS STORAGE

20' CHASSIS STORAGE

45' CHASSIS STORAGE

40' CHASSIS STORAGE STACK

EMPLOYEE PARKING

EXIST (OUT) LANES

EXIST (IN) LANES

EX. GATES

EX. CONTAINER GATE

EX. VEHICLE SERVICE

EX. ADMIN OFFICE

WALT WHITMAN BRIDGE

PACKER AVENUE

PUBLICKER SITE

EXIST BRIDGE ABUTMENT

EXIST TRUCK SCALE

EXIST NORTH GATE

SEAWALL

EXIST GUARD HOUSE

EX. GASOLINE EASEMENT

EX. SUBSTATION

A-16 A-15 A-14 A-13 A-12 A-11 A-10 A-9 A-8 A-7 A-6 A-5 A-4 A-3

B-20 B-19 B-18 B-17 B-16 B-15 B-14 B-13 B-12 B-11 B-10 B-9 B-8 B-7 B-6 B-5 B-4 B-3 B-2

C-18 C-17 C-16 C-15 C-14 C-13 C-12 C-11 C-10 C-9

D-10 D-9

R-16 R-15

BOAT RAMP SEAWALL

RORO BERTH

EXISTING BUILDING 6

EX. SEWAGE LIFT SATATION

EX. MARINE CRANE OPS TRAILERS

EXISTING BUILDING 2A

EXISTING BUILDING 1A (FROZEN STORAGE)

EXISTING INFILL BUILDING

EXISTING BUILDING 1

SEAWALL

K-3

BERTH 5

H7

H6

K-2

BERTH 4

PACECO

BERTH 3

SOUTH

BERTH 2

K-5

SEAWALL

BERTH 1

HEAVY LIFT AREA

EX. TRESTLE

3100'

DELAWARE RIVER

EX. MOORING DOLPHIN

SECTION A

SECTION B

SECTION C

SECTION D

LEGEND:

- EX. STORM DRAIN INLET
- EX. RAIL TRACKS
- EX. FENCE
- EX. LIGHT POLES
- REACH STACKER CONTAINER YARD
- REACH STACKER EMPTY CONTAINER YARD
- EX. REEFERS
- CHASSIS AREA STORAGE
- STACKING LIMITATION DUE TO GRADE OR CONDITION
- EXISTING BUILDINGS

0 300 600

SCALE IN FEET

PARSONS BRINCKERHOFF

TITLE :

EXISTING TERMINAL

PHILADELPHIA REGIONAL PORT AUTHORITY
PACKER AVENUE MARINE TERMINAL

DATE : JUNE 16, 2014

DWG NO. : E1

NORTH

45' CHASSIS STORAGE

40' CHASSIS STORAGE STACK

40' CHASSIS STORAGE

DELAWARE AVENUE SERVICE ROAD

EXIST CHASSIS STORAGE

WALT WHITMAN BRIDGE

PACKER AVENUE

DAM

GATE

GATE

SLOPED STORAGE AREA

BOAT RAMP

SEAWALL

EXISTING BUILDING 6

SEAWALL

EX. GASOLINE ISLAND

EX. VEHICLE SERVICE

SEAWALL

EXISTING BUILDING 2A

EXISTING BUILDING 1A (FROZEN STORAGE)

EXISTING INFILL BUILDING

EXISTING BUILDING 1

SEAWALL

SEAWALL

K-3

BERTH 5

H7

H6

K-2

BERTH 4

PACECO

BERTH 3

SOUTH

BERTH 2

K-5

BERTH 1

3100'

DELAWARE RIVER

LEGEND:

- DI EX. STORM DRAIN INLET
- EX. RAIL TRACKS
- EX. FENCE
- EX. LIGHT POLES
- REACH STACKER CONTAINER YARD
- REACH STACKER EMPTY CONTAINER YARD
- EX. REEFERS
- CHASSIS AREA STORAGE
- STACKING LIMITATION DUE TO GRADE OR CONDITION
- EXISTING BUILDINGS

0 300 600

SCALE IN FEET

PARSONS BRINCKERHOFF

TITLE :

PHASE 1 LAYOUT

PHILADELPHIA REGIONAL PORT AUTHORITY
PACKER AVENUE MARINE TERMINAL

DATE : JUNE 16, 2014

DWG NO. : PH1

NORTH

45' CHASSIS STORAGE

40' CHASSIS STORAGE STACK

40' CHASSIS STORAGE

DELAWARE AVENUE SERVICE ROAD

WALT WHITMAN BRIDGE

PACKER AVENUE

DAM

GATE

GATE

SUPER STORAGE GATE

BOAT RAMP SEAWALL

EXISTING BUILDING 6

SEAWALL

EX. GASOLINE STATION

EX. VEHICLE SERVICE

SEAWALL

EXISTING BUILDING 2A

EXISTING BUILDING 1A (FROZEN STORAGE)

EXISTING INFILL BUILDING

225'

SEAWALL

BERTH 5

BERTH 4

BERTH 3

BERTH 2

BERTH 1

K-3

H7

H9

K-2

PACECO

CRANE SUBSTATION (TYP.)

3100'

DELAWARE RIVER

LEGEND:

- EX. STORM DRAIN INLET
- EX. RAIL TRACKS
- EX. FENCE
- EX. LIGHT POLES
- REACH STACKER CONTAINER YARD
- REACH STACKER EMPTY CONTAINER YARD
- EX. REEFERS
- CHASSIS AREA STORAGE
- STACKING LIMITATION DUE TO GRADE OR CONDITION
- EXISTING BUILDINGS

0 300 600

SCALE IN FEET

PARSONS BRINCKERHOFF

TITLE :

PHASE 2 LAYOUT

PHILADELPHIA REGIONAL PORT AUTHORITY
PACKER AVENUE MARINE TERMINAL

DATE : JUNE 16, 2014

DWG NO. : PH2

NORTH

DELAWARE AVENUE SERVICE ROAD

45' CHASSIS STORAGE

40' CHASSIS STORAGE STACK

40' CHASSIS STORAGE

DAM

GATE

GATE

OPEN STORAGE GATE

BOAT RAMP

SEAWALL

EXISTING BUILDING 6

SEAWALL

EX. CATENARY LIGHT

MAINTENANCE BLDG

RTG HIGHWAY

WALT WHITMAN BRIDGE

PACKER AVENUE

SEAWALL

EXISTING BUILDING 2A

EXISTING BUILDING 1A (FROZEN STORAGE)

EXISTING INFILL BUILDING

225'

SEAWALL

SEAWALL

K-3

BERTH 5

BERTH 4

BERTH 3

BERTH 2

H7

H6

K-2

BERTH 1

PACECO

CRANE SUBSTATION (TYP.)

BERTH 3

BERTH 2

3100'

BERTH 1

DELAWARE RIVER

LEGEND:

- EX. STORM DRAIN INLET
- EX. RAIL TRACKS
- EX. FENCE
- EX. LIGHT POLES
- REACH STACKER CONTAINER YARD
- REACH STACKER EMPTY CONTAINER YARD
- EX. REEFERS
- CHASSIS AREA STORAGE
- STACKING LIMITATION DUE TO GRADE OR CONDITION
- EXISTING BUILDINGS

0 300 600

SCALE IN FEET

PARSONS BRINCKERHOFF

TITLE :

PHASE 3 LAYOUT

PHILADELPHIA REGIONAL PORT AUTHORITY
PACKER AVENUE MARINE TERMINAL

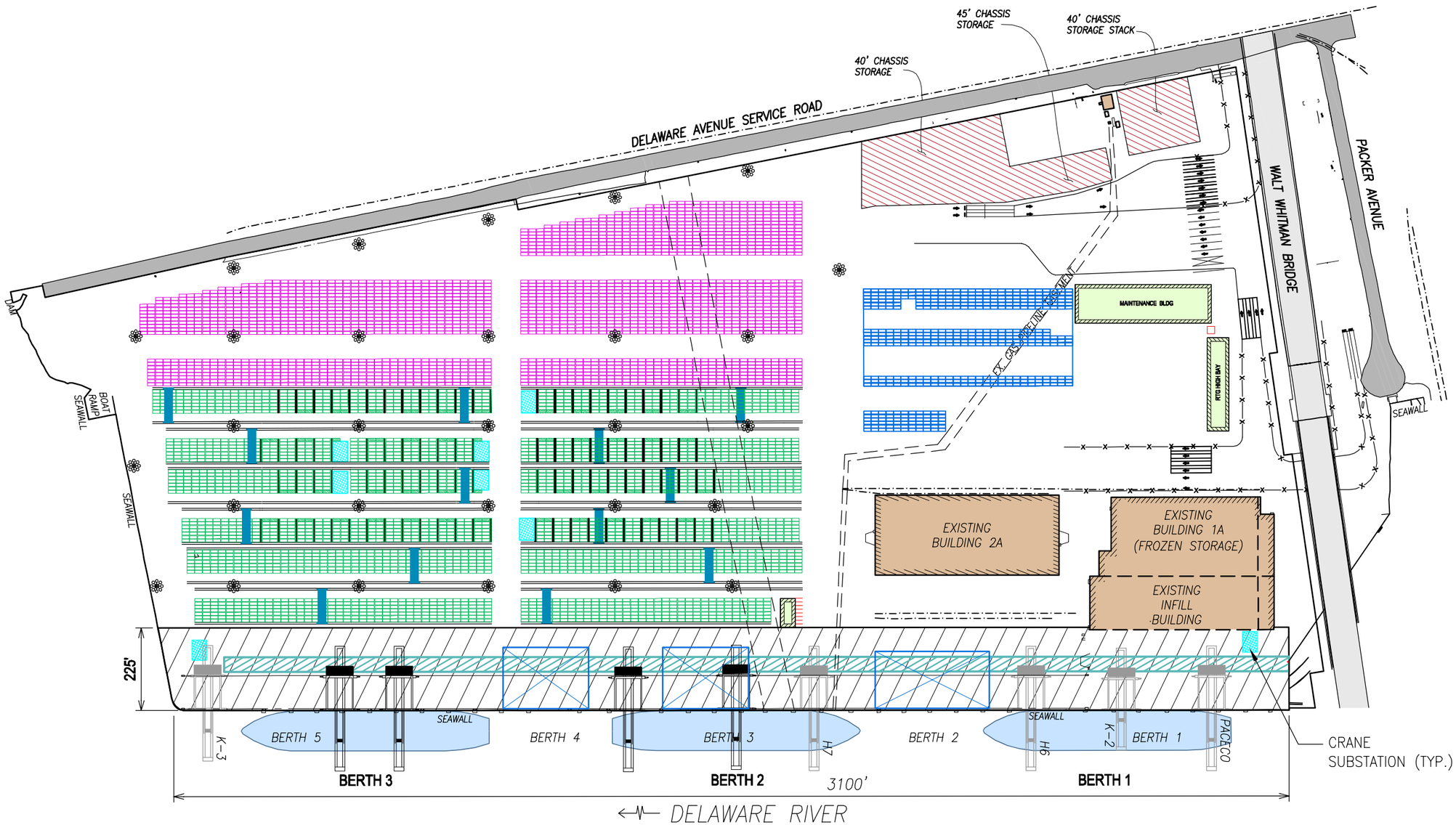
DATE : JUNE 16, 2014

DWG NO. : PH3

NORTH

LEGEND:

- EX. STORM DRAIN INLET
- EX. RAIL TRACKS
- EX. FENCE
- EX. LIGHT POLES
- REACH STACKER CONTAINER YARD
- REACH STACKER EMPTY CONTAINER YARD
- EX. REEFERS
- CHASSIS AREA STORAGE
- STACKING LIMITATION DUE TO GRADE OR CONDITION
- EXISTING BUILDINGS



0 300 600

SCALE IN FEET

PARSONS BRINCKERHOFF

TITLE :

PHASE 4 LAYOUT

PHILADELPHIA REGIONAL PORT AUTHORITY
PACKER AVENUE MARINE TERMINAL

DATE : JUNE 16, 2014

DWG NO. : PH4

NORTH

DELAWARE AVENUE SERVICE ROAD

PACKER AVENUE

WALT WHITMAN BRIDGE

GAS PIPELINE EASEMENT

REEFER INSPECTION BLDG

MAINTENANCE BLDG

ARMORY

BOAT RAMP

SEAWALL

SEAWALL

SEAWALL

EXISTING BUILDING 1A (FROZEN STORAGE)

EXISTING INFILL BUILDING

225'

BERTH 4

BERTH 2

BERTH 3

BERTH 2

3100'

BERTH 1

H7

H6

PACECO

CRANE SUBSTATION (TYP.)

DELAWARE RIVER

LEGEND:

- EX. STORM DRAIN INLET (DI)
- EX. RAIL TRACKS
- EX. FENCE
- EX. LIGHT POLES
- REACH STACKER CONTAINER YARD
- REACH STACKER EMPTY CONTAINER YARD
- EX. REEFERS
- CHASSIS AREA STORAGE
- STACKING LIMITATION DUE TO GRADE OR CONDITION
- EXISTING BUILDINGS (EXISTING BUILDING 1A (FROZEN STORAGE))

0 300 600

SCALE IN FEET

PARSONS BRINCKERHOFF

TITLE :

PHASE 5 LAYOUT

PHILADELPHIA REGIONAL PORT AUTHORITY
PACKER AVENUE MARINE TERMINAL

DATE : JUNE 16, 2014

DWG NO. : PH5

NORTH

OUT GATE LANE

OPEN MAINTENANCE, EQUIPMENT FUELING & PARKING

FUEL STATION

DELAWARE AVENUE SERVICE ROAD

WALT WHITMAN BRIDGE

PACKER AVENUE

REEFER INSPECTION BLDG

MAINTENANCE BLDG

RTG HIGH MAY

GAS PIPELINE EASEMENT

A-09 A-08 A-07 A-06 A-05 A-04 A-03 A-02 A-01

B-10 B-09 B-08 B-07 B-06 B-05 B-04 B-03 B-02 B-01

C-08 C-07 C-06 C-05 C-04 C-03 C-02 C-01

D-04 D-03 D-02 D-01

IN GATE LANE

225'

CRANE MAINTENANCE / BREAK ROOM

CRANE SUBSTATION (TYP.)

LH7

9H6

BERTH 3

BERTH 2

BERTH 1

DELAWARE RIVER

SECTION A

SECTION B

SECTION C

SECTION D

0 300 600

SCALE IN FEET

LEGEND:

- PROPOSED RTG STACK
- PROPOSED REEFER STACK
- PROPOSED EMPTY STORAGE
- PROPOSED REEFER SUBSTATIONS
- BERTHING AREA
- PARKING AREA
- HATCH COVER AREA
- PROPOSED BUILDINGS
- PROPOSED RTG
- EXISTING CRANE
- PROPOSED NEW CRANE
- LIGHT POLE/FIRE HYDRANT

PARSONS BRINCKERHOFF

TITLE :

FULL BUILDOUT LAYOUT

PHILADELPHIA REGIONAL PORT AUTHORITY
PACKER AVENUE MARINE TERMINAL

DATE : JUNE 16, 2014

DWG NO. : FB1

APPENDIX B – HAZARDOUS MATERIALS SITE ASSESSMENT

May 20, 2014

RE: Philadelphia Regional Port Authority
Packer Avenue Marine Terminal
Hazardous Materials Visual Assessment Report

On April 29, 2014 Parsons Brinckerhoff, Inc. – Hazardous Materials Group (herein referred as PB) has performed a visual assessment of the Packer Avenue Marine Terminal (PAMT), located at South Columbus Boulevard, Philadelphia, PA 19148 (herein referred as Proposed Project Area). This visual assessment was performed to verify the assumed presence of asbestos–containing materials (ACM), lead–based paint (LBP), hazardous materials and universal wastes (HM/UW) and underground storage tanks (USTs) associated with the existing buildings and structures within the Proposed Project Area. In addition, a visual inspection was also performed to assess any other potential hazardous materials that may impact the proposed scope of work. The findings and recommendations are presented in this Hazardous Materials Visual Assessment Letter Report. No testing for ACM, LBP or HW/UW was performed during this Visual Assessment effort.

SCOPE OF WORK:

The proposed Scope of Work (SOW) includes demolition of five (5) buildings, entrance gates and relocation of the associated utilities. The new construction also requires demolition of the existing pavement and utilities relocation include relocation of the fire hydrants, demolition of the existing electrical power and telecommunication lines, demolition of the existing electrical feeders and manholes, as well as removal of the existing site lighting.

ASSESSMENT FINDINGS:

1. ASBESTOS-CONTAINING MATERIALS

PB has reviewed available previous asbestos survey reports performed at the Proposed Project Area. These reports were provided by the Philadelphia Regional Port Authority and included:

- Report of Asbestos – Containing Materials Survey at PAMT System Preservation Improvements, Packer Avenue Terminal , Philadelphia, PA, prepared by Criterion Laboratories, Inc. and dated August 26, 2010
- City of Philadelphia Asbestos Inspection Report for PAMT System Preservation Improvements, Packer Avenue Terminal – Building #6, prepared by Criterion Laboratories, Inc. and dated August 1, 2011

The following materials were identified as ACM contains asbestos greater than 1% asbestos) in these reports:

<u>Building #1:</u>

- White Fireproofing in the Men's Room of the Boiler Room
- Valve Insulation in the Men's Room of the Boiler Room
- Block Pipe Insulation in the Men's Room of the Boiler Room

Building #1A:

- Roof Flashing
- Heat Exchange Insulation (GSA 1982) in the 2nd Floor Mechanical Room
- Black Tar Material on Wall Near Stairwell in the 2nd Floor Mechanical Room
- Large Diameter Fittings A/W Fiberglass Pipe Insulation in the Freezer

Building #6:

- Floor Tiles and Associated Mastic in the Office
- Black Roofing Tar on the Roof Around Edges
- Exterior Sealant on Corrugated Metal Walls

No previous asbestos survey data, pertinent to the Building #2A, Maintenance Building, Gates and Terminal Grounds, was available for PB's review.

1.1 ASBESTOS ABATEMENT ASSOCIATED WITH BUILDINGS DEMOLITION

The following materials identified as ACM in the previous reports as well as observed in the assessed buildings throughout the Proposed Project Area and assumed to be ACM will be impacted by the proposed SOW:

Building #1

- White Fireproofing in the Men's Room of the Boiler Room
- Valve Insulation in the Men's Room of the Boiler Room
- Block Pipe Insulation in the Men's Room of the Boiler Room
- Exterior Caulking Sealant on Corrugated Metal Walls (Assumed ACM)
- Exterior Caulking at Cargo Gate Frame (Assumed ACM)
- Roof Flashing (Assumed ACM)

Building #1A

- Roof Flashing
- Heat Exchange Insulation (GSA 1982) in the 2nd Floor Mechanical Room
- Black Tar Material on Wall Near Stairwell in the 2nd Floor Mechanical Room
- Exterior Caulking Sealant on Corrugated Metal Walls (Assumed ACM)
- Exterior Caulking at Cargo Gate Frame (Assumed ACM)

Building #1B

- Large Diameter Fittings A/W Fiberglass Pipe Insulation in the Freezer
- Exterior Caulking Sealant on Corrugated Metal Walls (Assumed ACM)
- Exterior Caulking at Cargo Gate Frame (Assumed ACM)

PB was informed that the roofing membrane at the Building #1B was replaced in the past and roof flashing materials should not be considered to be ACM.

Building #2A

- Roof Flashing (Assumed ACM)
- Exterior Caulking Sealant on Corrugated Metal Walls (Assumed ACM)
- Exterior Caulking at Cargo Gate Frame (Assumed ACM)
- Fittings at Fiberglass Pipe Insulation (Assumed ACM)

Building #6

- 9" x 9" Floor Tile and Associated Mastic in the Checkers Office
- Black Roofing Tar on the Roof Around Edges
- Exterior Sealant on Corrugated Metal Walls
- Exterior Caulking at Cargo Gate Frame (Assumed ACM)

Maintenance Building

- Floor Tile and Associated Mastic in the Offices Area (Assumed ACM)
- Suspended Ceiling Tiles in the Offices Area (Assumed ACM)
- Roofing Membrane Including Flashing (Assumed ACM)
- Exterior Sealant on Corrugated Metal Walls (Assumed ACM)
- Exterior Caulking at Cargo Gate Frame (Assumed ACM)

1.2ASBESTOS ABATEMENT ASSOCIATED WITH ELECTRICAL EQUIPMENT DEMOLITION

The electrical manholes within the Proposed Project Area, which will be impacted by the proposed SOW, were not accessible at the time of this Visual Assessment.

The following assumptions were made during this Visual Assessment effort:

- The demolition or relocation of the electric sub-station and power cables cuts will disturb transite backing board, cable insulation, ark proof tape, duct bank sealant materials, etc. All these materials are assumed to be ACM.
- Underground electrical cables may be installed in the transite duct. Power cable has insulation and arc-proof tape. All these materials are assumed to be ACM.
- Manholes are assumed to have tar/mastic waterproofing membrane (assumed ACM) applied on walls.

1.3ASBESTOS ABATEMENT ASSOCIATED WITH TELECOMMUNICATION EQUIPMENT DEMOLITION

The telecommunication cable systems, including manholes, within the Proposed Project Area were not accessible at the time of this Visual Assessment.

The following assumptions were made during this Visual Assessment effort:

- The existing telecom lines to be removed are installed in transite ducts. This material is assumed to be ACM.
- The Telecom manholes are assumed to have tar/mastic (assumed ACM) applied on walls.

1.4ASBESTOS ABATEMENT ASSOCIATED WITH DEMOLITION OF THE SITE LIGHTING

Site light poles and associated electrical cables will be removed within the Proposed Project Area as part of the proposed SOW.

The following materials were assumed to be ACM during this assessment:

- Caulking/sealant on light pole pedestal
- Gasket materials at access hatches

2. LEAD BASED PAINT

Various painted surfaces were observed during this Visual Assessment. PB also reviewed available previous lead survey report, provided by the Philadelphia Regional Port Authority, entitled:

- Lead- Based Paint Inspection Report for PAMT System Preservation Improvements, Packer Avenue Terminal – Building #6, prepared by Criterion Laboratories, Inc. and dated July 27, 2011

No previous lead survey data, pertinent to the Buildings #1, #1A, #1B, #2A, Maintenance Building, Gates and Terminal Grounds, was available for PB's review.

The U.S. Environmental Protection Agency (EPA) and U.S. Department of Housing and Urban Development (HUD) has established the definition of lead-based paint as a paint or other surface coatings that contain lead equal to or greater than 1.0 milligram centimeter square (1.0 mg/cm^2) when analyzed via X – Ray Fluorescence Spectrometry (XRF), or 0.5% by weight, when analyzed via Atomic Absorption Spectrometry (AAS), (equivalent units are: 5,000 µg/g, 5,000 mg/kg, or 5,000 ppm by weight). Surface coatings include paint, shellac, varnish or any other coating, including wallpaper which covers painted surfaces.

Regulations Relating to Labeling, Application and Removal of Lead Paint issued by the City of Philadelphia Department of Public Health on December 26, 1977 states that any paint, lacquer or other applied liquid surface coating, putty or caulking or other sealing compound with lead content of 0.7 mg/cm^2, or greater, is considered lead – based.

The report's data confirmed presence of LBP on various building components in various locations throughout the inspected Building #6, located at the Proposed Project Area. Based on the fact that Buildings #1, #1A, #6 and Maintenance Building were constructed at the same time and all maintenance and repair work within these buildings was performed by the same crew utilizing the same materials, presence of LBP shall be assumed on the structural building components, similar to those of Building #6.

However, any paint that contains lead, but not in quantity to be classified as LBP as defined by the guidelines listed above, is subject to other regulatory requirements including, but not limited to, Occupational Safety and Health Administration (OSHA) 29 CFR 1926.62 (OSHA – Lead in Construction Standard), 29 CFR 1910.1025 (OSHA – Lead Standard in General Industry) and the *Resource Conservation and Recovery Act* (RCRA) 40 CFR parts 260 through 279.

Based on the proposed SOW, demolition of any painted surface which will be impacted by the proposed scope of work, shall be a subject to the regulatory requirements including, but not limited to, OSHA – Lead in Construction Standard, OSHA – Lead Standard in General Industry and RCRA.

The demolition contractor(s) shall be made aware of the presence of LBP and shall employ all proper engineering controls and work practices to minimize creation of the lead dust.

3. HAZARDOUS MATERIALS AND UNIVERSAL WASTES

The Hazardous/Universal waste materials assessment was performed to reasonably identify those materials that will be impacted and ultimately removed and disposed prior to commencing this work.

The following potential Hazardous Materials (HM) were assumed to be present during this assessment:

- Oil in electrical transformers (PCB-containing)
- Exterior Sealant on Corrugated Metal Walls (PCB-containing)
- Exterior Caulking at Cargo Gate Frame (PCB-containing)
- Duct plugging materials at duct bank in electrical manholes (PCB-containing)
- Fluid in the HV cable jacket (PCB-containing)
- Cable joint enclosure in street light (PCB-containing)
- Miscellaneous petroleum products and chemicals stored throughout the Proposed Project Area
- Petroleum products and chemicals stored throughout the Maintenance Building
- Fluorescent light ballasts in buildings #1, #1A, #1B, #6, Maintenance Building and Gates

The following materials were assumed to be Universal Wastes (UW) during this assessment:

- High Intensity Discharge Lighting (mercury-containing) at the site light fixtures in buildings and site lighting throughout the Proposed Project Area
- Fluorescent light tubes (mercury-containing) throughout the buildings #1, #1A, #1B, #6, Maintenance Building and Gates

4. UNDERGROUND STORAGE TANKS

PB has reviewed available reports pertaining to the Underground Storage Tanks (UST) located at the Proposed Project Area. These reports were provided by the Philadelphia Regional Port Authority and included:

- Aboveground and Underground Storage Tank Assessment Report prepared by Pennoni Associates, Inc. (Pennoni) and dated July 15, 1996
- Underground Storage Tank Closure Report prepared by BGS Environmental, Inc. (BGS) and dated November 3, 1997

According to the Pennoni's report, there were seven (7) USTs identified in the vicinity of the Proposed Project Area.

According to the BGS's report, a 10,000–gallon heating oil UST, located at the Building #1A, was closed and removed from the site.

As discussed during the site visit on April 29, 2014, a UST formerly located at the Maintenance Building was leaking and was removed from the Terminal grounds. However, PB was informed that contaminated soil is still present around the location of the removed tank.

5. RECOMMENDATIONS

5.1 ASBESTOS – CONTAINING MATERIALS (ACM)

Based on the findings of Visual Assessment, PB recommends that all assumed asbestos materials be sampled and tested to determine asbestos content. Prior to demolition of the building and structure as required by the SOW, all materials confirmed to be asbestos – containing during the proposed testing, must be removed by a Philadelphia–licensed Asbestos Abatement Contractor.

5.2 LEAD – BASED PAINT (LBP)

Based on the proposed SOW, demolition of the buildings and structures throughout the Proposed Project Area is subject to regulatory requirements including, but not limited to, 29 CFR 1926.62 (OSHA – Lead in Construction Standard), 29 CFR 1910.1025 (OSHA – Lead Standard in General Industry) and 40 CFR parts 260 through 279 (RCRA).

The paint and/or primer on the metal components throughout the building and structure, which will require cutting, burning, welding, torching, etc. should be abated prior to performing such activities in accordance with all applicable local, State and Federal Regulations.

Demolition work activities that would create dust shall be performed in a controlled manner following safe work practices, good housekeeping activities and best management practices to prohibit dust or fume migration.

5.3 HAZARDOUS AND UNIVERSAL WASTE MATERIALS REMOVAL

All UW (i.e. fluorescent light tubes, high – intensity discharge lamps, batteries and mercury – containing equipment) shall be removed in accordance with all applicable local, State and Federal Regulations.

All PCB materials shall be abated in accordance with all applicable local, State and Federal Regulations.

All asbestos activities, related to the removal of UW, HW and PCB materials shall be performed by the professionals who are licensed and approved in accordance with the applicable rules and regulations for licensure established in the local, State and Federal Regulations.

It is assumed, that all hazardous materials present in the Vehicle Service area located within the Maintenance Building will be removed by the Owner for the future re-use during the normal Terminal operations.

5.4. UNDERGROUND STORAGE TANKS

The proposed SOW will require removal of all remaining USTs within the Proposed Project Area as well as remediation of the contaminated soil at the Maintenance Building. All activities, related to the removal of the UST and contaminated soil shall be performed by professionals who are licensed and approved in accordance with the applicable rules and regulations for licensure established in the local, State and Federal Regulations.

A site specific Health and Safety Plan (HASP), Field Sampling Plan (FSP) and Material Handling Plan (MHP) should be developed prior to commencing any field activities. In addition, air monitoring should be performed during the removal of USTs and contaminated soil remediation.

6. REPORT CERTIFICATION

The conclusions and recommendations contained in this report represent the results of PB's effort on behalf of Philadelphia Regional Port Authority. The assessment findings and recommendations stated in this report represent the actual conditions observed at the inspected locations at the time of PB's inspection. This report shall not be used to imply that all potential Asbestos – Containing Materials, Lead – Based Paint, Universal Waste and PCB materials were addressed in this report.

If you have any questions regarding the findings in the report, please contact me at (212) 465-5282.

Sincerely,

_____

Boris Feldman
Environmental Scientist

APPENDIX C – FULL BUILD COST ESTIMATE

Construction Cost Estimate

Project: Packer Avenue Marine Terminal

Task: Container Terminal

Date: June 25, 2014

Wharf (Berth 1, Strengthening & Landside Railroad)

Item No.	Item	Unit	Unit Cost	Quantity	Item Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	1	$ 294,911	10% of total wharf costs
2	Piles for landside crane rail	LF	$ 105	54,800	$ 5,754,000	Steel pipe: 14" OD x 3/8" wall, concrete filled, 120' long. Includes new 100' gage rail and 90' gage extension. Note: Assumptions taken from similar projects - no geotechnical information available nor structural design performed.
3	Crane rail beam for 100' gage landside crane rail	CY	$ 650	4,300	$ 2,795,000	Cast in Place Beam 4'-6" deep by 7'-0" wide. Include 20% increase in concrete quantity to account for tie-downs/pin sockets. Formed on two sides, bottom cast against ground. 125# rebar/CY. Note: Assumptions taken from similar projects - no structural design performed.
4	Crane rail beam for 90' gage crane rail extension	CY	$ 650	1,400	$ 910,000	Cast in Place Beam 4'-6" deep by 7'-0" wide. Formed on two sides, bottom cast against ground. 125# rebar/CY. Note: Assumptions taken from similar projects - no structural design performed.
5	Crane Rail	LF	$ 100	4,250	$ 425,000	Actual rails for the cranes to run on. Includes landside and waterside 90' gage rail at berth 1 and 100' gage landside rail full length.
6	Piles for Waterside crane rail	LF	$ 105	33,840	$ 3,553,200	Steel pipe: 14" OD x 3/8" wall, concrete filled, 120' long. These piles support crane beam modification. Note: Assumptions taken from similar projects - no geotechnical information available nor structural design performed.
7	Waterside Crane Rail Beam Modification	CY	$ 550	1,148	$ 631,400	New cast-in-place beam doweled into existing crane beam for full length. Supported by piles where additional support is needed. Supports cable trench elsewhere. Formed on one side. Note: Assumptions taken from similar projects - no structural design performed.
8	Excavation for waterside crane rail beam	CY	$ 22	4,690	$ 103,180	Excavation 3 to 6 feet deep and 6 feet wide. Laid back 1V:2H on one side(included in quantity). Pavement demo covered elsewhere. No disposal of material included
9	Excavation for landside crane rail beam	CY	$ 20	13,500	$ 270,000	Excavation 3 to 4 feet deep and 12 feet wide. Laid back 1V:2H on both sides (included in quantity). Pavement demo covered elsewhere. No disposal of material included
10	Backfill	CY	$ 25	12,150	$ 303,750	Granular backfill placed and compacted after new beam and beam modifications are complete. Pavement restoration covered elsewhere.
	Subtotal				$ 15,040,441	

Site Work

Item No.	Item	Unit	Unit Cost	Quantity	Item Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	1	$ 1,569,062	2% of total site work costs
2	Site Grading	Acre	$ 37,000	93.2	$ 3,448,400	
3	Open Maintenance Area Site Grading	Acre	$ 37,000	3.9	$ 144,300	
4	SubBase	Acre	$ 25,000	93.2	$ 2,330,000	6" aggregate base for wharf and yard pavement. Note: No geotechnical information available.
5	Open Maintenance Area Site SubBase	Acre	$ 25,000	3.9	$ 97,500	6" aggregate base for wharf and yard pavement. Note: No geotechnical information available.
6	Pavement OTR Trucks	Acre	$ 450,000	31	$ 13,725,000	12" unreinforced concrete. Note: No geotechnical information available.
7	Heavy Pavement	Acre	$ 760,000	61	$ 46,132,000	18" RCC. Includes areas for side picks/empty handlers, hatch covers & loaded container storage. Note: No geotechnical information available.
8	Open Maintenance Heavy Pavement	Acre	$ 760,000	2	$ 1,520,000	18" RCC. Includes areas for side picks/empty handlers, hatch covers & loaded container storage. Note: No geotechnical information available.
9	Open Maintenance Area RTG Payment	Acre	$ 1,264,000	1.9	$ 2,401,600	Heavily reinforced concrete pavement, 18" thick. 125 pounds of rebar/CY. Note: No geotechnical information available.
10	RTG Runways	LF	$ 250	28,040	$ 7,010,000	Heavily reinforced concrete pavement strip, 18" thick x 8'-6" wide. 125 pounds of rebar/CY. Formed on two sides. Note: No geotechnical information available.
11	Striping/Signage	Acre	$ 20,000	77.4	$ 1,548,000	striping and signage for parking, and RTG Blocks.
12	Guiderail	LF	$ 25	800.0	$ 20,000	around gas tanks, and power station
13	E&S Item: Inlet Protection	EA	$ 350	218	$ 76,300	
	Subtotal				$ 80,022,162	

Utilities

Item No.	Item	Unit	Unit Cost	Quantity	Item Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	1	$ 1,644,442	2% of total utilities costs
2	Water, Potable	N/A		-	$ -	Tie new buildings to existing service on site - Included in Building Cost.
3	Water, Fire	Acre	$ 113,000	93.2	$ 10,531,600	Fire line for fire water only (potable water for Main, refer inspection and RTG bldgs not included). Need a pump to provide 1,500 gpm at the furthest 3 hydrants (4,500 gpm total demand). Fire line is looped and Fire hydrants can be spaced at 400 feet apart. Use 8" looped line, C900 PVC pipe and 6" DIP for connection to hydrants
4	Sanitary Sewer	N/A		-	$ -	Tie new buildings to existing service on site - Included in Building Cost.
5	Storm Sewer / Drainage	Acre	$ 172,000	93.2	$ 16,030,400	4 structures per acre (75% - inlets and 25% - manholes). 300 LF of pipe overall per acre, using the following breakdown for total amount of pipe (40% - 18 inch or smaller (includes roof drain tie-in), 20% - 24 inch, 20% - 36 inch and 20% - greater than 36 inch and/or culverts). All stormwater pipe needs to be Class V RCP and All inlets and manholes rated for heavy duty loading
6	Yard Lights	EA	$ 130,000	47.0	$ 6,110,000	100 ft high-mast light, 360 ft O.C. To include concrete foundation and junction box.
7	Electrical Distribution	Acre	$ 250,000	77.4	$ 19,350,000	480 volt power cables in 3" schedule 40 PVC conduit for lights and Reefers with associated junction boxes (from unit substations). 5kV shielded power cable in 4" schedule 40 PVC for cranes with associated medium voltage manholes (from unit substations). 15kV shielded 133% power cable in 5" schedule 40 PVC from main substations to unit substations.
8	Panzerbelt	LF	$ 65	3,100	$ 201,500	Crane Power: 5kV power cable, one per crane.
9	Reefer Plugs	EA	$ 450	2,160.0	$ 972,000	Includes the acquisition and installation of reefer sockets (480V) and connections to reefer sub stations. Maintenance not included. Includes tie-in to existing power supply.
10	Reefer Rack	EA	$ 236,900	114.0	$ 27,006,600	Assume galvanized steel construction of 4 levels of catwalks serving seven containers wide. Each rack set accommodates two Includes manufacturing, delivery and installation. Maintenance costs not included.
11	Main Substation for Reefers/Lighting	EA	$ 370,000	1	$ 370,000	Main 13.2 kV Double Ended Outdoor NEMA 3R Substation (two incoming 13.2 electric service feeders) with grounding system and surge protection. Includes connection to utility service
12	Main Substation for Cranes	EA	$ 350,000	1	$ 350,000	Main 13.2 kV Double Ended Outdoor NEMA 3R Substation (two incoming 13.2 electric service feeders) with grounding system and surge protection. Includes connection to utility service
13	Portable Back-Up Generator for crane power	EA	$ 50,000	1	$ 50,000	Portable emergency generator set with manual quick connect service safety switch and generator connection cords.
14	Unit Substations, Crane	EA	$ 350,000	2	$ 700,000	13.2kV/5kV 3MVA Outdoor NEMA 3R Single Ended Unit Substation with electrical grounding system and surge protection. Maintenance not included.
15	Unit Substations, Reefer and Lighting	EA	$ 50,000	11.0	$ 550,000	13.2kV/480V Outdoor NEMA 3R Single Ended Unit Substation with electrical grounding system and surge protection. Maintenance not included.
	Subtotal				$ 83,866,542	

Building

Item No.	Item	Unit	Unit Cost	Quantity	Item Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	1	$ 262,800	2% of total building costs
2	Maintenance & Repair	SF	$ 220	39,000	$ 8,580,000	Steel framed, one story, building on piles. Concrete Block walls. Minimal interior finishes. Fully sprinklered. To house maintenance shop with vehicle lifts, hazardous material storage, restrooms and office space. Includes tie-in of potable water, electrical/communications and sanitary to existing service. No maintenance equipment, furnishings, supplies or interior buildout included.
3	RTG High Bay Building	SF	$ 230	16,000	$ 3,680,000	Steel framed mill building on piles. One story, but high enough to accommodate an RTG, say 80'foot ceiling height. Minimal interior finishes. To house maintenance shop with hazardous material storage. Fully sprinklered. Includes tie-in of potable water, electrical/communications and sanitary to existing service. No maintenance equipment, furnishings, supplies or interior buildout included.
4	Crane Maintenance Bldg.	SF	$ 220	4,000	$ 880,000	Steel framed, one story, building on piles. Concrete Block walls. Moderate interior finishes. To house maintenance shop, office space, restrooms, locker rooms and meeting room. Fully sprinklered. Includes tie-in of potable water, electrical/communications and sanitary to existing service. No maintenance equipment, furnishings, supplies or interior buildout included.
	Subtotal				$ 13,402,800	

Equipment

Item No.	Item	Unit	Unit Cost	Quantity	Item Cost	Descriptions/Assumptions
1	Yard Trucks/Hostlers	EA	$ -	-	$ -	Not included in this estimate. Assume that operator will specify, acquire and maintain.
2	Empty Handlers/Side Picks	EA	$ -	-	$ -	Not included in this estimate. Assume that operator will specify, acquire and maintain.
3	Rubber Tired Gantry Crane	EA	$ 2,300,000	21.0	$ 48,300,000	RTG with 1 over 5 high stacking and 7 wide. Assume all specification, acquisition and delivery costs. Maintenance costs not included.
4	Ship to Shore Quay Cranes	EA	$ 12,000,000	4.0	$ 48,000,000	100' gauge conventional ship to shore cranes. Assume all specification, acquisition and delivery costs. Includes drive motors and controls. Maintenance costs not included.
5	Crane Removal	EA	$ 150,000	5.0	$ 750,000	Disassembly and removal by truck
6	Electrification of Existing Cranes	EA	$ 1,700,000	2	$ 3,400,000	
7	Terminal Operating System	EA	$ -	-	$ -	Not included in this estimate. Assume that operator will specify, acquire and maintain.
	Subtotal				$ 100,450,000	

Demolition

Item No.	Item	Unit	Unit Cost	Quantity	Item Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	1	$ 971,283	2% of total demolition costs
2	Building 1	SF	$ 45	90,000	$ 4,050,000	
3	Building 6	SF	$ 45	105,000	$ 4,725,000	
4	Existing Rail	LF	$ 30	9,125	$ 273,750	500' of rail adjacent to building 1A assumed Demolished in Phase 1.
5	Building 1A	SF	$ 55	99,000	$ 5,445,000	
6	Infill Building	SF	$ 45	75,000	$ 3,375,000	
7	Building 2A	SF	$ 45	110,000	$ 4,950,000	
8	Maintenance Building	SF	$ 45	59,000	$ 2,655,000	
9	Pavement	ACRE	$ 217,800	93.2	$ 20,298,960	
10	Utilities	ACRE	$ 20,000	93.2	$ 1,864,000	
11	Open Maintenance Area Pavement	ACRE	$ 217,800	3.9	$ 849,420	
12	Open Maintenance Area Utilities.	ACRE	$ 20,000	3.9	$ 78,000	
	Subtotal				$ 49,535,413	

Item No.	Item	Unit	Unit Cost	Quantity	Item Cost	Descriptions/Assumptions
	Total Construction Cost				$ 342,317,357	
	Contingency Fees					
	Studies (Geotechnical, Environmental etc.), Design & Administration			10%	$ 24,186,736	
	Construction			35%	$ 84,653,575	
	Equipment			5%	$ 5,022,500	
	Contingency Total				$ 113,862,811	
	Total Cost with Contingency Fees				$ 456,180,000	

APPENDIX D – PHASE 2 COST ESTIMATE

Construction Cost Estimate

Project: Packer Avenue Marine Terminal

Task: Container Terminal

Date: June 25, 2014

Wharf (Berth 1, Strengthening & Landside Railroad)

Item No.	Item	Unit	Unit Cost	Phase 2 - Wharf Quantity	Phase 2 - Wharf Total Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	2%	$ 294,911	10% of total wharf costs
2	Piles for landside crane rail	LF	$ 105	54,800	$ 5,754,000	Steel pipe: 14" OD x 3/8" wall, concrete filled, 120' long. Includes new 100' gage rail and 90' gage extension. Note: Assumptions taken from similar projects - no geotechnical information available nor structural design performed.
3	Crane rail beam for 100' gage landside crane rail	CY	$ 650	4,300	$ 2,795,000	Cast in Place Beam 4'-6" deep by 7'-0" wide. Include 20% increase in concrete quantity to account for tie-downs/pin sockets. Formed on two sides, bottom cast against ground. 125# rebar/CY. Note: Assumptions taken from similar projects - no structural design performed.
4	Crane rail beam for 90' gage crane rail extension	CY	$ 650	1,400	$ 910,000	Cast in Place Beam 4'-6" deep by 7'-0" wide. Formed on two sides, bottom cast against ground. 125# rebar/CY. Note: Assumptions taken from similar projects - no structural design performed.
5	Crane Rail	LF	$ 100	4,250	$ 425,000	Actual rails for the cranes to run on. Includes landside and waterside 90' gage rail at berth 1 and 100' gage landside rail full length.
6	Piles for Waterside crane rail	LF	$ 105	33,840	$ 3,553,200	Steel pipe: 14" OD x 3/8" wall, concrete filled, 120' long. These piles support crane beam modification. Note: Assumptions taken from similar projects - no geotechnical information available nor structural design performed.
7	Waterside Crane Rail Beam Modification	CY	$ 550	1,148	$ 631,400	New cast-in-place beam doweled into existing crane beam for full length. Supported by piles where additional support is needed. Supports cable trench elsewhere. Formed on one side. Note: Assumptions taken from similar projects - no structural design performed.
8	Excavation for waterside crane rail beam	CY	$ 22	4,690	$ 103,180	Excavation 3 to 6 feet deep and 6 feet wide. Laid back 1V:2H on one side(included in quantity). Pavement demo covered elsewhere. No disposal of material included
9	Excavation for landside crane rail beam	CY	$ 20	13,500	$ 270,000	Excavation 3 to 4 feet deep and 12 feet wide. Laid back 1V:2H on both sides (included in quantity). Pavement demo covered elsewhere. No disposal of material included
10	Backfill	CY	$ 25	12,150	$ 303,750	Granular backfill placed and compacted after new beam and beam modifications are complete. Pavement restoration covered elsewhere.
	Subtotal				$ 15,040,441	

Site Work

Item No.	Item	Unit	Unit Cost	Phase 2 - Wharf Quantity	Phase 2 - Wharf Total Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	2%	$ 182,504	2% of total site work costs
2	Site Grading	Acre	$ 37,000	15.8	$ 584,600	
3	Open Maintenance Area Site Grading	Acre	$ 37,000	-	$ -	
4	SubBase	Acre	$ 25,000	15.8	$ 395,000	6" aggregate base for wharf and yard pavement. Note: No geotechnical information available.
5	Open Maintenance Area Site SubBase	Acre	$ 25,000	-	$ -	6" aggregate base for wharf and yard pavement. Note: No geotechnical information available.
6	Pavement OTR Trucks	Acre	$ 450,000	12.5	$ 5,625,000	12" unreinforced concrete. Note: No geotechnical information available.
7	Heavy Pavement	Acre	$ 760,000	3.3	$ 2,508,000	18" RCC. Includes areas for side picks/empty handlers, hatch covers & loaded container storage. Note: No geotechnical information available.
8	Open Maintenance Heavy Pavement	Acre	$ 760,000	-	$ -	18" RCC. Includes areas for side picks/empty handlers, hatch covers & loaded container storage. Note: No geotechnical information available.
9	Open Maintenance Area RTG Payment	Acre	$ 1,264,000	-	$ -	Heavily reinforced concrete pavement, 18" thick. 125 pounds of rebar/CY. Note: No geotechnical information available.
10	RTG Runways	LF	$ 250	-	$ -	Heavily reinforced concrete pavement strip, 18" thick x 8'-6" wide. 125 pounds of rebar/CY. Formed on two sides. Note: No geotechnical information available.
11	Striping/Signage	Acre	$ 20,000	-	$ -	striping and signage for parking, and RTG Blocks.
12	Guiderail	LF	$ 25	-	$ -	around gas tanks, and power station
13	E&S Item: Inlet Protection	EA	$ 350	36.0	$ 12,600	
	Subtotal				$ 9,307,704	

Utilities

Item No.	Item	Unit	Unit Cost	Phase 2 - Wharf Quantity	Phase 2 - Wharf Total Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	2%	$ 116,090	2% of total utilities costs
2	Water, Potable	N/A				Tie new buildings to existing service on site - Included in Building Cost.
3	Water, Fire	Acre	$ 113,000	15.8	$ 1,785,400	Fire line for fire water only (potable water for Main, refer inspection and RTG bldgs not included). Need a pump to provide 1,500 gpm at the furthest 3 hydrants (4,500 gpm total demand). Fire line is looped and Fire hydrants can be spaced at 400 feet apart. Use 8" looped line, C900 PVC pipe and 6" DIP for connection to hydrants
4	Sanitary Sewer	N/A				Tie new buildings to existing service on site - Included in Building Cost.
5	Storm Sewer / Drainage	Acre	$ 172,000	15.8	$ 2,717,600	4 structures per acre (75% - inlets and 25% - manholes). 300 LF of pipe overall per acre, using the following breakdown for total amount of pipe (40% - 18 inch or smaller (includes roof drain tie-in), 20% - 24 inch, 20% - 36 inch and 20% - greater than 36 inch and/or culverts). All stormwater pipe needs to be Class V RCP and All inlets and manholes rated for heavy duty loading
6	Yard Lights	EA	$ 130,000	-	$ -	100 ft high-mast light, 360 ft O.C. To include concrete foundation and junction box.
7	Electrical Distribution	Acre	$ 250,000	-	$ -	480 volt power cables in 3" schedule 40 PVC conduit for lights and Reefers with associated junction boxes (from unit substations). 5kV shielded power cable in 4" schedule 40 PVC for cranes with associated medium voltage manholes (from unit substations). 15kV shielded 133% power cable in 5" schedule 40 PVC from main substations to unit substations.
8	Panzerbelt	LF	$ 65	3,100.0	$ 201,500	Crane Power: 5kV power cable, one per crane.
9	Reefer Plugs	EA	$ 450	-	$ -	Includes the acquisition and installation of reefer sockets (480V) and connections to reefer sub stations. Maintenance not included. Includes tie-in to existing power supply.
10	Reefer Rack	EA	$ 236,900	-	$ -	Assume galvanized steel construction of 4 levels of catwalks serving seven containers wide. Each rack set accommodates two Includes manufacturing, delivery and installation. Maintenance costs not included.
11	Main Substation for Reefers/Lighting	EA	$ 370,000	-	$ -	Main 13.2 kV Double Ended Outdoor NEMA 3R Substation (two incoming 13.2 electric service feeders) with grounding system and surge protection. Includes connection to utility service
12	Main Substation for Cranes	EA	$ 350,000	1	$ 350,000	Main 13.2 kV Double Ended Outdoor NEMA 3R Substation (two incoming 13.2 electric service feeders) with grounding system and surge protection. Includes connection to utility service
13	Portable Back-Up Generator for crane power	EA	$ 50,000	1	$ 50,000	Portable emergency generator set with manual quick connect service safety switch and generator connection cords.
14	Unit Substations, Crane	EA	$ 350,000	2	$ 700,000	13.2kV/5kV 3MVA Outdoor NEMA 3R Single Ended Unit Substation with electrical grounding system and surge protection. Maintenance not included.
15	Unit Substations, Reefer and Lighting	EA	$ 50,000	-	$ -	13.2kV/480V Outdoor NEMA 3R Single Ended Unit Substation with electrical grounding system and surge protection. Maintenance not included.
	Subtotal				$ 5,920,590	

Equipment

Item No.	Item	Unit	Unit Cost	Phase 2 - Wharf Quantity	Phase 2 - Wharf Total Cost	Descriptions/Assumptions
1	Yard Trucks/Hostlers	EA	$ -	-	$ -	Not included in this estimate. Assume that operator will specify, acquire and maintain.
2	Empty Handlers/Side Picks	EA	$ -	-	$ -	Not included in this estimate. Assume that operator will specify, acquire and maintain.
3	Rubber Tired Gantry Crane	EA	$ 2,300,000	-	$ -	RTG with 1 over 5 high stacking and 7 wide. Assume all specification, acquisition and delivery costs. Maintenance costs not included.
4	Ship to Shore Quay Cranes	EA	$ 12,000,000	2	$ 24,000,000	100' gauge conventional ship to shore cranes. Assume all specification, acquisition and delivery costs. Includes drive motors and controls. Maintenance costs not included.
5	Crane Removal	EA	$ 150,000	2	$ 300,000	Disassembly and removal by truck
6	Electrification of Existing Cranes	EA	$ 1,700,000	-	$ -	
7	Terminal Operating System	EA	$ -	-	$ -	Not included in this estimate. Assume that operator will specify, acquire and maintain.
	Subtotal				$ 24,300,000	

Demolition

Item No.	Item	Unit	Unit Cost	Phase 2 - Wharf Quantity	Phase 2 - Wharf Total Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	2%	$ 157,885	2% of total demolition costs
2	Building 1	SF	$ 45	90,000	$ 4,050,000	
3	Building 6	SF	$ 45	-	$ -	
4	Existing Rail	LF	$ 30	2,900	$ 87,000	500' of rail adjacent to building 1A assumed Demolished in Phase 1.
5	Building 1A	SF	$ 55	-	$ -	
6	Infill Building	SF	$ 45	-	$ -	
7	Building 2A	SF	$ 45	-	$ -	
8	Maintenance Building	SF	$ 45	-	$ -	
9	Pavement	ACRE	$ 217,800	15.8	$ 3,441,240	
10	Utilities	ACRE	$ 20,000	15.8	$ 316,000	
11	Open Maintenance Area Pavement	ACRE	$ 217,800	-	$ -	
12	Open Maintenance Area Utilities.	ACRE	$ 20,000	-	$ -	
	Subtotal				$ 8,052,125	

Item No.	Item	Unit	Unit Cost	Phase 2 - Wharf Quantity	Phase 2 - Wharf Total Cost	Descriptions/Assumptions
	Total Construction Cost				$ 62,620,859	
	Contingency Fees					
	Studies (Geotechnical, Environmental etc.), Design & Administration			10%	$ 3,832,086	
	Construction			35%	$ 13,412,301	
	Equipment			5%	$ 1,215,000	
	Contingency Total				$ 18,459,387	
	Total Cost with Contingency Fees				$ 81,080,000	

APPENDIX E – PHASE 3 COST ESTIMATE

Construction Cost Estimate

Project: Packer Avenue Marine Terminal

Task: Container Terminal

Date: June 25, 2014

Site Work

Item No.	Item	Unit	Unit Cost	Phase 3 - Section B Quantity	Phase 3 - Section B Total Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	2%	$ 506,107	2% of total site work costs
2	Site Grading	Acre	$ 37,000	24.5	$ 906,500	
3	Open Maintenance Area Site Grading	Acre	$ 37,000	3.9	$ 144,300	
4	SubBase	Acre	$ 25,000	24.5	$ 612,500	6" aggregate base for wharf and yard pavement. Note: No geotechnical information available.
5	Open Maintenance Area Site SubBase	Acre	$ 25,000	3.9	$ 97,500	6" aggregate base for wharf and yard pavement. Note: No geotechnical information available.
6	Pavement OTR Trucks	Acre	$ 450,000	5.7	$ 2,565,000	12" unreinforced concrete. Note: No geotechnical information available.
7	Heavy Pavement	Acre	$ 760,000	18.8	$ 14,288,000	18" RCC. Includes areas for side picks/empty handlers, hatch covers & loaded container storage. Note: No geotechnical information available.
8	Open Maintenance Heavy Pavement	Acre	$ 760,000	2.0	$ 1,520,000	18" RCC. Includes areas for side picks/empty handlers, hatch covers & loaded container storage. Note: No geotechnical information available.
9	Open Maintenance Area RTG Payment	Acre	$ 1,264,000	1.9	$ 2,401,600	Heavily reinforced concrete pavement, 18" thick. 125 pounds of rebar/CY. Note: No geotechnical information available.
10	RTG Runways	LF	$ 250	8,960.0	$ 2,240,000	Heavily reinforced concrete pavement strip, 18" thick x 8'-6" wide. 125 pounds of rebar/CY. Formed on two sides. Note: No geotechnical information available.
11	Striping/Signage	Acre	$ 20,000	24.5	$ 490,000	striping and signage for parking, and RTG Blocks.
12	Guiderail	LF	$ 25	800.0	$ 20,000	around gas tanks, and power station
13	E&S Item: Inlet Protection	EA	$ 350	57.0	$ 19,950	
	Subtotal				$ 25,811,457	

Utilities

Item No.	Item	Unit	Unit Cost	Phase 3 - Section B Quantity	Phase 3 - Section B Total Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	2%	$ 504,638	2% of total utilities costs
2	Water, Potable	N/A				Tie new buildings to existing service on site - Included in Building Cost.
3	Water, Fire	Acre	$ 113,000	24.5	$ 2,768,500	Fire line for fire water only (potable water for Main, refer inspection and RTG bldgs not included). Need a pump to provide 1,500 gpm at the furthest 3 hydrants (4,500 gpm total demand). Fire line is looped and Fire hydrants can be spaced at 400 feet apart. Use 8" looped line, C900 PVC pipe and 6" DIP for connection to hydrants
4	Sanitary Sewer	N/A				Tie new buildings to existing service on site - Included in Building Cost.
5	Storm Sewer / Drainage	Acre	$ 172,000	24.5	$ 4,214,000	4 structures per acre (75% - inlets and 25% - manholes). 300 LF of pipe overall per acre, using the following breakdown for total amount of pipe (40% - 18 inch or smaller (includes roof drain tie-in), 20% - 24 inch, 20% - 36 inch and 20% - greater than 36 inch and/or culverts). All stormwater pipe needs to be Class V RCP and All inlets and manholes rated for heavy duty loading
6	Yard Lights	EA	$ 130,000	10.0	$ 1,300,000	100 ft high-mast light, 360 ft O.C. To include concrete foundation and junction box.
7	Electrical Distribution	Acre	$ 250,000	24.5	$ 6,125,000	480 volt power cables in 3" schedule 40 PVC conduit for lights and Reefers with associated junction boxes (from unit substations). 5kV shielded power cable in 4" schedule 40 PVC for cranes with associated medium voltage manholes (from unit substations). 15kV shielded 133% power cable in 5" schedule 40 PVC from main substations to unit substations.
8	Panzerbelt	LF	$ 65	-	$ -	Crane Power: 5kV power cable, one per crane.
9	Reefer Plugs	EA	$ 450	788.0	$ 354,600	Includes the acquisition and installation of reefer sockets (480V) and connections to reefer sub stations. Maintenance not included. Includes tie-in to existing power supply.
10	Reefer Rack	EA	$ 236,900	42.0	$ 9,949,800	Assume galvanized steel construction of 4 levels of catwalks serving seven containers wide. Each rack set accommodates two Includes manufacturing, delivery and installation. Maintenance costs not included.
11	Main Substation for Reefers/Lighting	EA	$ 370,000	1.0	$ 370,000	Main 13.2 kV Double Ended Outdoor NEMA 3R Substation (two incoming 13.2 electric service feeders) with grounding system and surge protection. Includes connection to utility service
12	Main Substation for Cranes	EA	$ 350,000	-	$ -	Main 13.2 kV Double Ended Outdoor NEMA 3R Substation (two incoming 13.2 electric service feeders) with grounding system and surge protection. Includes connection to utility service
13	Portable Back-Up Generator for crane power	EA	$ 50,000	-	$ -	Portable emergency generator set with manual quick connect service safety switch and generator connection cords.
14	Unit Substations, Crane	EA	$ 350,000	-	$ -	13.2kV/5kV 3MVA Outdoor NEMA 3R Single Ended Unit Substation with electrical grounding system and surge protection. Maintenance not included.
15	Unit Substations, Reefer and Lighting	EA	$ 50,000	3.0	$ 150,000	13.2kV/480V Outdoor NEMA 3R Single Ended Unit Substation with electrical grounding system and surge protection. Maintenance not included.
	Subtotal				$ 25,736,538	

Building

Item No.	Item	Unit	Unit Cost	Phase 3 - Section B Quantity	Phase 3 - Section B Total Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	2%	$ 262,800	2% of total building costs
2	Maintenance & Repair	SF	$ 220	39,000.0	$ 8,580,000	Steel framed, one story, building on piles. Concrete Block walls. Minimal interior finishes. Fully sprinklered. To house maintenance shop with vehicle lifts, hazardous material storage, restrooms and office space. Includes tie-in of potable water, electrical/communications and sanitary to existing service. No maintenance equipment, furnishings, supplies or interior buildout included.
3	RTG High Bay Building	SF	$ 230	16,000.0	$ 3,680,000	Steel framed mill building on piles. One story, but high enough to accommodate an RTG, say 80'foot ceiling height. Minimal interior finishes. To house maintenance shop with hazardous material storage. Fully sprinklered. Includes tie-in of potable water, electrical/communications and sanitary to existing service. No maintenance equipment, furnishings, supplies or interior buildout included.
4	Crane Maintenance Bldg.	SF	$ 220	4,000.0	$ 880,000	Steel framed, one story, building on piles. Concrete Block walls. Moderate interior finishes. To house maintenance shop, office space, restrooms, locker rooms and meeting room. Fully sprinklered. Includes tie-in of potable water, electrical/communications and sanitary to existing service. No maintenance equipment, furnishings, supplies or interior buildout included.
	Subtotal				$ 13,402,800	

Equipment

Item No.	Item	Unit	Unit Cost	Phase 3 - Section B Quantity	Phase 3 - Section B Total Cost	Descriptions/Assumptions
1	Yard Trucks/Hostlers	EA	$ -	-	$ -	Not included in this estimate. Assume that operator will specify, acquire and maintain.
2	Empty Handlers/Side Picks	EA	$ -	-	$ -	Not included in this estimate. Assume that operator will specify, acquire and maintain.
3	Rubber Tired Gantry Crane	EA	$ 2,300,000	6	$ 13,800,000	RTG with 1 over 5 high stacking and 7 wide. Assume all specification, acquisition and delivery costs. Maintenance costs not included.
4	Ship to Shore Quay Cranes	EA	$ 12,000,000	2	$ 24,000,000	100' gauge conventional ship to shore cranes. Assume all specification, acquisition and delivery costs. Includes drive motors and controls. Maintenance costs not included.
5	Crane Removal	EA	$ 150,000	-	$ -	Disassembly and removal by truck
6	Electrification of Existing Cranes	EA	$ 1,700,000	-	$ -	
7	Terminal Operating System	EA	$ -	-	$ -	Not included in this estimate. Assume that operator will specify, acquire and maintain.
	Subtotal				$ 37,800,000	

Demolition

Item No.	Item	Unit	Unit Cost	Phase 3 - Section B Quantity	Phase 3 - Section B Total Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	2%	$ 189,970	2% of total demolition costs
2	Building 1	SF	$ 45	-	$ -	
3	Building 6	SF	$ 45		$ -	
4	Existing Rail	LF	$ 30	3,000	$ 90,000	500' of rail adjacent to building 1A assumed Demolished in Phase 1.
5	Building 1A	SF	$ 55	-	$ -	
6	Infill Building	SF	$ 45	-	$ -	
7	Building 2A	SF	$ 45	-	$ -	
8	Maintenance Building	SF	$ 45	59,000	$ 2,655,000	
9	Pavement	ACRE	$ 217,800	24.5	$ 5,336,100	
10	Utilities	ACRE	$ 20,000	24.5	$ 490,000	
11	Open Maintenance Area Pavement	ACRE	$ 217,800	3.9	$ 849,420	
12	Open Maintenance Area Utilities.	ACRE	$ 20,000	3.9	$ 78,000	
	Subtotal				$ 9,688,490	

Item No.	Item	Unit	Unit Cost	Phase 3 - Section B Quantity	Phase 3 - Section B Total Cost	Descriptions/Assumptions
	Total Construction Cost				$ 112,439,285	
	Contingency Fees					
	Studies (Geotechnical, Environmental etc.), Design & Administration			10%	$ 7,463,929	
	Construction			35%	$ 26,123,750	
	Equipment			5%	$ 1,890,000	
	Contingency Total				$ 35,477,678	
	Total Cost with Contingency Fees				$ 147,917,000	

APPENDIX F – PHASE 4 COST ESTIMATE

Construction Cost Estimate

Project: Packer Avenue Marine Terminal

Task: Container Terminal

Date: **June 25, 2014**

Site Work

Item No.	Item	Unit	Unit Cost	Phase 4 - Section A Quantity	Phase 4 - Section A Total Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	2%	$ 441,508	2% of total site work costs
2	Site Grading	Acre	$ 37,000	25.7	$ 950,900	
3	Open Maintenance Area Site Grading	Acre	$ 37,000	-	$ -	
4	SubBase	Acre	$ 25,000	25.7	$ 642,500	6" aggregate base for wharf and yard pavement. Note: No geotechnical information available.
5	Open Maintenance Area Site SubBase	Acre	$ 25,000	-	$ -	6" aggregate base for wharf and yard pavement. Note: No geotechnical information available.
6	Pavement OTR Trucks	Acre	$ 450,000	7.0	$ 3,150,000	12" unreinforced concrete. Note: No geotechnical information available.
7	Heavy Pavement	Acre	$ 760,000	18.7	$ 14,212,000	18" RCC. Includes areas for side picks/empty handlers, hatch covers & loaded container storage. Note: No geotechnical information available.
8	Open Maintenance Heavy Pavement	Acre	$ 760,000	-	$ -	18" RCC. Includes areas for side picks/empty handlers, hatch covers & loaded container storage. Note: No geotechnical information available.
9	Open Maintenance Area RTG Payment	Acre	$ 1,264,000	-	$ -	Heavily reinforced concrete pavement, 18" thick. 125 pounds of rebar/CY. Note: No geotechnical information available.
10	RTG Runways	LF	$ 250	10,340	$ 2,585,000	Heavily reinforced concrete pavement strip, 18" thick x 8'-6" wide. 125 pounds of rebar/CY. Formed on two sides. Note: No geotechnical information available.
11	Striping/Signage	Acre	$ 20,000	25.7	$ 514,000	striping and signage for parking, and RTG Blocks.
12	Guiderail	LF	$ 25	-	$ -	around gas tanks, and power station
13	E&S Item: Inlet Protection	EA	$ 350	60.0	$ 21,000	
	Subtotal				$ 22,516,908	

Utilities

Item No.	Item	Unit	Unit Cost	Phase 4 - Section A Quantity	Phase 4 - Section A Total Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	2%	$ 571,096	2% of total utilities costs
2	Water, Potable	N/A				Tie new buildings to existing service on site - Included in Building Cost.
3	Water, Fire	Acre	$ 113,000	25.7	$ 2,904,100	Fire line for fire water only (potable water for Main, refer inspection and RTG bldgs not included). Need a pump to provide 1,500 gpm at the furthest 3 hydrants (4,500 gpm total demand). Fire line is looped and Fire hydrants can be spaced at 400 feet apart. Use 8" looped line, C900 PVC pipe and 6" DIP for connection to hydrants
4	Sanitary Sewer	N/A				Tie new buildings to existing service on site - Included in Building Cost.
5	Storm Sewer / Drainage	Acre	$ 172,000	25.7	$ 4,420,400	4 structures per acre (75% - inlets and 25% - manholes). 300 LF of pipe overall per acre, using the following breakdown for total amount of pipe (40% - 18 inch or smaller (includes roof drain tie-in), 20% - 24 inch, 20% - 36 inch and 20% - greater than 36 inch and/or culverts). All stormwater pipe needs to be Class V RCP and All inlets and manholes rated for heavy duty loading
6	Yard Lights	EA	$ 130,000	18.0	$ 2,340,000	100 ft high-mast light, 360 ft O.C. To include concrete foundation and junction box.
7	Electrical Distribution	Acre	$ 250,000	25.7	$ 6,425,000	480 volt power cables in 3" schedule 40 PVC conduit for lights and Reefers with associated junction boxes (from unit substations). 5kV shielded power cable in 4" schedule 40 PVC for cranes with associated medium voltage manholes (from unit substations). 15kV shielded 133% power cable in 5" schedule 40 PVC from main substations to unit substations.
8	Panzerbelt	LF	$ 65	-	$ -	Crane Power: 5kV power cable, one per crane.
9	Reefer Plugs	EA	$ 450	934.0	$ 420,300	Includes the acquisition and installation of reefer sockets (480V) and connections to reefer sub stations. Maintenance not included. Includes tie-in to existing power supply.
10	Reefer Rack	EA	$ 236,900	50.0	$ 11,845,000	Assume galvanized steel construction of 4 levels of catwalks serving seven containers wide. Each rack set accommodates two Includes manufacturing, delivery and installation. Maintenance costs not included.
11	Main Substation for Reefers/Lighting	EA	$ 370,000	-	$ -	Main 13.2 kV Double Ended Outdoor NEMA 3R Substation (two incoming 13.2 electric service feeders) with grounding system and surge protection. Includes connection to utility service
12	Main Substation for Cranes	EA	$ 350,000	-	$ -	Main 13.2 kV Double Ended Outdoor NEMA 3R Substation (two incoming 13.2 electric service feeders) with grounding system and surge protection. Includes connection to utility service
13	Portable Back-Up Generator for crane power	EA	$ 50,000	-	$ -	Portable emergency generator set with manual quick connect service safety switch and generator connection cords.
14	Unit Substations, Crane	EA	$ 350,000	-	$ -	13.2kV/5kV 3MVA Outdoor NEMA 3R Single Ended Unit Substation with electrical grounding system and surge protection. Maintenance not included.
15	Unit Substations, Reefer and Lighting	EA	$ 50,000	4	$ 200,000	13.2kV/480V Outdoor NEMA 3R Single Ended Unit Substation with electrical grounding system and surge protection. Maintenance not included.
	Subtotal				$ 29,125,896	

Equipment

Item No.	Item	Unit	Unit Cost	Phase 4 - Section A Quantity	Phase 4 - Section A Total Cost	Descriptions/Assumptions
1	Yard Trucks/Hostlers	EA	$ -	-	$ -	Not included in this estimate. Assume that operator will specify, acquire and maintain.
2	Empty Handlers/Side Picks	EA	$ -	-	$ -	Not included in this estimate. Assume that operator will specify, acquire and maintain.
3	Rubber Tired Gantry Crane	EA	$ 2,300,000	7	$ 16,100,000	RTG with 1 over 5 high stacking and 7 wide. Assume all specification, acquisition and delivery costs. Maintenance costs not included.
4	Ship to Shore Quay Cranes	EA	$ 12,000,000	-	$ -	100' gauge conventional ship to shore cranes. Assume all specification, acquisition and delivery costs. Includes drive motors and controls. Maintenance costs not included.
5	Crane Removal	EA	$ 150,000	-	$ -	Disassembly and removal by truck
6	Electrification of Existing Cranes	EA	$ 1,700,000	2	$ 3,400,000	
7	Terminal Operating System	EA	$ -	-	$ -	Not included in this estimate. Assume that operator will specify, acquire and maintain.
	Subtotal				$ 19,500,000	

Demolition

Item No.	Item	Unit	Unit Cost	Phase 4 - Section A Quantity	Phase 4 - Section A Total Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	2%	$ 217,944	2% of total demolition costs
2	Building 1	SF	$ 45	-	$ -	
3	Building 6	SF	$ 45	105,000	$ 4,725,000	
4	Existing Rail	LF	$ 30	2,025	$ 60,750	500' of rail adjacent to building 1A assumed Demolished in Phase 1.
5	Building 1A	SF	$ 55	-	$ -	
6	Infill Building	SF	$ 45	-	$ -	
7	Building 2A	SF	$ 45	-	$ -	
8	Maintenance Building	SF	$ 45	-	$ -	
9	Pavement	ACRE	$ 217,800	25.7	$ 5,597,460	
10	Utilities	ACRE	$ 20,000	25.7	$ 514,000	
11	Open Maintenance Area Pavement	ACRE	$ 217,800	-	$ -	
12	Open Maintenance Area Utilities.	ACRE	$ 20,000	-	$ -	
	Subtotal				$ 11,115,154	

Item No.	Item	Unit	Unit Cost	Phase 4 - Section A Quantity	Phase 4 - Section A Total Cost	Descriptions/Assumptions
	Total Construction Cost				$ 82,257,958	
	Contingency Fees					
	Studies (Geotechnical, Environmental etc.), Design & Administration			10%	$ 6,275,796	
	Construction			35%	$ 21,965,285	
	Equipment			5%	$ 975,000	
	Contingency Total				$ 29,216,081	
	Total Cost with Contingency Fees				$ 111,474,000	

APPENDIX G – PHASE 5 COST ESTIMATE

Construction Cost Estimate

Project: Packer Avenue Marine Terminal

Task: Container Terminal

Date: **June 25, 2014**

Site Work

Item No.	Item	Unit	Unit Cost	Phase 5 - Section C Quantity	Phase 5 - Section C Total Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	2%	$ 320,988	2% of total site work costs
2	Site Grading	Acre	$ 37,000	18.5	$ 684,500	
3	Open Maintenance Area Site Grading	Acre	$ 37,000	-	$ -	
4	SubBase	Acre	$ 25,000	18.5	$ 462,500	6" aggregate base for wharf and yard pavement. Note: No geotechnical information available.
5	Open Maintenance Area Site SubBase	Acre	$ 25,000	-	$ -	6" aggregate base for wharf and yard pavement. Note: No geotechnical information available.
6	Pavement OTR Trucks	Acre	$ 450,000	3.8	$ 1,710,000	12" unreinforced concrete. Note: No geotechnical information available.
7	Heavy Pavement	Acre	$ 760,000	14.7	$ 11,172,000	18" RCC. Includes areas for side picks/empty handlers, hatch covers & loaded container storage. Note: No geotechnical information available.
8	Open Maintenance Heavy Pavement	Acre	$ 760,000	-	$ -	18" RCC. Includes areas for side picks/empty handlers, hatch covers & loaded container storage. Note: No geotechnical information available.
9	Open Maintenance Area RTG Payment	Acre	$ 1,264,000	-	$ -	Heavily reinforced concrete pavement, 18" thick. 125 pounds of rebar/CY. Note: No geotechnical information available.
10	RTG Runways	LF	$ 250	6,540	$ 1,635,000	Heavily reinforced concrete pavement strip, 18" thick x 8'-6" wide. 125 pounds of rebar/CY. Formed on two sides. Note: No geotechnical information available.
11	Striping/Signage	Acre	$ 20,000	18.5	$ 370,000	striping and signage for parking, and RTG Blocks.
12	Guiderail	LF	$ 25	-	$ -	around gas tanks, and power station
13	E&S Item: Inlet Protection	EA	$ 350	44.0	$ 15,400	
	Subtotal				$ 16,370,388	

Utilities

Item No.	Item	Unit	Unit Cost	Phase 5 - Section C Quantity	Phase 5 - Section C Total Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	2%	$ 340,328	2% of total utilities costs
2	Water, Potable	N/A				Tie new buildings to existing service on site - Included in Building Cost.
3	Water, Fire	Acre	$ 113,000	18.5	$ 2,090,500	Fire line for fire water only (potable water for Main, refer inspection and RTG bldgs not included). Need a pump to provide 1,500 gpm at the furthest 3 hydrants (4,500 gpm total demand). Fire line is looped and Fire hydrants can be spaced at 400 feet apart. Use 8" looped line, C900 PVC pipe and 6" DIP for connection to hydrants
4	Sanitary Sewer	N/A				Tie new buildings to existing service on site - Included in Building Cost.
5	Storm Sewer / Drainage	Acre	$ 172,000	18.5	$ 3,182,000	4 structures per acre (75% - inlets and 25% - manholes). 300 LF of pipe overall per acre, using the following breakdown for total amount of pipe (40% - 18 inch or smaller (includes roof drain tie-in), 20% - 24 inch, 20% - 36 inch and 20% - greater than 36 inch and/or culverts). All stormwater pipe needs to be Class V RCP and All inlets and manholes rated for heavy duty loading
6	Yard Lights	EA	$ 130,000	12.0	$ 1,560,000	100 ft high-mast light, 360 ft O.C. To include concrete foundation and junction box.
7	Electrical Distribution	Acre	$ 250,000	18.5	$ 4,625,000	480 volt power cables in 3" schedule 40 PVC conduit for lights and Reefers with associated junction boxes (from unit substations). 5kV shielded power cable in 4" schedule 40 PVC for cranes with associated medium voltage manholes (from unit substations). 15kV shielded 133% power cable in 5" schedule 40 PVC from main substations to unit substations.
8	Panzerbelt	LF	$ 65	-	$ -	Crane Power: 5kV power cable, one per crane.
9	Reefer Plugs	EA	$ 450	438.0	$ 197,100	Includes the acquisition and installation of reefer sockets (480V) and connections to reefer sub stations. Maintenance not included. Includes tie-in to existing power supply.
10	Reefer Rack	EA	$ 236,900	22.0	$ 5,211,800	Assume galvanized steel construction of 4 levels of catwalks serving seven containers wide. Each rack set accommodates two Includes manufacturing, delivery and installation. Maintenance costs not included.
11	Main Substation for Reefers/Lighting	EA	$ 370,000	-	$ -	Main 13.2 kV Double Ended Outdoor NEMA 3R Substation (two incoming 13.2 electric service feeders) with grounding system and surge protection. Includes connection to utility service
12	Main Substation for Cranes	EA	$ 350,000	-	$ -	Main 13.2 kV Double Ended Outdoor NEMA 3R Substation (two incoming 13.2 electric service feeders) with grounding system and surge protection. Includes connection to utility service
13	Portable Back-Up Generator for crane power	EA	$ 50,000	-	$ -	Portable emergency generator set with manual quick connect service safety switch and generator connection cords.
14	Unit Substations, Crane	EA	$ 350,000	-	$ -	13.2kV/5kV 3MVA Outdoor NEMA 3R Single Ended Unit Substation with electrical grounding system and surge protection. Maintenance not included.
15	Unit Substations, Reefer and Lighting	EA	$ 50,000	3	$ 150,000	13.2kV/480V Outdoor NEMA 3R Single Ended Unit Substation with electrical grounding system and surge protection. Maintenance not included.
	Subtotal				$ 17,356,728	

Equipment

Item No.	Item	Unit	Unit Cost	Phase 5 - Section C Quantity	Phase 5 - Section C Total Cost	Descriptions/Assumptions
1	Yard Trucks/Hostlers	EA	$ -	-	$ -	Not included in this estimate. Assume that operator will specify, acquire and maintain.
2	Empty Handlers/Side Picks	EA	$ -	-	$ -	Not included in this estimate. Assume that operator will specify, acquire and maintain.
3	Rubber Tired Gantry Crane	EA	$ 2,300,000	6	$ 13,800,000	RTG with 1 over 5 high stacking and 7 wide. Assume all specification, acquisition and delivery costs. Maintenance costs not included.
4	Ship to Shore Quay Cranes	EA	$ 12,000,000	-	$ -	100' gauge conventional ship to shore cranes. Assume all specification, acquisition and delivery costs. Includes drive motors and controls. Maintenance costs not included.
5	Crane Removal	EA	$ 150,000	2	$ 300,000	Disassembly and removal by truck
6	Electrification of Existing Cranes	EA	$ 1,700,000	-	$ -	
7	Terminal Operating System	EA	$ -	-	$ -	Not included in this estimate. Assume that operator will specify, acquire and maintain.
	Subtotal				$ 14,100,000	

Demolition

Item No.	Item	Unit	Unit Cost	Phase 5 - Section C Quantity	Phase 5 - Section C Total Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	2%	$ 187,706	2% of total demolition costs
2	Building 1	SF	$ 45	-	$ -	
3	Building 6	SF	$ 45	-	$ -	
4	Existing Rail	LF	$ 30	1,200	$ 36,000	500' of rail adjacent to building 1A assumed Demolished in Phase 1.
5	Building 1A	SF	$ 55	-	$ -	
6	Infill Building	SF	$ 45	-	$ -	
7	Building 2A	SF	$ 45	110,000	$ 4,950,000	
8	Maintenance Building	SF	$ 45	-	$ -	
9	Pavement	ACRE	$ 217,800	18.5	$ 4,029,300	
10	Utilities	ACRE	$ 20,000	18.5	$ 370,000	
11	Open Maintenance Area Pavement	ACRE	$ 217,800	-	$ -	
12	Open Maintenance Area Utilities.	ACRE	$ 20,000	-	$ -	
	Subtotal				$ 9,573,006	

Item No.	Item	Unit	Unit Cost	Phase 5 - Section C Quantity	Phase 5 - Section C Total Cost	Descriptions/Assumptions
	Total Construction Cost				$ 57,400,122	
	Contingency Fees					
	Studies (Geotechnical, Environmental etc.), Design & Administration			10%	$ 4,330,012	
	Construction			35%	$ 15,155,043	
	Equipment			5%	$ 705,000	
	Contingency Total				$ 20,190,055	
	Total Cost with Contingency Fees				$ 77,590,000	

APPENDIX H – PHASE 6 COST ESTIMATE

Construction Cost Estimate

Project: Packer Avenue Marine Terminal

Task: Container Terminal

Date: June 25, 2014

Site Work

Item No.	Item	Unit	Unit Cost	Phase 6 - Section D Quantity	Phase 6 - Section D Total Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	2%	$ 117,955	2% of total site work costs
2	Site Grading	Acre	$ 37,000	8.7	$ 321,900	
3	Open Maintenance Area Site Grading	Acre	$ 37,000	-	$ -	
4	SubBase	Acre	$ 25,000	8.7	$ 217,500	6" aggregate base for wharf and yard pavement. Note: No geotechnical information available.
5	Open Maintenance Area Site SubBase	Acre	$ 25,000	-	$ -	6" aggregate base for wharf and yard pavement. Note: No geotechnical information available.
6	Pavement OTR Trucks	Acre	$ 450,000	1.5	$ 675,000	12" unreinforced concrete. Note: No geotechnical information available.
7	Heavy Pavement	Acre	$ 760,000	5.2	$ 3,952,000	18" RCC. Includes areas for side picks/empty handlers, hatch covers & loaded container storage. Note: No geotechnical information available.
8	Open Maintenance Heavy Pavement	Acre	$ 760,000	-	$ -	18" RCC. Includes areas for side picks/empty handlers, hatch covers & loaded container storage. Note: No geotechnical information available.
9	Open Maintenance Area RTG Payment	Acre	$ 1,264,000	-	$ -	Heavily reinforced concrete pavement, 18" thick. 125 pounds of rebar/CY. Note: No geotechnical information available.
10	RTG Runways	LF	$ 250	2,200	$ 550,000	Heavily reinforced concrete pavement strip, 18" thick x 8'-6" wide. 125 pounds of rebar/CY. Formed on two sides. Note: No geotechnical information available.
11	Striping/Signage	Acre	$ 20,000	8.7	$ 174,000	striping and signage for parking, and RTG Blocks.
12	Guiderail	LF	$ 25	-	$ -	around gas tanks, and power station
13	E&S Item: Inlet Protection	EA	$ 350	21.0	$ 7,350	
	Subtotal				$ 6,015,705	

Utilities

Item No.	Item	Unit	Unit Cost	Phase 6 - Section D Quantity	Phase 6 - Section D Total Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	2%	$ 112,290	2% of total utilities costs
2	Water, Potable	N/A				Tie new buildings to existing service on site - Included in Building Cost.
3	Water, Fire	Acre	$ 113,000	8.7	$ 983,100	Fire line for fire water only (potable water for Main, refer inspection and RTG bldgs not included). Need a pump to provide 1,500 gpm at the furthest 3 hydrants (4,500 gpm total demand). Fire line is looped and Fire hydrants can be spaced at 400 feet apart. Use 8" looped line, C900 PVC pipe and 6" DIP for connection to hydrants
4	Sanitary Sewer	N/A				Tie new buildings to existing service on site - Included in Building Cost.
5	Storm Sewer / Drainage	Acre	$ 172,000	8.7	$ 1,496,400	4 structures per acre (75% - inlets and 25% - manholes). 300 LF of pipe overall per acre, using the following breakdown for total amount of pipe (40% - 18 inch or smaller (includes roof drain tie-in), 20% - 24 inch, 20% - 36 inch and 20% - greater than 36 inch and/or culverts). All stormwater pipe needs to be Class V RCP and All inlets and manholes rated for heavy duty loading
6	Yard Lights	EA	$ 130,000	7.0	$ 910,000	100 ft high-mast light, 360 ft O.C. To include concrete foundation and junction box.
7	Electrical Distribution	Acre	$ 250,000	8.7	$ 2,175,000	480 volt power cables in 3" schedule 40 PVC conduit for lights and Reefers with associated junction boxes (from unit substations). 5kV shielded power cable in 4" schedule 40 PVC for cranes with associated medium voltage manholes (from unit substations). 15kV shielded 133% power cable in 5" schedule 40 PVC from main substations to unit substations.
8	Panzerbelt	LF	$ 65	-	$ -	Crane Power: 5kV power cable, one per crane.
9	Reefer Plugs	EA	$ 450	-	$ -	Includes the acquisition and installation of reefer sockets (480V) and connections to reefer sub stations. Maintenance not included. Includes tie-in to existing power supply.
10	Reefer Rack	EA	$ 236,900	-	$ -	Assume galvanized steel construction of 4 levels of catwalks serving seven containers wide. Each rack set accommodates two Includes manufacturing, delivery and installation. Maintenance costs not included.
11	Main Substation for Reefers/Lighting	EA	$ 370,000	-	$ -	Main 13.2 kV Double Ended Outdoor NEMA 3R Substation (two incoming 13.2 electric service feeders) with grounding system and surge protection. Includes connection to utility service
12	Main Substation for Cranes	EA	$ 350,000	-	$ -	Main 13.2 kV Double Ended Outdoor NEMA 3R Substation (two incoming 13.2 electric service feeders) with grounding system and surge protection. Includes connection to utility service
13	Portable Back-Up Generator for crane power	EA	$ 50,000	-	$ -	Portable emergency generator set with manual quick connect service safety switch and generator connection cords.
14	Unit Substations, Crane	EA	$ 350,000	-	$ -	13.2kV/5kV 3MVA Outdoor NEMA 3R Single Ended Unit Substation with electrical grounding system and surge protection. Maintenance not included.
15	Unit Substations, Reefer and Lighting	EA	$ 50,000	1	$ 50,000	13.2kV/480V Outdoor NEMA 3R Single Ended Unit Substation with electrical grounding system and surge protection. Maintenance not included.
	Subtotal				$ 5,726,790	

Equipment

Item No.	Item	Unit	Unit Cost	Phase 6 - Section D Quantity	Phase 6 - Section D Total Cost	Descriptions/Assumptions
1	Yard Trucks/Hostlers	EA	$ -	-	$ -	Not included in this estimate. Assume that operator will specify, acquire and maintain.
2	Empty Handlers/Side Picks	EA	$ -	-	$ -	Not included in this estimate. Assume that operator will specify, acquire and maintain.
3	Rubber Tired Gantry Crane	EA	$ 2,300,000	2	$ 4,600,000	RTG with 1 over 5 high stacking and 7 wide. Assume all specification, acquisition and delivery costs. Maintenance costs not included.
4	Ship to Shore Quay Cranes	EA	$ 12,000,000	-	$ -	100' gauge conventional ship to shore cranes. Assume all specification, acquisition and delivery costs. Includes drive motors and controls. Maintenance costs not included.
5	Crane Removal	EA	$ 150,000	1	$ 150,000	Disassembly and removal by truck
6	Electrification of Existing Cranes	EA	$ 1,700,000	-	$ -	
7	Terminal Operating System	EA	$ -	-	$ -	Not included in this estimate. Assume that operator will specify, acquire and maintain.
	Subtotal				$ 4,750,000	

Demolition

Item No.	Item	Unit	Unit Cost	Phase 6 - Section D Quantity	Phase 6 - Section D Total Cost	Descriptions/Assumptions
1	Mob/Demob	EA	2%	2%	$ 217,777	2% of total demolition costs
2	Building 1	SF	$ 45	-	$ -	
3	Building 6	SF	$ 45	-	$ -	
4	Existing Rail	LF	$ 30	-	$ -	500' of rail adjacent to building 1A assumed Demolished in Phase 1.
5	Building 1A	SF	$ 55	99,000	$ 5,445,000	
6	Infill Building	SF	$ 45	75,000	$ 3,375,000	
7	Building 2A	SF	$ 45	-	$ -	
8	Maintenance Building	SF	$ 45	-	$ -	
9	Pavement	ACRE	$ 217,800	8.7	$ 1,894,860	
10	Utilities	ACRE	$ 20,000	8.7	$ 174,000	
11	Open Maintenance Area Pavement	ACRE	$ 217,800	-	$ -	
12	Open Maintenance Area Utilities.	ACRE	$ 20,000	-	$ -	
	Subtotal				$ 11,106,637	

Item No.	Item	Unit	Unit Cost	Phase 6 - Section D Quantity	Phase 6 - Section D Total Cost	Descriptions/Assumptions
	Total Construction Cost				$ 27,599,132	
	Contingency Fees					
	Studies (Geotechnical, Environmental etc.), Design & Administration			10%	$ 2,284,913	
	Construction			35%	$ 7,997,196	
	Equipment			5%	$ 237,500	
	Contingency Total				$ 10,519,609	
	Total Cost with Contingency Fees				$ 38,119,000	