Understanding Existing Conditions

A Key To Terminal Planning

Jim Hunt
TEC Inc.
October 18, 2011

Agenda

- Introduction to TEC
- Why We Need to Understand Existing Operations In The Planning Phase
  - Better Understanding of Project Needs and Requirements
  - Model Input
- Case Study – Philadelphia Packer Avenue Marine Terminal
- Case Study – Port of Portland, Terminal 6
- Discussion/Questions

TEC Inc.

- Founded 1990
- 250+ Staff
- Headquartered in Charlottesville, VA
- 20 Offices
- Environmental – Engineering - Architecture
  - Environmental Planning
  - Asset Management
  - Port Planning & Engineering

Why We Need to Understand Existing Operations and Conditions

- Better Understanding of All Project Needs
  - Most are more than just "Maximize Throughput"
  - Sometimes The Plan Also Needs To Improve "Deficiencies" and Eliminate Constraints
- Especially Critical if Planning Improvements For An Older, Existing Terminal;
- Provides opportunity to incorporate all infrastructure requirements into Project Planning and Phasing.

The Initial Planning Task

- The Planning Process Should Begin with a Thorough Review of Existing Operations and A Review of **Facility/Equipment Conditions**
- Typical Scope Might Include:
  - Kick-off Meeting To Agree on Overall Objectives
  - Review of Existing Operations and Any Unique Terminal Requirements
  - Inventory of Existing Conditions and Facilities
    - Equipment Inventory and Assessment
  - Identify Critical Issues Relevant to Existing Terminal and Operations
  - Prepare Summary Operational Criteria Report

This Information Will Also Serve As Input To Various Capacity Models

- TEC's Capacity Model dependent on analysis of base terminal operational data:
  - Berth (Number of STS Cranes; Berth Utilization Factors; Crane Productivity; etc.)
  - Container Yard (CY); (Type of Equipment; Dwell Times; Size; MTs; Chassis, Buildings, etc.)
  - Gate (Number of Stages; Equipment Used; Processing Time; etc.)
- The Models Will Determine "Theoretical" Capacity for Both Current and Future Conditions
- But That Is Only Part of The Planning Need

Case Studies

Philadelphia's Packer Avenue Marine Terminal (PAMT)

And

Portland's Terminal 6

Philadelphia's Packer Avenue Terminal

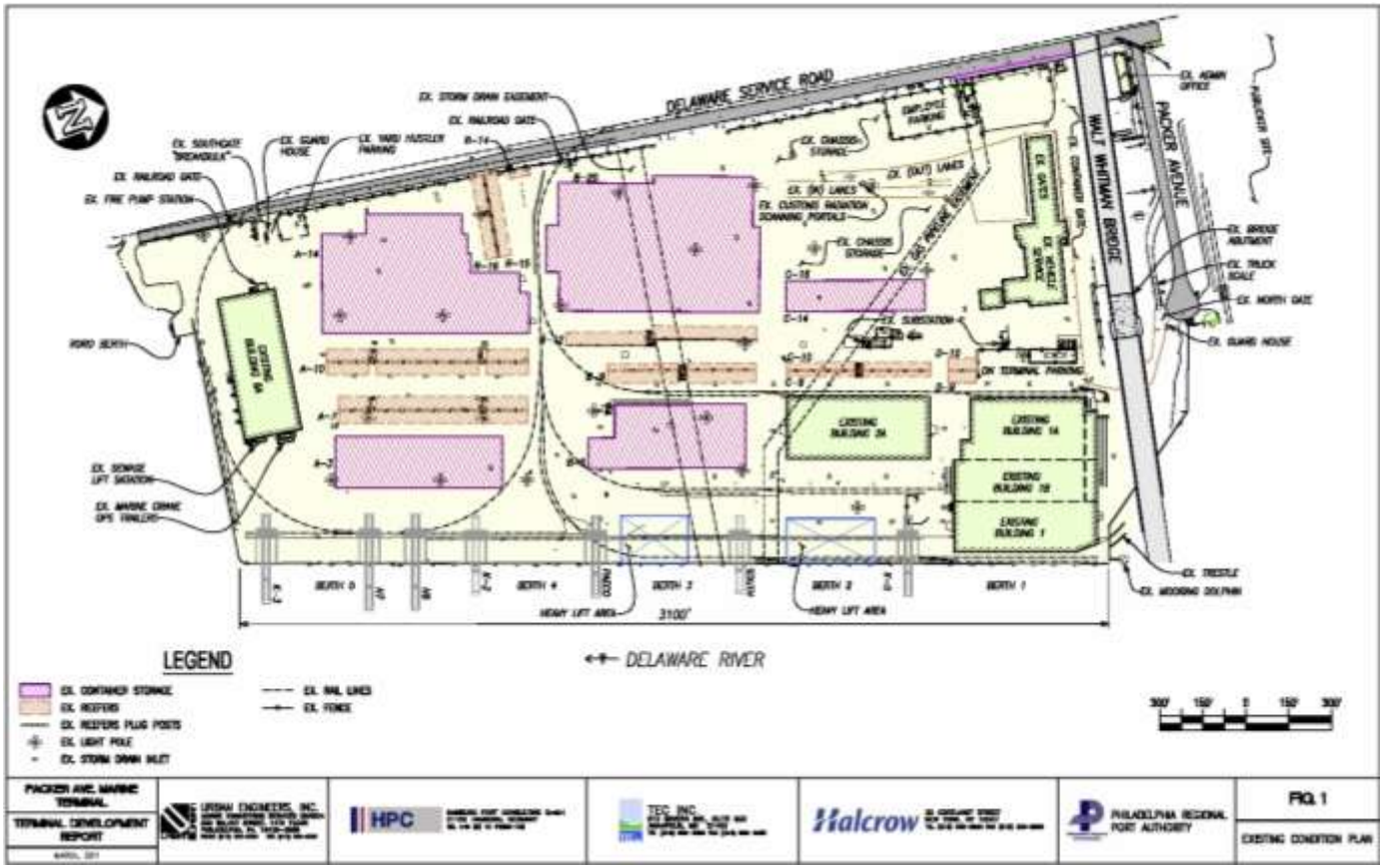
Packer Avenue Marine Terminal

- Facilities Include:
  - 6 berths - 3,800 linear ft. (1,158.24 m.) of marginal wharf and 1 RO/RO Berth
  - 290,000 sq.ft. dry/heated warehousing capacity
  - 2,200,000 cu.ft. refrigerated warehousing capacity
  - 1160 Reefer Plugs
  - 7 container cranes (45-375 Tons)
- Refrigerated Containers (Reefers) 42% of Cargo Volume

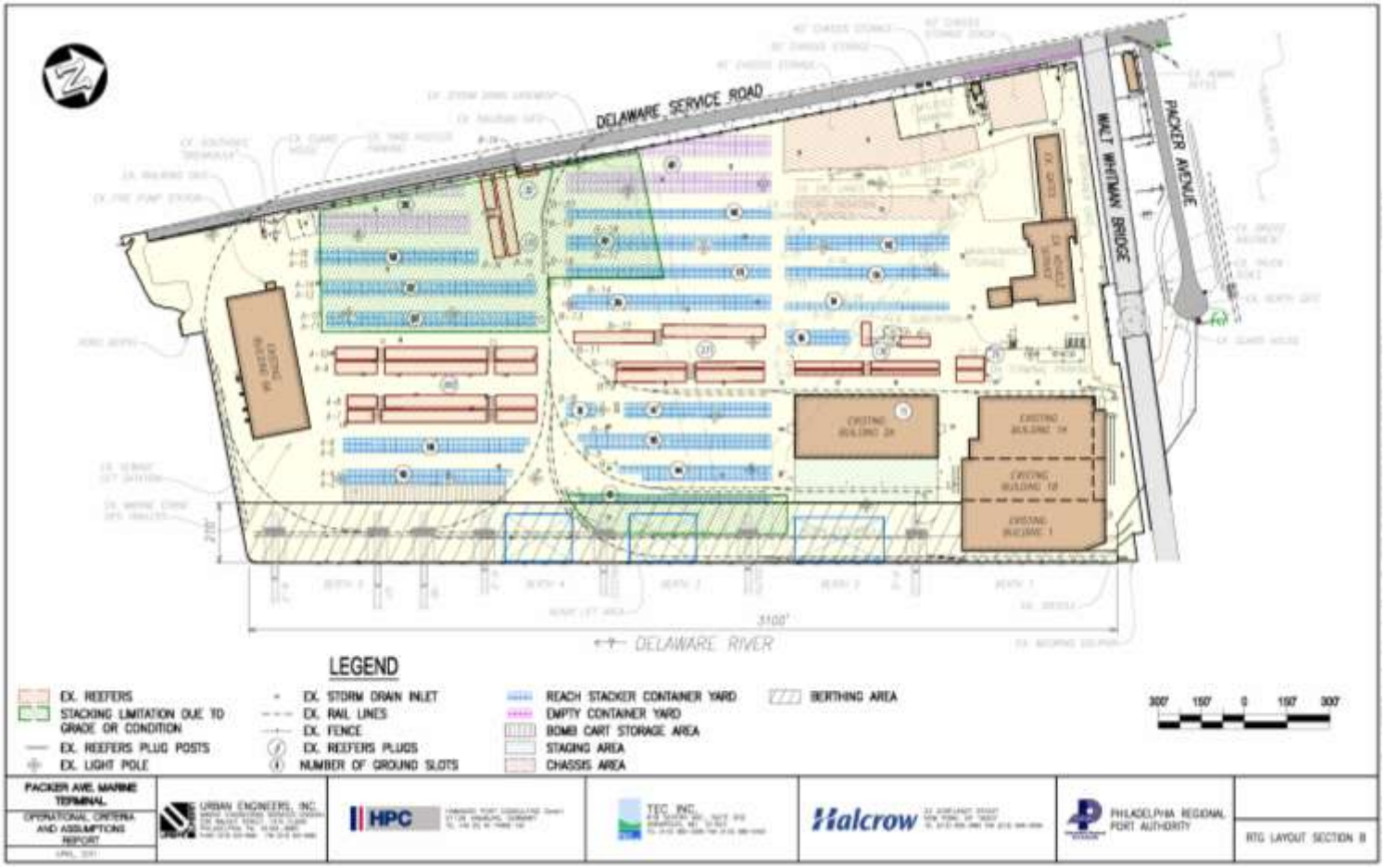
PAMT Objective

- Goal: To develop a "state-of-the-art" marine cargo terminal in the Port of Philadelphia that is capable of supporting high speed vessels (aka "FastShip").
- Planning Team Selected:
  - Urban Engineers (Prime);
  - TEC
  - HPC
  - Halcrow

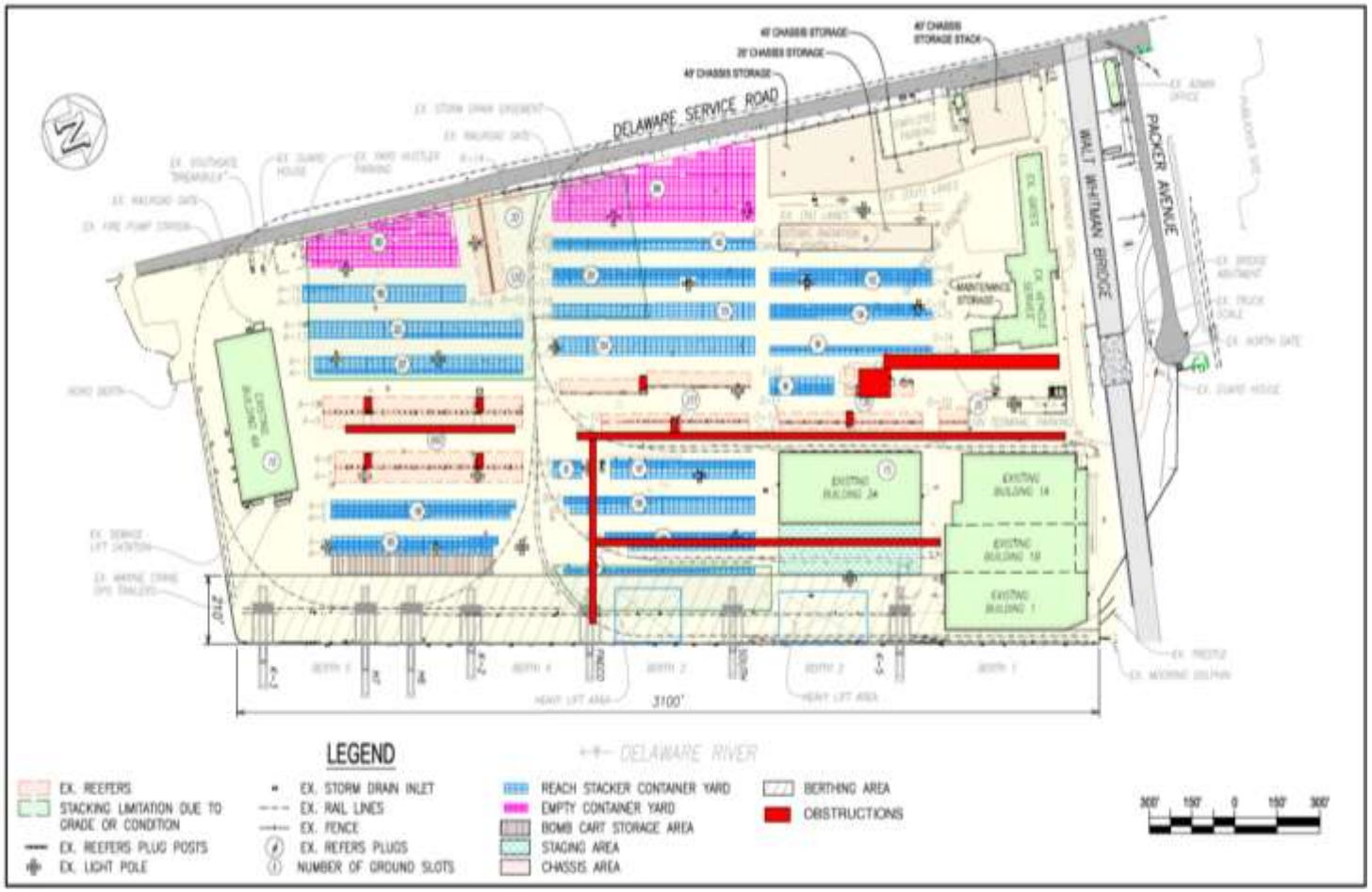
Initial Inventory and Facility Conditions Report Helped To Determine Terminal Physical Constraints



From The Constraints Map An Initial Improvement Program Was Recommended Using Existing Equipment (Reach Stackers)



Inventory and Facility Conditions Report Help To Determine Other Obstacles And Constraints



Operational Details - PMAT

Reefer	Section A	Section B	Section C	TOTAL
Existing Yard Plugs	810	231	156	1,197
Existing Building Plugs (not used in analysis)	10	10	10	
Dwell Time (Days)	6	6	6	
Cycles / Year	60	60	60	
Reefer Throughput Capacity	48600	13860	9360	71,820
Optimization	85%	85%	85%	
Theorhetical Maximum Capacity (annual)	41310	11781	7956	61,047
Dry Containers	Section A	Section B	Section C	TOTAL
Total Ground Slots (teu)	951	1,302	446	2,699
Maximum Stacking Height	3	3	3	3
Average Stacking Height	2	2	2	2
Cycles / Year	52	52	52	52
Total Throughput (teu)	98,904	135,408	46,384	280,696
Import Percentage	65.75%	65.75%	65.75%	65.75%
Import Groundslot Capacity (teu)	65,029	89,031	30,497	184,558
Export Percentage	34.25%	34.25%	34.25%	34.25%
Export Groundslot Capacity (teu)	33,875	46,377	15,887	96,138
Empties	Section A	Section B	Section C	TOTAL
Total Ground Slots (teu)	383	694	0	1,077
Maximum Stacking Height	4	3	0	3
Average Stacking Height	3.5	2	0	2
Cycles / Year	30	52	0	52
Total Throughput (teu)	40,215	72,176	0	112,008

Phasing Analysis Driven By Reefer Requirements

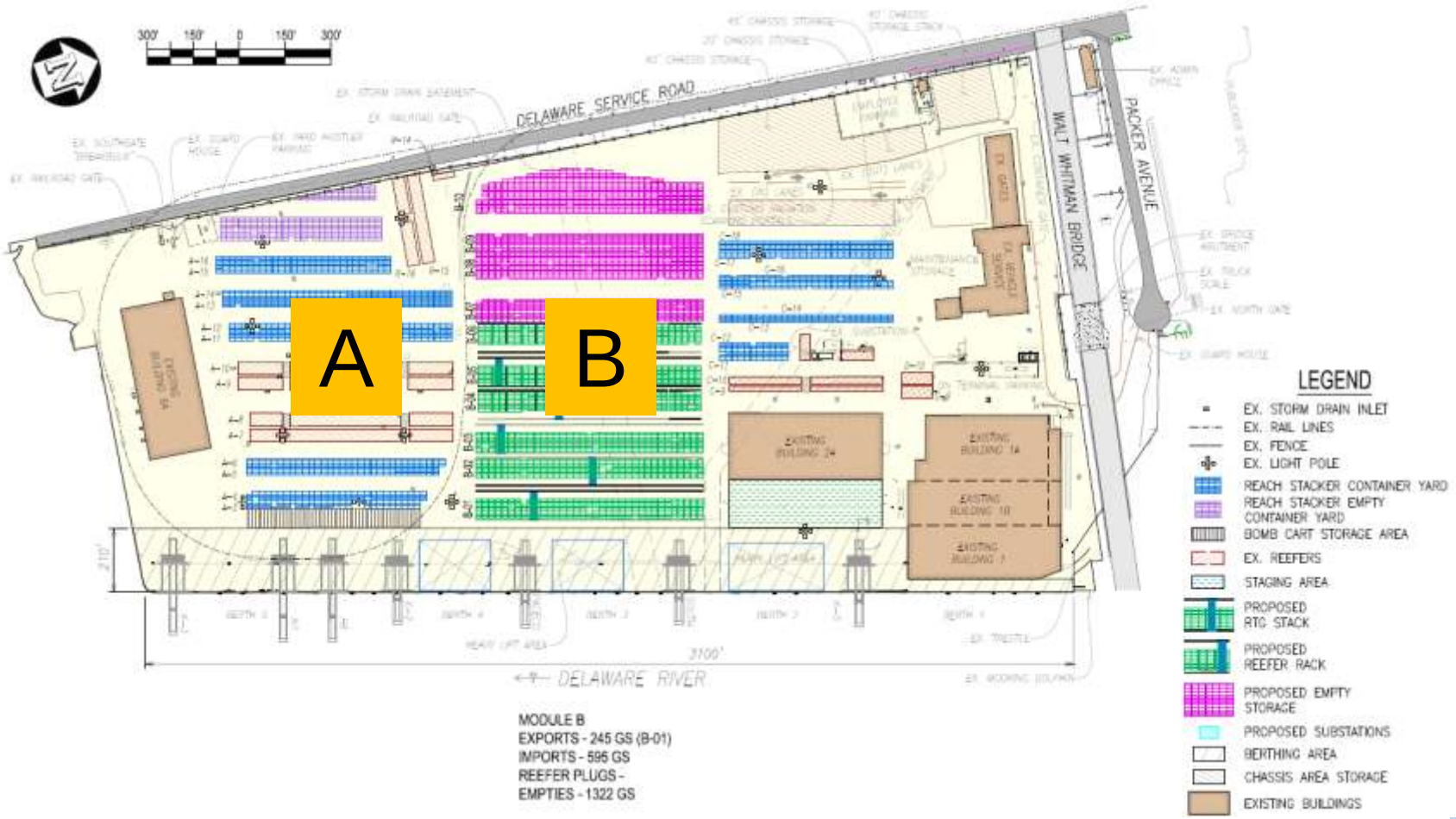
Capacity During and After Reconstruction of Module A

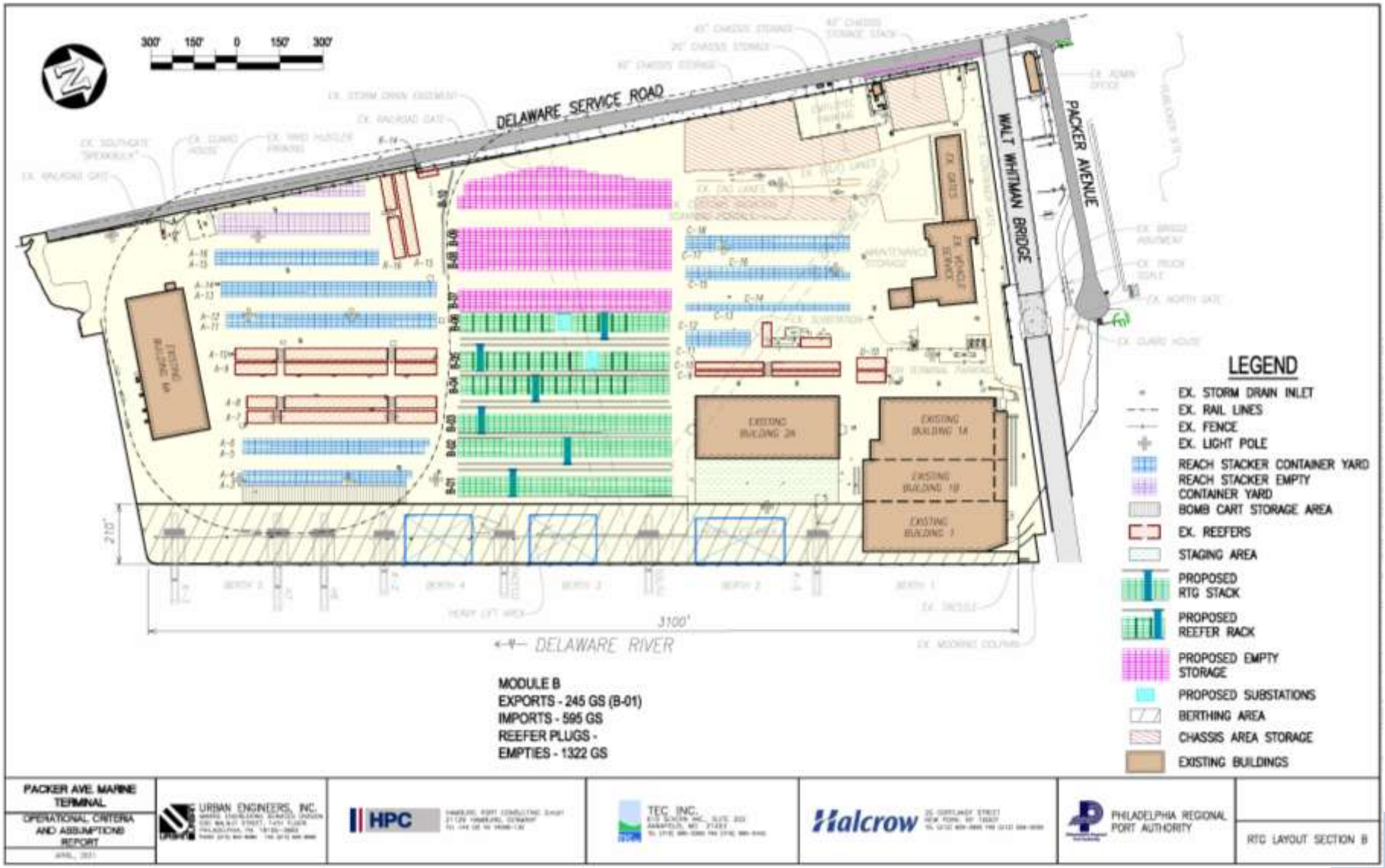
	Total After	Total During Reconstruction w/o A
Dry Capacities TEU	**368,987**	213,832
Reefer Capacities TEU	**187,732**	**24,868**
MT Capacities TEU	**124,825**	85,461
Total TEU	**681,544**	**324,161**

Capacity During and After Reconstruction of Module B

	Total After	Total During Reconstruction w/o B
Dry Capacities TEU	**392,108**	170,895
Reefer Capacities TEU	**189,536**	**62,234**
MT Capacities TEU	**140,422**	85,461
Total TEU	**722,065**	**318,589**

Used Existing Data To Determine Best Phasing Plan

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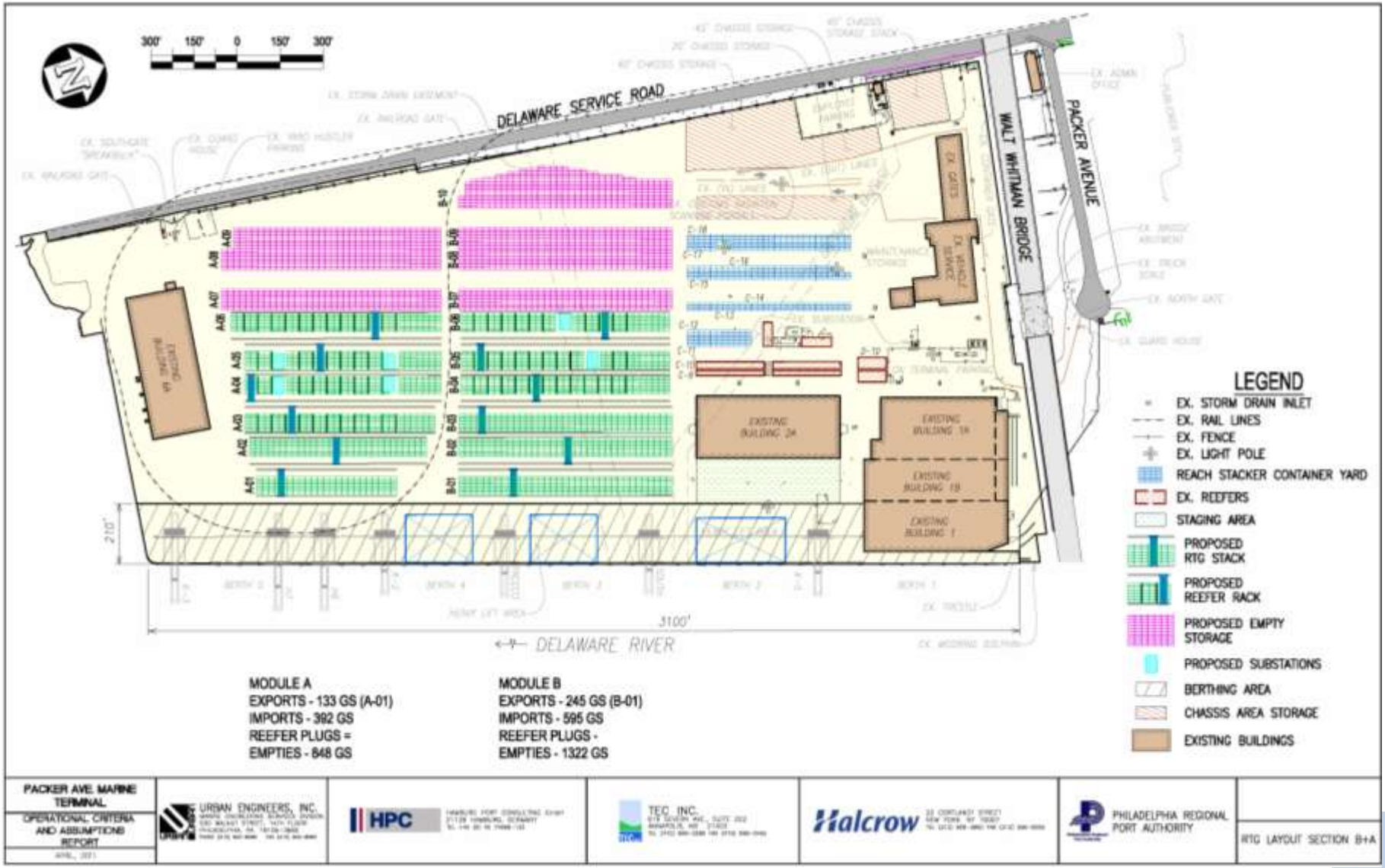
DELAWARE SERVICE ROAD
WALT WHITMAN BRIDGE
PACKER AVENUE
EXISTING BUILDING 2A
EXISTING BUILDING 1A
EXISTING BUILDING 1B
EXISTING BUILDING 1
3100'
DELAWARE RIVER
LEGEND
EX. STORM DRAIN INLET
EX. RAIL LINES
EX. FENCE
EX. LIGHT POLE
REACH STACKER CONTAINER YARD
REACH STACKER EMPTY CONTAINER YARD
BOMB CART STORAGE AREA
EX. REEFERS
STAGING AREA
PROPOSED RTG STACK
PROPOSED REEFER RACK
PROPOSED EMPTY STORAGE
PROPOSED SUBSTATIONS
BERTHING AREA
CHASSIS AREA STORAGE
EXISTING BUILDINGS
MODULE B
EXPORTS - 245 GS (B-01)
IMPORTS - 595 GS
REEFER PLUGS -
EMPTIES - 1322 GS
PACKER AVE. MARINE TERMINAL
OPERATIONAL CRITERIA AND ASSUMPTIONS REPORT
URBAN ENGINEERS, INC.
HPC
TEC, INC.
Halcrow
PHILADELPHIA REGIONAL PORT AUTHORITY
RTG LAYOUT SECTION B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3100'
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LEGEND
EX. STORM DRAIN INLET
EX. RAIL LINES
EX. FENCE
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EXISTING BUILDINGS
MODULE A
EXPORTS - 133 GS (A-01)
IMPORTS - 392 GS
REEFER PLUGS =
EMPTIES - 848 GS
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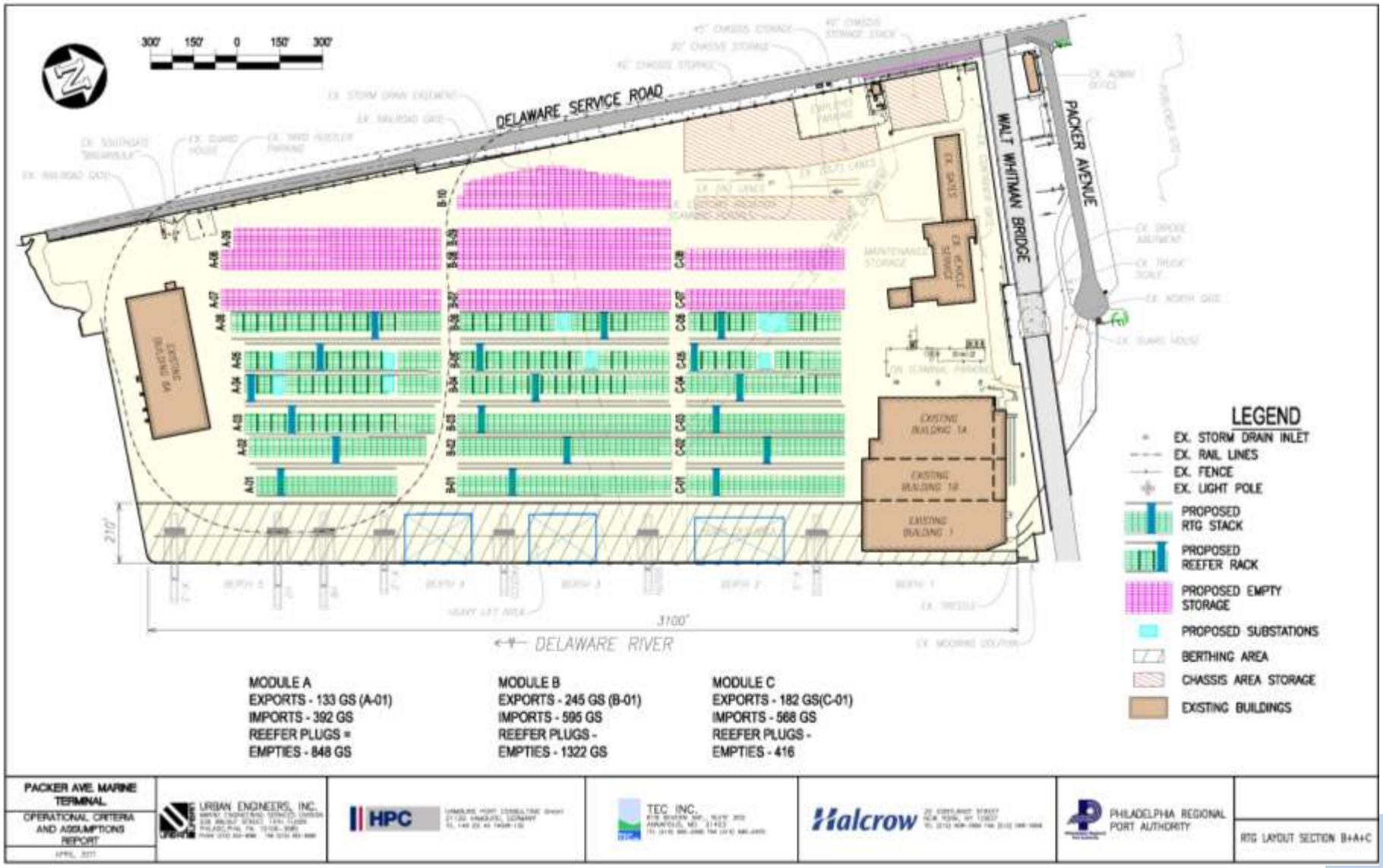
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DELAWARE SERVICE ROAD
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PACKER AVENUE
EXISTING BUILDING 1A
EXISTING BUILDING 1B
EXISTING BUILDING 1
EXISTING BUILDING 1C
210'
3100'
DELAWARE RIVER
LEGEND
EX. STORM DRAIN INLET
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EX. FENCE
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PROPOSED RTG STACK
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MODULE B
EXPORTS - 245 GS (B-01)
IMPORTS - 595 GS
REEFER PLUGS -
EMPTIES - 1322 GS
MODULE C
EXPORTS - 182 GS(C-01)
IMPORTS - 568 GS
REEFER PLUGS -
EMPTIES - 416
PACKER AVE. MARINE TERMINAL
OPERATIONAL CRITERIA AND ASSUMPTIONS REPORT
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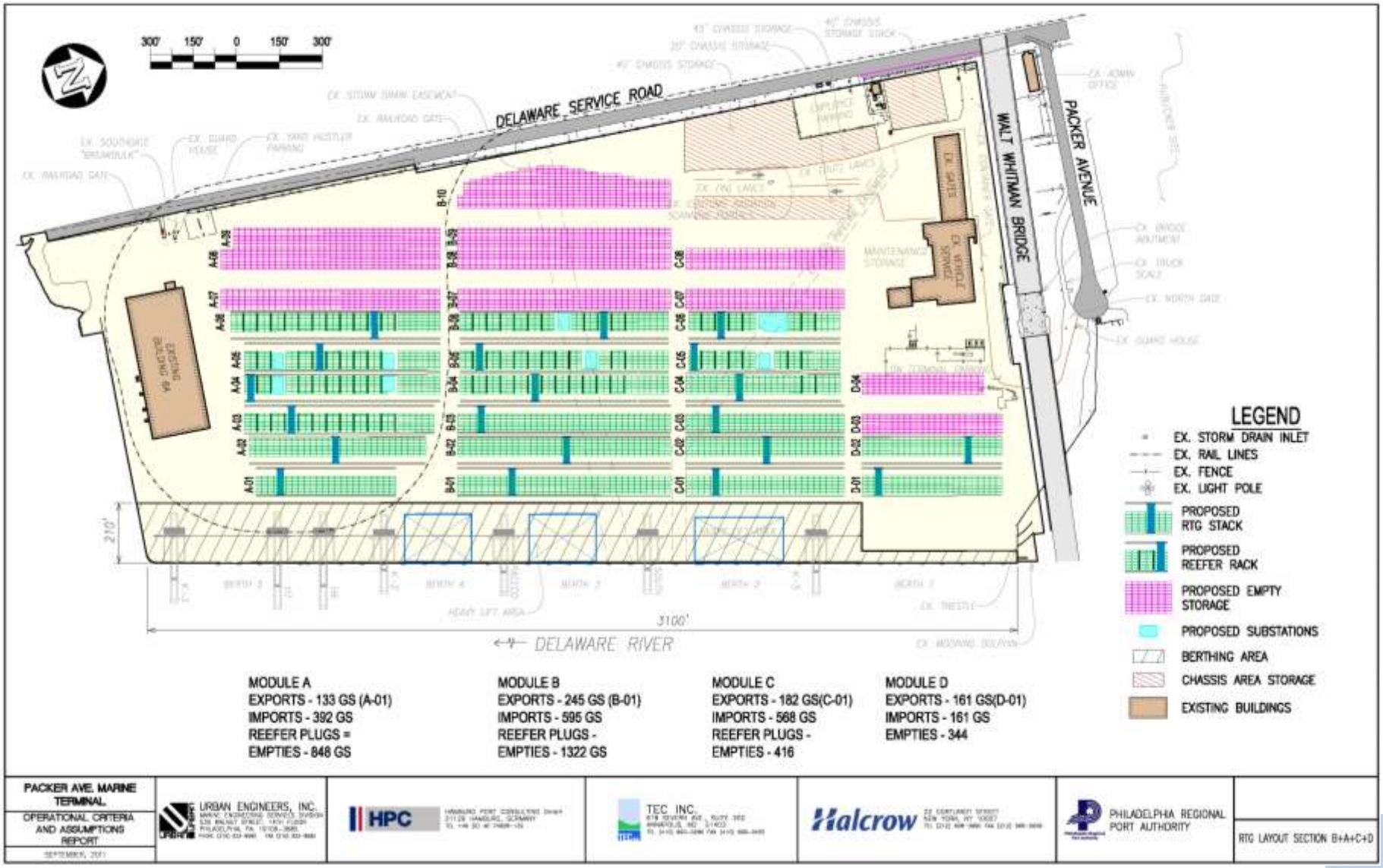
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EMPTIES - 848 GS
MODULE B
EXPORTS - 245 GS (B-01)
IMPORTS - 595 GS
REEFER PLUGS -
EMPTIES - 1322 GS
MODULE C
EXPORTS - 182 GS(C-01)
IMPORTS - 568 GS
REEFER PLUGS -
EMPTIES - 416
MODULE D
EXPORTS - 161 GS(D-01)
IMPORTS - 161 GS
EMPTIES - 344
PACKER AVE. MARINE TERMINAL
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SEPTEMBER, 2011
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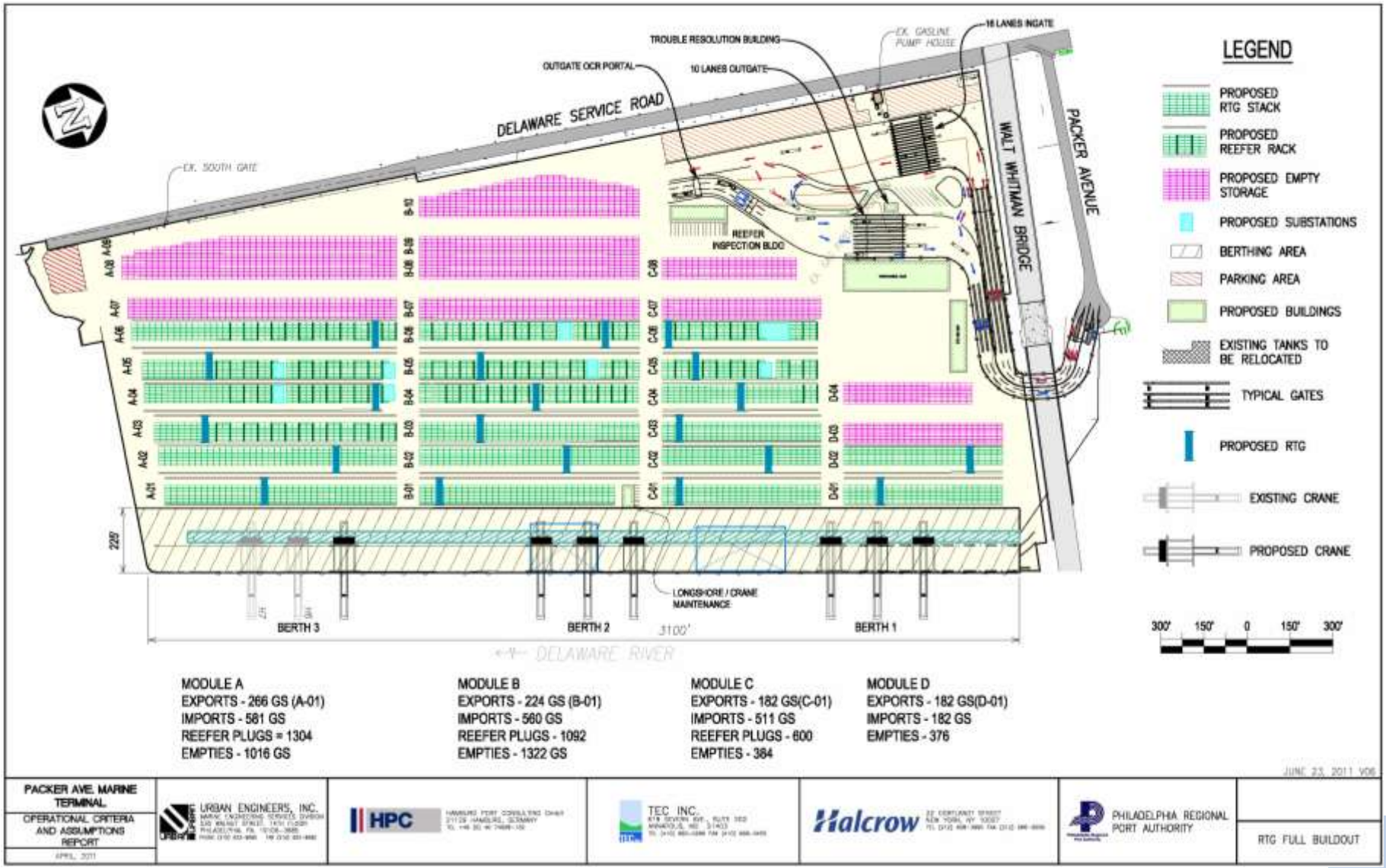
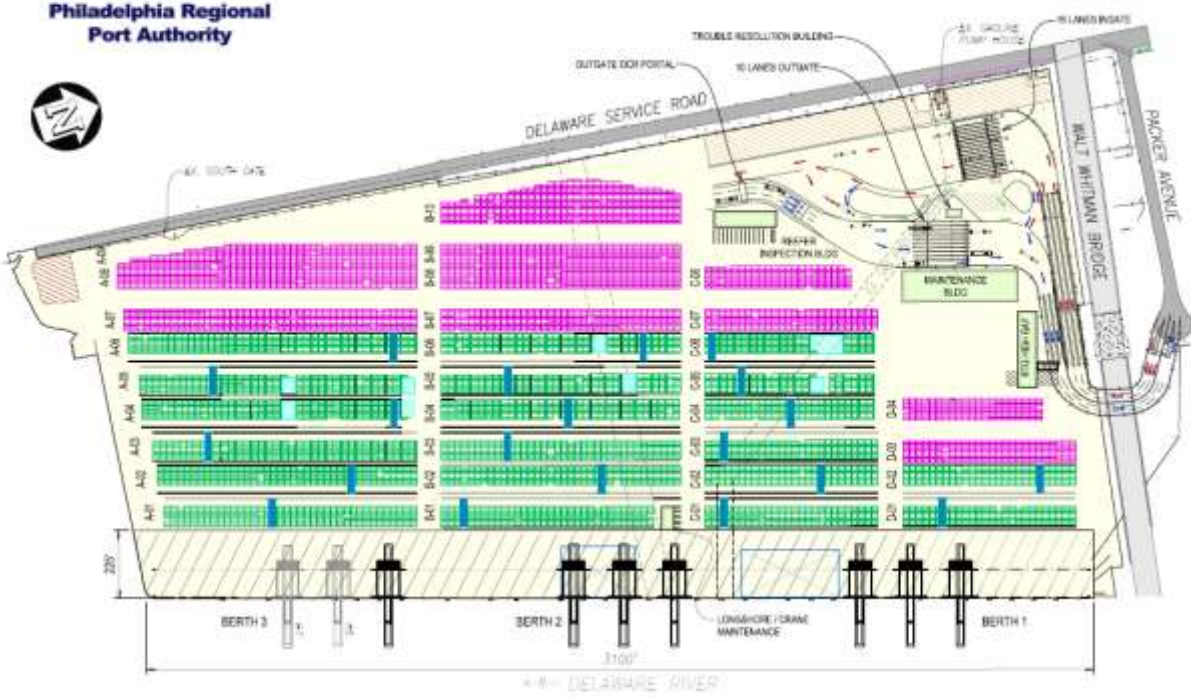
RTG LAYOUT SECTION B+A+C+D

AAPA Marine Terminal Management Training Program 2011



AAPA Marine Terminal Management Training Program 2011

Philadelphia Regional Port Authority



Highlights:

Yard Capacity (GS)		
Total	41,000	TEU
Reefer	3,000	plugs
Dry	13,500	TEU
MT	18,500	TEU

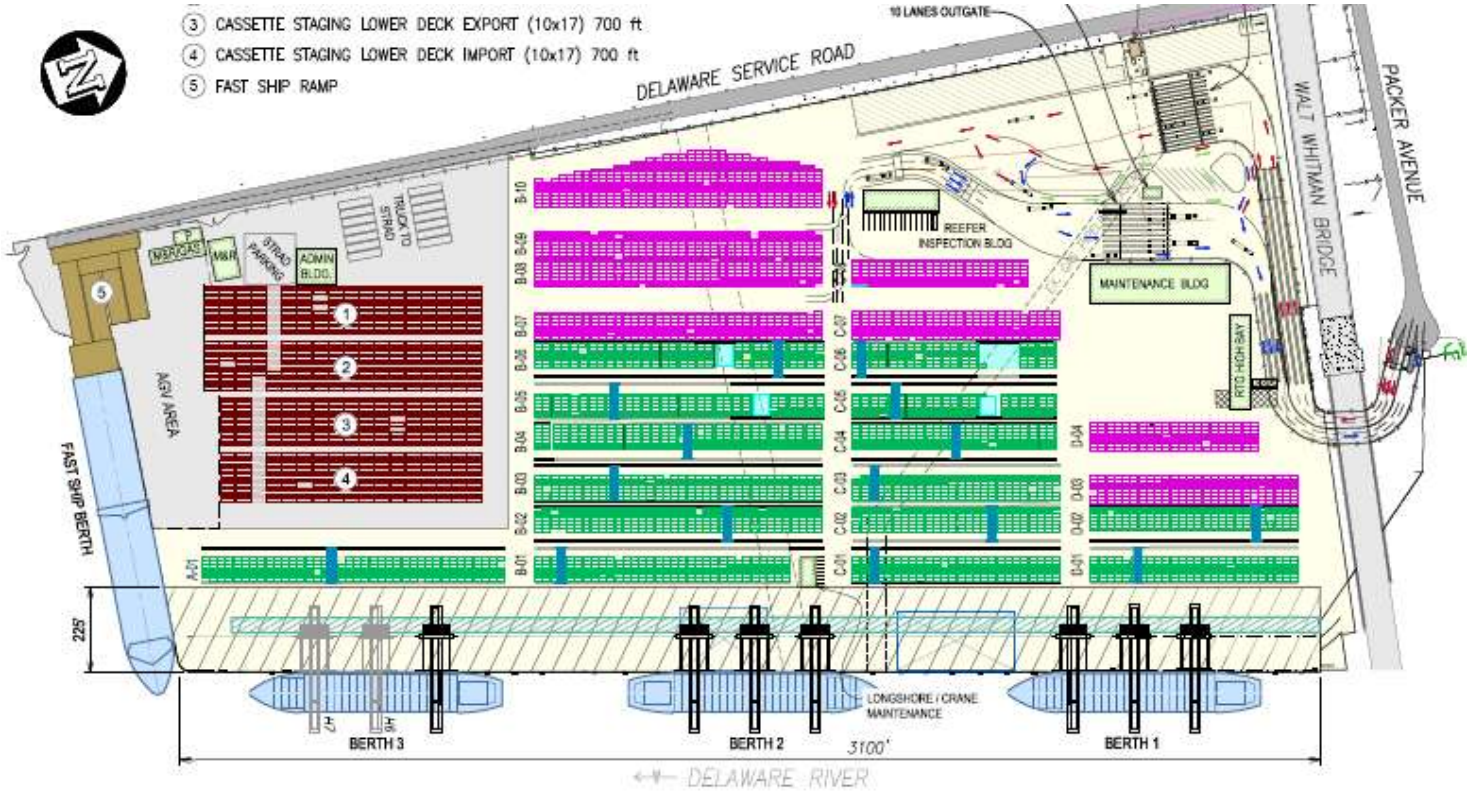
Throughput Capacity	
Total	1.18m TEU
Reefer	0.25m TEU
Dry	0.47m TEU
MT	0.46m TEU

6–9	Quay Cranes
34	RTGs
29	Jockey Trucks
14	MT Handler
16	In lanes
10	Out lanes

URBAN ENGINEERS Halcrow HPC TEC inc

TEC inc

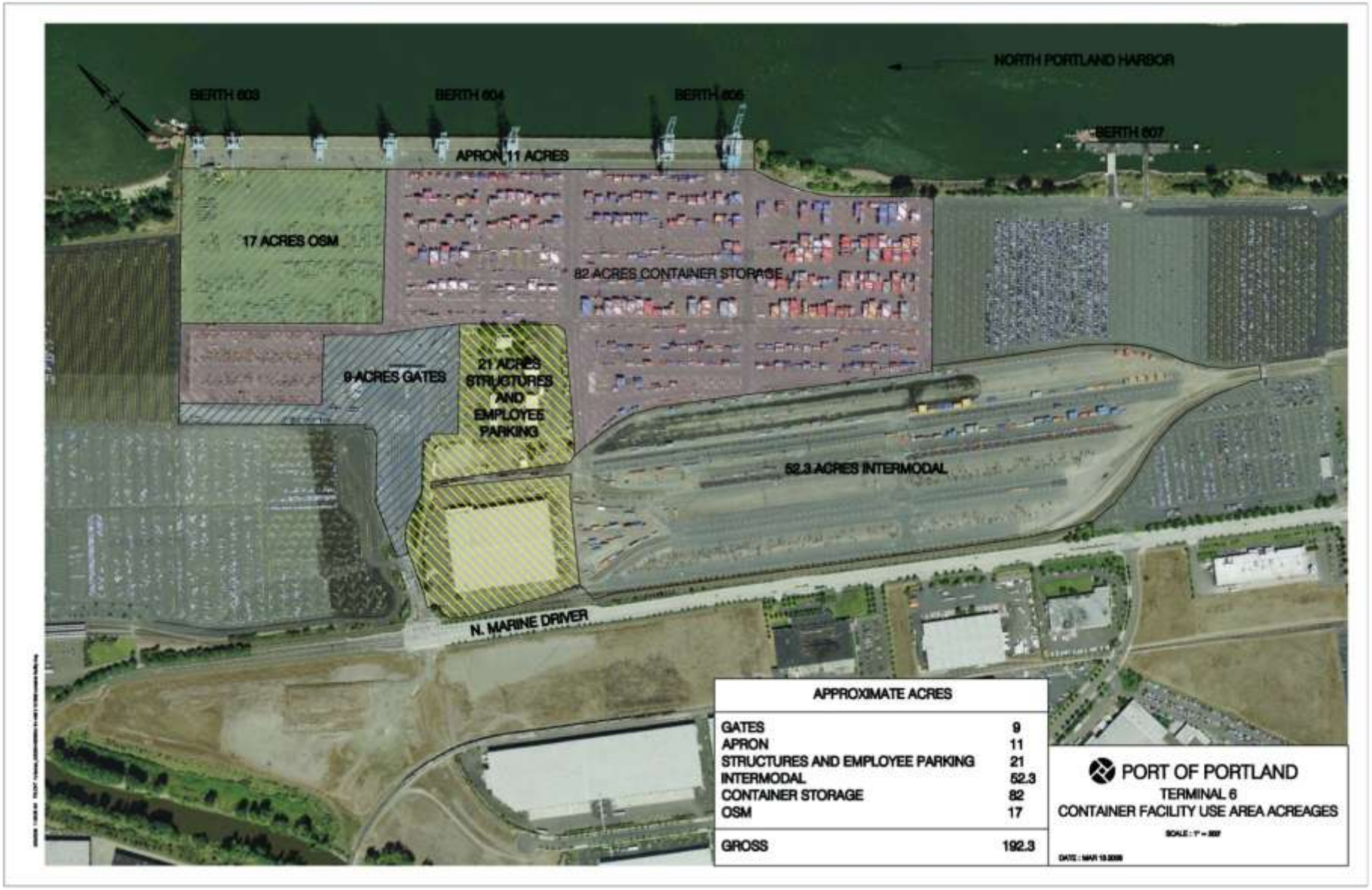
PMAT was Planned to Add "FastShip"



The Initial Inventory and Assessment Was Critical

- To Identify Critical Operational Elements That Needed To Be Incorporated Into The Phasing Plan
- To Identify Physical Constraints and Obstacles To Reconfiguring The Terminal;
- To Develop A Phasing Program That Allows The Operator to Maintain Terminal Operations During Reconstruction

Port of Portland Terminal 6



Port of Portland Terminal 6

- The Largest Container Terminal At The Port of Portland;
- Port of Portland Was Negotiating A 30-year Concession with a private Terminal Operator – ICTSI
- TEC Inc. Was Serving as ICTSI Technical Consultant For Terminal Planning

As Part Of The Development Plan -A Detailed Facility Condition Assessment Was Conducted

- ICTSI Needed To Know Current Conditions of Facilities and Equipment;
  - Determined Annual Maintenance Budget;
  - Project Remaining "Useful-Life" of all Facilities and Equipment;
  - Project Re-Capitalization Costs Over Period of Concession;
  - Develop Capital Expense Model under Several Growth Scenarios

Facility Condition Assessment

- Engineering Evaluation
  - Inventory of all assets in integrated system, logically grouped
  - Identify deficiencies, or “deferred maintenance” including cost estimates
  - Establish general conditions and remaining useful life of assets
  - Establish major maintenance and recapitalization requirements

Asset Summary Reports

TEC Inc. Structures and Employee Parking Asset Summary Report

7205 - M2 Maintenance Building 2 (Structures and Employee Parking)

Asset Level Information

Inspection Date	Category Code	Asset Size	RV	FCI	Year Built
7/1/2009	EXCHGE AUTO REPAIR STA	13,516.00	$1,482,976	0.0194	1973

Asset Summary

This facility is serving to provide vehicle repair and maintenance and include the following spaces: Electrical parts storage and shop, Lube area, motor repair, grease & oil storage, general parts, tire storage, tire repair, trailer repair, lunch room, toilets, locker room, and administration office.

Asset History

The structure was constructed 1973 as a high one story building with Three areas of second levels. The continued use has been vehicle repair and maintenance.

Inventory Description		Unitformat	Quantity	Units	Install Year	Eff. Age	Rem. Life
A10	**Foundations**						
A10	Foundations ($167,203)						
Perimeter reinforced concrete strip footings		Foundation	420.00	LF	1973		89
A1010	Standard Foundations ($89,721)						
Column reinforced spread concrete footings and pedestals (3'X3'X1')		Standard Foundations	29.00	EA	1973		89
A1030	Slab On Grade ($127,562)						
Concrete 6" slab on grade		Slab On Grade	9,420.00	SF	1973		89
B10	**Superstructure**						
B10	Superstructure ($315,693)						
Pre-engineered steel columns, wall frame and roof frame		Superstructure	9,420.00	SF	1973		36
B20	**Exterior Enclosure**						
B20	Exterior Enclosure ($161,804)						
Pre-engineered metal siding		Exterior Enclosure	4,848.00	SF	1973		8
B2010	Exterior Walls ($180,314)						
Reinforced concrete 6" thick tilt-up walls		Exterior Walls	4,200.00	SF	1973		1
B30	**Roofing**						
B30	Roofing ($105,514)						
Pre-engineered high standing seam roof with roof ridge		Roofing	9,420.00	SF	1973		-9
C10	**Interior Construction**						
C10	Interior Construction ($33,597)						
Office space wood walls, steel floor, concrete deck		Interior Construction	4,344.00	SF	1973		-5
C20	**Stairs**						

TEC Inc. Entrance/Exit Gates Asset Summary Report

14 - EN Entrance Lanes (Entrance/Exit Gates)

Asset Level Information

Inspection Date	Category Code	Asset Size	RV	FCI	Year Built
N/A	Entrance/Exit Gate Lanes	6.00	$300,000	0.0000	1997

Asset Summary

The entrance consists of 9 lanes, 6 with in-ground scales, 9 intercom pedestals, 4 chassis cameras, 4 camera poles behind and 5 camera pedestals ahead of the lanes.

Asset History

The entrance lanes were constructed in 1997

Inventory Description		Unitformat	Quantity	Units	Install Year	Eff. Age	Rem. Life
G20	**Site Improvements**						
G2020	Parking Lots ($0)						
Truck Scales		Miscellaneous Structures & Equipment	6.00	EA	1997		8
Intercom Pedestals		Miscellaneous Structures & Equipment	9.00	EA	2006		17
Chassis Camera Pedestals		Miscellaneous Structures & Equipment	5.00	EA	2006		17
Camera Poles		Miscellaneous Structures & Equipment	4.00	EA	2006		17
Camera Pedestals		Miscellaneous Structures & Equipment	5.00	EA	2006		17
G40	**Site Electrical Utilities**						
D4010	Site Communication & Security ($3,080)						
Intercom in Lane		Site Communication & Security	9.00	EA	2006		27
Chassis Cameras		Site Communication & Security	9.00	EA	2006		27
Rear Cameras		Site Communication & Security	18.00	EA	2006		27
Dome Cameras		Site Communication & Security	27.00	EA	2006		27

Trade	Narrative Name	Narrative Description
Electrical	Other	
Electrical	Security System	
Mechanical	Site Mechanical Utilities	
Structural	Foundation	
Structural	Other	
Structural	Pavement/Walkways	
Structural	Site Work	
Structural	Special Construction	

Deficiencies & Work Packages

TEC Inc. Work Package Report

Deficiency Details

H98-31763 - HDPE Pile Cover Damage

60310.JPG-

Problem Statement:

HDPE Cover Damaged

Solution Statement:

Replace HDPE Cover

Code Reference:

Uniformat Classification	
Uniformat Code:	Mooring & Berthing System
Inventory Item:	Berth 603 Fender System

Deficiency Impacts	
Severity Rating:	High
Impact Type:	Deferable
Impact Severity:	Deferable
Impact Mishap Probability:	Failure is likely to occur before next scheduled inspection (3 years)
Distress Type:	Broken

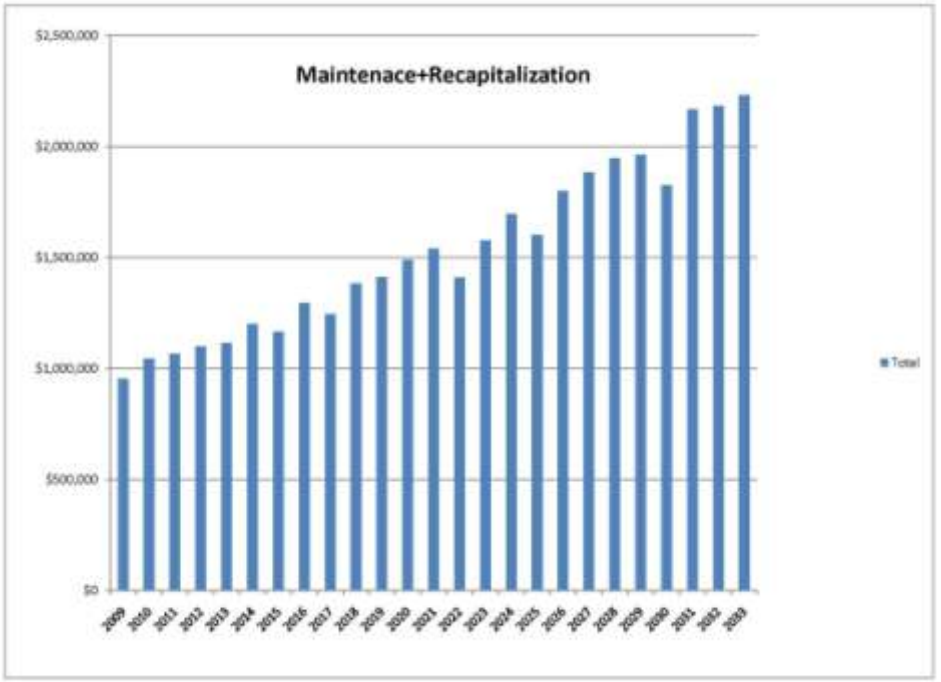
Deficiency Specifications	
Recommended Execution Year:	2009
Deficiency Source:	FMS
Work Type:	Repair

Deficiency Cost	
Labor	$706.23
Materials	$648.00
Equipment	$795.34
Total	**$2,149.57**

Maintenance & Recapitalization Schedules

HierarchyName	(All)
AssetName	(All)

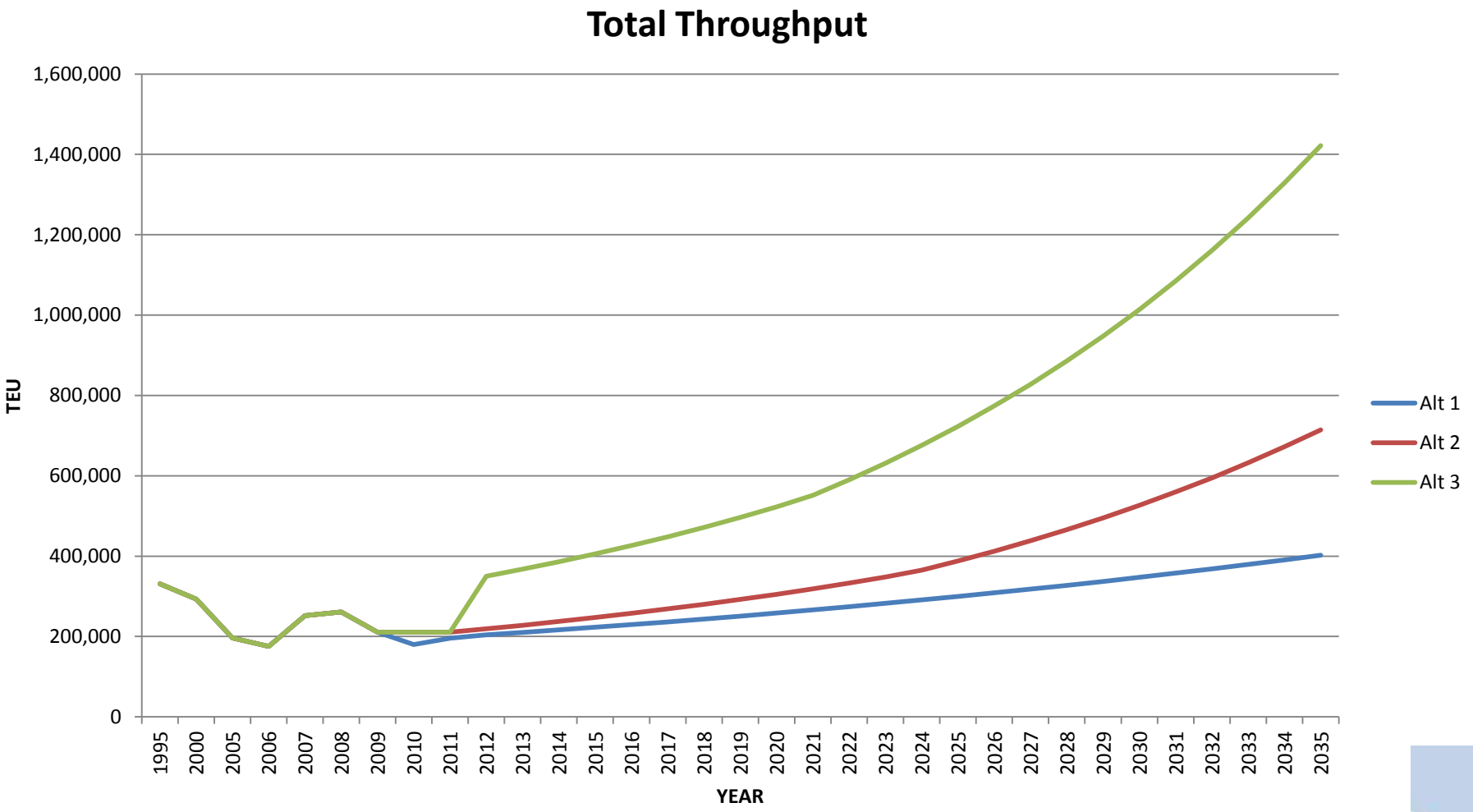
	Values	
Year	Annual Maint.	Recapitalization
2009	$955,170	$6,572,609
2010	$1,045,109	$1,153,090
2011	$1,066,237	$2,741,187
2012	$1,099,986	$3,194,785
2013	$1,116,402	$5,510,286
2014	$1,200,987	$1,156,988
2015	$1,165,241	$8,974,844
2016	$1,296,997	$192,501
2017	$1,245,331	$9,904,387
2018	$1,384,994	$643,373
2019	$1,412,030	$2,808,865
2020	$1,489,612	$91,655
2021	$1,541,575	$110,877
2022	$1,411,230	$18,543,423
2023	$1,578,742	$7,382,907
2024	$1,696,285	$1,413,994
2025	$1,603,052	$16,719,563
2026	$1,800,407	$3,183,384
2027	$1,884,750	$1,161,586
2028	$1,948,214	$1,447,219
2029	$1,962,473	$6,895,005
2030	$1,827,193	$27,535,011
2031	$2,169,425	$673,753
2032	$2,183,900	$6,840,553
2033	$2,232,068	$9,904,974
Grand Total	$38,317,410	$144,756,819



Three Alternative Growth Scenarios Were Introduced

- Alternative 1 - Reduced volumes through 2012, then 3% growth of imports, exports, and empties;
- Alternative 2 - No growth to 2012, then 6.3% growth for imports, 2.1% growth for exports, and empties to balance;
- Alternative 3 - No growth to 2012, then increase throughput to 350,000 teu (new service), followed by 7.0% growth for imports, 3.0% growth for exports

Summary of Alternatives



Capital Costs and Timing Under Each Alternative Was Determined

- Current Terminal Capacity Was Determined;
- Expansion Requirements For Each Alternative Was Determined;
- Three Implementation Plans Were Developed Based on Both The Need To Replace Facilities and Expand For Growth
- New Capital Costs Were Forecasted Under Each Alternative

Infrastructure Expense Were Projected Under Each Alternative

- Showing maintenance, deficiencies, recapitalization, and expansion in 5-year increments
- Highlights major costs by year
- Identified Major Recapitalization and Expansion Projects, By Year
  - Identified Required Projects For Each Alternative

Terminal 6 Alternative 3
Phase 1 Plan; - 2010 - 2014

ALTERNATIVE 3

BASED ON NO GROWTH UNTIL 2012, THEN ASSUMES A NEW SERVICE TO ACHIEVE 350,000 TEU, FOLLOWED BY 7% GROWTH FOR IMPORTS, 3% GROWTH FOR EXPORTS, AND EMPTIES BASED ON OVERALL GROWTH FOR THROUGH PUT OR IMBALANCE OF IMPORT VS EXPORT (WHICHEVER IS HIGHER)

MAINTENANCE

ESTIMATED COSTS BASED ON A PERCENTAGE (1%) OF THE PLANT REPLACEMENT VALUE (PRV) OF ALL TERMINAL ASSETS

DEFICIENCIES (> $100K)

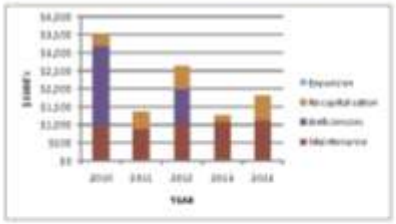
ITEM	DESCRIPTION	YEAR(S)	COST ($1000's)
D1	FENDER SYSTEM REPAIRS	2010	$309
D2	PAVEMENT REPAIRS (606)	2010	$175
D3	PAVEMENT REPAIRS (606)	2010	$138
D4	CDC BUILDING ROOF STRUCTURE, EXTERIOR, ELECTRICAL AND HVAC	2010	$883
D5	CDC BUILDING ROOFING	2012	$784

RECAPITALIZATION (> $250K)

ITEM	DESCRIPTION	YEAR(S)	COST ($1000's)
R1	CDC BUILDING ELECTRICAL	2012	$312
R2	WATER DISTRIBUTION SYSTEM (SMCP)	2014	$401

EXPANSION (> $1M)

NO PLANNED EXPANSION



INFRASTRUCTURE EXPENSE SUMMARY

ESTIMATED COSTS ($1000's)

YEAR	MAINTENANCE	DEFICIENCIES	RECAPITALIZATION	EXPANSION	TOTAL BY YEAR
2010	$961	$2,240	$267	$0	$3,468
2011	$905	$2	$437	$0	$1,344
2012	$1,037	$960	$621	$0	$2,638
2013	$1,080	$0	$176	$0	$1,256
2014	$1,119	$11	$690	$0	$1,820

TEC Inc.

INFRASTRUCTURE EXPENSES - ALTERNATIVE 3
2010 -2014

PORT OF PORTLAND
TERMINAL 6

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Terminal 6 Alternative 3
Phase 2 Plan- 2015 - 2019

ALTERNATIVE 3

BASED ON NO GROWTH UNTIL 2012, THEN ASSUMES A NEW SERVICE TO ACHIEVE 360,000 TEU, FOLLOWED BY 7% GROWTH FOR IMPORTS, 3% GROWTH FOR EXPORTS, AND EMPTIES BASED ON OVERALL GROWTH FOR THROUGH PUT OR IMBALANCE OF IMPORT VS EXPORT (WHICHEVER IS HIGHER)

MAINTENANCE

ESTIMATED COSTS BASED ON A PERCENTAGE (1%) OF THE PLANT REPLACEMENT VALUE (PRV) OF ALL TERMINAL ASSETS

DEFICIENCIES (> $100K)

NO DEFICIENCIES IDENTIFIED

RECAPITALIZATION (> $250K)

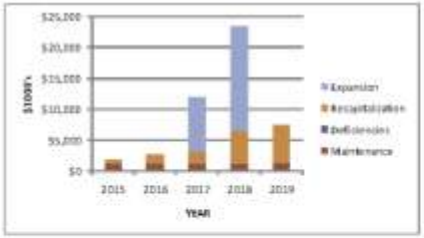
ITEM	DESCRIPTION	YEAR(S)	COST ($1000's)
R1	CDC BUILDING PLUMBING	2016	$963
R2	STORM SEWER SYSTEM (603 WHARF)	2017	$811
R3	WATER DISTRIBUTION SYSTEM (603)	2017	$405
R4	STORM SEWER SYSTEM (603)	2017	$577
R5	PAVEMENT (604)	2018	$4,114
R6	GATE CANOPY EXTERIOR	2018	$329
R7	ADMIN. BUILDING EXTERIOR	2018	$295
R8	CDC BUILDING STAIRS	2018	$321
R9	PAVEMENT (606)	2019	1699

EXPANSION (> $1M)

ITEM	DESCRIPTION	YEAR(S)	COST ($1000's)
E1	RECONSTRUCT PAVEMENT	2017	$8,839
E2	RECONSTRUCT WHARF	2018	$16,773

AREAS UNDER CONSTRUCTION

2017
2018
2019



INFRASTRUCTURE EXPENSE SUMMARY

ESTIMATED COSTS ($1000's)

YEAR	MAINTENANCE	DEFICIENCIES	RECAPITALIZATION	EXPANSION	TOTAL BY YEAR
2015	$1,157	$15	$577	$0	$1,749
2016	$1,180	$0	$1,406	$0	$2,586
2017	$1,245	$0	$1,906	$8,839	$11,990
2018	$1,147	$0	$5,519	$16,773	$23,439
2019	$1,285	$0	$6,235	$0	$7,520

TEC Inc.

INFRASTRUCTURE EXPENSES - ALTERNATIVE 3
2015 -2019

PORT OF PORTLAND
TERMINAL 6

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Terminal 6 Alternative 3
Phase 3 Plan - 2020 - 2024

ALTERNATIVE 3

BASED ON NO GROWTH UNTIL 2012, THEN ASSUMES A NEW SERVICE TO ACHIEVE 350,000 TEU, FOLLOWED BY 7% GROWTH FOR IMPORTS, 3% GROWTH FOR EXPORTS, AND EMPTIES BASED ON OVERALL GROWTH FOR THROUGH PUT OR IMBALANCE OF IMPORT VS EXPORT (WHICHEVER IS HIGHER)

MAINTENANCE

ESTIMATED COSTS BASED ON A PERCENTAGE (1%) OF THE PLANT REPLACEMENT VALUE (PRV) OF ALL TERMINAL ASSETS

DEFICIENCIES (> $100K)

NO DEFICIENCIES IDENTIFIED

RECAPITALIZATION (> $250K)

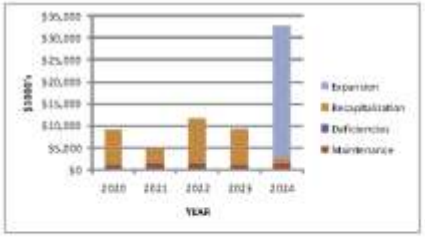
ITEM	DESCRIPTION	YEAR(S)	COST ($1000's)
R1	PAVEMENT (606)	2020	$4,747
R2	MAINTENANCE BUILDING 1 INTERIOR	2020	$362
R3	CDC BUILDING EXTERIOR	2020	$2,377
R4	PAVEMENT (ENTRANCE/EXIT)	2021	$3,230
R5	PAVEMENT (SAEP)	2022	$2,401
R6	WHARF DECK, UTILITIES, MOORING AND FENDER SYSTEM (604)	2023	$7,886
R7	WHARF DECK, UTILITIES, MOORING AND FENDER SYSTEM (605)	2024	$7,324

EXPANSION (> $1M)

ITEM	DESCRIPTION	YEAR(S)	COST ($1000's)
E1	CONSTRUCT WHARF (606)	2024	$30,000

AREAS UNDER CONSTRUCTION

2020
2021
2022
2022
2023
2024



INFRASTRUCTURE EXPENSE SUMMARY
ESTIMATED COSTS ($1000's)

YEAR	MAINTENANCE	DEFICIENCIES	RECAPITALIZATION	EXPANSION	TOTAL BY YEAR
2020	$1,348	$0	$7,692	$0	$9,040
2021	$1,388	$0	$3,409	$0	$4,797
2022	$1,479	$0	$10,136	$0	$11,615
2023	$1,375	$0	$7,832	$0	$9,207
2024	$1,567	$0	$1,121	$30,000	$32,688

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INFRASTRUCTURE EXPENSES - ALTERNATIVE 3
2020 -2024

PORT OF PORTLAND
TERMINAL 6

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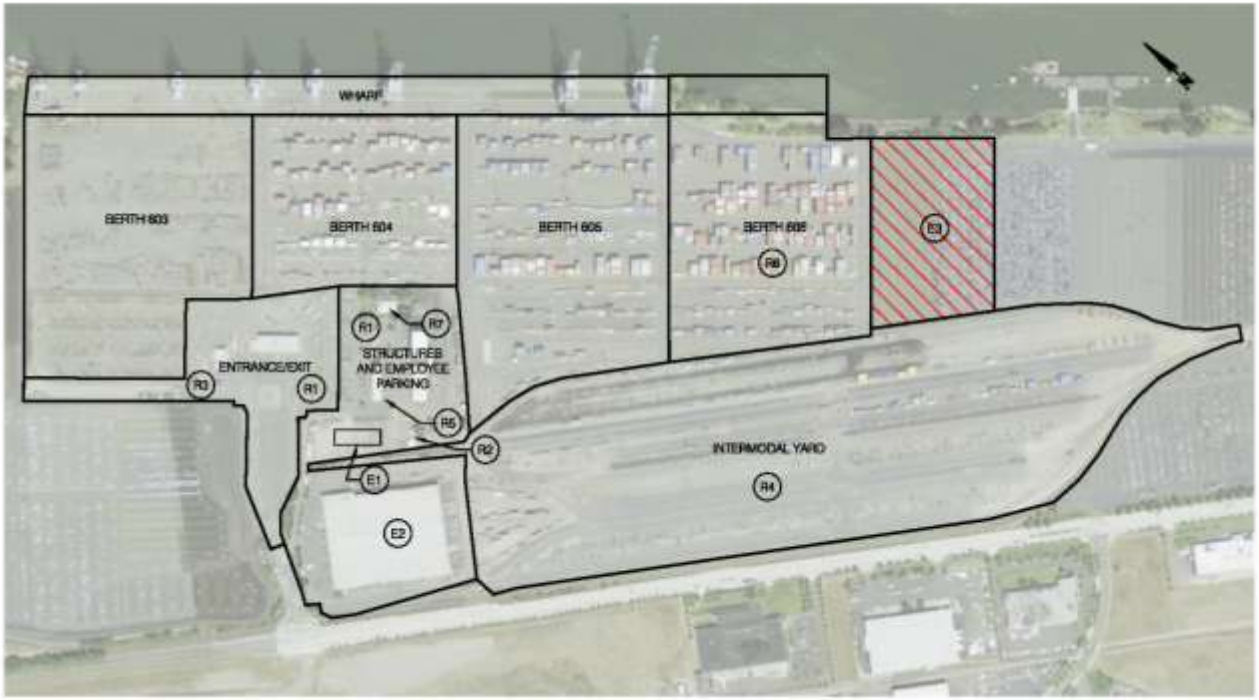
Terminal 6 Alternative 3
Phase 4 Plan - 2025 - 2029



ALTERNATIVE 3

BASED ON NO GROWTH UNTIL 2012, THEN ASSUMES A NEW SERVICE TO ACHIEVE 350,000 TEU, FOLLOWED BY 7% GROWTH FOR IMPORTS, 3% GROWTH FOR EXPORTS, AND EMPTIES BASED ON OVERALL GROWTH FOR THROUGH PUT OR IMBALANCE OF IMPORT VS EXPORT (WHICHEVER IS HIGHER)

MAINTENANCE

ESTIMATED COSTS BASED ON A PERCENTAGE (1%) OF THE PLANT REPLACEMENT VALUE (PRV) OF ALL TERMINAL ASSETS

DEFICIENCIES (> $100K)

NO DEFICIENCIES IDENTIFIED

RECAPITALIZATION (> $250K)

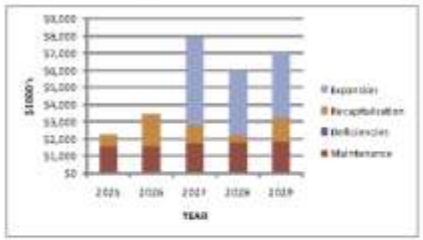
ITEM	DESCRIPTION	YEAR(S)	COST ($1000's)
R1	SECURITY FENCING (ENTRANCE/EXIT AND S&EP)	2025	$329
R2	ELECTRICAL SYSTEM	2026	$1,294
R3	EXIT LANES	2027	$269
R4	WATER DISTRIBUTION SYSTEM (INTERMODAL YARD)	2027	$344
R5	ELECTRIC SHOP EXTERIOR	2027	$251
R6	WATER DISTRIBUTION SYSTEM (606)	2029	$606
R7	ADMIN. BUILDING HVAC	2029	$320

EXPANSION (> $1M)

ITEM	DESCRIPTION	YEAR(S)	COST ($1000's)
E1	CONSTRUCT VEHICLE MAINTENANCE FACILITY	2027	$5,000
E2	DEMOLISH CDC, DEVELOP EMPTY YARD	2028	$3,700
E3	DEVELOP EMPTY YARD	2029	$3,800

AREAS UNDER CONSTRUCTION

2029

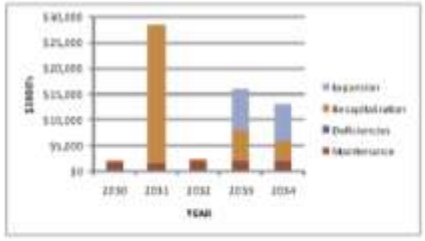


INFRASTRUCTURE EXPENSE SUMMARY

ESTIMATED COSTS ($1000's)

YEAR	MAINTENANCE	DEFICIENCIES	RECAPITALIZATION	EXPANSION	TOTAL BY YEAR
2025	$1,634	$0	$629	$0	$2,263
2026	$1,635	$0	$1,829	$0	$3,464
2027	$1,746	$0	$1,093	$5,000	$7,839
2028	$1,808	$0	$476	$3,700	$5,984
2029	$1,867	$0	$1,383	$3,800	$7,050

Terminal 6 Alternative 3
Phase 5 Plan; 2030 - 2034



INFRASTRUCTURE EXPENSE SUMMARY

ESTIMATED COSTS ($1000's)

YEAR	MAINTENANCE	DEFICIENCIES	RECAPITALIZATION	EXPANSION	TOTAL BY YEAR
2030	$1,914	$0	$143	$0	$2,057
2031	$1,556	$0	$26,853	$0	$28,409
2032	$2,086	$0	$47	$0	$2,133
2033	$2,124	$0	$5,957	$7,800	$15,881
2034	$2,197	$0	$3,831	$7,000	$13,028

ALTERNATIVE 3

BASED ON NO GROWTH UNTIL 2012, THEN ASSUMES A NEW SERVICE TO ACHIEVE 350,000 TEU, FOLLOWED BY 7% GROWTH FOR IMPORTS, 3% GROWTH FOR EXPORTS, AND EMPTIES BASED ON OVERALL GROWTH FOR THROUGH PUT OR IMBALANCE OF IMPORT VS EXPORT (WHICHEVER IS HIGHER)

MAINTENANCE

ESTIMATED COSTS BASED ON A PERCENTAGE (1%) OF THE PLANT REPLACEMENT VALUE (PRV) OF ALL TERMINAL ASSETS

DEFICIENCIES (> $100K)

NO DEFICIENCIES IDENTIFIED

RECAPITALIZATION (> $250K)

ITEM	DESCRIPTION	YEAR($)	COST ($1000's)
R1	PAVEMENT (INTERMODAL YARD)	2031	$12,998
R2	RAIL TRACK (INTERMODAL YARD)	2031	$13,130
R3	STORM SEWER SYSTEM (604)	2033	$598
R4	PAVEMENT (605)	2033	$2,567
R5	STORM SEWER SYSTEM (606)	2033	$1,611
R6	MAINT. BUILDING 1 EXTERIOR	2033	$432
R7	ELECTRIC SHOP ELECTRICAL	2033	$263
R8	STORM SEWER SYSTEM (ENTRANCE/EXIT)	2034	$1,261
R9	STORM SEWER SYSTEM (S&EP)	2034	$1,170
R10	SANITARY SEWER SYSTEM (S&EP)	2034	$301
R11	ADMIN. BUILDING INTERIOR	2034	$370
R12	MAINT. BUILDING 2 PLUMBING, HVAC	2034	$376

EXPANSION (> $1M)

ITEM	DESCRIPTION	YEAR($)	COST ($1000's)
E1	DEVELOP EMPTY YARD (INTERMODAL YARD)	2033	$7,800
E2	DEVELOP EMPTY YARD (HONDA)	2034	$7,000

AREAS UNDER CONSTRUCTION

2031
2033
2033 (GRAVEL)
2034

TEC Inc.

INFRASTRUCTURE EXPENSES - ALTERNATIVE 3
2030 -2034

PORT OF PORTLAND
TERMINAL 6

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Summary of Infrastructure Expenses and Capital Expansions

Description	ALT 1	ALT 2	ALT 3
Maintenance	$36,838,142	$36,838,142	$36,838,142
Deficiencies (Backlog)	$6,955,661	$6,955,661	$3,248,217
Recapitilization	$115,754,791	$90,283,822	$90,283,822
Expansion	$0	$36,012,344	$82,912,344
Totals	$159,548,594	$170,089,969	$213,282,525

Terminal 6 Summary

- A More Detailed Facility Condition Assessment Was Required For the Planning Process;
- A Final Terminal Development Plan was Developed Based On Various Growth Scenarios and Total Capital Costs:
  - Engineering / Infrastructure Analysis
  - Capital Improvements
  - Expansion Plans
  - Equipment Maintenance / Procurement
  - Financial Requirements & Timeline

Discussion / Questions

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