MILITARY SURFACE DEPLOYMENT AND DISTRIBUTION COMMAND (SDDC)

TRANSPORTATION ENGINEERING AGENCY (TEA)

Update to Port Look 2008

Strategic Seaports Study

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3 January 2012

This study is in response to Public Law 111-383, Section 335 – Requirement to Update Study on Strategic Seaports

Prepared by: SDDCTEA Distribution Infrastructure and

Deployability Divisions

Preparation of this report/study cost the Department of Defense a total of approximately $85,000 in Fiscal Years 2010 - 2012.
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Update to Port Look 2008 Strategic Seaports Study

Executive Summary

INTRODUCTION

The United States (U.S.) Maritime Administration (MARAD) administers the Strategic Seaport Program, which facilitates the movement of deploying military forces through U.S. seaports while minimizing commercial disruptions. Growth in commercial cargo volume in recent decades has raised concern over conflicts between military and commercial seaport usage. With many seaports operating at near capacity, an overriding concern is whether existing seaport infrastructure will be available when required by the Department of Defense (DoD) during force deployments. As an administrative note, several acronyms are used throughout this report and Appendix A is a Glossary of terms and acronyms.

United States Transportation Command (USTRANSCOM) is the DoD Single Port Manager identified in Joint Publication 4-01.2, *Sealift Support to Joint Operations*. Military Surface Deployment and Distribution Command (SDDC) serves as the surface transportation component to USTRANSCOM and executes the Strategic Seaport Program in partnership with MARAD. The Military Surface Deployment and Distribution Command's Transportation Engineering Agency (TEA) administers the Programs for National Defense which includes the Ports for National Defense (PND), Highways for National Defense (HND) and Railroads for National Defense (RND) Programs. Together these programs ensure DoD has the capability of deploying using the Nation's civil sector infrastructure.

In March 2007, the House Armed Services Committee (HASC) expressed concerns about potential future conflicts between military and commercial needs at Strategic Seaports. House Resolution (H.R.) 1585, "National Defense Authorization Act for Fiscal Year 2008," directed the Secretary of Defense to develop and implement a plan to optimize Strategic Seaport usage. In response to H.R. 1585, the SDDC commander contracted Logistics Management Institute (LMI) to conduct the Port Look 2008 Study.

The Port Look 2008 Study analyzed current and projected future unit cargo deployment requirements. Port Look 2008 did not analyze throughput requirements or capabilities associated with the movement of ammunition through DoD's ammunition seaports in support of contingency operations. An Integrated Planning Team (IPT) composed of SDDC and MARAD representatives captured 25 specific LMI recommendations in the Port Look 2008 Implementation Plan. One of the findings from the Port Look 2008 study identified a unit cargo throughput shortfall on the Gulf Coast. To mitigate this shortfall the Port of Port Arthur was designated a Strategic Seaport by the Commander SDDC in October 2009 following an IPT analysis. Additionally, item 8 of the Plan, which was the impetus for conducting the Port Look Relook Study, recommended reassessment of

the Port Look 2008 findings and resulting recommendations, as necessary, using deployment requirements generated from the Mobility Capabilities and Requirements Study-2016 (MCRS-16). The MCRS-16, released 26 February 2010, is the most recent in a series of DoD major mobility studies that serve to define service programs of record for lift assets, deployment-related infrastructure and other enabling systems.

The Port Look Relook Study is classified *SECRET//NOFORN*. The Port Look Relook Study Final Report was published in June 2010. The focus of Port Look Relook was the movement of unit cargo in support of contingency deployment operations. It was not designed to address the movement of ammunition through DoD's ammunition seaports. Port Look Relook is available for download from the Defense Technical Information Center (DTIC) website at: https://webs.dtic.smil.mil/dtic/index.html. Registration and valid userid/password are required to access Port Look Relook from this website. The unclassified information is captured in this document for the widest distribution with civil sector authorities.

Public Law 111-383, "Ike Skelton National Defense Authorization Act for Fiscal Year 2011" required the USTRANSCOM commander to update the "Port Look 2008 Strategic Seaports Study." Section 335 of this bill states:

> *SEC. 335. REQUIREMENT TO UPDATE STUDY ON STRATEGIC SEAPORTS. The Commander of the United States Transportation Command shall update the study entitled `PORT LOOK 2008 Strategic Seaports Study'. In updating the study under this section, the Commander shall consider the infrastructure in the vicinity of a strategic port, including bridges, roads, and rail, and any issues relating to the capacity and condition of such infrastructure.*

The movement of ammunition to support the Warfighter during military operations is an essential mission for DoD. Thus, USTRANSCOM determined it was necessary to address the movement of ammunition through DoD's ammunition ports in this report as well because these operations are crucial for strategic military planning and neither Port Look 2008 nor Port Look Relook included them in their scope of work. The report provides a basic understanding on DoD requirements and necessary capabilities for Strategic Seaports that support large-scale ammunition movement operations.

This study constitutes the update on U.S. Strategic Seaports and incorporates the most recent unit cargo and ammunition deployment requirements as derived from the MCRS-16 and approved major Operations Plans (OPLANs). The study determines the number of commercial Strategic Seaports and their outloading capabilities, in terms of Port Planning Order (PPO) facilities, needed to satisfy current and future unit cargo deployment requirements and also addresses port ammunition movement requirements. In addition, this study provides an in-depth assessment of the infrastructure in the vicinity of our Strategic Seaports, including bridges, roads, and railroads.

FINDINGS

Existing PPO facilities at current U.S. Strategic Seaports provide sufficient throughput capability to meet the unit cargo out loading requirements from the MCRS-16 and the OPLAN examined here. Although two of the coasts had little or no redundant capability measured against the most stressing MCRS-16 deployment, there are Alternate Seaports providing additional capability should it be required. However, the common user DoD-owned ammunition ports on the East and West Coasts have documented shortfalls in throughput capability. Please contact SDDCTEA at 1-800-722-0727 or via email at sddc.safb.pndemail@us.army.mil for details on the classified Appendix E, Ammunition Port Throughput Requirements, Capabilities and Shortfalls Analysis.

Also, the existing road, bridge and rail networks (Strategic Highway Network or STRAHNET and Strategic Rail Corridor Network or STRACNET) leading to the Strategic Seaports are adequate and capable of supporting DoD unit cargo deployments. Although a few areas have less than ideal conditions, none would impede deployment of unit cargo thus no specific improvements are necessary. Rail lines to all the Strategic Seaports are maintained to a safe standard that meets military requirements. These rail lines also meet military needs for oversize/overweight cargo and have adequate capacity (trains per day) to handle peak contingency military train traffic.

Coastal assessments of the port throughput, road/bridge infrastructure, and rail infrastructure leading to/from the Strategic Seaports are as follows:

- In Alaska, the PPO facilities at Anchorage provided sufficient throughput capability to meet OPLAN and MCRS-16 requirements; however, there is no appreciable redundant throughput capability. The Port of Anchorage is the only Strategic Seaport on the Alaskan Coast. Daily traffic levels indicate a potential congestion issue but this is not a hindrance to military operations. Any traffic-related delays would not increase deployment times by more than 1 hour. The railroad line leading to the Port of Anchorage meets military needs for moving oversize and overweight defense cargo and there are no capacity issues that would prevent military trains from reaching the seaport in a timely manner.

- On the Gulf Coast, two Strategic Seaports are likely to be sufficient in meeting both current and future out loading requirements. Roadway data for the three Gulf Coast Strategic Seaports did not indicate any significant physical problems associated with military use. Daily traffic levels on the STRAHNET Connectors do not indicate a significant congestion issue. The Connector route to Port Arthur has a lane width of 11 feet, which does not meet ideal limits but accommodates 99% of all military traffic expected in a deployment. The railroad lines to all three Gulf Coast Strategic Seaports meet military needs for moving oversize and overweight defense cargo. Maintenance conditions of these rail lines are adequate and will support military deployments. Rail congestion issues did occur at the Ports of Beaumont and Corpus Christi during Operation Iraqi Freedom (OIF) in 2003; however, recent rail improvements have mitigated this issue at both seaports; rail line capacity to these ports is adequate for military needs.

- On the West Coast, the capability at four of the five general cargo Strategic Seaports is needed to meet OPLAN and MCRS-16 deployment requirements. The PPO facilities at West Coast Strategic Seaports provided sufficient capability to meet unit cargo deployment requirements; however, there was no appreciable reserve throughput capability towards the MCRS-16 requirement. The container out loading capabilities on the West Coast do not meet ammunition deployment requirements. Detailed information is contained in Appendix E (classified annex) of this report. Roadway data on the seven West Coast Strategic Seaports did not indicate any significant physical problems associated with military use. Daily traffic levels on the STRAHNET Connectors into the Port of Long Beach indicate significant congestion that could impede military operations. Naval Magazine Indian Island (NAVMAG) has one bridge structure with an operating rating of 34.9 tons. Follow-up conversations with Washington State Department of Transportation (WSDOT) determined the structure is adequate for military use. The railroad lines to all seven West Coast Strategic Seaports meet military needs for moving oversize and overweight defense cargo. Maintenance conditions of these rail lines are adequate and the lines will support military deployments. No capacity issues exist that would prevent military trains from reaching the seaports in a timely manner. No rail congestion issues occurred during OIF deployments on the West Coast. While NAVMAG does not have on base rail, it utilizes the rail service located at Naval Base Kitsap – Bangor, Washington.
- On the East Coast, five of the nine general cargo Strategic Seaports were used to meet more demanding unit cargo deployment requirements (MCRS-16) with the remaining seaports providing an overall coastal excess of 500,000 square feet (SqFt)/day out loading capability. Three of the ten East Coast Strategic Seaports have lane widths accessing the seaport of less than 12 feet; however, overall horizontal clearances along the roadways are adequate to accommodate military traffic. The container out loading capability on the East Coast does not meet ammunition deployment requirements. Detailed information is contained in Appendix E (classified annex) of this report. Daily traffic levels on the STRAHNET Connectors into the Port of New York/New Jersey indicate significant congestion that could impede military operations, which would require additional deployment time. One bridge structure along the route to MOTSU had abnormally low operating and sufficiency ratings. While this is not an ideal situation, this bridge is suitable for military needs. The railroad lines to all 10 East Coast Strategic Seaports meet military needs for moving oversize and overweight defense cargo. Maintenance conditions of these rail lines are adequate and the rail lines will support military deployments. No congestion issues exist that would prevent military trains from reaching the seaports in a timely manner. No main line rail congestion issues delayed deployments during OIF.

Update to Port Look 2008 Strategic Seaports Study

INTRODUCTION

The U.S. Maritime Administration (MARAD) administers the Strategic Seaport Program, the intent of which is to facilitate the movement of deploying military forces through U.S. seaports while minimizing commercial disruptions. Growth in commercial cargo volume in recent decades has raised concern over conflicts between military and commercial seaport usage. With many seaports operating at near capacity, an overriding concern is whether existing seaport infrastructure will be available when required by DoD during major force deployments.

United States Transportation Command (USTRANSCOM) is the DoD Single Port Manager identified in Joint Publication 4-01.2, *Sealift Support to Joint Operations*. Military Surface Deployment and Distribution Command (SDDC) serves as the surface transportation component to USTRANSCOM and executes the Strategic Seaport Program in partnership with MARAD. The Military Surface Deployment and Distribution Command's Transportation Engineering Agency (TEA) administers the Programs for National Defense which includes the Ports for National Defense (PND), Highways for National Defense (HND) and Railroads for National Defense (RND) Programs. Together these programs ensure DoD has the capability of deploying using the Nation's civil sector infrastructure.

In March 2007, the HASC expressed concerns about potential future conflicts between military and commercial needs at Strategic Seaports. House Resolution 1585, "National Defense Authorization Act for Fiscal Year 2008," directed the Secretary of Defense to develop and implement a plan to optimize Strategic Seaport usage. In response to H.R. 1585, the SDDC commander contracted Logistics Management Institute (LMI) to conduct the Port Look 2008 Study to serve as the basis for this plan.

The Port Look 2008 Study analyzed current and projected future unit cargo deployment requirements. Port Look 2008 did not analyze throughput requirements or capabilities associated with the movement of ammunition through DoD's ammunition seaports in support of contingency operations. The results of the MCRS-16 were unavailable for inclusion in the Port Look Study. At the conclusion of Port Look 2008 Study, an Integrated Planning Team composed of SDDC and MARAD representatives developed an implementation plan to pursue the study's recommendations. One of the findings from the Port Look 2008 study identified a unit cargo throughput shortfall on the Gulf Coast. To offset this shortfall the Port of Port Arthur was designated a Strategic Seaport by the Commander SDDC in October 2009. One of the Implementation Plan recommendations was to update the study with results of MCRS-16. To fulfill this recommendation SDDCTEA used the deployment requirements generated by MCRS-16 to reassess Port Look 2008 findings and recommendations, which resulted in the Port Look Relook Study.

The Port Look Relook Study is classified *SECRET//NOFORN*. The Port Look Relook Study Final Report was published in June 2010. The focus of Port Look Relook was the movement of unit cargo in support of contingency deployment operations. It was not designed to address the movement of ammunition through DoD's ammunition seaports. It is available for download from the Defense Technical Information Center website: https://webs.dtic.smil.mil/dtic/index.html. Registration and valid userid/password are required to access Port Look Relook from this website. The unclassified information is captured in this document for the widest distribution with civil sector authorities.

Public Law 111-383, "Ike Skelton National Defense Authorization Act for Fiscal Year 2011" required the USTRANSCOM commander to update the "Port Look 2008 Strategic Seaports Study." Section 335 of this bill states:

> *SEC. 335. REQUIREMENT TO UPDATE STUDY ON STRATEGIC SEAPORTS. The Commander of the United States Transportation Command shall update the study entitled `PORT LOOK 2008 Strategic Seaports Study'. In updating the study under this section, the Commander shall consider the infrastructure in the vicinity of a strategic port, including bridges, roads, and rail, and any issues relating to the capacity and condition of such infrastructure.*

The movement of ammunition to support the Warfighter during military operations is an essential mission for DoD. Thus, USTRANSCOM determined it was necessary to address the movement of ammunition through DoD's ammunition ports in this report, although neither Port Look 2008 nor the Port Look Relook study included them in their scope of work. This report provides a basic understanding on DoD requirements and necessary capabilities for Strategic Seaports that support large-scale ammunition movement operations. Details on this ammunition throughput analysis can be found in Appendix E, which is classified and separate from this document. Please contact SDDCTEA at 1-800-722-0727 or via email at sddc.safb.pndemail@us.army.mil for details on Appendix E.

This study constitutes the update on U.S. commercial and military Strategic Seaports and incorporates the most recent unit cargo and ammunition deployment requirements as derived from the MCRS-16 and approved major OPLANs. The study determines the number of commercial Strategic Seaports and their outloading capabilities, in terms of Port Planning Order (PPO) facilities, needed to satisfy current and future unit cargo deployment requirements and also addresses port ammunition movement requirements. Similarly, the study evaluates the out loading capability of the military Strategic Seaports and their ability to meet current and future ammunition deployment requirements. In addition, this study provides an in-depth assessment of the infrastructure in the vicinity of a Strategic Seaport, including bridges, roads, and railroads.

PURPOSE

The purpose of this portion of the Port Look Study Update is to fulfill the requirement under Section 335 of Public Law 111-383, “Ike Skelton National Defense Authorization Act for Fiscal Year 2011”, to Update Study on Strategic Seaports.

BACKGROUND

The LMI Port Look 2008 Study:

- Determined the optimum number of commercial and military Strategic Seaports
- Identified the optimum Strategic Seaport locations
- Proposed full-time SDDC manning targets
- Validated the 48-hour PPO availability timeline
- Identified process improvements for port selection

The Port Look 2008 Study approach included conducting interviews with key stakeholders and visiting SDDC-designated commercial Strategic Seaports. The study focused on both current and projected unit deployment requirements, which represented analytically the actual Global War on Terrorism (GWOT) cargo data, data from a 2006 OPLAN, and the 2005 Mobility Capability Study (MCS) scenarios.

In December 2008 SDDC released the Port Look 2008 Study. An Integrated Planning Team composed of SDDC and MARAD representatives captured 25 specific LMI recommendations in the Port Look 2008 Implementation Plan. One of the findings from the Port Look 2008 study identified a unit cargo throughput shortfall on the Gulf Coast. To offset this shortfall the Port of Port Arthur was designated a Strategic Seaport by the Commander SDDC in October 2009. Item 8 of the Plan, which was the impetus for conducting the Port Look Relook Study, recommended reassessment of the Port Look 2008 findings and resulting recommendations, as necessary, using deployment requirements generated from the MCRS-16.

Public Law 111-383, “Ike Skelton National Defense Authorization Act for Fiscal Year 2011” required the USTRANSCOM commander to update the "PORT LOOK 2008 Strategic Seaports Study." This study constitutes the update on U.S. Strategic Seaports.

OBJECTIVES

The objectives of this study update are to:

- Assess whether the throughput capability provided by U.S. Strategic Seaport PPOs is sufficient to meet current and future unit cargo deployment requirements.
- Assess whether the throughput capability provided by DoD’s common user ammunition seaports is sufficient to meet current and future ammunition deployment requirements.

- Assess the condition and capacity of the bridge, road and rail infrastructure in the vicinity of U.S. Strategic Seaports relative to DoD needs.
- Analyze various infrastructure characteristics that could adversely affect military deployments.

SCOPE

There are currently 22 U.S. Strategic Seaports. Figure 1 shows these Strategic Seaports, 17 of which are commercial, with 5 being military. This analysis excluded the commercial Port of Guam, in Apra Harbor because U.S. Department of Transportation (DOT), Guam Department of Public Works, and DoD are addressing current transportation infrastructure improvements through the "One Guam" approach to infrastructure improvements. This analysis focuses on the remaining 21 Strategic Seaports. The port throughput analysis examines unit equipment flowing through seaports during the first 150 days of deployment of a major contingency operation, which captures peak Strategic Seaport workload requirements. Large-scale ammunition movements through DoD's three ammunition ports, Military Ocean Terminal – Concord (MOTCO), Naval Magazine – Indian Island (NAVMAG), and Military Ocean Terminal – Sunny Point (MOTSU) are addressed as well. As such, there are known, significant shortcomings with the current capacity of these ports relative to documented requirements, particularly at MOTCO, which are addressed.

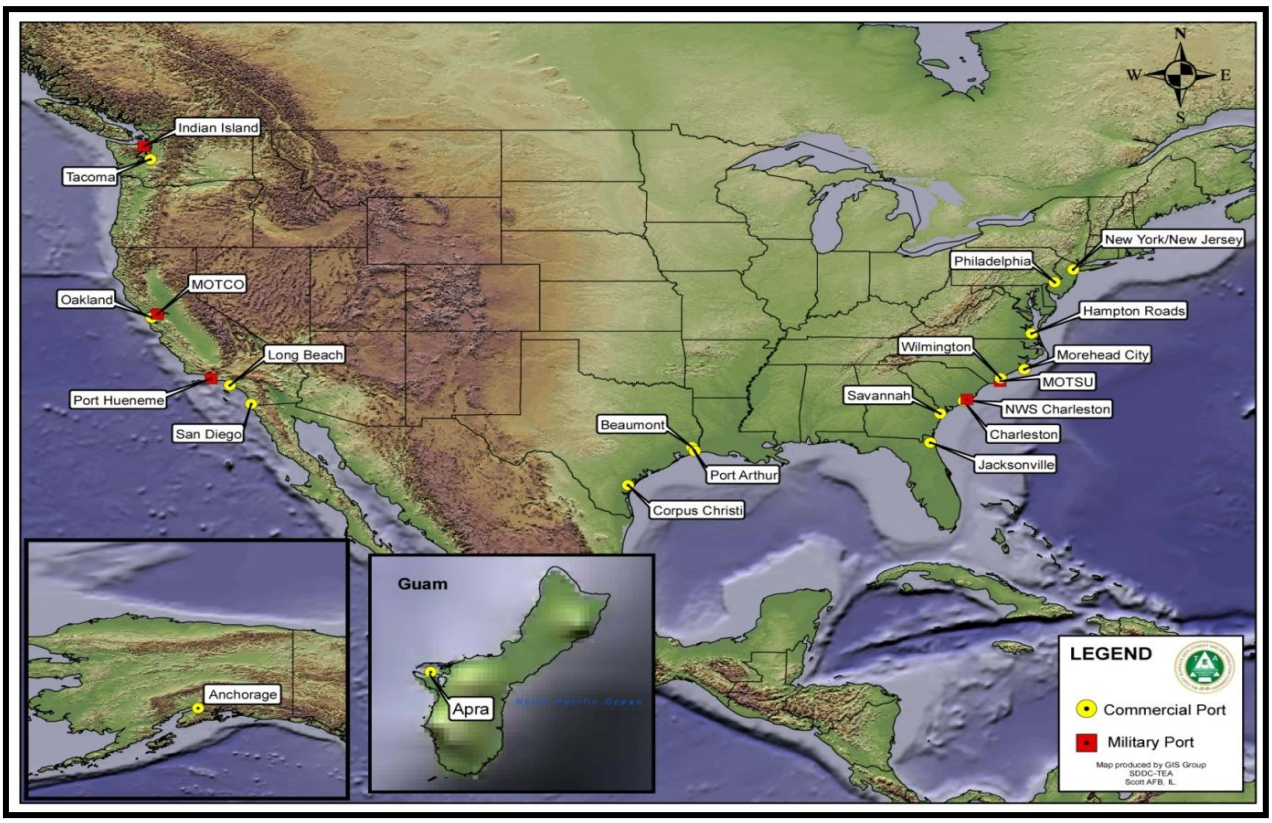

Figure 1 – U.S. Strategic Seaports

ASSUMPTIONS

Deployment Requirements

Port Look Relook evaluated commercial Strategic Seaport capabilities needed to meet current and future unit cargo deployment requirements. Ammunition throughput requirements were not addressed as a part of the Port Look Relook Study effort. This study assumes the unit cargo deployment requirements as documented in the Port Look Relook study remain valid and independently evaluates ammunition throughput requirements for the military Strategic Seaports (see Appendix E).

- Current Requirement: Current major OPLANs representing the most stressing deployment requirements on continental United States (CONUS)/Alaska commercial and military Strategic Seaports.
- Future Requirement: MCRS-16 Case 1, the most stressing on strategic mobility lift, represents two nearly simultaneous conventional campaigns, world-wide lesser contingencies, and consequence management responses to CONUS disasters.

The Strategy, Plans, Policy and Programs Division of SDDC's Operations Directorate maintains a listing of PPO facilities at commercial Strategic Seaports. The PPO facilities represent seaport capabilities available for current and future military unit cargo deployments. Table 1 shows the

PPO berthing available at commercial Strategic Seaports, along with the Analysis of Mobility Platform (AMP) and Enhanced Logistics Intra-theater Support Tool (ELIST) berth representations for modeling the MCRS-16 deployments.

Table 1 – PPO Berthing and AMP/ELIST Berth Representation

Coast	Seaport	Berth Length (linear ft)	AMP/ELIST Berth Name	AMP/ELIST Draft Depth (ft)
Alaska	Anchorage, AK	2,200	Berths 1-3	35
Gulf	Beaumont, TX	1,880	HIMT	40
		1,373	2-4	38
		1,435	Carroll	40
	Corpus Christi, TX	865	South 8	45
		660	North 9	38
		938	15	36
	Port Arthur, TX	1,000	Generic	40
West	Tacoma, WA	950	Evergreen T3	51
		930	Evergreen T4	51
		1,120	K-Line	51
	San Diego, CA	645	10th Ave 7	42
		700	Nat'l City 2	35
		1,000 (500 each)	Nat'l City 3-4	35
	Oakland, CA	1,025	Hanjin 55	42
		1,200	Hanjin 56	42
		1,100	Outer Harbor 23	42
	Long Beach, CA	1,310 (655 each)	T123-T124	50
		650	T-126	40
		735	T-128	40
		1,070	Navy Mole 12 East	50
	Port Hueneme, CA	3,102	Wharfs 3/4/6	32
East	Jacksonville, FL	750	Blount 20	41
		650	Blount 22	41
		1,600 (800 each)	Blount 32-35	38
	Savannah, GA	1,675 (700/975)	Ocean 12-13	42
		1,178 (600/578)	Ocean 1-2	42
	Wilmington, NC	3,000 (1,000 each)	Berths 03-05	43
	Charleston, SC	2,430 (810 each)	Berths 1-3	45
	Morehead City, NC	1,800 (900 each)	2-3	45
		1,000 (500 each)	4-5	35
	Hampton Roads, VA	950	NNMT Pier C North	40
		1,500	NIT North	40
		1,500	NIT South	41
	Philadelphia, PA	810	Packer Ave 6	32
		1,190	Packer Berth 1	40
	Port Elizabeth (NY/NJ)	3,000 (1,000 each)	APM 88/90/92	45

For unit cargo movements through commercial Strategic Seaports, Port Look 2008 assumed a range of seaport throughput capabilities based on model runs in Port Simulation Model (PORTSIM) and Ports Operational Performance Simulator (POPS) tools. For Port Look Relook, PND personnel confirmed sustained throughput capabilities, given in Table 2, based on a notional deployment of division-sized forces (Infantry/Mechanized) through seaports utilizing the PPO facilities. These sustained throughputs, measured in SqFt/Day, match the expected throughputs published in PND port studies. For the ammunition ports, PND personnel confirmed sustained throughput capabilities, given in Appendix E, based on Process Models developed to capture the varying processing operations and Net Explosive Weight (NEW) constraints at each of the three ammunition ports.

Table 2 – PND Sustained Throughput Estimates

Coast	Seaport	SqFt/Day
Alaska	Anchorage, AK	110,000
Gulf	Beaumont, TX	130,000
	Corpus Christi, TX	120,000
	Port Arthur, TX	64,800
West	Tacoma, WA	134,700
	San Diego, CA	90,000
	Oakland, CA	128,000
	Long Beach, CA	90,600
	Port Hueneme, CA	70,000
East	Jacksonville, FL	140,000
	Savannah, GA	130,000
	Wilmington, NC	150,000
	Charleston, SC	125,000
	Morehead City, NC	110,000
	Hampton Roads, VA	153,500
	Philadelphia, PA	87,000
	Port Elizabeth (NY/NJ)	131,000

Infrastructure Assumptions

This portion of the study focuses on the transportation infrastructure specifically located along the STRAHNET and STRACNET routes leading into and out of the designated U.S. Strategic Seaports because these road and rail networks are the minimum networks needed to meet DoD civil sector road and rail requirements.

The U.S. Interstate Highway System and associated bridges condition and capacity to meet DoD requirements are addressed through the HND program and its partnership with civil sector authorities. Roads and bridges “in the vicinity of” are defined as the STRAHNET Connector(s)

from the port to the nearest high-level facility such as an interstate or roadway meeting similar geometric criteria. This analysis also considered any bridges along those same routes. The STRAHNET Connectors were assessed using appropriate metrics relative to determining condition and capacity of roads and bridges.

Analogous to the interstate highway system, commercial railroads have high traffic density main lines which form the core rail system. For the most part, STRACNET uses these main lines and some seaports connect directly to STRACNET. A STRACNET Connector is used when the seaport is not directly on a STRACNET main line. Therefore, this analysis assessed STRACNET or Connector lines to seaports against their appropriate metrics for determining condition and capacity.

METHODOLOGY

Commercial Port Throughput Assessment

Identifying the unit cargo deployment requirement through Strategic Seaports, measured in cumulative out loading, is an essential component of this analysis. Port Look 2008 used the best available deployment requirements data at that time, with the current requirements based on a 2006 OPLAN plus actual cargo data from the GWOT as recorded in the Worldwide Port System. The future requirement was based on the MCS plus the same GWOT cargo data. Port Look Relook used updated unit cargo deployment requirements, with a more recent OPLAN representing the current requirement and the MCRS-16 representing the future requirement.

Time-Phased Force Deployment Data (TPFDD) prescribes the desired timing for the movement of units from home stations, through ports of embarkation (POE), to their final theater destinations. This study utilized the Joint Flow and Analysis System for Transportation (JFAST)-modeled deployment requirements from the October 2008 OPLAN Force Flow Conference. The study also used AMP-modeled future deployment requirements to simulate the end-to-end deployment of TPFDD forces, with the ELIST model simulating unit movement from origin through POE. Several AMP/ELIST model runs were conducted for the MCRS-16 deployments in order to ensure the model accurately represented available PPO facilities and produced a timely flow of forces to their final destinations in theater.

Using the JFAST- and AMP/ELIST-modeled force flows, the analysis determined the sustained throughputs at each seaport based on associated ship loading and departure data. The sustained throughput methodology captures the dynamics of multiple ships berthed at a port at the same time and aligns with PND methods used in determining seaport throughput capabilities. Figure 2 gives an example of the methodology used to calculate the sustained seaport throughput.

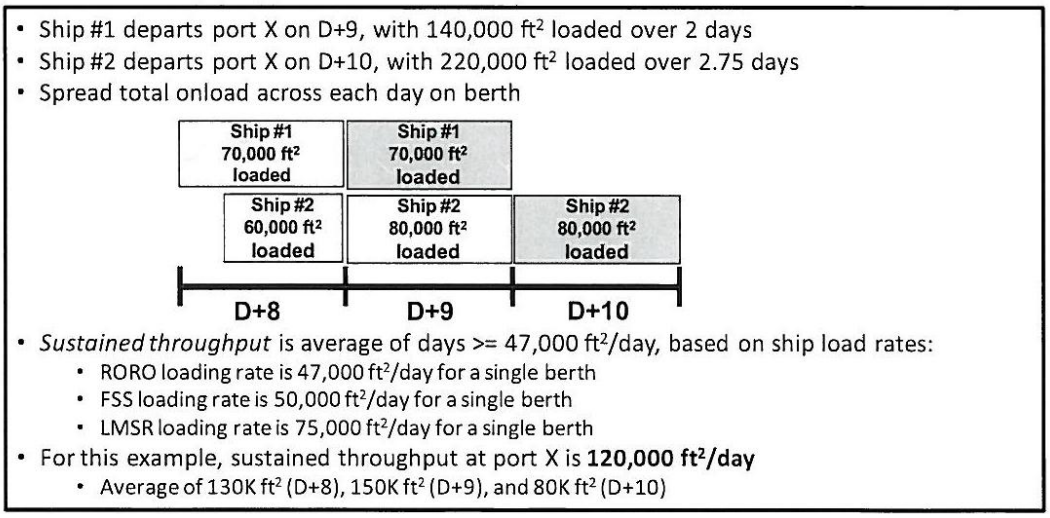

Figure 2 – Sustained Throughput Methodology Example

The next step combined the sustained throughputs at each coastal seaport. Figure 3 shows the result of combining, or stacking, coastal seaport throughputs. The leftmost stacked column represents expected total coastal capabilities determined by PND estimates using PORTSIM. The OPLAN and MCRS-16 stacked columns to the right reflect coastal capabilities used in the associated deployments modeled in JFAST and AMP/ELIST, respectively.

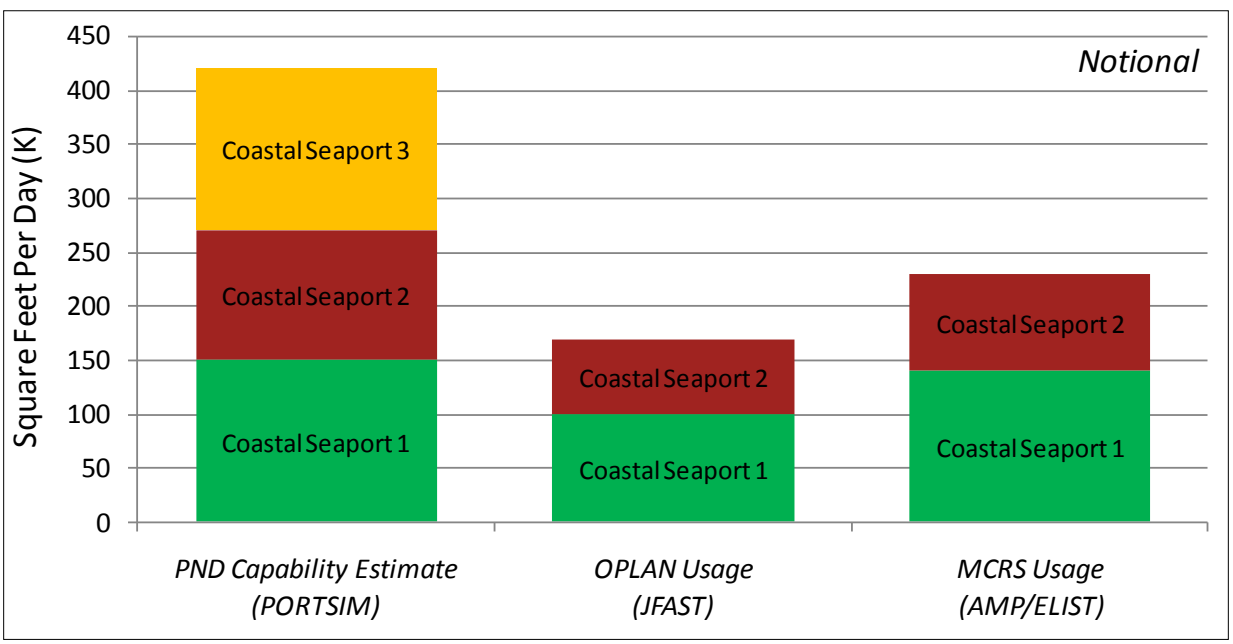

Figure 3 – Stacked Seaport Capabilities (by Coast)

Finally, the study compared the stacked sustained throughputs from the OPLAN and MCRS-16 model runs against the stacked PND estimates for the coast to assess whether expected capabilities

are sufficient to meet current and future out loading requirements. The output is an assessment of Strategic Seaport capabilities needed to meet current and future deployment out loading requirements. Figure 4 shows this final assessment step, with two coastal seaports meeting OPLAN and MCRS-16 requirements. Note that roughly 160,000 SqFt/Day is sufficient to meet OPLAN requirements, while 240,000 SqFt/Day meets MCRS-16 requirements for this coast.

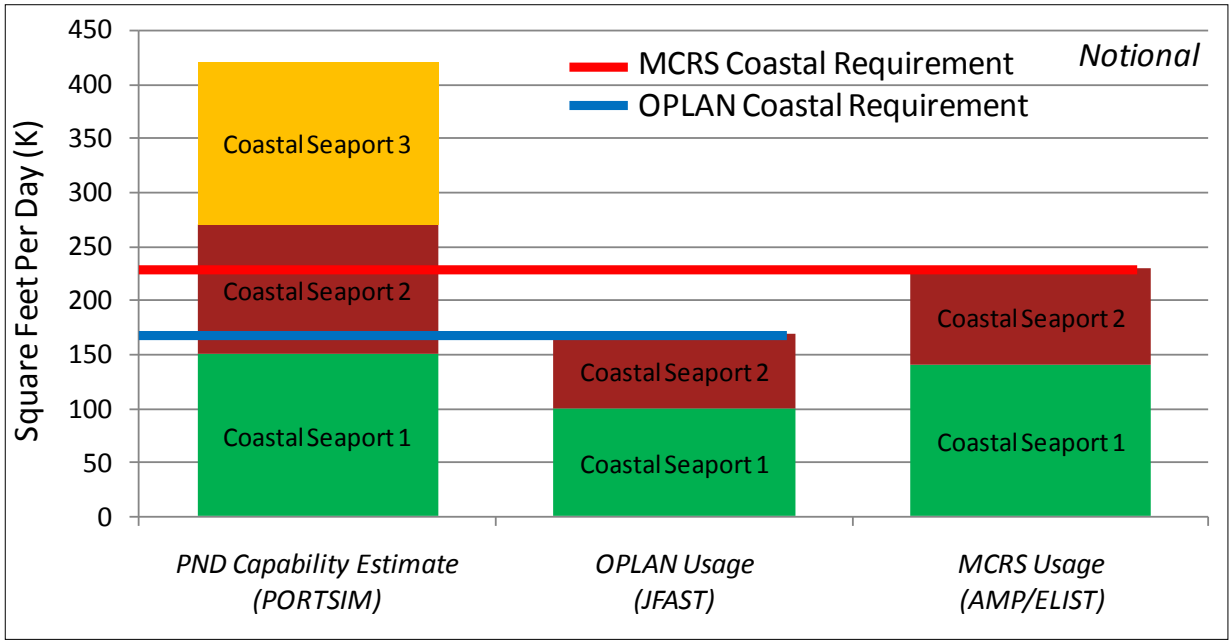

Figure 4 – Strategic Seaport Capabilities Assessment (by Coast)

Ammunition Port Throughput Assessment

The methodology used to assess port throughput capability is defined in Appendix E.

Road, Bridge, and Rail Infrastructure Assessments

There are two main focus areas for this portion of the analysis: roads and bridges; and rail. Each of these areas has their own task list, but in general the tasks include:

- Verification of existing STRAHNET and STRACNET information
- Identification of infrastructure data/metrics to properly assess condition/capacity
- Collect data from DoD, external sources and SDDCTEA's Intelligent Road/Rail Information Server (IRRIS)
- Validate compiled data with external sources
- Analyze validated data and develop final assessment

Intelligent Road/Rail Information Server, FHWA information systems, State DOTs, Federal Railroad Administration (FRA), MARAD, American Association of Port Authorities (AAPA),

American Association of State Highway and Transportation Officials (AASHTO) and others provided data necessary for the completion of this portion of the study.

Road and Bridge

In conjunction with the owning authority (State, county or local agencies), SDDCTEA and FHWA administer the STRAHNET. The STRAHNET system consists of over 46,700 miles of interstate routes, over 16,000 miles of non-interstate major routes, and over 1,700 miles of STRAHNET Connector routes. Connector routes connect important military facilities and Strategic Seaports to major STRAHNET routes. Designation/re-designation of these routes occur through either periodic reviews by SDDCTEA or as requested by installations or State DOT. More frequent changes would be detrimental to planning and programming of projects by owning authorities.

The owning authority wholly controls the public roadways and bridges in the United States. Each owning authority of a roadway or bridge has the responsibility to maintain and repair those facilities. The FHWA has some limited regulatory authority over the inspection of those roadways. An owning authority is not required to report on the condition and capacity of every mile of roadway and only inspects and reports a sample of similar roadways to FHWA. This sampling includes the STRAHNET system and its Connectors shown in Figure 5.

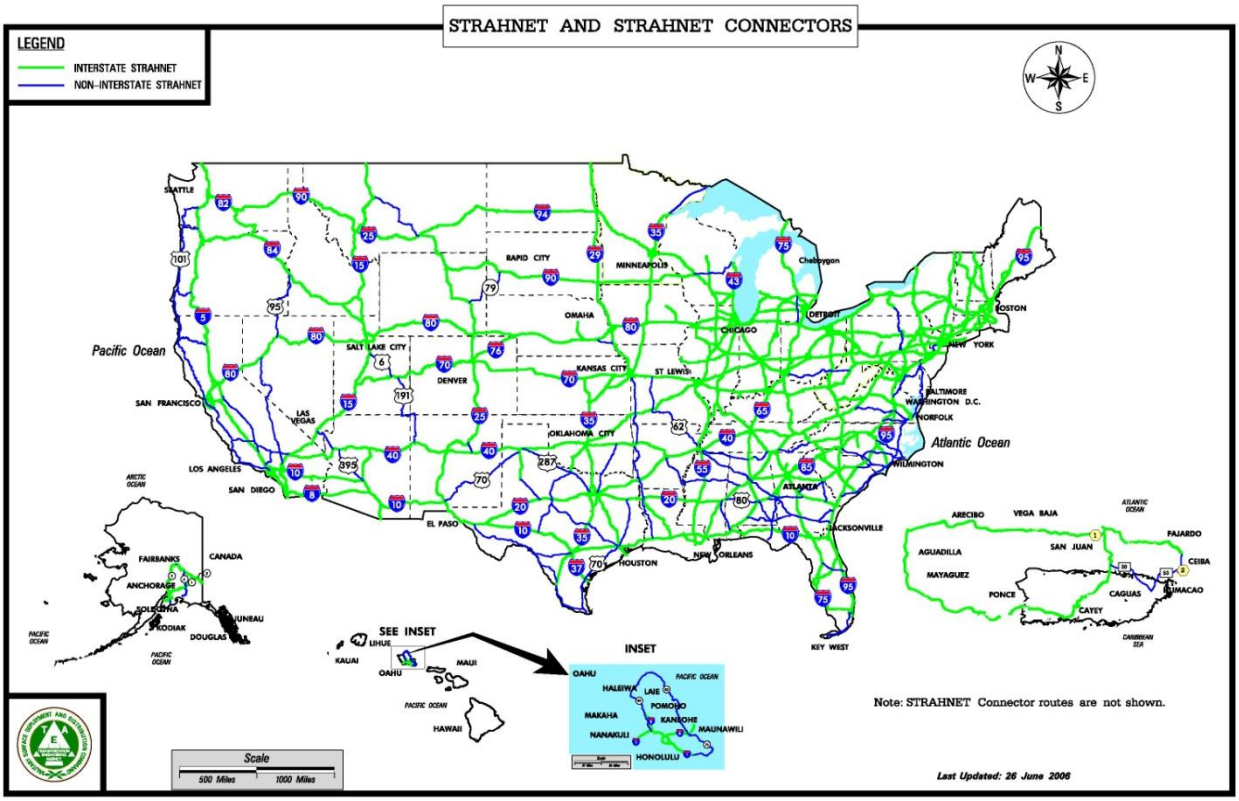

Figure 5 – STRAHNET Routes

Federal law requires the annual reporting and periodic inspection of all public bridges. The periodic inspections are required at least every 24 months and may occur more frequently depending upon the condition of the bridge.

The road and bridge analysis for this study makes use of this inspection data contained in these reports for the STRAHNET Connector routes leading to/from the U.S. Strategic Seaports. The scope of this study includes a total of approximately 90 miles of STRAHNET Connectors and 99 bridges along those connectors.

These FHWA bridge reports, as well as information gathered from IRRIS, provided the initial screening of data. In addition, SDDCTEA sent direct requests for additional data to FHWA Division Offices and State DOT. The study further validated the data utilizing IRRIS, commercial mapping services, and State DOT websites. Finally, the study compared data utilized in Port Look Relook to the roadway and bridge characteristics. Strategic Seaport studies conducted by SDDCTEA provided further information from port authorities during field visits and surveys. The physical roadway characteristics used for this study were lane width, horizontal clearance, and vertical clearance.

The load capacity and operational status of the structure were utilized for the bridges. Load capacities and operational status are a component of the National Bridge Inventory (NBI) reports maintained by FHWA.

Further comparison of the above information was conducted through use of data from the Port Look Relook study and the PND Program's Strategic Seaport Studies. Port Look Relook provided equipment data on width, height, and weight for validation and comparison of actual needs. No equipment exceeded 14 feet in height. Eleven pieces of equipment exceed 12 feet in width. This represents only 0.13% of all equipment moved and some of these pieces, such as a barge or tug, are impractical to move by road. A 40-ton load limit will accommodate 97% of all pieces of equipment.

The PND Program performs periodic reviews of Strategic Seaports. One of the factors considered is the highway access into the port. These studies incorporate a survey of port authorities to assess the capability of the access roadways.

Below is a summary of the characteristics and analysis methodology used in this study:

- <u>Lane Width and Lateral Clearance</u>
  A lane width of 12 feet is the ideal standard for military road design. Army Field Manual 3-34.170, *Engineer Reconnaissance*, documents that a travel-way width greater than 23.9 feet for wheeled vehicles and 26.3 feet for tracked vehicles is adequate for two-way traffic flow. This would include the lane width and any lateral clearance to an obstruction. Therefore, any facility with a lateral clearance greater than 14 feet is adequate for military usage.

- Vertical Clearance
  Military design standards dictate a minimum vertical clearance of 14 feet.

- Load Capacity
  Military standards do not specifically address load capacity of a structure. Therefore, this analysis used the Federal legal load limit of 40 tons as the screening parameter. The NBI defines the maximum load capacity using standard bridge analysis as the operating rating. Operating rating is the absolute maximum permissible load level a bridge may carry without special bridge analysis. This capacity is a reasonably accurate measurement of the capability of a bridge to handle a given load without further bridge analysis by structural engineers for a required load or piece of equipment.

- Military Load Classification (MLC)
  Military load classification is a standard factor used in military route planning. Military references indicate that an MLC of 50 is good for average usage. This value will accommodate the majority of military vehicles to include a Stryker vehicle, a Mine Resistant Ambush Protected vehicle and most truck-trailer configurations. For bridges, a conservative value for MLC can be determined using a correlation method with known bridge data. These MLC are very conservative and are only for planning purposes. In this study, they serve as a filtering tool and a comparison mechanism.

- Sufficiency Rating (SR)
  Sufficiency Rating is a calculated value found within the NBI reports produced by FHWA. The formula for calculating SR is a method of evaluating factors, which indicate a bridge's sufficiency to remain in service. The result of the formula is a percentage in which 100 represents a fully sufficient bridge and 0 represents a totally deficient bridge. States annually submit to the FHWA all of the required information for each bridge. The FHWA uses these numbers to determine the SR. The SR does not necessarily indicate a bridge's ability to carry traffic loads, its safety or its capacity but it helps determine which bridges may need repair or replacement. A bridge's SR affects its eligibility for Federal funding for maintenance, rehabilitation, or replacement activities.

- Operational Status (Open, Posted, Closed)
  Operational status indicates the status of the bridge based upon physical inspection by owning authority bridge inspectors. The NBI identifies the operational status for a bridge as open, closed, or posted-for-load limits in the NBI listings. Posted-for-load-limits means that the structure has signing that indicates that the bridge has restrictions for loads.

- Daily Traffic Volume and Daily Capacity (Congestion)
  Traffic congestion for this analysis is a comparison of Annual Daily Traffic (ADT) and the theoretical daily capacity of the roadway. The reported ADT is the worst-case location along the route. Traffic facilities generally operate poorly at or near capacity, and facilities are not typically designed to operate near capacity. Any daily volume to daily capacity ratio

exceeding 0.85 indicates the roadway may be approaching a stopped condition and can affect military usage. These traffic conditions generally do not occur over the entire 24-hour period. Heavy congestion typically only occurs during the peak morning and afternoon traffic hours. Military planning factors (i.e., rate of march) are conservative enough to account for any impacts traffic congestion would have upon military movement. Without employing any control measures, traffic congestion could have some impact on military usage. However, planners can mitigate the impact of traffic congestion through operational activities (e.g., local law enforcement coordination, time-of-day restrictions). The study team compared these volume-to-capacity ratios to the results found in the PND Strategic Seaport Studies, which indicate a likelihood of delay due to traffic. A direct correlation between the two should be avoided as this study focuses on the volume-to-capacity of the STRAHNET Connectors whereas the PND studies take a system level approach and assess probability of delay based upon all roadways in that region. There is no direct association between a specific PND probability of delay and the volume-to-capacity ratio, e.g. a ratio of 0.50 does not necessarily correlate to a medium probability of delay.

Military equipment is designed for rough roadway conditions. Road surface conditions are defined as pavement condition and distress. Examples would include potholes, cracking, and faulting. In CONUS, DoD shares the STRAHNET with civilian traffic. Long before pavement conditions on a STRAHNET route reached a point to negatively impact military operations, it would have been brought to the attention of owning authorities by the public, the media, and politicians because of issues and impacts to civilian vehicles. Therefore, the roadway pavement conditions on STRAHNET routes would not be a limiting factor for military operations and was not a focus of this study.

Rail

As part of the RND Program, SDDCTEA and FRA jointly review the nation's rail lines and designate certain lines as the STRACNET. This is an ongoing program and SDDCTEA, in partnership with FRA, works to ensure America's railroads meet military needs. Figure 6 shows the STRACNET which consists of about 32,000 miles of rail lines forming the minimal rail network needed for military needs. The FRA gives additional priority to inspecting the STRACNET and defense connector lines to ensure these lines meet safety maintenance standards. In addition to the STRACNET, there are over 4,000 miles of defense connector lines, which provide rail service to locations which have a military need for rail service but are not located directly on a STRACNET line. The STRACNET is not a routing guide, and actual shipments may not necessarily travel over STRACNET lines. The presence of additional non-STRACNET lines is beneficial as it creates more routing options and more overall capacity.

The Transportation Engineering Agency evaluated approximately 270 miles of rail lines near Strategic Seaports based on maintenance condition; ability to handle oversize/overweight military equipment; and congestion. The FRA provided assistance to SDDCTEA in determining the maintenance condition of the rail lines.

Figure 6 – STRACNET and Defense Connector Lines

The rail analysis for this study focuses on specific characteristics of the STRACNET routes leading to/from the U.S. Strategic Seaports. Descriptions of these characteristics are listed below:

- <u>Maintenance condition</u>
  The FRA routinely inspects the commercial railroad lines in the U.S. to ensure owners maintain the track to a safe condition level. The FRA puts a higher priority on inspecting railroad lines that are designated as important to National Defense, including the railroad lines to Strategic Seaports. The FRA has standards that govern the allowable speed of trains along the nation's rail lines. Table 3 summarizes these standards which the FRA uses to categorize U.S. rail lines into five primary classes. This information can help ascertain the lines' overall maintenance condition.

Table 3 – FRA Rail Class Summaries

Train Type	Speed Limits (MPH)				
	Class 1	Class 2	Class 3	Class 4	Class 5
Freight	10	25	40	60	80
Passenger	15	30	60	80	90

This analysis used a baseline of FRA Class 1 standards or better. Class 1 indicates that freight trains can safely operate at speeds of at least 10 miles per hour (MPH). Since many ports are in congested urban areas, it is common for trains to operate at slow speeds in the immediate vicinity of the port. Once trains are a few miles away from a seaport they will usually be on a railroad mainline and operate much faster than 10 mph. However, for the track in the immediate vicinity of the port, safe freight train operation at 10 mph is a reasonable criterion. The study team consulted FRA's Office of Safety to obtain this information.

- Oversize/Overweight Restrictions

  Figure 7 shows the DoD accepted rail clearance profile which represents the outer dimensional limits of military equipment on railcars. This profile accommodates 99.8% of all DoD unit equipment moved by rail in MCRS-16. Transportation Engineering Agency Pamphlet 70-1, *Transportability for Better Deployability*, documents this clearance profile and this analysis compared the profile to existing clearances along rail lines leading into and out of the U.S. Strategic Seaports. The analysis makes a simple determination of "yes" or "no" based on whether or not the rail line in the vicinity of each seaport can sufficiently meet the DoD clearance profile, enabling the military unit cargo identified in MCRS-16 to be deployed by rail to that particular seaport. The SDDCTEA obtained this "yes" or "no" determination through analysis of published clearances supplemented by coordination with clearance engineers from major railroads.

  For overweight restrictions, the analysis identified and compared industry standards on load capacity of the U.S. rail network against to the heaviest DoD rail load. The DoD load used in this analysis is two M1A1 Abrams tanks loaded on a six-axle railcar. Typical commercial rail cars have only four axles so this analysis required the determination of axle loads in order to account for the difference in the number of axles.

Bridges do not normally limit military usage of railroad lines, and are not a constraint on any rail lines to Strategic Seaports. Older railroad bridges have very robust designs to handle the heavy dynamic loadings associated with steam locomotives. Modern railroad bridge design standards exceed military requirements, which are a gross weight of 365,000 pounds on a railroad car with six axles or 263,000 pounds on a railroad car with four axles (a 100-ton car). Railroad bridges routinely handle 100-ton freight cars, and many of them handle 125-ton freight cars. Usually, the railroad track structure rather than railroad bridge structure controls the railroad line weight capacity and for this reason the analysis focused on the railroad track structure.

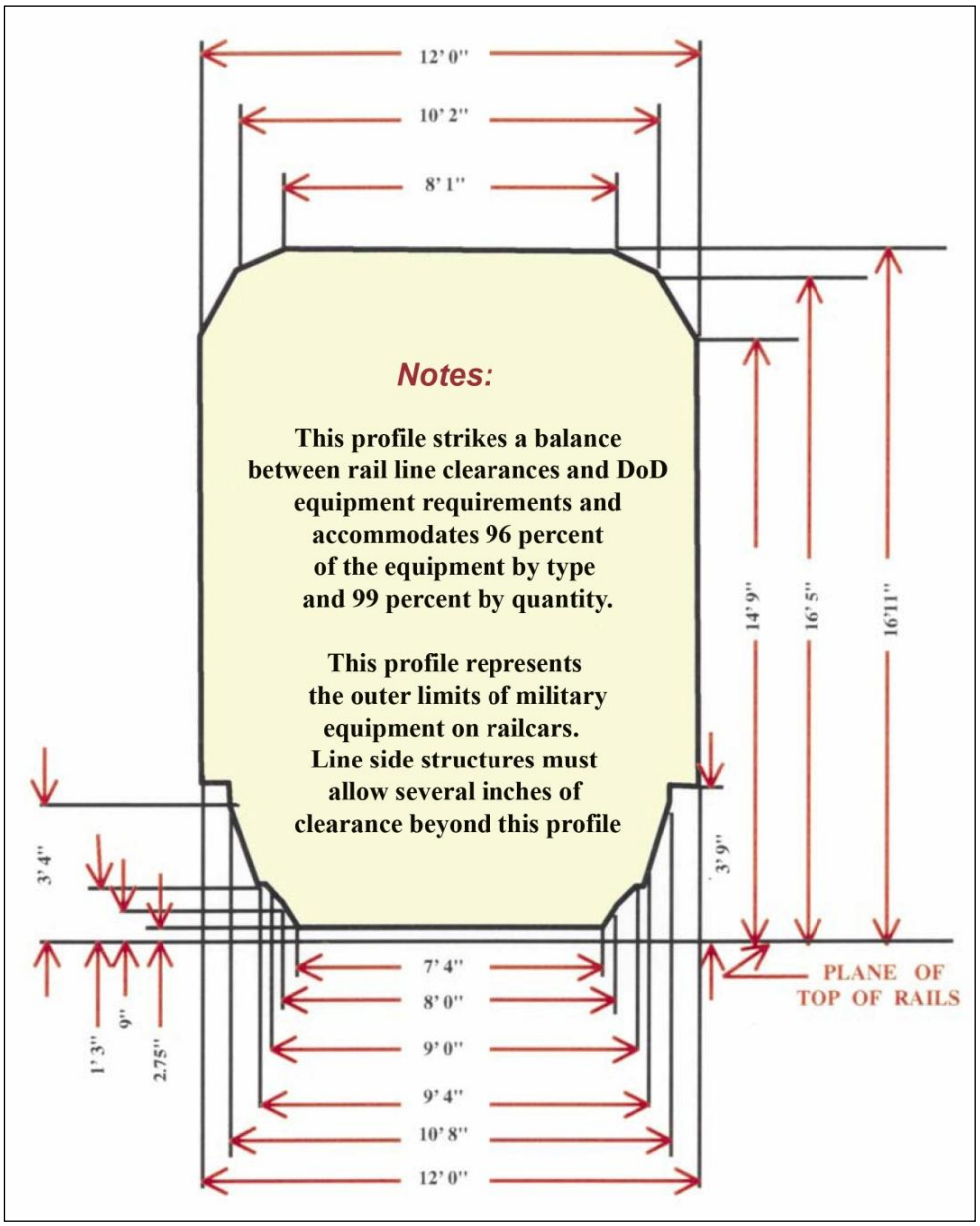

Figure 7 – DoD Rail Clearance Profile

- Capacity

  This analysis evaluated rail congestion based on experience in OIF and the practical capacity of a single-track railroad. Unlike a highway, movement on a railroad is centrally controlled, and controllers can give military trains priority over other traffic. Therefore, this analysis focused on whether military trains can cause congestion, rather than the quantity of civilian trains, which is often proprietary information.

  A single-track railroad line can typically handle at least 20 trains per day[1], which would allow at least 10 trains to arrive and depart each seaport each day. Each train can represent up to 100 railcars. No deployment plans envision tasking any seaport with this volume of military traffic. In fact, MCRS-16 unit cargo requirements show a peak-day-maximum volume of 258 railcars (about 4 trains) at a single Strategic Seaport.

  While some ports see more than 10 trains per day of commercial traffic under normal conditions, these ports are already served by enhanced rail lines with capacities of more than 20 trains per day. The civil sector will program increased capacity of rail lines to ports when day-to-day commercial demands approach capacity. In some cases, the railroad companies themselves will provide all the funding for capacity increases. In other cases, a public-private partnership is needed for funding capacity increases and interested parties contribute to the project. The Alameda Corridor, which greatly increased rail capacity to the Ports of Los Angeles and Long Beach, is one example of a recent public-private partnership. If a port has a very high day-to-day cargo volume, military cargo will represent only a small proportion of the total cargo handled. The railroad lines leading to busy commercial ports will be able to accommodate the few extra military trains, and if necessary, can take precedence over civilian trains.

RESULTS

In keeping with the format of the Port Look 2008 study, the results for the Port Look Relook and the road/bridge and rail analysis are presented below, organized by coastal region. Appendix B is the Port Look Relook Data which provides additional information on the analysis. Appendices C and D provide more detailed information on road and bridge data.

Alaskan Coast

The Port of Anchorage is the only Strategic Seaport on the Alaskan Coast.

Commercial Port Throughput Assessment. Figure 8 shows the assessment of Alaskan commercial Strategic Seaports; The OPLAN deployment used Anchorage and Valdez seaports, with a combined throughput roughly equivalent to the PND estimate of Anchorage PPO facilities.

[1] ***An Introduction to Transportation Engineering***, William W. Hay, John Wiley & Sons, New York, 1961

The sustained throughput for MCRS-16 was nearly identical to the PND estimate, thus, the PPO facilities at Anchorage provided sufficient capability to meet OPLAN and MCRS-16 unit cargo requirements, although there was no redundant capability.

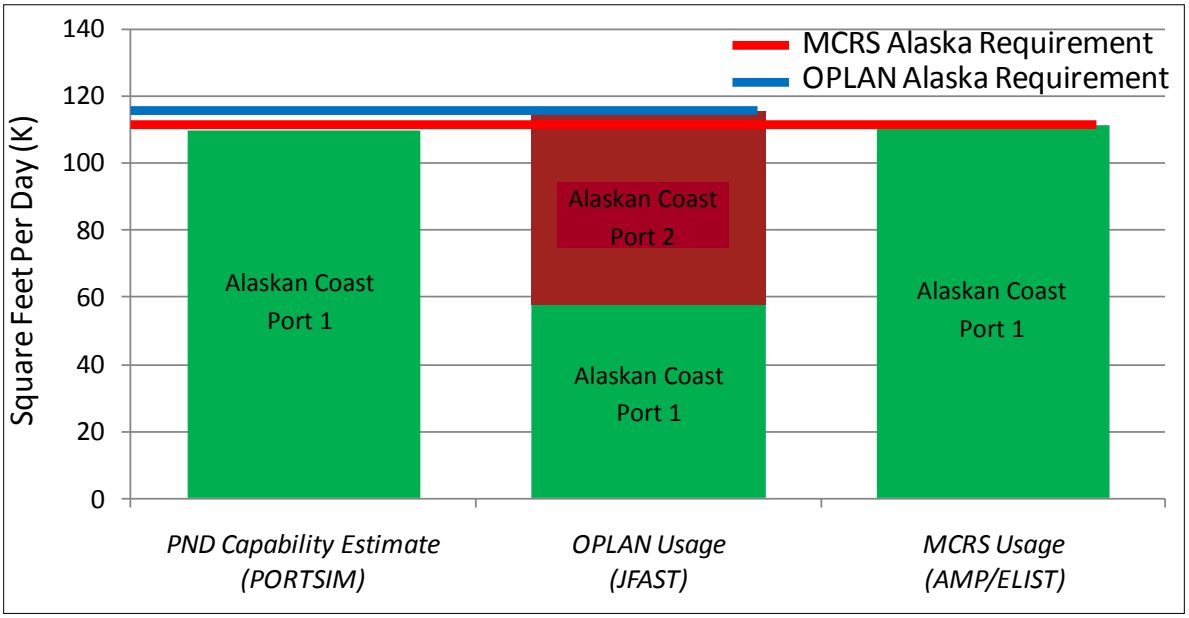

Figure 8 – Commercial Strategic Seaport Capabilities Assessment (Alaska)

Road and Bridge Assessment. Daily traffic levels on the STRAHNET Connector to the Port of Anchorage indicate a congestion issue so advanced planning should include coordination with local authorities and avoidance of peak traffic hours to avoid any hindrance to military operations.

The STRAHNET Connector into the Port of Anchorage is approximately 1.82 miles long. It consists primarily of urban streets traveling through a mixed-use commercial area with multiple signalized intersections between Alaska Highway 1 and the port. Roadway data did not indicate any significant problems associated with military use of this route. The roadway data did not identify any physical limitations. Our analysis found that the daily volume-to-capacity ratio of 0.93 indicates the potential for traffic to approach stopped conditions. However, this is an urban area with the expectation of congestion during peak morning and afternoon traffic times. Therefore, any traffic-related delays would not increase deployment times by more than 1 hour.

The Port of Anchorage has one bridge on the STRAHNET Connector. Bridge data indicates that the bridge is adequate for military use. It has an operating rating of 101.6 tons and an MLC of 63.

The most recent SDDCTEA port study (March 2010) indicates there is a medium to high potential for delay due to high levels of traffic and potential adverse weather conditions. This study also determined there are no height or weight restrictions.

Alaska DOT reports one major planned project in the vicinity to improve traffic congestion along Alaska Highway 1 connecting to the STRAHNET Connector. This project will start construction in 2013. The Cherry Hill Haul Road provides direct access to the Port of Anchorage from Joint Base Elmendorf-Richardson (JBER) and is currently an aggregate surfaced construction haul road being used for the port's expansion project. If paved, this roadway would provide a permanent alternate access route to/from JBER with minimal to no use of public roadways.

Rail Assessment. The rail line running from Anchorage north to Eielson Air Force Base and Fort Wainwright is designated as a STRACNET connector. The rail line from Anchorage south to the port of Whittier is also designated as a STRACNET connector; Whittier is not a Strategic Seaport, but it is used by railroad ferries to move railcars between Alaska and other States since there is no continuous rail route through Canada to the United States.

The rail lines to Anchorage meet military needs for moving oversize and overweight defense cargo. The rail line to the Port of Anchorage and other trackage in the vicinity of the main Anchorage rail yards have a speed limit of 10 mph and are maintained to permit safe operations at this speed. The overall maximum speed for freight trains between Anchorage and Fairbanks is 49 mph, and freight train speeds increase once they are outside of the terminal areas of Anchorage. There are no congestion issues that would prevent military trains from reaching the Port of Anchorage in a timely manner.

Gulf Coast

There are three Strategic Seaports on the U.S. Gulf Coast; the Ports of Beaumont, Port Arthur and Corpus Christi.

Commercial Port Throughput Assessment. Figure 9 shows the assessment of Gulf Coast Strategic Seaports. The capability of only one Strategic Seaport (Beaumont) meets both OPLAN and MCRS-16 out loading requirements. The MCRS-16 model run, however, produced sustained throughputs at Beaumont exceeding the PND estimate. Thus, two Strategic Seaports on the Gulf Coast are likely sufficient to meet both current and future unit cargo deployment requirements.

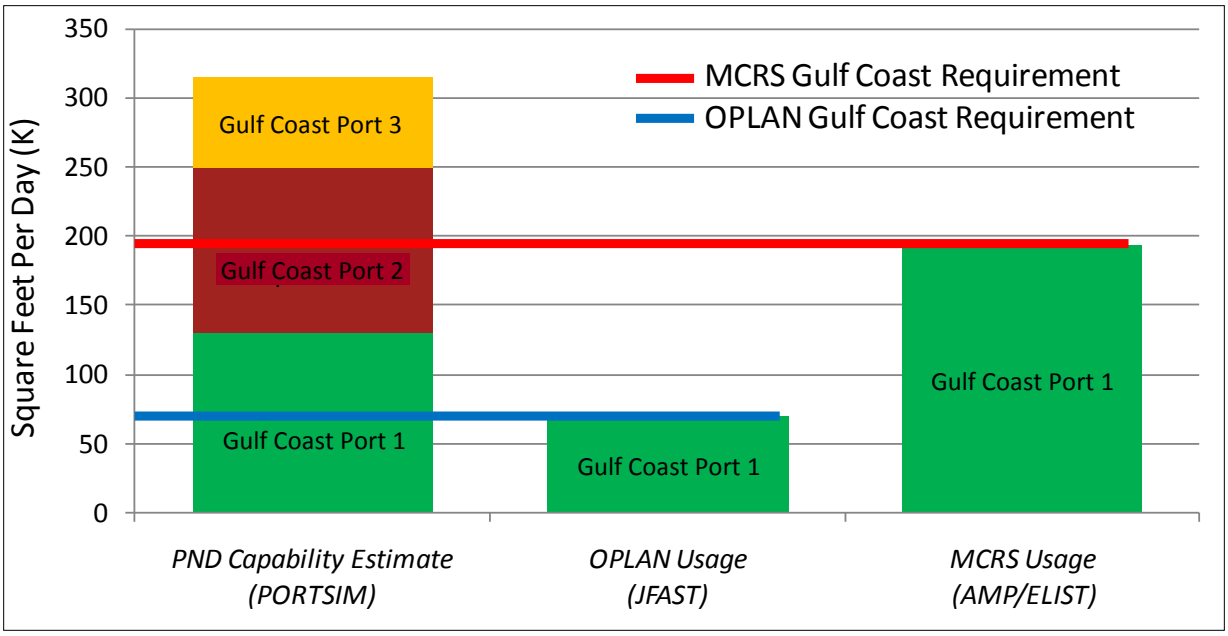

Figure 9 – Commercial Strategic Seaport Capabilities Assessment (Gulf Coast)

Road and Bridge Assessment. The roadway data did not indicate any significant physical problems associated with military use. Daily traffic levels on the STRAHNET Connectors do not indicate a significant congestion issue and therefore should not be a hindrance to military operations. Finally, Texas DOT (TXDOT) did not identify any programmed improvements in the vicinity of these ports.

Port of Beaumont, TX

The Port of Beaumont has a STRAHNET Connector that is approximately 2.7 miles long. The route is a typical urban section through primarily commercial and some residential areas from Interstate 10 to the port. The roadway data and the daily volume-to-capacity ratio of 0.56 did not identify any physical limitations or capacity issues.

The Port of Beaumont has no bridges on the STRAHNET Connector.

The most recent SDDCTEA port study (April 2011) indicates there is no likelihood of delay based upon a regional highway movement perspective. This study determined there are no height or weight restrictions on the STRAHNET Connector. The Port of Beaumont does restrict military traffic to commercial trucks or rail.

Port of Port Arthur, TX

Transportation Engineering Agency and FHWA added the port of Port Arthur STRAHNET Connector in 2010. The HND program coordinated with TXDOT and Installation Transportation Officers from Fort Polk, Louisiana and Fort Hood, Texas to identify the STRAHNET Connector. The input from these installations determined this STRAHNET

Connector would be adequate for military use. The STRAHNET Connector is approximately 1.1 miles long. The route is a typical urban section through primarily residential areas from Texas Highway 82 into the port. The connector lane width is 11 feet which does not meet ideal limits of a highway for military or commercial use but it does have two lanes in each direction. This lane width will accommodate 99.4% of all military traffic identified in Port Look. The lateral clearance will accommodate the remaining equipment. The volume-to-capacity ratio of 0.37 did not identify any capacity issues.

The Port of Port Arthur has no bridges on the STRAHNET Connector into the seaport.

The most recent SDDCTEA port study (January 2011) indicates there is no likelihood of delay. This study determined there are no height or weight restrictions on the STRAHNET Connector into the port.

Port of Corpus Christi

The Port of Corpus Christi has two separate commercial terminals on opposite sides of the shipping harbor. The Southside Cargo Terminal has a STRAHNET Connector from Interstate 37 that is approximately 1.0 miles long. The Northside Cargo Terminal has a relatively newer (completed late 2007) STRAHNET Connector, also from Interstate 37, that is approximately 9.5 miles long. The Southside Cargo Terminal Connector passes through commercial and light industrial areas while the Northside Cargo Terminal Connector passes through a primarily undeveloped area with some industrial development. The roadway data determined that Port Avenue to the Southside Cargo Terminal does have lane widths of only 11 feet but there are 2 lanes of traffic in each direction that will accommodate military traffic over that width. The volume-to-capacity ratio of 0.29 on the STRAHNET Connector did not indicate any capacity issues.

The Port of Corpus Christi has two bridges on the STRAHNET Connectors. Bridge data indicates the bridges are adequate for military use. Neither bridge has an operating rating of less than 53.9 tons or an MLC of less than 69.

The most recent SDDCTEA port study (December 2007) indicates there is a medium likelihood of delay due to traffic on Interstate 37. This study determined there are no height or weight restrictions on the STRAHNET Connectors.

Rail Assessment. The rail lines to all three ports meet military needs for moving oversize and overweight defense cargo. Maintenance condition of rail lines to all three ports is adequate and will support military deployments.

The ***Department of Defense Report to Congress on Projected Military Requirements for Military Throughput at Strategic Seaports*** dated April 2007 noted that congestion occurred at the ports of Beaumont and Corpus Christi during OIF in 2003. The report recommended that track improvements proposed by the civil sector for both ports be constructed. Since 2007, track

improvements have been made at both ports. Furthermore, in 2003, Beaumont and Corpus Christi were the only Strategic Seaports on the Gulf Coast. In 2009 Port Arthur, Texas, was designated as a Strategic Seaport, allowing Gulf Coast military cargo to be spread among three ports instead of two. It should be emphasized that even during OIF the railroad lines from the major installations to the Gulf Coast ports were uncongested until the trains neared the ports' entry gates. The congestion that did occur during OIF was a result of cargo backing up within the ports, not a lack of capacity on the railroad main lines.

West Coast

There are seven Strategic Seaports on the U.S. West Coast. The Ports of San Diego, Long Beach, Hueneme, Oakland and MOTCO are all along the California coast and the Port of Tacoma and NAVMAG are located along the Washington coast.

Commercial Port Throughput Assessment. Figure 10 shows the West Coast commercial Strategic Seaport assessment. Analysis indicated the capability of four seaports alone were able to meet the OPLAN and MCRS-16 deployment requirements, with Port Hueneme unused in both deployments. The seaports of Tacoma, Oakland, and Long Beach required sustained throughputs slightly exceeding PND estimates to meet MCRS-16 requirements, but the total throughput of 500,000 SqFt/Day nearly matched PND estimated total capacity for all West Coast Strategic Seaports. Thus, the PPO facilities at West Coast Strategic Seaports provided sufficient capability to meet OPLAN and MCRS-16 unit cargo requirements, although there was no appreciable redundant out loading capability to meet the MCRS-16 requirement.

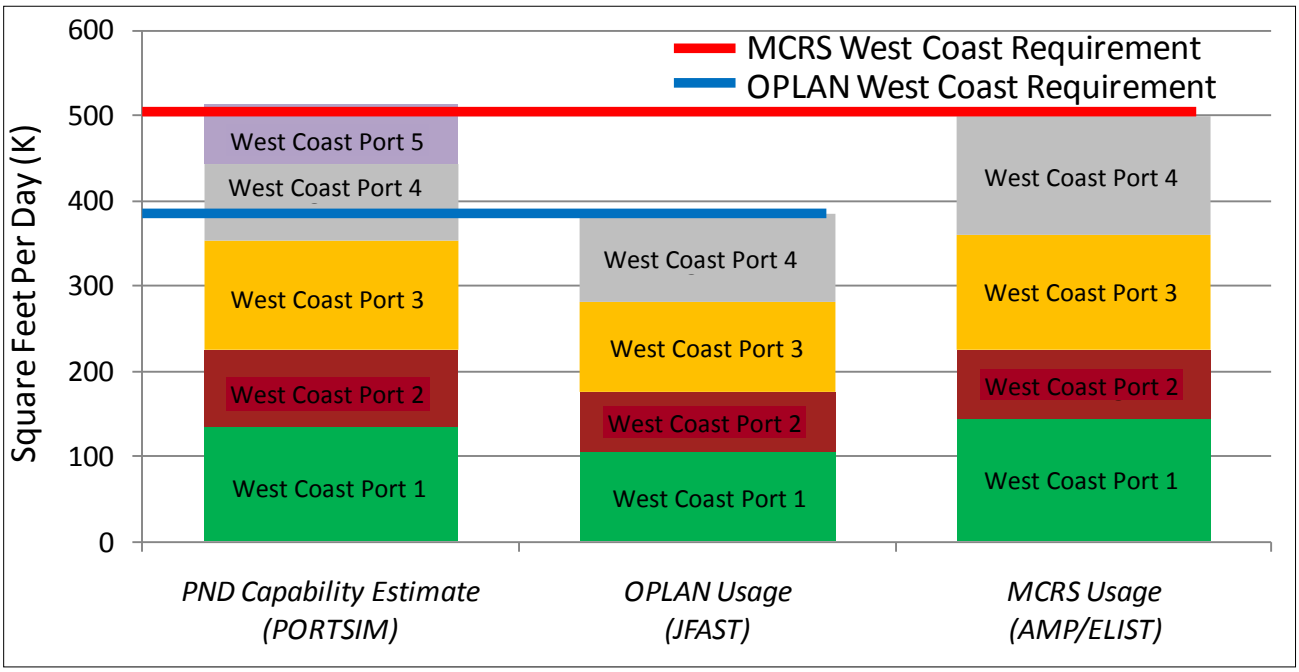

Figure 10 – Commercial Strategic Seaport Capabilities Assessment (West Coast)

Ammunition Port Throughput Assessment

The container out loading capability on the West Coast does not meet ammunition deployment requirements. Currently there are no funded projects or viable alternatives to the use of DoD's ammunition ports to correct this deficiency. Programmed projects to mitigate this deficiency have been removed from the FY 13-17 POM and improvements remains unfunded as of November 2011. See Appendix E for additional information on port throughput capabilities and requirements.

Road and Bridge Assessment. The roadway data indicated all STRAHNET Connectors are adequate to handle military traffic. Daily traffic levels on the STRAHNET Connectors into Long Beach indicate a significant congestion issue that could be a potential hindrance to military operations. Naval Magazine Indian Island has one structure with an operating rating of 34.9 tons. Further review with WSDOT determined the structure is adequate to handle military operations.

Naval Magazine Indian Island (NAVMAG)

Naval Magazine Indian Island is an ammunition seaport and as such will primarily handle containerized ammunition instead of general cargo in support of major deployment operations. We analyzed both the ammunition throughput aspects of the port as well as the condition and capacity of the surrounding transportation infrastructure and the associated impacts to the movement of ammunition containers. Throughput capability shortfalls have been identified and no mitigating actions are being pursued. See Appendix E for details.

The STRAHNET Connector to NAVMAG begins in Tacoma, WA and extends approximately 72 miles passing the Bangor Trident Base. It extends from Interstate 5 in Tacoma to the port. This route is a typical two-lane two-way rural highway with some steep grades (<5%) and blind entrances that are not limitations to military use. The roadway data and volume-to-capacity ratio of 0.63 did not identify any physical limitations or capacity issues.

There are six bridges on the NAVMAG STRAHNET Connector. Preliminary data review identified one bridge with an operating rating of 34.9 tons and an MLC of 37. Follow-up with WSDOT determined the structure does not have any load postings and there were no evident problems. This structure is sufficient to address military needs into NAVMAG.

The most recent SDDCTEA port study (July 2010) indicates there is low potential for delay and the route is in good condition. This study determined there are no height or weight restrictions.

Washington State DOT does not report any major planned projects along this route.

Port of Tacoma

The STRAHNET Connector for this port is approximately 2.2 miles long. It is a typical urban section extending through industrial areas from Interstate 5 to the port. The roadway data and the daily volume-to-capacity ratio of 0.27 did not identify any physical limitations or capacity issues.

The Port of Tacoma has three bridges on the STRAHNET Connector. None of the bridges have an operating rating of less than 43.7 tons or an MLC of less than 64.

The most recent SDDCTEA port study (May 2008) indicates there is a medium likelihood of delay which is primarily associated with the Interstate 5 corridor not traffic on the STRAHNET Connector. The PND Study evaluates traffic delay for all roadways approaching the port, to include Interstate 5, at Tacoma. This study determined there are no height or weight restrictions.

Washington State DOT is currently completing lane additions to Interstate 5 that will alleviate the congestion into the Port of Tacoma. The City of Fife and WSDOT have been completing projects at the Port of Tacoma Road interchange with Interstate 5. In addition, unfunded construction projects programmed for 2015 would also improve the interchange geometrics. The port authority in conjunction with WSDOT and other local parties is conducting a transportation study of the area to identify freight-related improvements in and around the port.

Port of Oakland

The Port of Oakland has two separate terminals identified for military use. There are three routes extending from Interstate 880 to the separate port facilities. The A.P. Moller-Maersk (APM) terminal has two STRAHNET Connectors and the Hanjin Terminal has one STRAHNET Connector. There is some overlap of the routes. The STRAHNET Connectors for this port are approximately 4 miles long. Both routes into the APM Terminal have height restrictions of no more than 14 feet. There is a suitable detour route that is less than 1 mile for any equipment over 14 feet. These routes are typical urban sections through industrial areas and have minor amounts of commercial activity. The volume-to-capacity ratio is determined at 0.41 for the STRAHNET Connector and does not indicate any capacity issues.

The Port of Oakland has six bridges on the STRAHNET Connectors. Bridge data indicates the bridges are adequate for military use. None of the bridges have an operating rating of less than 60.6 tons or an MLC of less than 51.

The most recent SDDCTEA port study (April 2008) indicates there is a high likelihood of delay which is attributed to the Interstate 880 and Interstate 80 routes. This study determined there are no height or weight restrictions.

California Department of Transportation (CALTRANS) did not identify any planned projects in the vicinity of the port.

Military Ocean Terminal Concord (MOTCO)

Military Ocean Terminal Concord is an ammunition seaport and as such will primarily handle containerized ammunition instead of general cargo in support of major deployment operations. We analyzed both the throughput aspects of the port as well as the condition and capacity of the surrounding transportation infrastructure and the associated impacts to the movement of ammunition containers. Throughput capability shortfalls have been identified in the analysis and mitigating actions have been identified but are not currently funded. See Appendix E for details.

The STRAHNET Connector for this port is approximately 4.5 miles long. California Route 4 is a high-speed four-lane limited-access facility from Interstate 680 to Port Chicago Avenue. Port Chicago Avenue is a typical industrial area roadway. The roadway data and the volume-to-capacity ratio of 0.62 did not identify any physical limitations or capacity issues.

There are 17 bridges on the MOTCO STRAHNET Connector. Bridge data indicates the bridges are adequate for military use. None of the bridges have an operating rating less than 65 tons or an MLC of less than 56.

The most recent SDDCTEA port study (February 2008) indicates there is a low to medium likelihood of delay which is primarily associated with the Interstate 680 corridor. This study determined there are no height or weight restrictions.

California Department of Transportation did not identify any projects for this area but completed a major congestion relief planning study in 2010 which identified several infrastructure improvements.

California Department of Transportation has not funded or programmed any of the improvements.

Naval Base Ventura County, Port Hueneme

The STRAHNET Connector for this port is approximately 5.9 miles long. This route is a typical urban section through undeveloped areas with minor amounts of commercial activity from U.S. Highway 101 into the port. The roadway data and the volume-to-capacity ratio of 0.76 did not indicate any physical limitations or capacity issues.

Port Hueneme has four bridges on the STRAHNET Connectors. Bridge data indicates the bridges are adequate for military use. None of the bridges have an operating rating of less than 59 tons or an MLC of less than 55. The lateral clearance will accommodate the remaining equipment.

The most recent SDDCTEA port study (April 2007) indicates there is a medium likelihood of delay which is primarily associated with the possibility that military convoys could be routed through the Los Angeles metropolitan area which would contribute to delay. This study determined there are no height or weight restrictions.

California Department of Transportation did not identify any planned projects in the vicinity of the port.

Port of Long Beach

The Port of Long Beach has less than ideal traffic conditions. Daily traffic levels on the STRAHNET Connector indicate a significant congestion issue. To avoid any hindrance to military operations, advanced planning should include coordination with local authorities to avoid peak hours between 6:00 a.m. – 9:00 a.m. and 2:00 p.m. – 6:00 p.m. Over a 24-hour period, the traffic impacts will have a significant impact on military operations.

The Port of Long Beach has two separate commercial terminals identified for military use. Pier F and Pier T each have separate STRAHNET Connectors. The Connector leading to Pier T is approximately 2.10 miles long from Interstate 710 to the port gate. The Connector to Pier F is approximately 0.72 miles long from Interstate 710 to the port gate. These routes are limited access routes through primarily industrial areas. Ocean Boulevard, also known as Long Beach Freeway or Seaside Freeway, has daily traffic volumes significantly over the estimated daily capacity for this route. The analysis calculated a volume-to-capacity ratio of 1.1. These traffic conditions could increase military travel times into the port by 3 to 4 hours. California Department of Transportation has recently announced a $1 billion reconstruction project along this route which includes the bridge crossing the channel accessing the inner harbor that will improve traffic and bridge capacity. Local authorities anticipate completion in 2016.

The Port of Long Beach has eight bridges on the STRAHNET Connectors. Bridge data indicates the bridges are adequate for military use. None of the bridges have an operating rating of less than 65.0 tons or an MLC of less than 62.

The most recent SDDCTEA port study (March 2008) indicates there is a high likelihood of delay. This study determined there are no height or weight restrictions on the STRAHNET Connectors. The study did identify one location on Interstate 710 beyond the immediate vicinity of the port that has a vertical limitation of 15.1 feet, which is not a hindrance to military use.

Port of San Diego

The Port of San Diego has two separate commercial terminals identified for military use. The STRAHNET Connector to the 10th Avenue Terminal is approximately 1.6 miles long from Interstate 5 to the port gate. The STRAHNET Connector to National City Terminal is approximately 0.6 miles long from Interstate 5 to the port gate. These routes are typical urban sections through primarily industrial areas. The roadway data and the volume-to-capacity ratio of 0.56 did not indicate any physical limitations or capacity issues.

The Port of San Diego has six bridges on the STRAHNET Connectors. Bridge data indicates the bridges are adequate for military use. None of the bridges have an operating rating of less

than 73.2 tons or an MLC of less than 56. The lateral clearance will accommodate the remaining equipment.

The most recent SDDCTEA port study (December 2007) indicates there is a medium likelihood of delay. This study determined there are no height or weight restrictions on the STRAHNET Connectors.

California Department of Transportation has programmed infrastructure improvements to the Interstate 5 and Bay Marina Drive interchange to improve access to the National City Terminal and a 2-year construction project to improve access to the 10th Avenue Terminal.

Rail Assessment. The rail lines to all of these ports meet military needs for moving oversize and overweight defense cargo. Maintenance condition of rail lines to these ports is adequate and will support military deployments. There are no congestion issues that would prevent military trains from reaching West Coast Strategic Seaports in a timely manner, and no rail congestion issues delayed deployments during OIF. Naval Magazine Indian Island does not have on base rail service, and is served by an off base railhead. No other West Coast port has any unique rail issues.

Naval Magazine Indian Island

There has never been direct on base rail access to NAVMAG. Rail shipments for NAVMAG are unloaded at Naval Base Kitsap – Bangor and transported by highway to NAVMAG. This system has worked well and has met all NAVMAG's peacetime and contingency needs. There are no plans by either the civil sector or the military to construct a rail line onto Indian Island; the cost of constructing such a rail line would exceed several hundred million dollars. The rail line to Bangor, the NAVMAG railhead, is well-maintained and meets military needs for moving oversize and overweight defense cargo.

East Coast

There are 10 Strategic Seaports on the U.S. East Coast. The Ports of New York/New Jersey and Philadelphia in the Northeast; the Port of Hampton Roads in Virginia; the Ports of Morehead City, Wilmington and MOTSU in North Carolina; the Port of Charleston and Charleston Naval Weapons Station in South Carolina; the Port of Savannah in Georgia; and the Port of Jacksonville in Florida.

Commercial Port Throughput Assessment. Figure 11 shows the assessment of East Coast Strategic Seaports. The capability of five Strategic Seaports taken alone fulfilled unit cargo deployment requirements specified in MCRS-16, with about 500,000 SqFt/Day in redundant out loading capability on the East Coast.

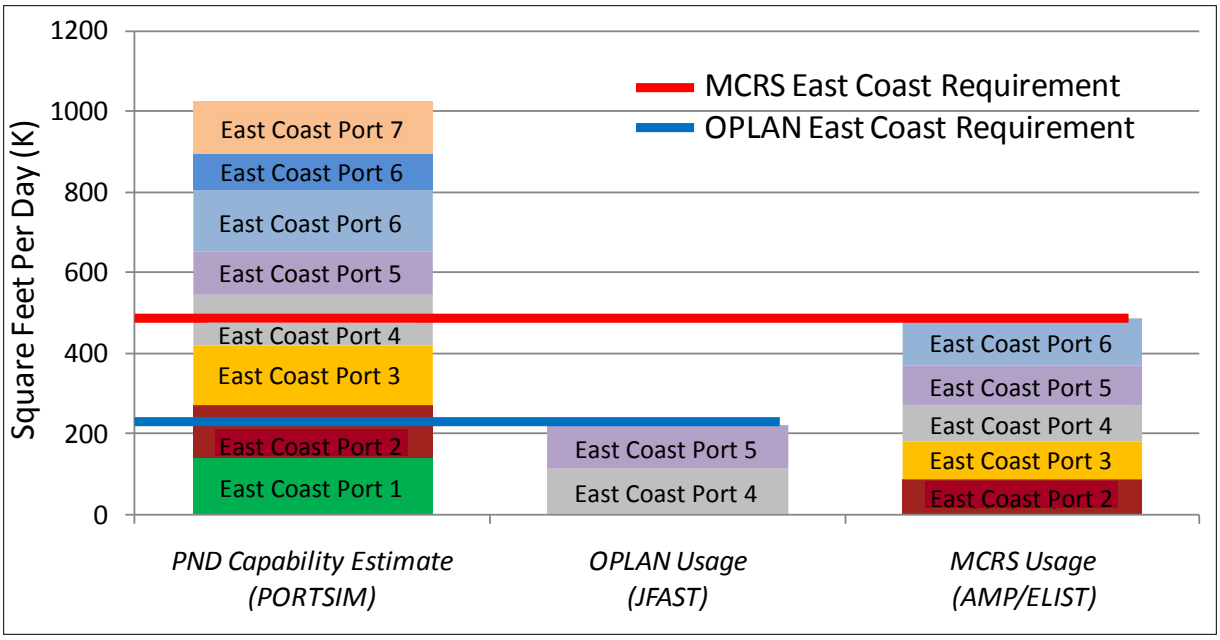

Figure 11 – Commercial Strategic Seaport Capabilities Assessment (East Coast)

Ammunition Port Throughput Assessment

The container out loading capability on the East Coast does not meet ammunition deployment requirements. The mitigating action to correct this deficiency has been identified and funded. See Appendix E for additional information on port throughput capabilities and requirements.

Road and Bridge Assessment. The roadway data indicated 3 of the 10 ports have lane widths accessing the port at less than 12 feet but overall roadway lateral clearance is adequate to handle military traffic. Daily traffic levels on the STRAHNET Connectors into New York/New Jersey indicate significant congestion (daily volume-to-capacity ratio of 0.98) that could be a potential hindrance to military operations.

Port of Jacksonville, Florida

The Port of Jacksonville has a STRAHNET Connector that is approximately 7.9 miles long. The route consists of a limited-access facility for approximately 6.2 miles with the rest being a four-lane divided highway. The roadway data and the volume-to-capacity ratio of 0.56 did not indicate any physical limitations or capacity issues.

The Port of Jacksonville has 27 bridges on the STRAHNET Connectors. Bridge data indicates the bridges are all adequate for military use. None of the bridges have an operating rating less than 44.1 tons or an MLC less than 61.

The most recent SDDCTEA port study (September 2010) indicates there is a low likelihood of delay. This study determined there are no height or weight restrictions on the STRAHNET Connectors.

Florida DOT, the City of Jacksonville, and the Port of Jacksonville have contributed significantly in recent years to improving freight access to this facility from Interstate 95. This route meets interstate design standards. Florida DOT did not identify any further programmed improvements in the vicinity of this port.

Port of Savannah, Georgia

The Port of Savannah has a STRAHNET Connector that is approximately 1.4 miles long. The route is a typical urban section through commercial and industrial areas from Interstate 516. Roadway data indicated one potential physical problem associated with military use of this route. West Lathrop lane widths are only 11 feet which is below ideal conditions with 5-foot unpaved shoulders. North Lathrop lane widths are only 10 feet with 5-foot unpaved shoulders. This lane width will accommodate 99.4% of all military traffic identified in Port Look Relook. The remaining vehicles can use this route by utilizing the 5-foot unpaved shoulder. A study completed by FHWA and Georgia DOT in 2009 identified the lane width issues on West Lathrop and have planned for those but funding has not yet been identified. This study further determined these routes have accommodated a fully loaded Heavy Equipment Transporter into the port. These routes are capable of handling military traffic. The daily volume-to-capacity ratio of 0.16 did not identify any physical limitations or capacity issues.

The Port of Savannah has one bridge on the STRAHNET Connector. Bridge data indicates the bridge is adequate for military use. The bridge has an operating rating of 68.9 tons and an MLC of 65.

The most recent SDDCTEA port study (September 2010) indicates there is a small likelihood of delay during peak hours. This study determined there are no height or weight restrictions on the STRAHNET Connector. The study does identify the narrow lanes and the commercial truck traffic use of this route.

Georgia DOT has recently announced several projects to improve port access but none provides direct improvement to the Port of Savannah.

Port of Charleston and Charleston Naval Weapons Station (NWS) Charleston, South Carolina

The Port of Charleston has two STRAHNET Connectors that access the North Charleston Terminal. The first is approximately 3.0 miles long from Interstate 26 following Remount Road. The second route following Virginia Avenue is approximately 1.0 miles from Interstate 526. Both routes are typical urban section through commercial, residential and some light industrial. The STRAHNET Connector into Charleston NWS is approximately 4.5 miles long and travels through residential and undeveloped property with some commercial near the

access to Interstate 26. The roadway data and volume-to-capacity comparison (ratio of 0.77 and 0.54, respectively) did not identify any physical limitations or capacity issues.

The Port of Charleston and Charleston NWS have seven bridges on the STRAHNET Connectors. Bridge data indicates the bridges are adequate for military use. All of the bridges have an operating rating of 54.7 tons and none has an MLC less than 52.

The most recent SDDCTEA port study (November 2009) indicates there is some potential for delay on major routes which is associated primarily with the Interstate 26 and Interstate 526 corridors. This study determined there are no height or weight restrictions on the STRAHNET Connectors.

South Carolina DOT is currently reconstructing Interstate 26 through Charleston, which includes an improved interchange with the STRAHNET Connector for the North Charleston Terminal. Construction completion is scheduled for 2011 and will significantly improve access to both facilities by alleviating traffic congestion. South Carolina DOT identified two other minor projects along these routes for improvement.

Marine Ocean Terminal Sunny Point (MOTSU), North Carolina

Military Ocean Terminal Sunny Point is an ammunition seaport and as such will primarily handle containerized ammunition instead of general cargo in support of major deployment operations. We analyzed both the throughput aspects of the port as well as the condition and capacity of the surrounding transportation infrastructure and the associated impacts to the movement of ammunition containers. Throughput capability shortfalls have been identified, mitigating actions have been funded. See Appendix E for additional details.

Sunny Point has a STRAHNET Connector that is approximately 13 miles long. The route is a rural two-lane section through undeveloped areas. The roadway data and the volume-to-capacity ratio of 0.28 did not indicate any physical limitations or capacity issues.

Sunny Point has two bridges on the STRAHNET Connector. Bridge data indicates the bridges are adequate for military use. One of the bridges listed an operating rating of 1.1 tons. Direct contact with the bridge engineer from North Carolina DOT (NCDOT) responsible for this bridge verified that the bridge has no problems handling loads up to 40 tons. The bridge is not posted for any load less than 40 tons and it is not on any NCDOT bridge restrictions. In addition, MOTSU has not reported any problems with this route. The other bridge has an operating rating of 50.3 tons and an MLC of 73.

The most recent SDDCTEA port study (January 2011) indicates there is no likelihood of delay. This study determined there are no height or weight restrictions on the STRAHNET Connector.

North Carolina DOT does not have any planned projects for this route.

Port of Wilmington, North Carolina
The Port of Wilmington STRAHNET Connector is approximately 3.5 miles long. The route is a typical urban section through commercial and some residential areas. The roadway data and the volume-to-capacity ratio of 0.73 did not indicate any physical limitations or capacity issues.

There are no bridges on the STRAHNET Connector for this port.

The most recent SDDCTEA port study (July 2010) indicates there is no likelihood of delay. This study determined the STRAHNET Connector into the port is adequate for military usage.

North Carolina DOT does not have any planned projects for this route.

Port of Morehead City, North Carolina
The Port of Morehead City has direct access from U.S. Highway 70. The STRAHNET Connector for this area is a route from U.S. 70 to the Radio Island Marshaling area. The route is a typical rural section through undeveloped light industrial areas. The roadway data and the volume-to-capacity ratio of 0.75 did not indicate any physical limitations or capacity issues.

There are no bridges on the STRAHNET Connector. There is one bridge, not on the STRAHNET Connector, between the port facilities and the marshaling area on Radio Island. Bridge data indicates the bridge is adequate for military use. The bridge has an operating rating of 73.3 tons and an MLC of 64.

The most recent SDDCTEA port study (March 2010) indicates there is no likelihood of delay. This study determined the STRAHNET Connector into the port is adequate for military use.

North Carolina DOT does not have any planned projects for this route.

Port of Hampton Roads, Virginia --
Newport News Terminal and Norfolk International Terminal
The Port of Hampton Roads has two facilities identified for military use: Newport News Terminal (NNT) and Norfolk International Terminal (NIT). The STRAHNET Connector for NNT has two separate routes for entrance and exit. Each route is approximately 0.6 miles long and is a typical urban section through commercial and industrial areas. Roadway data indicated one substandard physical component along this route. One section of this route has 11-foot lanes and a 2-foot gutter area. The three lanes of the facility and the one-way usage mitigate the width and therefore have adequate width for military movement. The STRAHNET Connector into NIT is approximately 1.8 miles long. This route is a limited-access facility through a light industrial area. The volume-to-capacity ratio of 0.53 does not indicate any significant congestion issues on the STRAHNET Connectors.

The Port of Hampton Roads has three bridges on the STRAHNET Connectors. Bridge data indicates the bridges are adequate for military use. None of the bridges have an operating rating of less than 86.4 tons or an MLC of less than 62.

The most recent SDDCTEA port study (April 2009) indicates there is some potential for delay due to normal peak-hour traffic within the Hampton Roads region, and the limitations of water crossings. The delay would not exceed 2 hours. This determination is based upon the overall perspective of the road network in the entire Hampton Roads region not specifically at the port access facilities. This study determined there are no height or weight restrictions on the STRAHNET Connectors.

The Metropolitan Planning Organization for this area recently completed a study of the military access and use of all roadways in the Hampton Roads region. The findings are not yet available. The study did include military members, port authorities, transportation officials and local interests.

Virginia Department of Transportation did not identify any planned projects for this area that would impact the port facilities.

Port of Philadelphia, Pennsylvania

The Port of Philadelphia STRAHNET Connector is approximately 2.0 miles long. The route is a typical urban section in a commercial and industrial area. Roadway data indicated a potential physical limitation associated with military use of this route. Three of the four sections of this route have 11-foot lanes. All three sections have four or more lanes with at least 5-foot shoulders giving a lateral clearance of approximately 49 feet. The 11-foot lane width will accommodate 99.4% of all military traffic identified in Port Look. The lateral clearance will accommodate the remaining equipment. The volume-to-capacity ratio of 0.30 did not indicate any physical limitations or capacity issues.

The Port of Philadelphia has four bridges on the STRAHNET Connector. Bridge data indicates the bridges required further study. The MLC for these bridges ranged between 33 and 41. None of the bridges have an operating rating of less than 68.2 tons. The Port of Philadelphia identifies this route for truck access. The Pennsylvania DOT did not identify any limitations to accessing this port via this route. These bridges are adequate to handle military traffic.

The most recent SDDCTEA port study (October 2010) indicates there is a medium likelihood of delay for the entire road network, including Interstates, surrounding the port and is primarily due to the proximity of this port to downtown Philadelphia. This study determined there are no height or weight restrictions on the STRAHNET Connector.

Pennsylvania DOT did not identify any planned projects for this area that would impact the port facilities.

Port of New York and New Jersey --
Port Elizabeth and Port Newark Terminals

The Port of New York and New Jersey STRAHNET Connector is approximately 1.5 miles long. The route is a typical urban section in a commercial and industrial area. Daily traffic levels on the STRAHNET Connector indicate significant congestion (ratio of 0.98). To avoid any hindrance to military operations, advanced planning should include coordination with local authorities to avoid peak hours between 6:00 a.m. – 9:00 a.m. and 2:00 p.m. – 6:00 p.m. Over a 24-hour period, the traffic impacts will have a significant impact on military operations.

The Port of New York and New Jersey has one bridge on the STRAHNET Connector. Bridge data indicates the bridge is adequate for military use. The bridge has an operating rating of 106.9 tons and an MLC of 62.

The most recent SDDCTEA port study (February 2010) indicates there is a medium to high likelihood of delay. Delays could exceed 3 hours. This study determined there are no height or weight restrictions on the STRAHNET Connector.

New Jersey Department of Transportation did not identify any planned projects for this area that would affect the port facilities.

Rail Assessment. The rail lines to all of these ports meet military needs for moving oversize and overweight defense cargo. Maintenance conditions of rail lines to these ports are adequate and will support military deployments. There are no congestion issues that would prevent military trains from reaching East Coast Strategic Seaports in a timely manner, and no main line rail congestion issues delayed deployments during OIF.

The NCDOT has a plan[2] to establish a Wilmington – Wallace – Raleigh passenger train route, which would involve rebuilding a previously abandoned 27-mile rail line between Castle Hayne and Wallace, NC. As shown in Figure 12, this proposed NCDOT project poses significant merit with reducing the rail distance from Camp LeJeune and some other military installations to Wilmington.

[2] *Southeastern North Carolina Passenger Rail Study*, NCDOT, Raleigh, NC, July 2005.

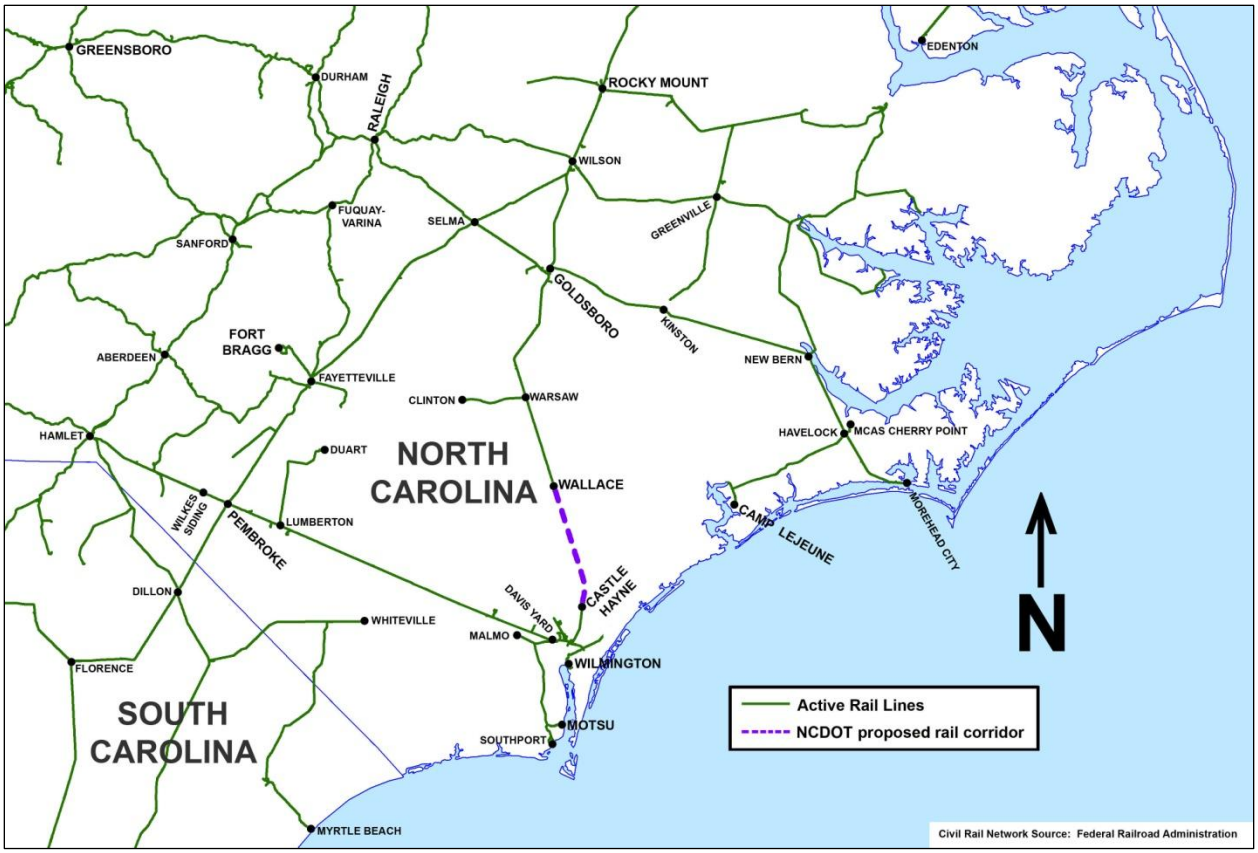

Figure 12 – Castle Hayne to Wallace, NC Proposed Rail Connection

CONCLUSIONS

Existing PPO facilities at current U.S. commercial Strategic Seaports provide sufficient throughput capability to meet OPLAN and MCRS-16 unit cargo out loading requirements. Although two of the coasts had little or no redundant capability measured against the most stressing MCRS-16 deployment, there are Alternate Seaports providing additional capability should it be required. Alternate Seaports are commercial or military seaports, also studied by SDDCTEA's PND program, that provide military planners with alternate port capability to support major deployment operations in the event that DoD does not have access to a Strategic Seaport due to commercial congestion, natural disaster or terrorist incident.

Figure 13 shows the Port Look Relook comparison of the coastal out loading capability provided by current PPO facilities against the OPLAN and MCRS-16 out loading requirements. Port Look Relook focused on unit cargo deployments and did not address ammunition throughput requirements or capabilities. However, the independent analysis of ammunition throughput capabilities and shortfalls is contained in Appendix E.

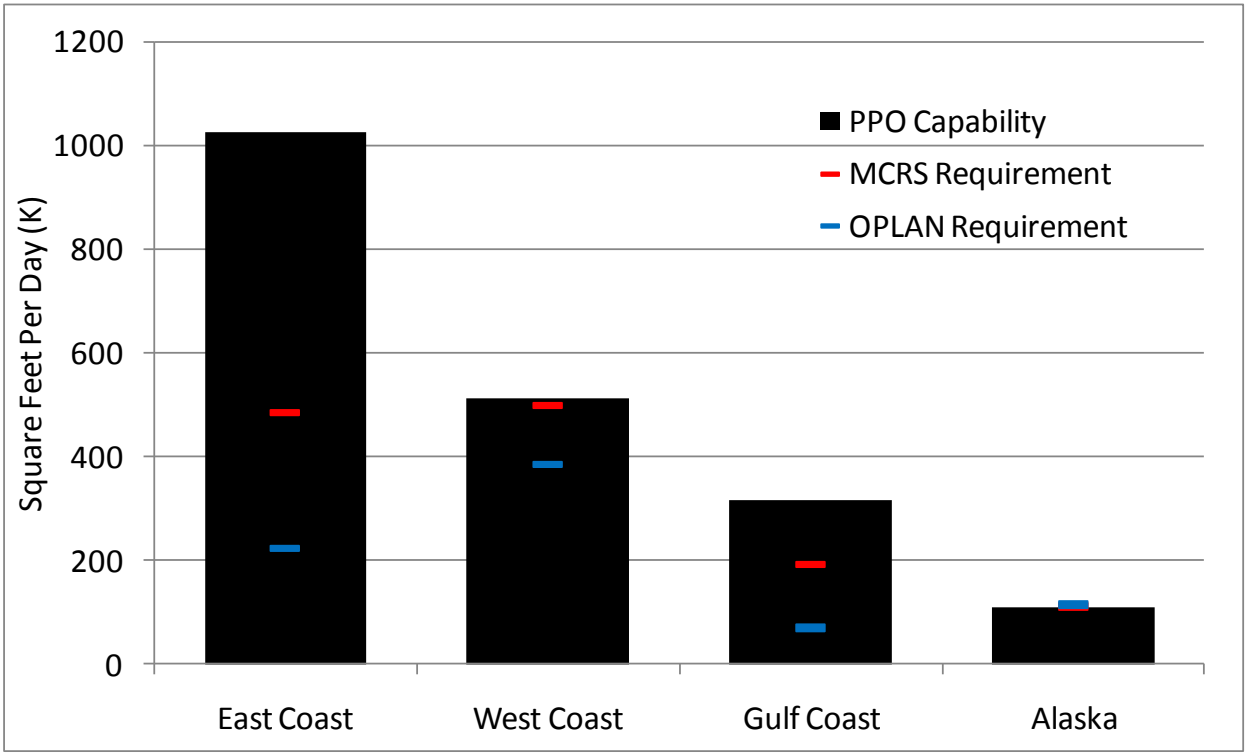

Figure 13 – Commercial Strategic Port Coastal Capabilities Compared to Requirements

PPO facilities provide some measure of redundancy on the Gulf Coast but even more so on the East Coast. Alaskan and West Coast PPO facilities meet OPLAN and MCRS-16 out loading requirements; however, there is no appreciable redundant out loading capability with respect to the MCRS-16 deployment requirement. Finally, the common user DoD-owned ammunition ports on the East and West Coasts have throughput capability shortfalls. There are mitigating actions funded for the East Coast and a currently unfunded mitigating action exists for the West Coast. Please refer to Appendix E for classified details.

Additionally, the existing STRAHNET and STRACNET leading to the Strategic Seaports are adequate and capable of supporting DoD deployments. Although a few areas have less than ideal conditions, none would impede deployment cargo thus no specific improvements are necessary. Any traffic congestion issues that may arise due to high volume-to-capacity ratios can be mitigated through advance coordination with appropriate authorities (State DOTs, police, etc) ahead of any major deployment operation. The Transportation Engineering Agency's HND Program will continue its partnerships with FHWA, AASHTO and State DOTs to advance ideal design standards and will also continue to coordinate with FHWA and the State DOTs to establish metrics for bridges and roads serving DoD needs.

Maintenance condition of rail lines to Strategic Seaports is adequate and will support military deployments. These rail lines also meet military needs for oversize/overweight cargo and have adequate capacity (trains per day) to handle peak contingency military train traffic.

Table 4 shows the results of the road, bridge, and rail access analysis and highlights areas with less than ideal conditions.

Table 4 – Road, Bridge and Rail Access Infrastructure Analysis Results

Coast/Port		Bridge [1]			Road				Rail	
		Operating Rating (ton)	Sufficiency Rating	MLC	Clearance LATERAL (ft)	Clearance VERTICAL (ft)	Lane Width (ft)	Daily Volume-Capacity Ratio	Clearances Acceptable	Class (≥ FRA 1)
East	New York/New Jersey	107.0	82.8	62	>14	>16	12	0.98	Yes	Yes
	Philadelphia	68.2	56.1	33	>14	15	11	0.30	Yes	Yes
	Hampton Roads	86.4	67.9	62	>14	>16	11	0.53	Yes	Yes
	Morehead City	73.3	40.0	64	>14	>16	12	0.75	Yes	Yes
	Wilmington	N/A	N/A	N/A	>14	>16	12	0.73	Yes	Yes
	MOTSU	1.1 [2]	6.0 [2]	73	>14	>16	12	0.28	Yes	Yes
	Charleston	54.7	73.0	52	>14	>16	12	0.77	Yes	Yes
	Charleston NWS	54.7	80.0	63	>14	>16	12	0.54	Yes	Yes
	Savannah	68.9	97.9	65	>14	>16	10	0.16	Yes	Yes
	Jacksonville	44.1	81.0	61	>14	>16	12	0.56	Yes	Yes
Gulf	Port Arthur	N/A	N/A	N/A	>14	>16	11	0.37	Yes	Yes
	Beaumont	N/A	N/A	N/A	>14	>16	12	0.56	Yes	Yes
	Corpus Christi	53.9	74.3	69	>14	>16	11	0.29	Yes	Yes
West/Alaskan	San Diego	73.3	67.7	56	>14	15	12	0.56	Yes	Yes
	Long Beach	65.0	65.0	55	>14	>16	12	1.10	Yes	Yes
	Port Hueneme	65.0	76.0	55	>14	>16	12	0.76	Yes	Yes
	Oakland	60.6	69.9	51	>14	14	12	0.41	Yes	Yes
	MOTCO	65.0	78.2	56	>14	>16	12	0.62	Yes	Yes
	Tacoma	48.2	79.5	64	>14	>16	12	0.27	Yes	Yes
	Indian Island	34.9 [3]	46.0	37 [3]	>14	>16	12	0.63	Yes [4]	Yes [4]
	Anchorage	102.0	93.0	63	>14	>16	12	0.93	Yes	Yes

1. Data shown is for bridge with most restrictive characteristics along roadways accessing the listed seaport.
2. This structure had some interim shoring work. The system skewed the calculation based upon this work. NC DOT indicated that the bridge is not an issue, not load posted, nor has it been identified during PND studies as a problem and is therefore acceptable for military use.
3. This structure is a pontoon bridge and the MLC calculation does not account for this bridge type. The WSDOT is currently performing improvements and construction on this structure. Indian Island's requirement focuses on containers not heavy cargo such as M1A1 tanks.
4. Data is for Bangor, Washington, the off post railhead for Indian Island. Indian Island does not have rail service.

Indicates locations with less than ideal conditions.

Coastal assessments of the port throughput, road/bridge infrastructure, and rail infrastructure leading to/from the Strategic Seaports are as follows:

- In Alaska, the PPO facilities at Anchorage provided sufficient throughput capability to meet OPLAN and MCRS-16 requirements; however, there is no appreciable redundant throughput capability. Daily traffic levels indicate potential congestion issues but this is not a hindrance to military operations. Any traffic-related delays would not increase deployment times by more than 1 hour. The railroad line leading to the Port of Anchorage meets military needs for moving oversize and overweight defense cargo and there are no congestion issues that would prevent military trains from reaching the seaport in a timely manner.

- On the Gulf Coast, two Strategic Seaports are likely to be sufficient in meeting both OPLAN and MCRS-16 out loading requirements. Roadway data for the three Gulf Coast Strategic Seaports did not indicate any significant physical problems associated with military use. Daily traffic levels on the STRAHNET Connectors do not indicate a significant congestion issue. The Connector route to the port of Port Arthur has a lane width of 11 feet, which does not meet ideal limits but accommodates 99% of all military traffic expected in a deployment. The railroad lines to all three Gulf Coast Strategic Seaports meet military needs for moving oversize and overweight defense cargo. Maintenance conditions of these rail lines are adequate and will support military deployments. Congestion issues did occur at the Ports of Beaumont and Corpus Christi during OIF in 2003; however, recent rail improvements have mitigated this issue at both seaports.

- On the West Coast, the capability of four of the five general cargo Strategic Seaports is needed to meet OPLAN and MCRS-16 deployment requirements. The PPO facilities at West Coast Strategic Seaports provided sufficient capability to meet deployment requirements; however, there was no appreciable reserve throughput capability towards the MCRS-16 requirement. The container out loading capability on the West Coast does not meet ammunition deployment requirements. Detailed information is contained in Appendix E of this report. Roadway data on the seven West Coast Strategic Seaports did not indicate any significant physical problems associated with military use. Daily traffic levels on the STRAHNET Connectors into the Port of Long Beach indicate significant congestion that could impede military operations. Naval Magazine Indian Island has one bridge structure with an operating rating of 34.9 tons and one load posted structure. Follow-up conversations with WSDOT determined both structures are adequate for military use. The railroad lines to all seven West Coast Strategic Seaports meet military needs for moving oversize and overweight defense cargo. Maintenance conditions of these rail lines are adequate and the lines will support military deployments. No congestion issues exist that would prevent military trains from reaching the seaports in a timely manner. No rail congestion issues occurred during OIF deployment. While NAVMAG does not have on base rail, it uses the rail service located at Naval Base Kitsap – Bangor, Washington.

- On the East Coast, the capability of five of the nine general cargo Strategic Seaports were needed to meet MCRS-16 deployment requirements with the remaining seaports providing an overall coastal excess of 500,000 SqFt/day out loading capability. Three of the ten East Coast Strategic Seaports have lane widths accessing the seaport of less than 12 feet; however, overall horizontal clearances along the roadways are adequate to accommodate military traffic. The container out loading capability on the East Coast does not meet ammunition deployment requirements. Detailed information is contained in Appendix E of this report. Daily traffic levels on the STRAHNET Connectors into the Port of New York/New Jersey indicate significant congestion that could impede military operations. One bridge structure along the route to MOTSU had abnormally low operating and sufficiency ratings. While this is not an ideal situation, this bridge is suitable for military needs. The railroad lines to all 10 East Coast Strategic Seaports meet military needs for moving oversize and overweight defense cargo. Maintenance conditions of these rail lines are adequate and the rail lines will support military deployments. No congestion issues exist that would prevent military trains from reaching the seaports in a timely manner. No main line rail congestion issues delayed deployments during OIF. One civil sector rail project that poses significant merit with reducing the travel distance from military installations to ports is the proposed NCDOT 27-mile rail reconnection between Castle Hayne and Wallace, NC.

Appendix A

Glossary

Acronym	Meaning
AADT	Annual Average Daily Traffic
AAPA	American Association of Port Authorities
AASHTO	American Association of State Highway and Transportation Officials
ADT	Average Daily Traffic
AMP	Analysis of Mobility Platform
APM	A.P. Moller-Maersk
CALTRANS	California Department of Transportation
CONUS	Continental United States
D-day	Deployment Day
DoD	Department of Defense
DOT	Department of Transportation
ELIST	Enhanced Logistics Intra-theater Support Tool
FHWA	Federal Highway Administration
FRA	Federal Railway Administration
Ft	Feet or Foot
GWOT	Global War on Terrorism
HASC	House Armed Services Committee
H.R.	House Resolution
HND	Highways for National Defense
IBD	Inhabited Building Distance
IL	Intra Line Distance
IMD	Inter Magazine Distance
IRRIS	Intelligent Road/Rail Information Server
JBER	Joint Base Elmendorf-Richardson
JFAST	Joint Flow and Analysis System for Transportation
lbs	Pounds
LMI	Logistics Management Institute
MARAD	Maritime Administration
MCRS-16	Mobility Capabilities and Requirements Study 2016
MCS	Mobility Capabilities Study
MLC	Military Load Classification
MOTCO	Military Ocean Terminal Concord
MOTSU	Military Ocean Terminal Sunny Point
MPH	Miles Per Hour
NAVMAG	Naval Magazine
NBI	National Bridge Inventory
NC	North Carolina
NCDOT	North Carolina Department of Transportation
NEW	Net Explosive Weight
NIT	Norfolk International Terminals
NNT	Newport News Terminal
NWS	Naval Weapons Station

OIF	Operation Iraqi Freedom
OPLAN	Operations Plan
PND	Ports for National Defense
POE	Port of Embarkation
POPS	Port Operations Performance Simulator
PORTSIM	Port Simulator
PPO	Port Planning Order
PTR	Public Traffic Route
RND	Railroads for National Defense
QD	Quantity Distance
SDDC	Surface Deployment and Distribution Command
SIPRNET	Secret Internet Protocol Router Network
SqFt	Square Feet or Square Foot
SR	Sufficiency Rating
STRACNET	Strategic Rail Corridor Network
STRAHNET	Strategic Highway Corridor Network
TEA	Transportation Engineering Agency
TEU	Twenty Foot Equivalent Unit
TPFDD	Time-Phased Force Deployment Data
TXDOT	Texas Department of Transportation
U.S.	United States
USACE	United States Army Corps of Engineers
USTRANSCOM	United States Transportation Command
WA	Washington
WSDOT	Washington Department of Transportation

Appendix B

Port Look Relook Data

Table B1 - AMP/ELIST Throughputs (MCRS-16 Case 1 Program Run)

Seaport	Berth Name	Berth Length (Linear Ft)	Berthings	Throughput (SqFt)
ANCHORAGE	AJBRGENERAL PU02	2,200	7	1,319,192
BEAUMONT	BBNV Berth 2-4x	1,373	7	845,574
	BBNV Carrollx	1,435	3	437,508
CORPUS CHRISTI	ENCN Southside 08	990	4	474,862
TACOMA	WPVT Evergreen T3x	900	10	1,078,051
	WPVT Evergreen T4x	1,900	61	8,402,909
	WPVT Hyundai A-Bx	2,000	17	2,659,426
	WPVT Maersk A-Bx	2,200	1	123,996
	WPVT TOTE Ax	800	3	290,893
SAN DIEGO	UTAC 10th Ave 7	720	1	103,213
	UTAC NC 10-11	1,500	3	521,631
	UTAC NC 3-5	2,030	1	275,578
OAKLAND	SERU Maersk 24	1,290	1	145,625
	SERU Outer Harbor 23	951	22	3,659,170
	SERU Transbay 25	1,050	13	2,189,273
	SERU TraPac 30 bg	1,075	4	602,273
LONG BEACH	NPTU Navy Mole Pier 15 East	815	1	49,617
	NPTU Pier C C60-C62	1,804	3	430,153
	NPTU Pier F F204-F205	1,264	5	880,929
	NPTU Pier F F206-F207	1,200	2	206,874
	NPTU Pier J J243-J244	1,200	10	1,536,689
JACKSONVILLE	LSGM Blount Is 32-35	3,650	5	586,864
SAVANNAH	UZXJ GCty Berth 7-8	1,200	1	118,028
	UZXJ GCty Berth 1x	1,690	1	117,705
	UZXJ Gcty Berth 2x	1,158	1	32,377
	UZXJ Gcty Berth 3x	917	2	154,118
	UZXJ OT Berth 12-13	1,675	2	144,223
WILMINGTON	ZBES Berth 6	700	4	470,773
	ZBES Berth 7	850	2	206,826
CHARLESTON	DKSD PUO2 NC	2,450	15	2,575,289
HAMPTON ROADS	RULV NNMT Pier B North	990	2	364,800
	RULV NNMT Pier B South	990	1	109,935
	RULV NNMT Pier C North	990	9	1,287,495
	RULV NNMT Pier C South	990	1	196,339
	SBEA NIT Northx	1,500	6	917,107
	SBEA NIT South	2,688	1	115,150
ELIZABETH	FVMT APM 88-92	2,019	1	144,954
	TOTAL	**53,154**	**233**	**33,775,419**

Table B2 - AMP/ELIST Throughputs (MCRS-16 Case 1 PPOs Enforced)

Seaport	Berth Name	Berth Length (Linear Ft)	Berthings	Throughput (SqFt)
ANCHORAGE	AJBRGENERAL PU02	2,200	8	1,389,545
BEAUMONT	BBNV Berth 2-4x	1,373	6	879,175
	BBNV Carrollx	1,435	4	578,389
	BBNV HIMTx	1,880	2	316,230
TACOMA	WPVT Evergreen T3x	950	30	4,255,075
	WPVT Evergreen T4x	930	34	3,680,834
	WPVT K-Line A-D	1,120	29	5,055,968
SAN DIEGO	UTAC 10th Ave 7	645	1	83,513
	UTAC NC 1-2	700	2	209,760
	UTAC NC 3-5	1,000	3	370,340
OAKLAND	SERU Hanjin 55-56	2,225	24	3,174,386
	SERU Outer Harbor 23	1,100	24	3,460,735
LONG BEACH	NPTU Pier T West T123-T124	1,310	23	3,265,689
	NPTU Pier T West T126-T128	1,385	3	695,420
SAVANNAH	UZXJ OT Berth 1-2	1,178	1	118,246
	UZXJ OT Berth 12-13	1,675	10	961,507
WILMINGTON	ZBES Berths 03-05	3,000	6	591,462
CHARLESTON	DKSD PUO2 NC	2,430	3	441,056
MOREHEAD CITY	QTUP Berth 4-5	1,000	2	200,184
HAMPTON ROADS	RULV NNMT Pier C North	950	15	2,461,492
	SBEA NIT Northx	1,500	15	2,484,359
	SBEA NIT South	1,500	3	783,564
	TOTAL	**31,486**	**248**	**35,456,929**

Appendix C

Raw Road Data

PORT	Route	Length (mi)	# Lanes	Lane Width (ft)	Shoulder/ Curb & Gutter -S or C & width	Clearance from Centerline (ft)	Min Vert Clearance (ft)	AADT	Daily Capacity
Anchorage	A Street	0.47	2	12	G-3	>14	>16	6650	24000
Anchorage	C Street SB	0.63	4	12	G-1.5	>14	>16	15387	48000
Anchorage	6th Ave	0.5	2	12	C-1.5	>14	>16	22275	24000
Anchorage	Ocean Dock	0.5	2	12.5	S-8	>14	>16	1911	24000
Anchorage	5th Ave	0.4	2	13	G-1.5	>14	>16	19034	24000
Anchorage	C Street NB	0.32	1	14.7	G-1.5	>14	>16	2008	12000
Beaumont	TX 380	1.9	4	12	S-10	>14	>16	27000	48000
Beaumont	Franklin	0.8	2	12	C-3	>14	>16	1500	24000
Charleston NCT	Virginia Ave	0.8	2	12	S-3	>14	>16	9700	24000
Charleston NCT	Remount Rd	3.0	6	12.5	C-2	>14	>16	26000	72000
Charleston NWS	University	1.7	4	12	C-2	>14	>16	36800	48000
Charleston NWS	Red Bank Road	5.4	4	12	S-10	>14	>16	26700	48000
Charleston NWS	Old State Road	0.8	4	12	C-2	14	>16	24900	48000
Charleston NWS	NAD Road	0.6	4	13	S-4	>14	>16	4500	48000
Corpus Christi	Port Ave	0.85	4	11	C-2	>14	>16	7100	45000
Corpus Christi	Stroman	0.1	2	12	S-11	>14	>16	7000	24000
Corpus Christi	Carbon Plant Rd	9.6	2	12	S-10	>14	>16	N/A	24000

PORT	Route	Length (mi)	# Lanes	Lane Width (ft)	Shoulder/ Curb & Gutter -S or C & width	Clearance from Centerline (ft)	Min Vert Clearance (ft)	AADT	Daily Capacity
Hampton Road Newport News	26th Street	0.34	3	11	C-2	>14	>16	2590	33000
Hampton Road Newport News	Huntington	0.15	3	12	C-2	>14	>16	5069	48000
Hampton Road Newport News	25th Street	0.13	3	12	C-2	>14	>16	3197	48000
Hampton Road Newport News	23rd Street	0.1	2	12	S-5	>14	>16	1710	24000
Hampton Road NIT	Int. Term Blvd	1.7	4	12	C-2	14	>16	25263	48000
Indian Island	SR3	11.4	4	12	S-8	>14	>16	25000	48000
Indian Island	SR104	6.7	2	12	S-9	>14	>16	15000	24000
Indian Island	SR19	10.7	2	12	4	>14	>16	8500	24000
Indian Island	SR116	2.8	2	12	4	>14	>16	4700	24000
Jacksonville	SR105	1.6	4	12	S-8	>14	>16	8600	48000
Jacksonville	SR9A	6.5	4	12	S-10	>14	>16	26750	48000
Long Beach	W Ocean Blvd	1	5	12	C-1	>14	>16	65850	60000
Long Beach	Pico Ave	1.15	4	12	C-3	>14	>16	9400	48000
Long Beach	Harbor Scenic	0.6	4	12	C-2	>14	>16	31000	48000
Long Beach	Harbor Plaza	0.12	4	12	C-5	>14	>16	4850	48000
Morehead City*	U.S. 70	N/A	4	12	S-5	>14	>16	18000	24000
MOTCO	Port Chicago	1.7	2	12	S-10	>14	>16	14800	24000

PORT	Route	Length (mi)	# Lanes	Lane Width (ft)	Shoulder/ Curb & Gutter -S or C & width	Clearance from Centerline (ft)	Min Vert Clearance (ft)	AADT	Daily Capacity
MOTCO	SH 4	2.8	4	12	S-10	>14	>16	10000	48000
MOTSU*	Sunny Point Rd								
MOTSU*	NC 87	12.2	2	12	S-8	>14	>16	6700	24000
NY/NJ	Port Street	1.34	3	12	S-12	>14	>16	35212	36000
Oakland	7th St	1.1	4	12	C-3	>14	14	19700	48000
Oakland	Maritime	1.6	4	12	C-8	>14	>16	10300	48000
Oakland	W Grand	0.45	4	12	C-4	>14	14	10000	48000
Oakland	5th	0.15	4	12	S-8	>14	>16	10300	48000
Oakland	Adeline	0.12	4	12	C-3	>14	>16	13100	48000
Oakland	Middle Harbor	0.62	4	12	C-1	>14	>16	13100	48000
Philadelphia	Packer Ave	0.6	6	11	S-13	>14	15	7338	60000
Philadelphia	Oregon Ave	1.4	4	11	S-13	>14	15	12108	45000
Philadelphia	Front St	0.46	4	11	S-5	>14	15	13323	45000
Philadelphia	Old Delaware	0.55	4	12	S-8	>14	>16	2489	48000
Port Arthur	Houston Ave	0.5	4	11	C-2	>14	>16	2400	45000
Port Arthur	SH 82	2.8	4	12	S-10	>14	>16	17900	48000
Port Hueneme	Victoria Ave	5.9	4	12	S-5	>14	>16	36300	48000
San Diego	National	0.1	2	12	C-2	>14	>16	13400	24000
San Diego	28th St	0.35	4	12	C-2	>14	>16	7600	48000

PORT	Route	Length (mi)	# Lanes	Lane Width (ft)	Shoulder/ Curb & Gutter -S or C & width	Clearance from Centerline (ft)	Min Vert Clearance (ft)	AADT	Daily Capacity
San Diego	Harbor	1.0	4	12	C-2	>14	>16	12500	48000
San Diego	Cesar Chavez	0.15	2	12	C-2	>14	>16	10000	24000
San Diego	Bay Marina	0.55	4	12	C-2	>14	15.25	10000	48000
Savannah	N Lathrop	0.65	2	10	S-3	>14	>16	3280	24000
Savannah	W Lathrop	0.62	2	11	S-5	>14	>16	3860	24000
Savannah	W Lathrop	0.17	4	13	C-1	>14	>16	3860	48000
Savannah	River Street	0.16	2	21	C-1	>14	>16	1000	24000
Tacoma	Port of Tacoma	0.25	4	12	C-2	>14	>16	11900	48000
Wilmington*	U.S. 421	2.7	4	12	C-2	>14	>16	35000	48000
Wilmington*	U.S. 117	0.8	4	12	S-2	>14	>16	15000	48000

*** - North Carolina did not reply to request for information or multiple follow-ups for roadway information. Information was gathered from IRRIS, NC DOT website and commercial services.**

Appendix D

Raw Bridge Data

PORT	BRIDGE #	MLC	OPERATING RATING (Ton)	SUFFICIENCY RATING	STRUCTURALLY DEFICIENT (Y/N)	FUNCTIONALLY OBSOLETE (Y/N)	OPERATIONAL STATUS
Anchorage	455	63	101.6	93	N	Y	N
Charleston	42179	52	54.7	93.3	N	Y	N
Charleston	22178	53	54.7	89.6	N	Y	N
Charleston	2100	71	54.7	73	N	N	N
Charleston NWS	900100	63	54.7	86.1	N	N	N
Charleston NWS	39100	64	54.7	90.5	N	N	N
Charleston NWS	800300	64	54.7	88	N	N	N
Charleston NWS	300100	66	54.7	80	N	N	N
Corpus Christi	6060	69	53.9	92.9	N	N	N
Corpus Christi	6059	69	53.9	74.3	N	Y	N
Hampton Road NIT	21026	62	86.4	67.9	N	Y	N
Hampton Road NN	20653	63	87.5	79.9	N	Y	N
Hampton Road NN	20759	64	120.2	99.5	N	N	N
Indian Island	81786	37	34.9	55.1	N	Y	N
Indian Island	80439	81	41.6	46	N	Y	N
Indian Island	11964	61	42.7	48	N	N	Y
Indian Island	0016525A	73	82.0	79	N	N	N
Indian Island	0014066B	80	104.9	93	N	N	N
Indian Island	14066A	79	108.2	100	N	N	N
Jacksonville	720640	81	44.1	87.9	N	N	N
Jacksonville	720146	70	45.2	90.4	N	N	N
Jacksonville	720232	65	53.9	81	N	N	N
Jacksonville	720239	71	60.5	95.6	N	N	N
Jacksonville	720478	71	62.7	97.6	N	N	N

PORT	BRIDGE #	MLC	OPERATING RATING (Ton)	SUFFICIENCY RATING	STRUCTURALLY DEFICIENT (Y/N)	FUNCTIONALLY OBSOLETE (Y/N)	OPERATIONAL STATUS
Jacksonville	720473	62	63.2	97.6	N	N	N
Jacksonville	720477	71	65.5	97.6	N	N	N
Jacksonville	720550	66	65.7	88.3	N	N	N
Jacksonville	720474	62	67.0	97.6	N	N	N
Jacksonville	720538	66	67.2	96	N	Y	N
Jacksonville	720539	66	67.2	96	N	Y	N
Jacksonville	720238	71	67.2	94.5	N	N	N
Jacksonville	720487	62	73.5	90.3	N	N	N
Jacksonville	720486	63	75.4	93.4	N	N	N
Jacksonville	720569	64	75.9	95	N	N	N
Jacksonville	720482	62	78.3	100	N	N	N
Jacksonville	720483	62	78.3	100	N	N	N
Jacksonville	720342	65	79.0	86.1	N	N	N
Jacksonville	720476	66	79.0	98.8	N	N	N
Jacksonville	720568	64	79.4	100	N	N	N
Jacksonville	720481	65	79.4	97.6	N	N	N
Jacksonville	720484	66	82.7	97.6	N	N	N
Jacksonville	720126	61	83.7	90.5	N	N	N
Jacksonville	720286	61	83.7	97	N	N	N
Jacksonville	720480	65	83.7	97.6	N	N	N
Jacksonville	720475	66	85.9	91.6	N	N	N
Jacksonville	720485	66	90.3	90.4	N	N	N
Long Beach	53C1727	71	65.0	96.8	N	N	N
Long Beach	53C0065	71	66.9	65	Y	Y	N

PORT	BRIDGE #	MLC	OPERATING RATING (Ton)	SUFFICIENCY RATING	STRUCTURALLY DEFICIENT (Y/N)	FUNCTIONALLY OBSOLETE (Y/N)	OPERATIONAL STATUS
Long Beach	53C0889	55	80.0	72.2	N	Y	N
Long Beach	53C2161	78	91.3	94	N	Y	N
Long Beach	53C2159	59	115.3	100	N	N	N
Long Beach	53C2049	62	117.0	66.5	Y	Y	N
Long Beach	53C2050	62	117.1	68	Y	Y	N
Long Beach	53C2172	75	121.0	97.6	N	N	N
Morehead City	310013	64	73.3	40	Y	N	N
MOTCO	280240L	56	65.0	96	N	N	N
MOTCO	280240R	56	65.0	96	N	N	N
MOTCO	280243R	64	65.0	98	N	N	N
MOTCO	280243S	64	65.0	98	N	N	N
MOTCO	280243L	66	65.0	98	N	N	N
MOTCO	280242R	66	65.0	98	N	N	N
MOTCO	280242L	68	65.0	93.9	N	N	N
MOTCO	280241L	69	65.0	78.2	N	N	N
MOTCO	280241R	69	65.0	92.9	N	N	N
MOTCO	280066R	63	77.2	95	N	N	N
MOTCO	280066L	63	77.2	95	N	N	N
MOTCO	280179L	59	84.8	68.1	N	Y	N
MOTCO	280179R	59	84.8	68.1	N	Y	N
MOTCO	28c0195	75	90.3	86.4	N	N	N
MOTCO	280244L	70	106.7	95	N	N	N
MOTCO	280260	59	121.3	100	N	N	N
MOTCO	280244R	64	121.3	92	N	N	N

PORT	BRIDGE #	MLC	OPERATING RATING (Ton)	SUFFICIENCY RATING	STRUCTURALLY DEFICIENT (Y/N)	FUNCTIONALLY OBSOLETE (Y/N)	OPERATIONAL STATUS
MOTSU	190011	73	1.1	6	Y	Y	N
MOTSU	190026	73	50.3	63	N	Y	N
NY/NJ	M104720	62	106.9	82.8	N	N	N
Oakland	330200	51	60.6	69.9	N	Y	N
Oakland	33C0028	55	65.7	81.1	Y	N	N
Oakland	330616R	66	65.7	87.1	Y	N	N
Oakland	330616L	66	65.7	92.4	Y	N	N
Oakland	330609L	71	65.7	83	N	N	N
Oakland	330609R	71	65.7	83	N	N	N
Philadelphia	1009800	39	68.2	56.1	Y	N	N
Philadelphia	1009520	41	68.2	88.0	N	N	N
Philadelphia	8414100	34	77.2	63.5	N	N	N
Philadelphia	7601400	33	88.2	87.8	N	Y	N
Port Hueneme	520439R	55	65.0	84.8	N	N	N
Port Hueneme	520439L	56	65.0	84.8	N	N	N
Port Hueneme	52C0064	59	79.4	76	Y	N	N
Port Hueneme	52C0142	65	121.3	80	Y	N	N
San Diego	570441	56	73.3	93.5	N	N	N
San Diego	57C0196	61	77.2	88.8	N	Y	N
San Diego	570939H	61	82.0	67.7	N	N	N
San Diego	570847G	63	96.0	81.3	N	N	N
San Diego	570251R	56	121.3	90.8	N	N	N
San Diego	570251L	56	121.3	85.3	N	N	N
Savannah	5100380	65	74.4	97.9	N	N	N

PORT	BRIDGE #	MLC	OPERATING RATING (Ton)	SUFFICIENCY RATING	STRUCTURALLY DEFICIENT (Y/N)	FUNCTIONALLY OBSOLETE (Y/N)	OPERATIONAL STATUS
Tacoma	6480A	64	48.2	79.5	N	N	N
Tacoma	15833B	72	59.1	82.4	N	N	N
Tacoma	15833A	84	80.9	93.2	N	N	N