

Capstone Project Assignment – Port Access

Scenario:

You are the multi-modal freight unit of your state's department of transportation, which includes oversight of port activities. You work closely with the Port Authority and provide strategic planning for economic development, harbor development, and marketing. With the expansion of the Panama Canal in 2014, there is an opportunity for a growth in your state's port activities. Your DOT Commissioner has asked that you lead the effort to study the possibilities for growth and the associated access issues. She is interested in the role that the state could play in bringing more cargo to the port, and consequently more jobs and economic activity. The study should also identify possible landside transportation access issues and offer solutions to alleviate those issues.

Your Assignment:

Make a recommendation that describes the course of action for conducting this study. Specifically, the final product should address the following:

- What resources will you use to identify opportunities for port activity growth?
- What data sources will you need to analyze the possible economic implications of that growth (i.e. direct and indirect jobs)?
- What strategies can you anticipate recommending that might alleviate possible landside access issues? How might technology play a role? How will you consider freight resiliency?
- Who will be involved from other DOT departments and other state agencies, and in what capacity?
- Who will be involved from the private sector, and in what capacity?
- How should the citizenry be involved?

Product:

Be prepared to present your recommendations for development of a port growth and access study and answer questions to a panel of executive level members of the I-95 Corridor Coalition via a webcast. Each capstone group will give a 30 minute PowerPoint presentation, followed by Q&A and discussion. You are also required to compile your recommendations into a final report (no more than 10 pages in length), due at the time of presentation. The report should be prepared as an executive briefing document that would be given to the DOT Commissioner and Governor's Office.



Planning for Port Growth and Regional Prosperity

Regional Freight Access and Infrastructure Evaluation: Study Scope

by Bala Akundi, Robby Burt, Scott Douglas,
William Guiher, Steve Pyburn and Ralph Volpe



A Freight Academy 2010 Capstone Project

This report is based on a hypothetical scenario developed through an academic exercise for the I-95 Corridor Coalition Freight Academy. The contents of this report should not be construed as factual in any way.



Purpose and Need

The Port is a major economic engine for the State, providing hundreds of thousands of jobs and billions of dollars in tax revenue. Prior to the start of the recent economic downturn, our Port was experiencing record growth in movement of containerized goods. We expect that freight will again grow as the economy rebounds. Coupled with the recovery, the Port is also expecting growth from the expansion of the Panama Canal, scheduled for completion in 2014. With an all-water route to the East Coast soon to be economically viable again, our Port is poised to become a major hub for cargo that once came in by rail from the west. To take full advantage of this growth, the Port will need to be able to accommodate larger ships, move more containers faster, and improve reliability for both carriers and shippers. Every indication from the Port Authority is that they will make the necessary improvements. However, in order to take full advantage of these improvements, the Port requires improved and expanded access through the region.

The DOT needs to evaluate the current status of freight movement in the region and determine what the State can do to accommodate the expected increase in both local and regional freight traffic. Our local highways are already congested, and the economic downturn has required state and local agencies to defer maintenance. Our rail infrastructure is adequate, but pressure to increase commuter service as well as lack of a strategic rail plan hampers the potential to use rail to divert freight off highways. Our domestic shipping ability is practically non-existent. Funding for infrastructure remains tight; however, the economic benefits of increased trade will result in improved economic prosperity if approached strategically.

We propose to conduct a study of regional freight access and infrastructure. The purpose of this study will be to evaluate the current and future status of goods movement in the region, and the infrastructure that supports it. The study team will examine existing transportation and land use plans, reach out to stakeholders for their input, and then use this information to perform an in-depth evaluation of transportation needs. The team will then develop a series of recommendations for projects and programs that will be needed to accommodate the Port's growth. Attention will be given to innovative technologies, freight resiliency and port security, as well as environmental issues to ensure that the proposed strategy provides the best solutions with the fewest impacts at the lowest cost to the taxpayer. Finally, the study will evaluate funding alternatives that have been proposed or used successfully in other regions to support freight infrastructure improvements.

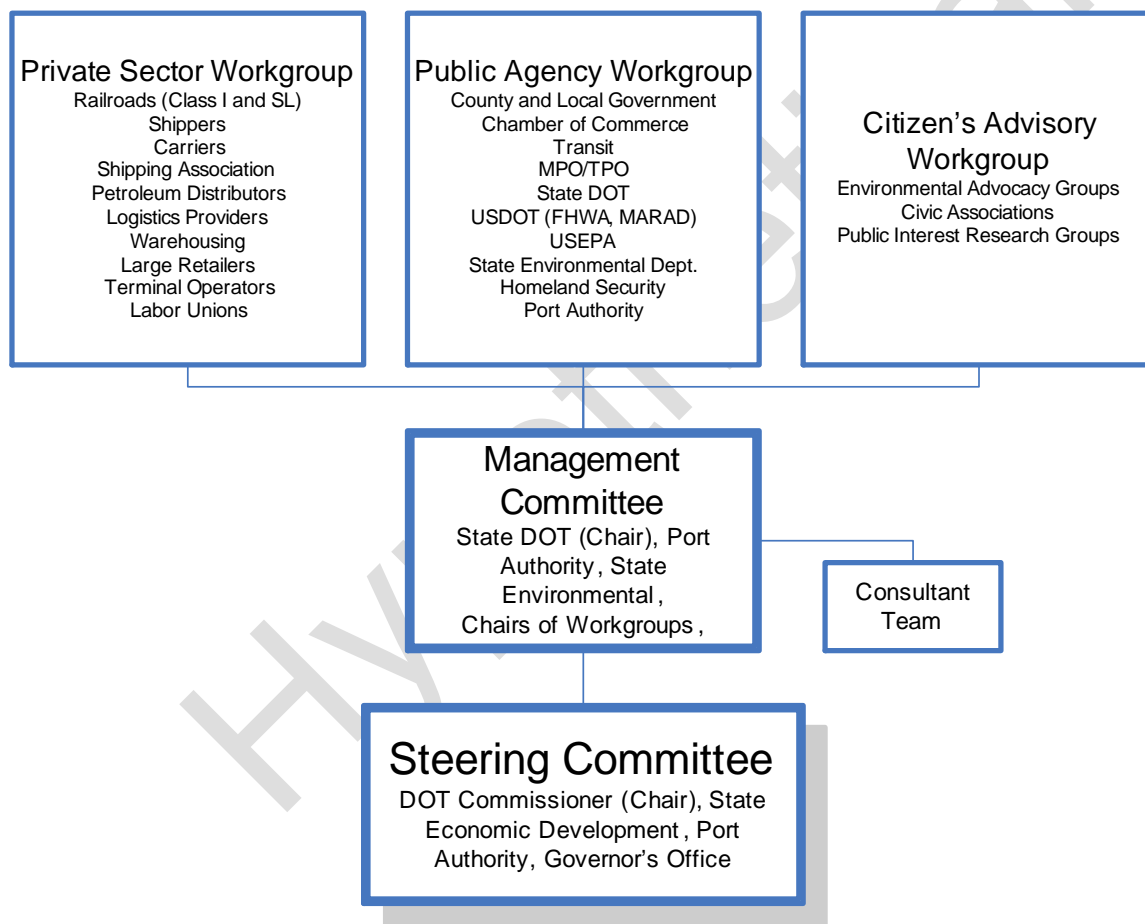
Study Scope

Competition in today's global marketplace demands efficient and reliable good movement. Companies of every type and size must have effective means for receiving raw materials they need and then shipping their products to their customers. To drive this competitiveness, the State must have a transportation infrastructure that saves both time and money by efficiently connecting its highway network with air, rail, and seaport facilities. Such a system will create a foundation for sustainable growth in a growing global marketplace and uniquely nurture a culture of innovation that provides enhanced access for companies pursuing new opportunities.

Because of the complexity of issues and entities involved with goods movement, their interdependence and impact on each other, as well as the wide range of options available, it is essential that a clear, systematic approach be taken. A complete analysis of pertinent data and innovative solutions needs to be conducted. The study team needs to examine impacts related to transportation, land use, economy, environment and communities. A qualified consultant team is needed to compile and synthesize existing data, plans and requirements, as well as a well-organized team of public and private stakeholders to provide data and insight to the process. The resulting study will be a consensus of both public and private needs, suitable for consideration by the highest levels of State government. To accomplish this, we propose the following steps:

Stakeholder Participation Plan – In order to ensure success, it will be necessary to bring together the right people to work on this plan. We propose a hierarchical program, with a Steering Committee comprised of upper management from the key agencies and the Governor’s office, a Management Committee comprised of staff managers and planners from key agencies, and a trio of workgroups that will secure input from the private sector, other interested public agencies, and the effected citizenry (Figure 1). The Management Committee (MC) will be responsible for day to day management of the consulting team, convening meetings of the workgroups, hearing and collecting input from stakeholders and providing comments on draft reports. The MC

Figure 1. Stakeholder Involvement Plan
for
Regional Freight Access and Infrastructure Evaluation



will decide on the makeup of each workgroup, but each workgroup will pick its own chairperson. The MC will report its results to the Steering Committee for final approval. The workgroups will function as a mechanism for the consultant team to conduct interviews with stakeholders in industry, public service and the general citizenry (and their advocates). In these meetings, the consultants will also seek assistance from the members in filling data gaps that have been identified and to seek partners for needed studies. Workgroups will also be polled to evaluate various strategies and recommendations that come out of the data scans and evaluations, as well as consultant work products. Each of the three workgroups will be responsible for selecting a chairperson, who will report out the results of their efforts to the MC. Thus, each workgroup also has a representative on the MC.



Data Scan – Existing plans and data will be evaluated by the consultant to form a context around which discussions by stakeholder groups will be centered.

Some examples of the documents that will be collected and reviewed are:

1. Regional Transportation Improvement Plan
2. Regional, County and Municipal Land Use Plans
3. State Economic Development Plan
4. Port Development Plan
5. State Freight Plan
6. Strategic Rail Plan
7. Freight Projections
8. Freight Origin/Destination Studies
9. Regional Commodity Flows by Mode
10. Regional Census Data
11. Metropolitan Transportation Plans and Transportation Improvement Programs

Data that will need to be assembled and compiled are:

1. Logistics Industry
 - a. Employment
 - b. Number of logistics provider establishments
 - c. Total sales from the logistics providers (value of the industry)
 - d. Map of core, related, and support logistics providers by employment size
 - e. Educational institutions that have a focus/curriculum in logistics (to support the industry)
2. Land use data
 - a. Locations of warehouse and distribution centers
 - b. Locations of major retailers
 - c. Locations of major port-dependent industry
 - d. Locations of major terminals
3. Trend analysis of historic /projected data relating to:
 - a. Number of logistics provider establishments (past 20 years)
 - b. Statewide truck tonnage 20 year projections (import, export, through, intrastate)
 - c. Statewide rail tonnage 20 year projections (import, export, through, intrastate)
 - d. Container Throughput at Port in TEUs (past 20 years)
 - e. Projected Port Capacity and Throughput (next 20 years)
4. Port
 - a. Number of berths
 - b. Number and size of cranes
 - c. Stevedoring productivity
 - d. Yard area and storage area and technology
 - e. Utilization of terminal area
 - f. Container dwell time
 - g. Number of gates and gate technology
 - h. Labor availability
 - i. Import/export trade ratio
 - j. Market share and distance/routes to major markets
 - k. Cargo flows compared to competing ports
 - l. Cargo security procedures



5. Current Local and Regional Traffic
 - a. average trip lengths,
 - b. accident records,
 - c. Traffic volumes/congestion areas
 - d. Vehicle classification
 - e. Roadway geometries
 - f. Daily directional distribution and peaking characteristics of port traffic.
6. Highways and Bridges
 - a. Roadway geometries
 - b. Locations of substandard facilities (i.e. inadequate turning radii, deteriorated pavement, bridge sufficiency ratings, etc.)
 - c. Tolls
 - d. Parking and Rest areas
 - e. International Roughness Index (IRI)
 - f. Height of bridges between the channel entry and the port to ensure adequacy of Post-Panamax vessels.
 - g. Last/first mile access
7. Waterways
 - a. Controlling Depth Reports for access channels
 - b. Current condition and depths of berths
 - c. Siltation rates and dredging frequencies
 - d. Extent of sediment contamination
 - e. Availability of management options for dredged material
 - f. Current cost of dredging and dredged material management
8. Rail
 - a. Current ownership, service availability and track rights
 - b. Condition of Class II and short line railroads
 - c. Service availability
 - d. Weight capacity
 - e. Double-stack clearance
 - f. Extent of track (single, double, etc) and capacity
 - g. Condition of bridges and trestles
 - h. Status of and congestion in yards
 - i. Track sharing agreements

The consultant will prepare an initial conditions document prior to the first meeting of the workgroups so that all groups understand the scope, capacity and condition of the existing transportation infrastructure as well as the various plans of participating agencies. This initial conditions report will clearly point out data gaps.

In order to determine the impact of the projected freight growth, additional data may be needed. It is hoped that the workgroups will be able to provide much of the needed data, however in some cases additional studies may be required.

Innovative Strategies – The Workgroups will be asked to come up with their recommendations and strategies for improving port access and ensuring efficient goods movement.

Some of the possible strategies that will be discussed are:

1. Optimizing the use of rail, roadway, and inland waterway facilities to disburse port imports and exports across modes
2. Establishing agreements between the various railroads serving the ports to share on-dock and near-dock rail facilities



3. Locating near-dock rail yards to eliminate the need for containers to be trucked from one rail line to another
4. Increasing hours of operation across the entire goods movement system
5. Make localized improvements to the arterial and freeway network to eliminate specific bottlenecks
6. Create truck-only facilities between docks and near-dock rail yards, warehouses, and forwarders
7. Ensure infrastructure can accommodate Post-Panamax vessels
8. Upgrade infrastructure to allow over-weight trucks between the cranes and forwarders/warehouses
9. Opportunities to co-locate rail facilities
10. Opportunity to create chassis pools
11. Opportunity for crane sharing
12. Opportunities for locating freight forwarding and warehousing facilities on port property to allow over-weight containers to be trucked from the dock to these facilities
13. Increase efficiency through technology

Technology is proving to be an increasingly popular method of managing congestion – specifically as the ability to provide additional capacity decreases. Intelligent transportation systems (ITS) applications specific to goods movement are frequently being implemented. One application of ITS is equipping trucks with radio frequency identification (RFID) tags to alert port operators the truck is arriving and the required container should be retrieved from the storage area. Examples of potential technology based systems are listed below.

1. Freeway and arterial detection systems - Install speed/volume sensors on surface streets near the ports.
2. Changeable message signs that display travel times.
3. Queue Detection / Terminal Turn Times – Measure delay inside the ports.
4. Truck Fleet Communications Program – Traffic & other information to/from trucks.
5. Truck Fleet Data Collection/Agreements – Use data from existing trucking systems and share it with all truckers.
6. Truck Parking Coordination – Use changeable message signs to alert truckers of the location of available parking spaces.
7. Port Reverse 911 Emergency Notification Call System – Response coordination.
8. Goods Movement Scheduling System – Container tracking & pickup coordination.
9. Radio Frequency Identification (RFID) – Identify location of trucks approaching port to reduce container pick-up time.
10. Vehicle Enforcement Strategies – In-motion systems to monitor/enforce safety, weight, and security.
11. Congestion Pricing Initiatives – Financial measures to reduce congestion.
12. Goods Movement Transportation Management – Coordination of the above functions.
13. Performance Monitoring System – Monitoring results & benefits from these actions.
14. Commercial Vehicle 511 traveler information

Greening the Port – It is no longer adequate to just talk about being environmentally friendly. The public demands action that demonstrates that ports (and freight) can be good neighbors. The consultants will compile a summary of environmental initiatives that have been shown to work in other regions on problems such as noise, air quality, light pollution, and alternative fuels/energy. The workgroups will evaluate these various environmental initiatives to determine if they are feasible as a way to lower the environmental footprint of the project.

Since it is likely that some construction will be recommended in the plan, environmental impacts will need to be evaluated. It is not possible at this time to know whether or not NEPA compliance will be an issue, therefore conducting a full scope Environmental Impact Assessment as part of this process is not appropriate. However, a preliminary programmatic environmental impact assessment can and will be conducted.



Freight Security and Resiliency – Since 911 and Hurricane Katrina, we have become much more aware of how unforeseen incidents can result in severe impacts on goods movement. We need to be prepared with contingencies for a range of issues from security delays to major catastrophes. Aging infrastructure can also result in loss of capacity and maintenance delays. In order to remain competitive, it is imperative that goods movement be maintained. The consultant team will work with the groups to:

1. Identify key infrastructure - This task will include definition of critical infrastructure and development of a list of these facilities (tunnel, bridge, highway, transit, rail, freight, port, inter-modal transfer, and etcetera). The selection of critical infrastructure will take into account the expected usage of facilities including throughput, commuting patterns, interstate travel, truck movement, economic importance, emergency services needs, and evacuation plans.
2. Develop and discuss potential scenarios - This task will include definition of possible scenarios where the use of critical infrastructure is suddenly lost due to a catastrophic event. Scenarios will focus on roadway based events but the loss of rail infrastructure and capacity will also be components of simulated events. Scenario design will include establishing the specific duration of the event, expected duration of infrastructure loss, and any particular details of the simulated event such as possible long term contamination issues. These scenarios will not encompass all possible threats and hazards, but will serve to provide a point of reference during the development of the redundancy analysis. It should be noted that the scenarios chosen will impact regional transportation system operations in both the short term as response efforts place additional loads on the system, as well as the long term when recovery efforts with the goal of restoring lost capacity become a focus. Determining scenario effects for both the short and long term during the following impact analysis tasks will be an important goal of the overall redundancy analysis as these effects will factor into assessing any needs for additional system capacity or protective action.
3. Impact Analysis - This task will include projecting the impacts on the regional transportation system following the catastrophic loss of critical infrastructure. This task will reference the earlier scenario design efforts and require the identification of system components that might offset the loss of capacity normally carried by affected facilities.
4. Develop Recommendations and Contingencies - This task will include a detailed documentation of the results from the earlier impact analysis. The ability of the regional transportation system to handle a catastrophic loss of critical infrastructure will be determined through an analysis of the effects modeled as part of each selected scenario. A specific focus will be the documentation of potential long term effects on regional transportation operations as the regular movement of people, goods, and services is pushed onto alternate routing or modes during the recovery and restoration stages of simulated events. This task will also include the development of recommendations to establish suggested protective action for transportation facilities that, if lost, would severely compromise the operation of the regional transportation system

Evaluation - The Port expansion will affect a broad range of infrastructure. For port access this includes facilities that affect ship movements in the channel, docks, container, vehicle, and bulk product, storage areas, warehouses, in-land water-ways, rail lines and roadways. Each of these types of facilities will have an impact on how efficiently freight moves within and around the Port, as well as the impacts of the port on the environment. It is anticipated that each of these types of facilities will be modeled to assess the need for and effectiveness of proposed improvements.

For the state to be prepared to handle the additional volume of traffic resulting from the expansion of the Panama Canal, we recommend a series of studies that would look at existing infrastructure, its current and



projected performance and develop strategies to mitigate potential adverse impacts. It is anticipated that the following studies will be developed:

1. Commodity Flow Study: to determine types, origins and destinations, values, weights, modes of transport, distance shipped, and ton-miles of commodities shipped into and out of the port.
2. Harbor traffic modeling: Assessment of strategies for managing peak demand times by ships and other harbor traffic.
3. Port circulation simulation: Assessment of to increase the efficiency of on-dock and near-dock movement of containers, autos, and project cargo.
4. Rail capacity modeling: Assessment of future rail operations using the Parametric Rail Capacity model.
5. Roadway travel demand modeling: Assess variable traffic routing strategies to identify the type and timing of future improvements.
6. Traffic operations simulation at key locations: Identify roadway geometry requirements to manage future traffic demand.

The consultant team, working with the Management Committee, will then use the findings of these studies and previous tasks will be used to develop a series of recommendations to accommodate the projected goods movement and ensure continued port competitiveness. The recommendations will be vetted with each of the workgroups, and their comments used to develop the final set of recommendations.

Financing – Paying the cost of major infrastructure improvements is a challenge in any economy, but is particularly challenging today. While in years past, we might be able to await an economic recovery before attempting a project of this magnitude, we do not have years to wait. The Panama Canal will be complete in 2014 and therefore we need to get started today on infrastructure needed to accommodate (and maintain) future growth. The consultant will compile a review of existing innovative financing strategies that have been used successfully in other regions such as container fees, fuels tax, port use fees, public/private partnerships and others. These strategies will be reviewed by the Management Committee and presented to the Steering Committee for consideration.

Another major consideration that has not previously received much consideration in projects of this kind is “return on investment”. Once a series of recommendations has been developed, the consultant team will be asked to evaluate the total cost of the program and compare it to expected revenues. A “no build” alternative will also be presented to illustrate the cost of no action.

Freight Access Plan - The consultant team will produce a final draft plan taking into account all of the public comments, and this plan will be presented to the Steering Committee for their comments once approved by the Management Committee. Included in this report will be a summary of the current conditions, opportunities and constraints, and a phased set of recommendations – both institutional and built. The final Freight Access Plan will then be presented to the general public.

Public Outreach Plan

The Port is committed to being a responsible partner with the community. To this end, the public involvement process for the port expansion project is going to be an important piece of the evaluation process. Public outreach “early and often” will be required for project success. Since there is already substantial public and private input into the plan, the outreach plan will be focused on disseminating the results of the study.

An initial public meeting will be held to inform public of overall port expansion goals and projects that may come as a result of the expansion. A one page fact sheet will be distributed at all meetings with an attached map of the area and possible projects.



A project mailing address will be established for any correspondence with the public both for the dissemination of information and suggestions or comments from the public.

A website, www.portaccess2014.com will be established and utilized. This website will be interactive and updated when any new information is available for dissemination. There will be a listserv set up on the website to allow people to sign up for updates. Information to be posted on the website will include meetings dates, times, agendas, and minutes, work products, other project information, media briefs, and other related information. Maps showing proposed port improvements and necessary road improvements will be available online. Links to project website will be placed on State DOT website, the city website, and MPO website.

A freight education campaign will be started by the DOT and the port as a result of this project. The education program will be directed to the community in two different paths. First, it will show the importance of freight to everyday life. For example, the delivery of food to the shelves, shoes to the mall. The second path will show the importance of the jobs that the port can create and the economic impact of the port to the community and to the state's economy. Income and taxes that the port and its employees as well as those shippers and carriers will be shown. Also, what impacts additional workers may have on the community such as additional shopping, restaurants and convenience stores. Finally, the economic benefits of the port will be exhibited in a way that will be easy to understand by the lay-public.

The media will be contacted early in the project process as well. We feel that this can a long way towards positive media coverage of the project and will help with our community involvement effort to explain the benefits of the port expansion. Selected DOT staff will make themselves available for all media, print and television for interviews. Media will be used to promote the freight educational program. Staff will also work with the media to develop a number of public service announcements about the benefits of the ports and community projects sponsored by the ports.



A Proposal for Evaluation of Regional Freight Access and Infrastructure

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Our Port, Our Future

- The Port supports over 200,000 jobs in the region
- The Port and its tenants generate approximately \$4 billion in tax revenue
- The Port provides opportunities for businesses and individuals
- The Port supplies needed food, clothing and other goods for the region that would otherwise have to come by truck



The Containers are Coming

- Port throughput was increasing at a rate of 5-7% annually prior to the recession.
- Current waterborne imports originate mostly from South America and Europe.
- The Panama Canal widening will increase traffic from Southeast Asia.
- The Panama Canal project is on schedule for 2014.
- Is our freight transportation infrastructure up to the challenge?

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The Plan

- Evaluate expected volumes and rate of increase in trade.
- Model this volume to predict bottlenecks and inefficiencies.
- Determine and prioritize necessary infrastructure improvements.
- Engage stakeholders both inside and outside of government to determine needs, plans and concerns.
- Ensure that the project takes full advantage of new technology.
- Obtain public support through outreach.



Plan Scope

- Review and integration of existing plans
- Stakeholder polling and data needs
- Freight Flow Modeling
- Land Use Analysis
- Transportation Needs Analysis
- Environmental Impact Analysis
- Economic Analysis
- Public Outreach



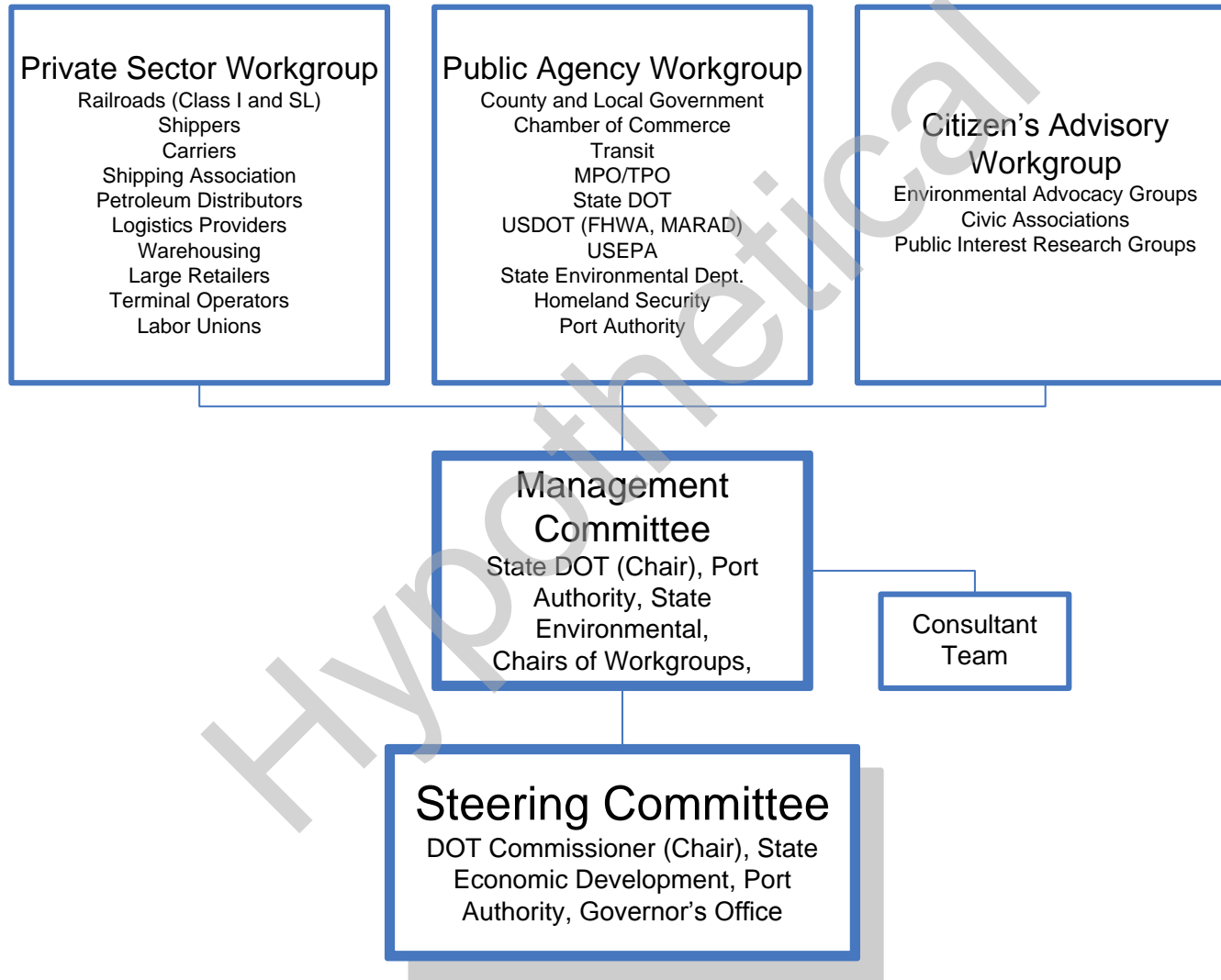
The Participants

- Federal
 - Maritime Administration
 - Federal Highway Administration
 - Army Corps of Engineers
 - Homeland Security
 - Environmental Protection Agency

- State
 - Department of Transportation
 - Department of Environmental Protection
 - Economic Growth Commission
 - Governor's Office

- Regional
 - Class I and II Railroads
 - Port Authority
 - Regional Planning Commission
 - Metropolitan Transportation Planning Organization
 - Municipal Economic Development Corporation
 - Harbor Shipping Association
 - City and County Government
 - Local Environmental Advocacy Groups

Figure 1. Stakeholder Involvement Plan for Regional Freight Access and Infrastructure Evaluation





Transportation Needs Analysis

- Transportation System Status
- Planning Studies
 - Commodity Flows Study
 - Rail Capacity Modeling
 - Travel Demand Modeling
 - Traffic Operations Simulation
 - Origin-Destination Studies
- Consider regional throughput
- Simultaneous “What-if” and Benefit/Cost modeling



Land Use Analysis

- Port support needs:
 - Container and chassis storage
 - Rail yards
 - Port support activities (forwarders, customs, etc)
 - Warehousing, logistics and distribution centers
 - Truck rest stops/trucker support
- Survey potential growth areas using
 - Geographical Information Systems (GIS)
 - Aerial photography,
 - Interviews with industry leaders and associations.
- Alternative expansion plans
- Preference toward brownfield development



Innovative Strategies

- Infrastructure improvements:
 - Near-dock rail yards
 - Port exclusive access roads and ramps
 - Limited weight upgrades along most utilized routes
 - Domestic shipping and PIDN
- Institutional changes:
 - Shared on-dock and near-dock rail agreements
 - Increased modal splits
 - Domestic shipping and PIDN
 - Terminal sharing
 - Chassis pools
 - Off peak terminal and warehouse access



Technological Tools

- Evaluate new technology
 - Radio Frequency Identification
 - “Smart” highways and roadways near Port
 - Advanced traveler information/transportation management systems ATIS/ATMS
 - Travel time displays, parking coordination
 - Reverse 911 Emergency Notification call system
 - Congestion Pricing
 - Commercial Vehicle 511 information system
 - Truck Fleet Communications and Data Collection
 - Goods Movement Scheduling System
 - Vehicle In-Motion Monitoring
 - Electronic terminal gates



Greening Freight

- Being a good neighbor is not just a slogan anymore, it's a necessity. The Team will evaluate environmental initiatives that if implemented will produce a lower environmental footprint
 - Emissions reduction program
 - Public access and viewing portals
 - Harbor and port education program
 - Noise and light reduction program
 - Equipment electrification, alternative fuels and solar power



Environmental Analysis

- A programmatic environmental analysis
- Environmental review and design may be iterative
- Environmental impacts
 - Sediment, soil, air and water quality
 - Contaminated sites
 - Sensitive areas
 - Threatened and endangered species
 - Point and non point pollution sources
 - Dredged material management issues
- Community impacts
 - Historical and cultural resources
 - Minority and disadvantaged communities
 - Traffic congestion
 - Noise and air quality



Freight Resiliency and Port Security

- A Freight Security Plan will be developed
- Modeling and exercises will identify
 - Critical Infrastructure
 - Threats and Vulnerabilities
 - Emergency Services
 - Evacuation Planning
 - Short and Long term Recovery



Schedule, Cost and Funding

- Economic analysis; including project cost/benefit and host community impact analysis (costs/benefits/mitigation).
 - Analyze innovative funding opportunities such as container fees, fuels tax, public/private partnerships
-
- Total study cost: \$4-5 million
 - Schedule: 3-4 years to complete
 - Initial Phase: Regional freight transportation analysis in 1 year for \$500,000



Public Outreach Plan

- Establish a Citizens Advisory Committee as part of the workgroup structure
- Conduct several outreach sessions in key communities during evening hours to solicit general public input at key stages in process
- A website (www.portaccess2014.com)

Questions?



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