

# Long Term Implementation of the M-580 Marine Highway

## 1. Contact Information:

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## 2. Project Title:

Full Implementation of the M-580 Marine Highway

## 3. Location:

- a.) Port of Stockton, Stockton, 2201 W. Washington St. Stockton CA. Served by SR 4 (PM 15.800 and PM T15.318) and I-5 (PM 25.496/PM 25.878)
- b.) Port of Oakland, 530 Water Street, Oakland CA. Served by I-80 and I-880<sup>1</sup>

## 4. Project Summary:

The Port of Stockton undertook a recent pilot project to determine if a permanent shift in container traffic away from truck transport to marine transport between the Port of Oakland and the Port of Stockton (Port) was feasible. Their initial capitalization was funded through a TIGER Grant. Although the M-580 operated during a period of fourteen months, the project realized reductions in truck volumes and criteria air pollutants associated with their operation. The lack of sufficient capitalization and coordination resulted in suspension of the project in 2014. Employing information obtained from the lessons learned report issued from the granting agency, it is proposed to provide an initial three to five days a week service (depending on demand, with future expansion to five days a week service) rather than a once weekly service to facilitate and enhance reductions in truck traffic (up to approximately 5 per cent) on the I-580 and the I-5, with affiliated reductions in criteria air pollutants. Establishment of a reliable container service to the Port furthers economic and industrial development in Port and City of Stockton light industrial precincts that are likely to reduce work commutes to the Bay area by skilled and semi-skilled labor.

## 5. How Project may address goals of CSFAP:

The Marine Highway (M)-580 provides an adjustment to the freight transportation infrastructure of Northern California. M-580 creates a water transportation corridor between the Port of Oakland and

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<sup>1</sup> Both Ports are partners in the project, although Port of Stockton is considered for this proposal the lead agency.

the Port of Stockton with overseas containers moved by barge. With reduced truck travel, the projects anticipates reduced VMT and congestion in the I-580 corridor, and for criteria air pollutant emissions. The availability of land for the stockpiling of empty containers and chassis at the Port of Stockton permits scheduling of truck trips to or from the Port outside periods of peak traffic use on I-5 and State Route (SR) 4 and independent of the arrival or departure of barges. Increased container traffic at the the Port of Stockton will permit the establishment and development of a local transloading industry, offering full employment (rather than seasonal) of the region's work force. With secure long term full time employment, fewer workers may seek employment outside the region, and based upon further local and regional establishment of affiliated industries and services might further reduce interregional work commutes from region.

## **6. Costs and Funding Commitments:**

The proposed project estimates a funding expenditure of \$85,000,000. No source for this funding has currently been identified.

The proposal assumes expenditures towards operational costs. The goal for the Port is to see a pricing structure consistent with the cost to load and transport a barge at 80% capacity with an additional 7% to 10% of that cost added on to cover maintenance and overhead. It may be stipulated that any profits over this be revenues to repay the grant.

The State's interest is in reduced congestion, improved travel times, and improved air quality that may result from implementation.

Local interests will rely upon development and establishment of new and present transportation based industries in the region.

At this time, no operational or capacity increasing improvements are foreseen for the supporting highway infrastructure at the Port of Stockton. At implementation, it is proposed to provide three barge circuits per week<sup>2</sup> expanding to five at the completion of the project. Three phases are anticipated:

### **Phase I, Start Up:**

The initial startup period (estimated at one and a half years) is anticipated as the most costly with expenditures near \$3M/month tapering over time to \$0.5 M/month by the end of phase (\$30M total). This will likely include outlay for a zero emissions tug boat to operate under Port authority (\$8M) .

### **Phase II, Full Implementation:**

Depending on market demand, this may require three years with a monthly expenditure of 0.75M/month (\$27M total) to establish a five to seven day per week service at the Port.

### **Phase III Service stabilization.**

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<sup>2</sup> The assumption is that the two barges will operate in tandem, traveling in opposite directions, with each making three trips per week, with increasing demand expansion of the number of trips will be needed.

Market uncertainty may affect the long term prospects of the service. A key factor appears that barge costs are largely the product of wage structures which are largely stable, while trucking costs are based upon fuel prices and travel time which are volatile. As long as fuel costs are high, and wait times at the Port of Oakland unpredictable, the barge service will win out. In the case of opposite conditions, where market forces result in cheap fuel prices and reduced container traffic to California, expenditure to keep the service operating may be needed. (\$20M)

At this point there are no local funding commitments by the Port of Stockton.

## **7. Timeline:**

Effort will begin after completion of the West SR 4 extension and the Navy Drive Improvements projects. Estimate time of completion is for 2017.

2016-2017, An RFP should be circulated by the Port of Stockton to select the private operator of the service, develop an oversight committee. The period before service initiation should include negotiation with the local union (ILUW) and outreach to the trucking industry informing them of the service and costs. Contracts with various services should be executed before 2018

2018—2020, start up with thrice weekly service.

2020—2023, expansion to five to seven day a week service

2023 to 2027 phasing out of cost support with the Port of Stockton directly handling container operations. Excess profits are paid back to refund the original monetary outlay.

2027 on, the M-580 is a cost contained freight service operated and maintained by the Port of Stockton at no more State or public expense.

## **8. Performance Measures:**

There are several performance measures to assess the success of the project. The first would be the ratio of containers arriving at the Port compared to the number arriving at Oakland (a second one, would be to consider tonnage given there may be containers in excess of the 40 Ton maximum for truck freight). The second would involve real time tracking through Caltrans Performance Measurement System specifically for five axle truck volumes at specific locations on I-580, I-205, I-5 and SR 4.

## **9. Partner Roles and Responsibilities:**

These have not been fully negotiated:

Port of Stockton will be lead agency. Will provide the infrastructure necessary to permit the movement of containers between the two ports, will be responsible for the maintenance and upkeep of the infrastructure. Will be responsible for RFP, and service provider for the contract.

Port of Oakland will be a partner agency, with the potential to incur costs toward the project.

Caltrans will provide the contracting and funding oversight for the project.

Agencies involved with the California Sustainable Freight Action Plan include:

- California State Transportation Agency (CalSTA)
- California Environmental Protection Agency (CalEPA)
- California Natural Resources Agency

The departments involved in the Sustainable Freight Action Plan include:

- California Department of Transportation (Caltrans)
- California Air Resources Board (ARB)
- California Energy Commission (CEC)
- Governor's Office of Business and Economic Development (Go-Bizz)

## **10. Further background**

[Original draft proposal]

District 10 considers the M-580 marine highway an important sustainable freight endeavor. The M-580 provides opportunities to realize sustainable local, regional, State, and international freight benefits. It has the potential to partially alleviate long distance work commutes in District 10, it provides reduced congestion and provided air quality benefits to the Bay Area as well as having reduced congestion at the Port of Oakland; it has the potential to reduce transfers of goods from the Ports of Los Angeles and Long Beach into the northern portion of the State. It provides a long term means to facilitate the movement of empty containers back out to East Asian export ports. It may even help reduce the number of international trips by cargo vessels into California ports.

Although the M-580 project was suspended recently due to operational issues, the Department considers the effort a qualified success. Barge service moving containers between the Port of Oakland and the Port of Stockton operated for a period of little more than a year (June 2013 to August 2014), and experienced cost overruns of approximately \$1 million per month before being transitioned from a weekly service to an “as needed” service by the Port of Stockton. At that time it was reported that during active operation the service provided 116 barge trips, which moved 7,259 containers, likely eliminated 24,629 truck trips.<sup>3</sup> With the reduction of truck trips came a proportionally equivalent reduction in criteria air pollutants.

Given sufficient time, with continued growth in the pilot project truck volume reductions greater than 0.1 percent on I-580 might have been realized. At full capacity, the pilot project would have in all likelihood provided a ceiling of 3 to 5 percent truck traffic reduction before additional barges might have

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<sup>3</sup> *The Maritime Executive* “Port of Stockton Transitions M-580 Marine Highway” August 11, 2014  
<http://maritime-executive.com/pressrelease/Port-of-Stockton-Transitions-M580-Marine-Highway-2014-08-11>

to come into service. Two constraints exist for expansion of the barge service--the number of truck trips generated from the Port of Stockton conforming to the existing Traffic Demand Model; and the ability of state highway system infrastructure to handle the increased truck traffic.

Further advance of the M-580 into a going concern should be considered in the light of Port of Stockton operations, and the local economy. Historically, the Port of Stockton is dedicated to the transfer of bulk materials by ship, and is a relatively new operator in the area of container shipping. The Port of Stockton maintains that it attained an efficient rate of container transfer of approximately eight to ten containers per hour, which translates into a four to five hour period required to load or off load containers from the barges. Barge trips between Port of Oakland and Port of Stockton generally take eight hours, with an assumed similar time period (possibly shorter) for off and on loading at Port of Oakland. The thirty two hour circuit for the barges might limit the availability of POS for truckers, given the regular shift work (e.g. a barge arriving from Port of Oakland may have to wait until the next day to be unladen). The availability of space at the Port of Stockton permits storage which with time permits a schedule for truck access similar to the Port of Oakland (Monday through Friday). With time and investment, the situation may require additional work shifts and barges.

The M-580 pilot study estimates that it created 45 new maritime terminal jobs, however it is unclear whether these jobs were full time, part time, or seasonal. It would be highly desirable to create full time employment at the Port of Stockton with the re-implementation and possible expansion of the M-580. Most of this employment would involve workers in the manufacturing (skilled labor) sector, an employment sector more highly represented in District 10 compared to the State, with a full 19% of residents employed in that sector commuting to work outside of the District. Indirectly, the employment opportunities at the POS could indirectly reduce travel into the Bay Area.

It is estimated that 10 per cent of truck traffic on I-580 has the Port of Oakland as a destination or origin.<sup>4</sup> The barges had the capability of moving 750 containers in a week, and the Port records show that 7,259 containers were transported within the fourteen months of operation. This comes to an average of 517.5 containers moved in a month, or a daily reduction of truck trips on I-580 of ~18 trucks a day, or a 0.004 percent reduction. Through time, the number of containers transported increased, and it may be assumed with sufficient time and investment barge trips may have been made near full capacity (80 percent). Under the current configuration of one round trip a week, the barges have the capability of moving 3,209 containers per month, or a daily reduction of trucks on I-580 of 112 or a reduction of 0.024%.<sup>5</sup>

For a 5 percent overall reduction in truck traffic<sup>6</sup> on I-580 of 637 trucks, it is estimated 230,000 containers be transported in a year by barge. This would require a five day a week barge service transporting approximately 540 containers each round trip. Currently, the Port projects vehicular traffic

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<sup>4</sup> It was estimated that the AADTT for I-580 between I-205 and SR 238 was 12,730 trucks of which 75% were five axle.

<sup>5</sup> The Port of Stockton estimates a ratio of approximately 3.6 truck trips for each container transported by barge. Because I-580 acts as a specific segment in the trip assignment, the conservative ratio is assumed to be 1.0 truck trips for each container transported by barge.

<sup>6</sup> The 5% reduction target is offered only as an upper limit threshold consistent with the current M-580 with two barges, and reflects the largest estimated reduction possible. Higher reduction is possible through expansion of the barge fleet, the number of cranes, and the number of work shifts.

growth to increase from 2,704 daily trips to 54,023 by 2020.<sup>7</sup> This increase was developed based upon estimation of Port growth and development for handling bulk cargos rather than containers. Assuming a one truck trip to one container ratio, implementation of a five day a week program would not adversely affect this growth projection (assuming two truck trips for each container delivery).

Current congestion at the Port of Oakland has grown so dire that importers consider employing the Ports of Los Angeles and Long Beach and trucking containers north into the Bay and Central Valley, and moving empty containers out through the Southland.<sup>8</sup> There are no values attached to what percentage of the container cargo destined for Northern California has been diverged, but it should be assumed that with implementation of the M-580 there may be no immediate reduction in truck traffic on I-580, although Port of Oakland congestion would show reduction.

The M-580 barge service operated for fourteen months as a pilot project. Its purpose was to barge containers between the Port of Oakland and the Port of Stockton, in order to shift truck movement away from I-205, I-580, I-238, I-880, and I-890 corridors. At the time of its development, congestion at the Port of Oakland truck terminal had not fully deteriorated to the degree it is now, which back then allowed truck operators to out compete the barge service by being capable of achieving three or greater truck trips per day. Once the Port of Stockton ceased operations on September 1, 2014 conditions worsened at Oakland. Currently, completion of a single truck trip is closer to the norm. This has led international shippers to deliver containers for the Bay Area and San Joaquin Valley through Los Angeles and Long Beach Harbors, and truck them northwards from there.

One advance on the Port's original pilot project is the need for a zero emissions tug boat. The use of near zero emission tugboats will further the M-580 corridor project's ability to meet the objectives of the California Sustainable Freight Action Plan. With verbal reports on the lack of cost containment for tug services, the desired outcome is to include this as a capital purchase. If not, a near zero emission tugboat service provider should be contracted with at outset (2018); however, if there is not a one immediately available, then the Port of Stockton should contract with an existing tugboat provider, with the clear intention to replace service with near zero emission tugboats when possible. Caltrans, the Air Resources Board, the California Energy Commission, and other potential financial supporters should partner with the Port to explore options for deploying near zero emission tug boats if need be.

One opportunity missed by the Port of Stockton was the opportunity to develop a transloading operation at the port. Ideally, overweight containers would be shipped from overseas, brought into the port, the container drayed from the berth to transloading operation on port precincts, the goods trans-loaded onto trucks, and carried to their final destination. This proposal is highly dependent upon POS marketing strategies, and could make up a significant portion of the freight barged from POO as that port lacks the space and infrastructure to accommodate that particular logistic management.

A principal weakness in the original proposal was the Port of Stockton's underestimate of costs associated with the movement of containers from the Port of Oakland. This is reflected in the recommendation from the MARAD's lessons learned (Appendix A):

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<sup>7</sup> Port of Stockton West Complex Development Plan EIR and Transportation Impact Assessment (p. D-8)

<sup>8</sup> Margaronis, S. "Is Oakland's loss Southern California's gain?", *American Journal of Transportation* 9/21-10/4/2015 pp. 11-12.

**Make your biggest cost driver a partner**—It is widely known that terminal handling costs are the biggest cost factor of most marine highway services that call at major terminals, therefore negotiations with terminal operators and labor should be conducted well before any major funds are expended on capital infrastructure or equipment. Where Marine Highways have been successful elsewhere, it's in large part due to good, open and honest negotiations with the union, sharing the cost model, the margin you need to make it work, the price and volume you to be competitive, and most importantly, the cost and productivity targets you need from them to make it work. Further, there have to be incentives built into the agreements that reward vendors for finding costs savings and efficiencies.<sup>9</sup>

With the initial volumes of containers transported, the cost to barge was \$1,200 compared to \$600 to \$700 to truck. Cost overruns appear to have originated in part from not having taken into consideration the \$20,000 berthing cost. This cost exists regardless of the number of containers transferred, and is incurred at both ends of a barge trip.

One of the issues pointed out in discussion was the difference in height and draft of the barges and ocean going container ships. This incompatibility results in the need for two crane movements, one to off load, the other to onload. With the Port of Oakland having two shallow water berths that cannot be employed by ocean going transports, few time constraints are likely to exist for the berthing of the barges for loading. Timing for when the barges are loaded compared to other modes of transport becomes the rate determining step for delivery, and is likely the largest time constraint.

It further needs stressing that as an effort towards sustainability, the economic model for the Marine Highway should be one that stresses cooperation over competition. For purposes of sustainability, the goal is to reduce the amount of fuel employed by trucking firms providing 'door to door' delivery service. What needs to be offered in return is reliability, efficiency, and thus an outcome that enhances their opportunity to realize a profit. This requires preliminary outreach to the trucking industry to assess how favorably they might support such a change in the cargo distribution system, anticipating that a primary driver would be distance to travel from either Oakland or Stockton, and willingness to share contract information, or to subcontract to other trucking firms with better proximity.

Such considerations need to also be extended to unions, especially with the growth of work opportunities for workers at the Port of Stockton.

“One strategy to provide alternative means of connectivity in order to handle future growth in interregional freight is to provide additional rail and waterway connections to relieve some of the pressure on congested highway corridors. The marine highway (M-580) that is already under operation is a regular barge service for containerized cargo, providing increased connectivity between the Port of Oakland and the Port of Stockton. Projects such as the marine highway and short-haul rail services can create important system redundancy and resiliency, along with diverting truck traffic off of especially congested interregional corridors. Past studies of these types of projects have concluded that they often do not generate sufficient rate of return (primarily because of the costs of additional handling as

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Factors for Marine Highway Success, MARAD three page summary document from “lessons learned evaluation, no date, provided by e-mail

cargo changes modes) to attract private investors without some government subsidies. Continuing reevaluation of these alternative modal services should be conducted as costs of congestion, air quality issues, or costs of fuel rise to a level that could justify the projects on the basis of their potential public benefits.” (*San Francisco Bay Area Freight Mobility Study* p.6-13)

The future number of both ship arrivals and truck trips generated at the Port are encompassed in the Port of Stockton West Complex Development Plan (State Clearinghouse Number 2002032048). An Environmental Impact Report (EIR) completed in 2005, without a Statement of Overriding Considerations, and including mitigation measures, including a truck plan. The plan included development of a biofuels plant and a truck distribution center, as well as a general development plan for the former naval base, Rough and Ready Island.

The EIR was revised to meet federal standards as an Environmental Impact Statement for the Tiger Grant. Administered by MARAD, the Tiger Grant provided funding for mobile cranes and landside modifications while the Port of Stockton funded the two barges.

Implementing and sustaining the M-580 marine highway can attain goals—reduction of truck traffic on I-580, reduction of congestion at the entrance to the Port of Oakland, along with maximization of cargo volumes on marine vessels. All three efforts can assist in reduction of emissions that impact air quality as well as greenhouse gases.

## **Factors for Marine Highway Success**

### **Introduction**

The following factors for marine highway service development success were gathered through interviews with various stakeholders that were either customers of or vendors to the M-580 Marine Highway Service. They included four shippers (both import and export), SSA Marine which runs Oakland International Container Terminal, Ports America which runs Outer Harbor Terminal, SSA Marine in Stockton, Brusco Tug and Barge, San Joaquin Council of Governments, CalTrans, U.S. Customs and Border Protection in Oakland, the Port of Stockton, and the Port of Oakland. MARAD gathered and shares these factors as a service to the industry; the factors do not create a regulatory requirement.

### **Factors – Partnerships, People, Process, and Product**

**Partnerships – It really does take a village** – One of the most important factors in any venture is establishing a good foundation built on solid partnerships, shared ownership in the loose sense, and cooperation.

- **The Public has to be a partner** – There has to be real “buy-in” from the broad range of public agencies that can benefit from the savings that marine highway services provide such as road maintenance and congestion, air emissions, and new transportation options. Public support can take many forms including tax incentives, capital infrastructure support, and operating support.
- **Make your biggest cost driver a partner** – It is widely known that terminal handling costs are the biggest cost factor of most marine highway services that call at major terminals, therefore negotiations with terminal operators and labor should be conducted well before any major funds are expended on capital infrastructure or equipment. Where Marine Highways have been successful elsewhere, it’s in large part due to good, open and honest negotiations with the union, sharing the cost model, the margin you need to make it work, the price and volume you need to be competitive, and most importantly, the cost and productivity targets you need from them to make it work. Further, there have to be incentives built into the agreements that reward vendors for finding costs savings and efficiencies.

**People – The Customer is King** – In any business, it’s important to know your customer, have a clear understanding of their business and their needs, and then build your business model to serve their interests, hopefully in a profitable manner.

- **Have a marketing plan** – The operator must sell the service, meet with customers to discuss their business and their supply chain needs, and how the marine highway service can help make them more competitive. Most importantly, make it easy for the customer to use. Also, relying on other transportation providers to sell your service generally adds cost to the customer, making your service less attractive or competitive.
- **A guaranteed revenue stream is a good thing** – Many shippers are willing to sign a weekly guarantee of bookings, if the service is on a regular, reliable, predictable fixed schedule. This provides the shipper with guaranteed access to markets in the lane being serviced by the marine highway, while also providing the operator with a guaranteed steady revenue stream.

**Process – Productivity Matters** – One of the biggest impediments to marine highway services are the additional container handling moves involved in the marine highway link of a supply chain. As productivity or lack thereof, drives up cost, it becomes a major factor in the success or failure of new services. New service providers and operators need to be hyper-focused on costs and productivity, looking for any way to reduce costs and find efficiencies.

- **Use the right equipment** – You can have efficiency or versatility but it's difficult to achieve both. Many ports in recent years have focused on purchasing Mobile Harbor Cranes and while they were versatile, they were not efficient for loading containers using certain processes. Because of a combination of the single point hoist, the framework on the barge, and landing the container on a hustler cart, the productivity of each crane can average between 8 and 15 moves an hour whereas a standard gantry crane averages between 25 and 30 moves an hour.

Scalability and versatility are also key in the floating equipment utilized for a marine highway service. Generally, when operating on an inland waterway or river, a standard inland push boat may be more economical than a larger ocean tug. Further, standard hopper barges that can be easily and inexpensively retrofitted to handle containers can also handle many other types of cargoes including bulk and break-bulk. If you're moving air, you're doing something wrong.

**Find efficiencies, reduce cost, and reduce waste** – Be obsessive about productivity and cost. Constantly analyze cargo handling operations, equipment utilization, and cargo volume. The Port of Richmond using a standard crawler construction crane averages between 20 and 25 moves per hour. They are able to achieve this by landing the container on the ground and then using a top lift to place the container on a chassis, rather than trying to line up the container on a chassis with the crane. Containers should be handled as few times as possible to keep costs low. Further, there must be an organizational structure and application of technology to reduce gate

delays, misplaced containers, and improve visibility of freight for customers. Most importantly, though, there has to be centralized control and visibility over both the costs and revenue of the operation as well as monitoring performance.

**Product – Know your competition** – One of the biggest challenges for marine highway services is the fact that a trucker can provide the customer any ocean carrier box (Evergreen, Maersk, Matson, APL, etc), from any terminal, within a few hours' notice, direct to their door on a round trip basis. Marine highway services, however, are limited to providing boxes only to those ocean carriers that participate or utilize the terminals that the marine highway service calls upon. To mitigate the one-way barge rate compared with the round trip truck rate, the operator should consider initially offering to reposition empty containers free of charge. Because of the additional costs, however, the operator must work with the sales staff of each ocean carrier to achieve a 50/50 match of inbound and outbound freight for each carrier. Additionally, marine highway operators must understand the total supply chain market that they connect with. The big incentive to using marine highway services, which is the ability to maximize the weight capacity of the container, turns out to be less of an incentive to export shippers where the export ocean freight market is extremely inexpensive. In certain markets, the ocean freight covering thousands of miles can be actually less than the domestic leg covering less than a hundred.

## Apenndix B: Application