

Volume II of III

Draft Environmental Impact Report Appendices Tenth Avenue Marine Terminal Redevelopment Plan and Demolition and Initial Rail Component



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June 2016

(UPD# EIR-2015-39 SCH# 2015-031046)

DRAFT

**ENVIRONMENTAL IMPACT REPORT
TENTH AVENUE MARINE TERMINAL
REDEVELOPMENT PLAN AND
DEMOLITION AND INITIAL RAIL COMPONENT**

VOLUME II: APPENDICES A THROUGH I

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Appendix A
Initial Study, Environmental Checklist, and Notice of
Preparation



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**NOTICE OF PREPARATION
of a
DRAFT ENVIRONMENTAL IMPACT REPORT**

PROJECT TITLE: TENTH AVENUE MARINE TERMINAL REDEVELOPMENT PLAN
(UPD #EIR-2015-39)

APPLICANT: San Diego Unified Port District

LOCATION: 687 Switzer Street, City of San Diego, 92101, in San Diego County, CA

REFERENCE: California Code of Regulations, Title 14, Sections 15082(a), 15103, 15375.

The San Diego Unified Port District (District) will be the Lead Agency in preparing an Environmental Impact Report (EIR) for the project (Proposed Project or Project) identified above. The District is soliciting input and feedback from various agencies, stakeholders, and the public pertaining to the scope and content of the environmental information that will be included in the EIR. For certain agencies, this may be germane to statutory responsibilities in connection with the Proposed Project. An agency may need to use the Proposed Project's EIR when considering its permit or other approval for the Project. The Project description, location, and possible environmental effects of the Proposed Project are contained in the attached materials.

Due to the time limits mandated by state law, your comments must be sent at the earliest possible date but no later than 30 days after receiving this notice. **Comments regarding environmental concerns will be accepted until 5:00 p.m. on Tuesday, April 14, 2015**, and should be mailed to: San Diego Unified Port District, Environmental & Land Use Management Department, 3165 Pacific Highway, San Diego, CA 92101 or emailed to: lhofreiter@portofsandiego.org.

A public scoping meeting regarding the proposed EIR will be held on Wednesday, March 18, 2015 at 5:30 p.m. at the San Diego Unified Port District Administration Building, Training Room, 3165 Pacific Highway, San Diego, CA 92101.

For questions on this Notice of Preparation, please contact Larry Hofreiter, Senior Redevelopment Planner, at 619-686-6257.

Signature: _____

Jason H. Giffen

Director, Environmental & Land Use Management

Date: MARCH 6, 2015

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**NOTICE OF PREPARATION
of a
DRAFT ENVIRONMENTAL IMPACT REPORT
for the
TENTH AVENUE MARINE TERMINAL REDEVELOPMENT PLAN
(UPD #EIR-2015-39)**

Publication of this Notice of Preparation (NOP) initiates the San Diego Unified Port District's (District's) compliance with the California Environmental Quality Act (CEQA) for the proposed project. The NOP is the first step in the Environmental Impact Report (EIR) process. It describes the proposed project and is distributed to responsible agencies, trustee agencies, cooperating federal agencies, and the general public. As stated in CEQA Guidelines, Section 15375, the purpose of the NOP is "to solicit guidance from those agencies as to the scope and content of the environmental information to be included in the EIR." The District is the CEQA lead agency and District's Maritime Division is the project applicant.

PROJECT SUMMARY

The Tenth Avenue Marine Terminal (hereafter "Terminal" or "TAMT" or "project site") Redevelopment Plan (hereafter "Redevelopment Plan" or "Plan") would replace an existing 2008 Maritime Business Plan (hereafter "2008 Plan") to meet current and future market conditions at the terminal. Depending on market opportunities, some improvements identified in the Plan may occur within a 5- to 10-year (Year 2025) planning horizon, whereas others may not occur until the 10- to 20-year (Year 2035) planning horizon. The proposed Plan includes a variety of infrastructure investments and improvements that may be undertaken over the long-term to accommodate a need to increase the terminal's capabilities and capacity. These include up to five gantry cranes, additional and consolidated dry bulk storage capacity, enhancements to the existing conveyor system, demolition of the molasses tanks and Warehouse C, additional open storage space, and on-dock intermodal rail facilities. One component of the project would be analyzed at the project-level. This component, referred to as the Demolition and Initial Rail Component, would demolish Transit Sheds #1 and #2, relocate an existing dry bulk tenant from Transit Shed #2 to the consolidated dry bulk facility, provide on-terminal rail upgrades, add a modular office with restroom facilities to replace the office that would be demolished as part of Transit Shed #2.

PROJECT LOCATION

The 96-acre TAMT site is located at 687 Switzer Street in San Diego, CA 92101. It is located along San Diego Bay, south of downtown San Diego, east of the San Diego Convention Center and Hilton Bayfront Hotel, and west adjacent to the San Diego community of Barrio Logan. Harbor Drive is located near the northern boundary of the TAMT. Site access from Harbor Drive is provided at two locations:

- Primary: from Cesar E. Chavez Parkway; this becomes Crosby Road as it approaches the terminal.

- Secondary: at the southern end of the Hilton hotel parking facility, adjacent to the backlands of the Dole container facility.

Major circulation facilities in the area include State Route 75, also known as the Coronado Bridge, located approximately 0.25 mile to the south, and Interstate 5, located about 0.5 mile to the north. Figure 1 shows the location of the project site.

BACKGROUND

The San Diego Unified Port District's (hereafter "District") 2012–2017 COMPASS Strategic Plan establishes the goal of providing a "thriving and modern maritime seaport." The District has two cargo terminals: The TAMT and the National City Marine Terminal (hereafter "NCMT"). The NCMT is managed under a long-term operating agreement with District tenant Pasha Automotive Services, while the TAMT is managed with multiple tenant leaseholds and open/covered terminal spaces for handling diverse cargos.

The District's maritime strategy is currently guided by the 2008 Plan. The 2008 Plan, which used economic and market data collected during 2006 and 2007 and covered marketing activities at both the TAMT and NCMT, was to be used to present a "vision for maritime activity through 2030." However, because of the dynamic nature of cargo markets, as well as the impact of the Great Recession of 2008 and 2009, the 2008 Plan no longer reflects existing and future market conditions for the cargos that the TAMT is ideally positioned to handle. District staff has determined that an update of the business plan for the TAMT, as well as planning for the redevelopment/infrastructure to implement the update, is appropriate. Accordingly, in June 2013, the District embarked on drafting the Plan.

PROJECT DESCRIPTION

The proposed project is the Redevelopment Plan, which includes the near-term implementation of the Demolition and Rail Infrastructure Component of the Plan. Both the proposed Plan and the Demolition and Rail Infrastructure Component are described in further detail below.

Proposed Plan

The proposed Plan would establish the following nodes and infrastructure improvements:

- Dry Bulk: The dry bulk node would be located in the general area of the southeastern portion of the terminal, also referred to as terminal "backlands." This node would be served by Berth 10-5/10-6 and Berth 10-7/10-8. Infrastructure improvements would include adding a consolidated dry bulk discharge facility, upgrades to the existing bulk cargo handling and conveyor system, and new semi-permanent storage facilities for dry bulk products.
- Liquid Bulk: The liquid bulk node and associated terminal infrastructure would be acknowledged by the proposed Plan, but no changes in location, capacity or infrastructure improvements are proposed. Preferred berths would be 10-1/10-2.
- Refrigerated Container: The refrigerated container node would be located on the northern portion of the terminal and served by Berths 10-3/10-4, and overflow would be handled at Berths 10-5/10-6. The boundary between the refrigerated container node and the multi-purpose general cargo node would be imprecise by design. This open area would allow the terminal to be used for the handling of diverse cargos as market conditions and vessel schedules permit. As such, construction of the refrigerated container node and Neo bulk /

Break Bulk / Multi-purpose General Cargo node would happen simultaneously. Infrastructure improvements would include one 100-foot mobile harbor crane at Berths 10-1/10-2 and up to three 100-foot electrical cranes at Berths 10-3/10-4 including associated electrical utility improvements to operate the cranes.

- Neo Bulk / Break Bulk / Multi-purpose General Cargo: The Neo bulk / Break bulk / Multi-purpose General Cargo node would include an intermodal rail facility and would be located on the southern portion of the terminal in the area that is currently occupied by the eastern portion of Warehouse C and it would share Berths 10-3/10-4 and 10-5/10-6 with the refrigerated container node. Similar to the refrigerated container node, the boundary would be imprecise by design. This open area would allow the terminal to be used for the handling of diverse cargos as market conditions and vessel schedules permit. As such, construction of the refrigerated container and multi-purpose nodes would happen simultaneously. Infrastructure improvements include two gantry cranes at Berths 10-5/10-6 as well as various intermodal yard and backland improvements. Intermodal yard and backland improvements could include a bridge crane, full wheel container module with gantry cranes, rubber tired cranes for load-on and load off, straddle carrier (stacked for the intermodal facility), additional paving to 600-per-square-foot live load and container handling equipment to handle 100kip wheel live load. Improvements would include upgrades to shore-side power capabilities to provide shore power to two vessels at the same time
- Central Gate Facility: The Central gate facility is the fifth redevelopment node contemplated by the proposed Plan. It would create a common gate facility, with a new truck weigh station, in the general location of the existing gate. It would be utilized by all terminal tenants and customers.

The TAMT Redevelopment plan also includes two additional conceptual options that will not be analyzed as part of this PEIR. They are:

- Full Refrigerated and Dry Container Build-Out: with an estimated total MPC of 5.8 million MT of container cargo, and
- Full Dry Container Build-Out: with an estimated total MPC of 6.0 million MT of container cargo.

Both of these development concepts exclude Neo Bulk and/ Break Bulk cargo from consideration, resulting in zero volume for these commodity types. However, the District has a longstanding commitment to handling neo bulk, break bulk and roll-on/roll-off cargos. Additionally, the additional metric tonnage potential for a full- container scenario is not significant to justify the exclusion of non-containerized commodities. Finally, the market for container vessels suitable to TAMT is clearly defined; focusing exclusively on a few carriers would represent a departure from an established and successful business development strategy. For these reasons, it was determined that the PEIR would focus on the first three redevelopment concepts as the primary options for analysis.

Table 3-1 below compares the TAMT's existing environmental baseline condition by cargo type with the MPCs identified in the 2008 Plan and the proposed Redevelopment Plan. The TAMT's existing environmental baseline condition is based on actual throughput calculations from July 2013 to June 2014, with June 2014 being the point in time at which the environmental analysis was initiated. The 2008 Plan identifies a MPC scenario if no infrastructure improvements are made. By contrast, the

last column shows the increased capacity that may result from implementation of the proposed Redevelopment Plan.

Table 3-1. TAMT Cargo Throughput Comparisons in Metric Tons

	<u>Baseline Conditions</u> Actual Cargo Throughput in MT July 2013-June 2014	<u>TAMT Redevelopment Plan^a</u> 2035 Maximum Practical Capacities in MT	<u>TAMT Redevelopment Plan</u> 2035 Market Forecast in MT
Dry Bulk	289,864 ^b	2,650,000	2,146,645 ^c
Liquid Bulk	31,520	239,017	154,000 ^d
Refrigerated Containers	577,326	1,799,893 ^e	1,790,155
Neo- Bulk/Breakbulk	85,131 ^f	629,650 ^g	114,824
Total	983,841	5,318,560^h	4,205,624

Notes:

^a Construction of the infrastructure improvements identified in the Plan are required to attain the MPCs identified.

^b Vessels brought in approximately 158,205 metric tons of dry bulk, whereas dry bulk tenants trucked in approximately 131,659.57 metric tons of dry bulk.

^c For the purposes of the analysis, two additional dry bulk customers were assumed over existing tenant volume, which resulted in a forecast of approximately 2,146,645 MT. However, as noted in the previous column, the MPC indicates that additional dry bulk volume could be accommodated.

^d The Redevelopment Plan acknowledges the existing liquid bulk facility, however it does not suggest any operational or infrastructure changes to the facility. Current capacity is sufficient to handle market demand and operations at the MPC, and is projected to remain sufficient throughout the plan horizon

^e For ease of understanding, District staff calculated an average based on the three potential MPC's for the refrigerated container node, which may shift depending on the cargo mix handled at the adjacent Neo Bulk node. The 1,799,893 MT average is based on averaging three Refrigerated Container Cargo MPC figures: 2,288,000, 1,555,840 MT and 1,555,840 MT, which are based on different scenarios. Development Concept #1 assumes the terminal attains an MPC of 2,288,000 MT of refrigerated container cargo, which results in a 327,700 MT MPC for the Neo Bulk / Break Bulk node. Development Concept #2 assumes a MPC of 1,555,840 MT of refrigerated container cargo, which results in a 977,400 MT MPC for Neo Bulk / Break Bulk. Finally, Development Concept #3 assumes a MPC of 1,555,840 MT of refrigerated container cargo, which results in a MPC of 583,850 MT for Roll-on / Roll-off Neo Bulk cargo.

^f In addition to 33,666 metric tons of neo-bulk material, the TAMT also processed 51,465 metric revenue tons of other miscellaneous cargo, yielding a total of 85,131 metric tons.

^g . The total is an average of the three development concepts identified in the Redevelopment Plan, which looked at different cargo mixes pursued at this node. The 629,650 MT average is based on averaging the following three Neo Bulk MPC figures: 327,700 MT for special non-containerized break bulk cargo, 977,400 MT for dry container cargo and 583,850 MT for roll-on / roll-off cargo, including automobiles and other wheeled vehicles.

^h The total is an average of the three development concepts identified in the TAMT Redevelopment Plan, which looked at different cargo types for the Neo Bulk and Break Bulk node, as outlined above. Development Concept #1 results in 5,504,717 MT, Development Concept #2 results in 5,422,257 MT, and Development Concept #3 results in 5,028,707 MT.

For the purposes of the environmental analysis, the MPC identified in the three development concepts contained within the TAMT Redevelopment Plan will be compared to the environmental baseline conditions established by actual cargo throughput that occurred between July 2013 and June 2014. As noted earlier, the maximum throughput associated with each cargo type that could theoretically be accommodated once the TAMT Redevelopment Plan is fully implemented

represents the “worst case”¹ scenario. As such, the Plan identifies the TAMT’s total MPC to be between 5 million and 5.5 million metric tons, depending on the type and mix of cargo types.

Conversely, the Redevelopment Plan’s 2035 Forecast listed in the third column in Table 3-1 identifies a more realistic planning scenario based on discussions with current tenants, potential tenants, and knowledge of industry trends. The Plan’s 2035 Forecast is estimated to be approximately 4.2 million metric tons annually.

It is important to reiterate that the MPC’s identified in the three development concepts in the TAMT Redevelopment Plan would only be reached if its infrastructure improvements are constructed and if market conditions allow. The District determined that the environmental analysis should assume favorable market conditions because this approach would be the most conservative (i.e., all improvements would be constructed and MPC would be reached), and it would provide the District with the most flexibility with respect to pursuing future opportunities. The environmental document also analyzes potential environmental impacts associated with the construction and operation of the infrastructure improvements contemplated by the Plan.

Table 3-2 summarizes maximum practical throughput based on the maximum capacity by cargo type, as well as the infrastructure improvements and operational enhancements that would be needed to attain such throughput levels.

Table 3-2. Maximum Practical Cargo Throughput Capacity and Associated Infrastructure for the “Worst Case” Development Scenario

Node	Size	Maximum Practical Capacity in Metric Tons (MT)	Capital Investments and Infrastructure Upgrades
Dry Bulk	~ 15 acres	Up to 2,650,000	<ul style="list-style-type: none"> • Operate primarily at Berths 10-5/10-6 and 10-7/10-8 • Upgrade the existing conveyor system to handle multiple bulk commodities, such as cement, bauxite or soda ash. • Maintain approximately 5 acres of open-storage space between Water Street and Terminal Street. • Add a consolidated bulk discharge unloader using a 200 metric ton per hour vacuum for cementitious materials at Berth 10-7/10-8 (either a Kovaco, Siwertell or similar type system). • Demolish existing molasses tanks once new dry bulk storage has been established. • Relocate existing bulk tenants from Warehouse C and Transit Shed 2 to the consolidated dry bulk facility prior to Transit Shed and Warehouse C demolition. • Establish a consolidated Multipurpose Dry bulk facility with two cement terminals and construct new semi-permanent (e.g. a Rubb style of building (www.rubb.com) storage facility (up to a total of

¹ Note that “worst case” refers to the development concept, or scenario, that would have the greatest potential impact on the environment.

Table 3-2. Maximum Practical Cargo Throughput Capacity and Associated Infrastructure for the “Worst Case” Development Scenario

Node	Size	Maximum Practical Capacity in Metric Tons (MT)	Capital Investments and Infrastructure Upgrades
			<p>100,000 square feet) to store dry bulk products. The following options have been identified²:</p> <ul style="list-style-type: none"> ○ Six 9,000 MT silos at each terminal to store 54,000 MT of bulk cement. ○ Two domes at each terminal that would each store 54,000 MT of bulk cement. ○ Any combination of silos and domes to allow 108,000 MT of bulk cement storage capacity.
Liquid Bulk	~ 3 acres	239,017	<ul style="list-style-type: none"> • The proposed Plan does not identify any infrastructure improvements or facility upgrades for liquid bulk. The location and capacity would remain as it is today.
Refrigerated Container	~ 40 acres	<p>1,799,893^b</p> <p><u>Development Concept #1</u> 2,288,000 MT</p> <p><u>Development Concept #2</u> 1,555,840 MT</p> <p><u>Development Concept #3</u> 1,155,840</p>	<ul style="list-style-type: none"> • Operate primarily at Berths 10-1/10-2, 10-3/10-4, with overflow at 10-5/10-6. • Maintain a 200,000 square feet of cold storage facility (Warehouse B). • Two 100-foot gantry cranes at Berths 10-3 and 10-4.
Neo Bulk / Break Bulk / Multi-purpose General Cargo	~ 30 acres	<p>629,650^c</p> <p><u>Development Concept #1</u> 327,700 MT</p> <p><u>Development Concept #2</u> 977,400 MT</p> <p><u>Development Concept #3</u> 583,850 MT</p>	<ul style="list-style-type: none"> • Operate primarily at Berths 10-3/10-4, and share Berth 10-5/10-6 with refrigerated cargo node. • Install two to three gantry cranes at Berths 10-5/10-6. • Demolish Warehouse C. • Up to 20 acres of open storage space. • Upgrade shore-side power capabilities to provide shore power to two vessels at the same time. • Intermodal yard and backland improvements could include: <ul style="list-style-type: none"> ○ Bridge crane, ○ Full wheel container module with gantry cranes, ○ Rubber-tired cranes for load-on and load-off (LO/LO) ○ Straddle carrier (stacked) for intermodal facility, ○ Additional paving of backland area to handle 600-per-square-foot (psf) live load, and ○ Container handling equipment to handle 100 kipa^d wheel live load, ○ Generator and accompanying housing structure.
Central Gate Estimated Size	~ 8 acres	Not applicable	<ul style="list-style-type: none"> • New truck weigh station.

Table 3-2. Maximum Practical Cargo Throughput Capacity and Associated Infrastructure for the “Worst Case” Development Scenario

Node	Size	Maximum Practical Capacity in Metric Tons (MT)	Capital Investments and Infrastructure Upgrades
Total	96 acres	5,318,560^e <i>Development Concept #1</i> 5,504,717 MT <i>Development Concept #2</i> 5,422,257 MT <i>Development Concept #3</i> 5,028,707 MT	

Note:

^a Cement Report 2014 by Phillip Caldwell

^b This is an average based on the three cargo scenarios identified in the Plan. The amount of refrigerated container cargo that could be processed depends on the type of cargo processed in the Neo Bulk / Break Bulk node, as described below. The average was attained by adding the total metric tons for each development concept and dividing by three.

^c Neo Bulk / Break Bulk cargo that could be processed depends on the type of cargo that is ultimately pursued.

^d kip = a unit of weight equal to 1,000 pounds; used to express deadweight load.

^e This is an average based on the three development concepts in the plan.

Demolition and Initial Rail Components of the Plan

The Demolition and Initial Rail Component is anticipated to occur in 2016 or when funding becomes available and will take approximately 29 weeks to complete. Total earthwork would consist of excavating 19,350 cubic yards (cy) of soil in an area of 144,000 square feet (sf) for Transit Shed #1 and 21,333 cy in an area of 192,000 sf for transit shed #2. Total excavation would be 40,683 cy over an area of 336,000 sf. Of the 40,683 cy, approximately 12,443 cy would be exported off-site in accordance with the approved soils management plan, which may require disposal in an appropriate hazardous waste facility if the soils are determined to be contaminated. The remaining soil would be treated on-site and re-compacted at the site of the excavation.

Phasing would include demolition, grading, and paving. Construction equipment would include excavators, loaders, forklifts and scissor lifts, water trucks, dump trucks, backhoes, dozers, saw cutting equipment, and air compressors.

Employment during construction is anticipated to result in 128 direct jobs and 39 indirect jobs. In addition, it should induce approximately 65 jobs, for a total of 232 construction-related jobs. The Demolition and Initial Rail Component of the Plan would include the following project features:

- Relocation of an existing dry bulk terminal tenant, currently located in the southern half of Transit Shed #2. This tenant would remain on the terminal and is anticipated to be relocated to the consolidated dry bulk facility.
- Demolition of Transit Sheds #1 and #2, consisting of seven warehouse bays, restroom facilities, and office space, as identified in Figure 3-1. Transit Shed #1 includes 145,000 square feet of space, comprising Bays A, B, and C. Transit Shed #2 includes approximately

200,000 square feet of warehouse space, comprising Bays E, F, G, and H. Demolition would also involve the proper removal of any asbestos, lead, polychlorinated biphenyls (PCBs), or other potentially hazardous materials that may be present in the transit sheds, followed by removal of the existing fire and electrical systems. Once completed, soil excavation and grading would occur, followed by paving and leveling across the site. The existing 90-foot-tall light poles at the loading docks and around the transit shed perimeter would be replaced.

- On-terminal rail facility upgrades, which would include installation of a rail lubricator and a compressed air system on the existing track, thereby increasing safety and efficiency. Manual lubrication would be eliminated and replaced with automated lubrication to accommodate a sharp curve in the existing track. The compressed air system would include a compressed air generator with an accompanying housing structure, and piping to several rails within the terminal.
- A temporary modular office with restroom facilities. Underground water, sewer, and electrical utilities would be installed to support the proposed modular structures.
- An updated 100-year floodplain boundary that accurately depicts potential flooding hazards on the TAMT project site.

An increase in cargo throughput within the existing terminal footprint is an expected outcome of the Demolition and Initial Rail Component. Although the on-dock intermodal rail facility would enable cargo to move more efficiently between vessel and rail, which may offset some truck trips with rail trips, at least initially, the Demolition and Initial Rail is generally assumed to result in a net increase cargo throughput. As such, long-term employment is anticipated to increase by 290 direct jobs and 57 indirect jobs. In addition, it should induce another 112 jobs, for a total of 459. Once the existing underutilized infrastructure is removed, cargo nodes could be developed, as recommended by the proposed Plan, based on cargo type and market conditions. To ensure market conditions are favorable, the Plan does not recommend making any infrastructure improvements until the cargo node reaches 70% of the maximum practical capacity identified in the 2008 Plan.

Proposed Plan Demolition and Construction Actions

Table 3-3 below identifies each proposed component or planned node, describes the existing structures, and summarizes the potential improvements in that node.

Table 3-3. Proposed Plan Demolition and Construction Actions

Component (node)	Infrastructure	Proposed Action/Description
Demolition and Initial Rail Component (Near-term; prior to nodes being established)	Transit Shed #1	Demolish, grade, and repave site
	Transit Shed #2	Demolish, grade, and repave site
	On-dock rail	Install compressed air system
	Utilities	Trench and install water, sewer, and electrical lines
	Generator and accompanying housing structure	Install
	Modular office/restroom	Install
Proposed Plan (Dry Bulk)	Molasses tanks	Demolish, grade, and repave
	Consolidated multi-purpose dry bulk facility	Create
	Dry bulk silos	Convert or expand all or a portion

	Bulk cargo ground-storage facility	Construct a new structure to provide cover for ground-stored bulk products. Structure may consist of a dome, silo or other structure and be permanent or semi-permanent.
	Warehouse	Demolish, grade and repave site
	Berths 10-7/10-8 unloading systems	Modernize
Proposed Plan (Liquid Bulk)	No changes	No changes
Proposed Plan (Refrigerated Bulk)	Gantry cranes	Install two new electrical gantry cranes (100-foot gauge)
Proposed Plan (Neo-Bulk)	Warehouse C	Demolish
Centralized Common Gate	Gate Facilities	Modernize and upgrade
	Weigh Station	Install

ENVIRONMENTAL CONSIDERATIONS

The EIR will address the following potential project-related and cumulative environmental effects of the proposed project: Aesthetics and Visual Resources, Air Quality/Health Risk, Biological Resources, Cultural Resources, Geology and Soils, Greenhouse Gas Emissions/Sea Level Rise, Hazards and Hazardous Materials, Hydrology and Water Quality, Noise, Transportation and Traffic, and Utilities/Energy, and other potential impacts identified during the scoping process. The EIR will also address feasible mitigation measures and a reasonable range of alternatives, as well as the additional mandatory sections required by CEQA. The District will also prepare a mitigation monitoring and reporting program to address the potential significant impacts of the proposed project.

The Initial Study – Environmental Checklist is attached.

COMMENTS

This NOP is available for a 30-day public review period that **starts on Thursday, March 12, 2015 and ends at 5:00 p.m. on Tuesday, April 14, 2015**. Comments regarding the scope and content of the environmental information that should be included in the EIR and other environmental concerns should be mailed to:

San Diego Unified Port District
Environmental & Land Use Management Department
Attn: Larry Hofreiter
3165 Pacific Highway
San Diego, CA 92101

or emailed to lhofreiter@portofsandiego.org

PUBLIC SCOPING MEETING

A public scoping meeting to solicit comments on the scope and content of the EIR for the proposed project will be held on **Wednesday, March 18, 2015, at 5:30 p.m. at the San Diego Unified Port District Administration Building, Training Room, 3165 Pacific Highway, San Diego, CA 92101**.

The District, as Lead Agency pursuant to CEQA, will review the public comments on the NOP to determine what issues should be addressed in the EIR.

Other opportunities for the public to comment on the environmental effects of the proposed project include:

- A minimum 45-day public review and comment period for the Draft EIR
- A public hearing for the Board of Port Commissioners to consider certification of the EIR

For questions regarding this NOP, please contact Larry Hofreiter, Senior Redevelopment Planner, at 619.686.6257.

ATTACHMENTS

Figure 1 – Regional Map

Figure 2 – Tenth Avenue Marine Terminal (TAMT) Aerial Map

Figure 3 – TAMT Long Term Full Build Out Development Plan Map

Initial Study/Environmental Checklist

Executive Summary for the Tenth Avenue Martine Terminal (TAMT) Redevelopment Plan



Regional Map

Figure 1

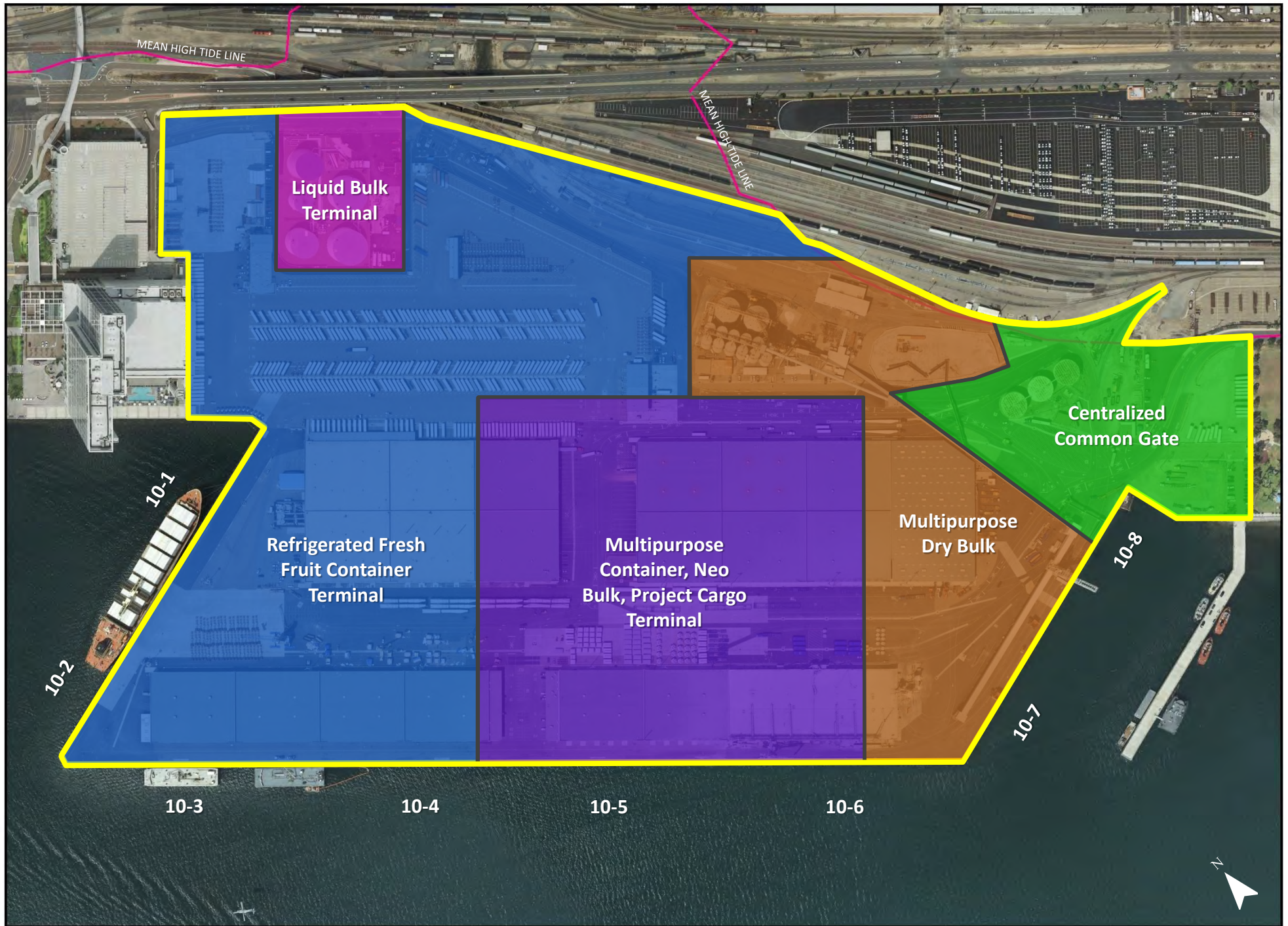
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Tenth Avenue Marine Terminal (TAMT) Aerial Photo

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TAMT Long Term Full Build Out Development Plan

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TENTH AVENUE MARINE TERMINAL (TAMT) REDEVELOPMENT PLAN

INITIAL STUDY / ENVIRONMENTAL CHECKLIST CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

Prepared by:

ICF INTERNATIONAL

MARCH 2015

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Acronyms and Abbreviations

AB	Assembly Bill
ALUCP	Airport Land Use Compatibility Plan
BMPs	best management practices
CARB	California Air Resources Board
CCA	California Coastal Act
CEQA	California Environmental Quality Act
CMP	Congestion Management Plan
DTSC	Department of Toxic Substances Control
EIR	environmental impact report
FAA	Federal Aviation Administration
GHG	greenhouse gas
HPD	Harbor Police Department
MHPA	Multi-Habitat Planning Area
MLLW	mean lower low-water
MSCP	Multiple Species Conservation Program
MTS	Metropolitan Transit System
NAAQS	National Ambient Air Quality Standards
OES	Office of Emergency Services
PAHs	polycyclic aromatic hydrocarbons
Plan	Tenth Avenue Marine Terminal Redevelopment Plan
PM10	particulate matter 10 microns in diameter or less
PM2.5	particulate matter 2.5 microns in diameter or less
PMP	Port Master Plan
PRC	Public Resources Code
RAQS	Regional Air Quality Strategy
SANDAG	San Diego Association of Governments
SDAPCD	San Diego Air Pollution Control District
SDFD	San Diego Fire-Rescue Department
SDIA	San Diego International Airport
SDPD	San Diego Police Department
SDUSD	San Diego Unified School District
SIP	State Implementation Plan
SR	State Route
SUSMP	Standard Urban Stormwater Mitigation Plan
SVOCs	semi-volatile organic compounds
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAMT	Tenth Avenue Marine Terminal
TIA	traffic impact analysis
VOCs	volatile organic compounds

Initial Study/Environmental Checklist

1. Project Title: Tenth Avenue Marine Terminal Redevelopment Plan (Plan)
2. Lead Agency Name and Address: San Diego Unified Port District
3165 Pacific Highway
San Diego, CA 92101
3. Contact Person and Phone Number: Larry Hofreiter, (858) 686-6257
4. Project Location: Within the San Diego Unified Port District—at the Tenth Avenue Marine Terminal. The nearest major intersection is Harbor Drive and Cesar E. Chavez Parkway (see Figure 2-1 of the Notice of Preparation)
5. Project Sponsor's Name and Address: San Diego Unified Port District
3165 Pacific Highway
San Diego, CA 92101
6. Port Master Plan Designation: Marine Terminal, Marine Related
7. Zoning: See Port Master Plan Designation
8. Description of Project: Approve a long-range redevelopment plan to accommodate anticipated economic activity at the Tenth Avenue Marine Terminal and near-term implementation of a component of the plan by demolishing two obsolete and underutilized transit sheds and installing a rail lubricator and compressed air system on the existing track to improve rail operations (see the project description in the NOP and the attached Executive Summary).
9. Surrounding Land Uses and Setting: North: Rail yards, stadium (Petco Park), and tourism/commercial (San Diego Convention Center and Hilton Hotel)
East: Rail yards, Crosby Street Park, ship yards (NASSCO), and the Barrio Logan community
South: San Diego Bay
West: San Diego Bay
10. Other Public Agencies Whose Approval Is Required: Federal Emergency Management Agency for modifying floodplain boundary; City of San Diego for ministerial permits (grading, building, etc.)

Environmental Factors Potentially Affected

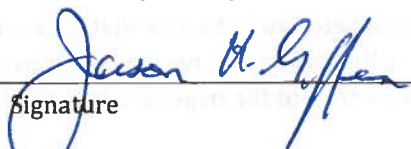
The environmental factors checked below could be affected by this Project (i.e., the Project would involve at least one impact that is a "potentially significant impact"), as indicated by the checklist on the following pages.

- | | | |
|--|--|--|
| <input checked="" type="checkbox"/> Aesthetics | <input type="checkbox"/> Agriculture and Forestry Resources | <input checked="" type="checkbox"/> Air Quality |
| <input checked="" type="checkbox"/> Biological Resources | <input checked="" type="checkbox"/> Cultural Resources | <input checked="" type="checkbox"/> Geology and Soils |
| <input checked="" type="checkbox"/> Greenhouse Gas Emissions | <input checked="" type="checkbox"/> Hazards and Hazardous Materials | <input checked="" type="checkbox"/> Hydrology and Water Quality |
| <input type="checkbox"/> Land Use and Planning | <input type="checkbox"/> Mineral Resources | <input checked="" type="checkbox"/> Noise |
| <input type="checkbox"/> Population and Housing | <input type="checkbox"/> Public Services | <input type="checkbox"/> Recreation |
| <input checked="" type="checkbox"/> Transportation and Traffic | <input checked="" type="checkbox"/> Utilities, Service Systems, and Energy | <input checked="" type="checkbox"/> Mandatory Findings of Significance |

Determination

On the basis of this initial evaluation:

- ☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
- ☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions to the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
- ☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
- ☐ I find that the proposed project MAY have an impact on the environment that is "potentially significant" or "potentially significant unless mitigated" but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards and (2) has been addressed by mitigation measures based on the earlier analysis, as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
- ☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the project, nothing further is required.


Signature

Jason H. Giffen

Printed Name

March 12, 2015

Date

San Diego Unified Port District

For

Evaluation of Environmental Impacts

1. A brief explanation is required for all answers except “No Impact” answers that are adequately supported by the information sources a Lead Agency cites in the parentheses following each question. A “No Impact” answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects such as the one involved (e.g., the project falls outside a fault rupture zone). A “No Impact” answer should be explained if it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
2. All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
3. Once the Lead Agency has determined that a particular physical impact may occur, the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. “Potentially Significant Impact” is appropriate if there is substantial evidence that an effect may be significant. If there are one or more “Potentially Significant Impact” entries when the determination is made, an Environmental Impact Report (EIR) is required.
4. “Negative Declaration: Less than Significant with Mitigation Incorporated” applies when the incorporation of mitigation measures has reduced an effect from a “Potentially Significant Impact” to a “Less-than-Significant Impact.” The Lead Agency must describe the mitigation measures and briefly explain how they reduce the effect to a less-than-significant level.
5. Earlier analyses may be used if, pursuant to tiering, program EIR, or other California Environmental Quality Act (CEQA) process, an effect has been adequately analyzed in an earlier EIR or negative declaration [Section 15063(c)(3)(D)]. In this case, a brief discussion should identify the following:
 - a. Earlier Analysis Used. Identify and state where earlier analyses are available for review.
 - b. Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards and state whether such effects were addressed by mitigation measures based on the earlier analysis.
 - c. Mitigation Measures. For effects that are “Less than Significant with Mitigation Incorporated,” describe the mitigation measures that were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.
6. Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, when appropriate, include a reference to the page or pages where the statement is substantiated.
7. Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8. This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.
9. The explanation of each issue should identify:
 - a. The significance criteria or threshold, if any, used to evaluate each question; and
 - b. The mitigation measure identified, if any, to reduce the impact to a less-than-significant level.

		Potentially Significant Impact	Less-than- Significant Impact with Mitigation Incorporated	Less-than- Significant Impact	No Impact
<i>I. Aesthetics</i>					
Would the project:					
a.	Have a substantial adverse effect on a scenic vista?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b.	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings along a scenic highway?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c.	Substantially degrade the existing visual character or quality of the site and its surroundings?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d.	Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

a. Have a substantial adverse effect on a scenic vista?

Less than Significant. The project site is located in the District’s jurisdiction, within the urban setting of downtown San Diego. The visual character of the project site and surrounding area is defined by the existing Tenth Avenue Marine Terminal (TAMT), proximity to Coronado and the San Diego–Coronado Bay Bridge, and the commercial and residential uses in the downtown San Diego community of Barrio Logan. Views of the TAMT from nearby surrounding areas include large cargo ships, liquid bulk storage tanks, security fencing, lighting, cranes, utility poles and cables, trucks, trains, and stored cargo.

Scenic vistas within the project vicinity are generally designated by the District in its Port Master Plan (PMP); however, other public viewing areas may also be considered scenic or locally important views that are enjoyed by the public. The PMP considers the scenic quality of the land within its jurisdiction and establishes District policies for maintenance of important views. Within many of its precise plans, the District has identified vista areas—key viewpoints from which to enjoy the scenic beauty of the Bay and other visible District features. Vista areas within the District’s jurisdiction are identified on the PMP’s precise plans by arrow symbols, which are placed on the vista areas and pointed toward the intended view. The Public Recreation portion of Section III of the PMP explains that these symbols identify “points of natural visual beauty, photo vantage points, and other panoramas. It is the intent of [the PMP] to guide the arrangement of development on those sites to preserve and enhance such vista points.”

The PMP does not identify any designated vista areas in Planning District 4 (TAMT). The nearest designated vista areas are located in Planning District 3 (Centre City/Embarcadero) and Planning District 6 (Coronado Bayfront). Within Planning District 3, there is a designated vista area near the San Diego Convention Center that faces west, toward the harbor and Coronado. The project site is located south of this designated vista area. No views of the project site exist, and none would be affected by the proposed project. Impacts would not occur. Areas near First Street and Orange Avenue with westerly views of downtown San Diego from Coronado have been designated as vista

areas. The potential exists for views of the project site from Coronado to be affected with the introduction of pole lighting, cranes, and utility structures. However, views from designated scenic vistas originating from Coronado already include the TAMT and all of the maritime operations such as pole lighting, cranes, and utility structures. Moreover, the 96-acre TAMT is only a small portion of the viewshed from Coronado with TAMT dwarfed by the high-rise towers of downtown San Diego and in character with the naval shipyards to the southeast. Therefore, the existing views from Coronado would not substantially change if the project is implemented and the plan is adopted. Impacts on scenic vistas would be less than significant and no further discussion in the EIR is warranted.

b. Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings along a scenic highway?

Less than Significant Impact. The San Diego–Coronado Bay Bridge (State Route [SR] 75) is a California State-designated scenic highway, located just south of the project area, that spans the Bay, connecting the City of San Diego to the City of Coronado. Existing long-distance views of the project site and the downtown area from the San Diego–Coronado Bay Bridge are dominated by a mix of high-rise residential, commercial, and urban developments as well as a variety of maritime industrial facilities (such as storage structures, large vessels, docks, piers, cranes, trucks, and other large pieces of shipping equipment). From SR-75, the project site appears in front of the downtown skyline of San Diego and behind the water of San Diego Bay. Ships, silos, warehouses, and heavy industrial machinery are visible under existing conditions. Views of the site include transit sheds, warehouses, cargo, and associated equipment at the terminal.

Implementation of the project is not anticipated to damage scenic resources, such as trees or rock outcroppings, because there are no such resources at the project site. Visual changes associated with the project would include internal terminal reconfiguration, including up to two new gantry cranes, and increased cargo throughput. The increased cargo throughput would include additional vessel, rail, and truck operations. Although these visual changes would be at least partly visible from portions of SR-75, they would not be striking or noticeable because of the distance between the site and SR-75. Additionally, the site would continue to be industrial in nature. Furthermore, motorists traveling on SR-75 would generally be focused on the roadway in front of them. Their northerly views while traveling westbound or eastbound would not be prolonged, and viewer sensitivity to the proposed changes would be low. Removal of the potentially historic transit sheds would affect two existing single-story industrial buildings that are not particularly noticeable or striking while traveling on SR-75. The proposed additions at the project site would be similar in size, color, and scale to elements of the existing developed site, which would continue to appear as a working marine terminal. The effect on SR-75, a designated scenic highway, would not be substantial for reasons discussed. Therefore, the impact on designated scenic highways would be less than significant and no further discussion in the EIR is warranted.

c. Substantially degrade the existing visual character or quality of the site and its surroundings?

Potentially Significant Impact. The proposed project would reconfigure and improve import and export operations at an existing marine terminal in an industrial and maritime area along San Diego Bay. In general, views of the project site from surrounding areas are limited because of the site's location along San Diego Bay and the limited visibility from adjacent roadways; however, intermittent and fleeting westerly views are available from northbound or southbound vehicles on Harbor Drive. The proposed project would remove two transit sheds and introduce new visual

elements (such as silos, large cargo stacks in open storage areas, a modular office, unloading systems, and up to two gantry cranes), and although their introduction would be compatible and consistent with the existing industrial and shipping-related visual character that exists at the site, further discussion and analysis is warranted in the EIR.

- d. Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?***

Potentially Significant Impact. The proposed project would include the replacement of existing light poles on the project site, which could adversely affect daytime or nighttime views in the area. Further discussion of potentially significant impacts related to substantial light or glare that would adversely affect daytime or nighttime views in the area will be included in the EIR.

	Potentially Significant Impact	Less-than- Significant Impact with Mitigation Incorporated	Less-than- Significant Impact	No Impact
<i>II. Agriculture and Forestry Resources</i>				
In determining whether impacts on agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts on forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the State's inventory of forestland, including the Forest and Range Assessment Project, the Forest Legacy Assessment Project, and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the Project:				
a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c. Conflict with existing zoning for, or cause rezoning of, forestland (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d. Result in the loss of forestland or conversion of forestland to nonforest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e. Involve other changes to the existing environment that, because of their location or nature, could result in the conversion of Farmland to nonagricultural use or the conversion of forestland to nonforest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

- a. *Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use?***

No Impact. The project site does not contain any Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency. As such, there is no potential for any actions to convert Farmland resources to a nonagricultural use. No impact would occur, and mitigation measures are not necessary. Further discussion in the EIR is not warranted.

- b. *Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract?***

No Impact. The project site is not zoned for agricultural use, nor is there a Williamson Act contract for the site. Therefore, the proposed project would not conflict with existing zoning for agricultural use or a Williamson Act contract, and no impact would occur. Further discussion in the EIR is not warranted.

- c. *Conflict with existing zoning for, or cause rezoning of, forestland (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?***

No Impact. No land that has been zoned as forestland or timberland exists within the boundaries of the project site. No impact would occur and further discussion of this topic in the EIR is not warranted.

- d. *Result in the loss of forestland or conversion of forestland to nonforest use?***

No Impact. As discussed in Item IIc, no land that has been zoned as forestland or timberland exists within the boundaries of the project site. Approval of the proposed plan would not result in a loss of forestland or the conversion of forestland to other uses; no impact would occur and further discussion of this topic in the EIR is not warranted.

- e. *Involve other changes to the existing environment that, because of their location or nature, could result in the conversion of Farmland to nonagricultural use or the conversion of forestland to nonforest use?***

No Impact. See Item IIa. No agricultural land, forestland, or timberland exists in the vicinity of the project site, which is part of the Port of San Diego, near downtown San Diego. The proposed project would not involve changes to the existing environment that, because of their location or nature, could result in the conversion of Farmland to nonagricultural use or forestland to nonforest use; no impact would occur and further discussion in the EIR is not warranted.

		Potentially Significant Impact	Less-than- Significant Impact with Mitigation Incorporated	Less-than- Significant Impact	No Impact
III. Air Quality/Health Risk					
Would the project:					
a.	Conflict with or obstruct implementation of the applicable air quality plan?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b.	Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c.	Result in a cumulatively considerable net increase in any criteria pollutant for which the project region is in nonattainment for an applicable Federal or State ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d.	Expose sensitive receptors to substantial pollutant concentrations?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e.	Create objectionable odors that would affect a substantial number of people?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

a. Conflict with or obstruct implementation of the applicable air quality plan?

Potentially Significant Impact. The San Diego Air Pollution Control District (SDAPCD) is required, pursuant to the federal and state Clean Air Acts, to reduce emissions of criteria pollutants for which the County is in nonattainment (i.e., ozone, particulate matter of 10 microns in diameter or smaller [PM10], and particulate matter of 2.5 microns in diameter or smaller [PM2.5]). The most recent SDAPCD air quality attainment plans are the 2009 Regional Air Quality Strategy (RAQS) and the 2002 and 2012 ozone maintenance plans. The RAQS outlines SDAPCD's plans and control measures designed to attain the state air quality standards for ozone, while the 2002 and 2012 maintenance plans include the SDAPCD's plans and control measures for attaining the National Ambient Air Quality Standards (NAAQS) for ozone. The 2009 RAQS projects future emissions and determines the strategies necessary for the reduction of stationary source emissions through regulatory controls. The federal Clean Air Act also mandates that the state submit and implement a State Implementation Plan (SIP) for local areas not meeting those standards. California Air Resources Board (CARB) mobile source emission projections and San Diego Association of Governments (SANDAG) growth projections are based on population and vehicle trends and land use plans developed by local agencies. As such, projects that propose development that is consistent with the growth anticipated by the relevant land use plans that were used in the formulation of the RAQS and SIP would be consistent with the RAQS and SIP. The PMP is the governing land use document for physical development under the jurisdiction of the Port District. Therefore, projects that propose development consistent with growth anticipated by the current PMP are considered consistent with the RAQS and SIP. Moreover, in the event that a project proposes development that is less dense than anticipated within a general plan (or other governing land use document such as the PMP), the project would likewise be consistent with the RAQS and SIP because emissions would be less than estimated for the existing PMP. If a project proposes development that is greater than that

anticipated in the PMP and SANDAG's growth projections, the project would be in conflict with the RAQS and SIP, and might have a potentially significant impact on air quality because emissions would exceed those estimated for the existing PMP. This situation would warrant further analysis to determine if a project would exceed the growth projections used in the RAQS for a specific subregional area. Further discussion will be provided in the EIR.

b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Potentially Significant Impact. Construction of the proposed project has the potential to create air quality impacts through the use of heavy-duty construction equipment, construction worker vehicle trips, truck haul and material delivery trips, off-gassing from paving activities, and fugitive dust from demolition and grading activities. Mobile-source criteria pollutant emissions would result from the use of construction equipment and vehicles, and paving operations would result in emissions of volatile organic compounds (VOCs) associated with off-gassing. Operation of the proposed project has the potential to create air quality impacts primarily associated with truck trips, rail activity, vessel activity, worker commutes, cargo on- and offloading and drayage, and minor increases in area sources associated with periodic painting of paved surfaces and structures. As such, the project has the potential to significantly contribute to the violation of an air quality standard or significantly contribute to an existing or projected air quality violation, and this issue area will be analyzed in the EIR.

c. Result in a cumulatively considerable net increase in any criteria pollutant for which the project region is in nonattainment for an applicable Federal or State ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?

Potentially Significant Impact. The San Diego Air Basin is in nonattainment status for ozone (8-hour standard) at the federal and state level and in nonattainment status for ozone (1-hour standard), particulate matter less than or equal to 10 micrometers in diameter, and particulate matter less than or equal to 2.5 micrometers in diameter at the State level. The proposed project could result in a cumulatively considerable net increase in these criteria pollutants. Further discussion will be provided in the EIR.

d. Expose sensitive receptors to substantial pollutant concentrations?

Potentially Significant Impact. Sensitive receptors in the area are primarily the residential areas east of the project site in the Barrio Logan neighborhood. Technical air quality analyses will be prepared and summarized within an air quality technical study to evaluate short-, medium-, and long-term pollutant emissions and concentrations. Further discussion will be provided in the EIR.

e. Create objectionable odors that would affect a substantial number of people?

Potentially Significant Impact. According to the California Air Resources Board's 2005 *CEQA Air Quality and Land Use Handbook*, land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting facilities, refineries, landfills, dairies, and fiberglass molding facilities. The proposed project does not include any uses identified by the California Air Resources Board as being associated with odors. However, potential odor emitters during construction activities include diesel exhaust, asphalt paving, and the use of any architectural coatings. Potential odor emitters during operations would include diesel exhaust from truck and train activity as well as the use of any architectural coatings. This topic will be discussed further in the EIR.

IV. Biological Resources		Potentially Significant Impact	Less-than- Significant Impact with Mitigation Incorporated	Less-than- Significant Impact	No Impact
Would the project:					
a.	Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b.	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c.	Have a substantial adverse effect on federally protected wetlands, as defined by Section 404 of the Clean Water Act (including, but not limited to, marshes, vernal pools, coastal wetlands, etc.), through direct removal, filling, hydrological interruption, or other means?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d.	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e.	Conflict with any local policies or ordinances to protect biological resources, such as a tree preservation policy or ordinance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f.	Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or State habitat conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

- a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?**

Potentially Significant Impact. The California Natural Diversity Database was reviewed to identify special-status species that are known to occur within 1 mile of the project site. Seven special-status plant species and eight special-status wildlife species have been recorded within 1 mile of the project site. Of these, no special-status plant species have the potential to occur within the project

site. However, the potential exists for three special-status wildlife species to occur within the project site. These include the western yellow bat (*Lasiurus xanthinus*), pocketed free-tailed bat (*Nyctinomops femorosaccus*), and big free-tailed bat (*Nyctinomops macrotis*). Future demolition activities at the TAMT could result in a significant impact on these three special-status wildlife species.

Per the Migratory Bird Treaty Act and similar provisions in Sections 1600–1616 of the California Fish and Game Code, the District would require qualified biologists to conduct preconstruction (i.e., prior to building-disturbing activities) nesting bird surveys during the nesting season (February 15 through September 15). Prior to commencement of building-disturbing activities during this timeframe, a qualified biologist would perform a preconstruction survey to determine whether nests are present in or around the project area. If a nest is found, an appropriate buffer would be established by the qualified biologist. No construction or other activities would be allowed to occur within the buffer until the young have fledged or the nest becomes inactive. The results of the preconstruction nesting bird survey would be provided to the District prior to the issuance of construction permits.

Because the transit sheds that planned for demolition may provide suitable habitat for special-status bats, a full analysis will be provided in the EIR to determine if a significant impact would occur.

b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

No Impact. The project site consists entirely of developed land; there are no sensitive vegetation communities or areas of riparian habitat on-site. Eelgrass beds are not known to occur in the area of the Bay where the project would occur, and the depth of the Bay at the project site significantly reduces the potential for growth. As such, no riparian or other sensitive natural community would be affected by project activities and no further discussion in the EIR is warranted.

c. Have a substantial adverse effect on federally protected wetlands, as defined by Section 404 of the Clean Water Act (including, but not limited to, marshes, vernal pools, coastal wetlands, etc.), through direct removal, filling, hydrological interruption, or other means?

No Impact. The project site consists entirely of developed land. No federally protected wetlands, as identified under Sections 401 and 404 of the Clean Water Act or the California Coastal Act, are located within or immediately adjacent to the project site. Future construction and operations at the TAMT would adhere to Stormwater Pollution Prevention Plans (SWPPPs) and Urban Stormwater Management Programs, as required, and no dredging, fill, or other waterside construction would occur within the Bay. As such, no federally protected wetlands would be affected by project activities and no further discussion in the EIR is warranted.

d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites?

No Impact. The project site consists entirely of developed land. Native species present on-site are limited to those that commonly occur in heavily developed areas. Such species would not be substantially affected by the project. Additionally, the site is not a wildlife corridor or a nursery site. No further discussion in the EIR is warranted.

e. Conflict with any local policies or ordinances to protect biological resources, such as a tree preservation policy or ordinance?

No Impact. The City of San Diego Multiple Species Conservation Program (MSCP) and the City of San Diego Multi-Habitat Planning Area (MHPA) do not apply to projects within the jurisdiction of the District. Additionally, the project site is several miles outside the boundary of the MHPA, which is the planned habitat preserve within the MSCP Subarea. Therefore, the proposed project does not conflict with any local policies or ordinances to protect biological resources, such as a tree preservation policy or ordinance. No impact would occur and no further discussion in the EIR is warranted.

f. Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or State habitat conservation plan?

No Impact. The project site is within the boundary of the City of San Diego MSCP but is several miles from the City of San Diego MHPA. The project area is not inside the jurisdiction of any other adopted plan. As such, no conflict would occur.

V. Cultural Resources		Potentially Significant Impact	Less-than- Significant Impact with Mitigation Incorporated	Less-than- Significant Impact	No Impact
Would the project:					
a.	Cause a substantial adverse change in the significance of a historical resource, as defined in Section 15064.5?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b.	Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c.	Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d.	Disturb any human remains, including those interred outside of formal cemeteries?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

a. Cause a substantial adverse change in the significance of a historical resource, as defined in Section 15064.5?

Potentially Significant Impact. Several structures on the project site are more than 45 years old and have the potential to qualify as historical resources, per State CEQA Guidelines Section 15064.5. A historical buildings survey will be completed at the TAMT property, and any potential impacts will be identified. In addition, mitigation measures will be proposed, if feasible. This resource topic will be further evaluated in the EIR.

b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?

Potentially Significant Impact. State CEQA Guidelines Section 15064.5 defines an archaeological resource as any artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that the resource:

- Contains information, with demonstrable public interest in that information, needed to answer important scientific research questions; or
- Has a special and particular quality, such as being the oldest of its type or the best available example of its type; or
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

A record search performed at the South Coastal Information Center on June 15, 2014, indicated that no archaeological resources have been identified in the project area. However, an archaeological site is located 100 feet east of the southeast corner of the project site. CA-SDI-5931 consists of stone tools, ground stone, shell, nonhuman bones, and a human burial. The record notes that additional cultural materials could be located outside the areas tested in 1993. Given the results of the records search, an area within the project site has been identified as an area where archaeological resources could be discovered. Although project-related activities involving ground disturbance are anticipated to be

limited to areas near the existing transit sheds, any trenching or other ground disturbance within a specific area in the northern portion of the site would require monitoring. Further discussion will be provided in the EIR.

c. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less than Significant Impact. The project area rests on the Bay Point Formation, which is a near-shore marine sedimentary deposit that dates from the late to middle Pleistocene, roughly 10,000 to 600,000 years ago. A tremendous variety of invertebrate and vertebrate fossils have been found in this deposit, including both marine and terrestrial animals, with mammoth and whale remains being some of the most significant. The formation is assigned high resource sensitivity by the City of San Diego; however, the City of San Diego's CEQA Significance Determination Thresholds state that potential significant impacts on the Bay Point Formation could occur if project-related activities reach depths greater than 10 feet and remove more than 1,000 cubic yards of soil. Utility work near the transit sheds would occur between 5 and 10 feet below the ground; no other project-related activities would affect areas beneath the terminal surface. Digging and trenching activities on the project site are not anticipated to go deeper than 10 feet, and the project would not directly destroy a unique paleontological resource, site, or unique geologic feature.

d. Disturb any human remains, including those interred outside of formal cemeteries?

Less than Significant Impact. No evidence in the historical record indicates that human remains were buried on-site. It is highly unlikely that human remains would be encountered during construction of the proposed project. The upper levels of the project site occur in filled lands that date from the late 1800s to the 1940s. Most of this fill came from trash deposits or Bay dredging. Bay Point Formation deposits that are marine in origin and date from 10,000 to 600,000 years ago underlie these fill layers. However, if human remains should be discovered during construction, however unlikely, they would be treated in accordance with applicable codes and regulations, notably Public Resources Code (PRC) Section 5097 and Health and Safety Code Section 7050.5, which would ensure that impacts would be less than significant.

		Potentially Significant Impact	Less-than- Significant Impact with Mitigation Incorporated	Less-than- Significant Impact	No Impact
VI. Geology and Soils					
Would the project:					
a.	Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
	1. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2. Strong seismic ground shaking?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3. Seismically related ground failure, including liquefaction?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4. Landslides?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b.	Result in substantial soil erosion or the loss of topsoil?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c.	Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in an on-site or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d.	Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e.	Have soils that would be incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

a1. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

Potentially Significant Impact. The City of San Diego Seismic Safety Geologic Hazards and Faults map (City of San Diego 2008) shows that the southeastern half of the project site is located within an active Alquist-Priolo Earthquake Fault Zone, an area associated with the Rose Canyon fault. This fault, located about 1.4 miles north of the project site, represents the most significant seismic hazard in the San Diego area. A preliminary geotechnical evaluation will be prepared, which will provide findings, conclusions, and recommendations that address issues related to future development at the TAMT site and determine the potential for earthquake fault rupture to expose people or structures to potentially significant impacts. This issue will be further evaluated in the EIR.

a2. Strong seismic ground shaking?

Potentially Significant Impact. Historically, the area surrounding San Diego Bay has experienced moderate earthquake activity; however, surface rupture has not been recorded during any instance of seismic activity. There are seven active faults within a 50-mile radius of the project site, the nearest being the Rose Canyon fault, about 1.4 miles north of the site. Increased ground motion resulting from an earthquake represents a potentially significant impact. As discussed above for Item a1, a preliminary geotechnical evaluation will be prepared that will provide findings, conclusions, and recommendations that address issues related to future development at the TAMT site. This issue will be further evaluated in the EIR.

a3. Seismically related ground failure, including liquefaction?

Potentially Significant Impact. The preliminary geotechnical evaluation to be prepared for the project would evaluate the potential for seismically related ground failure, including liquefaction. The potential for liquefaction to occur at the project site is considered to be high because of the low density of the underlying loose to medium-dense sands and silty sands in the shallow groundwater. This issue will be further evaluated in the EIR.

a4. Landslides?

No Impact. Landslide activity generally occurs in areas that lack vegetation and have steep slopes (typically, with grades of 30% or more). The project site occurs on fill areas that are flat and completely developed. No portion of the project site would be susceptible to landslides. Therefore, impacts are not anticipated. Further discussion of landslides is not warranted in the EIR.

b. Result in substantial soil erosion or the loss of topsoil?

No Impact. The paved project site is an existing marine terminal that was constructed on artificial fill in the mid-twentieth century. None of the actions associated with the proposed project would disrupt any native soil or topsoil. Soil erosion is not anticipated to occur as a result of construction or future operations at the project site. No impact would occur, and further discussion in the EIR is not warranted.

- c. ***Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project and potentially result in an on-site or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?***

Potentially Significant Impact. Bay deposits and fill layers that underlie the project site could be unstable because of their liquefaction potential. The project site occurs on undocumented fill that ranges from saturated sand to silty sand; this fill is compressible and liquefiable. This issue will be further discussed in the EIR.

- d. ***Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?***

Less-than-Significant Impact. Expansive soils are fine-grained soils (generally, high-plasticity clays) that can undergo a significant increase in volume with an increase in water content or, conversely, a significant decrease in volume with a decrease in water content. Changes in the water content of an expansive soil can result in severe distress to structures that have been built on the soil. As mentioned above, expansive soils are generally high-plasticity clays, while liquefiable soils are generally cohesionless sands. Also, although both conditions are influenced by the presence of groundwater, soil expansion differs from soil liquefaction in that soil expansion is not seismically induced. The majority of surficial soils throughout the project site are silty sands that have a low potential for expansion, as defined by Table 18-1-B of the Uniform Building Code. Therefore, construction of the proposed project would not result in substantial risks to life or property as a result of being located on expansive soils. Impacts would be less than significant.

- e. ***Have soils that would be incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater?***

No Impact. No septic tanks or alternative wastewater disposal systems are proposed; therefore, no impact would occur.

VII. Greenhouse Gas Emissions		Potentially Significant Impact	Less-than- Significant Impact with Mitigation Incorporated	Less-than- Significant Impact	No Impact
Would the project:					
a.	Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b.	Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

a. *Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?*

Potentially Significant Impact. The project would provide a plan that could be implemented to increase marine terminal operations. Increased terminal operations would increase greenhouse gas (GHG) emissions associated with vessel calls, truck trips and increased rail activity, worker trips, and energy and water use. This increase in GHG emissions could potentially, either directly or indirectly, have a significant impact on the environment by exceeding established thresholds for GHG emissions. Further discussion will be provided in the EIR.

b. *Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?*

Potentially Significant Impact. The Port District has enacted a variety of policies and plans to reduce GHG emissions as part of its Climate Action Plan, including the implementation of shore power, equipment and truck replacement/retrofits, vessel speed reductions, and the Clean Truck Program. The project would increase GHG emissions at TAMT because of the greater throughput that is forecasted with the project and may therefore conflict with or impede implementation of plans, policies, or regulations that were adopted to reduce the emissions of GHG. In addition, sea level rise will be discussed and the most current published guidance will be consulted to determine if the project would be adversely affected. Therefore, these issues will be analyzed in the EIR.

VIII. Hazards and Hazardous Materials		Potentially Significant Impact	Less-than- Significant Impact with Mitigation Incorporated	Less-than- Significant Impact	No Impact
Would the project:					
a.	Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b.	Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c.	Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d.	Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e.	Be located within an airport land use plan area or, where such a plan has not been adopted, be within 2 miles of a public airport or public use airport and result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
f.	Be located within the vicinity of a private airstrip and result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g.	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
h.	Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including in areas where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

- a. ***Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?***

Potentially Significant Impact. The potential exists for the project to create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials during the construction or operational phases of the project, depending on the types of cargo that are stored on-site or transported to and from the site. This potentially significant impact will be further discussed in the EIR.

- b. ***Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?***

Potentially Significant Impact. A previous site assessment indicates that petroleum hydrocarbons, benzene, toluene, polycyclic aromatic hydrocarbons (PAHs), semi-volatile organic compounds (SVOCs), and metals may be present in soil within portions of the project area. The presence of these hazardous materials could create a significant hazard to the public or the environment if they were to be disrupted during construction activities and released into the environment. This impact will be further discussed in the EIR.

- c. ***Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school?***

Potentially Significant Impact. The closest school is about 0.25 mile east of the project site. Because the potential exists for hazardous materials to be released during project construction, impacts are considered to be potentially significant. Further discussion will be provided in the EIR.

- d. ***Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment?***

Potentially Significant Impact. Pursuant to a check of the California Department of Toxic Substances Control (DTSC) database (EnviroStor), it was determined that the project site is not included on a list of hazardous material sites (DTSC 2014). The State Water Resources Control Board (SWRCB) site (GeoTracker) identifies two open sites within the terminal, a diesel fuel spill site (Case #H24706-002) beneath the bulk loader facility and a non-specified site (Case #9000000537) near the center of the terminal (SWRCB 2014). A previous site assessment indicates that petroleum hydrocarbons, benzene, toluene, PAHs, SVOCs, and metals may be present in soil within portions of the project area. The potential exists for the project to result in a significant hazard to the public or the environment. This is considered to be a potentially significant impact, which will be mitigated by the measures included in the Soil Management Plan. Further discussion will be provided in the EIR.

- e. ***For a project within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?***

Less-than-Significant Impact. The project site is about 2 miles south of San Diego International Airport (SDIA). The site is within Review Area 2 of the Airport Influence Area, per the Airport Land Use Compatibility Plan (ALUCP) for this airport (SDIA 2014). It is not anticipated that the project would result in a safety hazard for people residing or working in the area; however, the Federal Aviation Administration (FAA) would be notified at least 45 days prior to construction because of the

proximity of the site to a navigation facility. Although a final determination has not been made by the FAA, this impact is anticipated to be less than significant. In the event that the FAA requires changes to the project, the changes will be reflected in the Project Description section of the EIR, thereby ensuring that impacts related to a safety hazard for people residing or working in the project area would not occur. There are no other airports or ALUCPs in the vicinity of the project site. Further discussion of this impact is not required in the EIR.

f. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

No Impact. The project is not located within the vicinity of a private airstrip. No hazard impacts related to private airstrips would occur with implementation of the proposed project, and further discussion of this threshold is not warranted in the EIR.

g. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Less-than-Significant Impact. Emergency response and evacuation is the responsibility of the police and fire service providers, as detailed in Section XIV, Public Services. Redevelopment of the TAMT site would involve the removal of existing buildings and improving operational efficiencies by eliminating underperforming elements of the terminal and preparing for future expansion. The result would be an increase in cargo throughput. Transport of the cargo both to and from the terminal would continue in a planned and controlled manner that would not cause an impairment of executing the approved emergency response plan.

The proposed project would be required to comply with applicable requirements set forth by the County of San Diego Office of Emergency Services (OES) Operational Area Emergency Plan, the City of San Diego Police Department, and the City of San Diego Fire Department. OES coordinates emergency response at the local level in the event of a disaster, including fires. This emergency response coordination is facilitated by the Operational Area Emergency Operations Center and responding agencies to the proposed project site, the City of San Diego Police and Fire Departments and San Diego Harbor Police Department. Impacts would be less than significant, and no further discussion is warranted in the EIR.

h. Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including in areas where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

No Impact. The project site is located on San Diego Bay, near downtown San Diego, and completely covered with impermeable surfaces. There are no wildlands or heavily vegetated areas in proximity to the TAMT property, and as such, redevelopment of the terminal would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires. No impacts would occur, and further discussion is not warranted in the EIR.

IX. Hydrology and Water Quality		Potentially Significant Impact	Less-than- Significant Impact with Mitigation Incorporated	Less-than- Significant Impact	No Impact
Would the project:					
a.	Violate any water quality standards or waste discharge requirements?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b.	Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c.	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on-site or off-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d.	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on-site or off-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e.	Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
f.	Otherwise substantially degrade water quality?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
g.	Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
h.	Place within a 100-year flood hazard area structures that would impede or redirect floodflows?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i.	Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
j.	Contribute to inundation by seiche, tsunami, or mudflow?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

a. *Violate any water quality standards or waste discharge requirements?*

Potentially Significant Impact. The potential impacts of construction activities on water quality concern primarily sediments, turbidity, and pollutants associated with sediments. Construction-related activities that expose and move soils are responsible primarily for sediment releases. The proposed project would involve soil disturbance from activities such as excavation for replacement light poles and utility work as well as concrete removal, grading, and repaving related to building demolition and construction. Demolition includes abatement associated with hazardous materials on-site, removal of existing structures, removal of any concrete slabs, removal of any utilities, and repaving the project site with asphalt concrete pavement. These project activities could result in wind and rain erosion of on-site soil. They could also increase the amount of suspended solids contained in storm flows resulting from erosion of exposed soil during construction. Other pollutants of concern are toxic chemicals from heavy equipment or construction-related materials. Non-sediment contaminants that could enter runoff from the construction site include metals, petroleum products, and trash. Concrete, soap, trash, and sanitary wastes are other common sources of potentially harmful materials on construction sites. Wash water from equipment and tools and other waste dumped or spilled on the construction site can lead to seepage of pollutants into watercourses. Also, construction chemicals may be accidentally spilled into watercourses. The impact of toxic construction-related materials on water quality would vary, depending on the duration and timing of activities. All of these contaminants could contribute to the degradation of water quality. The proposed area of land disturbance is approximately 50 to 60 feet from the shoreline of the Bay and direct discharges into the Bay from construction activities are less likely than discharges to storm drains that lead to the Bay. Because there is a potentially significant impact related to water quality during construction, this subject will be discussed in the EIR.

Potential pollutants that may be generated at the TAMT during operation of the proposed project include gross pollutants, metals, nutrients, oil and grease, organics, sediment, and trash (San Diego Unified Port District 2008). As part of the proposed project, cargo would be kept outside on the terminal, within containers (i.e., silos or domes), as opposed to stored in existing terminal sheds. Although the dry bulk storage area would not have a roof, it would be contained within walls, which would prevent contaminants from being discharged. Operations at the port would also include routine maintenance activities; waste storage, handling, and disposal; outdoor parking; as well as vehicle and equipment storage, washing, and maintenance. Because the project would have the potential to create a significant water quality impact during operations, this issue will be further discussed in the EIR.

b. *Substantially deplete groundwater supplies or interfere substantially with groundwater recharge, resulting in a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?*

Less-than-Significant Impact. Although the proposed project would involve demolition and repaving of existing impervious surfaces, it would result in no change to the amount of impervious area. Given the depth of grading and trenching anticipated, dewatering is not likely. Should dewatering activities be necessary, such activities would be short-term and require only minimal volumes of water for the installation of underground utility lines. Because of the proximity to the Bay, groundwater at the project site is saline from saltwater intrusion, and therefore, it is not used for drinking water and consequently would not impact drinking water. Impacts related to lowering the groundwater table and groundwater recharge would be less than significant.

- c. ***Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on-site or off-site?***

Less-than-Significant Impact. Topography at the project site is flat or sloping slightly downward from east to west to the point where it meets the existing wharf. The existing storm drain system includes catch basins that have been equipped with filter inserts and a water treatment system on the main 36-inch-diameter storm drain discharge lines. The proposed project would most likely require additional storm drains as a result of the transit sheds' removal; the additional storm drains would be appropriately sized and able to carry stormwater during a rain event, thereby preventing on-site drainage issues. Because of the largely impervious nature of the site, erosion and siltation are unlikely. As a result, impacts related to changes in the drainage pattern, including erosion and/or siltation, would be less than significant.

- d. ***Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on-site or off-site?***

Less-than-Significant Impact. The existing drainage patterns would be left intact; no streams or rivers exist on-site. As a result, no substantial changes in drainage patterns would occur, and the project would not cause surface runoff to result in flooding on- or off-site. Therefore, impacts would be less than significant.

- e. ***Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?***

Less-than-Significant Impact. The proposed project would not result in an increase in the volume of runoff water that would exceed the capacity of the existing or planned stormwater drainage system. The existing system would be evaluated for compliance with the County of San Diego Standard Urban Stormwater Mitigation Plan (SUSMP) and upgraded as necessary to ensure its effectiveness and compliance with appropriate regulations. In accordance with the County's MS4 permit, stormwater specialists from the District's Environmental and Land Use Management Department review all engineering projects for compliance with the SUSMP. A summary report on the projects and their SUSMP compliance determinations is submitted with the District's annual SUSMP compliance monitoring report to the SDRWQCB. In addition, the District performs a regular inspection of catch basins with filters to evaluate the condition of the catch basin filter inserts. Inserts are cleaned and maintained or replaced, as required; catch basins are cleaned of all debris and sediment semiannually or more frequently, as required. The storm drain clarifier units are inspected and cleaned regularly by the District's Environmental and Land Use Management Department and its contractors. Reports of these best management practice (BMP) maintenance activities are submitted to the State Water Resources Control Board in accordance with the terminal's Industrial Stormwater Permit.

The proposed project would include additional storm drains, the design and placement of which would be subject to the District's engineering review. The drains would be appropriately sized and able to carry stormwater during a rain event, thereby preventing on-site drainage issues. Consequently, the project would not contribute additional sources of polluted runoff during operation. Therefore, the proposed project would not create runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. Impacts would be less than significant.

f. Otherwise substantially degrade water quality?

Potentially Significant Impact. As described in Item IXa, short-term construction impacts and long-term operational impacts on water quality would be potentially significant. Therefore, the project's potential to degrade water quality will be discussed in the EIR.

g. Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

No Impact. The majority of the project site is located outside the 100-year floodplain; a small area north of the project site is located within 100-year Flood Zone A. However, no housing is proposed on the project site. Therefore, no impacts would occur.

h. Place within a 100-year flood hazard area structures that would impede or redirect floodflows?

Potentially Significant Impact. The project proposes construction of a modular office building, with an area of approximately 6,800 square feet and height of approximately 32 feet (12 feet above mean lower low-water [MLLW] tide). Over the long-term, additional structures may also be constructed within the 100-year flood area. As part of the proposed project, the District expects to work with the necessary federal agencies to update the 100-year floodplain boundary to more accurately reflect potential flooding hazards. Therefore, this issue will be further discussed in the EIR.

i. Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?

Less-than-Significant Impact. Dam failures are rated as a low-probability, high-loss event. Only two major dam failures have been recorded in San Diego County. These occurred in 1916 and were caused by a flood event (County of San Diego 2010). The project site is not identified within a risk zone of a potential dam failure (County of San Diego 2010). Thus, it is highly unlikely that the proposed project would expose people or structures to a significant risk of loss, injury, or death involving flooding as a result of the failure of a levee or dam. Impacts would be less than significant.

j. Contribute to inundation by seiche, tsunami, or mudflow?

Less-than-Significant Impact. Although the project site is within a designated high-risk zone for a tsunami, the likelihood that an event would occur during the 29-week construction period is low. If such an event were to occur, the likelihood that it would affect the project site is also low. The project site is located on the Bayfront but approximately 2 miles from the Pacific Ocean. Coronado is located between the site and the ocean. Moreover, the project site is located at approximately 10 feet MLLW. Therefore, considering the distance from the ocean, the buffering provided by landmass, and the height above sea level, the potential for hazards associated with direct wave action in the event of a storm surge, tsunami, or seiche is low. Conditions under the proposed project would be similar to the existing conditions and would not increase the potential of site inundation. Although inundation from a tsunami or seiche is possible, it is unlikely; if it were to occur, damage would most likely be limited to ground-floor water damage. People would be given sufficient warning to evacuate the project site by the West Coast and Alaska Tsunami Warning Center, which monitors earthquakes and issues tsunami warnings when a tsunami is forecast to occur. Consequently, although inundation from a tsunami or seiche is reasonably foreseeable, any associated impacts would be less than significant.

The potential for large-scale slope instability at the site that could lead to mudflow is not present at the project site. The project site is located on flat topography. Impacts would be less than significant.

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	Potentially Significant Impact	Less-than- Significant Impact with Mitigation Incorporated	Less-than- Significant Impact	No Impact
X. Land Use and Planning				
Would the project:				
a. Physically divide an established community?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c. Conflict with any applicable habitat conservation plan or natural community conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

a. Physically divide an established community?

No Impact. The proposed project would redevelop an existing marine terminal on San Diego Bay but would not expand the physical boundaries of the terminal or develop areas outside of its current boundaries. Therefore, the project would not physically divide an established community, and impacts would not occur.

b. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

No Impact. The PMP is the guiding land use policy document for all areas under the District's jurisdiction. The proposed project is located within Planning District 4, which has been identified as the only area in the entire San Diego region with an established waterfront industrial shipping operation, which cannot be easily created or replaced. However, the TAMT is experiencing a shortage of space. The proposed project would result in the adoption of near-term improvements and a redevelopment plan for the TAMT site. This would allow the TAMT to continue its present use as a marine terminal but would not result in any changes in land use. Project approval would be consistent with the provisions of the California Coastal Act (CCA). The project site, which has been used for industrial shipping operations since the early 1900s, exists for the benefit of water dependent commerce, which is consistent with the CCA and the Public Trust Doctrine. Project-related actions would involve the removal and demolition of existing structures and the rearrangement of existing and future tenants at the TAMT. None of the project-related actions would present new barriers or obstacles related to coastal access. The TAMT site would continue to be unavailable to the general public, and no new impacts or changes regarding coastal access would result upon project implementation. As such, the proposed project would not conflict with the PMP, CCA, or the Public Trust Doctrine or any other land use document adopted for the purpose of avoiding or mitigating an environmental effect. Impacts would not occur, and this issue will not be further discussed in the EIR.

c. Conflict with any applicable habitat conservation plan or natural community conservation plan?

No Impact. As discussed under Item IVf, the proposed project would occur outside the boundaries of the City of San Diego MSCP and the City of San Diego MHPA. Therefore, the proposed project would not be in conflict with a habitat conservation plan or natural community conservation plan.

XI. Mineral Resources		Potentially Significant Impact	Less-than- Significant Impact with Mitigation Incorporated	Less-than- Significant Impact	No Impact
Would the project:					
a.	Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b.	Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State?

No Impact. The project site, an area characterized by industrial marine-related activities, does not contain any known mineral resources. In addition, the project site is underlain by artificial fill material. No commercial mining operations exist on the project sites or in the immediate vicinity. The project site and the surrounding area are not designated or zoned as land with the availability of mineral resources. In addition, the project sites do not contain aggregate resources and are not located in a mineral resource zone that contains important resources, as designated by the California Department of Conservation Division of Mines and Geology. Therefore, the proposed project would not result in a loss of known mineral resources. No impact would occur.

b. Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

No Impact. See Item Xia, above. The project site is underlain by artificial fill material. The PMP does not identify any mineral resources in the area or designated plans for mineral resource extraction. The project site and the surrounding area do not contain locally important mineral resources. Therefore, implementation of the project would not result in the loss of availability of a locally important mineral resource recovery site, and no impact would occur.

		Potentially Significant Impact	Less-than- Significant Impact with Mitigation Incorporated	Less-than- Significant Impact	No Impact
XII. Noise					
Would the project:					
a.	Expose persons to or generate noise levels in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b.	Expose persons to or generate excessive ground-borne vibration or ground-borne noise levels?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c.	Result in a substantial permanent increase in ambient noise levels in the project vicinity, above levels existing without the project?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d.	Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity, above levels existing without the project?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e.	Be located within an airport land use plan area, or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport and expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f.	Be located in the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

a. Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Potentially Significant Impact. The potential exists for construction and additional operations at the project site to result in significant impacts. Existing noise conditions will be documented and compared with projected noise conditions with implementation of additional operations at the project site. Noise levels during project construction and operation will be evaluated in the EIR.

b. Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels?

Potentially Significant Impact. Limited ground disturbance related to the proposed project is anticipated to occur. Although ground-borne vibration or noise generated by project actions would most likely not travel to surrounding residential uses or other sensitive receptors, vibration levels during project construction and operation will be evaluated in the EIR.

- c. A substantial permanent increase in ambient noise levels in the project vicinity, above levels existing without the project?*

Potentially Significant Impact. As described in Item XIIa, the proposed project could increase permanent ambient noise levels during construction and operation. As a result, impacts are potentially significant and will be evaluated in the EIR.

- d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity, above levels existing without the project?*

Potentially Significant Impact. As described in Item XIIa, site preparation-related activities could result in a temporary or periodic increase in ambient noise levels. Therefore, impacts from noise are potentially significant and will be evaluated in the EIR.

- e. For a project located within an airport land use land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?*

No Impact. The proposed project would not construct any habitable structures and would not attract large numbers of people to the project site. In addition, the project site is not located within the Forecast Noise Exposure areas identified in Exhibit 2-1 of the SDIA ALUCP (May 2014). Therefore, the project would not expose people residing or working in the project area to excessive airport noise levels and no further discussion in the EIR is warranted.

- f. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?*

No Impact. The project is not located within the vicinity of a private airstrip. No impacts related to private airstrips would occur with implementation of the proposed project, and further discussion of this threshold is not warranted in the EIR.

		Potentially Significant Impact	Less-than- Significant Impact with Mitigation Incorporated	Less-than- Significant Impact	No Impact
XIII. Population and Housing					
Would the project:					
a.	Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b.	Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c.	Displace a substantial number of people, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

a. Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?

Less-than-Significant Impact. The proposed project would not construct any homes or businesses or extend roads; however, additional employees and construction workers are anticipated to work at the TAMT as a result of near-term optimization improvements and future redevelopment activities. As stated above in the Project Description, approximately 232 jobs (direct, indirect, and induced) would be created during the near-term construction period, and a total of 459 long-term (through the life of the plan) direct and indirect jobs would be created as a result of the proposed redevelopment plan.

Although implementation of the proposed project would require up to 459 new employees and temporarily increase the number of construction workers in the area, the introduction of additional employees would not result in a significant increase in the local population and would not induce substantial population growth. The additional jobs are expected to be filled by residents who currently live in the San Diego region. Furthermore, the permanent jobs would occur over an extended period of time, and the workers could be accommodated with existing housing stock. The jobs would not result in the relocation of any population. Therefore, the proposed project would not directly or indirectly induce substantial population growth through the creation of new homes or businesses in the San Diego region. Impacts would be less than significant, and no further discussion is warranted in the EIR.

b. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

No Impact. No housing would be displaced with implementation of the proposed project. No impact would occur, and no further discussion is warranted in the EIR.

c. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

No Impact. The project site is a working marine terminal on San Diego Bay and does not include residential housing. Proposed project actions are concerned with redevelopment of the marine terminal to accommodate market-driven cargo operations. It would not displace people or require the construction of replacement housing elsewhere. No impact would occur, and further discussion is not warranted in the EIR.

XIV. Public Services	Potentially Significant Impact	Less-than- Significant Impact with Mitigation Incorporated	Less-than- Significant Impact	No Impact
Would the project:				
a. Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:				
1. Fire protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Police protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Schools?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Parks?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5. Other public facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

a1. Fire protection?

Less-than-Significant Impact. The project site is served by the City of San Diego Fire-Rescue Department (SDFD) and by the San Diego Harbor Police Department (HPD) for fireboat operations. Each department is discussed below.

City of San Diego Fire-Rescue Department

Four SDFD fire stations, including Fire Stations 1, 4, 7, and 11, are located within the project vicinity and could respond in the event of an emergency; however, Fire Station 7 is the immediate responder for the proposed project. Fire Station 7 is located at 944 Cesar E. Chavez Parkway, about 0.87 mile northeast of the project site.

Although not first responders, Fire Stations 1, 4, and 11 could also respond to the project site. Fire Station 1 is located at 1222 1st Avenue, about 1.1 miles north of the project site. Fire Station 4 is located at 404 8th Avenue, about 1 mile west of the project site. Lastly, Fire Station 11 is located at 945 25th Street, about 1.5 miles northeast of the project. Although redevelopment activities would occur at the project site through 2035, no physical expansion of the terminal's boundaries would occur. The SDFD would continue to provide emergency services at the project site. No significant impacts are anticipated, and further discussion is not warranted in the EIR.

San Diego Harbor Police Department

The HPD provides law enforcement and marine firefighting services in and around San Diego Bay. Three HPD offices serve the project area: downtown San Diego, Airport, and Shelter Island (HPD 2014). The downtown San Diego office is located at 3380 North Harbor Drive and serves as the headquarters and administration building. The Airport and Shelter Island offices serve as dispatch

centers; these offices would serve the project site in the event of an emergency in the Bay. The HPD has two departments for fire protection and emergency response: marine firefighting and vessel patrol (Port of San Diego 2014). Marine firefighter officers with the HPD are cross-trained as both land and marine firefighters. Their patrol boats also serve as firefighting boats that can respond to fire emergencies along the Bay. The vessels are staffed 24 hours a day and in all types of weather. The HPD patrols San Diego Bay, its associated waterways, and coastal areas similar to the way in which it patrols on land. Its primary function is to respond to all types of law enforcement–related issues. However, part of its fleet is designed to respond to fire and rescue calls.

Under the proposed project, a new redevelopment plan, which would provide for future improvements at the TAMT, would be adopted. Proposed operations at the TAMT site would be similar to existing operations in terms of the need for fire protection services. Therefore, the proposed project would not result in increased demand that would require new or physically altered fire protection facilities; impacts would be less than significant. No further discussion in the EIR is warranted.

a2. Police protection?

Less-than-Significant Impact. The HPD is the primary responder to calls for police protection services at the project site; the San Diego Police Department (SDPD) is a secondary responder.

Harbor Police Department

As of July 2014, the HPD had 122 sworn law enforcement officers, all of whom are cross-trained as firefighters and police officers (HPD 2014). HPD vehicle patrols monitor all land activity around the Bay. The units that could be dispatched to the project site, in addition to vehicle patrols, include the bicycle team, dive team, investigations unit, and reserve senior volunteer patrol.

City of San Diego Police Department

The SDPD provides law enforcement services for areas within District jurisdiction that generate tax revenue for the City of San Diego (e.g., TAMT, hotels, restaurants). The proposed project is in the SDPD's Central Division, the headquarters for which is at 2501 Imperial Avenue, San Diego. The division serves a population of 103,524 and encompasses 9.7 square miles, extending beyond the boundaries of the Downtown Community Plan (City of San Diego 2014).

Similar to the SDFD and HPD, SDPD police protection is evaluated by tracking average response time to an emergency call. There is also a Citywide goal for the SDPD to have 1.45 officers per 1,000 residents. With a City population of approximately 1,345,895 as of April 2014 (California Department of Finance 2014) and 2,775 sworn police officers as of May 22, 2014 (AreaVibes 2014), the current ratio of SDPD officers per 1,000 residents is 2.06.

The proposed project would adopt a new redevelopment plan that would include various improvements to the terminal. Although operations would increase under the proposed project, the TAMT is a monitored environment that has controlled access and active security. Operations under the proposed project would be similar to operations under existing conditions in terms of the need for police protection services given the restricted access and the available security services. Therefore, the proposed project would not result in increased demand that would require new or physically altered police protection facilities; no impact would occur. No further discussion in the EIR is warranted.

a3. Schools?

No Impact. The project site is within the boundary of the San Diego Unified School District (SDUSD), the second-largest school district in California. SDUSD schools within the project vicinity include Perkins Elementary School, located 0.25 mile east of the project site; Washington Elementary School, located approximately 2 miles to the northeast; and Logan Elementary School, located 1.7 miles to the east. High schools near the project site include Garfield High School, located about 1.5 miles north of the project site, and San Diego High School, located about 1.6 miles north of the project site. There are no other public schools within 2 miles of the project site.

The proposed project would not result in adverse impacts on schools. Physical impacts on school facilities and services are usually associated with in-migration and population growth, which increase the demand for schools and result in the need for new or expanded facilities. The proposed project would have no effect on population growth and school demand. Therefore, the proposed project would not result in increased demand that would require the need for new or physically altered school facilities; no impact would occur. No further discussion in the EIR is warranted.

a4. Parks?

Less-than-Significant Impact. The project site does not contain any parks. The closest park is Cesar Chavez Park, located immediately adjacent to the TAMT at 1449 Cesar E. Chavez Parkway. This park offers arbors, bike paths, gazebos, picnic tables, play equipment, public art, and restrooms. The next-closest park is Embarcadero Marina Park South, located 0.25 mile west of the project site at 200 Marina Park Way. This park offers arbors, bike parking, bike paths, concessions, exercise stations, a fishing pier, gazebos, picnic tables, public art, restrooms, and telephones.

Although the proposed project would have a negligible effect on population growth, it is possible that use of recreational facilities in the vicinity of the project sites could increase slightly due to the increase in employees, particularly at lunch breaks.

However, this insignificant increase in use would result in very light use of the park (e.g. sitting at benches eating lunch) and would not substantially degrade the existing facilities. Therefore, the proposed project would not result in an increased demand requiring the need for new or physically altered park facilities, and any related impact would be less than significant. No further discussion in the EIR is warranted.

a5. Other public facilities?

No Impact. The proposed project would not result in adverse impacts on other public facilities. As discussed above, physical impacts on public services are usually associated with in-migration and population growth, which increase the demand for public services and facilities. The proposed project would not increase the local population. Although additional employees are anticipated during construction and operation, they are not expected to increase the use of existing public facilities. Therefore, the proposed project would not result in increased demand that would require the need for new or physically altered public facilities. No impact would occur, and further discussion in the EIR is not warranted.

		Potentially Significant Impact	Less-than- Significant Impact with Mitigation Incorporated	Less-than- Significant Impact	No Impact
XV. Recreation					
Would the project:					
a.	Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b.	Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

a. Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

Less-than-Significant Impact. An increase in the use of existing parks and recreational facilities typically results from an increase in the number of housing units or residents in an area. The proposed project would not result in an increase in the number of housing units or residents in the vicinity. Although additional employees are anticipated during construction and operation, they are not expected to heavily use the existing neighborhood or regional parks or any other recreational facilities. Impacts would be less than significant, and no further discussion is warranted in the EIR.

b. Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?

Less-than-Significant Impact. The proposed project does not include the development of any recreational facilities. The proposed project would redevelop portions of the TAMT. In addition, as described in Item XVa, the project would not result in significant impacts on or require expansion of existing recreational facilities. Therefore, the proposed project would not require construction or expansion of recreational facilities that might have an adverse physical effect on the environment. As a result, impacts related to recreation would be less than significant, and no further discussion is warranted in the EIR.

		Potentially Significant Impact	Less-than- Significant Impact with Mitigation Incorporated	Less-than- Significant Impact	No Impact
XVI. Transportation/Traffic					
Would the project:					
a.	Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and nonmotorized travel, and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b.	Conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c.	Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that would result in substantial safety risks?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d.	Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e.	Result in inadequate emergency access?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f.	Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities or otherwise decrease the performance or safety of such facilities?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- a. Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and nonmotorized travel, and relevant components of the circulation system, including, but not limited to, intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?**

Potentially Significant Impact. Project operations would increase truck and automobile traffic and could conflict with local policies that measure the effectiveness of the circulation system. A transportation impact analysis (TIA) will be prepared for the proposed project and summarized in the EIR.

- b. *Conflict with an applicable congestion management program, including, but not limited to, level-of-service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways?***

Potentially Significant Impact. The designated congestion management agency for the San Diego region is SANDAG, which is responsible for preparing the Regional Transportation Plan, of which the Congestion Management Plan (CMP) is an element to monitor transportation system performance, develop programs to address near- and long-term congestion, and better integrate land use and transportation planning decisions. The CMP includes a requirement for enhanced CEQA review applicable to certain large developments that generate an equivalent of 2,400 or more average daily vehicle trips or 200 or more peak hour vehicle trips. These large projects must complete a traffic analysis that identifies the project's impacts on CMP system roadways, their associated costs, and appropriate mitigation. Early coordination with affected public agencies, such as the Metropolitan Transit System (MTS), is required to ensure that the impacts of new development on the CMP performance measures are identified. This issue area will be analyzed in the EIR.

- c. *Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that would result in substantial safety risks?***

Less-than-Significant Impact. The project site is about 2 miles south of SDIA. The site is within Review Area 2 of the Airport Influence Area, per the ALUCP (SDIA 2014). The FAA would be notified at least 45 days prior to construction because of the proximity of the site to a navigation facility. Although a final determination has not been made by the FAA, this impact is anticipated to be less than significant. In the unlikely event that the FAA requires changes to the project (e.g. height restrictions), the changes will be reflected in the Project Description section of the EIR, thereby ensuring that impacts related to a safety hazard for people residing or working in the project area would not occur. There are no other airports or ALUCPs in the vicinity of the project site. Further discussion of this issue is not required in the EIR.

- d. *Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?***

Potentially Significant Impact. A new entrance gate would be constructed to replace the existing gate on Crosby Road. The TIA may determine road improvements and/or other changes to the circulation network are required by the project. Therefore, this issue will be discussed in the EIR.

- e. *Result in inadequate emergency access?***

No Impact. Existing access to the TAMT is from an entrance gate on Crosby Road, near the southeastern portion of the project site. Traffic arriving at the entrance gate is inspected by security personnel prior to admittance. Under the proposed project, an updated gate complex would be installed as part of the redevelopment plan. Final plans would be reviewed for safety and would comply with fire access regulations, which ensure adequate access in the event of an emergency. Approval of the emergency access plans would be required by the Harbor Police, and the City's police and fire departments. No impact would occur, and further discussion in the EIR is not warranted.

f. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities or otherwise decrease the performance or safety of such facilities?

Potentially Significant Impact. See Item XVIa. The project site occurs at an operating marine terminal with restricted access. While there are no public transit, bicycle, or pedestrian facilities within the project site, the proposed project will be evaluated to determine if its implementation would result in conflicts with any adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities. Further discussion will be included in the EIR.

XVII. Utilities, Service Systems, and Energy		Potentially Significant Impact	Less-than- Significant Impact with Mitigation Incorporated	Less-than- Significant Impact	No Impact
Would the project:					
a.	Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b.	Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c.	Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d.	Have sufficient water supplies available to serve the project from existing entitlements and resources, or would new or expanded entitlements be needed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e.	Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
f.	Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
g.	Comply with Federal, State, and local statutes and regulations related to solid waste?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
h.	Result in the wasteful, inefficient, and unnecessary consumption of energy?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

Potentially Significant Impact. The project would generate additional wastewater compared with existing conditions due to the increase in the number of employees anticipated. Although it is not anticipated that the additional wastewater would exceed the requirements of the Regional Water Quality Control Board, this impact will be further discussed in the EIR.

b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Potentially Significant Impact. The project would result in an increase in water demand related to more employees being onsite and more cargo being processed. Further discussion of the need for new or expanded water infrastructure will be discussed in the EIR. Wastewater generated at

the TAMT would be minimal and conveyed by the existing sewer system, with some upgrades to connect the sewer to the restrooms at the proposed modular office. A new sewer lateral from the modular restroom would extend to the existing sewer system, which parallels Berths 10-3/10-4 and extends to an existing manhole between the transit sheds. This issue will be further discussed in the EIR.

c. Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Potentially Significant Impact. The project site consists almost entirely of impervious surfaces; no new impervious surfaces would be created with implementation of the project. As part of the near-term optimization improvements, the transit sheds would be removed and their footprints regraded and paved to match the surrounding contour, with some slope for drainage. The existing storm drain system and water quality treatment devices will be evaluated and modified to ensure sufficient flow capacity and effective treatment of any contaminants from activities on the new paved areas. Further discussion will be provided in the EIR.

d. Have sufficient water supplies available to serve the project from existing entitlements and resources, or would new or expanded entitlements be needed?

Potentially Significant Impact. The proposed project would likely result in an increase in water demand related to cargo and site washing as well as employee restroom and break room use. The project's additional water demand will be discussed in the EIR.

e. Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

Potentially Significant Impact. The proposed project would generate some additional wastewater related to restroom and break room use as more employees will be working at TAMT in the future. Further discussion of wastewater generation will be included in the EIR.

f. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?

Potentially Significant Impact. During site preparation, concrete would be exported off-site to an approved facility for recycling. Nine facilities in San Diego County accept concrete for recycling (Recycle San Diego 2014).¹ During operations, very small amounts of waste, associated with the additional permanent employees, would be generated. However, further discussion in the EIR is warranted.

g. Comply with Federal, State, and local statutes and regulations related to solid waste?

Less-than-Significant Impact. Assembly Bill (AB) 939 requires each city and county in the state to divert at least 50% of its solid waste from landfill disposal through measures such as source reduction, recycling, and composting. AB 939 mandates the reduction of solid waste disposal in landfills and a minimum 50% diversion goal, and also requires cities and counties to prepare Source Reduction Recycling Elements in their General Plans. Concrete and building materials associated with

¹ Recycle San Diego. 2014. *Recycling Concrete*. Available: <<http://recyclesandiego.org/item/concrete/>>. Accessed: April 30, 2014.

demolition of the transit sheds and any other demolition that would occur during the life of the redevelopment plan would be exported and recycled at one of several approved facilities in San Diego County. During operations, the project would generate waste associated with the additional employees, which would consist primarily of food and beverage packaging that would be disposed of on site in appropriate waste and recycling receptacles. Therefore, the proposed project would have a less-than-significant impact related to compliance with federal, state, and local statutes and regulations related to solid waste.

h. Result in the wasteful, inefficient, and unnecessary consumption of energy?

Potentially Significant Impact. The proposed project would increase cargo throughput at the TAMT. This would be partly accomplished by improving infrastructure at the TAMT including adding two gantry cranes, more lighting, and additional open area storage by demolishing two transit sheds. Therefore, the project could require additional energy beyond what is currently used at the TAMT.

According to Appendix F, Energy Conservation, of the State CEQA Guidelines, a project has the potential to result in wasteful, inefficient, and unnecessary consumption of energy when considering:

- The project's energy requirements and its energy-use efficiencies by amount and fuel type for each stage of the project, including construction, operation, maintenance, and/or removal.
- The effects of the project on local and regional energy supplies and requirements for additional capacity.
- The effects of the project on peak- and base-period demands for electricity and other forms of energy.
- The degree to which the project complies with existing energy standards.
- The effects of the project on energy resources.

Considering the proposed project's increase in energy demand, impacts associated with the consumption of energy are considered potentially significant and will be further analyzed in the EIR.

Further discussion in the EIR is warranted.

XVIII. Mandatory Findings of Significance		Potentially Significant Impact	Less-than- Significant Impact with Mitigation Incorporated	Less-than- Significant Impact	No Impact
a.	Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b.	Does the project have impacts that are individually limited but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c.	Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?**

Potentially Significant Impact. The project site does not support any special-status plant species but may support suitable habitat for special-status bats. Further evaluation will be provided in the EIR. No in-water work would occur in the Bay, which would avoid any impacts on a fish and marine mammal species. Additionally, because the site was not created until the mid-twentieth century using fill materials, there is no potential for any prehistoric resources to be affected. However, given the age of the buildings on the project site, the potential exists for impacts on historical buildings. As such, this issue will be further evaluated in the EIR.

- b. Does the project have impacts that are individually limited but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)**

Potentially Significant Impact. A cumulative impact could occur for a given resource area if the project were to result in an incrementally considerable contribution to a significant cumulative impact that has resulted from past, present, and reasonably foreseeable future projects. As discussed

in Sections I through XVII, the proposed project could result in potentially significant impacts. Even issues that were found to be less than significant with implementation of the project could contribute to a cumulatively significant impact. As such, the potential cumulative impact from all resource issues will be evaluated in the EIR.

- c. Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?*

Potentially Significant Impact. Given the analysis provided in Sections III (Air Quality), IV (Geology and Soils), VII (Greenhouse Gas Emissions), VIII (Hazards and Hazardous Materials), IX (Hydrology and Water Quality), XII (Noise), and XVI (Transportation/Traffic), the proposed project could result in a potentially significant impact that could cause substantial adverse effects on human beings, either directly or indirectly. Therefore, this issue will be further discussed in the EIR.

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This summary to the Tenth Avenue Marine Terminal Redevelopment Plan has been co-authored the Vickerman & Associates (“V&A”) team and the San Diego Unified Port District (“SDUPD” and “the District”) staff to inform the preparation of a Programmatic Environmental Impact Report (PEIR) for three Redevelopment concepts on the Tenth Avenue Marine Terminal.

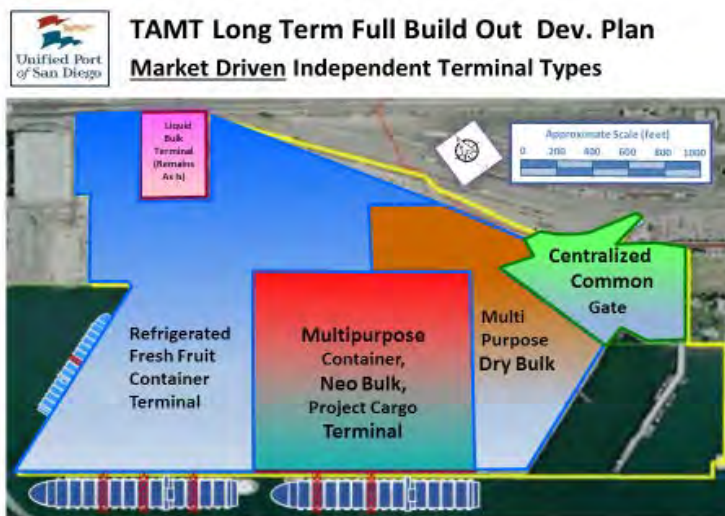
The District commissioned the Vickerman and Associates team to update a maritime business plan (“2008 Business Plan”) that was published in December 2008 by the Port of San Diego. Cargo patterns and industry economics have changed since the 2008 economic baseline was established. The global cargo market is recovering following the 2008 global recession. At this time, future growth in both the container and non-container cargo markets are projected, which is creating potential opportunities to handle additional volume at TAMT. However, although potential market opportunities continue to increase, the terminal infrastructure presents challenges to serve additional cargo volumes. An update to the 2008 Maritime Business Plan and review of potential redevelopment concepts were warranted for these reasons.

The overall objective of the Tenth Avenue Marine Terminal Redevelopment Plan (“Redevelopment Plan” or “the Plan”) is to provide the District with a series of market-driven port terminal development concepts for the Tenth Avenue Marine Terminal (TAMT), which will appropriately position the Port of San Diego to maximize cargo growth while maintaining sustainable and environmentally responsible cargo operations. While the Plan developed by Vickerman & Associates was not intended to become the foundation of an Environmental Impact Review document, as these development concepts were further refined and various infrastructure improvements became apparent, the District concluded that a formal environmental analysis under the California Environmental Quality Act (CEQA) would be necessary. As a result, the District decided to prepare a Programmatic Environmental Impact Report (PEIR). The PEIR will analyze the three most likely Redevelopment Plan concepts based on customer and cargo mix, core business strengths, and terminal footprint. These three development concepts encompass a variety of cargos, including refrigerated and dry containers. The remaining two concepts, which will not be advanced for full analysis, require the terminal be converted nearly entirely to container operations. A full-container model is not consistent with the District’s core maritime cargo strengths, and represents a departure from the existing markets and cargo mix served at TAMT. For these reasons, the decision was made to proceed with an analysis of the “most impactful” volumes generated by the three primary terminal redevelopment concepts. This document highlights the Redevelopment Plans development concepts, as well as other pertinent data, that will be used to evaluate potential environmental impacts associated with its implementation.

The TAMT Redevelopment Plan establishes an overall business framework to help make project level decisions based on long range market needs to 2035. It includes an analysis of emerging industry-wide maritime and intermodal trends. It also includes a review of the actual TAMT cargo throughput, market assessments and forecasts, and proposes various infrastructure and transportation improvements that should be implemented as market conditions allow¹. It identifies development and improvement concepts by dividing the TAMT into like operating nodes or modules. These nodes should be viewed as flexible “bladders” with similar operational cargo characteristics capable of expanding or contracting to meet operational and market conditions. The Plan identifies a Centralized Gate Complex as a tenant-in-common planning node, and the following four operating nodes:

¹ A final determination on a specific investment should only be considered after a complete and full financial and Return-On-Investment (ROI) analysis. This analysis needs to itemize all capital costs, ongoing District expenses, revenues and provide a detailed cash flow. For planning purposes, however, the Redevelopment Plan suggests improvements should be considered when each node reaches 70% of the MPC identified in the 2008 Maritime Business Plan.

1. Consolidated Dry Bulk
2. Liquid Bulk (existing operations to remain as-is over the plan-horizon year)
3. Refrigerated Container / Fresh Fruit
4. Neo Bulk / Break Bulk / General Container Cargo



Within these nodes, the Plan identifies two distinct types of cargo throughput measurements. The first measurement is related to the terminal's maximum practical capacity (MPC), which is the highest theoretical activity level at which the terminal, or node, could operate if all physical improvements were made and if market conditions allowed. The second measurement is the Redevelopment Plan's 2035 Forecast that was developed through discussions with current tenants, potential tenants, and knowledge of industry trends. The Plan includes a cursory GDP Market Cargo Forecast overview for the District and integrates the forecast results into the Plan².

The MPC for the Neo Bulk / Break Bulk / General Cargo node varies based on the specific type of cargo that is ultimately pursued, and this in turn affects the MPC that can be accommodated at the Refrigerated Container node. The Plan updates the MPC to a 2035 horizon by looking at five distinct market driven development concepts, three of which will be analyzed in the PEIR.

Development Concepts #1-3 are described in detail below, and per the Redevelopment Plan, estimate a "most impactful" MPC of 5.5 million metric tons of cargo, in which containers would be handled in conjunction with neo bulk and break bulk cargos. The remaining two concepts are as follows:

- Development Concept #4: Full Refrigerated & Dry Containers, with an estimated total MPC of 5.8 million MT of container cargo
- Development Concept #5: Dry Container Full Build-out, with an estimated total MPC of 6.0 million MT of container cargo

Both of these development concepts exclude Neo Bulk and Break Bulk cargo from consideration, resulting in zero volume for these commodity types. However, the District has a longstanding commitment to handling neo bulk, break bulk and roll-on/roll-off cargos. Additionally, the additional metric tonnage potential for a full-container scenario is not significant to justify the exclusion of non-containerized commodities. Finally, the

² The GDP market forecast is a measurement of trade within the San Diego area using U.S. state and local GDP figures.

Executive Summary of the Tenth Avenue Marine Terminal (TAMT) Redevelopment Plan

market for container vessels suitable to TAMT is clearly defined; focusing exclusively on a few carriers would represent a departure from an established and successful business development strategy. For these reasons, it was determined that the PEIR would focus on the first three redevelopment concepts as the primary options for analysis.

For the purposes of the environmental analysis, the maximum practical capacity (MPC) is used to determine the “worst case”, or most impactful, environmental scenario. This scenario assumes all potential improvements identified in the Plan are constructed and that market conditions enable the terminal to operate at its MPC. Depending on the commodity mix handled and ultimately pursued at the terminal, the MPC for the three development concepts to be analyzed at TAMT ranges between 5 and 5.5 million metric tons annually³. Conversely, the Plan’s 2035 Forecast identifies a more realistic planning scenario based on information obtained from existing and potential tenants, as well as current maritime trends. A realistic forecast is estimated to be approximately 4.2 million metric tons annually. The Plan’s maximum practical capacities and 2035 forecasts for each of the four operating nodes are summarized below:

	2035 Maximum Practical Capacity (MPC) ¹	Redevelopment Plan’s 2035 Forecast
Dry Bulk	2,650,000	2,146,645 ²
Liquid Bulk	239,017	154,000 ³
Refrigerated Container	1,799,893 ⁴	1,790,155
Neo Bulk / Break Bulk / General Container Cargo(Omni)	629,650 ⁵	114,824
TOTAL	5,318,560⁶	4,205,624
<p>Notes:</p> <p>1 Construction of the infrastructure improvements identified in the Plan are required to attain the MPCs identified.</p> <p>2 For the purposes of the analysis, two additional dry bulk customers were assumed over existing tenant volume, which resulted in a forecast of approximately 2,146,645 MT. However, as noted in the previous column, the MPC indicates that additional dry bulk volume could be accommodated.</p> <p>3 The Redevelopment Plan acknowledges the existing liquid bulk facility, however it does not suggest any operational or infrastructure changes to the facility. Current capacity is sufficient to handle market demand and operations at the MPC, and is projected to remain sufficient throughout the plan horizon.</p> <p>4 For ease of understanding, District staff calculated an average based on all of the potential MPC’s for the refrigerated container node, which may shift depending on the cargo mix handled at the adjacent Neo-bulk node. The 1,799,893 MT average is based on averaging three Refrigerated Container Cargo MPC figures: 2,288,000, 1,555,840 MT and 1,555,840 MT, which are based on different development concepts. Development Concept #1 assumes the terminal attains an MPC of 2,288,000 MT of refrigerated container cargo, which results in a 327,700 MT MPC for the Neo Bulk / Break Bulk / General Container Cargo node. Development Concept #2 assumes a MPC of 1,555,840 MT of refrigerated container cargo, which results in a 977,400 MT MPC for Neo Bulk / Break Bulk / General Container Cargo. Finally, Development Concept #3 assumes a MPC of 1,555,840 MT of refrigerated container cargo, which results in a MPC of 583,850 MT for Roll-on / Roll-off Neo Bulk cargo.</p> <p>5 District staff also identified a 629,650 MT average for the Neo Bulk / Break Bulk / General Container Cargo MPC that is based on three distinct cargo types that could be pursued at this node, as well as the MPC of the adjacent Refrigerated Container cargo node. The 629,650 MT average is based on averaging the following three Neo Bulk MPC figures: 327,700 MT for special non-containerized break bulk cargo, 977,400 MT for dry container cargo and 583,850 MT for roll-on / roll-off cargo, including automobiles and other wheeled vehicles.</p> <p>6 The total is an average of the three cargo development concepts identified in the TAMT Redevelopment Plan, which looked at different cargo types for the Neo</p>		

³ Although the Redevelopment Plan identifies four cargo handling nodes, two of the nodes (e.g. the Refrigerated Container Node and Neo Bulk Node) result in different MPC’s depending on the type of cargo that is pursued. For comparison purposes, an average MPC was identified for the Refrigerated Container node and the Neo Bulk / Break Bulk / General Container Cargo. For more information on the three cargo development concepts and how the average MPC was derived, please see pages 6 and 7 of the Executive Summary.

Bulk and Break Bulk node, as outlined above. Development Concept #1 results in 5,504,717 MT, Development Concept #2 results in 5,422,257 MT, and Development Concept #3 results in 5,028,707 MT. For more information, see pages 8 through 10 of the Executive Summary.

Source: San Diego Unified Port District

A description of the centralized gate facilities, as well as each of the four operating nodes, is summarized below. The summary includes the nodes' approximate location, the berth that serves the cargo in those nodes, and any infrastructure improvements that would be needed to attain the maximum practical capacities (MPC's) identified in the Redevelopment Plan. It also identifies the Plan's 2035 Forecast for each operating node. To help ensure that future improvements are market-driven, the Redevelopment Plan suggests waiting to make any improvements until the node reaches 70% of the MPC that was identified in the 2008 Maritime Business Plan, as described below.

Central Gate Facilities: This node involves the creation of a common gate facility, with a new truck weigh station, in the general location of the existing gate⁴. It would be utilized by all terminal tenants and customers.

Dry Bulk: This node includes products that are delivered in bulk or supersacks (also known as bulk-bags) to the ground, flat storage, silo's, and/or through a new consolidated facility. Dry bulk products include (but are not limited to) cement, Fly-Ash, Slag, Bauxite, Chemical NEC, Potassium-Nitrate, Soda Ash, and other non-hazardous bulk materials. The market forecast assumed a Compound Annual Growth Rate (CAGR) for cement between 9% and 15% to year 2020, and a 3% CAGR thereafter. It also assumed a 1% CAGR for export potash and a 2% CAGR for other dry bulk commodities. The Plan's 2035 Forecast for Dry Bulk is expected to be approximately 2,146,645 MT annually. The Dry bulk node would be located in the general area of the southeastern portion of the terminal, also referred to as terminal "backlands." This node would be served by Berth 10-7/10-8, with overflow capacity handled at Berth 10-5/10-6. Under existing conditions, the dry bulk node has a maximum practical capacity of 2,250,000. Therefore, the Plan recommends that infrastructure improvements should not be considered until dry bulk throughput reaches 1,575,000 metric tons annually. With the following infrastructure improvements identified in the Redevelopment Plan, the Dry Bulk Node, would have a **maximum practical capacity of 2,650,000 metric tons:**

- Establishing a consolidated Multi-purpose Dry-bulk facility with two cement handling facilities, including a new semi-permanent storage facility (e.g. a Rubb style of building or equivalent) up to a total of 100,000 square feet, to store dry bulk products.
- Demolishing the existing inactive liquid-Molasses tanks once a new bulk storage facility has been established, creating space that can be configured to serve dry bulk commodities.
- Demolishing Warehouse C and transferring any dry bulk tenants to the proposed multi-purpose Dry-bulk facility.
- Upgrading or adding a new conveyor system to handle bauxite or soda ash, and connecting the new semi-permanent dry bulk storage facilities to berths 10-5/10-6 and 10-7/10-8.
- Adding a consolidated bulk discharge unloader using a 200 metric ton per hour vacuum (or better) for cementitious materials at Berth 10-7/10-8 (either a Kovaco, Siwertell or similar type system).
- Establishing approximately 5 acres of open-storage space between Water Street and Terminal Street for various operational purposes.

⁴ The Redevelopment Plan acknowledges that there may be interest in developing an Alternate Central Gate complex. However, there have been no preliminary engineering studies or other technical work performed to evaluate its technical feasibility or assess its potential environmental impacts. Therefore, the Alternate Central Gate complex is not identified in the project description for the PEIR. However, if the PEIR finds that an Alternate Central Gate could help alleviate certain environmental impacts, than it may be incorporated into the PEIR as a mitigation measure and/or as a project alternative.

Liquid Bulk: Liquid bulk commodities currently handled at the TAMT include petroleum products and fuel for vessels and the airport⁵. The Liquid bulk node and its existing infrastructure are acknowledged by the proposed Redevelopment Plan, but the Plan does not propose any changes to its current location or any infrastructure improvements. Preferred berths would continue to be 10-1/10-2 and 10-3/10-4. The current maximum practical capacity according to the 2008 Business Plan is 220,000 metric tons of liquid bulk cargo. The Redevelopment Plan estimates that the existing infrastructure is capable of handling slightly more than what was identified in the 2008 Business Plan, and updates the **maximum practical capacity to 239,017 metric tons** for liquid bulk cargo. However, the plan acknowledges that, based on market fluctuations in the price of liquid fuels, it is best practice to maintain a minimum level of fuel in storage. Should the market dictate storing fuel in levels above 70% of capacity, the liquid bulk facility operator has indicated barges would be employed to supplement the operation on a short term basis. As such, no changes to infrastructure or customer base are recommended for the liquid bulk facility. For the purposes of the environmental analysis, the District and Vickerman & Associates have determined that an annual figure of 154,000 MT of Liquid Bulk would be an appropriate estimate for the Plan's 2035 Forecast. This figure is 70% of the 220,000 MT MPC that was identified in the 2008 Business Plan.

Refrigerated Container: The Refrigerated container node would include refrigerated and frozen perishable commodities, and other containerized cargo that may or may not need to be refrigerated. It would be located on the northern portion of the terminal and served by Berths 10-3/10-4, and overflow would be handled at Berths 10-1/10-2 and 10-5/10-6, depending on vessel size and operational requirements. According to the 2008 Business Plan, the refrigerated container facility has a maximum practical capacity of approximately 730,000 metric tons. The future boundary between the proposed refrigerated container node and the proposed multi-purpose general cargo node would be imprecise by design. The Redevelopment Plan calls for these two areas of the terminal to be used for the handling of diverse cargos as market conditions and vessel schedules permit. As such, construction of the refrigerated container node and Neo Bulk / Break Bulk / General Container Cargo node would happen simultaneously.

The Redevelopment Plan forecasts substantial growth in the refrigerated container market. With the improvements identified in the Plan, the Plan's 2035 forecast for the refrigerated container cargo node is 1,790,893 MT. The Plan's forecast assumes that the terminal's current tenant (Dole Fresh Fruit Company) would continue to operate through the year 2035 and that a new customer, specializing in refrigerated container cargo would begin sometime in calendar year 2016. The Plan's forecast assumes a second refrigerated container carrier's vessels would have a capacity of 350 forty-foot equivalent units (FEU) in 2016, a 500 FEU capacity in 2021, and a 700 FEU capacity in 2030⁶.

Based on the three potential development concepts identified in the Redevelopment Plan, the District has calculated an **average maximum practical capacity of 1,799,893 metric tons for the Refrigerated**

⁵ Historically, molasses products were also handled at the TAMT. However, TAMT has not handled molasses for several years and the Redevelopment Plan recommends demolition of the existing molasses tanks.

⁶ The Redevelopment Plan is not intended to address tenant projects or maintenance at the terminal, as these types of projects have independent utility and do not rely on the adoption of the Redevelopment Plan. However, these types of projects will be included as part of the cumulative analysis in the EIR. Therefore, it should be noted that the Dole Fresh Fruits Company (Dole) has submitted an application to construct an additional 94 refrigerated racks within its leasehold. The project is intended to help Dole accommodate additional cargo volume by increasing its on-site refrigerated storage capabilities. The District has determined that the Dole project will require the issuance of a non-appealable Coastal Development Permit (CDP), as well as a stand-alone environmental document, both of which will be processed independently of the proposed TAMT Redevelopment Plan. The TAMT Redevelopment Plan, and its programmatic environmental analysis, will assume Dole, or another similar type of tenant, will remain a tenant and that its proposed infrastructure improvements will be made to its leasehold to accommodate additional cargo volume. By disclosing these assumptions, the Redevelopment Plan can more accurately forecast market conditions for the refrigerated container node, and the District can more easily comply with the provisions of the California Environmental Quality Act (CEQA).

Container node. The three development concepts affecting the MPC for the Refrigerated Cargo nodes are summarized below:

1. The first MPC development concept assumes that the Neo Bulk / Break Bulk / General Container Cargo node would continue to process large, heavy break-bulk items that are “high” and “wide”. Under this development concept, the Refrigerated Container node would have a MPC of approximately 2,288,000 MT; or
2. Under the second MPC development concept, the Refrigerated Container node would have a MPC of approximately 1,555,840 MT, if the Neo Bulk / Break Bulk / General Container Cargo node processed some break bulk cargo and was supplemented with dry container cargo; or
3. Under the third MPC development concept, the Refrigerated Container node would also have a MPC of approximately 1,555,840 MT, if Roll-on / Roll-off cargo (e.g. automobiles) were processed at the Neo Bulk / Break Bulk / General Container Cargo node.

Both estimates (the 2035 MPC and the Plan’s 2035 Forecast) would require the following infrastructure improvements to be made within this node:

- The demolition of Transit Sheds #1 and #2.
- Constructing two to three 100 foot Gantry Cranes (intended to serve containerized cargo) at Berths 10-3 and 10-4, and the infrastructure required to support those cranes.
- Maintaining Warehouse B (200,000 sq. ft.) as a cold storage facility.

Neo Bulk / Break Bulk with General Container Cargo: The Neo Bulk / Break Bulk / General Container Cargo node includes the broadest range of cargo types including rolling vehicles, bagged and palletized products, and large, heavy break-bulk items that cannot move in standard containers. The Neo Bulk / Break Bulk / General Container Cargo node would be centrally located in the terminal, in the vicinity of portion of what is currently Transit Shed #1, Transit Shed #2, and Warehouse C. This facility could also include an intermodal rail facility, which would be located on the southern portion of the terminal in the area that is currently occupied by the eastern portion of Warehouse C. The Neo-Bulk node would be primarily served by berth 10-5/10-6, with overflow handled at Berths 10-3/10-4. As discussed above, it would share a boundary with the Refrigerated Container node, which would be imprecise by design to allow flexibility for the area of the two nodes. The area is intended to remain open to allow for the handling of diverse cargos as market conditions and vessel schedules permit.

The Redevelopment Plan forecasts moderate growth in Neo Bulk / Break Bulk / General Container cargo. Based in part on gross domestic product projections and market trends, as well as accounting for a broad array of cargo types, the Plan’s 2035 Forecast estimates approximately 114,824 MT of Neo Bulk / Break Bulk / General Container cargo.

Conversely, the District identified an **average maximum practical capacity for the Neo Bulk / Break Bulk / General Container Cargo node is 629,650 metric tons**, based on the development concepts presented in the Redevelopment Plan. Similar to the Refrigerated Container node, the MPC for the Neo Bulk / Break Bulk / General Container Cargo node varies based on what development concept, or cargo type, is ultimately pursued, assuming the various infrastructure improvements identified in the Redevelopment Plan are realized. The first development concept assessed the capacity of the terminal to continue to process “high” and “wide” break bulk items that cannot move in standard containers. Under this development concept, the MPC of the Neo Bulk / Break Bulk / General Container Cargo node would be approximately 327,700 MT annually. The second development concept assessed the capability of the Neo Bulk / Break Bulk / General Container Cargo node to process some break bulk cargo that would be supplemented with dry containers. Under this development concept, the MPC of the Neo Bulk / Break Bulk / General Container Cargo would be

approximately 977,400 MT annually. Finally, the third development concept assessed the capacity of the Neo Bulk / Break Bulk / General Container Cargo node to process roll-on / roll-off cargo, which could include automobiles. Under this development concept, the MPC of the Neo Bulk / Break Bulk / General Container Cargo node would be 583,850 MT of cargo annually.

Although all three Neo Bulk / Break Bulk / General Container Cargo development concepts would result in a different maximum practical capacity, for planning purposes, all three concepts were assumed to require following infrastructure improvements identified in the Redevelopment Plan:

The Redevelopment Plan identifies three separate development concepts for the Neo Bulk / Break Bulk / General Container Cargo node, all of which would result in different maximum practical throughput capacities. However, for planning purposes, all three development concepts were assumed to require following infrastructure improvements to attain the maximum practical capacities identified in the Redevelopment Plan:

- Installing two to three gantry cranes (intended to serve containerized cargo) at Berths 10-5/10-6, including associated infrastructure to support those cranes.
- Demolition of Warehouse C and Transit Sheds #1 and #2, creating up to 20 acres of open storage space.
- Upgrades to the existing on-dock rail infrastructure
- Installation of additional rail infrastructure to create an on-dock intermodal rail facility in the vicinity of what is currently the eastern portion of Warehouse C
- Various intermodal yard and backland improvements, which could include:
 - Bridge crane.
 - Full wheel container module with gantry cranes.
 - Rubber-tired cranes for load-on and load-off (LO/LO).
 - Straddled carrier (stacked) for intermodal facility.
 - Additional paving of backland area to hand (at least) a 600-per-square-foot (psf) live load.
 - Container handling equipment to handle 100 kipa wheel live load.
 - Generator and accompanying housing structure.
 - Temporary or semi-permanent office space for staff and support personnel

The maximum practical capacities for the three Neo Bulk / Break-bulk node cargo mix alternatives are summarized in the following tables. Including Roll-on / Roll-off cargo and general dry containers in this mode requires additional operating space such as to limit the MPC of the adjacent refrigerated container node. Limiting operations to only break-bulk cargos in this node increases the MPC of the adjacent refrigerated container node.

Development Concept #1: Neo Bulk / Break Bulk / General Container Cargo	
Maximum 2035 Maximum Practical Capacity (MPC)	
Refrigerated Container	2,288,000 MT
Neo Bulk / Break Bulk / General Container Cargo	327,700 MT
TOTAL OF REFRIGERATED CONTAINER AND NEO-BULK NODE WITH BREAK-BULK:	2,615,7000 MT
Source: San Diego Unified Port District	

Development Concept #2: Neo Bulk / Break Bulk / General Container Cargo	
Maximum 2035 Maximum Practical Capacity (MPC)	
Refrigerated Container	1,555,840 MT
Neo Bulk / Dry Containers	977,400 MT
TOTAL OF REFRIGERATED CONTAINER AND NEW-BULK NODE WITH ADDTL CONTAINERS:	2,533,240 MT
Source: San Diego Unified Port District	

Development Concept #3: Neo Bulk / General Cargo with Automobiles, Ro-Ro	
Maximum 2035 Maximum Practical Capacity (MPC)	
Refrigerated Container	1,555,840 MT
Neo Bulk Roll-on / Roll-off	583,850 MT
TOTAL OF REFRIGERATED CONTAINER AND NEO-BULK NODE WITH RO-RO:	2,139,690 MT
Source: San Diego Unified Port District	

The following chart shows the maximum practical capacity of the terminal in annual metric tons, based on the nodes as outlined above. An average tonnage is used to represent the neo-bulk and refrigerated container nodes, acknowledging the MPC will be affected by the cargo commodity mix that is ultimately handled in those areas. This average calculation is not a reflection of a potential development concept contained in the Redevelopment Plan, but rather for ease of understanding and quantifying variations in potential cargo tonnage based on changes in cargo mix:

SUMMARY OF 2035 MPC Development Concepts AND AVERAGE METRIC TON CALCULATIONS					
Cargo Node:	Dry Bulk (no variation)	Liquid Bulk (no variation)	Refrigerated Containers	Neo Bulk and Break Bulk (includes Dry Containers & Roll-on / Roll-off)	Total in MTs
Development Concept #1	2,650,000 MT	239,017 MT	2,288,000 MT	327,700 ¹ MT	5,504,717 MT
Development Concept #2	2,650,000 MT	239,017 MT	1,555,840 MT	977,400 ² MT	5,422,257 MT
Development Concept #3	2,650,000 MT	239,017 MT	1,555,840 MT	583,850 ³ MT	5,028,707 MT
Total	7,950,000 MT	717,051 MT	5,399,680 MT	1,888,950 MT	15,955,681 MT
Divided by # of Concepts	3	3	3	3	3
Average (MT) per Node:	2,650,000	239,017	1,799,893	629,650	5,318,560
Source: San Diego Unified Port District					

¹ Development Concept #1 assumes that the Neo Bulk node would continue to specialize in non-containerized break-bulk cargo.

² Development Concept #2 assumes that the Neo Bulk node would include dry container cargo.

³ Development Concept #3 assumes that the Neo Bulk node would pursue roll-on / roll-off cargo, including automobiles and other wheeled vehicles.

The Redevelopment Plan identifies the following key principles and recommendations to be implemented in conjunction with the various optimum development and improvement concepts discussed above.

1. Improvements need to be market-driven. The Redevelopment Plan includes a cursory market forecast to 2035, but these forecasts may need to be updated as the 2035 horizon year approaches and/or as market conditions change. The need for infrastructure improvements can be illustrated and quantified using the $(N = F - C)$ formula where forecast minus capacity equals need.
2. Demolition of Transit Sheds # 1 and # 2 is a high priority and will remove notable operational constraints.
3. Improvements should maximize cargo throughput capabilities and efficiencies, be consistent with the District's Climate Action Plan goals, policies and measures, and provide the District with competitive financial returns on the District's investments.
4. All District marine-oriented industrial uses, such as TAMT, should be encouraged to modernize to meet the present day expectations and requirements of the maritime industry. All of the development concepts identified in the Redevelopment Plan rely on the Modular Operating Grid System (MOGS), which involves standardized infrastructure improvements and large, open-storage space areas that can accommodate a wide variety of cargo types. The Modular Operating Grid System (MOGS) should be used in the planning, design and construction of improvements.
5. Employ a Central Gate node, in cooperation with TAMT users and tenants, and establish a practical "freight only" gate complex. TAMT should also maintain a secondary access gate for emergency egress situations.
6. When the market will sustain it, TAMT should employ on-dock intermodal operations to maximize freight rail utilization for general cargo container operations and reduce annual truck trips from TAMT.
7. While the District continues its efforts to secure near-term maritime opportunities, it should also anticipate long-term future cargo opportunities for TAMT. Although the actual booking of cargo remains the responsibility of the carriers and customers, the District should continue to monitor long-term market trends and work with carriers and customers to identify mutually beneficial terminal infrastructure improvements based on market conditions.
8. While dredging all berths to 42 feet MLLW may be beneficial, the Plan does not recommend dredging 10-1 and 10-2 due to operational and financial constraints. This may need to be reassessed in future plans.

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Appendix B

Notice of Preparation Letters



Edmund G. Brown Jr.
Governor

STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse and Planning Unit



Ken Alex
Director

Notice of Preparation

March 12, 2015

To: Reviewing Agencies

Re: Tenth Avenue Marine Terminal (TAMT) Redevelopment Plan
SCH# 2015031046

Attached for your review and comment is the Notice of Preparation (NOP) for the Tenth Avenue Marine Terminal (TAMT) Redevelopment Plan draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Larry Hofreiter
San Diego Unified Port District
3165 Pacific Highway
San Diego, CA 92101

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Attachments
cc: Lead Agency

**Document Details Report
State Clearinghouse Data Base**

SCH# 2015031046
Project Title Tenth Avenue Marine Terminal (TAMT) Redevelopment Plan
Lead Agency San Diego Unified Port District

Type NOP Notice of Preparation

Description The project is a long-range Redevelopment Plan and near-term project improvements to accommodate anticipated economic activity at the Tenth Avenue Marine Terminal. The development concepts and infrastructure improvements identified in the Redevelopment Plan would result in a maximum practical capacity (MPC) at TAMT in 2035 between 5 million and 5.5 million metric tons annually. The near-term, project level component of the plan would demolish two obsolete/under utilized transit sheds and would improve rail operations by installing a rail lubricator and compressed air system on the existing track. The near-term project level improvements are anticipate to occur in 2016 (or when funding is available) and will take ~29 weeks. The long range development concepts would occur over several years as market conditions allow.

Lead Agency Contact

Name	Larry Hofreiter	
Agency	San Diego Unified Port District	
Phone	619-686-6257	Fax
email		
Address	3165 Pacific Highway	
City	San Diego	State CA Zip 92101

Project Location

County	San Diego		
City	San Diego		
Region			
Cross Streets	Harbor Drive and Cesar Chavez Parkway (687 Switzer Street)		
Lat / Long	32° 41' 57" N / 117° 9' 22" W		
Parcel No.	020-183; 020-091; 020-025; 020-039		
Township	Range	Section	Base

Proximity to:

Highways	I-5
Airports	
Railways	BNSF
Waterways	San Diego Bay
Schools	Perkins Elementary
Land Use	Port Master Plan designates the 96-acre area as either Marine Terminal or Marine Related.

Project Issues Aesthetic/Visual; Air Quality; Archaeologic-Historic; Biological Resources; Coastal Zone; Drainage/Absorption; Flood Plain/Flooding; Geologic/Seismic; Noise; Public Services; Schools/Universities; Soil Erosion/Compaction/Grading; Toxic/Hazardous; Traffic/Circulation; Water Quality; Cumulative Effects

Reviewing Agencies Resources Agency; Department of Parks and Recreation; Department of Fish and Wildlife, Region 5; Native American Heritage Commission; Caltrans, District 11; Air Resources Board; Regional Water Quality Control Board, Region 9; State Lands Commission; State Water Resources Control Board, Division of Water Quality; Department of Toxic Substances Control; California Coastal Commission; Caltrans, Division of Aeronautics

Document Details Report
State Clearinghouse Data Base

Date Received 03/12/2015

Start of Review 03/12/2015

End of Review 04/10/2015

Sources Agency

Resources Agency

Nadell Gayou

☐ Dept. of Boating & Waterways

Nicole Wong

☐ California Coastal Commission

Elizabeth A. Fuchs

☐ Colorado River Board

Lisa Johansen

☐ Dept. of Conservation

Elizabeth Carpenter

☐ California Energy Commission

Eric Knight

☐ Cal Fire

Dan Foster

☐ Central Valley Flood Protection Board

James Herota

☐ Office of Historic Preservation

Ron Parsons

Dept of Parks & Recreation

Environmental Stewardship Section

☐ California Department of Resources, Recycling & Recovery

Sue O'Leary

☐ S.F. Bay Conservation & Dev't. Comm.

Steve McAdam

☐ Dept. of Water Resources

Nadell Gayou

Fish and Game☐ Depart. of Fish & Wildlife

Scott Flint

Environmental Services Division

☐ Fish & Wildlife Region 1

Donald Koch

☐ Fish & Wildlife Region 1E

Laurie Harnsberger

☐ Fish & Wildlife Region 2

Jeff Drongesen

☐ Fish & Wildlife Region 3

Charles Armor

☐ Fish & Wildlife Region 4

Julie Vance

☒ Fish & Wildlife Region 5

Leslie Newton-Reed

Habitat Conservation Program

☐ Fish & Wildlife Region 6

Tiffany Ellis

Habitat Conservation Program

☐ Fish & Wildlife Region 6 I/M

Heidi Sickler

Inyo/Mono, Habitat Conservation Program

☐ Dept. of Fish & Wildlife M

George Isaac

Marine Region

Other Departments☐ Food & Agriculture

Sandra Schubert

Dept. of Food and Agriculture

☐ Dept. of General Services

Public School Construction

☐ Dept. of General Services

Anna Garbeff

Environmental Services Section

☐ Delta Stewardship Council

Kevan Samsam

☐ Housing & Comm. Dev.

CEQA Coordinator

Housing Policy Division

IndependentCommissions/Boards☐ Delta Protection Commission

Michael Machado

☐ OES (Office of Emergency Services)

Dennis Castrillo

☒ Native American Heritage Comm.

Debbie Treadway

☐ Public Utilities Commission

Leo Wong

☐ Santa Monica Bay Restoration

Guangyu Wang

☐ State Lands Commission

Jennifer Deleong

☐ Tahoe Regional Planning Agency (TRPA)

Cherry Jacques

Cal EPA

Air Resources Board

☒ All Other Projects

Cathi Slaminski

☐ Transportation Projects

Nesamani Kalandiur

☐ Industrial/Energy Projects

Mike Tollstrup

☐ State Water Resources Control Board

Regional Programs Unit

Division of Financial Assistance

☐ State Water Resources Control Board

Jeffery Werth

Division of Drinking Water

☐ State Water Resources Control Board

Student Intern, 401 Water Quality Certification Unit

Division of Water Quality

☐ State Water Resources Control Board

Phil Crader

Division of Water Rights

☐ Dept. of Toxic Substances Control

CEQA Tracking Center

☐ Department of Pesticide Regulation

CEQA Coordinator

Regional Water Quality Control Board (RWQCB)

☐ RWQCB 1

Cathleen Hudson

North Coast Region (1)

☐ RWQCB 2

Environmental Document Coordinator

San Francisco Bay Region (2)

☐ RWQCB 3

Central Coast Region (3)

☐ RWQCB 4

Teresa Rodgers

Los Angeles Region (4)

☐ RWQCB 5S

Central Valley Region (5)

☐ RWQCB 5F

Central Valley Region (5)

Fresno Branch Office

☐ RWQCB 5R

Central Valley Region (5)

Redding Branch Office

☐ RWQCB 6

Lahontan Region (6)

☐ RWQCB 6V

Lahontan Region (6)

Victorville Branch Office

☐ RWQCB 7

Colorado River Basin Region (7)

☐ RWQCB 8

Santa Ana Region (8)

☐ RWQCB 9

San Diego Region (9)

☐ Other

Conservancy

DEPARTMENT OF TRANSPORTATION

DISTRICT 11

PLANNING DIVISION

4050 TAYLOR STREET, M.S. 240

SAN DIEGO, CA 92110

PHONE (619) 688-6960

FAX (619) 688-4299

TTY 711



*Serious drought.
Help save water!*

ELUM 1 APR '15AM7:58

March 24, 2015

11-SD-5
PM 14.12
NOP TAMT

Mr. Larry Hofreiter
Port of San Diego
3165 Pacific Highway
San Diego, CA 92101

Dear Mr. Hofreiter:

The California Department of Transportation (Caltrans) appreciates the opportunity to have reviewed the Notice of Preparation (NOP) for the 10th Avenue Marine Terminal (TAMT) Redevelopment Plan to take primary access at Cesar E. Chavez Parkway. The development is located nearest to Interstate 5 (I-5) and State Route 75 (SR-75) within the community of Barrio Logan. Caltrans has the following comments:

A traffic impact study (TIS) is necessary to determine this proposed project's near-term and long-term impacts to the State facilities – existing and proposed – and to propose appropriate mitigation measures. The study should use as a guideline the *Caltrans Guide for the Preparation of Traffic Impact Studies*. Minimum contents of the traffic impact study are listed in Appendix "A" of the TIS guide. www.dot.ca.gov/hq/tpp/offices/ocp/igr_ceqa_files/tisguide.pdf

The Level of Service (LOS) for operating State highway facilities is based upon Measures of Effectiveness (MOE) identified in the Highway Capacity Manual (HCM). Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" on State highway facilities; however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. If an existing State highway facility is operating at less than this target LOS, the existing MOE should be maintained. In general, the region-wide goal for an acceptable LOS on all freeways, roadway segments, and intersections is "D". For undeveloped or not densely developed locations, the goal may be to achieve LOS "C".

All State-owned signalized intersections affected by this project should be analyzed using the intersecting lane vehicle (ILV) procedure from the Caltrans Highway Design Manual, Topic 406, page 400-21.

The geographic area examined in the traffic study should include as a minimum all regionally significant arterial system segments and intersections, including State highway facilities where the project will add over 100 peak hour trips. State highway facilities that are experiencing noticeable delays should be analyzed in the scope of the traffic study for projects that add 50 to 100 peak hour trips.

All freeway entrance and exit ramps where a proposed project will add a significant number of peak-hour trips that may cause any traffic queues to exceed storage capacities should be analyzed. If ramp metering is to occur, a ramp queue analysis for all nearby Caltrans metered on-ramps is required to identify the delay to motorists using the on-ramps and the storage necessary to accommodate the queuing. The effects of ramp metering should be analyzed in the traffic study. For metered freeway ramps, LOS does not apply. However, ramp meter delays above 15 minutes are considered excessive.

The data used in the TIS should not be more than 2 years old.

Caltrans endeavors that any direct and cumulative impacts to the State Highway System be eliminated or reduced to a level of insignificance pursuant to the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) standards.

Mitigation measures to State facilities should be included in TIS. Mitigation identified in the traffic study, subsequent environmental documents, and mitigation monitoring reports, should be coordinated with Caltrans to identify and implement the appropriate mitigation. This includes the actual implementation and collection of any "fair share" monies, as well as the appropriate timing of the mitigation. Mitigation improvements should be compatible with Caltrans concepts.

Mitigation measures for proposed intersection modifications are subject to the Caltrans Intersection Control Evaluation (ICE) policy (Traffic Operation Policy Directive 13-02). Alternative intersection design(s) will need to be considered in accordance with the ICE policy; therefore, please refer to the policy for more information and requirements.

<http://www.dot.ca.gov/hq/traffops/signtech/signdel/policy/13-02.pdf>

The lead agency should monitor impacts to insure that roadway segments and intersections remain at an acceptable LOS. Should the LOS reach unacceptable levels, the lead agency should delay the issuance of building permits for any project until the appropriate impact mitigation is implemented.

Mitigation conditioned as part of a local agency's development approval for improvements to State facilities can be implemented either through a Cooperative Agreement between Caltrans and the lead agency, or by the project proponent entering into an agreement directly with Caltrans for the mitigation. When that occurs, Caltrans will negotiate and execute a Traffic Mitigation Agreement.

Any work performed within Caltrans right-of-way (R/W) will require discretionary review and approval by Caltrans and an encroachment permit will be required for any work within the Caltrans R/W prior to construction.

As part of the encroachment permit process, the applicant must provide an approved final environmental document including the California Environmental Quality Act (CEQA) determination addressing any environmental impacts within the Caltrans' R/W, and any corresponding technical studies. If these materials are not included with the encroachment permit application, the applicant will be required to acquire and provide these to Caltrans before the permit application will be

Mr. Larry Hofreiter
March 24, 2015
Page 3

accepted. Identification of avoidance and/or mitigation measures will be a condition of the encroachment permit approval as well as procurement of any necessary regulatory and resource agency permits. Encroachment permit submittals that are incomplete can result in significant delays in permit approval.

Improvement plans for construction within State Highway R/W must include the appropriate engineering information consistent with the state code and signed and stamped by a professional engineer registered in the State of California. Caltrans Permit Manual contains a listing of typical information required for project plans. All design and construction must be in conformance with the Americans with Disabilities Act (ADA) requirements.

Additional information regarding encroachment permits may be obtained by contacting the Caltrans Permits Office at (619) 688-6158. Early coordination with Caltrans is strongly advised for all encroachment permits.

If you have any questions, or require further information, please contact Trent Clark, at (619) 688-3140 or email at Trent_Clark@dot.ca.gov.

Sincerely,



JACOB M. ARMSTRONG, Chief
Development Review Branch

PUBLIC UTILITIES COMMISSION

320 WEST 4TH STREET, SUITE 500
LOS ANGELES, CA 90013



April 7, 2015

Larry Hofreiter
San Diego Unified Port District
3165 Pacific Highway
San Diego, CA 92101

ELUM 7 APR '15AM11:54

Re: SCH 2015031046 – Tenth Avenue Marine Terminal (TAMT) Redevelopment Plan

Dear Mr. Hofreiter:

The California Public Utilities Commission (Commission) has jurisdiction over the safety of highway-rail crossings (crossings) in California. The California Public Utilities Code requires Commission approval for the construction or alteration of crossings and grants the Commission exclusive power on the design, alteration and closure of crossings. The Commission's Rail Crossings and Engineering Branch (RCEB) is in receipt of the *Notice of Preparation (NOP) for the Tenth Avenue Marine Terminal (TAMT) Redevelopment Plan draft Environmental Impact Report*. The San Diego Unified Port District (District) is the lead agency.

There are railroad and light rail transit tracks and crossings present in the vicinity of the project. Pedestrian and vehicular violations should be reviewed as part of the draft EIR. Any development adjacent to or near the railroad right-of-way (ROW) should be planned with the safety of the rail corridor in mind.

Additional traffic at intersections near highway-rail crossings may impact the ability of vehicles to move away from the tracks as a train is approaching. The need for traffic signal improvements or other improvements should be considered at those locations.

Modification to an existing public rail crossing requires authorization from the Commission. RCEB representatives are available for consultation on any potential safety impacts or concerns at crossings. Please continue to keep RCEB informed of the project's development. More information can be found at: <http://www.cpuc.ca.gov/PUC/safety/Rail/Crossings/index.htm>.

If you have any questions, please contact me at kevin.schumacher@cpuc.ca.gov or 415-310-9807.

Sincerely,

A handwritten signature in cursive script, appearing to read "Kevin Schumacher".

Kevin Schumacher
Utilities Engineer
Rail Crossings and Engineering Branch
Safety and Enforcement Division

CC: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044



Air Resources Board



Matthew Rodriguez
Secretary for
Environmental Protection

Mary D. Nichols, Chair
1001 I Street • P.O. Box 2815
Sacramento, California 95812 • www.arb.ca.gov

Edmund G. Brown Jr.
Governor

October 22, 2015

Mr. Larry Hofreiter
San Diego Unified Port District
3165 Pacific Highway
San Diego, California 92101

Dear Mr. Hofreiter:

Thank you for providing the California Air Resources Board (ARB) the opportunity to comment on the Notice of Preparation (NOP) for the Tenth Avenue Marine Terminal (TAMT) Redevelopment Plan (Plan) draft Environmental Impact Report (EIR). This new proposed Plan provides an opportunity to create a terminal that promotes the use of the cleanest technologies and practices available during both the construction phase and full project build-out.

The proposed Plan includes a number of features that begin to mitigate the air quality impacts of the proposed project. These features include 100-foot electrical cranes, electrical utility improvements, and on-terminal rail facility upgrades. However, the increase in cargo throughput from baseline conditions to 2035 is substantial. The long-term operation of diesel vehicles and equipment will likely have a significant impact in the region, especially given the proximity to residences and sensitive receptors. Should the project have significant impacts, the project features need to maximize the use of existing and emerging zero and near-zero emission technology for the vehicles and equipment that will serve the facility. Additionally, a full health risk assessment should be conducted and the air quality and health risk assessment should use both the existing conditions baseline and a future conditions baseline.

ARB staff concludes that it is extremely likely the proposed Plan will increase the health risk in the immediate area. Should the results of the EIR analysis find this to be the case, the proposed Plan should utilize all existing and emerging zero-emission technology and implement land use decisions that minimize diesel particulate matter (PM) exposure to the neighboring community. ARB staff believes that technology capable of zero and near-zero emissions is available now and will be available for additional applications in the early years of full project build-out. The final project conditions should provide for the use of those technologies now and in the future. This will serve to better protect the health of nearby residents from the harmful effects of fine

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website: <http://www.arb.ca.gov>.

California Environmental Protection Agency

particle pollution, including diesel PM, and help achieve emission reductions required to attain air quality standards for all pollutants and reduce greenhouse gases.

We recognize the critical role the proposed Plan will play in keeping the San Diego Unified Port District (Port) competitive well into the future. The scale of the proposed Plan provides the City of San Diego and the Port an opportunity to set a benchmark for environmental leadership for freight transport in California while expanding economic opportunities.

Background

The proposed Plan covers 96 acres along the San Diego Bay (near downtown San Diego and the San Diego community of Barrio Logan). The proposed Plan replaces the existing 2008 Maritime Business Plan to meet current and future market conditions at the terminal. The proposed Plan includes a variety of infrastructure investments and improvements to accommodate a need to increase the terminal's capabilities and capacity within a 2025 and 2035 planning horizon.

Proposed improvements include up to five gantry cranes (some of which are electric), additional and consolidated dry bulk storage capacity, enhancements to the existing conveyor system, additional open storage space, a refrigerator container node, and on-dock intermodal rail facilities. Development Scenario 1 in the Notice of Preparation, states that the proposed Plan can result in a throughput of 5,504,717 Metric Tons of cargo annually, an increase of 4,520,876 Metric Tons from baseline conditions.

Existing land uses surrounding the TAMT include several sensitive receptors: Cesar Chavez Park, Perkins Elementary School, and Mercado Head Start Preschool, as well as the residences, schools, childcare facilities, and healthcare facilities along the truck routes that would be used by the additional trucks entering and leaving the TAMT. Also adjacent is the San Diego community of Barrio Logan, which is already determined by the California Environmental Protection Agency (CalEPA) to be among the worst five percent in the State for cumulative pollution burden.¹

Project Design Features for Consideration

The majority of the probable localized cancer risk for the proposed Plan will likely be attributable to an increase in diesel PM from the construction and long-term operation of the facility. Consequently, ARB staff recommends actions to support the deployment of zero and near-zero emission technology to reduce localized health risk and regional

¹ Office of Environmental Health Hazard Assessment, "CalEnviro Screen Version 2.0," November, 10, 2014, <<http://oehha.ca.gov/ej/ces2.html>>, accessed April 30, 2015.

emissions. If analysis shows significant health or air quality impacts, consider implementing the following project features:

- 1) Incorporate zero and near-zero emission technologies that are commercially available over the course of project development and by full build-out in 2035. We believe that use of these technologies is feasible within the build-out years of the Plan². Support the deployment of these technologies including utilizing zero emission (such as battery electric or fuel cell electric) forklifts, electrified rail mounted gantry cranes, and battery electric and hybrid electric medium-duty trucks to the fullest extent feasible. These technologies are commercially available today. Additional advancements, especially for on-road trucks, are expected in the next three to five years; well before project build-out in 2035. ARB's Technology and Fuels Assessments provide information on the current and projected development of mobile source technologies and fuels, including current and anticipated costs at widespread deployment. The assessments can be found at <http://www.arb.ca.gov/msprog/tech/tech.htm>.
- 2) Implement, and plan accordingly for, the necessary infrastructure to support the zero emission and near-zero emission technology vehicles and equipment that will be operating at the TAMT at full build-out. This includes physical (e.g. needed footprint), energy, and fueling infrastructure for construction equipment, on-site vehicles and equipment, and medium-heavy and heavy-heavy duty trucks.
- 3) Ensure that the berths providing shore power can accommodate changes to vessel sizes and various berthing configurations. Additionally, consider installing shore power or equivalent alternate control techniques at all berths at the terminal in order to eliminate emissions to the greatest extent possible. ARB's Sustainable Freight: Pathways to Zero and Near-Zero Emissions Discussion Document has identified the development and proposal of amendments to the At-Berth Regulation as an action that will be pursued over the next few years and implemented before 2035, if approved by the Air Resources Board.
- 4) Ensure that the terminal will continue to be plug-in equipped for the volumes expected at project build-out. If not already implemented, eliminate the amount of time that a transport refrigeration system powered by a fossil-fueled internal combustion engine can operate utilizing the combustion system while at the TAMT. Use of zero emission all-electric plug-in transport refrigeration systems,

² For the purposes of CEQA, "feasible" means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors. (California Code of Regulations, title 14, section 15364)

hydrogen fuel cell transport refrigeration, and cryogenic transport refrigeration would be encouraged. We applaud the important work the Port has already done to make the terminal's cold storage and refrigerated container facilities state-of-the-art by including refrigerated container plugs and encourage continuing that practice.

- 5) Install an electronic gate access system (using Radio Frequency Identification tags for example) at the centralized common gate. This will allow for more efficient movement through the gate and will improve compliance with current regulations and programs for on-road trucks.
- 6) Ensure the cleanest possible construction practices and equipment are utilized. This should include eliminating idling of diesel powered equipment, requiring the use of zero and near-zero emission equipment and tools to the greatest extent feasible, and providing the necessary infrastructure, like electric hookups, to support that equipment. In addition, require all construction fleets be in compliance with current air quality regulations for off-road equipment. ARB is available to provide assistance in implementing this recommendation.
- 7) Ensure all tenants be in compliance and monitor compliance with all current air quality regulations for on-road trucks including ARB's Heavy-Duty Greenhouse Gas Regulation and Truck and Bus Regulation. ARB is available to provide assistance in implementing this recommendation.

Air Quality Analysis and Health Risk Assessment

Health Risk Guidance and Tools

ARB strongly recommends that a full health risk assessment is conducted. The health risk assessment should utilize the most current Office of Environmental Health Hazard Assessment (OEHHA) guidance for that assessment, which is presently the 2015 Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments found at http://oehha.ca.gov/air/hot_spots/hotspots2015.html.

Use of Current and Future Baseline in Health Risk and Air Quality Analysis

ARB also recommends that the health risk and air quality analysis use both the existing conditions baseline (current conditions) and a future conditions baseline (full build out year, without the project.) This analysis will be useful to the public in understanding the full impacts of the project. *Neighbors for Smart Rail v Exposition Metro Line Construction Authority* (2013) 57 C4th 439 confirmed the scope of a lead agency's

discretion on how to best define a baseline under the circumstances of rapidly changing environmental conditions, and confirmed that a project may be reviewed using both an existing conditions and future conditions baseline. In this situation, the project site is located in a non-attainment area for several State and federal criteria pollutants and is adjacent to residential areas, sensitive receptors, and the community of Barrio Logan. Additionally, full build out of the proposed Plan will not occur until 2035, when environmental conditions may be significantly different from current conditions due to full implementation of existing regulation and policy. For those reasons, it is important to ensure that the public has a complete understanding of the environmental impacts of the proposed Plan, as compared to both existing conditions and future conditions.

Use of Highest Cargo Throughput Scenario in Analysis

When developing the health risk assessment, use the scenario with the highest cargo throughput for the analysis of project impacts. Table 3.2 in the Notice of Preparation indicates that Development Scenario 1 would generate the highest volume increase in cargo throughput. This scenario should be used unless preliminary analysis indicates that the Development Scenario 2 or 3 would generate more significant impacts.

Other Recommendations

Coordinate and consult with the community on truck traffic circulation

We recognize the important work the Port has previously done in collaborating with the community to identify truck routes that divert truck traffic away from neighborhood streets. We request that you continue that coordination and consultation with the community, especially Barrio Logan, while considering truck traffic impacts and circulation that will result from this project.

Develop and consider a project design alternative that is the cleanest feasible

ARB requests the lead agency to develop and analyze a project design alternative that uses the cleanest feasible technologies, which also poses the lowest possible air quality and health risk impacts. That alternative should include all of the mitigation measures and project design features outlined in this letter.

Closing

ARB staff appreciates the opportunity to comment on the Notice of Preparation for the proposed Plan. Given the scale of the terminal and the risk associated with the increase in diesel PM, it is critical that the draft EIR incorporate the use of zero and

Mr. Larry Hofreiter
October 22, 2015
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near-zero emission technologies as they become commercially available. We are pleased to provide assistance for successful implementation and deployment of a state-of-the-art facility that serves the region's distribution and air quality needs, while protecting public health.

If you would like to understand more about ARB's freight related work, please see our Sustainable Freight: Pathways to Zero and Near-Zero Emissions Discussion Document at <http://www.arb.ca.gov/gmp/sfti/sfti.htm>. Please include the Air Resources Board to your State Clearinghouse list of selected State agencies that will receive the Draft EIR as part of the comment period. If you have questions, please contact Ms. Kelly Lier, Air Pollution Specialist, Freight Transport Branch, at (916) 322-7194 or Kelly.Lier@arb.ca.gov

Sincerely,



Heather Arias, Chief
Freight Transport Branch
Transportation & Toxics Division

cc: State Clearinghouse
P.O. Box 3044
Sacramento, California 95812-3044

Mr. Andy Hamilton
Section Supervisor
San Diego County Air Pollution Control District
10124 Old Grove Road
San Diego, California 92131-1649

Ms. Michelle White
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3165 Pacific Highway
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Continued next page.

Mr. Larry Hofreiter
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Page 7

cc: (continued)

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April 14, 2015

File Number 3330300

Mr. Larry Hofreiter
Environmental & Land Use Management Department
San Diego Unified Port District
3165 Pacific Highway
San Diego, CA 92101

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Unified Port District

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Tribal Chairmen's Association

Mexico

Dear Mr. Hofreiter:

SUBJECT: Comments on the Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the Tenth Avenue Marine Terminal (TAMT) Redevelopment Plan

Thank you for the opportunity to comment on the NOP for the TAMT Redevelopment Plan (UPD #EIR-2015-39).

Our comments are based on policies included in the Regional Comprehensive Plan (RCP) and the 2050 Regional Transportation Plan and its Sustainable Communities Strategy (2050 RTP/SCS) and are submitted from a regional perspective, emphasizing the need for land use and transportation coordination, and implementation of smart growth and sustainable development principles. The goal of these regional plans is to focus housing and job growth in urbanized areas where there is existing and planned transportation infrastructure to create a more sustainable region.

The 2050 RTP/SCS sets forth a multimodal approach to meeting the region's transportation needs. Therefore, it is recommended that the traffic analysis consider the needs of motorists, transit riders, pedestrians, and bicyclists, and the implementation of a robust Transportation Demand Management (TDM) Program. The San Diego Association of Governments (SANDAG) recommends that the following comments be addressed:

Multi-Modal Transportation Considerations

Harbor Drive is a critical local connector road for both Port terminals and is impacted by multiple traffic generators, including Naval Base San Diego and other working waterfront enterprises. SANDAG strongly encourages early and close coordination with the City of San Diego as this roadway is under their jurisdiction. Harbor Drive is a multimodal facility that includes part of the Bayshore Bikeway; please take this regional bikeway into consideration.

The TAMT Redevelopment Plan NOP states that improvements could result in a Maximum Practical Capacity (MPC) between 5 million and 5.5 million metric tons (MT), in comparison to the existing baseline condition of nearly 1 million MT. If this increase in supply should result in an increase in vehicle trips or an altered vehicle configuration, an in-depth traffic analysis should be developed that considers the impacts to site access and other related traffic impacts.

Long term employment is estimated to increase by nearly 460 jobs. Please consider methods of deterring single-occupancy car trips, such as local pedestrian/bicycle treatments and improvements that enhance access to the 12th and Imperial Transit Center.

Sidewalks along Harbor Drive alongside the project area and access to the Transit Center are limited. Please consider the safety and security of workers and other pedestrians, especially alongside major freight improvements, and consider providing alternative mode choices such as transit, biking, and walking to and from the site.

Goods Movement

Please ensure that, as needed, mitigation for potential impacts in relation to goods movement, especially air quality, greenhouse gas (GHG) emissions, and local transportation circulation, are adequately addressed.

Air Quality

Please note that the Port should refer to prevailing California Air Resources Board (CARB) regulations as well as CARB's evolving Sustainable Freight Pathways to Zero and Near-Zero Emissions documents, including technical appendices when assessing air quality and GHG-related impacts (see link below).

http://www.arb.ca.gov/gmp/sfti/Sustainable_Freight_Draft_4-3-2015.pdf

Aggregate Considerations

Please consider exploring opportunities for an aggregate off-loading, storage, and distribution facilities to serve redevelopment efforts in central San Diego area. It can be expensive to truck aggregate from outside the region and could be advantageous to have an aggregate supply facility located at the 10th Avenue Terminal. Below is a link to an example from the Port of Richmond.

<http://www.polarismaterials.com/operations-projects/richmond-terminal/Transportation>

Transportation Demand Management

To address potentially significant transportation and greenhouse gas emissions impacts anticipated as a result of the Tenth Avenue Marine Terminal Redevelopment Plan, please consider the implementation of transportation demand management (TDM) strategies as mitigation. Given the projected increase in employment during and after construction, TDM programs and services can reduce single-occupancy vehicle trips to and from the site. Examples of TDM measures that could be considered include designation of a transportation coordinator for industrial tenants and their employees, promotion of the Regional Vanpool Program and ridematching system to encourage carpooling among employees; subsidized transit passes for industrial tenants and their employees;

employee shuttle service; enhanced bicycle and pedestrian facilities that connect residents to regional bicycle facilities and transit service off Harbor Drive; bicycle amenities like secure and convenient bicycle parking, locker rooms and showers, and bike repair stands.

Please also consider a parking management plan to assist in reducing parking demand while encouraging the use of transportation alternatives to reduce traffic congestion. The SANDAG TDM division, iCommute, can assist with efforts to promote and implement TDM measures and parking management strategies as part of this project.

Other Considerations

We appreciate the opportunity to comment on the NOP for the TAMT Redevelopment Plan.

We encourage, where appropriate, consideration of the following tools in evaluating this project based on these SANDAG publications (which can be found on our website at sandag.org/igr):

1. Designing for Smart Growth, Creating Great Places in the San Diego Region
2. Planning and Designing for Pedestrians, Model Guidelines for the San Diego Region
3. Trip Generation for Smart Growth
4. Parking Strategies for Smart Growth
5. Regional Multimodal Transportation Analysis: Alternative Approaches for Preparing Multimodal Transportation Analysis in Environmental Impact Reports
6. Integrating Transportation Demand Management into the Planning and Development Process - A Reference for Cities
7. Riding to 2050, the San Diego Regional Bike Plan
8. SANDAG Regional Parking Management Toolbox

If you have any questions or concerns regarding this letter, please contact me at (619) 699-1943 or susan.baldwin@sandag.org.

Sincerely,



SUSAN BALDWIN
Senior Regional Planner

SBA/SST/

From: [Hower, Sean P](#)
To: [Larry Hofreiter](#)
Cc: ["sharon@sdpta.com"](mailto:sharon@sdpta.com)
Subject: NOP for Draft EIR Commentary
Date: Tuesday, April 14, 2015 10:52:52 AM

Hello Mr. Hofreiter,

The TAMT redevelopment plan forecast calls for a large amount of freight growth. Please keep in mind that, in supporting this growth, the port must also support rail capacity. Any portion of the growth that does not use rail infrastructure will add truck traffic on San Diego streets. The port needs to adopt a position of active rail advocacy in San Diego.

Best,
Sean

Sean Hower | Director, Port Business Development - PSW | *BNSF* Railway Company | *Office* 323-267-4151 | *Mobile* 817-676-6913 | 
sean.hower@bnsf.com



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San Diego Unified Port District
 Environmental & Land Use Management Department
 Attn: Larry Hofreiter
 3165 Pacific Highway
 San Diego, CA 92101
 Via email to: lhofreiter@portofsandiego.org

April 14, 2015

Re: EHC Comments on Notice of Preparation of an Environmental Impact Report for the Tenth Avenue Marine Terminal Redevelopment Plan

Dear Mr. Hofreiter:

Environmental Health Coalition is (EHC) is a 35-year-old nonprofit organization. EHC builds grassroots campaigns to confront the unjust consequences of toxic pollution, discriminatory land use, and unsustainable energy policies. Through leader development, organizing and advocacy, EHC improves the health of children, families, neighborhoods and the natural environment in the San Diego/Tijuana region.

EHC appreciates the opportunity to review the Notice of Preparation (NOP) for the programmatic Environmental Impact Report (EIR) for the Tenth Avenue Marine Terminal (TAMT) Redevelopment Plan. We concur with the conclusion that a full EIR is required for this potentially massive increase in cargo throughput, and we offer the following comments to ensure that the project impacts are fully analyzed and mitigated.

I. PROJECT DESCRIPTION

A. PROJECT OBJECTIVES

The Project Description provided in the NOP does not specify the project objectives. EHC suggests the project objectives for this long-range redevelopment plan should include the following objectives on energy, air quality, consistency with the California Air Resources Board (ARB) Sustainable Freight Strategy, greenhouse gas (GHG) emissions, and reduction of community impacts.

- Minimize or eliminate air pollution, traffic, and other environmental impacts on adjacent communities.
- Use cleanest available technologies for moving freight and powering equipment, vehicles and buildings for new and expanded or increased activities and operations on the TAMT, in order to reduce harmful impacts while allowing growth of terminal activity.

EMPOWERING PEOPLE. ORGANIZING COMMUNITIES. ACHIEVING JUSTICE.
EMPODERANDO A LA GENTE. ORGANIZANDO A LAS COMUNIDADES. LOGRANDO LA JUSTICIA.

- Align the TAMT Redevelopment Plan and any expansion of throughput with the current proposed goals of the ARB Sustainable Freight Strategy to:
 - i. Move goods more efficiently with zero/near zero emissions;
 - ii. Transition to cleaner, renewable transportation energy sources;
 - iii. Provide reliable velocity and expanded system capacity;
 - iv. Integrate with national and international freight transportation systems; and,
 - v. Support healthy, livable communities.¹
- Comply with or exceed the greenhouse gas reduction goals of the Port of San Diego's Climate Action Plan (10% below 2006 levels by 2020) and California's Executive Order S-3-05 (80% below 1990 levels by 2050). (See, *Sierra Club v. County of San Diego*, Case No. D064243; see also, Cal Health & Saf Code § 38551(b) ["It is the intent of the Legislature that the statewide greenhouse gas emissions limit continue in existence and be used to maintain and continue reductions in emissions of greenhouse gases beyond 2020."]).
- When storage of cargo is necessary, all cargo must be stored on TAMT, rather than off-tidelands, in order to minimize trucking, air quality, safety, and noise impacts on residences.

B. WORST CASE SCENARIO

Table 3.2 on page 7 of the NOP indicates the development scenario that would generate the highest volume increase in cargo throughput is Development Scenario 1 at 5,504,717 MT. This is the true worst case scenario and should be the one used for analysis of project impacts, *unless* preliminary analysis indicates that Scenario 2 or 3 would generate more truck trips, air emissions, or other significant impacts.

C. LIQUID BULK VOLUME

The analysis must use the maximum capacity (239,017 MT). If maximum capacity is not analyzed, the Port should implement a cap on new liquid imports or exports and analyzed the maximum capped amount. Given that the bulk liquids in question are flammable or combustible fuels, a large increase in import or export volumes has very significant health and safety impacts, which should be fully analyzed and mitigated in the EIR.

D. PROJECT LOCATION

Table 3-2 refers to new silos and domes for bulk storage "at each terminal." This should be amended to say, "....at each cargo node" if that is what is intended. Port staff indicated to us that

¹ Memo from Andre Boutos to ARB on California Freight Mobility Plan and National Freight Network Update, March 20, 2014.

“cargo nodes” is correct, rather than “at each terminal”²; however, we formally request this change.

E. PROJECT SCENARIOS NOT ANALYZED

The Redevelopment Plan in its current iteration contains two development scenarios that the Port does not consider to be potentially feasible. Thus, these alternatives need not be analyzed in the EIR. (CEQA Guideline §15126.6(a); *South County Citizens for Smart Growth v. County of Nevada* (2013) 221 Cal App. 4th 316, 327). Pursuant to CEQA, the Port must analyze feasible alternatives which are capable of being implemented. (*Id.*). Further, the Port should take its responsibility to analyze a reasonable range of project alternatives that avoid or substantially lessen environmental impacts. (CEQA Guideline §15126.6(b)). In doing so, EHC encourages the Port to study an alternative that meets the project objectives, but sets a cap on future throughput in order to lessen environmental impacts.

II. ANALYSIS OF ENVIRONMENTAL IMPACTS IN EIR

EHC concurs that a full EIR is needed for this redevelopment plan that will potentially increase cargo throughput by 550%. We offer recommendations below on baselines and significance thresholds to use in the analysis, as well as on specific environmental effects to analyze.

A. BASELINES

- The baselines for both air emissions and GHGs should be based on the 2013 Air Emission Inventory **and** the implementation of shorepower at Dole.
- Regarding baseline cargo throughput, use of the cargo throughput that corresponds with the 2013 Air Emissions inventory rather than the timeframe of July 2013 through June of 2014 would facilitate analysis of increased emissions over the baseline.

B. THRESHOLDS OF SIGNIFICANCE

- The thresholds of significance for criteria, toxic, or diesel pollutants should be set at No Net Increase. The San Diego air basin is out of attainment with the federal 8-hour ozone standard, and is out of attainment with state ozone and PM standards as well. The Lead Agency for a project has the legal authority and, in fact, is encouraged under CEQA Guidelines §15064.7 to develop and publish its own thresholds of significance. In determining whether an effect will be adverse or beneficial, **the lead agency shall consider the views held by members of the public in all areas affected as expressed in the whole record before the lead agency.** (§ 15064.7(c)) Lead agencies may also consider thresholds of significance previously adopted or recommended by other public agencies, or recommended by experts, **provided the decision of**

² Email from Larry Hofreiter to Joy Williams, March 23, 2015

the lead agency to adopt such thresholds is supported by substantial evidence.
(§15064.7(b))

- GHG emissions should be calculated as both an annual summation and a cumulative total because GHGs are persistent in the environment for decades.
- The threshold for significance for GHGs should be any level of emission that will cause a violation of the state's GHG reduction goal of 80% below 1990 levels by 2050, originally set by Executive Order S-3-05. (See, *Sierra Club v. County of San Diego*, Case No. D064243; see also, Cal Health & Saf Code § 38551(b) ["It is the intent of the Legislature that the statewide greenhouse gas emissions limit continue in existence and be used to maintain and continue reductions in emissions of greenhouse gases beyond 2020."])).

C. AIR QUALITY/HEALTH RISK

We agree with the Initial Study assessment that all aspects of air quality are potentially significant and must be analyzed in the EIR. As identified in the Initial Study, construction and operation of the project both have the potential to increase emissions of ozone-forming VOCs and particulate matter, criteria pollutants for which the region is out of attainment.

(a) Additional Air Quality Impacts

In addition to the criteria pollutants, it is important that the EIR include analysis of the following air quality/health risk factors:

- Potential increases in emissions of toxic air contaminants, including diesel exhaust and other mobile source pollutants. The analysis should be based on currently adopted regulations for cleaner engines and fuels, and not include any assumptions that fleets will get cleaner beyond current requirements. The analysis should assume a moderate level of noncompliance with rules for construction equipment and other non-drillage trucks, unless the Port adopts a general truck rule that prohibits any vehicles that are not in compliance with California's On-Road Heavy-Duty Bus and Truck Rule.
- Potential fugitive dust emissions resulting from bulk cargos in dry form, such as cement, soda ash, or bauxite. Cesar Chavez Park users—who are generally vulnerable populations including children, families, and homeless individuals-- have had previous experience with airborne soda ash pollution originating at TAMT and are concerned that increases in import or export of similar materials would impact air quality at the park.
- Fugitive dusts containing toxic contaminants from past land uses, released as a result of construction and new ongoing operations. According to the Initial Study, petroleum hydrocarbons, benzene, toluene, PAHs, SVOCs, and metals may be present in soil within portions of the site.
- Impacts, both positive and negative, of possible mode shifts between trucks and rail, and between barges and trucks (such as for cement coming into the region by barge rather than being trucked in).

- Impacts of any potential shifts of cargo to or from the National City Marine Terminal or National Distribution Center as a result of this plan, including impacts to National City residents.
- Impacts of cargo transportation to warehouses off-tidelands, within communities in the region. The analysis and plan should specify where additional cargo is to be stored and how it is to be transported. Communities adjacent to the cargo terminals remain concerned that cargo warehouses, such as the former Dole warehouse on Main Street in Barrio Logan, may be sited in residential neighborhoods and produce additional truck traffic, idling, and safety impacts. The Port should require that any storage of cargo be done on-tidelands, not off-tidelands near residences.
- Impacts of emissions associated with generation of electricity for new or expanded use of shorepower, new electric cargo handling equipment, and electric or hybrid electric commercial harbor craft.

(b) Sensitive Receptors

Air quality impacts should be analyzed at both a regional level and a local level. Potential pollution hot spots should be identified. Sensitive receptors include the following.

- Children and adults using Cesar Chavez Park.
- Perkins Elementary School, including the property across Main Street from the current Perkins parcel. The San Diego Unified School District has already made a clear commitment to purchase this property and use it to expand the school footprint, and the analysis must include evaluation of impacts to schoolchildren and school staff at this site.
- Residences, schools, and childcare and healthcare facilities within 500 feet of the truck routes that would be used by the additional trucks entering and leaving TAMT.
- The San Diego Continuing Education Center
- The Mercado Apartments
- Mercado Head Start PreSchool
- Workers at TAMT
- Potential residents in the Barrio Logan transition zone south of Main Street. Since the June 2014 citywide referendum overturned the Barrio Logan Community Plan adopted by the San Diego City Council in the fall of 2013, residential development in the transition zone is possible; analysis of impacts to residents must assume that residences may be present closer to TAMT than are current residences.

(c) Consider Location Specific Factors in Analysis of Impacts

CEQA Guidelines recognize that the level of impacts and their significance depends upon a multitude of factors such as project setting, design, construction, etc. CEQA Guidelines also call for careful judgment based on scientific and factual data to the extent possible and explain, "For example, an activity which may not be significant in an urban area may be significant in a rural

area.” (§ 15064(b)) Similarly, emissions of 100 lbs per day of particulate matter in the middle of Barrio Logan—an urban low-income community of color already determined by the California Environmental Protection Agency (CalEPA) to be among the worst 5% in the state for cumulative pollution burden³ — could potentially be more significant than 100 lbs per day of particulate matter in the middle of the desert with no nearby sensitive receptors.

Accordingly, the EIR must acknowledge that the project location sits directly adjacent to an area (Barrio Logan) identified by CalEPA as having a cumulative pollution burden that is among the worst 5% of zipcodes in the state.⁴

Further, available monitoring data indicate ambient air in the Barrio Logan area is more impacted by diesel particulate matter than is air in other communities. The following table compares the percentage of elemental carbon (EC) in total carbon fine particulate matter in three areas of the region. Because diesel exhaust, compared to gasoline, has relatively more EC as a percentage of total carbon, the higher percentages of EC indicate that more of the particulate matter in Barrio Logan originated from diesel engines. All three of these communities are traffic-impacted areas, with levels of PM2.5 higher than background levels⁵; however, the PM2.5 in Barrio Logan may be more harmful to health.

Table 1. Elemental Carbon (EC) as a Percentage of Total PM2.5 Carbon, 2012

Air Monitor	Average EC Percent	Maximum EC Percent
Barrio Logan (Beardsley)	21.9	44.3
El Cajon	14.6	24.5
Escondido	15.2	24.7

Source of data: US EPA, Air Data, from monitoring data submitted by SD APCD. Percentages compiled by EHC.
US EPA Air Data website: <https://ofmext.epa.gov/AQDMRS/aqdmrs.html>

Finally, on top of the many other public health and safety consequences of this pollution, children in Barrio Logan visit the ER for asthma-related incidents almost three times as often as children in the rest of the County.⁶ The evidence is undeniable and substantial.

³ <http://www.oehha.ca.gov/ej/ces2.html>

⁴ <http://www.oehha.ca.gov/ej/ces2.html>

⁵ Average annual PM2.5 levels in Barrio Logan (“Downtown San Diego”), El Cajon, and Escondido in 2013 were 10.3, 10.6, and 10.3 micrograms per cubic meter, respectively, versus 8.3 ug/m3 at the Kearny Mesa monitor. <http://www.sdapcd.org/info/reports/5-year-summary.pdf>.

⁶ Data on children’s Emergency Department visits with diagnoses of asthma are from the California Office of Statewide Health Planning and Development. Rates are generated using SANDAG current estimates of population by age for zipcodes in San Diego County. The most current data year is 2013.

The EIR air quality analysis must account for these local adverse conditions in assessing the impacts of additional emissions and the fact that any increase in air pollution would result in a cumulatively significant impact to the adjacent community and region.

(d) Consistency with Port Master Plan

The NOP acknowledges “if a project proposes development that is greater than that anticipated in the PMP and SANDAG’s growth projections, the project would be in conflict with the RAQS and SIP, and might have a potentially significant impact on air quality because emissions would exceed those estimated for the existing PMP. This situation would warrant further analysis to determine if a project would exceed growth projections used in the RAQS.” (NOP Initial Study, p11). We agree the project proposes extreme growth that may be in conflict with the Port Master Plan (PMP) and further study. The extreme growth proposed by this project and the proposed removal of the transit sheds both do not appear to be described in the PMP, would therefore be considered new and different from the approved PMP. As such, California Coastal Commission analysis and approval may also be warranted.

(e) Mitigations for Air Quality Impacts

Mitigations to reduce air quality impacts should include all of the following:

- Electric cargo handling equipment
- Hybrid tugboats
- Zero emission freight technologies as demonstration or pilot projects initially, and as requirements once they are commercially available
- Tier 4 or cleaner locomotives on terminal
- Shorepower or equivalent technologies for ships, including for ships that are not required to shorepower under California law
- Solar power on rooftops on and off the terminal
- Enforcement of California’s On-Road, Heavy-Duty Truck and Bus Rule
- Subsidize alternative transportation for workers
- Realignment infrastructure on Harbor Drive to support truck route

D. GREENHOUSE GAS EMISSIONS

EHC concurs that greenhouse gas (GHG) emissions will increase to the extent that ship calls, truck trips and increased rail activity, worker trips, and energy and water use increase. Our recommendations for analysis and mitigation of these impacts are as follows:

(a) Assessment of GHG Impacts Should Be Cumulative

Unlike other air pollutants that have limited atmospheric lifetimes, greenhouse gases remain in the atmosphere for years, decades, or centuries. To fully assess and mitigate the GHG impacts of the project on the Earth’s climate systems, the full atmospheric lifetimes of the greenhouse gases must be factored into the quantification of these gases over the project lifetime and beyond.

(b) Mitigation of GHGs: Projected Emissions Cannot Assume Reductions from Voluntary Policies

The Port's Climate Action Plan (CAP) may not be cited in the EIR as mitigation for the project's GHG impacts, as the CAP does not include any enforceable measures. Therefore the EIR cannot assume the project's compliance with the Port's CAP, unless specific actions are expressly required as an enforceable mitigation measure to this project.

(c) Mitigate GHG from Electricity Generation

If shorepowering is proposed as a mitigation measure for air quality, the EIR should also analyze the GHGs associated with the additional electricity needed and require that amount be offset by renewable energy. Renewable energy (on-site or nearby) should also be considered as a mitigation to offset other electricity use associated with the project.

(d) Threshold of Significance for GHGs Should Be Zero

The GHG significance threshold should examine the project's consistency with (a) the Port's CAP goal to reduce port-wide GHGs by 25% below 2006 levels by 2035⁷ and (b) State Executive Order S-3-05, which mandates statewide GHG emissions reductions of 80 percent below 1990 levels by 2050. Compliance with S-3-05 should be of particular legal concern given the precedent set in the SANDAG RTP lawsuit and the San Diego County Climate Action Plan. Further, in light of the Redevelopment Plan's 20-year planning horizon, compliance with AB 32 or the CARB Scoping Plan will not address the full extent of the Project's emissions (i.e. beyond 2020).

One method recommended by CAPCOA is to use a zero emissions threshold, which the CAPCOA explains "has merit" because:

*"Both large and small GHG generators cause the impact. While it may be true that many GHG sources are individually too small to make any noticeable difference to climate changes, it is also true that the countless small sources around the globe combine to produce a very substantial portion of the total GHG emissions. A zero threshold approach is based on a belief that, 1) all GHG emissions contribute to global climate change and could be considered significant, and 2) not controlling emissions from smaller sources would neglect a major portion of the GHG inventory."*⁸

⁷ Port of San Diego, Climate Action Plan, 2013, GHG Reduction Goals, p4 (does NOT state goal is for "new projects" anywhere)

⁸ CA Air Pollution Control Officers Association (CAPCOA), *CEQA and Climate Change- Evaluating and Addressing Greenhouse Gas Emissions From Projects Subject to the California Environmental Quality Act*, January 2008, p27

Whatever approach is taken, the Port must comply with foundational CEQA requirements, including an appropriate description of the baseline for purposes assessing the significance of the project's impacts and the appropriate level of mitigation.

Applying a business as usual ("BAU") threshold, as the Port proposed in the recent SDRS Draft MND, would be inappropriate, as the measure of the significance of the Project's GHG emissions must be against the baseline existing conditions (Guideline §15125(a)). (*Communities for a Better Environment v. South Coast Air Quality Management District* (2010) 48 Cal.4th 310, 322 ("CBE v. SCAQMD")). Further, the California Supreme Court is currently reviewing a challenge to the often-used and inappropriate "business as usual" approach. (*Center For Biological Diversity V. Department Of Fish And Wildlife (Newhall Land And Farming Company)*, Case: S217763, Supreme Court of California).

CEQA GHG analysis is governed by Guideline section 15064.4, which states a lead agency should consider three factors, among others, when assessing the significance of impacts from GHG emissions on the environment, including the "extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting." (Guideline §15064.4(b)(1), emphasis added). The environmental setting (the existing physical environment) will "normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant." (Guideline §15125(a)).

As the California Supreme Court held in *CBE v. SCAQMD*, "using hypothetical allowable conditions as the baseline results in 'illusory' comparisons that 'can only mislead the public as to the reality of the impacts and subvert full consideration of the actual environmental impacts,' a result at direct odds with CEQA's intent." (*CBE v. SCAQMD* (2010) 48 Cal.4th 310, 322 [citation omitted]).

E. HAZARDOUS MATERIALS

EHC concurs that hazardous materials impacts are potentially significant. We recommend an additional impact, not identified in the NOP, that should be analyzed is the potential for release of toxic and hazardous materials from the project site into the bay and adjacent communities under future conditions of higher sea levels, storm surges, and tsunamis. We recommend the EIR include analysis of this hazard.

F. LAND USE

(a) Port Transition Zone Policy Consistency

We recommend the EIR analyze whether the project impacts, such as the potential for additional trucks, warehouses, and other supporting uses in adjacent neighborhoods, would be consistent with the Port's Transition Zone Policy. In order to ensure compliance with the Port's Transition Zone Policy and minimize impacts to local residents, the Port should require that cargo storage, warehousing, and distribution be done on-Tidelands.

(b) Port Master Plan Potential Inconsistency

We disagree with the NOP's statement that "the project would not conflict with the PMP, CCA, or the Public Trust Doctrine or any other land use document adopted for the purpose of avoiding or mitigating an environmental effect".⁹ The PMP does not appear to describe the extreme growth proposed by this project, nor the proposed removal of the transit sheds to use the space for open storage rather than closed; therefore the project would therefore be considered new and different from the approved PMP and warrant further study in the EIR. The project's impacts on public access, safe and healthy enjoyment of Cesar Chavez Park, and water quality are also yet unknown and potentially significant. For all of these reasons, California Coastal Commission analysis and approval may also be warranted.

G. LIGHT POLLUTION

EHC agrees that analysis of light pollution must be included in the EIR. Light pollution is widely acknowledged as an impact of living near ports. In addition to sleep disruption and annoyance, light pollution has the potential to disrupt circadian rhythms and hormone levels, and increase cancer risk for hormone-related cancers such as breast and prostate.

Circadian rhythms affect physiological processes including brain wave patterns, hormone production, cell regulation, and other biologic activities. Disruption of the circadian clock is linked to several medical disorders in humans, including depression, insomnia, cardiovascular disease, and cancer.¹⁰

Excess light at night is also linked in epidemiologic studies to increases in breast cancer risk among night shift workers, and IARC in 2007 declared night shift work to be a Group 2A Probable Human Carcinogen. Researchers believe the increased cancer risk is linked to decreases in melatonin – a hormone secreted at night. Decreases in melatonin in turn produce a range of physiologic consequences including increased levels of estrogen.¹¹ The health risk appears not to be limited to night shift workers. A 2013 case-control study of patients with breast cancer in the state of Georgia found that high light exposure at night, as measured by satellite imaging, was associated with increased risk of breast cancer.¹²

Light pollution issues specific to residential areas near ports include general night time light, and flashing lights from straddle carriers and forklifts, as noted by the Natural Resources Defense Council.¹³

⁹ NOP Initial Study, p29

¹⁰ *Environmental Health Perspectives*, Vol. 117, Number 1, January 2009. Pp. A20-A27.

¹¹ *Ibid.*, p.A26.

¹² *International Journal of Health Geographics* 2013, 12:23 doi:10.1186/1476-072X-12-23.

¹³ <http://www.nrdc.org/air/pollution/ports1/overview.asp>.

Mitigations for light pollution may include:

- Use of energy efficient lighting;
- Use of guidelines such as those put forward by LEED or the International Dark-Sky Association for limiting total lumens and shielding light so that light pollution is minimized.
- Black out shades for Barrio Logan homes.

H. NOISE

EHC concurs that noise impacts could be significant and should be analyzed. It is important to consider night time noise as well as daytime noise, and impacts to workers as well as to residents. Assessment of noise should consider cumulative noise impacts, including truck traffic noise on surface streets and train noise, as well as noise generated by operations on the terminal. Residential noise standards should be used as the threshold of significance for noise impacts, not industrial or commercial levels, given that the impacted community is predominantly a residential neighborhood that includes schools, parks, and residences.

Potential mitigations for noise pollution include the following.

- Use of electric engines in place of fossil fueled engines throughout the terminal;
- Terminal design features such as quieter pavements;
- Sound barriers, such as a sound wall or trees, to insulate residential neighborhoods from TAMT noise;
- Constraints on night time construction or operations that generate noise at night.
- Regulate operation hours to morning to early evening time.

I. PUBLIC SERVICES

We believe that impacts to public services are potentially significant, and that this impact should be analyzed in the EIR. Potential impacts of significance include parks and firefighting resources.

(a) Impacts to Cesar Chavez Park

The project will impose impacts on the park, including dust, diesel emissions, noise, and additional traffic on Cesar Chavez Parkway south of Harbor. TAMT workers may use the parking area for their vehicles, making it more difficult for park users to find parking. Project mitigations could include upgrades to the park.

(b) Impacts to Firefighting Resources

Given that the project proposes a large-volume increase in the capacity for storage of liquid fuels on the terminal, the level of preparedness for a major fire event at the terminal should be assessed to determine the potential impact on firefighting resources of the region of a major fire. Potential mitigations for impacts to firefighting resources include:

- Storage of firefighting foam onsite at TAMT;
- Secondary containment for flammable liquids;

- A warning system for workers and the surrounding community in the event of a major fire or other disaster.

J. TRANSPORTATION/TRAFFIC

(a) Analysis of Impacts

We agree that impacts to transportation and traffic could be significant. The Traffic Impact Analysis should include estimates of additional truck trips to and from terminal and the potential impact of mode shifts. Impacts of additional employee transportation on traffic levels and on parking space within the Barrio Logan community should also be assessed.

(b) Mitigations

Potential mitigations for transportation and traffic impacts include the following.

- A multi-story parking structure for employees of industrial waterfront and terminal.
- Mode shifting from truck transport of cargo to rail and/or barge, to reduce truck trips through the community.
- Incentives to TAMT employees to carpool, use transit or bicycle, and/or park on the terminal rather than in the community.
- Ensure cargo is stored and handled at the terminal rather than at warehouses off-tidelands, near residences or other sensitive receptors within the community.
- Ensure established truck routes around the community are followed and enforced at all times.
- Implement and fund Harbor Drive infrastructure improvements for truck, pedestrian, and biking circulation.

K. WATER AND WASTEWATER

EHC concurs that impacts on water quality are potentially significant. We recommend the site be designed to retain onsite the pollutants contained in the volume of storm water runoff produced from a 24-hour 85th percentile storm event (design capture volume), as required under the 2013 MS4 permit for Priority Development Projects (PDPs). In addition, permeable pavement in place of impervious pavement would increase the capacity of the site to retain stormwater and reduce runoff. For all water quality and hydrology mitigation measures, the EIR and project permits must specify what maintenance will be required, how often, and who will have the responsibility for this maintenance.

Further, impacts to water quality based on substantial additional sources of polluted runoff will likely result in a significant impact. The most recent Tenth Avenue Marine Terminal monitoring reports under the General Industrial Stormwater Permit indicate the routine presence of an oily sheen during quarterly observations and violations of water quality limits (including the California Toxics Rule). By increasing output substantially, the project is likely (if not certain) to provide substantial additional sources of existing and new pollutants.

L. UTILITIES, SERVICE SYSTEMS, AND ENERGY

EHC concurs that increased energy use is potentially a significant impact and must be analyzed. Mitigations could include the following:

- Offset new electricity requirements with additional renewable energy resources either on or off the terminal, for example, solar PV at Perkins Elementary School.
- Offset new electricity requirements with electricity use reduction through efficiency measures elsewhere on-Tidelands or off-Tidelands, for example, retrofitting or retro commissioning buildings.
- Ensure all ships that call at TAMT are compliant with MARPOL Annex VI (2011 amendments) requirements for ship energy efficiency management, as verified by International Energy Efficiency certificates onboard.
- Pursuant to the CEQA requirement to describe feasible mitigation measures which could minimize significant adverse impacts, including inefficient and unnecessary consumption of energy, the Port should include and analyze the suggest mitigation measures in the EIR. (CEQA Guideline §15126.4(a)(1)).

M. MANDATORY FINDINGS OF SIGNIFICANCE

(a) Other Projects that Add to Cumulative Impacts

EHC concurs the project has impacts that could be cumulatively significant. Projects that could add to the cumulative burden of impacts on adjacent communities include the BAE expansion and plans by both Dole and Pasha to bring in more and/or larger ships with additional cargo tonnages. Impacts may extend to the National City community if increases in cargo throughput at TAMT result in shifting of cargo storage or distribution to NCMT.

(b) Environmental Justice

An additional issue related to the cumulative significance of the project is that, as noted above, the project area is already identified as a high-ranking area in California's screening model for cumulative environmental and social vulnerability, CalEnviroScreen. The project location sits directly adjacent to an area (Barrio Logan) identified by the California Environmental Protection Agency as having a cumulative pollution burden that is among the worst 5% of zipcodes in the state.¹⁴ This potentially massive project can have hugely detrimental impacts on the adjacent vulnerable communities, or it can enhance air quality, health, and the efficiency and economic vitality of maritime commerce if done in compliance with our recommended mitigation measures and with Port's Environmental Justice Guiding Principle for integrated planning:

“Seek to achieve environmental justice which shall be defined as: working to reduce the cumulative health burdens on neighboring communities and ensure fair treatment of people of all races, cultures, and incomes in developing, adopting, implementing, and enforcing environmental laws, regulations, and policies.”

¹⁴ <http://www.oehha.ca.gov/ej/ces2.html>

N. MITIGATIONS

(a) Local hire provisions.

The project is expected to provide up to 232 direct and indirect jobs in the construction phase and 459 direct and indirect jobs from operation of the expanded terminal. Local hire provides benefits to the community and also reduces impacts from worker travel to site and the need for worker housing in the region. We recommend local hire and job quality, safety, and training standards, and other community benefits be required in a Community Benefits Agreement.

A Community Benefits Agreement is especially important for this project in light of the fact that it will precede the development and final approval of the Port Master Plan Update, which will be the Port's broader visioning policy as influenced by public input. "Everyone rises with the tide. This is not happening today because of the 'piecemeal planning process' that is occurring which prevents a larger vision from being implemented and often results in litigation." (San Diego Port Master Plan Update Assessment Report Vision Statement and Guiding Principles, p. 10). Thus, because the TAMT Redevelopment Plan is undergoing the precise piecemeal planning process the Master Plan Update is intended to avoid, the Port should focus in particular on a Community Benefits Agreement which will ensure the broader goals of the Update are not frustrated by the TAMT Redevelopment Plan. As evidenced by the success of the Chula Vista Bayfront Master Plan, community cooperation and buy-in is integral to this type of project planning.

(b) Increased funding to MIIF. The Marine Industrial Impacts Fund is intended to reduce off-terminal impacts of on-terminal operations. Potential increases of over 500% in cargo throughput require corresponding increases in the magnitude of funding for the MIIF. The MIIF should not be relied upon as a funding source for mitigation of the TAMT project at this time; the project funding itself should pay for mitigating any anticipated impacts. Rather, the MIIF could be used for mitigation of future unanticipated impacts.

III. PUBLIC COMMENT PROCESS

We would like to thank Port staff for holding a second public scoping meeting on Wednesday, April 8, as the first scoping meeting conflicted with the Barrio Logan Community Planning group meeting. We appreciate staff's efforts and actions to ensure Barrio Logan residents (and National City residents and other stakeholders) were able to learn about the project in person and provide feedback in person, and we appreciate the provision of Spanish translation.

We are concerned, however, by a statement made by Port staff Jerine Rosato at the April 8 meeting that verbal comments would *not* be considered in the environmental review process and that all comments *must* be written to be a part of the record and influence the process. This appears to be in conflict the Port's policies values of transparency and public input. For example, the Port's Compass Strategic plan sets as a value:

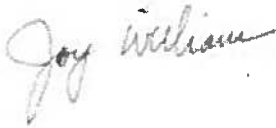
"Transparency is a commitment to our partners, stakeholders, and the community to enhance openness, public participation, access to information, outreach, and collaboration. Transparency promotes accountability, increased public trust, and a more efficient, effective and public-focused organization.

The Port's Compass Strategic plan also sets as a goal to be "A port that the public understands, trusts and values" including the strategy to "Solicit Feedback from stakeholders and respond to input."


Given that not all stakeholders have the capacity to provide written comments, it would be good public policy and consistent with the Port's own policies to allow, encourage, and consider stakeholder input in multiple formats, including verbal comments made at a public scoping meeting. We urge you to take into consideration the verbal comments that were made at both scoping meetings and allow and encourage multiple kinds of public input on future projects as well.

Thank you for the opportunity to comment on this NOP and the EIR that will be developed for redevelopment of TAMT.

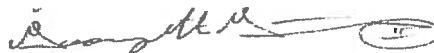
Sincerely,



Joy Williams
Research Director
joy@environmentalhealth.org
O. 619-474-0220 x110



Kayla Race
Policy Advocate
kaylar@environmentalhealth.org
O. 619-474-0220 x133
M. 617-909-8819



Georgette Gómez
Associate Director
georgetteg@environmentalhealth.org
O. 619-474-0220 x104
M. (619) 952-4589

CC: Mayra Medel, Associate Redevelopment Planner, mmedel@portofsandiego.org
Rebecca Harrington, Attorney, rharrington@portofsandiego.org
Tom Russell, Port Attorney, trussell@portofsandiego.org



April 22, 2014

Chair Bob Nelson and Port Commissioners
San Diego Unified Port District
Via Email

RE: Environmental Health Coalition comments on next steps for the TAMT PEIR analysis

Dear Chair Nelson and Commissioners:

Environmental Health Coalition (EHC) appreciates the additions by staff to the Scope of Work for the Programmatic Environmental Impact Report (PEIR) last month and the early briefing on the Business Plan for the Tenth Avenue Marine Terminal (TAMT). We also appreciate the opportunity to offer additional comments and suggestions on various aspects of the TAMT PEIR analysis. Please find our recommendations for the PEIR below.

Project Objectives:

1. The project objectives should include an objective on energy, air quality (no net increases), consistency with the Air Resources Board (ARB) Sustainable Freight Strategy, and reduction of community impacts such as:
 - a. Minimize or eliminate air pollution, traffic, and other environmental impacts on adjacent communities.
 - b. New and expanded or increased activities and operations on the TAMT will promote and use cleanest available technologies in order to reduce harmful impacts while allowing growth of terminal activity.
 - c. The TAMT expansion of through-put will align with the current proposed goals of the ARB Sustainable Freight Strategy to:
 - i. Move goods more efficiently with zero/near zero emissions;
 - ii. Transition to cleaner, renewable transportation energy sources;
 - iii. Provide reliable velocity and expanded system capacity;
 - iv. Integrate with national and international freight transportation systems; and,
 - v. Support healthy, liveable communities.¹

¹ Memo from Andre Boutos to ARB on California Freight Mobility Plan and National Freight Network Update, March 20, 2014.

Baselines:

2. The baseline for both the air quality and GHGs should be based on the 2013 Air Emission Inventory **and** the implementation of showerpower at Dole, which is already reducing local air emissions.
3. As ARB Resolution 14-2 notes, freight-related emissions, “...are a public health concern at both **regional and community levels** and also contribute to global warming.”(emphasis added)² In the TAMT PEIR analysis it will be important to include local hot spots analysis (Diesel Particulate Matter and Carbon Monoxide especially) as well as regional impacts.

Thresholds of Significance:

4. The thresholds of significance for Particulate Matter (PM) and NOx should be set at No Net Increase, especially since both are currently out of attainment in our air basin.
5. The thresholds of significance for criteria, toxic, or diesel pollutants should be set at No Net Increase.
6. GHG emissions should be calculated as both an annual summation and a cumulative total because GHGs are persistent in the environment.
7. The threshold for significance for GHGs should be any level of emission that will cause a violation of the state’s GHG reduction goal of 80% below 1990 levels by 2050. This requirement is based on the best available science. This goal has been reaffirmed as a state goal by Executive Order B-16-2012.³

Analysis:

8. We recommend that the Preferred Alternative (or a fully analyzed alternative) plan for all TAMT cargo activity to remain on TAMT so that the use of the National Distribution Center (NDC) for transfer be ended or significantly reduced.
9. If all containers and other cargo are not or cannot all be handled on the TAMT, then the resulting expected increased use and activity at the NDC, impacts from that facility and traffic between the two facilities must be analyzed in this PEIR as the two are directly related.
10. In addition, any increases at the NDC should be a cumulative project for the NCMT Master Planning EIR.
11. Analysis should include future land uses as well as current land use and assume Barrio Logan Community Plan Update (BLCPU) zoning and a Perkins School playground on Main Street. Analysis of health impacts must also include potential residential exposure in the transition zone if the Tenants’ referendum succeeds in overturning the BLCPU, as this would mean that no action to alter zoning could be

² Sustainable Freight Strategy Update, Air Resources Board Resolution 14-2, January 23, 2-14

³ Ibid, p.2

taken for one year and, moving forward, the current zoning allowing residences in the immediate vicinity of TAMT would remain.

12. We request an analysis of an alternative central gate location to determine if it can reduce truck trips, shorten distances, and ensures that the school, parks, and other sensitive uses are not more impacted.
13. We object to the finding of FONSI by the consultants when they have not even begun the analysis. Our cursory analysis demonstrates that this finding is premature.
14. Last, we fully support the action on the part of the Port to do a full EIR at this stage. The example mentioned at the April Port meeting of the South Bay Power plant demo is not comparable for several reasons. If the staff moves away from this level of analysis, we request the opportunity to respond with additional comments.

We will have several comments related to the mitigation measures that will need to be adopted to mitigate the impacts of this project over the next 20 years.

Thank you for the opportunity to comment on this important issue.

Sincerely,



Laura Hunter
Policy Advocate



Joy Williams
Research Director



Kayla Race
Policy Advocate

cc.

Joel Valenzula

Larry Hofreiter

Rebecca Harrington

Melissa Hocanson

From: Melissa Hocanson
Sent: Friday, April 17, 2015 3:21 PM
To: Melissa Hocanson
Subject: FW: CRM item #3033844 FW: Letter to the Port District, Environment and Land Use Department

Importance: High

From: CustomerServiceCenter
Sent: Friday, April 17, 2015 10:49 AM
To: Joely Habib
Cc: Laura Nicholson; Annette Walton
Subject: FW: Letter to the Port District, Environment and Land Use Department

Good morning,

Please review and update the following BP:

3033844 / 62339

From: kragand@cox.net [<mailto:kragand@cox.net>]
Sent: Thursday, April 16, 2015 11:02 PM
To: CustomerServiceCenter
Subject: Letter to the Port District, Environment and Land Use Department

Would you please see that the appropriate department receives the attached letter?

Thank you,

Kay Ragan, President

League of Women Voters San Diego

kragand@cox.net

May 16, 2015

To: San Diego United Port District, Environmental and Land Use Department

From: The League of Women Voters of San Diego

Regarding comments on the proposed Tenth Avenue Marine Terminal Redevelopment Plan (UPI) #EIR-2015-39

The League of Women Voters of San Diego supports the protection of the natural environment as a primary responsibility of the San Diego United Port District as well as recreation for the general public, maintenance of a balance of maritime comments and accountability and responsiveness to member cities and to the public. Furthermore, the Port District should promote clean air, healthy communities and environmental justice to reduce the cumulative health burdens on neighboring communities.

We are concerned about emissions this project could generate, that are associated with vessel calls, truck trips, increased rail activity, worker trips, energy and water use that could exceed established thresholds for greenhouse gas emissions (GHO) and the City of San Diego's Climate Action Plan.

CHG emissions that WOULD ALLOW A 400-500% increase generated by TAMT's proposed Redevelopment Plan could greatly impact the adjacent community of Barrio Logan, the Convention Center visitors and Downtown resident's air quality, resulting in health risks and a degraded environment.

We find it troubling that this project is being proposed as an unappeasable Coastal Development Permit and not subject to Costal Commission review. What authority or circumstance can you cite that will grant unappeasable approval of the TAMT project?

We urge you to address our comments on your website and respond to them in the Draft EIR.

Thank you for the opportunity to comment. We look forward to your response on these issues.

Respectfully Yours,

Kay Ragan
President, LWVSD

Cathy O'Leary
Port District Observer, LWVSD

Environmental Impact Report for Tenth Avenue Marine Terminal (TAMT) Proposal

The following is to be included to public input on the potential environmental effects of a proposed modernization plan for TAMT, located off Harbor Drive and Cesar Chavez Parkway:

In analyzing and comparing current tonnage and truck moves to Port's 2035 market forecast contained in the draft EIR report, the following are comments and questions:

1) The Port's current 95,232 truck moves falls within existing EIR in 2000, what is the maximum truck moves - verify if this is 110,000 truck moves, or if this was revised at some point subsequent to the 2000 EIR

2) The Port's 2035 forecast will create 405,162 truck moves, or 4 times current truck moves

3) Are there plans to directly connect TAMT with Hwy 5? There would be approximately 405,000 more trucks will be moving on Harbor Dr. by Barrio Logan community

Calculations are: 1,306 trucks/day in 2035 (based on 310 days/yr.), compared to 307 trucks/day in 2013-14, for an increase of 1,000 trucks/day by Barrio Logan

4) Even if the Port could get Caltrans funding to build overpass direct connect to Hwy 5, it is still 405,000 trucks moving a top Barrio Logan rooftops - is there another plan to mitigate this?

5) In analyzing other methods to transfer cargo off of TAMT besides trucks, has the Port reviewed the BNSF railroad's current cargo volume? What is the BNSF's capacity for the San Diego region? How will the proposed changes and upgrades to TAMT affect the existing BNSF rail line?

6) How was the projected cargo volume increases calculated? What were the assumptions made about future business/trade development? Is there any new firm cargo commitments to the Port that would pay for the proposed infrastructure changes/ modifications?

7) Has the Port prepared a preliminary cost-benefit analysis so it would support the proposed changes to TAMT?

8) Has the Port reviewed previous engineering reports that analyzed the installation of the gantry cranes? If so, have the cost estimates been reviewed?

9) What is the current cold storage facility cargo volume and will an increase to the future cargo volumes mean that the facility will have to be upgraded as well?

Prepared by: Mike VandenBergh
Mikejvandenbergh@aol.com

4-8-15

TO THE PORT DISTRICT,

As a native San Diegan, I've been interested in the growth of our city for many years.

—:—

Please feel free to keep and analize these sketches of ideas for downtown.

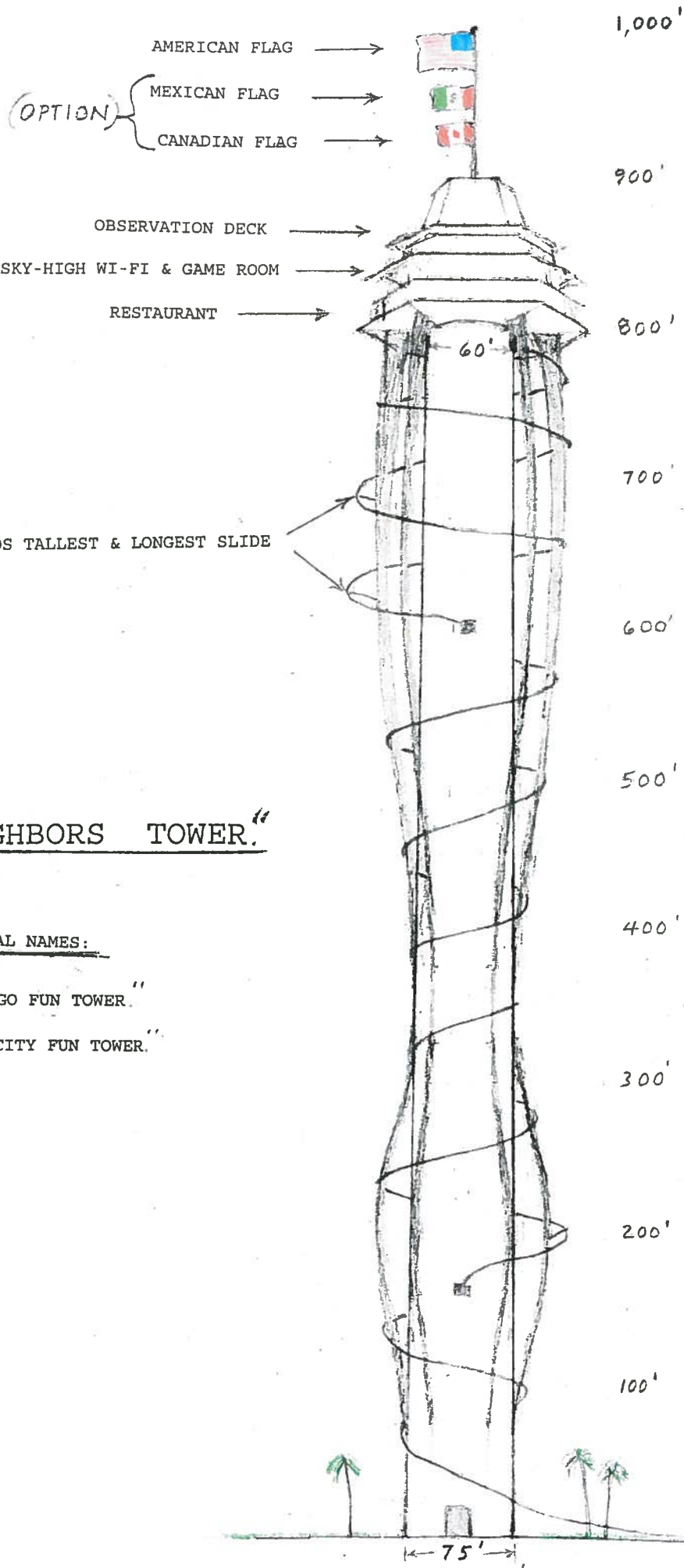
(Location; South of 500ft height limit.)

John Karpinski
12071 Alta Carmel Ct Unit 103
San Diego CA 92128-3816

RECEIVED

APR 08 2015

Env & Land Use Ping



"NEIGHBORS TOWER."

OPTIONAL NAMES:

"SAN DIEGO FUN TOWER."

"CENTRE CITY FUN TOWER."

RECEIVED

APR 08 2015

Env & Land Use Plng

1" = 100'

John Karpinski
12071 Alta Carmel Ct Unit 103
San Diego, CA 92128-3816

Downtown San Diego has everything except an amusement park. Here is a sketch of a "Fun Zone" for Downtown.

Worlds tallest flagpole.

RECEIVED

APR 08 2015

Env & Land Use Plng

Highest restaurant in Downtown.

Worlds tallest & longest water slide.

"The Drop."

700'

1000'

600'

Roller Coaster.

Ferris Wheel.

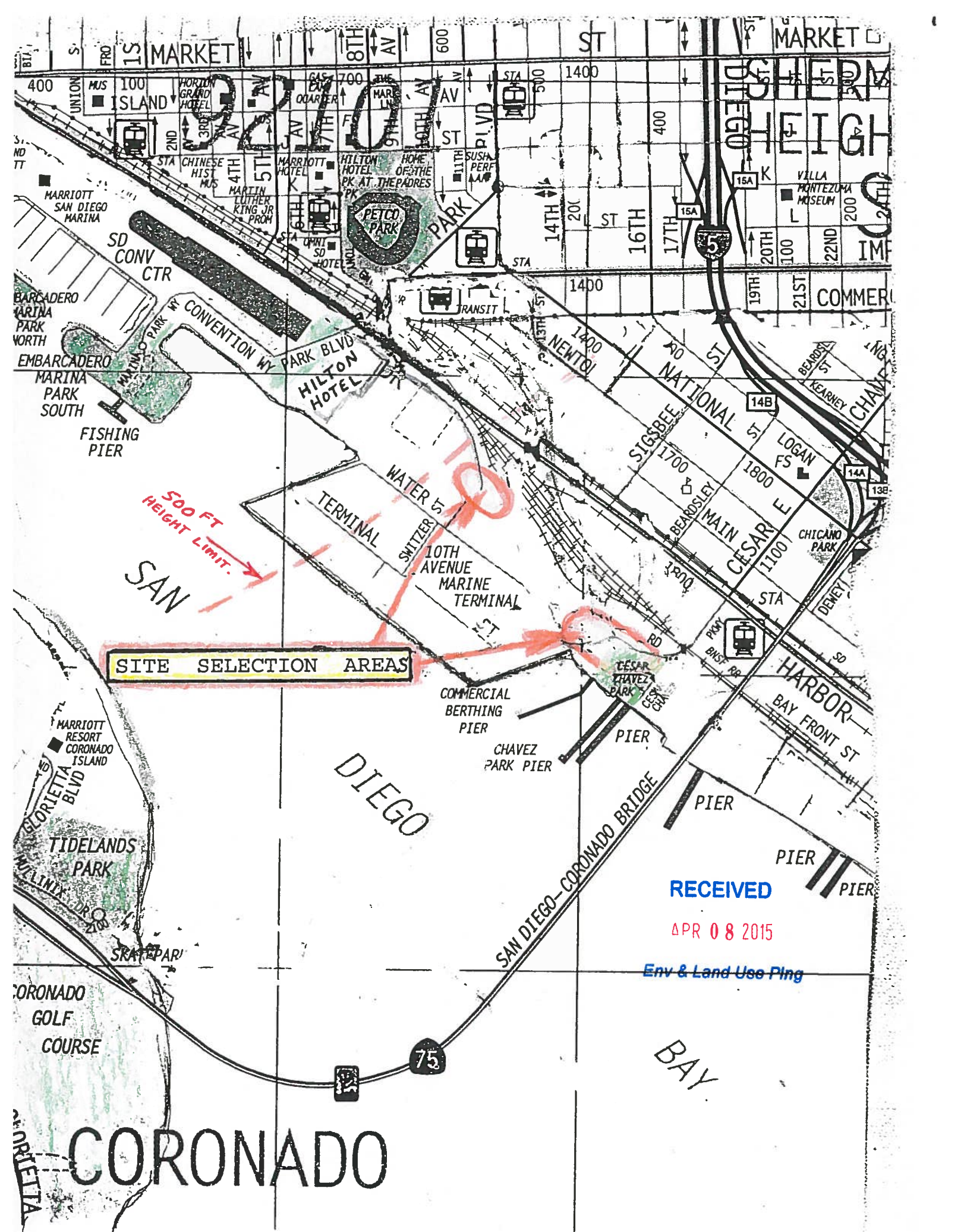
"CENTRE CITY FUN" or, "SAN DIEGO FUN" Amusement Park.

Location; South of 500ft height limit.

← to Convention Center. NW SE to Coronado Bridge. →

1" = 200'

John Karpinski
12071 Alta Carmel Ct Unit 103
San Diego, CA 92128-3816





RECEIVED

APR 08 2015

Env & Land Use Plng

Tenth Avenue Marine Terminal Redevelopment Plan (EIR)

COMMENTS REGARDING EIR SCOPE

PLEASE PRINT CLEARLY

NAME & ORGANIZATION: Bryan Constantino → Resident

MAILING ADDRESS: 1970 Julian Ave
San Diego, CA 92113

EMAIL ADDRESS: bryan-actea1@hotmail.com

Your checklist seemed to not be looking into certain features of the neighborhood and its residents.

Why is that? Shouldn't we have more benefits or importance to the residents?

~~THE~~ Our port will make people more money, and it is leaving our neighborhood. Why should we care about others when we get nothing in return?

Please use back side of sheet for additional comments...

Comments will be accepted in writing until **5:00 pm on Tuesday, April 14, 2015**.
Please submit via email to: lhofreiter@portofsandiego.org, via fax to: 619.686.6508,
OR via personal delivery or mail service to:
Larry Hofreiter, ELUM Dept.
Port of San Diego
3165 Pacific Highway
San Diego, CA 92101

From: [Cathy OLeary Carey](#)
To: [Larry Hofreiter](#)
Subject: Tenth avenue Marine Terminal Redevelopment Plan, comments
Date: Monday, April 13, 2015 10:21:53 PM

April 13, 2015

To: The San Diego Unified Port District, Environmental and Land Use Department
Regarding: the Proposed Tenth Avenue Marine Terminal Redevelopment Project
(UPD # EIR 2015-39)

We are concerned about the proposed Tenth Avenue Marine Redevelopment (TAMT) proposal because of its potential to further degrade the quality of the close environment, namely, Downtown San Diego, which has become increasingly residential, the San Diego Convention Center and Hilton Bayfront Hotel visitors and tourists, and the adjacent community of Barrio Logan.

We believe that the environmental factors considered in the Districts NOP may have a significant impact on the surrounding environment .
Therefore, if emissions from this project harm humans, nature and wildlife we oppose the TAMT Redevelopment project.

Lives and livelihoods that could be in harms way or at risk from the projects increased emissions must have priority over the Port's priority of increased profit margins and market shares.

We appreciate the opportunity to comment on this proposal.

Thank you,

Cathy O'Leary Carey and John Carey
cathycaper@sbcglobal.net
Tel # 858-385-0419

Cathy OLeary Carey

Tenth Avenue Marine Terminal Redevelopment Plan (EIR)

COMMENTS REGARDING EIR SCOPE

PLEASE PRINT CLEARLY

NAME & ORGANIZATION: Dan Wood, various groups

MAILING ADDRESS: 4539 166 Avenue
LA Mesa, CA. 91941

EMAIL ADDRESS: dwood8@cox.net

- ① When was the current Tenth Avenue Marine Terminal Redevelopment plan commissioned?
- ② Which consultant was hired to develop the ²⁰⁰⁸ current plan?
- ③ How was this consultant selected; open bidding or sole source?
- ④ What public input was received by the Port and the consultant, prior to the writing of the plan?
- ⑤ Who was consulted by the lead consultant as the plan was being written?
- ⑥ What TMT plan was updated as part of the current plan update?
- ⑦ Were the current TMT tenants consulted?
- ⑧ Were the freight, lines, ^{shipping} consulted?
- ⑨ Were Barrio Logan stakeholders like EHE consulted?
- ⑩ Was the Barrio Logan Planning Committee consulted?
- ⑪ Was the City of San Diego planning dept consulted?
- ⑫ Was the SD County Air Quality District consulted?
- ⑬ If the answer is no, when will these parties be consulted?

Please use back side of sheet for additional comments...

Comments will be accepted in writing until **5:00 pm** on **Tuesday, April 14, 2015**.
Please submit via email to: lhofreiter@portofsandiego.org, via fax to: 619.686.6508,

OR via personal delivery or mail service to:

Larry Hofreiter, ELUM Dept.

Port of San Diego

3165 Pacific Highway

San Diego, CA 92101



RECEIVED

MAR 18 2015

Env & Land Use Plng

Tenth Avenue Marine Terminal Redevelopment Plan (EIR)

COMMENTS REGARDING EIR SCOPE

PLEASE PRINT CLEARLY

NAME & ORGANIZATION: Don Wood, NBCC, C-3, etc.

MAILING ADDRESS: 4539 LEE AVENUE
LA MESA, CA. 91941

EMAIL ADDRESS: dwood@cox.net

Is this individual project going to become a component of the ongoing long term comprehensive planning process the Port is currently pursuing? How will this project fit into that larger planning process? How would implementation of this TANT redevelopment project affect all the other components of the long range comprehensive plan?

Does the Port plan to ask the California Coastal Commission as a component of the comprehensive plan, or is this being considered as a separate piecemeal project planning effort?

Please use back side of sheet for additional comments...

Comments will be accepted in writing until **5:00 pm on Tuesday, April 14, 2015**.
Please submit via email to: lhofreiter@portofsandiego.org, via fax to: 619.686.6508,

OR via personal delivery or mail service to:

Larry Hofreiter, ELUM Dept.

Port of San Diego
3165 Pacific Highway
San Diego, CA 92101



RECEIVED

MAR 18 2015

Env & Land Use Plng

Tenth Avenue Marine Terminal Redevelopment Plan (EIR)

COMMENTS REGARDING EIR SCOPE

PLEASE PRINT CLEARLY

NAME & ORGANIZATION: Dan Wood

MAILING ADDRESS: 4539 IEE AVE
LA MESA

EMAIL ADDRESS: DWOOD@COX.NET

Please Post 2008 business plan and VICKERS + ASSOCIATES TANT REDEVELOPMENT Plans on the Port's website and email me a link to those web pages.

Please use back side of sheet for additional comments...

Comments will be accepted in writing until **5:00 pm on Tuesday, April 14, 2015**.
Please submit via email to: lhofreiter@portofsandiego.org, via fax to: 619.686.6508,

OR via personal delivery or mail service to:

Larry Hofreiter, ELUM Dept.

Port of San Diego
3165 Pacific Highway
San Diego, CA 92101

RECEIVED

MAR 18 2015

Env & Land Use Plng

March 18, 2015

To: San Diego Unified Port District, Environmental & Land Use Department

From: Donald Wood

Subject: Initial Scoping Comments on proposed Tenth Avenue Marine Terminal Redevelopment Project (UPD #EIR 2015-39)

My name is Don Wood, and I have been involved in downtown San Diego waterfront planning issues since 1982. These initial comments respond to the Port's Notice of Preparation of a Draft Environmental Impact Report and Notice of Public Scoping Meeting mailed out on March 11, 2015.

In addition to the factors listed in the above notice, please add a full assessment of the potential impacts on existing public access and public views that might be created by this proposed project. In addition, the draft EIR should identify all potential impacts to air quality affecting the terminal and the nearby Bario Logan neighborhood, examine each of those potential impacts in detail, and fully describe actions the Port proposes to take to fully mitigate those impacts.

The draft EIR should examine a wide range of alternative uses for this property that might have less impact on surrounding neighborhoods. One key alternative that should be fully examined in the draft EIR must be moving existing cruise ship operations from the North Embarcadero down to the Tenth Avenue Marine Terminal (TAMT). This should include berthing cruise ships at TAMT, or moving them to berths along a longer version of the existing pier west of the Bayfront Hilton, thereby freeing up the B Street Pier and Broadway Pier for more public uses, including new restaurants and expansion of berthing for the vessels of the San Diego Maritime Museum.

I may supplement these initial comments after seeing the staff presentation this evening, but in any case please post these initial comments on your project website and fully respond to them in the draft EIR.

Thank you.



Don Wood
619-463-9035
Dwood8@cox.net

Appendix C
Tenth Avenue Marine Terminal Redevelopment Plan



FINAL REPORT December 2014



Tenth Avenue Marine Terminal (TAMT) **Redevelopment Plan**

]

Final Report

Date: December 14, 2014

(SDUPD Consultant Agreement Document No. 60457, dated June 10, 2013, Incorporating Amendments No. 1 through No. 4, and Amendments)

Prepared for:



Prepared by



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ABSTRACT

The San Diego Unified Port District (“SDUPD” and “the District”) commissioned Vickerman and Associates (“V&A”) team update the San Diego Unified Port District Maritime Business Plan (“2008 Business Plan”) published in December 2008 by the Port of San Diego. The overall objective of the Tenth Avenue Marine Terminal Redevelopment Plan (“Redevelopment Plan” or “the Plan”) is to provide the District with a series of market driven port terminal development concepts for the Tenth Avenue Marine Terminal (TAMT).

The Plan updates the maximum practical capacities to meet potential 2035 needs and provides an overall flexible strategic market direction. It establishes an overall business framework within which project decisions should be made. The Plan’s total MPC for TAMT depends on the overall business framework, and it is estimated to be between 5,000,000 and 6,000,000 metric tons.

Table 1. V&A Estimated Maximum Practical Capacity in Metric Tons¹

Multipurpose Alternative	Neo Bulk and Break Bulk	Reefer & Dry Containers	Dry Bulk	Liquid Bulk	Total
Auto / Truck Terminal	583,850	1,555,840	2,650,000	239,017	5,028,707
General Cargo Omni Ro/Ro Terminal	977,400	1,555,840	2,650,000	239,017	5,422,257
Break-bulk and Neo-bulk Omni Type Terminal	327,700	2,288,000	2,650,000	239,017	5,504,717
Full Container Refrigerated & Dry	0	2,960,840	2,650,000	239,017	5,849,857
Dry Container Full Build Out	0	3,155,840	2,650,000	239,017	6,044,857

The Redevelopment Plan relies on the SDUPD Climate Action Plan for findings and recommendations associated with “Sustainability”.

The Redevelopment Plan’s optimum development concepts recommend that the District’s focus should be on the following key strategic development issues:

1. Improvements need to be market-driven and follow a market forecast (Market Forecast Demand Minus Current Terminal Capacity Equals Justifiable Terminal Needs and Requirements). A Modular Operating Grid System (MOGS) should be used in the planning, design and construction of improvements.
2. Improvements need to maximize cargo throughput capabilities and efficiencies, meet the District’s Climate Action Plan policies and procedures, and provide the District with competitive financial return on the District’s investment
3. District’s marine-oriented industrial uses (TAMT and NCMT) need to be modernize to meet the present day pressures of the maritime industry.

¹ The Redevelopment Plan uses metric tons for consistency throughout the report. However, the District maintains tonnage reports using metric revenue tons (unit of measure used in calculating wharfage). Cargo can be measured by either weight (metric tons) or by size and measurement (cubic meters).

4. *Successful implementation of any improvement needs to focus on the recommended operating nodes: Multipurpose Dry Bulk Cargo, Containerized Fresh Fruit, Liquid Bulk, and Multipurpose General Cargo Neo-bulk and Containerized Cargoes operations.*
5. *The cargoes associated with these operating nodes remain a good fit for TAMT into the future.*
6. *The 2008 Business Plan recommendation to demolition Transit Sheds # 1 and # 2 is a high priority to remove notable operational constraints.*
7. *Employ a Central Gate planning node to provide tenant-in-common services and establish a practical "freight only" gate complex. Implementation needs to be in cooperation with all users of TAMT. TAMT needs to maintain a second access and egress gate for emergency situations.*
8. *When the market requires, employ on-dock intermodal operations to help reduce annual truck trips from TAMT.*
9. *The District needs to commit to near-term maritime opportunities and anticipate long-term future terminal opportunities. The District's Maritime marketing and sales cooperation to facilitate the growth of the current tenants and cargo base, including locally based project cargo, should remain, but the actual booking of cargo remains the responsibility of the carriers and customers.*
10. *While dredging all berths to 42 feet MLLW may be beneficial, the Plan does not recommend dredging 10-1 and 10-2 due to operational and financial constraints.*

**Tenth Avenue Marine Terminal (TAMT)
Redevelopment Plan**

Executive Summary

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I. Background and Introduction:

The San Diego Unified Port District (“SDUPD” and “the District”) commissioned Vickerman and Associates (“V&A”) to update the San Diego Unified Port District Maritime Business Plan (“2008 Business Plan”) published in December 2008. The overall objective of the Tenth Avenue Marine Terminal Redevelopment Plan (“Redevelopment Plan” or “the Plan”) is to provide a series of market driven port terminal development concepts for the Tenth Avenue Marine Terminal (TAMT).

TAMT is a 96-acre deep-water marine terminal located along the San Diego Bay, west of Harbor Drive, between San Diego and the Coronado Bay Bridge, and immediately adjacent to the Barrio Logan neighborhood and north of three water-dependent shipyards. A BNSF rail facility is located between the terminal and Harbor Drive. There are terminal rail spurs serving facilities on TAMT and on-dock rail adjacent to the berths.

The Redevelopment Plan is an analysis of TAMT development opportunities with particular attention paid to infrastructure and transportation improvements that maximize cargo growth.

Intent of the TAMT Redevelopment Plan:

The Plan includes a discussion of emerging industry-wide maritime and intermodal trends, a review of the TAMT actual cargo throughput, and a market assessment and forecast. The Plan uses the 2008 Business Plan’s **Maximum Practical Capacity (“MPC”)** calculations.

Table 2. 2008 Business Plan Maximum Practical Capacity Calculations (Metric Tons)

Cargo Handling Mode	Berth MPC Metric Tons (MTs)	Storage MPC Metric Tons (MTs)
Neo bulk and Break bulk	940,000	1,670,000
Containers	730,000	730,000
Dry Bulk	2,650,000	2,250,000
Liquid Bulk	220,000	220,000
Total Cargo Handling Mode MPC	4,540,000	4,870,000

The Plan updates the above maximum practical capacities to meet potential 2035 needs and provides an overall flexible strategic market direction. Most important it establishes an overall business framework within which project decisions should be made. The Plan has a range for TAMT’s total MPC depending on the overall business framework between 5,000,000 and 6,000,000 metric tons

Order of Magnitude and Cost Estimates:

Whenever cost estimates are presented or referenced, they are to be considered as an order of magnitude “*Opinion of Probable Cost*”. The improvement costs are not guarantee maximum figures.

Navigation Channels in San Diego Bay:

The Federal navigational entrance channel characteristics in the San Diego Bay, with regards to the mean lower low water (MLLW) datum remain unchanged by the Redevelopment Plan.

Tenth Avenue Marine Terminal Berths:

TAMT has eight (8) operating berths totaling 4,620 linear feet on three separate waterfronts:

Table 3. Length, Depth, and Special Characteristics

Berths	Length	Depth Berth-side	Primary Customer	Special Characteristics
10 -1 & 10-2	1,118 lf	30 ' MLLW	Dole	Fuel, Water, Vessel Electricity
10-3, 10-4, 10-5 & 10-6	2,580 lf	42 ' MLLW	CEMEX with Siwertell Bulk Loading at 5 & 6	Fuel, Water, Vessel Electricity (3&4)
10-7 & 10-8	650 lf	36 ' MLLW	Searles Valley Minerals Bulk Unloading System	Fuel, Water

Aerial Photo of TAMT



Source: SDUPD

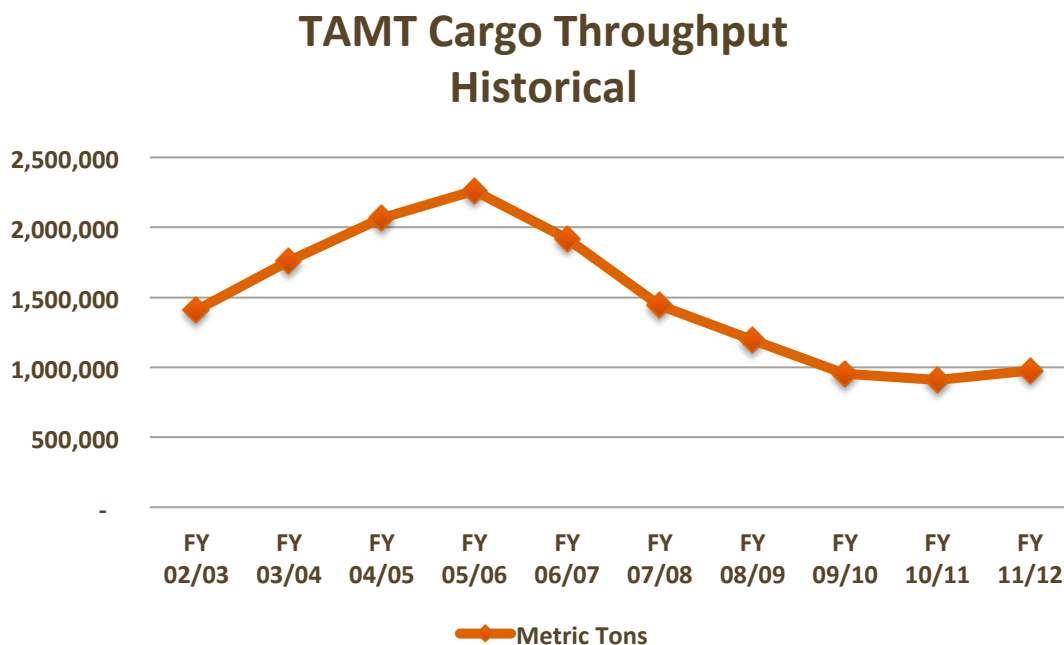
Tenth Avenue Marine Terminal Commodities:

Tenants at TAMT handle containerized fruit, break-bulk fruit, dry bulk, liquid bulk, and project cargo (“neo-bulk”). TAMT offers dockside cool or frozen storage, break bulk transit sheds, dry bulk unloading and storage capabilities (silo and flat storage), and open terminal area for project cargo. Over the years, principal inbound cargoes have been refrigerated commodities (bananas, pineapples and other tropical fruits), dry bulk commodities (fertilizers, bauxite, sand, and cement), liquid bulk products (molasses and petroleum products), break-bulk commodities (bagged and palletized products) and neo-bulk commodities (rolls of newsprint, yachts, steel products, and wind

energy components). Export cargoes include much of the same commodities but in smaller quantities.

Historic Cargo Tonnage Throughput:

Cargo throughput and trend for TAMT from FY 02/03 to FY 11/12 is shown below:



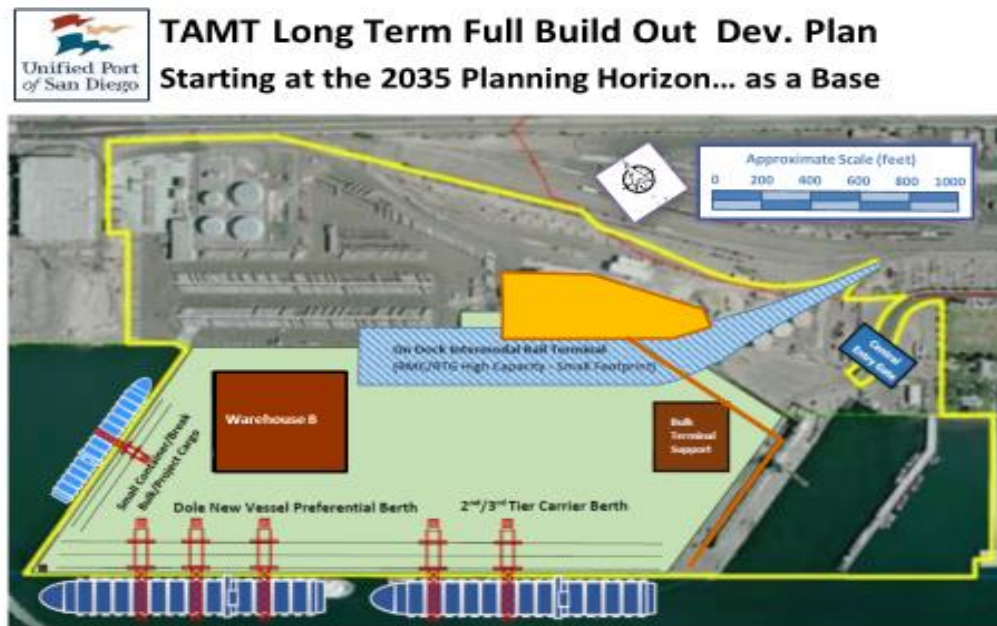
Source - SDUPD Maritime Division Cargo Report 9/11/12

II. Vickerman & Associates Scope of Work:

In response to the SDUPD RFQ # 566886, V&A was commissioned by the District on June 10, 2013, Document # 60457, to assist the District with a Tenth Avenue Marine Terminal ("TAMT") Redevelopment Plan. The scope of work involved a process that has been successful in 67 of the 90 North American deep-water general cargo ports that have benefited from the V&A strategic planning process. The steps in this process were the assessment of existing terminal conditions and a terminal cargo throughput analysis and terminal needs assessment resulting in a terminal facilities initial building program solution.

The TAMT Working Team, consisting of V&A and SDUPD Staff, employed a process referred to as "SITE WEEK" (SITE is an acronym for System of Intensive Team Effort). SITE WEEK for this project occurred June 4th to 7th, 2013. An important product of SITE was the preparation of a long-term concept for the redevelopment of the terminal.

Illustration. Long Term S.I.T.E. Optimum Development Concept



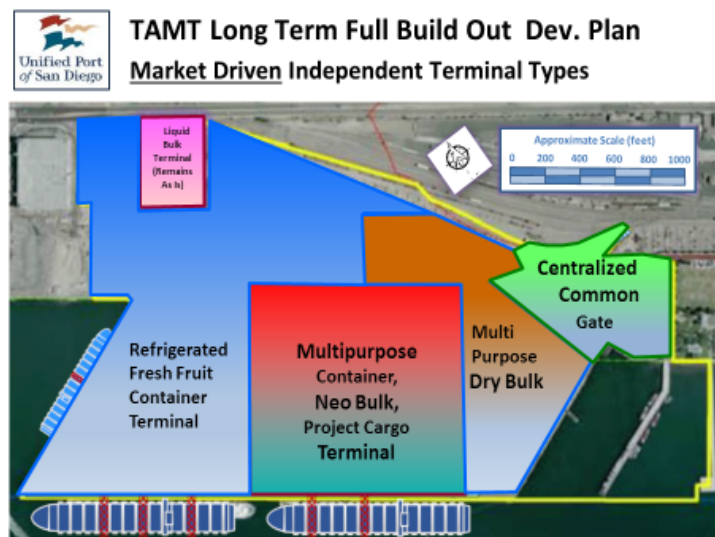
Source: Vickerman & Associates 2014

III. Approach and Methodology:

The TAMT Redevelopment Plan methodology used data from a variety of sources including business and market factors. Sources include:

- Previous reports and forecasts prepared for the District
- The maximum practical cargo estimates calculated in the 2008 Business Plan.
- A market forecast using US, State and Regional GDP's
- A facility needs assessment with staff and customer input
- Customers' cargo forecasts and market assessments

The Plan's market-driven approach is summarized by the formula "**Forecast less Capacity equals Need**" ($F - C = N$). Market conditions will change, therefore the phasing for individual opportunities and projects are suggested for **general planning purposes**. The fundamental building blocks for the Plan divide TAMT into four (4) operating nodes and one (1) planning node.



Source: Vickerman & Associates 2014

The Operating nodes are the Multi Purpose Dry Bulk, Liquid Bulk Terminal, Refrigerated Fresh Fruit Container Terminal, and Multipurpose Container, Neo Bulk, Project Cargo Terminal. The Planning node is the Centralized Common Gate.

IV. SDUPD Planning Documents and Prior Studies:

SDUPD CLIMATE ACTION PLAN (“CAP”):

The SDUPD developed a comprehensive Climate Action Plan (“CAP”) in 2013. The CAP served as a framework for the preparation of the Redevelopment Plan. While the Redevelopment Plan does not discuss specific implementation, tracking, and monitoring of the CAPS’s measure, the Plan does attempt to follow the CAP’s guiding principles and overarching policies.

The CAP policies and measures are companion measures and should be read as companion documents with the Redevelopment Plan. Some of the principles that apply to the recommendations and findings of the Redevelopment Plan include:

- Encourage uses of alternative fueled cargo handling equipment and terminal and stationary equipment.
- Implement appropriate roadway management systems on access and egress roads serving TAMT.
- The on-dock and near-dock rail freight system should be used, when and where, appropriate and feasible.
- Terminal improvements must incorporate energy performance standards, achieve reduction in energy usage and employ state-of-the-art technology, when practical and feasible.
- High mast terminal lighting should include low energy bulbs and should incorporate standards and measures to meet OSHA and marine terminal standards consistent with the CAP.
- TAMT improvements and operations should attempt to capture and use recycled water and meet the highest standard for capture and discharge of storm water run-off.
- Improvements should include water conservation measures during construction and CAP standards for water conservation during operations.
- Where practical and feasible, implement renewable energy sources for TAMT operations and establish a “Smart Grid” to allow management and automatic adjustments for the electrical demands associated with the refrigerated containers and the on-term cold storage facility.
- Reduce waste and encourage recycling.

SDUPD Master Plan adopted March 18, 1984:

An important Port Master Plan guideline is: ***“Existing, established marine-oriented industrial areas that have been devoted to transportation, commerce, industry and manufacturing are encouraged to modernize and to construct necessary facilities within these established areas in order to minimize or eliminate the necessity for future dredging and filling in new areas.”***

The Redevelopment Plan is not an amendment or modification to the Port District’s approved and certified Port Master Plan.

SDUPD, Final Report, Maritime Business Plan Update, TEC Inc. December 2008:

The San Diego Unified Port District engaged TEC Inc. in August 2006, to update a 1999 Port of San Diego Marine Terminal Business Plan. The Redevelopment Plan is intended to update this Plan.

Port Development Compared to a Pipeline:

Factors that influence a terminals throughput include:

- Vessel and Berth Activities
- Ship-to-Apron Transfer
- Apron-to Storage Transfer
- Storage
- Intermodal Transfer



Since physical factors at TAMT have not changed since the 2008 Business Plan, the Redevelopment Plan relies on the berth, storage and customer MPC's calculated by that Report.

Table 4. Maximum Practical Capacity as Calculated in 2008 (Metric Tons per Year)

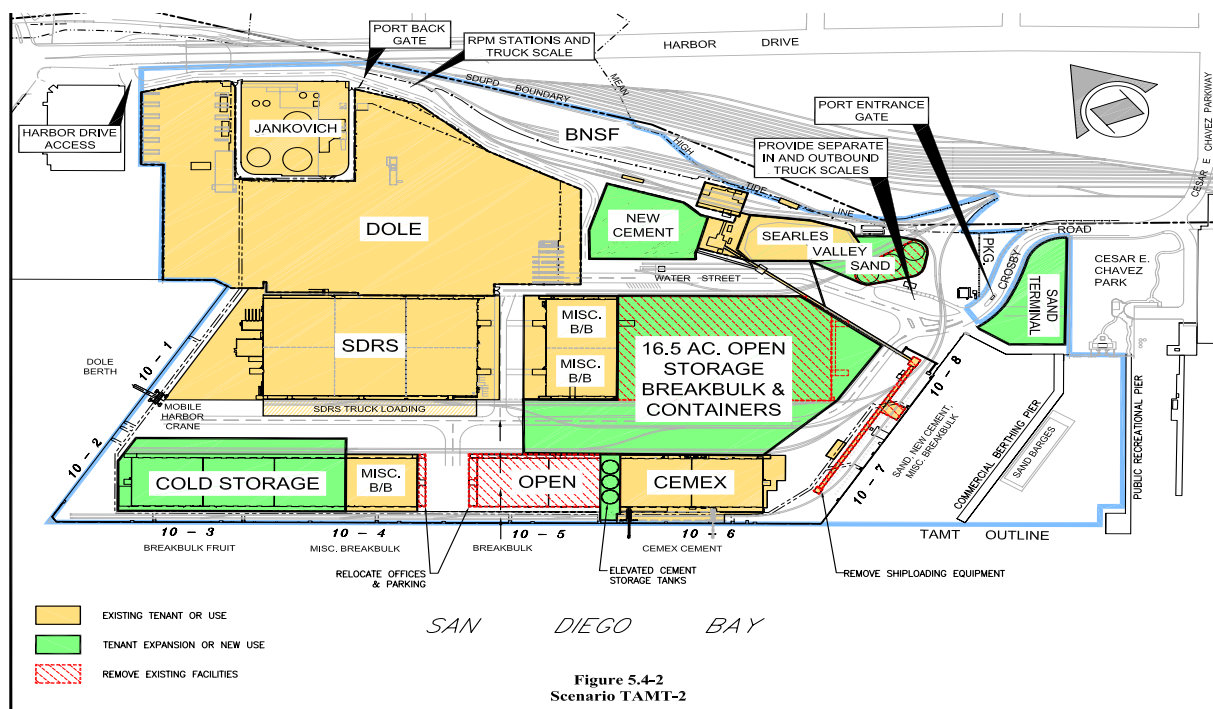
Cargo Mode	TEC Berth MPC	TEC Storage MPC	TEC Customer MPC
Break Bulk	940,000	1,670,000	1,295,000
Containers	730,000	730,000	730,000
Dry Bulk	2,650,000	2,250,000	2,625,000
Liquid Bulk	220,000	220,000	220,000
TOTAL	4,540,000	4,870,000	4,870,000

Table 5. Maximum Practical Capacity as Calculated in 2008 based upon Customers

<i>Tenant</i>	<i>Maximum Practical Throughput Capacity</i>	<i>Notable Constraints</i>
CEMEX	750,000 mt	storage capacity, ship unloader undersized; reclaim to truck station inefficient
Future Cement (CEMEX).	375,000 mt	Future, potential throughput if additional CEMEX cement storage is provided
Searles Valley - Soda Ash, etc. Searles Valley - Sand	1,000,000 mt (silos) 500,000 mt (open)	N/A (silo complex inactive) Dry bulk open-air storage capacity; truck loading system
Dole Fresh Fruit Co.	730,000 mt (115,000 TEUs)	Container storage capacity, vessel discharge times
San Diego Refrigerated Services (SDRS)	400,000 mt	Cold storage capacity, cargo transfer berth to storage
The Copley Press, Inc.	130,000 mt	Cargo transfer berth to Warehouse C
Star Shipping & Misc. Breakbulk cargo – Open Storage	280,000 mt	Open-air storage capacity
Spot Cargo, Misc. Breakbulk.- Covered Storage	350,000 mt	Cargo consistency / reliability
Windmills and Project Cargo	135,000 mt ⁽¹⁾	Open-air storage; cargo transfer berth to storage behind transit sheds
The Jankovich Co.	220,000 mt	None noted
TOTALS	4,870,000 mt / year	

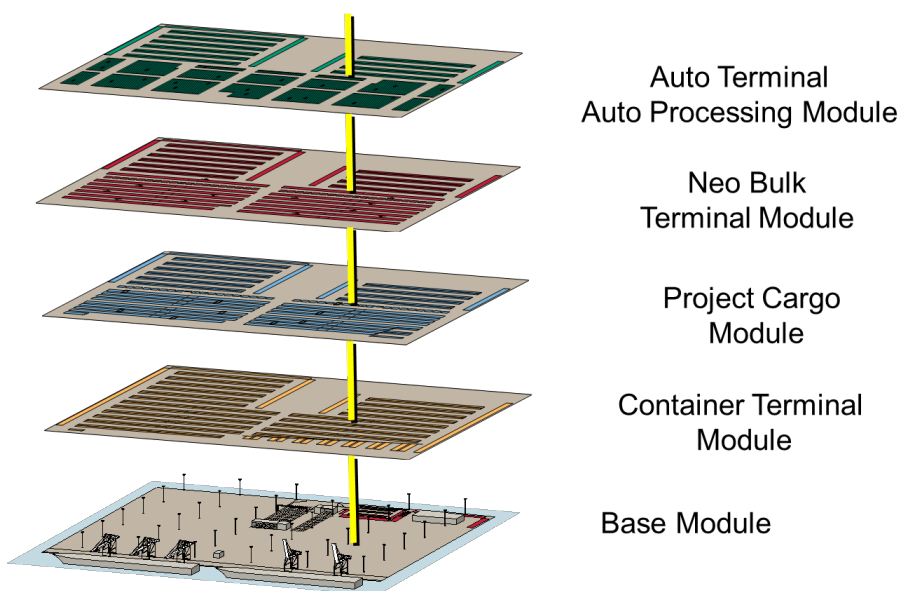
⁽¹⁾Project Cargo (ie. windmill parts) is represented in revenue tons, because these items can not accurately be translated into metric tons.

Source: TEC 2008 Business Plan Update

Illustration: 2008 Proposed Preferred Concept Scenario 2 for TAMT


Rather than focusing the current TAMT Redevelopment Plan on individual parcels of land, the Plan's focus is on a flexible market drive cargo handling operating nodes. When the District desires to implement a specific element of the Plan, it is recommended that the District use a Modular Grid Overlay System (MGOS)

Illustration: Modular Operating Grid Overlay System Concept



Other Reports and Studies Reviewed:

- Economic and Financial Value of TAMT (Martin Associates – 2011)
- Operating Model Study of TAMT (Martin Associates – 2012)
- Assessment of Gantry Cranes for TAMT – Mercator International, July 29, 2013
- Port of San Diego, Container Marketing Plan Study, Charles Labitan, June 13, 2013
- COMPASS, Strategic Plan 2012 – 2017 (SDUPD)

V. Evolving Pressures in the Maritime and Intermodal Industry:

“A port cannot be planned or designed as an arbitrary arrangement of independent terminals. It cannot even be planned as an independent whole, because the arteries connecting the port to the sea and to the hinterland are as important as the port itself. A port should always be studied and planned in its true node in a complex system.”²

Nowhere is this principle more important than at TAMT with its collection of lease agreements, easements, tidelands use and occupancy permits and other land permits that encumber the 96 acres.

The Redevelopment Plan has a “*bifocal*” vision. This vision is intended to enable the District to have the ability to commit to near term opportunities and to anticipate future operational efficiencies.

² Source: Guidelines for Port Planning published by the International Association of Ports and Harbors (IAPH).

The Plan must be read and understood as a document created to be flexible to changing market conditions.

In evaluating new market opportunities the District needs to focus on the following:

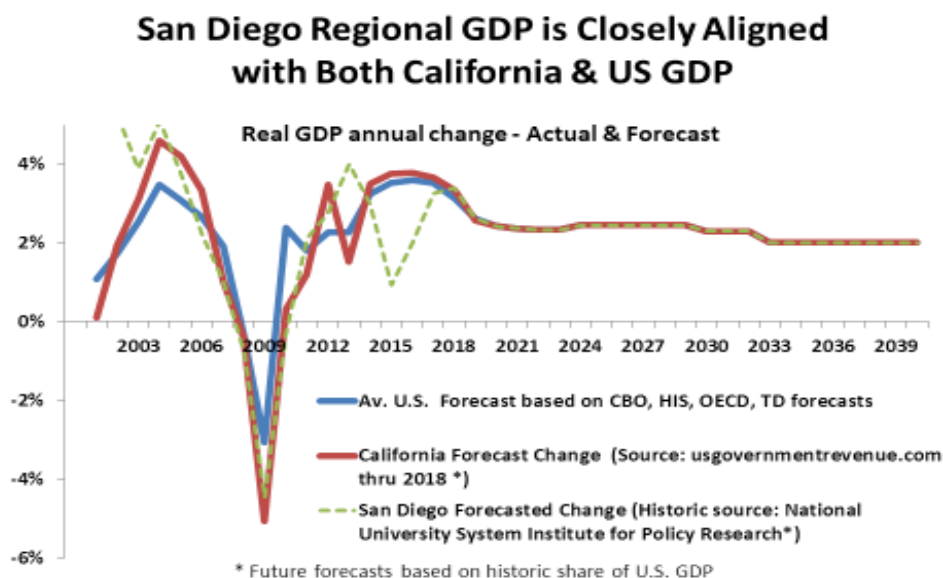
- Changing Maritime Customer
- Growth in Containerization
- Reliance on Intermodal Rail
- Need for Concentrated Logistics Support Services

Market Forecast Demand Minus Current Terminal Capacity Equals Justifiable Terminal Needs and Requirements:

The Redevelopment Plan's concepts rely heavily on previous work performed by the District Staff. The Plan's findings and recommendations are optimum modernization and development concepts using previous data reviewed and assessed. The concepts discussed are market driven and implementation must follow a successful marketing approach. The Plan builds upon the existing terminal conditions, compares existing throughput to terminal capacity, and suggests future customers needs.

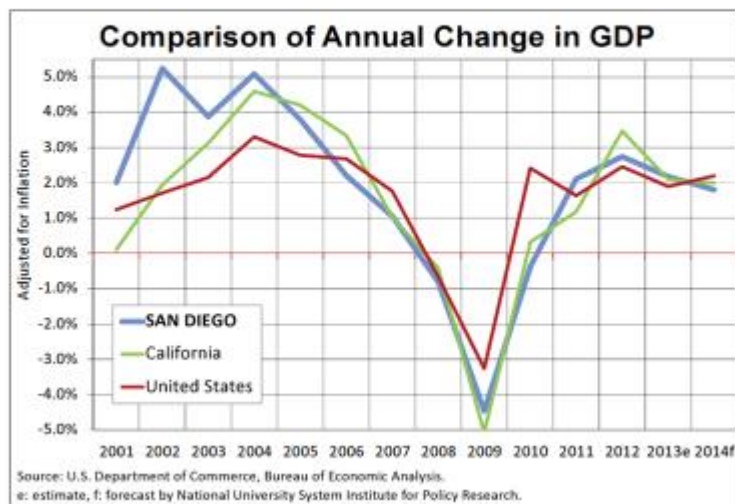
VI. Market Forecast Based on US, State and Regional Gross Domestic Product (GDP) Methodology

The Redevelopment Plan includes a cursory GDP Market Cargo Forecast for the Port of San Diego and it integrates the forecast results into the Plan. The forecast includes review and collection of relevant North American, US and US Southern California regional area, port, truck, and railroad data from private and public sources. The forecast was based on publically available GDP trade and transportation existing information and project data on a national, state, regional and metropolitan basis. On average both historically and looking ahead, the San Diego GDP is closely aligned to both the California and U.S. forecasted GDP growth as evidenced in the chart below.



Historic comparison of the actual GDP for San Diego vs. both California and the U.S. exhibiting close alignment is illustrated below.

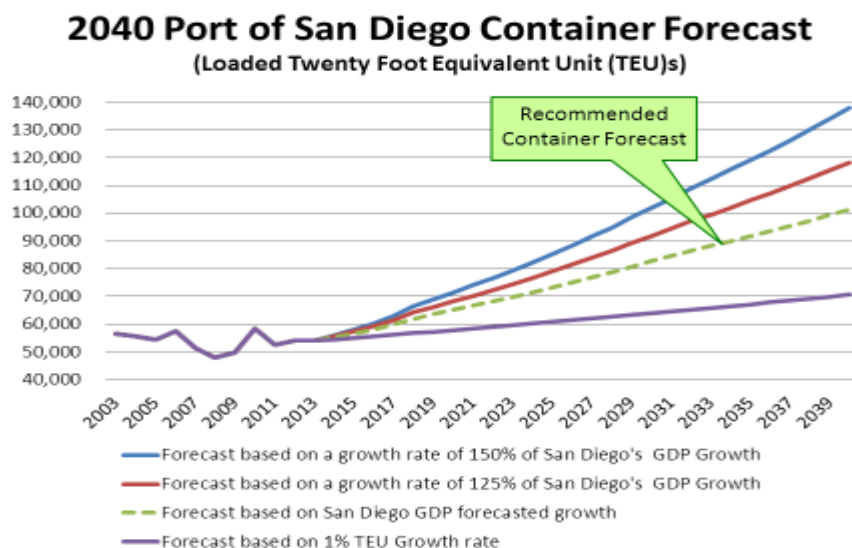
Historic Comparison of the Actual GDP for San Diego vs. Both California and the U.S.



An Industrial Production forecast prepared by the California Department of Transportation, Office of State Planning, shows the real industrial production forecast is to grow almost 4% annually for both San Diego and the State of California. This again has a positive impact on San Diego's future trade growth.

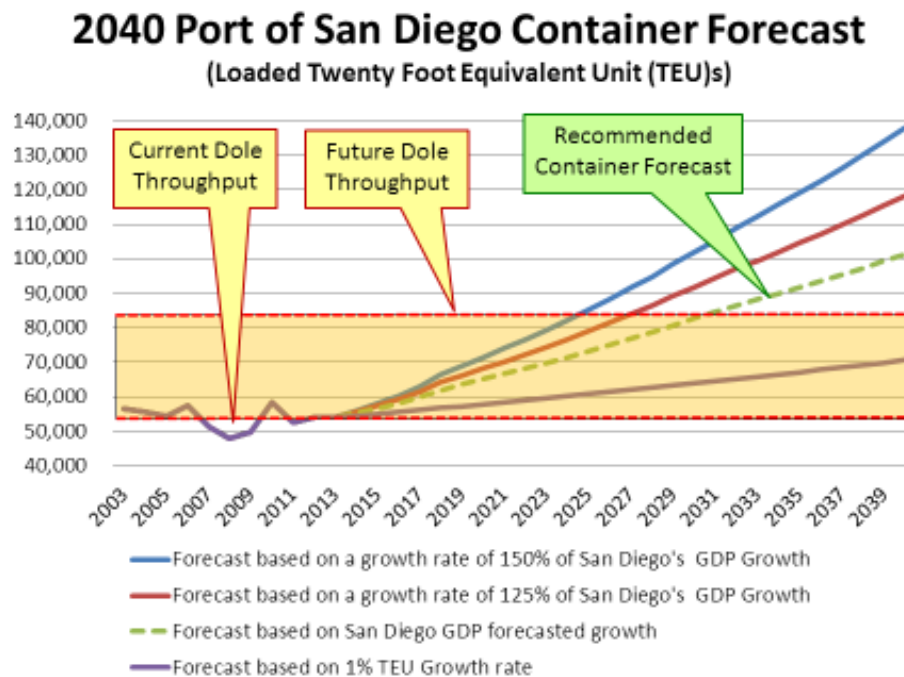
2040 GDP Port of San Diego Container Forecast:

Four cargo market forecast scenarios were prepared as indicated below. The dotted green line represents the recommended container forecast for the Port of San Diego.



Source: Vickerman & Associates 2014

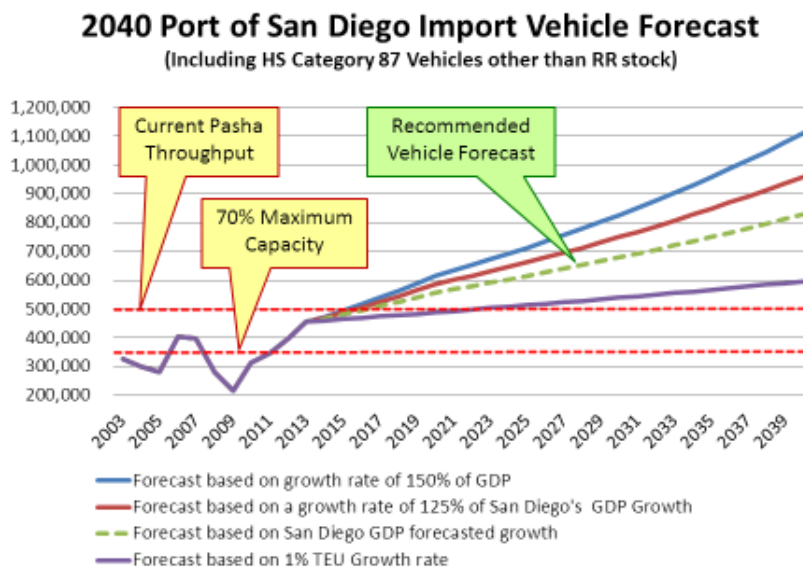
Superimposing TAMT Refrigerated Fresh Fruit Terminal capacity over the forecast results in the following graphic analysis:



Source: Vickerman & Associates 2014

2040 Port of San Diego Import Vehicle Forecast

Superimposing the National City Terminal (Pasha) approximate capacity over the forecast results was also used to verify the GDP findings. The cursory GDP market forecast anticipates positive future growth for the Port of San Diego, particularly in import containers and import vehicles for the foreseeable future. V&A elected to use a planning horizon for TAMT Operational Nodes of 2035.



Source: Vickerman & Associates 2014

For the operating nodes, the Compounded Annual Growth Rate (CAGR) used is based on both the GDP forecast and on any industrial indexes and forecasts available for specific cargo.

VII. Water Side Access and Navigational Issues:

The Federal navigational entrance channel characteristics in the San Diego Bay, with regards to the mean lower low water (MLLW) datum, are as follows:

- 55 ft. from Buoy 4 to Buoys 9/10 for a width of 800 ft.;
- 47 ft. to the carrier turning basin for a width of 600–800 ft.;
- 50 ft. in the channel turning basin;
- 42 ft. in Central Bay first section for a width of 600-1,900 ft. from the turning basin up to and including TAMT at the San Diego-Coronado Bridge; and
- 35 ft. in Central Bay second section for a width of 600-1,900 ft. from the San Diego-Coronado Bridge south along the face of the Naval Station piers up to and including NCMT.

The mean tidal range is four (4) feet (1.22 meters) and a tidal range of about ten (10) feet (3.05 meters) may be experienced during maximum tides. The channel has a soft bay mud deposit on top of a 14-foot bay silt formation. This type of soft bay bottom may offer future potential opportunities for larger vessels without the need for additional major dredging.

V&A specifically looked at the potential dredging of 10-1 and 10-2 to a depth equal to the other berths. While it is acknowledged that dredging all berths to 42 feet MLLW may be beneficial to the SDUPD, Dredging 10-1 and 10-2 below the current design depths will require significant investment to add a sheet-pile wall below the current design depth. Since the Plan recognizes that Return-on-Investment (ROI) is an important criteria and use of limited resources a critical factor to a successful Plan, the expenditure of funds for dredging 10-1 and 10-2 at this time was determined not to be a priority need. Additionally, use of 10-1 and 10-2 for potential new container opportunities will create operational constraints on both 10-1 and 10-2 as well as 10-3 and 10-4.

VII. Tenants and Berth Occupancy Analysis:

A critical factor for evaluating berth occupancy is contractual obligation placed on the berth. During the preparation of the Plan, the following non-exclusive preferential berth assignments were either in place or being considered:

- Dole Fresh Fruit Company (“Dole”) has the non-exclusive preferential use of Berths 10-1 and 10-2. When the new Dole vessels are in operation, the non-exclusive preferential assignment will occupy Berths 10-3 and 10-4. (In Place)
- Searles Valley Minerals (“SVM”) has a non-exclusive preferential use of Berth 10-7. With additional bulk opportunities at TAMT (e.g. two to three cement operators with SVM), Berths 10-7 and 10-8 may experience congestion and will have limited use for other spot cargo opportunities. (In Place)
- During preparation of the Redevelopment Plan, San Diego Refrigerated Services (“SDRS”) was in the process of completing a new agreement with the District. A provision of that agreement may include a non-exclusive, preferential berth assignment at Berth 10-4 under specified conditions. (Being Considered)

The Redevelopment Plan finds that current TAMT navigational conditions, berth features and the preferential berth assignments do not restrict current tenant operations or their future operations. It is recommended, however, that the Port re-number the berths so that the numbering system recognizes the larger standards for vessels.

New customers will require assurances and guarantees of a berth upon their vessel arrival. It is suggested that language be incorporated in new agreements that provide for a specific schedule of notices be provided in exchange for the preferential assignment.

TAMT Berth Occupancy Comparison:

The 2008 Business Plan’s berth occupancy factors used fiscal year 2005 / 2006 actuals. The Redevelopment Plan’s berth occupancy uses fiscal year 2012 / 2013 and a “Berth Utilization Report” provided by the District. The Redevelopment Plan recommends that the District ensure that non-cargo operations that occur at TAMT be factor into future berth utilization requirements and needs.

Table 6. Berth Occupancy by Vessel Types and Days

Plan / Report	Day	Vessel	Barge
2008 Business Plan (Pre-Recession)	889 days	181	146
Redevelopment Plan	328 days	142	28

Source: Berth Utilization Report

Table 7. Percentage of Berth Occupancy (using 352 days)

BERTH	2008 BUSINESS PLAN OCCUPANCY	2014 REDEVELOPMENT PLAN OCCUPANCY
10-1	35%	0%
10-2	60%	37%
10-3	58%	14%
10-4	18%	16%
10-5	9%	15%
10-6	44%	1%
10-7	12%	8%
10-8	17%	0%
TOTAL ALL BERTHS	32%	11.4%

Source: Berth Utilization Report

In the Berth Utilization Report a vessel assigned to a single berth may overlap or occupy more than one berth. Additionally, the percentages of Berth Occupancy are based on 352 days used in the 2008 Business Plan Update. V&A prefers to use 300 days rather than the 352 days. Using a 300 day availability factor, the Plan calculates that total occupancy of all berth's is 13.5%.

TAMT Berth Capacity Findings:

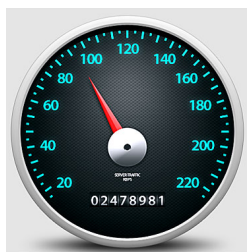
- TAMT continues to have berth capacity capable to support additional cargo and customers.
- New capital investment, to expand or extend the current berthing configuration, is not necessary.
- The District needs to continue to monitor and evaluate the structural integrity of the wharves and berths as part of an asset management program.
- There are significant non-cargo activities, identified in the Maritime Division's "Berth Utilization Report". While these transactions are small, they do represent important business activities for users of the Port of San Diego.

IX. TAMT Cargo Throughput and Capacity Analysis:

Since there have been few changes to the physical facilities of TAMT since the 2008 Business Plan, the TAMT “**Maximum Practical Terminal Capacity**” (**MPC**) throughput calculated for storage and customers of 4,870,000 metric tons was used in the Redevelopment Plan. The use of the Maximum Practical Capacity (MPC) methodology is a planning tool and metric for making decision regarding when to undertake specific terminal improvements.



Maximum Practical Terminal Capacity is the capacity which is achieved under a practical operating scenario and with the best conditions in place and assumed. MPC is independent of most market forces. However, it is governed by terminal equipment, equipment conditions, operations and vessel/train/truck arrival and departure schedules. MPC can be achieved or even exceeded for short periods. However, a terminal operator will seldom tolerate this level of stress on the terminal system for very long.



Sustainable Terminal Capacity (STC) is that capacity which is most reasonable and profitable to the operator. STC is most accurately determined by a thorough economic analysis of a terminal's operations. However, for purpose of the Redevelopment Plan, STC is estimated to occur at 70% of MPC. If the STC is exceeded for long, the Port and/or terminal operator should generally consider making improvements to upgrade the terminal's throughput capabilities.

Therefore, in the TAMT Redevelopment Plan, improvements to capacity are not recommended until the terminal's storage and cargo handling capabilities generally reach 70% of the MPC. By making the improvements at the 70% level, it ensures that the terminal is able to increase its capabilities at the same time as expected cargo growth and the terminal's capacity remains equal to the throughput.

Dry Bulk Cargo Analysis:

In the 2008 Business Plan, dry bulk cargoes had the largest MPC throughput. This was based upon linkage to housing starts and construction in the San Diego region. The 2008 Business Plan used a 3% CAGR for dry bulk cargo, and there were two forecasts; one was without a new customer and one was with a new customer. Without a new customer, dry bulk commodities were forecasted to continuously grow and reach the 70% of MPC level in FY 2020 and reach the MPC in FY 2030. With a new customer, dry bulk commodities were projected to reach the 70% level by FY 2010 and to reach and exceed the MPC by FY 2025. The recession, which dramatically impacted construction and housing, was not forecasted.

Shown below the actual throughput for recent years is well below the 2008 low forecast and well below the 70% MPC metric.

Dry Bulk Actual Throughput Compared to 2008 Low Forecast & MPC (Metric Tons)

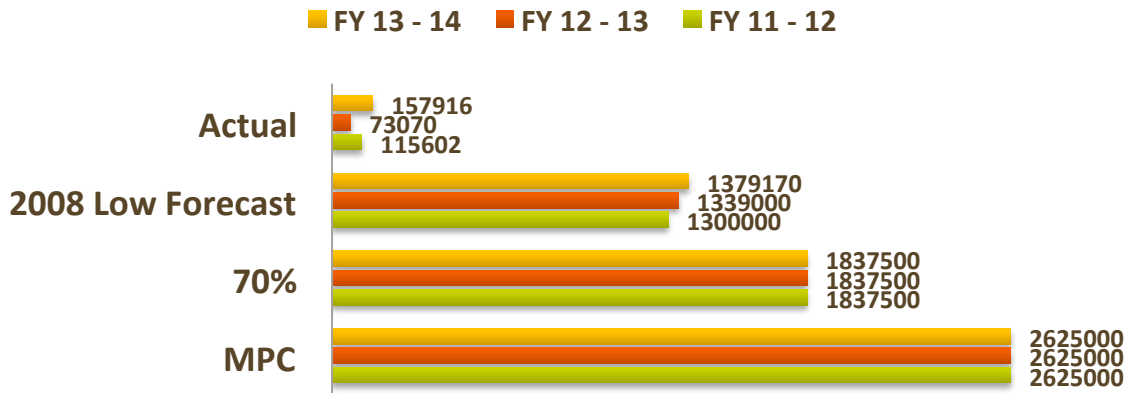
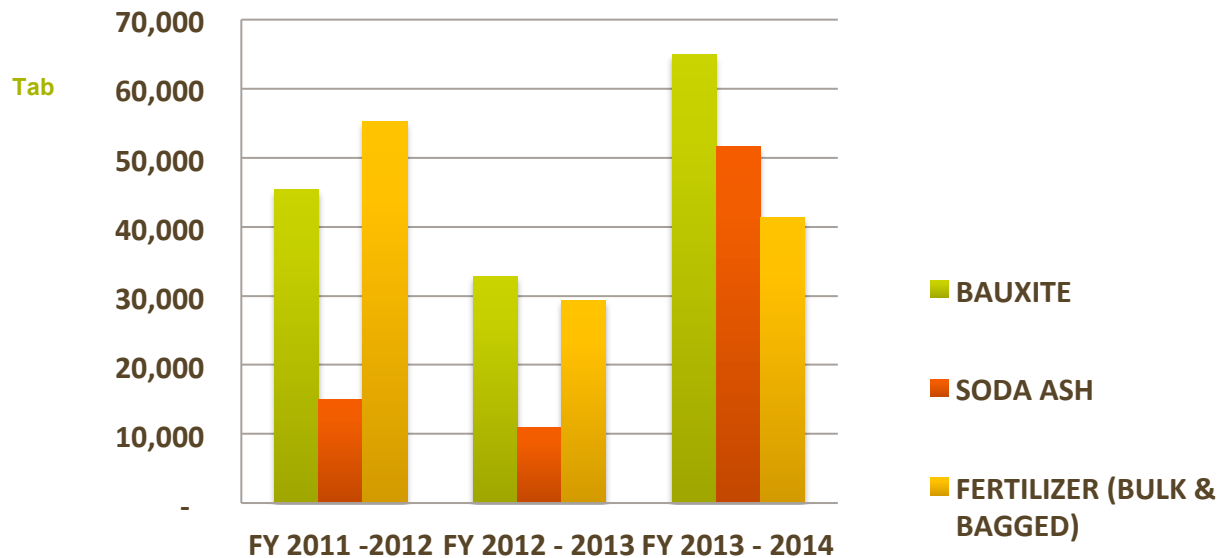
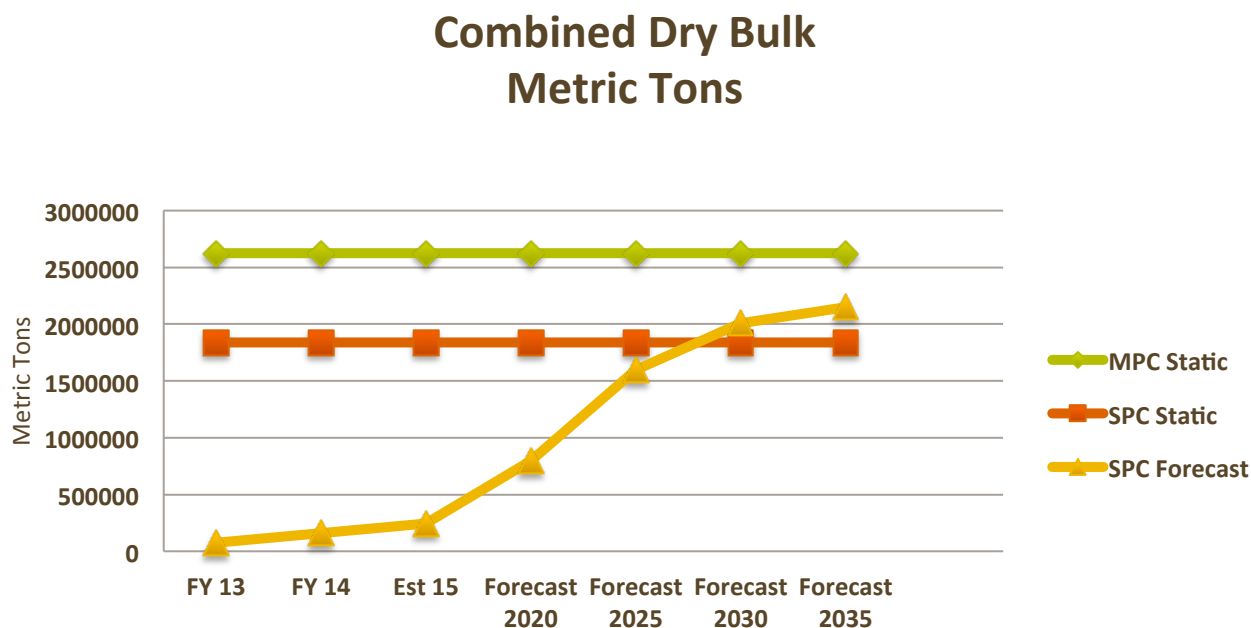


Table 8 All Dry Bulk Forecast is based upon Waterborne / Vessel Operations



Product Mix of Dry Bulk Cargo by Vessel

Table 9 Dry Bulk MPC, SPC and Forecast



Redevelopment Plan Dry Bulk Cargo Findings:

The actual waterborne dry bulk cargo handled at TAMT is well below the MPC. There appears to be ample capacity to handle additional waterborne dry bulk cargo. The low level of dry bulk cargo is a carryover from the recession years.

- The past relocation of SVM products to the Port of Long Beach, identified in the 2008 Business Plan, was done to reduce inland transportation costs. This relocation limited rail service to the Union Pacific and permitted rail car storage at a Port of Long Beach facility. SVM desires to maintain facilities at the Port of San Diego, and is initiating new potash exports that will utilize their existing leased facilities with smaller shipments for to Mexico.
- The current cement customer (CEMEX) indicates that waterborne cement may restart at TAMT after 2015 and based upon market conditions improving.
- A second cement customer has expressed interest to develop a new cement handling facility to accommodate imports.
- Dry bulk customers provide a guaranteed revenue stream to the SDUPD based upon contract revenue guarantees, however, the direct and indirect economic benefits from the vessel and cargo handling have diminished since the 2008 Business Plan.
- Dry bulk commodities that are low-value provide a greater business risk to the District than commodities that have either a high value (e.g. Bauxite) or a solid private investment. Dry bulk customers that have an integrated supply chain are preferred over those that sell products at TAMT.
- Establishing a multi-purpose consolidated facility in backland locations away from other general cargo and refrigerated terminal areas will improve TAMT operations for other non-bulk cargoes.
- Marketing to “high value” commodities and customers for greater spot business

opportunities better utilizes the non-exclusive terminal space (covered and open storage areas). These products can be handled in super-sacks (1.2 to 1.5 MTs per sack or direct bulk discharge).

Liquid Bulk Cargo Analysis:

There are two Liquid Bulk cargo facilities at TAMT. The Jankovich Fuel Farm facility is located on 3.3 acres at the northeast corner with fuel transfer equipment and five storage tanks up to 40 ft. in height and 100 ft. in diameter containing 20,000 barrels-diesel fuel; 55,000 barrels-bunker fuel; and 139,000 barrels-jet fuel. Five pipelines ranging from 8 to 12 inches in diameter connect the facility to Berth's 10-1 through 10-4 for the receipt or discharge of diesel and bunker fuels. An additional pipeline is connected to San Diego International Airport for the transfer of jet fuel. The other terminal is on a 59,000 square feet parcel located near the southeast entrance to TAMT. It has three storage tanks each 32 ft. high and 73 ft. in diameter with a capacity of one million gallons each. Connected to Berth's 10-6 through 10-8 by three pipelines ranging from 6 to 14 inches in diameter that have been used to receive various bulk liquids including palm oil and molasses. This latter facility remains inactive.

Liquid Bulk Cargo Findings:

- The fuel facility operations are essential support services for the Port's maritime operations (both cargo and cruise).
- The fuel facility is included in all concepts for TAMT.
- The unused Molasses storage tanks should be demolished and the parcel is to be incorporated into the Consolidated Dry Bulk Operating Node.

Break-Bulk and Neo-Bulk Cargo Analysis:

Generally cargo that is bagged³ and palletized, large sized project cargo (e.g. wind energy components), and non-containerized commodities are characterized as break-bulk and/or neo-bulk cargo. The 2008 Business Plan evaluated this type of cargo by commodity types. The cargo growth for this market segment was between 1% and 3% CAGR, and it included a new service for break bulk fresh fruit (e.g. palletized).

The Redevelopment Plan evaluates break bulk and neo-bulk as a multi-purpose general cargo operation use. In today's market, the pure break bulk operators that were once looking for a dedicated berth and transit sheds have shifted to a multi-purpose operation generally unloading charter vessels or operating with a series of roll on and roll off vessels. Charter vessels calls are "induced calls", requested by the importer/exporter, rather than regularly scheduled calls on a liner service basis.

The facilities and storage MPC calculated by the 2008 Business Plan for break bulk and neo bulk was 895,000 metric tons. The 2008 Business Plan forecast suggested that break-bulk and neo-bulk capabilities were able to handle projected growth to FY 2025. The former Business Plan also identified a new palletized fresh fruit customer by FY 2010, and if added to TAMT the forecast exceeded the 70% metric mark in the FY 2010 to FY 2015 time frame. Accordingly, a new cold

³ The TAMT Redevelopment Plan includes bagged, super sack, bulk cargo under the Dry Bulk Operating Node.

storage transit shed was recommended in the 2008 Business Plan. The Redevelopment Plan compared the 2008 Business Plan forecast for break bulk and neo bulk to the actual throughput.

Breakbulk and Neo Bulk Actual Compared to 2008 Business Plan

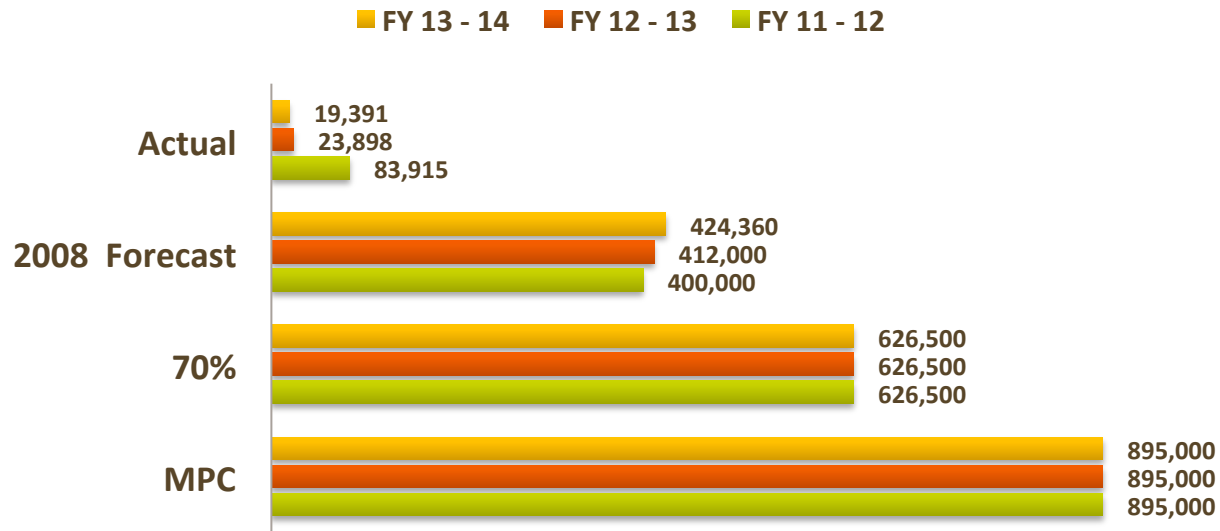


Table 10. Breakbulk and Neobulk cargo based upon metric tons

Selected Recent Commodity Types

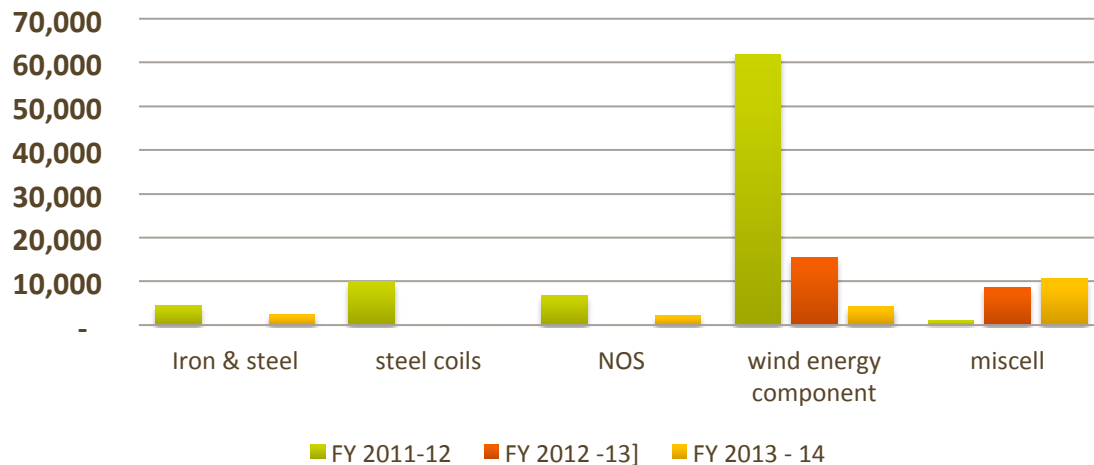
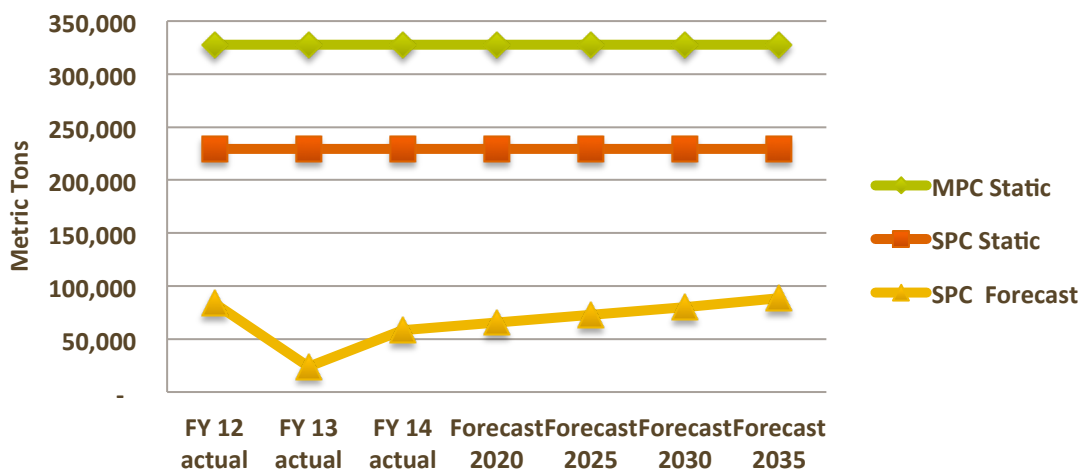


Table 11. Multipurpose Operating Node Alternative 1 with a 2% CAGR⁴

General Cargo Neobulk and Breakbulk



The trend and future forecast identified in the Plan for break-bulk and neo-bulk business is included with multipurpose carriers, including roll on and roll off vessels (“Ro/Ro”) and small niche container vessels.

Break-Bulk and Neo-Bulk Cargo Findings:

The actual throughput for FY 2011-12 and FY 2012 – 13 is well below the projections forecasted in the 2008 Business Plan and the 70% MPC threshold. Currently, break-bulk and neo-bulk cargo is moving through TAMT on an inducement basis. This market remains a good fit for TAMT.

- Continue to market to local importers and exporters to develop inducement calls (such as local shipyards).
- A new palletized banana importer, or a new break-bulk liner service, is unlikely.
- There are a seasonal fresh fruit opportunities from Chile and Peru. Some of these imports require fumigation at the terminal. Fumigation is not a permitted operation at TAMT. This removes this market segment as a viable opportunity until changes are made by the importers by either pre-clearing and fumigating fruit prior to arrival in U.S. or changing the methods used to protect the fruit from pests.
- Break-bulk and neo-bulk vessels and commodities represent a low risk cargo for TAMT, but this market is declining. While TAMT has an excellent record for handling these types of commodities and has a small loyal customer base, the Redevelopment Plan recognizes it as

⁴ After the preparation of the Redevelopment Plan, the PASHA Hawaii Direct service had a number of vessel calls at TAMT. The Fiscal Year 2013-2014 includes these domestic cargo vessel calls. The breakbulk and neobulk SPC forecast would be much higher if the PASHA Hawaii Direct Service called at TAMT on a regular schedule service.

- a declining market.
- The existing transit sheds continue to be an operational constraint. Today break-bulk and neo-bulk facilities are more dependent upon open storage areas than the traditional covered storage.
- Removal of the remaining Transit Shed # 1 and Transit Shed # 2 removes notable constraints.
- Existing spot market customers may be attract to TAMT with a new, or existing, Ro/Ro Liner Service customer.
- A public - private partnership with an existing provider of terminal services that has an existing book of business may induce cargo to TAMT. The intent of this partnership is to provide competitive terminal services to all users. The attraction of this type of partnership is to continue to offer spot and inducement calls to carriers and at the same time providing the benefits of the existing TAMT book of business.

Refrigerated Fresh Fruit Container Cargo Analysis:

The containerized cargo throughput in the 2008 Business Plan was identified with the Dole Fresh Fruit weekly service having a three-ship rotation between San Diego and Ecuador. Dole unloads mostly bananas, but they also carry pineapples and other tropical fruits. The current Dole vessel has a refrigerated container capacity of 982 TEUs (491 FEUs).

Dole vessels generally arrive on Sunday and depart on Tuesday. Dole uses the on-dock cold storage warehouse to strip containers for future delivery by truck to consignees. Pineapples are moved directly from the terminal to a cold storage facility located in Fullerton (CA) for delivery to consignees in the Greater Los Angeles markets. Dole uses a portion of the off-dock warehouse in National City. Each voyage loads some southbound cargo destined for Latin America, but repositioning empty containers back to the plantations is the primary purpose of the southbound voyage.

The Redevelopment Plan estimates Dole's current annual discharge to be 51,064 TEUs (25,532 FEUs). On August 14, 2012, Dole Fresh Fruit and SDUPD agreed to extend its agreement with the Port in order to facilitate the loading and unloading of new Dole vessels being built by Dole. These new vessels have a capacity between 1,540 and 1,600 TEUs (770 and 800 FEUs). The annual discharge on a weekly basis will be between 80,000 to 83,200 TEUs (40,000 to 41,600 FEUs).

To begin building the northbound markets, Dole has recently augmented their regular vessel calls with a special charter vessel. Dole has chartered this vessel for six (6) discharges of 500 TEUs (250 FEUs) every two-week schedule over a six-week schedule. This increases Dole's annual discharge by 3,000 TEUs (1,500 FEUs).

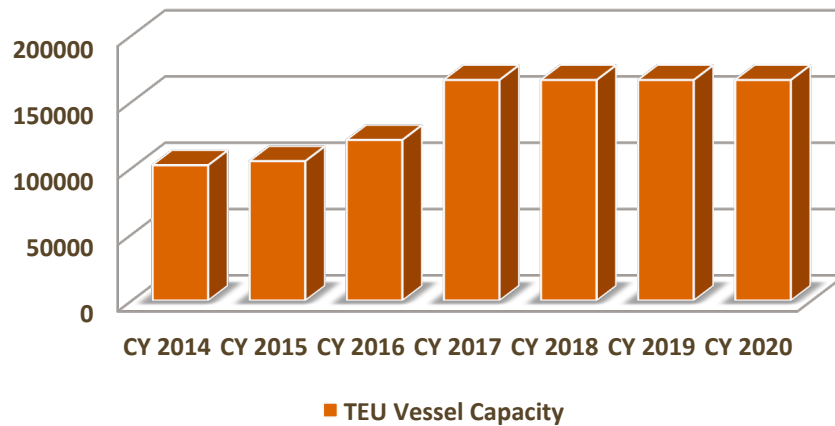
Dole intends to accommodate all of the increase in cargo throughput within their existing 20.5 acres, and they will relocate their non-exclusive preferential berths from 10-1 and 10-2 to 10-3 and 10-4 to accommodate the larger vessels as they enter service.

The 2008 Business Plan MPC established a berth capacity for Dole in excess of 1,000,000 metric tons, however, Dole's current leased terminal and operations was calculated at 710,000 metric tons. Because the storage and facility MPC is the constraining factor, the Redevelopment Plan uses the lower of the two MPC. For FY 2005 / 2006, Dole's throughput was 651,514 metric tons.

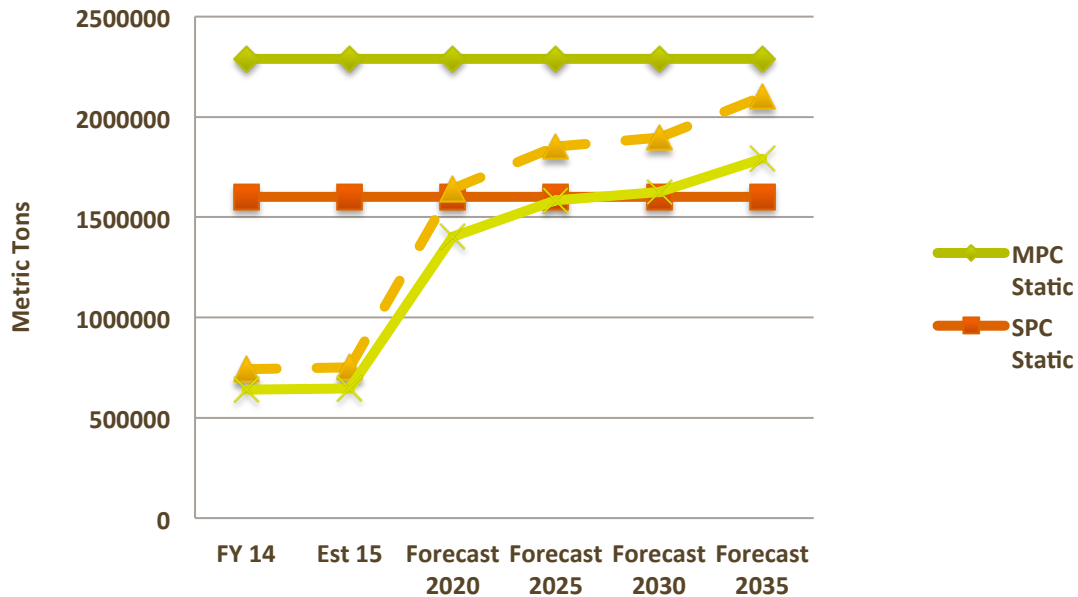
The Redevelopment Plan assumes that 100% of northbound vessel capacity will be full loads (83% bananas, 10% pineapples, and 7% other), and the Dole terminal is capable of handling increased loads without additional land.

Table 12. Estimated based upon reported vessel capabilities

DOLE TEU Vessel Capacity



Containers (Refrigerated Fresh Fruit)



The dashed forecast line above include empties at 4 metric revenue tons. The solid forecast line is without empties.

The Plan also assumes that the new larger vessels will be in full operation by 2017, and Dole will have a 100% unloading and loading per vessel call at 3,200 TEUs (1,600 FEUs). Unloaded cargo will be full at 20 metric tons per container, but loaded containers returning will mostly be empties.

A second containerized banana / fresh fruit customer was identified in the 2008 Business Plan, the Martin Associates' Economic and Financial Value Report, the Mercator Assessment for TAMT Gantry Cranes, and the Labitan Report. The Redevelopment Plan agrees. The Plan's assumptions are a weekly discharge with the same ratio of cargo to empties and a vessel call later in the week to avoid conflicts with Dole. This new customer's vessel capacity will begin with 700 TEUs (350 FEUs), grow to 1,000 TEUs (500 FEU), and eventual grow to 1,400 TEUs (700 FEUs).

Refrigerated Fresh Fruit Container Cargo Findings:

- The containerized fresh fruit business sector is a good long-term sustainable opportunity for TAMT. It is a low risk business opportunity since the Port has an excellent track record with Dole.
- Dole's new vessels will increase TAMT's fresh fruit market share. Likewise, the larger Dole vessel provides a "third party cargo" opportunity for northbound fresh fruit products. This third party capability offers the Port a regular service to TAMT.
- A cargo circulation plan is needed from Berths 10-3 and 10-4 to the Dole Terminal to avoid potential conflicts and congestions with, and without, Transit Shed # 1.
- Demolition Transit Shed # 1 to create an improved backland area adjacent to berths 10-3 and 10-4 to accommodate potential new refrigerated container opportunities.
- Include 100-foot gauge gantry crane rail infrastructure in the pavement reconstruction as Transit Shed # 1 is removed. The purchase of gantry cranes are market driven and are intended to support future cargo handling capabilities.

X. TAMT Optimum Terminal Development Concept Schematic Nodes

The development and improvement concepts suggested by the Redevelopment Plan are not fixed and determined capital investment projects at a fixed point in time, but rather they are directions towards the most optimum solutions from a market driven standpoint. A final determination on a specific investment should only be considered after a complete and full financial and Return-on-Investment (ROI) analysis. This analysis needs to itemize all capital costs, on-going District expenses, revenues and provide a detailed cash flow.

Approach:

The Plan divides the TAMT into like operating nodes or modules, these nodes are to be viewed as flexible "*bladders*" with similar operational cargo characteristics being able to expand or contract to meet operational and market conditions and not as rigid boundaries for specific terminal operations. An underlying theme is "*cast the widest possible*" net to attract the widest potential customers and strategic partners.

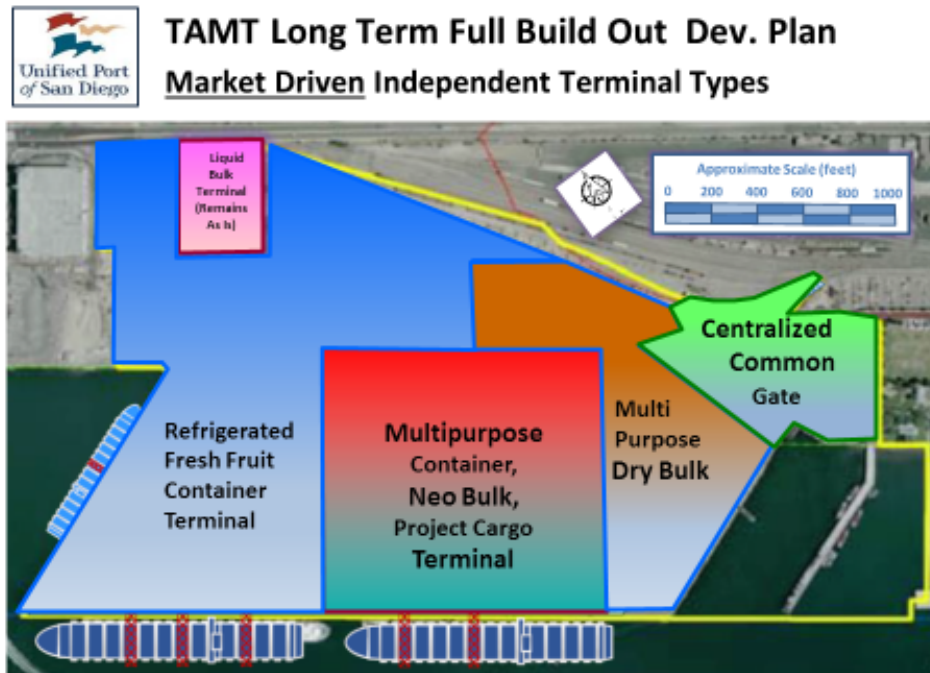
The four (4) operating nodes or modules are:

1. Multi-Purpose Consolidated Dry Bulk Terminal
2. Liquid Bulk Terminal (existing operations to remain as is over the planning horizon)
3. Refrigerated Fresh Fruit Container Terminal

4. Multipurpose General Cargo Terminal (neo bulk, break bulk, roll on / roll off, and container)

There is one (1) planning node or module; it is “Centralized Gate Complex”, a tenant-In-common service area.

TAMT Operational Nodes and Conceptual Layout:



Source: Vickerman & Associates 2014

The above TAMT conceptual site plan illustrates the general location of all the nodes recommended by the Plan. The general geographic areas are flexible and expandable. The Multi-Purpose Consolidated Dry Bulk Terminal consolidates all bulk terminal functions into one area supported by “back of the house” storage and operation areas. The Refrigerated Fresh Fruit Container Terminal Node incorporates the entire leasehold area of Dole Fresh Fruit and San Diego Refrigerated Services (SDRS) with expansion in the backlands of Berth 10-1, 10-2, 10-3 and 10-4. The Multi-Purpose General Cargo Terminal has project cargo, neo bulk, break bulk, RO/RO, and Container Cargo capability. An optional On-Dock Intermodal Rail Terminal Concept (not shown above) could produce significant benefits in future long-term container handling opportunities.

The Centralized Gate Complex functions as an automated entry/exit gate for all tenants. As a result of discussions with stakeholders, the Redevelopment Plan identifies an alternative gate concept envisioned for “freight only” movements for the Refrigerated Fresh Fruit Container Terminal and the Multi-Purpose General Cargo Terminal. This alternative would leave the Dole Gate complex in its current location. The Consolidated Multi-Purpose bulk terminal continues to use the existing TAMT entry gate particularly for domestic bulk shipments..



SDUPD – TAMT Long Term Dev. Plan

Alternative Centralized Gate Complex



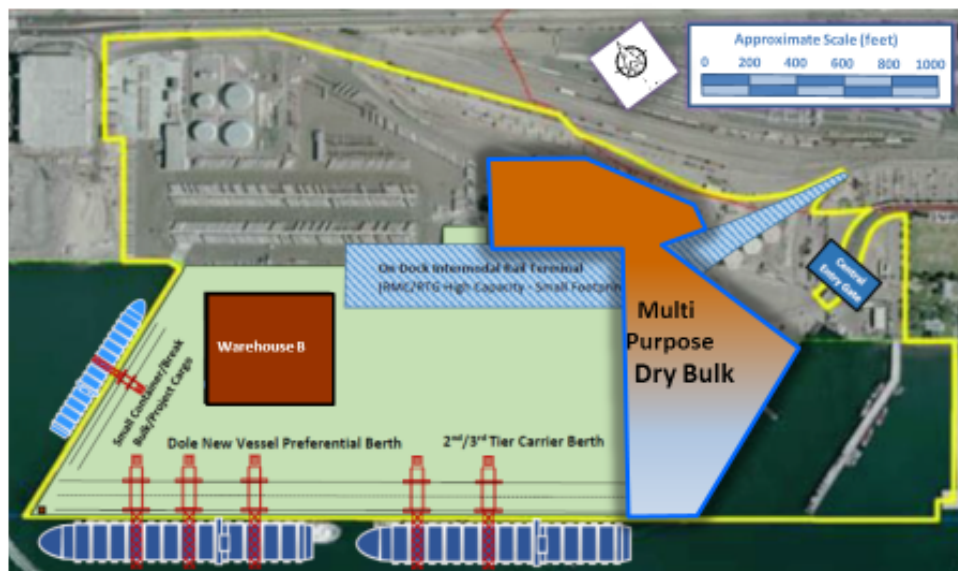
XI. TAMT Modular Operational Nodes

Overview of Long Term Multi-Purpose Dry Bulk Operating Node:



TAMT Long Term Development Plan

Consolidated Multipurpose Dry Bulk Terminal



Source: Vickerman & Associates 2014

Multi-Purpose Dry Bulk Operating Node Description, Characteristics, and Opportunities	
Node Size	Approximately 15 acres
Maximum Practical Capacity	Range 2,250,000 to 2,650,000 Metric Tons per year
Berth	Berth 10-7 and 10-8 Depth and Approach: 42 feet MLLW
Commodities To Be Handled	Cement, Fly-Ash, Slag, Bauxite, Chemical NEC, Potassium-Nitrate, Soda Ash, and other non-hazardous bulk materials
Vessel Size	Up to 40,000 dwt
Cargo Transfer	Ship loader and un-loader at the berth with conveyor system(s) or ships gear for lift-on and lift off
Inland Transportation	Primary mode is truck and secondary mode rail
Existing customer Base	CEMEX, Searles Valley Materials, YARA, and International Materials Inc.
New customer Opportunities	TBD
Opportunities / Forecast	The Portland Cement Association (PCA) forecast for near-term is 9% CAGR and based upon other demand factors, there appears to be a sufficient near-term demand for new import/export facilities in San Diego. The GDP trade forecast for TAMT has a 3% CAGR. The Business Plan Update is constructed on a combined PCA and GDP forecast.

Dry Bulk Terminal Development Approach:

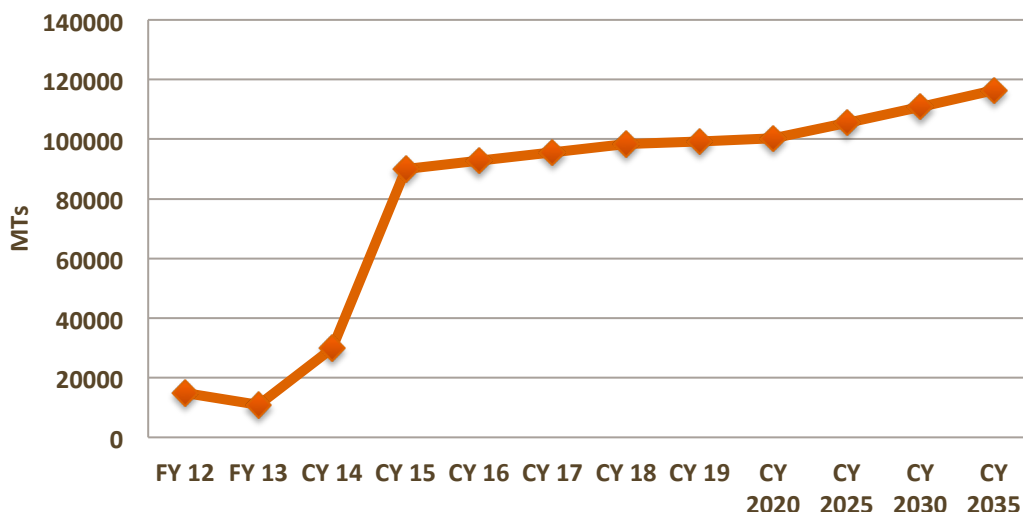
In discussing the dry bulk cargo opportunities, the Redevelopment Plan examines the optimum concepts through existing customers and their specific commodity types and future market opportunities.

Soda Ash (Searles Valley Minerals):

Searles Valley Minerals (SVM) has the lease on approximately 4.57 acres of tideland area, 708 square-foot rail/truck scale area, and 17,146 square-foot of air space and footing areas for a conveyor system. This lease expires in 2017. Soda ash exports to Mexico are scheduled to

commence in the near term. The short-term soda ash opportunity is approximately 100,000 MTs annually with 17 to 18 vessel calls per annum. The vessels are 20,000 DWT, and the average export load will be 5,000 MTs per call. The existing ship-to-apron components will remain unchanged. The SVM export soda ash cargo forecast shows a dramatic jump in calendar year 2014 and 2015 as the Mexico service comes on line. The projected increases are conservative (3% CAGR through 2018 and 1% CAGR thereafter).

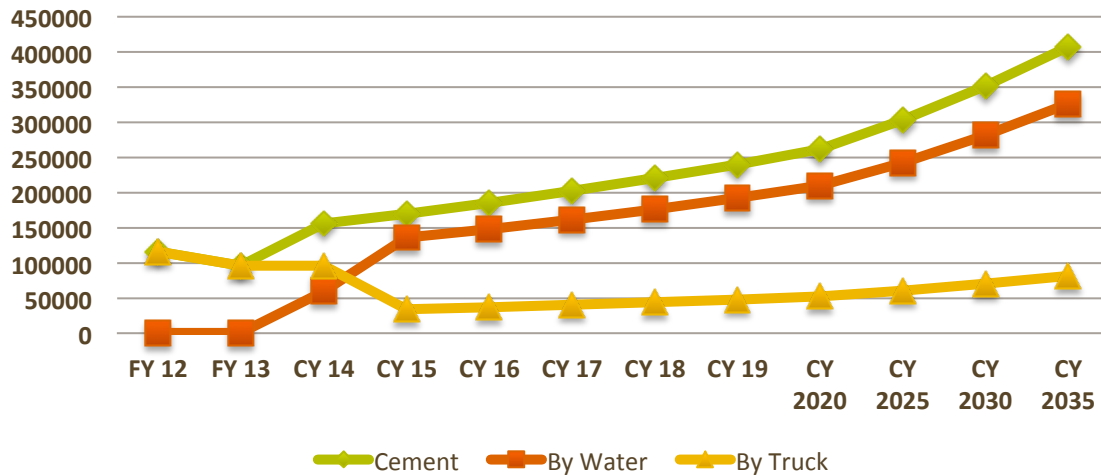
Soda Ash Forecast



Cement (CEMEX and New Customer):

The Redevelopment Plan forecast for CEMEX's imports shows a gradual increase from 96,000 MTs to over 400,000 MTs by 2035. It needs to be noted that the 2035 level remains below the average of the five highest years prior to the recession (600,000 MTs). The Redevelopment Plan also separates the forecast by water (vessels) and by truck using an 80:20 ratio of water to truck. CEMEX assumptions include water service that will resume in calendar year 2014 - 2015 with two 30,000 MTs vessel calls and the amount of truck product remains at 96,000 MTs; commencing 2015, the truck mode will be reduced to the 80:20 fixed ratio of water to truck; and for the period 2015 through 2020, the forecast uses the PCA 9% CAGR; after 2020, the forecast uses a 3% CAGR.

CEMEX CEMENT FORECAST METRIC TONS (TRUCK VS. WATER)

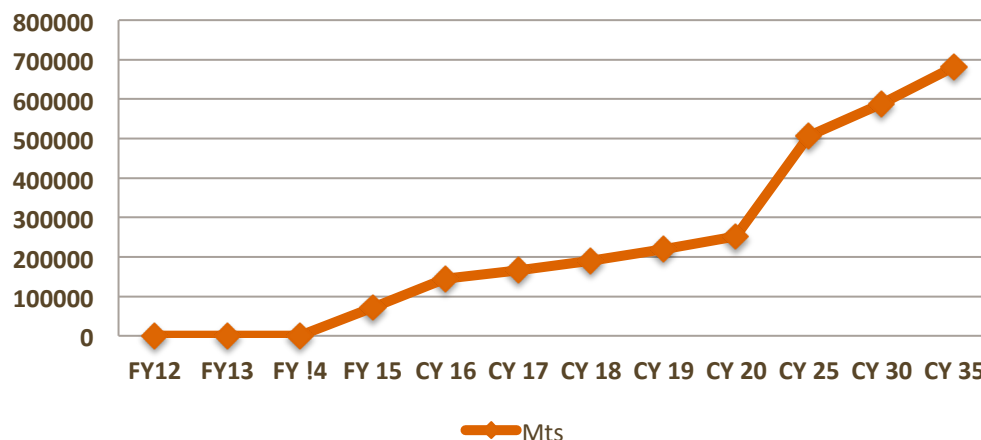


The Plan forecasts a second cement operator. The capacity and assumptions are:

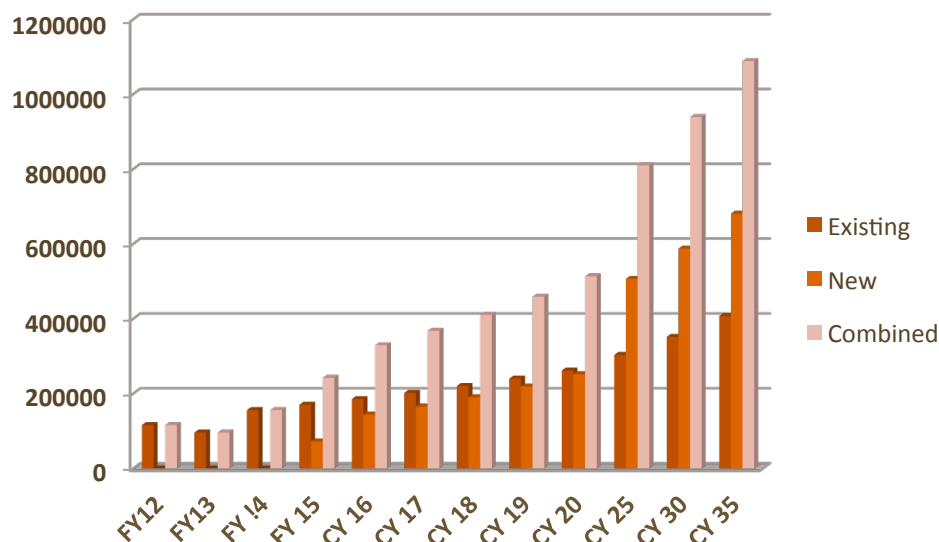
- Import up to 500,000 MTs per year.
- Cement will be pneumatically unloaded into a “Flat Storage Type Facility” using a 200 metric ton per hour mobile vacuum un-loader.
- Storage capability would be approximately 33,000 metric ton.
- 100% of the product will be trucked away. There will be one truck loading rack with two 200 metric ton silos with appropriate dust controls.
- Initial year of operations will be 144,000 metric tons.
- CAGR is 15% up to 500,000 metric tons.
- 30,000 to 40,000 metric tons to be unloaded at each vessel call.
- The vessel will call at Berth 10-7 and 10-8 shared with SVM.

The forecast shows the maximum 500,000 metric tons may be achieved by FY 2025, and if the cement continues to grow then improvements to the capacity and capabilities may be required after FY 2025.

New Cement Customer Forecast



Combined Existing (CEMEX) and New Customer Forecast

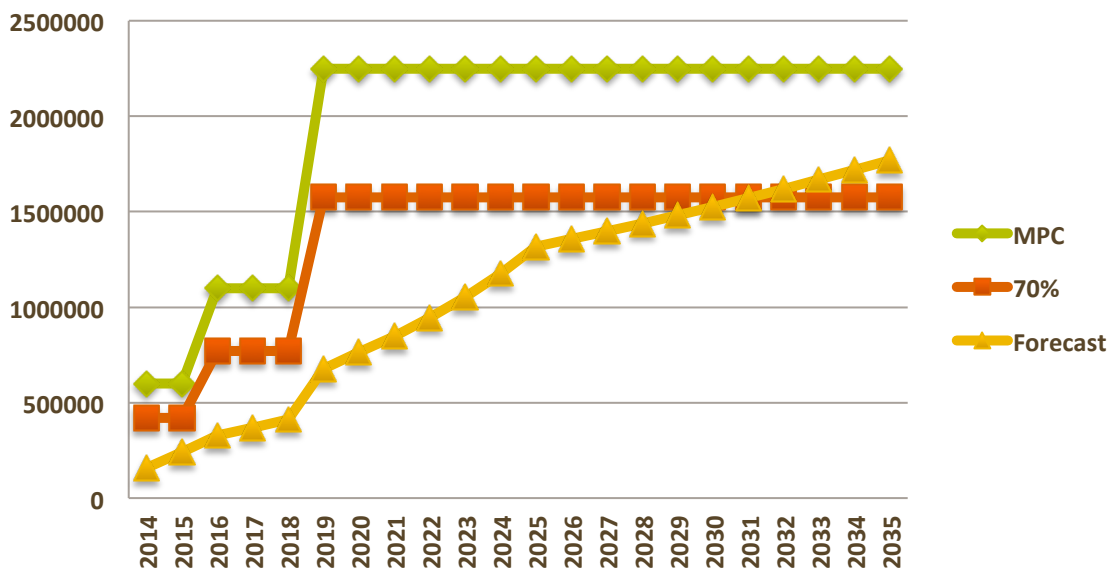


The combined cement forecast above shows a growth in waterborne delivery of cement from zero in FY 2013 to over 1,000,000 MTs by FY 2035. The forecast suggests that TAMT will exceed the 2008 Business Plan actual throughput in FY 2025.

Other Dry Bulk Commodities:

In addition to soda ash and cement, TAMT serves other water dependent customers as spot business. These products include Bauxite, Chemicals NEC, Calcium Nitrate, and Potassium Nitrate. The Redevelopment Plan suggests that the District maintain the existing dry bulk spot business, and the Plan uses a conservative 2% CAGR.

Consolidated MPC and Low Forecast All Dry Bulk Products in Metric Tons



Multipurpose Dry Bulk Recommendations:

- Maintain the dry bulk berth and storage capacity for TAMT at 2,650,000 million metric tons per year.
- When the market allows, implement the consolidation into a Multipurpose Dry Bulk Facility
- TS # 2 should be removed the sooner of the market demands additional capacity for dry bulk cargo throughput or the beginning of implementation of the Multipurpose General Cargo Node.
- The Plan assumes 80% of the cargo will arrive by vessels and 20% by either rail or trucks
- The largest import dry bulk commodity will be cement products used in the regional construction industry. Cement products include Portland cement, slag, fly ash and other types of similar types of dry bulk products.
- Exports will account for a small percentage of the cargo, but they should remain a priority for TAMT.
- Dry Bulk Cargo vessels will be handled at Berths 10-5 and 10-6 and at Berths 10-7 and 10-8. Dry Bulk operations at Berths 10-5 and 10-6 will end, the sooner of either the development of the Multipurpose General Cargo Node or the construction of a Consolidated Multipurpose Dry Bulk Facility.
- Due to a sluggish construction economy, the near term Redevelopment Plan's forecast is conservative. To achieve the higher volumes the existing unloading/loading system at 10-7 and 10-8 may need to be modernized to increase capabilities. These improvements should be made in association with the development of the Consolidated Multipurpose Dry Bulk Facility.
- Demolition and removal of existing Molasses Tanks.
- Maintain the area between the apron area and Terminal Street and between Terminal Street

and Water Street as non-exclusive open storage areas. Both of these areas will be adjacent to the proposed new Multipurpose General Cargo Node.

- The District should consider conversion of the existing dry bulk silo's for the potential implementation of the Consolidated Multipurpose Dry Bulk Facility.
- As part of the Consolidated Multipurpose Dry Bulk Facility, to accommodate other dry bulk products, such as bauxite or super-sacks) construct or maintain a semi-permanent (**e.g. a Rubb style of building – see www.rubb.com**) storage facility (70,000 to 100,000 square feet) for the storage of bulk products.

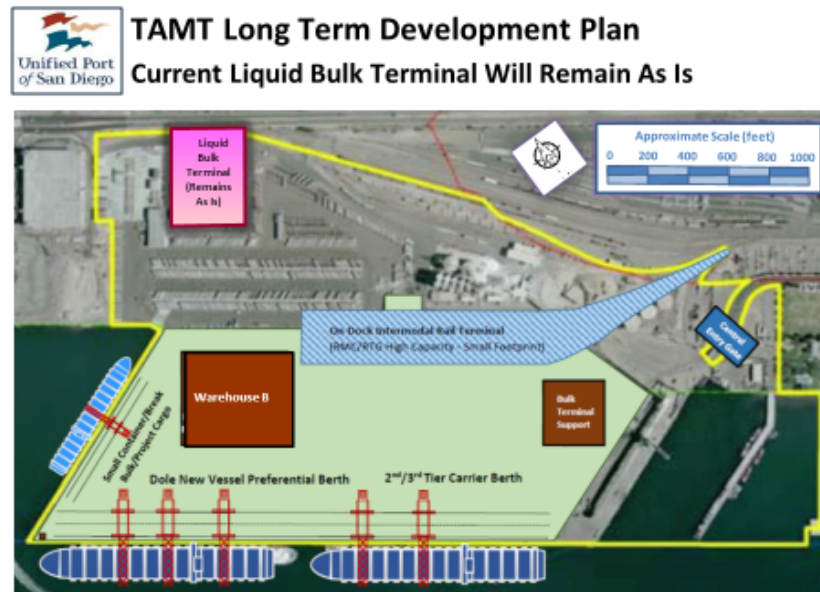
Sustainability Recommendations:

- No hazardous dry bulk materials should be handled at the facility. Dry Bulk customers should be required to provide the Maritime Division copies of Material Safety Data Sheets (MSDS) handled at the facilities.
- Improvements to existing facilities and construction of new facilities are to meet the SDUPD standards for reduced air emissions, energy efficiencies, and comply with the policies of the "Climate Action Plan".
- Trucks picking up bulk cargo or delivery bulk cargo to TAMT are to meet the SDUPD Clean Truck Program; where practical and feasible, customers should explore transportation alternatives that will reduce the number of trucks required by their operations. Customers need to explore and implement any new air emission reduction programs to reduce truck emissions.

Dry Bulk Cargo Throughput Redevelopment Plan Forecasts

Dry Bulk Commodities	2017	2020	2035
Soda Ash	95481	100362	116317
Cement (without new customers)	202025	261628	407607
Other Bulk Materials	67298	71417	96118
Total	364804	433407	620043
Soda Ash	95481	100362	116517
Cement (with new customers)	367625	765341	1769194
Other Bulk Materials	67298	71417	96118
Total	530404	937120	1981829

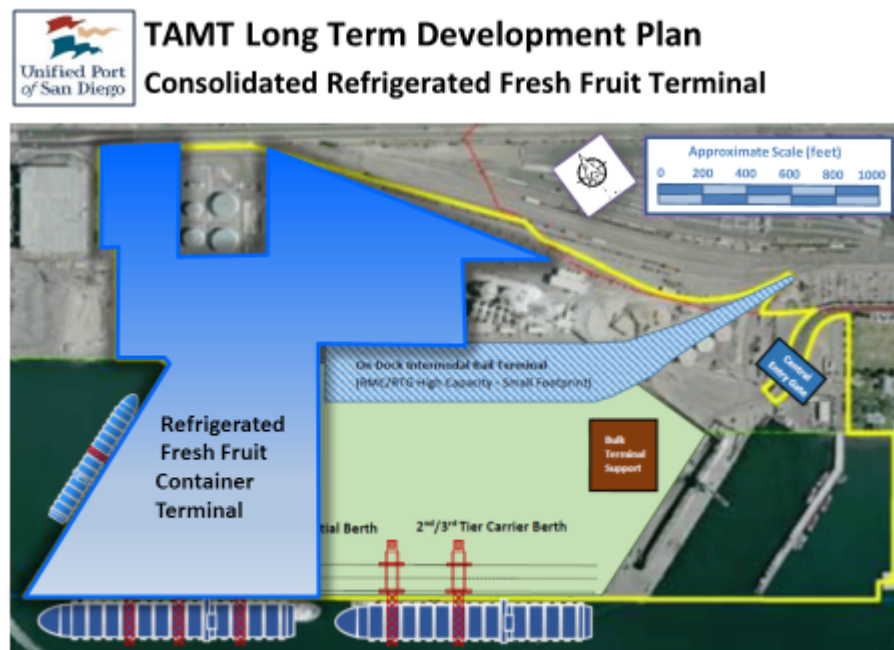
Liquid Bulk Operating Node (Jankovich Fuel Facility):



Source: Vickerman & Associates 2014

The Redevelopment Plan recommends no changes to the TAMT Fuel Farm and the Jankovich operations. The Plan recommends that the former Molasses Tanks be removed as part of the Multipurpose Dry Bulk node.

Refrigerated Fresh Fruit Container Terminal Operating Node (Dole and New Customer):



Source: Vickerman & Associates 2014

Refrigerated Fresh Fruit Container Terminal Operating Node Description, Characteristics, and Opportunities

Size	Approximately 40 Acres including existing Dole Terminal, SDRS Lease Premises, and the area where TS # 1 will be removed (approximately 10-12 acres).
Maximum Practical Capacity	2,288,000 MTs includes bananas, tropical fruits, and other general containerized cargo. 312,000 TEUs or 156,000 FEUs with the existing Customer having 166,400 TEUs and a new customer with 145,600 TEUs.
Berth	10 -1 and 10-2 Depth and Approach: 30 feet MLLW 10- 3 and 10-4 Depth and Approach: 42 feet MLLW Berths are subject to the Dole preferential assignment.
Commodities To Be Handled	Bananas, Tropical Fruits and General Cargo
Vessel Size	Vessels up to 1,600 – 1,700 TEUs
Cargo Transfer	Ships Gear to chassis with current Mobile Harbor Crane. Future demand may include up to two (2) 100 ft. gauge gantry cranes. Backland storage will include a combination of wheeled chassis operations and grounded operations requiring top pickers for handling of containers.
Inland Transportation	Truck
Customer base	Dole Fresh Fruit, San Diego Refrigerated Services, and New Banana and Tropical Fruit account
Forecast	While the existing refrigerated terminal will get a boost in capacity due to the next and larger vessels being employed by Dole, the CAGR applied to this terminal is 3%. This is consistent with the GDP trade forecast and the potential population increases within the market served by the fresh fruit importers.

The proposed Refrigerated Fresh Fruit Container Terminal builds upon Dole's operations and the anticipation of their new vessels. A marketing effort with other banana companies, seasonal melon importers, and carriers that have a book of business within the fresh fruit liner services is recommended. The removal of TS #1 provides 8 to 12 additional acres for new and improved open terminal operations.

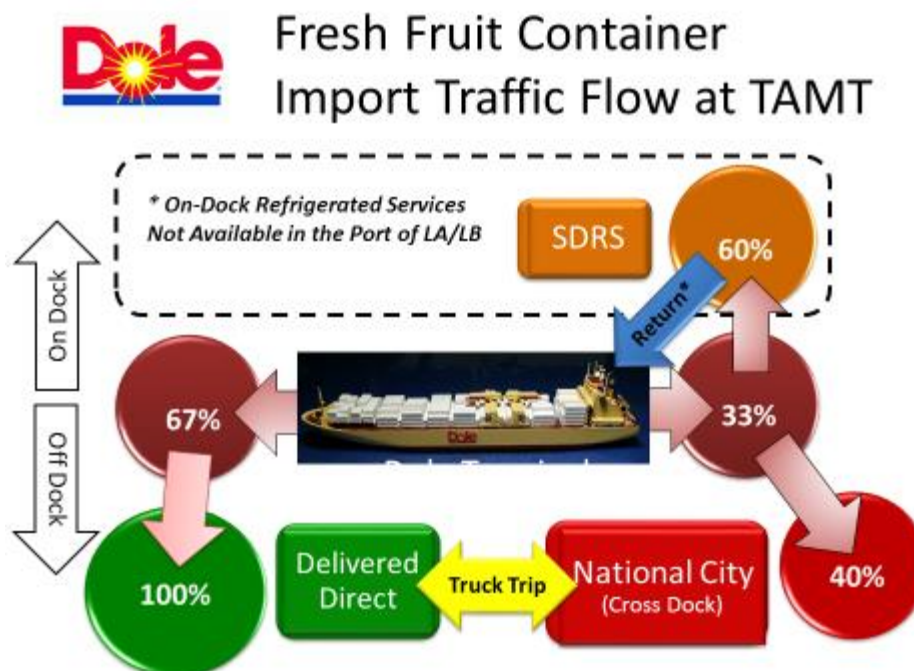
Refrigerated Fresh Fruit Container Terminal Optimum Development:

The Refrigerated Fresh Fruit Container Terminal optimum development concept examines the existing customers (Dole and SDRS) commodity types and future market opportunities. In the past five years, Dole's TEUs have increased from 96,126 in FY 2008 / 2009 to over 100,000. The current vessel capacity is 982 TEUs. With Dole's weekly service, Dole is discharging a full load and returning with a full load or 1,964 TEUs weekly. This rotation is 102,128 TEUs annually. Based upon Dole's FY 2012/2013 throughput, the vessel deployment and capabilities are reaching 100%

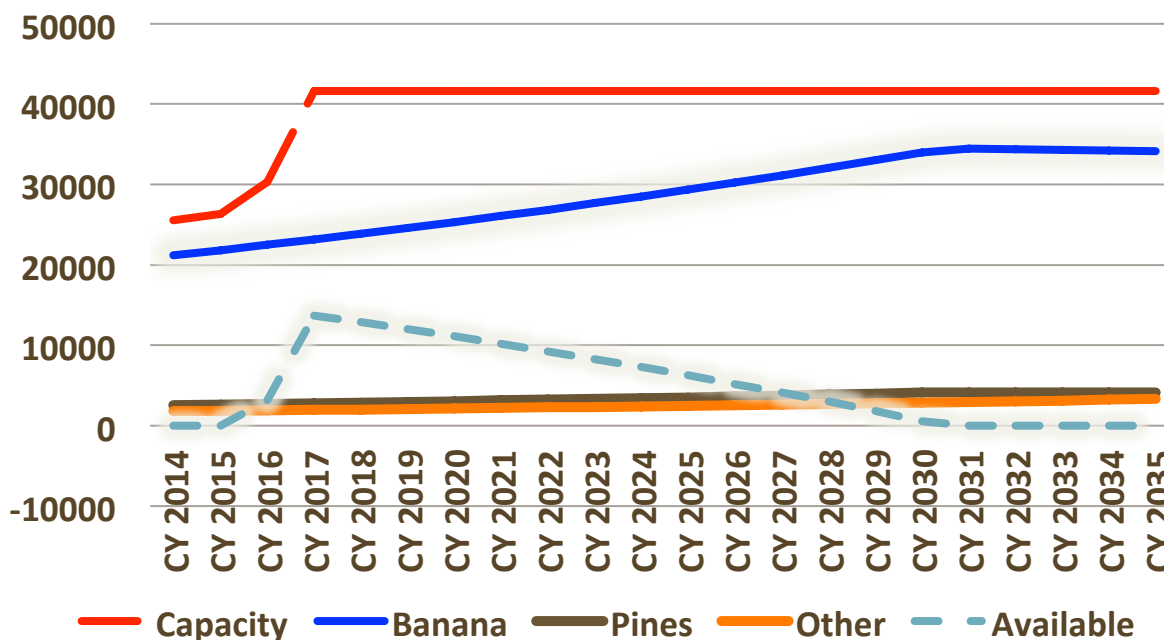
of their terminal's MPC. Dole is therefore building new vessels to enter the West Coast service. The Redevelopment Plan assumes Dole's vessels will have a 1,600 TEU / 800 FEU capacity, and these vessels will be in full service by CY 2017. Therefore, Redevelopment Plan assumptions for Dole are:

- For calendar year 2015, total capability remains at 105,192 TEUs (52,596 FEUs).
- For calendar year 2016, total capability begins to increase as the new vessels come on line. For purposes of the Plan, it was assumed that the new vessels will have 17 calls and the existing vessels will have 34 vessel calls. The CY 2016 capacity increases to 121,176 TEUs (60,588 FEUs).

For calendar year 2017 and beyond, the vessel capacity will be 166,400 TEUs (83,200 FEUs). For the current Dole Fresh Fruit service, the Redevelopment Plan assumes northbound loads will have 83% of the containers for bananas, 10% for pineapples, and 7% for other tropical and/or general refrigerated cargo. For southbound loads, the Plan assumes 2% of these loads will be full (general cargo) and 98% empty. One of the most important features of the Dole operations is the ability to unload containers at TAMT into the SDRS cold storage warehouse where required and necessary federal inspections occur. The cargo flow for Dole suggests that approximately 67% of the northbound loads will be sold and delivered directly at the terminal. Regional grocery chain or fresh fruit broker pick up the fruit at the terminal and truck it to its final destination. The remaining 33% will either be unloaded directly into the cold storage facility or moved to another location to be unloaded and reloaded into domestic over-the-road carriers.



Refrigerated Container Vessel Capacity and Forecast based upon a 1,600 TEU Vessel



NOTE: The graph above uses FEUs since the banana trade is generally exclusively 40 foot containers.

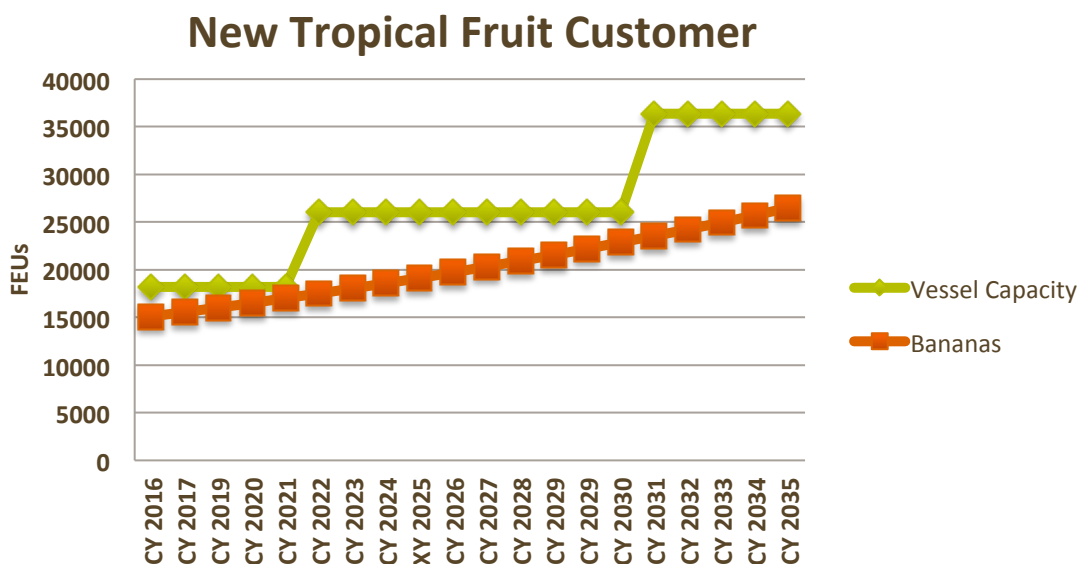
With the increase in the Dole vessel capabilities, a new market opportunity exists for Dole Liner Service to solicit third party cargo to the terminal utilizing the Dole vessel capacity. While it is unlikely, the third party capability will include banana imports by a major importer, it does provide opportunities for “niche” seasonal products such as melons from Central America.

New Containerized Fresh Fruit (Bananas):

The Redevelopment Plan’s approach to a new fresh fruit opportunity is supported by previous reports and is based upon the removal of the remaining portions of Transit Shed # 1 and repaving the backland areas to support stacked container operations. The level of investment in the infrastructure needs to be based upon a specific agreement with the user/operator. The Plan **does not** suggest a “*build it and they shall come*” approach. Potential customers should be approached with the proposed Redevelopment Plan’s operational concepts.

The Redevelopment Plan recommends that the operating nodes have flexible borders (“expandable bladders”) so that additional areas can be added from the adjacent Multipurpose General Cargo Node. The Plan assumes that the new operator will operate similarly to Dole with 60% of the inbound loads going directly by truck and the remaining 40% will go to either a cold store or a cross-dock facility.

The forecast for the new fresh fruit container service commences in FY 2016. The initial northbound vessel has a capability of 700 TEUs (350 FEUs). The plan forecasts that after five years, the vessel capacity will increase to 1,000 TEUs (500 FEUs) and by 2030 will increase to 1,400 TEUs (700 FEUs). The 2030 capacity is 36,500 FEUs.



Note: FEUs are used since this is the primary container used in the banana trade.

Refrigerated Fresh Fruit Container Terminal Optimum Planning Recommendations:

The Redevelopment Plan recommends the following:

- Increase the existing refrigerated container capacity to support larger and additional cargo capabilities by demolishing existing transit sheds to create more open space. At the earliest time frame, add additional open space and better unloading circulation on the backlands of berths 10-3 and 10-4.
- Pursue the opportunity to serve the refrigerated fresh fruit container terminal with consolidated terminal services in order to utilize the same equipment and labor throughout the terminal to provide the greatest level of efficiency.
- Infrastructure improvements (e.g. reefer plugs, crane rails, etc.) should be added when the market demands.
- The largest refrigerated cargo commodity will remain bananas from Latin America. The southbound empties provide the District with limited potential export opportunities.
- The immediate excess capacity on the larger Dole vessel provides a new opportunity to offer northbound vessel services for the time that vessel capacity exceeds the banana demand.
- Refrigerated Fresh Fruit Container vessels will be handled at Berths 10-3 and 10-4. Dole's non-exclusive, preferential berth assignment encumbers this berth. Seasonal "niche" carriers that have spot business associated with the non-containerized trade shall have access to 10-1 and 10-2 at its current operating depth. Overflow use of 10-5 and 10-6 will be used to support any operations that otherwise cannot be handled at 10-3 and 10-4. Fresh fruit operating vessels should be provided a priority use of TAMT berths subject to appropriate and reasonable notice provisions.
- Gantry cranes should be considered in association with a combined terminal services provider. The District's responsibility should be to provide necessary infrastructure while the private sector should provide the gantry cranes.

SUSTAINABILITY

- Although new season refrigerated container services may fall below the California Air Resources Board criteria for “ship-to-shore power” requirements, refrigerated vessel operators should be required to meet the shore-side power requirements.
- Products leaving by or arriving by trucks at TAMT are to meet the SDUPD Clean Truck Program. Where practical and feasible, customers should explore transportation and operational alternatives that will reduce the number of trucks required by their operations.
- All new terminal equipment, including Gantry Cranes, need to meet the highest level of energy efficiency with the lowest level of air emissions.

There are three alternatives, not mutually inconsistent concepts, for proceeding with the Refrigerated Fresh Fruit market:

Development Concept for Immediate Cargo Opportunity:

- Transit Shed # 1 is removed in order to make between 8 and 10 acres of available open storage backland area.
- The remainder of the Terminal area remains the same.
- While marketing for new fresh fruit opportunities, the open non-exclusive terminal space is used to support the Dole new vessel operations (e.g. circulation and staging) and spot project cargo opportunities.

Development Concept for New Seasonal or Year-Around Customer:

- Transit Shed # 1 is removed in order to make between 8 and 10 acres of available open storage backland area.
- Subject to the needs and requirements of the seasonal or year-round customer, improvements to accommodate either a stacked or wheeled operations are to be made in the 8 to 10 acre terminal area.
- The Dole terminal circulation plan will accommodate the unloading and loading operations at Berths 10-3 and 10-4.
- As needed, expanded capabilities for the storage of palletized cargo unloaded from the containers may be required within the SDRS facilities.
- The Multipurpose General Cargo Node adjacent to the Refrigerated Fresh Fruit Container Terminal will be designed to permit flexibility for expansion and overflow cargo requirements.

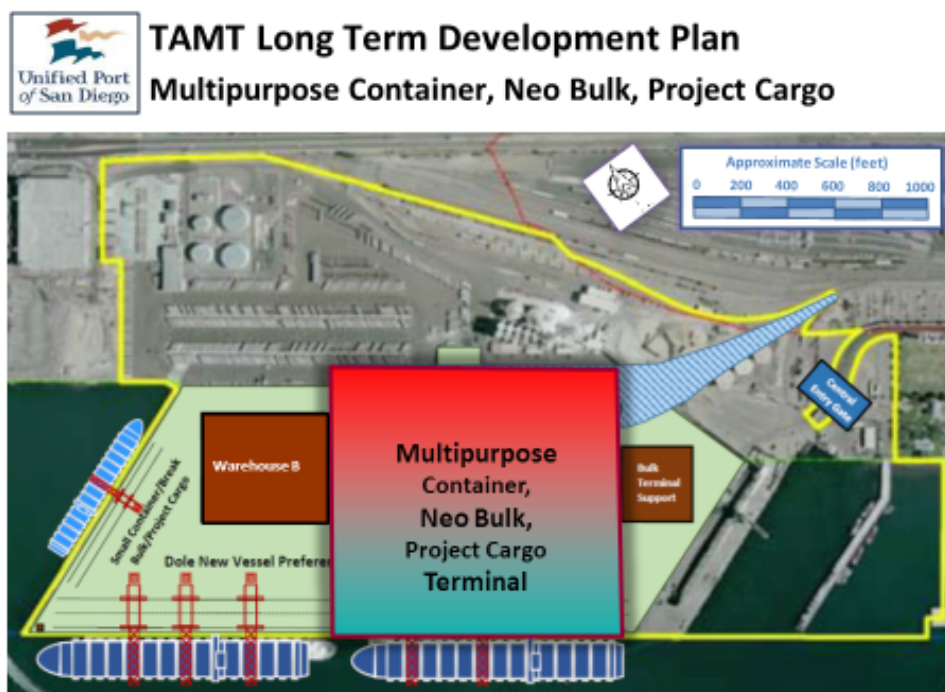
Full Build Out of Refrigerated Fresh Fruit Container Facilities with Gantry Cranes:

- Transit Shed # 1 is removed in order to make between 8 and 10 acres available open storage backland area.
- Subject to the needs and requirements of the customer, improvements to accommodate either a stacked or wheeled operations are to be made in the 8 to 10 acre terminal area, or alternately to the adjacent Multipurpose General Cargo Node.
- When vessel capacity for refrigerated container vessels begins to exceed 1,300 lifts (number of containers lifted on and lifted off) weekly, the SDUPD, in association with its customer, may wish to consider implementation of gantry cranes to support vessel productivity.
- The minimum recommendation for gantry cranes is two (2) new, 100-foot gauge, electrical

gantry cranes. Prior to approval of the gantry cranes, the selected cranes are to meet the San Diego Climate Action Plan for sustainability over the life of the crane.

- The future use of a Mobile Harbor Crane (MHC) will be on Berths 10-1 and 10-2 to support “niche” seasonal fresh fruit vessel operations.

Multipurpose General Cargo Node to support Neo-bulk, Break-bulk, Container and/or Project Cargo Terminal Operations:



Source: Vickerman & Associates 2014

There are three optimum development concepts for this Multi-Purpose General Cargo Terminal. They are:

- Multi-Purpose General Cargo with Automobiles
- Multi-Purpose General Cargo with Containers (Dry and Refrigerated)
- Multi-Purpose General Cargo with Project Cargo, Neo Bulk, and Break Bulk

While each of the development concepts can handle levels of automobiles, containers, neo bulk, and break bulk cargoes, the distinction is the emphasis placed on the operating mode and the customer's needs. Full utilization and improvement of this Multipurpose General Cargo Node requires:

- Relocation or termination of the existing Dry Bulk operations inside of Transit Shed # 2.
- Relocation or termination of uses in Warehouse C.
- Demolition of Transit Sheds # 1, # 2, and Warehouse C.

With the demolition and removal of the existing structures, the Redevelopment Plan recommends that the “Modular Grid Overlay System” be employed.

Since an open storage area can have multiple throughput capacities based on use, the Redevelopment Plan identifies three (3) maximum practical capacities are for this Multipurpose General Cargo node.

Import / Export Automobile and Truck Terminal:

The primarily use is the handling of automobile imports and exports. Unless needed for the development of the Fresh Fruit Node, the backland area behind 10-3 and 10-4 is available to support placement of automobiles and project cargo, and the covered storage area inside of the SDRS facility can be used to support other general cargo.

Operating Node Description, Characteristics, and Opportunities	
Automobile & Truck Terminal	
Size	Approximately 30 acres with a total static storage capacity for 5,000 units.
Maximum Practical Capacity	420,000 Metric Tons or 300,000 units.
Berth	Berths 10-5 and 10-6. Secondary use of Dole's 10-3 and 10-4. Depth alongside the berth 42 feet MLLW
Commodities To Be Handled	Automobile and Truck imports and exports. General project cargo compatible for Roll On and Roll Off vessel operations.
Vessel Size	Standard Pure Car and Truck Carriers.
Cargo Transfer	Roll On and Roll Off operations
Inland Transportation	Truck and Rail
Customer Base	TBD
Forecast	The CAGR applied to this terminal is 3%. The cursory GDP market results anticipate positive future growth.

The proposed MPC is computed based upon the customer building in velocity to the overall operations. The dwell time for the inbound first-point-of rest (FPR) cannot exceed a 7-day dwell, and preferably should be closer to 3 to 4 days. The inbound First Point of Rest is planned with a "blocked stow" storage pattern (approximately 10 cars per row). The vehicle distribution / processing center is located away from the TAMT on industrial property in close proximity to the Port. The industrial land could take advantage of a Foreign Trade Zone designation. Working with these operational parameters and a five-year forecast to initiate service, the Redevelopment Plan's forecast is 156,000 to 260,000 units during year one and by applying the 3% CAGR, by year five the volume may grow to over 175,000 and 290,000 units.

Container Terminal (Dry and Refrigerated on the Multi-purpose General Cargo Node):

There are two alternatives for the Multipurpose General Cargo Container Node: a 30-acre facility with general cargo dry container using the backland of 10-5 and 10-6, and if available the backland area behind 10-3 and 10-4. And, the second alternative is to combine all the 10-3 and 10-4 backland to the Multipurpose General Cargo Node to provide for a 40-acre container terminal. The Redevelopment Plan shows this 40-acre terminal as a full service refrigerated and general cargo terminal to accommodate carriers identified in recent reports associated with the Latin American market.

Operating Node Description, Characteristics, and Opportunities**Alternative 1 – Dry Containers**

Size	Approximately 30 acres
Maximum Practical Capacity	120,000 TEUs annually. The Plan assumes 10 metric tons per TEU.
Berth	10 -3 and 10 – 4 subject to Dole’s preferential rights and 10 - 5 and 10 – 6 as the primary non-exclusive preferential berth. Depth and Approach: 42 feet MLLW
Commodities To Be Handled	Containerized general cargo transshipped from Latin America or on a “niche” trade route.
Vessel Size	C-7 or C-8 class container vessel
Cargo Transfer	Need for a minimum of two (2) gantry cranes with a 100 ft gauge. Terminal handling may include high speed, low emission, lifting equipment.
Inland Transportation	Truck and Rail
Customer Base	TBD
Opportunities / Forecast	The 3% CAGR has been applied. The GDP market forecast anticipates positive future growth.

The Redevelopment Plan anticipates marketing and development of Alternative 1 for the Dry Container Node will take approximately five (5) years. Therefore, the forecast for the full container starts in CY 2020 and projected for a fifteen-year term to CY 2035. The initial container service at the Multipurpose General Cargo Container terminal forecasts approximately 60,000 lifts of 100,000 TEUs. Using a throughput of 4,000 TEUs per acre (based upon a wheeled operation), the dry container node has a potential to increase to 120,000 TEUs per annum or 1,200,000 metric tons. By utilizing high-speed, low emission, stacking capabilities, the terminal can greatly increase its handling efficiencies.

Operating Node Description, Characteristics, and Opportunities

Alternative 2– Refrigerated and General Cargo Containers

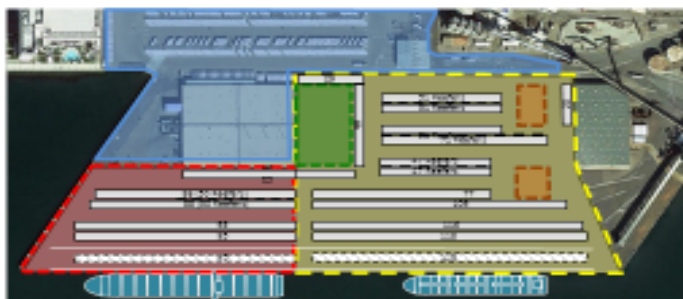
In June 2014, the District requested V&A to prepare a detailed conceptual schematic terminal layout using the Multi-Purpose General Cargo Terminal Operating Node area as a combined refrigerated and dry container terminal. The conceptual schematic terminal layout combines the backlands areas adjacent to Berths: 10-1, 10-2, 10-3, 10-4, 10-5 and 10-6 into a large multi-tenant, multi-berth, state-of-the-art refrigerated container complex. The terminal layout uses chassis container operations and maximizes the available backlands area for container yard storage. The layout includes the ability to accommodate the Alternative TAMT Gate concepts. The following terminal layout is based upon V&A's current understanding of operational requirements by current liner services calling between Latin America and Southern California.



Multipurpose Container Terminal Schematic with Refrigerated Fresh Fruit Capabilities (Schematic Container Yard Layout – CY Chassis Storage Layout)



Terminal Chassis Capacity Characteristics & Throughput



Approximate Annual Terminal Throughput
(Based on a Maximum of 4,000 TEU/acre/year Throughput)

Exclusive Lease Area (Yellow)

Chassis Storage Throughput = 113,600 TEUs/Year

Non- Exclusive Lease Area (Red)

Chassis Storage Throughput = 49,600 TEUs/Year

Total Terminal area Lease Area (Red + Yellow)

Chassis Storage Throughput = 163,200 TEUs/Year

Exclusive Lease Area (Yellow)

Approx. Acreage: 28.4

Reefer Slots: 318

Dry Ground Slots: 632*

(* 118 Ground Slots used in the
Absence of Gantry Crane Operations)

Total Ground Slots: 950

Non - Exclusive Lease Area (Red)

Approx. Acreage: 12.4

Reefer Slots: 100

Dry Ground Slots: 407*

(* 95 Ground Slots used in the Absence
of Gantry Crane Operations)

Total Ground Slots: 507

Container, Project Cargo, Neo Bulk and Break Bulk (Omni) Terminal:

The term Omni is used in the Redevelopment Plan for this concept because the terminal is capable of handling break bulk, neo bulk, and containers.

Operating Node Description, Characteristics, and Opportunities

Alternative 1 – General Cargo Project, Neo Bulk and Break Bulk (Lift On & Lift Off Vessels)

Size	Approximately 20 acres
Maximum Practical Capacity	327,700 Metric Tons
Berth	10 - 5 and 10 – 6 as the primary berths but no non-exclusive preferential berth. Depth and Approach: 42 feet MLLW
Commodities To Be Handled	Various General Cargo (e.g. steel, wind energy components, yachts, and other neo bulk and break bulk cargo) with a small volume of on-deck containers.
Vessel Size	Star Class Vessel
Cargo Transfer	Ships Gear and use of Mobile Harbor Crane.
Inland Transportation	Truck with rail for specialized cargo
Customer Base	Existing and new
Opportunities / Forecast	The 2% CAGR has been applied.

Operating Node Description, Characteristics, and Opportunities

Alternative 2 – General Cargo Project, Neo Bulk and Break Bulk (Roll On & Roll Off Vessels)

Size	Up to 40 Acres
Maximum Practical Capacity	977,400 Metric Tons
Berth	10 - 5 and 10 – 6 as the primary berths with non-exclusive preferential berth. 10-3 and 10-4 as the secondary berths subject to Dole's preferential berth. Depth and Approach: 42 feet MLLW
Commodities To Be Handled	Various General Cargo in all cargo modes both international and domestic trade opportunities.
Vessel Size	Roll On and Roll Off Vessels with on deck containers
Cargo Transfer	Roll On and Roll Off Operations. On deck containers may require Gantry Cranes.
Inland Transportation	Truck with rail for specialized cargo

Customer Base	TBD
Opportunities / Forecast	The 3% CAGR has been applied.

Multi-Purpose General Cargo Terminal Optimum Planning Recommendations:

- Increase the TAMT open storage capacity for neo-bulk, break-bulk, containers, and project cargo.
- For the Multipurpose General Cargo Container Node incorporate refrigerated cargo commodities.
- The excess capacity on the larger Dole vessel offers a new short-term opportunity to offer northbound vessel services for the time that vessel capacity exceeds the banana demand.
- Addition of gantry cranes should be considered in association with a single terminal operator.
- Incorporate domestic and coastwise shipping alternatives within the Multi-Purpose General Cargo Terminal.

SUSTAINABILITY

- The Multipurpose General Cargo Terminal, for container and reefer vessels, will require a shore side power capability in order to provide power for two vessels at the same time.
- Where practical and feasible, customers should explore transportation and operational alternatives that will reduce the number of trucks required by their operations.
- Use of terminal equipment, including gantry cranes, should be limited to low-emission technology and need to meet the District's "Climate Action Plan" criteria for energy usage.

XII. Summary of the Updated Business Plan and TAMT Redevelopment Plan:

The 2008 Business Plan Update estimated that TAMT Maximum Practical Capacity (MPC) between 4,540,000 and 4,870,000 metric tons.

Terminal Type	TEC Berth MPC	TEC Storage MPC
Neo Bulk/Break Bulk	940,000	1,670,000
Containers	730,000	730,000
Dry Bulk	2,650,000	2,250,000
Liquid Bulk	220,000	220,000
TOTAL	4,540,000	4,870,000

In summary the Redevelopment Plan maintains the MPC for dry bulk at 2,250,000 metric tons; it slightly increases the Liquid Bulk based upon improvements made to the terminal since 2008 to 239,017; it decreases neo bulk and break bulk cargo and increases the container capabilities of

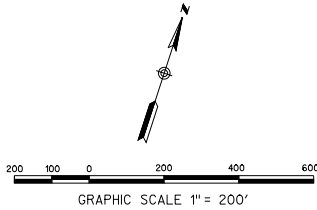
TAMT. The table bellows shows various alternative capacities based upon different Multipurpose Node uses previously discussed..

Multipurpose Alternative	Neo Bulk and Break Bulk	Reefer & Dry Containers	Dry Bulk	Liquid Bulk	Total
Auto / Truck Terminal	583,850	1,555,840	2,650,000	239,017	5,028,707
General Cargo Omni Ro/Ro Terminal	977,400	1,555,840	2,650,000	239,017	5,422,257
Break-bulk and Neo-bulk Omni Type Terminal	327,700	2,288,000	2,650,000	239,017	5,504,717
Full Container Refrigerated & Dry	0	2,960,840	2,650,000	239,017	5,849,857
Dry Container Full Build Out	0	3,155,840	2,650,000	239,017	6,044,857

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Appendix D
Chula Vista Parcels for Soil Export

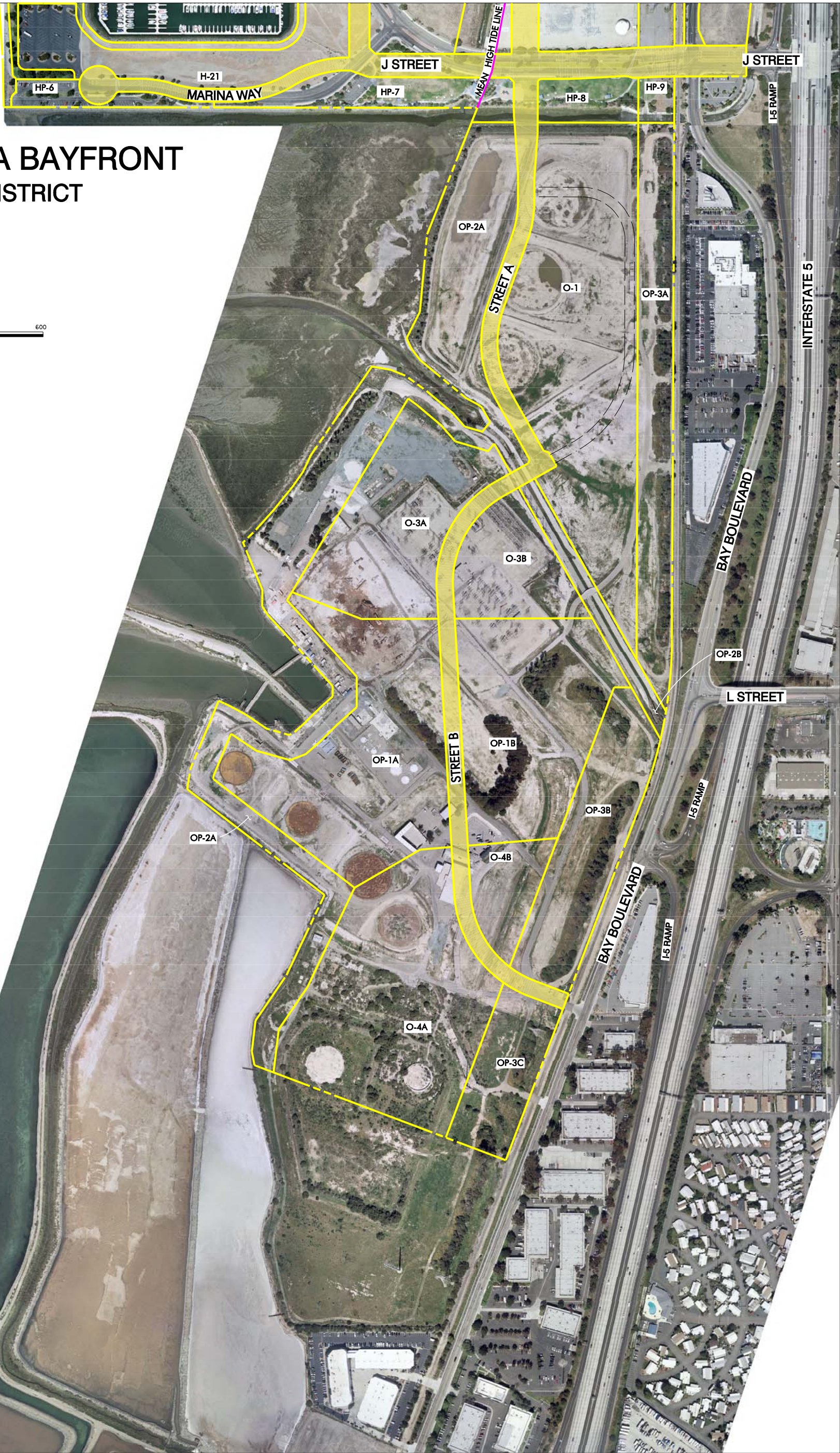
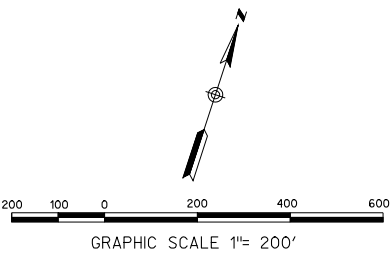
CHULA VISTA BAYFRONT
SWEETWATER & HARBOR DISTRICTS



If soils are found appropriate for reuse, they may be used as fill material on the following Chula Vista Bayfront Harbor District parcels as an option to raise surface elevations. The following parcels are not environmentally sensitive areas and they have been cleared through the environmental review process to be used as streets, surface parking, and to support subsequent development. The soil may be placed on any of these parcels during grading (or immediately after grading) and/or once the District confirms placement would not result in any new biological impacts to the affected parcel(s). Therefore, the soil could be temporarily stored at: HP-1(S), H-3, or H-21; whereas final reuse of the soil could be placed at any one of the following parcels: Streets, HP-1(S) (N), HP-3A, H-3, H-8, H-9, H-23, H-21, HP-3C, HP-6, HP-7, HP-14, HP-15, O-1, O-3A, O-3B, OP-1A, OP-1B, O-4A, and O-4B.



CHULA VISTA BAYFRONT OTAY DISTRICT



Appendix E

Cargo Conversion Factors

Appendix E: Conversion Matrix to Common Throughput Measurement

Table 1. Conversion Matrix for Multi-Purpose General Cargo

Neo-Bulk July 2013 to June 2014	Tonnage (metric tons)	Units	CBMs	TEUs	FEUs	MBF	Total Tonnage
Base Data	33,666	19,429	18,987	55	253	18.58	NA
Conversion	N/A	Variable ¹	1 CBM = 1 MRT	1 TEU = 10 MRT	1 FEU = 20 MRT	1 MBF = 1 MRT	NA
Metric Revenue Tons (MRT)	33,666	26,848	18,987	550	5,060	19	85,131
Notes:							
¹ See Table 2-5 for an explanation of how “unit” cargo was converted to a format that permits estimating MRT.							

Table 2. Conversion Matrix for Multi-Purpose General Cargo Initially Measured in Units

Commodity	Units	MRT
Vehicles 1 unit = 1.4 MRT	18,821	26,349
Empty Trailers 1 unit = 3.3 MRT	63	208
Van Pacs 1 unit = 0.53 MRT	545	290
TOTAL	19,429	26,848

Appendix F

Air Quality and Greenhouse Gas Calculations

- **CAP and Executive Order Targets**
- **Operation Emission Calculation Sheets**
 - **Vessels Methodology**
 - **Vessels, Tugs, and Shore Power**
 - **Trucks and Workers**
 - **Freight Rail**
 - **Cargo Handling Equipment**
 - **Bulk Loading Dust**
 - **Electricity and Water**
 - **Refrigerants**
- **Construction Emission Calculation Sheets**
- **Health Risk Assessment Sheets**
 - **Risk Calculation Sheets**
 - **AERMOD outputs (upon request)**
- **Sea Level Rise Calculation Sheet**

CAP and Executive Order Targets

Executive Order Target Interpolation

Calculations of Percent below BAU Emissions Needed to Meet AB 32 and B-30-15 Targets

Metric	MMTC02e	Notes
1990 emissions	431.00	Actual statewide emissions, excluding sinks
2013 emissions	459.28	Actual emissions, excluding sinks
2006	485.69	Actual emissions, excluding sinks
<i>Calculation of Percent below 2020 BAU Target</i>		
2020 BAU emissions	539	2014 forecast, excludes Pavley/LCFS.
2020 target	431	1990 emissions (from above)
% < 2006	11%	Calculation
% < 2013	6%	Calculation
% < 2020 BAU	20%	Calculation
<i>Calculation of Percent below 2030 BAU Target</i>		
2030 BAU emissions	500.23	CA Pathways Forecast
2030 target	258.6	40% below 1990
% < 2006	47%	
% < 2013	44%	Calculation
% < 2030 BAU	48%	Calculation

Interpolating BAU targets at interim years

Year	<u>BAU Target (non-adjusted 2020 target)</u>	<u>adjusted to 2013 base</u>	<u>adjusted to 2006 base</u>
2030	40%	48%	47%
2031	42%	50%	49%
2032	44%	52%	50%
2033	46%	54%	52%
2034	48%	55%	54%
2035	50%	57%	56%
2036	52%	59%	57%
2037	54%	61%	59%
2038	56%	62%	61%
2039	58%	64%	63%
2040	60%	66%	65%
2041	62%	68%	66%
2042	64%	69%	68%
2043	66%	71%	70%
2044	68%	73%	72%
2045	70%	75%	73%
2046	72%	76%	75%
2047	74%	78%	77%
2048	76%	80%	79%
2049	78%	82%	80%
2050	80%	83%	82%

CAP EMISSIONS TABLE

		GHG Emissions Summary by Category and Activity Type CAP Table ES-2				Percent Reductions	
		2006	2020 BAU	2020 with state	2020 target (1990)	Below Existing	Below 2020 BAU
Category	Activity						
Port Operations	--	37,164	38,930	30,044	33,533	10%	14%
Maritime	Ocean Going Vessels	55,162	72,786	62,365	49,773	10%	32%
	Recreational Boating	80,441	118,252	106,391	72,583	10%	39%
	Other Terminal Activity	89,242	109,859	92,000	80,524	10%	27%
	Total Maritime	224,845	300,897	260,756	202,880	10%	33%
Other	Industrial	137,426	138,258	131,725	124,001	10%	10%
	Shipbuilding	123,725	123,545	90,187	111,638	10%	10%
	Lodging	137,429	249,852	197,750	124,004	10%	50%
	Other	165,840	188,217	145,025	149,639	10%	20%
	Total Other	564,420	699,872	564,687	509,282	10%	27%
TOTAL		826,429	1,039,699	855,487	745,695	10%	28%

Note:

2020 Business As Usual (BAU) inventory does not account for reductions due to currently approved regulations.

2020, 2035, and 2050 with state emissions include:

- Renewables Portfolio Standards (RPS) - 33%
- Pavley Vehicle Standards - in EMFAC
- Low Carbon Fuel Standard (LCFS) - 10% across the board for all transportation fuels
- Heavy Duty (Tractor-Trailer) GHG Regulation - Phase 1 only
- Ocean Going Vessels (OGV) Fuel Switch Regulation - 0.1% sulfur

Operation Emission Calculation Sheets

- Vessels, Tugs, and Shore Power**
- Trucks and Workers**
- Freight Rail**
- Cargo Handling Equipment**
- Bulk Loading Dust**
- Electricity and Water**
- Refrigerants**

Tenth Avenue Marine Terminal Vessel Emissions Methodology

Ocean Going Vessel emissions inventories are generally calculated by using energy-based emission factors together with activity profiles for each vessel. The bulk of the work involves determining representative engine power ratings for each vessel and the development of activity profiles for each ship call. Using this information, ships are binned by ship type, engine type, deadweight tonnage (DWT), and emissions for each mode are calculated for propulsion and auxiliary engines and auxiliary boilers using the general equation below.

$$E = P \times LF \times A \times EF$$

Where E = Emissions (grams [g])

P = Maximum Continuous Rating Power (kilowatts [kW])

LF = Load Factor (percent of vessel's total power)

A = Activity (hours [h]) (hours/call * # of calls)

EF = Emission Factor (grams per kilowatt-hour [g/kWh])

The emission factor is in terms of emissions per unit of energy from the engine. It is multiplied by the energy needed to move the ship or perform another particular activity.

The next several sections describe (1) vessel characteristics, (2) activity profiles, (3) load factors, (4) emissions factors for ocean going vessels, and (5) 2020 Project and 2035 Plan Assumptions.

1) Vessel Characteristics

Existing vessel activity was based on July 2013 to June 2014 vessel calls as obtained from the District. There were a total of 100 vessel calls at TAMT made by 38 different vessels. Vessel type, engine type, engine tier, engine size, service speed, and hotel time are presented in **Table 1**.

Table 1. Vessel Descriptions

Ship Type	Engine Type ^a	Emission Tier	Calls	Vessel Averages			
				Propulsion (Main) Power (kW)	Auxiliary Power (kW)	Service Speed	Hotel Hours
Auto Carrier	SSD	1	8	11,060	2,760	20.00	27.6
Bulk Carrier	MSD	1	2	9,100	2,973	16.65	37.9
	SSD	0	2	8,139	2,325	14.60	28.7
		1	5	10,705	2,250	15.92	37.8
		2	2	9,140	2,393	15.00	85.1
Heavy Load Carrier	MSD	0	2	5,738	1,950	13.00	114.0
Container Ship	SSD	0	49	14,948	7,158	20.03	61.4
		1	8	13,055	3,676	18.93	60.8
General Cargo	MSD	0	1	5,738	1,950	13.00	123.0
		1	5	6,400	2,367	15.34	62.5
	SSD	0	3	9,268	2,557	15.23	86.3
		1	11	12,430	2,920	16.98	45.5
		2	2	8,630	2,048	14.90	50.9
Total			100	12,627	4,904	18.43	57.3

^a SSD = Slow speed diesel, MSD = Medium speed diesel

2) Activity Profiles

Vessel emissions generally result from three activities: transiting, maneuvering, and hoteling. The study area for analyzing vessel emissions is defined as 24 nm from shore (or what NOAA refers to as the California Baseline), consistent with the ARB rulemaking as well and is identical to the NOAA contiguous zone. The boundary of the vessel speed reduction (VSR) zone is defined as 20 nautical miles (nm) from the tip of Point Loma¹.

Transit: Transit emissions occur in open water within both the outer unrestricted speed zone and within the vessel speed reduction zone. Vessels that call on TAMT arrive from and depart to the north, south, and west. Guatemala is the most frequent last port of call, while Guatemala and Ecuador are the most frequent next port of call. Vessel transit distances are longest on calls to and from the north because the air basin starts at the Orange County line, about 48.9 nautical miles from Point Loma. Vessels that arrive from and depart to the south travel approximately 11.5 nautical miles from Point Loma to the international border; thus, vessel call transit is shortest from the south and occur completely within the vessel speed reduction zone. Vessels from the west actually transit to Point Loma from the northwest and take a path similar to the “outer-south” path denoted in the District’s air emissions inventory, which is about 35.3 nautical miles from Point Loma. During transit, the propulsion and auxiliary engines operate and the auxiliary boilers are off unless propulsion engine load drops below 20% at reduced speeds, as described below.

Vessels entering and leaving the port comply with the VSR on a voluntary basis. Compliance is deemed at operating within the VSR at 12 knots or less. **Table 2** shows the compliance percentage and speeds for both arrival and departure. Some frequent vessel operators, including Transfrut Express Ltd (46 calls, 85% compliant) and Arkas Denizcilik ve Nakliyat (6 calls, 92% compliant), currently exceed the voluntary target of 80%.

Table 2. Vessel Compliance with VSR

Ship Type	Engine Type	Emission Tier	Arrival				Departure			
			Comp (%)	Distance (nm)	Speed (kts)		Comp (%)	Distance (nm)	Speed (kts)	
					Comp	NC			Comp	NC
Auto Carrier	SSD	1	0%	35.30	12.00	16.06	0%	35.30	12.00	15.24
Bulk Carrier	MSD	1	50%	30.20	11.00	13.60	50%	23.40	11.20	13.60
	SSD	0	100%	30.20	10.70	14.60	100%	30.20	12.45	14.60
		1	60%	33.94	11.13	13.10	40%	26.46	11.90	13.07
		2	100%	11.50	11.05	15.00	100%	48.90	12.50	15.00
Heavy Load Carrier	MSD	0	100%	5.75	9.45	13.00	100%	24.45	9.45	13.00
Container Ship	SSD	0	90%	11.99	11.57	14.78	73%	12.26	11.83	16.06
		1	63%	11.50	12.08	16.03	75%	11.50	12.53	15.40
General Cargo	MSD	0	100%	11.50	10.10	13.00	100%	48.90	10.10	13.00
		1	60%	35.98	12.57	13.20	60%	23.74	12.20	15.10
	SSD	0	100%	23.97	12.07	15.23	100%	36.43	12.30	15.23
		1	91%	26.95	11.77	13.10	45%	34.06	11.86	15.23
		2	100%	42.10	10.95	14.90	100%	30.20	11.00	14.90
Averages			78%	19.31	11.60	14.57	65%	20.74	11.87	15.41

¹ Tip of Point Loma reference location is 32° 39'54" N, 117° 14'33" W.

Maneuvering: Maneuvering emissions occur as vessels operate at slow speed while in-port areas. Based on the ARB's methodology, maneuvering time was calculated as the distance traveled during maneuvering divided by speed, plus 15 minutes each for docking or undocking. Maneuvering is assumed to begin at the point where the pilot boards the vessel and ended at the berth. In San Diego, pilots board the vessel near the Whistle Buoy, which is located approximately 2.5 nautical miles south of the tip of Point Loma. During maneuvering, vessels slow to slow speeds, dropping main engine load below 20%, so the propulsion, auxiliary engines, and auxiliary boilers all operate. For purposes of calculating propulsion load factors, maneuvering speeds are assumed to be 7 knots.

Hoteling: Per the ARB, hoteling time can be defined as beginning when a ship ties up at a berth, and ends when it leaves that berth. Likewise, anchorage is defined as beginning when a ship drops anchor and ends when the anchor is raised and the ship begins moving again. Similar to the District's inventory, hoteling time and emissions includes at-berth and at-anchor. During hoteling, vehicle cargo is loaded and unloaded. The propulsion engine is shut off, the auxiliary engines operate to power onboard ventilation lights, equipment, container refrigeration, while boilers operate primarily for fuel heating. Average hoteling time for current TAMT calls is 57.3 hours per call. Hoteling time by ship type are shown in **Table 1**.

3) Load Factors

Load factors are expressed as a percent of the vessel's total propulsion or auxiliary power. At service or cruise speed, the propulsion load factor is assumed to be 82.5 percent. At lower speeds, the Propeller Law is used to estimate ship propulsion loads, based on the theory that propulsion power varies by the cube of speed as shown in the equation below.

$$LF = (AS/MS)^3$$

Where **LF** = Load Factor (percent)

AS = Actual Speed (knots)

MS = Maximum Speed (knots)

Maximum speed is calculated from service speed. Service speed is 93.7 percent of maximum speed.² While load factors will be calculated using the above propeller law, load factors below 2 percent will be set to 2 percent as a minimum.³ At main engine loads of less than 20%, engine emissions are multiplied by an adjustment factor which accounts for higher emission rates at low loads. The low engine loads occur during reduced vessel speeds (in VSR) and while maneuvering.

Load factors for auxiliary engines vary by operating mode. Load factors for auxiliary engines vary by operating mode from the 2011 ARB OGV methodology. Hoteling load factor for container ships was modified from the ARB methodology to account for the high amount of refrigerated containers on the Dole ships. Auxiliary engine load factors used to estimate emission are presented in **Table 3**.

² California Air Resources Board, Emissions Estimation Methodology for Ocean-Going Vessels, May 2011
<http://www.arb.ca.gov/regact/2011/ogv11/ogv11appd.pdf>

³ Starcrest Consulting Group LLC, Update to the Commercial Marine Inventory for Texas to Review Emission Factors, Consider a Ton-Mile EI Method, and Revised Emissions for the Beaumont-Port Arthur Non-Attainment Area, prepared for the Houston Advanced Research Center, January 2004

Table 3. Auxiliary Engine Load Factors

Ship Type	Transit	Maneuver	Hotel
Auto Carrier	0.15	0.45	0.26
Bulk Carrier	0.17	0.45	0.10
Heavy-Load Carrier	0.17	0.45	0.10
Container Ship	0.13	0.50	0.35
General Cargo	0.17	0.45	0.10

Vessel boiler loads for auto carriers were taken from the 2014 Port of Long Beach Inventory⁴ and are presented in **Table 4**. Boilers are typically not used during transit at sea since many vessels are equipped with an exhaust gas recovery system or economizers that uses heat of the main engine exhaust for heating fuel or water. However, when main engine speed drops, so does the load factor, which makes the economizers less effective. When main engine load drops below 20% during maneuvering and transit, boilers are assumed to operate. Boiler emissions are included in the transit emission calculations for VSR-compliant calls since main engine loads drop below 20% during complaint trips and all maneuvering trips.

Table 4. Boiler Loads (kW)

Ship Type	Ship Size	Transit	Maneuver	Hotel
Auto Carrier	All	351	351	351
Bulk Carrier	All	132	132	132
Heavy-Load Carrier	All	132	132	132
Container Ship	0 - 1000 TEU	241	241	241
	1000 – 2000 TEU	325	325	325
	2000 – 3000 TEU	474	474	474
General Cargo	All	135	135	135

4) Emission Factors

The emission factors used from this analysis come from the 2011 ARB OGV methodology⁵ and the EPA's Category 3 Engine Rulemaking⁶. Tier 0 Emission factors are shown in **Table 5**. The emission factors take into account use of 0.1% sulfur marine distillate fuel which is required in California starting January 1, 2014. Tier 1 and 2 NOx emission factors for propulsion and auxiliary engines are shown in Table 6.

⁴ Starcrest Consulting Group, Port of Long Beach Inventory of Air Emissions – September 2014
<http://www.polb.com/environment/air/emissions.asp>

⁵ ARB. 2011. Emissions Estimation Methodology for Ocean-Going Vessels.
<http://www.arb.ca.gov/regact/2011/ogv11/ogv11appd.pdf>

⁶ EPA 2011. Regulatory Impact Analysis: Control of Emissions of Air Pollution from Locomotive Engines and Marine Compression Ignition Engines Less than 30 Liters Per Cylinder. <https://www.regulations.gov/document?D=EPA-HQ-OAR-2003-0190-0938>

Table 5. Tier 0 Emission Factors (g/kWh)

Engine Type	NOx	DPM	PM _{2.5}	ROG	CO	SOx	CO ₂	CH ₄	N ₂ O
SSD Propulsion	17.0	0.25	0.23	0.78	1.10	0.36	588	0.07	0.018
MSD Propulsion	13.2	0.25	0.23	0.65	1.10	0.40	645	0.08	0.018
Auxiliary	13.9	0.25	0.23	0.52	1.10	0.40	690	0.08	0.018
Boiler	2.0	0.13	0.12	0.11	0.20	0.58	922	0.03	0.013

Table 6. Tier 1 and Tier 2 NOx Emission Factors (g/kWh)

Engine Type	Tier 1	Tier 2
SSD Propulsion	15.1	12.6
MSD Propulsion	11.7	9.2
Auxiliary	12.4	9.9

Emission factors are considered to be constant down to about 20 percent load. Below that threshold, emission factors tend to increase as the load decreases. This trend results because diesel engines are less efficient at low loads and the brake-specific fuel consumption (BSFC) tends to increase. Thus, while mass emissions (grams per hour) decrease with low loads, the engine power tends to decrease more quickly, thereby increasing the emission factor (grams per engine power) as load decreases. Energy and Environmental Analysis Inc. (EEA) demonstrated this effect in a study prepared for EPA in 2000.⁷ The low-load emission factor adjustment factors were developed based upon the concept that the BSFC increases as load decreases below about 20 percent load.

During transit without speed reduction, load factors are above 20 percent so no low load adjustment factor is applied to propulsion engines. During VSR-complaint transit, however, some load factors drop below 20 percent, so a low load adjustment factor needs to be applied to propulsion engine emission factors for those cases. Low load adjustment factors are shown in **Table 7**. There is no need for a low load adjustment factor for auxiliary engines, because they are generally operated in banks. When only low loads are needed, one or more engines are shut off, allowing the remaining engines to operate at a more efficient level.

While EEA does not directly develop low load adjustment factors for CH₄ and N₂O emissions, CH₄ adjustment factors are the same as for ROG while N₂O adjustment factors are the same as for NOx. This is the same methodology that Starcrest used in the Port of Los Angeles and Port of Long Beach inventories. Low load adjustment factors are multiplied by the emission factors in **Table 5** and **Table 6**.

Greenhouse gas emission factors also are weighted by global warming potential. The global warming potential for GHG emissions used in this analysis are taken from AR4 and are shown in **Table 8**.

⁷ Energy and Environmental Analysis Inc., *Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data*, EPA420-R-00-002, February 2000. <http://www.epa.gov/otaq/models/nonrdmdl/c-marine/r00002.pdf>

Table 7. Propulsion Engine Low Load Adjustment Factors

Load	NO _x	DPM	PM _{2.5}	ROG	CO	SO _x	CO ₂	CH ₄	N ₂ O
2%	4.63	7.29	7.29	21.18	9.68	3.36	3.28	21.18	4.63
3%	2.92	4.33	4.33	11.68	6.46	2.49	2.44	11.68	2.92
4%	2.21	3.09	3.09	7.71	4.86	2.05	2.01	7.71	2.21
5%	1.83	2.44	2.44	5.61	3.89	1.79	1.76	5.61	1.83
6%	1.60	2.04	2.04	4.35	3.25	1.61	1.59	4.35	1.60
7%	1.45	1.79	1.79	3.52	2.79	1.49	1.47	3.52	1.45
8%	1.35	1.61	1.61	2.95	2.45	1.39	1.38	2.95	1.35
9%	1.27	1.48	1.48	2.52	2.18	1.32	1.31	2.52	1.27
10%	1.22	1.38	1.38	2.20	1.96	1.26	1.25	2.20	1.22
11%	1.17	1.30	1.30	1.96	1.79	1.21	1.21	1.96	1.17
12%	1.14	1.24	1.24	1.76	1.64	1.18	1.17	1.76	1.14
13%	1.11	1.19	1.19	1.60	1.52	1.14	1.14	1.60	1.11
14%	1.08	1.15	1.15	1.47	1.41	1.11	1.11	1.47	1.08
15%	1.06	1.11	1.11	1.36	1.32	1.09	1.08	1.36	1.06
16%	1.05	1.08	1.08	1.26	1.24	1.07	1.06	1.26	1.05
17%	1.03	1.06	1.06	1.18	1.17	1.05	1.04	1.18	1.03
18%	1.02	1.04	1.04	1.11	1.11	1.03	1.03	1.11	1.02
19%	1.01	1.02	1.02	1.05	1.05	1.01	1.01	1.05	1.01
20%	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Table 8. Global Warming Potential

Pollutant	GWP
CO ₂	1
CH ₄	25
N ₂ O	298

5) 2020 Project and 2035 Plan Assumptions

Calls are increased based upon cargo throughput increases and known changes in capacity associated with the new Dole vessels. Throughput increases by commodity type are shown in **Table 9**.

Table 9. Commodity Throughput Ratios for 2020 and 2035 over Baseline

Commodity	2020	2035
Dry Bulk	(no change)	9.14
Liquid Bulk	(no change)	(no change)
Refrigerated Containers	1.08	3.59
Multi-Purpose General Cargo	1.46	11.48
Total	1.08	5.89

Using the commodities listed in the call data provided by the Port and the matchings shown in **Table 10**, the cargo throughput ratios by ship type/engine type/emission tier are shown in **Table 11**.

Table 10. Commodity breakout by Ship Type/Engine Type/Emission Tier

Ship Type	Engine Type	Engine Tier	Commodity Type	Percent of Emissions
Auto Carrier	SSD	1	Multi-Purpose General Cargo	100%
Bulk Carrier	MSD	1	Dry Bulk	46%
			Multi-Purpose General Cargo	54%
	SSD	0	Dry Bulk	100%
		1	Dry Bulk	100%
		2	Dry Bulk	100%
Heavy Load Carrier	MSD	0	Multi-Purpose General Cargo	100%
Container Ship	SSD	0	Refrigerated Containers	100%
		1	Refrigerated Containers	100%
General Cargo	MSD	0	Multi-Purpose General Cargo	100%
		1	Multi-Purpose General Cargo	100%
	SSD	0	Dry Bulk	72%
			Multi-Purpose General Cargo	28%
		1	Dry Bulk	16%
			Multi-Purpose General Cargo	84%
		2	Dry Bulk	62%
			Multi-Purpose General Cargo	38%

Table 11. Commodity Throughput Ratios for 2020 and 2035 over Baseline by Ship Type/Engine Type/Emission Tier

Ship Type	Engine Type	Emission Tier	2020	2035
Auto Carrier	SSD	1	1.46	11.48
Bulk Carrier	MSD	1	1.23	10.31
		0	1.00	9.14
	SSD	1	1.00	9.14
		2	1.00	9.14
Heavy Load Carrier	MSD	0	1.46	11.48
Container Ship	SSD	0	--	--
		1	--	--
		2	1.08	3.59
General Cargo	MSD	0	1.46	11.48
		1	1.46	11.48
	SSD	0	1.15	9.92
		1	1.37	11.06
		2	1.23	10.31

In all cases except container ships, calls at future years were multiplied by the ratios given in Table 11. For container ships, calls were revised because the current container ships are being replaced by newer (Tier 2) vessels with more capacity. To calculate new calls for container ships for 2020 and 2035, baseline refrigerated container TEUs were multiplied by the ratios given in Table 11 and then divided by the TEUs of the new ships (1560 TEUs). This resulted in 50 container ship calls in 2020 and 130 in 2035. Hoteling time was set at 89 hours

Vessel Emissions Methodology

per the Dole EIR. In addition, since the new ships were built to utilize shore power, it was assumed that 100% of the container ship calls used shore power. It was estimated when shore power is used that during the first and last 1.5 hours of hoteling the auxiliary engines ran while the cables were being connected or disconnected.

Baseline

20 VSR Distance

Ships

Ship Type	Engine Type	Emission Tier	Power (kW)			Service Speed (kts)	Total Transit Distance (nm)		Comp (%)	Transit - Arrival				Transit - Departure				Time (hrs)	Boiler Load (kW)		NOx				
			Calls	Main	Aux		Arrival	Depart		Distance (nm)	Speed (kts)	NC	Main Load Factor	Comp (%)	Distance (nm)	Speed (kts)	NC		Main Load Factor	Aux	Boiler (kW)	Main	Aux		
AUTO CARRIER	SSD	1	0.08	11,060	2,760	20.00	35.30	35.30	0%	15.30	12.00	20.00	0.18	0.82	0%	15.30	12.00	20.00	0.18	0.82	1.53	0.15	351	37.07	1.39
	MSD	1	0.02	9,100	2,973	16.65	30.20	23.40	0%	10.20	11.00	16.65	0.24	0.82	0%	3.40	11.20	16.65	0.25	0.82	0.82	0.17	-	3.15	0.23
BULK CARRIER	SSD	0	0.02	8,139	2,325	14.60	30.20	30.20	0%	10.20	10.70	14.60	0.32	0.82	0%	10.20	12.45	14.60	0.51	0.82	1.40	0.17	-	7.01	0.34
		1	0.05	10,705	2,250	15.92	33.94	26.46	0%	13.94	11.13	15.92	0.28	0.82	0%	6.46	11.90	15.92	0.34	0.82	1.28	0.17	-	18.78	0.67
		2	0.02	9,140	2,393	15.00	11.50	48.90	0%	-	11.05	15.00	0.33	0.82	0%	28.90	12.50	15.00	0.48	0.82	1.93	0.17	-	8.05	0.34
BULK CARRIER, HL	MSD	0	0.02	5,738	1,950	13.00	5.75	24.45	0%	-	9.45	13.00	0.32	0.82	0%	4.45	9.45	13.00	0.32	0.82	0.34	0.17	-	0.94	0.07
CONTAINER SHIP	SSD	0	0.49	14,948	7,158	20.03	11.99	12.26	0%	-	11.57	20.03	0.16	0.82	0%	-	11.83	20.03	0.17	0.82	-	0.13	132	-	-
		1	0.08	13,055	3,676	18.93	11.50	11.50	0%	-	12.08	18.93	0.21	0.82	0%	-	12.53	18.93	0.24	0.82	-	0.13	-	-	-
GENERAL CARGO	MSD	0	0.01	5,738	1,950	13.00	11.50	48.90	0%	-	10.10	13.00	0.39	0.82	0%	28.90	10.10	13.00	0.39	0.82	2.22	0.17	-	3.05	0.23
		1	0.05	6,400	2,367	15.34	35.98	23.74	0%	15.98	12.57	15.34	0.45	0.82	0%	3.74	12.20	15.34	0.41	0.82	1.29	0.17	-	8.73	0.71
		SSD	0	0.03	9,268	2,557	15.23	23.97	36.43	0%	3.97	12.07	15.23	0.41	0.82	0%	16.43	12.30	15.23	0.43	0.82	1.34	0.17	-	11.48
1	0.11		12,430	2,920	16.98	26.95	34.06	0%	6.95	11.77	16.98	0.27	0.82	0%	14.06	11.86	16.98	0.28	0.82	1.24	0.17	-	46.36	1.85	
Grand Total		2	0.02	8,630	2,048	14.90	42.10	30.20	0%	22.10	10.95	14.90	0.33	0.82	0%	10.20	11.00	14.90	0.33	0.82	2.17	0.17	-	8.55	0.33
			1.00	12,627	4,904	18.43	19.31	20.74	0%	4.45	11.60	18.43	0.22	0.82	0%	5.21	11.87	18.43	0.24	0.82	0.58	0.15	93	153.18	6.68

Harborcraft

			NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		Hours		NOx		DP
Tug/Barge	Calls	Hours	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Tug	Barge	Tug	Barge	Tug
Robyn J (Barge Jake J)	0.04	16.4	7.42	0.35	0.25	0.01	0.25	0.01	0.70	0.06	5.57	0.26	0.01	0.00	654	32	0.013	0.001	0.029	0.001	1.0	4.5	0.02	0.28	0.00
Robyn J (Barge Payton J)	0.81	16.4	163.26	7.62	5.57	0.28	5.40	0.27	15.37	1.29	122.58	5.80	0.16	0.01	14,393	714	0.286	0.025	0.649	0.032	1.0	4.8	0.46	6.69	0.02
Robyn J (Barge Tori J)	0.15	16.4	29.68	1.39	1.01	0.05	0.98	0.05	2.80	0.23	22.29	1.05	0.03	0.00	2,617	130	0.052	0.005	0.118	0.006	1.0	5.3	0.08	1.34	0.00
Grand Total	1.00	16.4	200.36	9.35	6.84	0.34	6.63	0.33	18.87	1.58	150.44	7.11	0.20	0.01	17,664	876	0.351	0.031	0.796	0.039	1.0	4.9	0.57	8.32	0.02

Assist Tugs

Tug	Hours per Call			Load Factors			NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O	
	Calls	Main	Aux	Main	Aux	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux
Scout	1.00	0.70	1.00	0.31	0.43		10.02	0.99	0.22	0.02	0.21	0.02	1.19	0.16	9.51	1.05	0.01	0.00	1,117	130	0.022	0.003	0.050	0.006
Tioga	1.00	0.70	1.00	0.31	0.43		10.02	0.79	0.22	0.03	0.21	0.03	1.19	0.13	9.51	0.60	0.01	0.00	1,117	74	0.022	0.003	0.050	0.003
Grand Total	2.00	0.70	1.00	0.31	0.43		20.03	1.78	0.44	0.05	0.43	0.05	2.39	0.30	19.02	1.66	0.03	0.00	2,233	204	0.044	0.006	0.101	0.009

Demo/Rail Project - 2020 - with CAP

Ships

	Engine	Emission	Power (kW)				Total Transit Distance (nm)		Transit - Arrival						Transit - Departure						Time		NC Boiler		NOx			
Ship Type	Type	Tier	Calls	Main	Aux	Service Speed (kts)	Arrival	Depart	Comp (%)	Distance (nm)	Comp	NC	Main Load Factor	Comp	NC	Comp (%)	Distance (nm)	Comp	NC	Main Load Factor	Comp	NC	(hrs)	Aux	Load (kW)	Main	Aux	
AUTO CARRIER	SSD	1	0.12	11,060	2,760	20.00	35.30	35.30	0%	15.30	12.00	20.00	0.18	0.82	0%	15.30	12.00	20.00	0.18	0.82	1.53	0.15	351	54.03	2.02			
	MSD	1	0.02	9,100	2,973	16.65	30.20	23.40	0%	10.20	11.00	16.65	0.24	0.82	0%	3.40	11.20	16.65	0.25	0.82	0.82	0.17	-	3.15	0.23			
BULK CARRIER		0	0.02	8,139	2,325	14.60	30.20	30.20	0%	10.20	10.70	14.60	0.32	0.82	0%	10.20	12.45	14.60	0.51	0.82	1.40	0.17	-	7.01	0.34			
	SSD	1	0.05	10,705	2,250	15.92	33.94	26.46	0%	13.94	11.13	15.92	0.28	0.82	0%	6.46	11.90	15.92	0.34	0.82	1.28	0.17	-	18.78	0.67			
		2	0.02	9,140	2,393	15.00	11.50	48.90	0%	-	11.05	15.00	0.33	0.82	0%	28.90	12.50	15.00	0.48	0.82	1.93	0.17	-	8.05	0.34			
BULK CARRIER, HL CONTAINER SHIP	MSD	0	0.03	5,738	1,950	13.00	5.75	24.45	0%	-	9.45	13.00	0.32	0.82	0%	4.45	9.45	13.00	0.32	0.82	0.34	0.17	-	1.41	0.10			
	SSD	2	0.50	19,420	11,320	19.50	11.92	12.16	0%	-	11.64	19.50	0.18	0.82	0%	-	11.93	19.50	0.19	0.82	-	0.13	132	-	-			
GENERAL CARGO	MSD	0	0.01	5,738	1,950	13.00	11.50	48.90	0%	-	10.10	13.00	0.39	0.82	0%	28.90	10.10	13.00	0.39	0.82	2.22	0.17	-	3.05	0.23			
		1	0.07	6,400	2,367	15.34	35.98	23.74	0%	15.98	12.57	15.34	0.45	0.82	0%	3.74	12.20	15.34	0.41	0.82	1.29	0.17	-	12.22	0.99			
	SSD	0	0.03	9,268	2,557	15.23	23.97	36.43	0%	3.97	12.07	15.23	0.41	0.82	0%	16.43	12.30	15.23	0.43	0.82	1.34	0.17	-	11.48	0.54			
		1	0.15	12,430	2,920	16.98	26.95	34.06	0%	6.95	11.77	16.98	0.27	0.82	0%	14.06	11.86	16.98	0.28	0.82	1.24	0.17	-	63.22	2.52			
		2	0.02	8,630	2,048	14.90	42.10	30.20	0%	22.10	10.95	14.90	0.33	0.82	0%	10.20	11.00	14.90	0.33	0.82	2.17	0.17	-	8.55	0.33			
Grand Total			1.04	14,524	6,799	18.04	20.86	22.44	0%	5.41	11.62	18.04	0.24	0.82	0%	6.22	11.85	18.04	0.25	0.82	0.69	0.15	103	190.96	8.30			
1.0365996 =scaling factor for baseline to 2020 (Baseline x 6% increase in annual calls)																												

Harborcraft

			NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		Hours		NOx		DP
Tug/Barge	Calls	Hours	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Tug	Barge	Tug	Barge	Tug
Robyn J (Barge Jake J)	0.04	16.4	7.16	0.33	0.24	0.01	0.24	0.01	0.67	0.06	5.37	0.25	0.01	0.00	631	31	0.013	0.001	0.028	0.001	1.0	4.5	0.02	0.27	0.00
Robyn J (Barge Payton J)	0.82	16.4	164.58	7.68	5.62	0.28	5.45	0.27	15.50	1.30	123.58	5.84	0.16	0.01	14,510	720	0.288	0.025	0.654	0.032	1.0	4.8	0.47	6.75	0.02
Robyn J (Barge Tori J)	0.14	16.4	28.62	1.34	0.98	0.05	0.95	0.05	2.70	0.23	21.49	1.02	0.03	0.00	2,523	125	0.050	0.004	0.114	0.006	1.0	5.3	0.08	1.29	0.00
Grand Total	1.00	16.4	200.36	9.35	6.84	0.34	6.63	0.33	18.87	1.58	150.44	7.11	0.20	0.01	17,664	876	0.351	0.031	0.796	0.039	1.0	4.9	0.57	8.31	0.02

Assist Tugs

Tug Running Emissions (lbs)

Baseline

Ships

			Transit Emissions (lbs)																								Comp (%)	
Ship Type	Engine Type	Emission Tier	Boiler	Main	DPM Aux	Boiler	Main	PM2.5 Aux	Boiler	Main	ROG Aux	Boiler	Main	CO Aux	Boiler	Main	SOx Aux	Boiler	Main	CO2 Aux	Boiler	Main	CH4 Aux	Boiler	Main	N2O Aux		Boiler
AUTO CARRIER	SSD	1	-	0.61	0.03	-	0.56	0.03	-	1.92	0.06	-	2.70	0.12	-	0.88	0.04	-	1,444	77	-	0.172	0.009	-	0.044	0.002	-	80%
BULK CARRIER	MSD	1	-	0.07	0.00	-	0.06	0.00	-	0.18	0.01	-	0.30	0.02	-	0.11	0.01	-	174	13	-	0.022	0.001	-	0.005	0.000	-	80%
	SSD	0	-	0.10	0.01	-	0.09	0.01	-	0.32	0.01	-	0.45	0.03	-	0.15	0.01	-	243	17	-	0.029	0.002	-	0.007	0.000	-	100%
		1	-	0.31	0.01	-	0.29	0.01	-	0.97	0.03	-	1.37	0.06	-	0.45	0.02	-	731	37	-	0.087	0.004	-	0.022	0.001	-	80%
		2	-	0.16	0.01	-	0.15	0.01	-	0.50	0.02	-	0.70	0.04	-	0.23	0.01	-	376	24	-	0.045	0.003	-	0.011	0.001	-	100%
BULK CARRIER, HL	MSD	0	-	0.02	0.00	-	0.02	0.00	-	0.05	0.00	-	0.08	0.01	-	0.03	0.00	-	46	3	-	0.006	0.000	-	0.001	0.000	-	100%
CONTAINER SHIP	SSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	
GENERAL CARGO	MSD	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80%	
		0	-	0.06	0.00	-	0.05	0.00	-	0.15	0.01	-	0.25	0.02	-	0.09	0.01	-	149	11	-	0.019	0.001	-	0.004	0.000	-	100%
	SSD	1	-	0.19	0.01	-	0.17	0.01	-	0.48	0.03	-	0.82	0.06	-	0.30	0.02	-	481	39	-	0.060	0.005	-	0.013	0.001	-	80%
		0	-	0.17	0.01	-	0.16	0.01	-	0.53	0.02	-	0.74	0.04	-	0.24	0.02	-	397	27	-	0.047	0.003	-	0.012	0.001	-	100%
		1	-	0.77	0.04	-	0.71	0.03	-	2.39	0.08	-	3.38	0.16	-	1.11	0.06	-	1,805	103	-	0.215	0.012	-	0.055	0.003	-	91%
		2	-	0.17	0.01	-	0.16	0.01	-	0.53	0.02	-	0.75	0.04	-	0.24	0.01	-	399	23	-	0.048	0.003	-	0.012	0.001	-	100%
Grand Total			-	2.62	0.14	-	2.41	0.12	-	8.01	0.28	-	11.54	0.60	-	3.83	0.22	-	6,245	374	-	0.748	0.043	-	0.189	0.010	-	88%

Harborcraft			Hoteling Emissions (lbs)																	
			M	PM2.5			ROG			CO			SOx		CO2		CH4		N2O	
Tug/Barge	Calls	Hours	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	
Robyn J (Barge Jake J)	0.04	16.4	0.02	0.00	0.01	0.00	0.05	0.02	0.22	0.00	0.00	2	26	0.000	0.001	0.000	0.001			
Robyn J (Barge Payton J)	0.81	16.4	0.36	0.02	0.35	0.08	1.14	0.35	5.27	0.00	0.01	44	603	0.002	0.021	0.002	0.028			
Robyn J (Barge Tori J)	0.15	16.4	0.07	0.00	0.07	0.01	0.23	0.06	1.06	0.00	0.00	8	121	0.000	0.004	0.000	0.006			
Grand Total	1.00	16.4	0.45	0.02	0.44	0.10	1.41	0.43	6.55	0.00	0.01	53	750	0.002	0.026	0.002	0.035			

Assist Tugs

Tug	Calls	Hours
Scout	1.00	0.70
Tioga	1.00	0.70
Grand Total	2.00	0.70

Demo/Rail Project - 2020 - with CAP

Ships

	Transit Emissions (lbs)																																											
Ship Type	Engine Type	Emission Tier	Boiler		Main	DPM Aux	Boiler		Main	PM2.5		Boiler		Main	ROG		Boiler		Main	CO		Boiler		Main	SOx		Boiler		Main	CO2		Boiler		Main	CH4		Boiler		Main	N2O		Boiler		Comp (%)
AUTO CARRIER	SSD	1	-	0.89	0.04	-	0.82	0.04	-	2.79	0.08	-	3.94	0.18	-	1.29	0.07	-	2,104	112	-	0.250	0.013	-	0.064	0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80%
	MSD	1	-	0.07	0.00	-	0.06	0.00	-	0.18	0.01	-	0.30	0.02	-	0.11	0.01	-	174	13	-	0.022	0.001	-	0.005	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80%
BULK CARRIER	SSD	0	-	0.10	0.01	-	0.09	0.01	-	0.32	0.01	-	0.45	0.03	-	0.15	0.01	-	243	17	-	0.029	0.002	-	-	0.007	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%
		1	-	0.31	0.01	-	0.29	0.01	-	0.97	0.03	-	1.37	0.06	-	0.45	0.02	-	731	37	-	0.087	0.004	-	-	0.022	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80%		
		2	-	0.16	0.01	-	0.15	0.01	-	0.50	0.02	-	0.70	0.04	-	0.23	0.01	-	376	24	-	0.045	0.003	-	-	0.011	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%		
BULK CARRIER, HL	MSD	0	-	0.03	0.00	-	0.02	0.00	-	0.07	0.00	-	0.12	0.01	-	0.04	0.00	-	69	5	-	0.009	0.001	-	-	0.002	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%
CONTAINER SHIP	SSD	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	88%
GENERAL CARGO	MSD	0	-	0.06	0.00	-	0.05	0.00	-	0.15	0.01	-	0.25	0.02	-	0.09	0.01	-	149	11	-	0.019	0.001	-	-	0.004	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%
		1	-	0.26	0.02	-	0.24	0.02	-	0.68	0.04	-	1.15	0.09	-	0.42	0.03	-	674	55	-	0.084	0.006	-	-	0.019	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80%		
	SSD	0	-	0.17	0.01	-	0.16	0.01	-	0.53	0.02	-	0.74	0.04	-	0.24	0.02	-	397	27	-	0.047	0.003	-	-	0.012	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	
		1	-	1.05	0.05	-	0.96	0.05	-	3.27	0.11	-	4.61	0.22	-	1.51	0.08	-	2,462	140	-	0.293	0.016	-	-	0.075	0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	91%	
		2	-	0.17	0.01	-	0.16	0.01	-	0.53	0.02	-	0.75	0.04	-	0.24	0.01	-	399	23	-	0.048	0.003	-	-	0.012	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%
Grand Total			-	3.27	0.17	-	3.01	0.15	-	9.98	0.35	-	14.37	0.74	-	4.77	0.27	-	7,777	464	-	0.931	0.054	-	-	0.235	0.012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	88%

Harborcraft			Hoteling Emissions (lbs)																	
			M	PM2.5			ROG			CO			SOx		CO2		CH4		N2O	
Tug/Barge	Calls	Hours	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	
Robyn J (Barge Jake J)	0.04	16.4	0.01	0.00	0.01	0.00	0.05	0.02	0.22	0.00	0.00	2	25	0.000	0.001	0.000	0.001			
Robyn J (Barge Payton J)	0.82	16.4	0.36	0.02	0.35	0.08	1.15	0.36	5.32	0.00	0.01	44	608	0.002	0.021	0.002	0.028			
Robyn J (Barge Tori J)	0.14	16.4	0.07	0.00	0.07	0.01	0.22	0.06	1.02	0.00	0.00	8	117	0.000	0.004	0.000	0.005			
Grand Total	1.00	16.4	0.45	0.02	0.44	0.10	1.41	0.43	6.55	0.00	0.01	53	749	0.002	0.026	0.002	0.035			

Assist Tugs

Baseline

Ships																											
Ship Type	Engine Type	Emission Tier	VSR - Arrival				VSR - Departure																				
			Distance (nm)	Speed (kts)	NC	Main Load Factor	Comp (%)	Distance (nm)	Speed (kts)	NC	Main Load Factor	Time (hrs)	Aux	Boiler Load (kW)	Main	NOx Aux	Boiler	Main	DPM Aux	Boiler	Main	PM2.5 Aux	Boiler	Main	ROG Aux		
AUTO CARRIER	SSD	1	20.00	12.00	16.06	0.18	0.43	80%	20.00	12.00	15.24	0.18	0.36	3.18	0.15	351	20.17	2.88	0.33	0.34	0.06	0.02	0.31	0.05	0.02	1.11	0.12
BULK CARRIER	MSD	1	20.00	11.00	13.60	0.24	0.45	80%	20.00	11.20	13.60	0.25	0.45	3.47	0.17	-	4.54	0.96	-	0.10	0.02	-	0.09	0.02	-	0.25	0.04
	SSD	0	20.00	10.70	14.60	0.32	0.82	100%	20.00	12.45	14.60	0.51	0.82	3.48	0.17	-	8.69	0.84	-	0.13	0.02	-	0.12	0.01	-	0.40	0.03
		1	20.00	11.13	13.10	0.28	0.46	80%	20.00	11.90	13.07	0.34	0.45	3.39	0.17	-	20.41	1.77	-	0.34	0.04	-	0.31	0.03	-	1.05	0.07
		2	11.50	11.05	15.00	0.33	0.82	100%	20.00	12.50	15.00	0.48	0.82	2.64	0.17	-	5.61	0.47	-	0.11	0.01	-	0.10	0.01	-	0.35	0.02
BULK CARRIER, HL	MSD	0	5.75	9.45	13.00	0.32	0.82	100%	20.00	9.45	13.00	0.32	0.82	2.72	0.17	-	2.88	0.55	-	0.05	0.01	-	0.05	0.01	-	0.14	0.02
CONTAINER SHIP	SSD	0	11.99	11.57	14.78	0.16	0.33	80%	12.26	11.83	16.06	0.17	0.42	1.99	0.13	132	107.54	27.87	0.50	1.62	0.50	0.03	1.49	0.46	0.03	5.59	1.04
		1	11.50	12.08	16.03	0.21	0.50	80%	11.50	12.53	15.40	0.24	0.44	1.79	0.13	-	16.56	1.87	-	0.27	0.04	-	0.25	0.03	-	0.86	0.08
GENERAL CARGO	MSD	0	11.50	10.10	13.00	0.39	0.82	100%	20.00	10.10	13.00	0.39	0.82	3.12	0.17	-	2.01	0.32	-	0.04	0.01	-	0.04	0.01	-	0.10	0.01
		1	20.00	12.57	13.20	0.45	0.52	80%	20.00	12.20	15.10	0.41	0.78	3.15	0.17	-	12.26	1.73	-	0.26	0.03	-	0.24	0.03	-	0.68	0.07
	SSD	0	20.00	12.07	15.23	0.41	0.82	100%	20.00	12.30	15.23	0.43	0.82	3.28	0.17	-	14.40	1.31	-	0.21	0.02	-	0.19	0.02	-	0.66	0.05
		1	20.00	11.77	13.10	0.27	0.38	80%	20.00	11.86	15.23	0.28	0.59	3.30	0.17	-	45.99	4.92	-	0.76	0.10	-	0.70	0.09	-	2.38	0.21
		2	20.00	10.95	14.90	0.33	0.82	100%	20.00	11.00	14.90	0.33	0.82	3.64	0.17	-	5.74	0.55	-	0.11	0.01	-	0.10	0.01	-	0.36	0.03
Grand Total			14.85	11.60	14.57	0.22	0.43	82%	15.53	11.87	15.41	0.24	0.51	2.51	0.15	93	266.79	46.05	0.83	4.34	0.87	0.06	4.00	0.80	0.05	13.92	1.80

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.81	16.4
Robyn J (Barge Tori J)	0.15	16.4
Grand Total	1.00	16.4

Assist Tugs		
Tug	Calls	Hours
Scout	1.00	0.70
Tioga	1.00	0.70
Grand Total	2.00	0.70

Demo/Rail Project - 2020 - with CAP

Ships																												
		VSR - Arrival						VSR - Departure						NC														
Ship Type	Engine Type	Emission Tier	Distance (nm)	Speed (kts)		Main Load Factor		Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Time (hrs)	Aux	Boiler Load (kW)	NOx			DPM			PM2.5			ROG		
				Comp	NC	Comp	NC			Comp	NC	Main	Aux				Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux			
AUTO CARRIER	SSD	1	20.00	12.00	16.06	0.18	0.43	80%	20.00	12.00	15.24	0.18	0.36	3.18	0.15	351	29.40	4.19	0.48	0.49	0.08	0.03	0.45	0.08	0.03	1.61	0.18	
BULK CARRIER	MSD	1	20.00	11.00	13.60	0.24	0.45	80%	20.00	11.20	13.60	0.25	0.45	3.47	0.17	-	4.54	0.96	-	0.10	0.02	-	0.09	0.02	-	0.25	0.04	
	SSD	0	20.00	10.70	14.60	0.32	0.82	100%	20.00	12.45	14.60	0.51	0.82	3.48	0.17	-	8.69	0.84	-	0.13	0.02	-	0.12	0.01	-	0.40	0.03	
		1	20.00	11.13	13.10	0.28	0.46	80%	20.00	11.90	13.07	0.34	0.45	3.39	0.17	-	20.41	1.77	-	0.34	0.04	-	0.31	0.03	-	1.05	0.07	
		2	11.50	11.05	15.00	0.33	0.82	100%	20.00	12.50	15.00	0.48	0.82	2.64	0.17	-	5.61	0.47	-	0.11	0.01	-	0.10	0.01	-	0.35	0.02	
BULK CARRIER, HL	MSD	0	5.75	9.45	13.00	0.32	0.82	100%	20.00	9.45	13.00	0.32	0.82	2.72	0.17	-	4.31	0.83	-	0.08	0.01	-	0.08	0.01	-	0.21	0.03	
CONTAINER SHIP	SSD	2	11.92	11.64	14.78	0.18	0.36	80%	12.16	11.93	16.06	0.19	0.46	1.97	0.13	325	114.49	31.56	1.23	2.31	0.80	0.08	2.12	0.73	0.08	7.75	1.66	
GENERAL CARGO	MSD	0	11.50	10.10	13.00	0.39	0.82	100%	20.00	10.10	13.00	0.39	0.82	3.12	0.17	-	2.01	0.32	-	0.04	0.01	-	0.04	0.01	-	0.10	0.01	
		1	20.00	12.57	13.20	0.45	0.52	80%	20.00	12.20	15.10	0.41	0.78	3.15	0.17	-	17.16	2.43	-	0.37	0.05	-	0.34	0.05	-	0.95	0.10	
	SSD	0	20.00	12.07	15.23	0.41	0.82	100%	20.00	12.30	15.23	0.43	0.82	3.28	0.17	-	14.40	1.31	-	0.21	0.02	-	0.19	0.02	-	0.66	0.05	
		1	20.00	11.77	13.10	0.27	0.38	80%	20.00	11.86	15.23	0.28	0.59	3.30	0.17	-	62.71	6.71	-	1.04	0.14	-	0.96	0.12	-	3.24	0.28	
GENERAL CARGO	SSD	2	20.00	10.95	14.90	0.33	0.82	100%	20.00	11.00	14.90	0.33	0.82	3.64	0.17	-	5.74	0.55	-	0.11	0.01	-	0.10	0.01	-	0.36	0.03	
		Grand Total			15.44	11.62	14.42	0.24	0.44	83%	16.22	11.85	15.38	0.25	0.54	2.62	0.15	196	289.48	51.94	1.71	5.32	1.21	0.11	4.90	1.11	0.10	16.93

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.82	16.4
Robyn J (Barge Tori J)	0.14	16.4
Grand Total	1.00	16.4

Assist Tugs

Baseline

Ships		VSR Emissions (lbs)																		Maneuvering								
		Engine		Emission	CO			SOx			CO2			CH4			N2O			Speed (kts)	Time (hrs)	Load Factors		Boiler Load (kW)				
		Type	Tier	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Main			Aux						
AUTO CARRIER		SSD	1	0.02	1.56	0.26	0.03	0.48	0.09	0.10	791	160	152	0.099	0.019	0.005	0.024	0.004	0.002	7.00	2.41	0.04	0.45	351	5.54	6.56	0.30	0.13
BULK CARRIER		MSD	1	-	0.43	0.09	-	0.16	0.03	-	250	53	-	0.031	0.006	-	0.007	0.001	-	7.00	2.41	0.06	0.45	132	1.25	1.77	0.03	0.03
		SSD	0	-	0.56	0.07	-	0.18	0.02	-	301	42	-	0.036	0.005	-	0.009	0.001	-	7.00	2.41	0.09	0.45	132	1.70	1.55	0.03	0.03
			1	-	1.49	0.16	-	0.49	0.06	-	795	99	-	0.095	0.011	-	0.024	0.003	-	7.00	2.41	0.07	0.45	132	4.36	3.34	0.07	0.09
			2	-	0.49	0.05	-	0.16	0.02	-	262	33	-	0.031	0.004	-	0.008	0.001	-	7.00	2.41	0.08	0.45	132	1.38	1.13	0.03	0.03
BULK CARRIER, HL		MSD	0	-	0.24	0.04	-	0.09	0.02	-	141	27	-	0.017	0.003	-	0.004	0.001	-	7.00	2.41	0.13	0.45	132	1.15	1.16	0.03	0.02
CONTAINER SHIP		SSD	0	0.03	7.81	2.21	0.05	2.31	0.80	0.15	3,747	1,384	231	0.502	0.160	0.008	0.114	0.036	0.003	7.00	2.41	0.04	0.50	241	51.42	129.74	1.25	1.06
GENERAL CARGO		1	-	1.21	0.17	-	0.39	0.06	-	-	645	104	-	0.077	0.012	-	0.020	0.003	-	7.00	2.41	0.04	0.50	362	7.72	9.70	0.31	0.18
		MSD	0	-	0.17	0.03	-	0.06	0.01	-	98	16	-	0.012	0.002	-	0.003	0.000	-	7.00	2.41	0.13	0.45	135	0.51	0.58	0.01	0.01
			1	-	1.15	0.15	-	0.42	0.06	-	676	96	-	0.084	0.011	-	0.019	0.003	-	7.00	2.41	0.08	0.45	135	2.10	3.51	0.07	0.05
		SSD	0	-	0.93	0.10	-	0.30	0.04	-	498	65	-	0.059	0.008	-	0.015	0.002	-	7.00	2.41	0.08	0.45	135	2.71	2.28	0.04	0.05
			1	-	3.35	0.44	-	1.10	0.16	-	1,791	274	-	0.213	0.032	-	0.055	0.007	-	7.00	2.41	0.06	0.45	135	10.14	9.54	0.16	0.21
Grand Total			2	-	0.50	0.06	-	0.16	0.02	-	268	39	-	0.032	0.004	-	0.008	0.001	-	7.00	2.41	0.09	0.45	135	1.25	1.22	0.03	0.03

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.81	16.4
Robyn J (Barge Tori J)	0.15	16.4
Grand Total	1.00	16.4

Assist Tugs		
Tug	Calls	Hours
Scout	1.00	0.70
Tioga	1.00	0.70
Grand Total	2.00	0.70

Demo/Rail Project - 2020 - with CAP

Ships		VSR Emissions (lbs)																		Maneuvering								
		Engine Type	Emission Tier	CO			SOx			CO2			CH4			N2O			Speed (kts)	Time (hrs)	Load Factors		Boiler Load (kW)					
				Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux			Main	Aux						
Ship Type																												
AUTO CARRIER	SSD	1	0.03	2.28	0.37	0.05	0.71	0.14	0.14	1,153	233	222	0.145	0.027	0.008	0.035	0.006	0.003	7.00	2.41	0.04	0.45	351	8.08	9.56	0.43	0.19	
	MSD	1	-	0.43	0.09	-	0.16	0.03	-	250	53	-	0.031	0.006	-	0.007	0.001	-	7.00	2.41	0.06	0.45	135	1.25	1.77	0.03	0.03	
BULK CARRIER	SSD	0	-	0.56	0.07	-	0.18	0.02	-	301	42	-	0.036	0.005	-	0.009	0.001	-	7.00	2.41	0.09	0.45	132	1.70	1.55	0.03	0.03	
		1	-	1.49	0.16	-	0.49	0.06	-	795	99	-	0.095	0.011	-	0.024	0.003	-	7.00	2.41	0.07	0.45	132	4.36	3.34	0.07	0.09	
		2	-	0.49	0.05	-	0.16	0.02	-	262	33	-	0.031	0.004	-	0.008	0.001	-	7.00	2.41	0.08	0.45	132	1.38	1.13	0.03	0.03	
			0	-	0.36	0.07	-	0.13	0.02	-	211	41	-	0.026	0.005	-	0.006	0.001	-	7.00	2.41	0.13	0.45	132	1.72	1.74	0.04	0.04
BULK CARRIER, HL	MSD	0	-	0.36	0.07	-	0.13	0.02	-	211	41	-	0.026	0.005	-	0.006	0.001	-	7.00	2.41	0.13	0.45	132	1.72	1.74	0.04	0.04	
CONTAINER SHIP	SSD	2	0.07	10.85	3.51	0.12	3.30	1.28	0.36	5,363	2,199	568	0.695	0.255	0.020	0.164	0.057	0.008	7.00	2.41	0.04	0.50	325	54.77	149.12	1.73	1.52	
GENERAL CARGO	MSD	0	-	0.17	0.03	-	0.06	0.01	-	98	16	-	0.012	0.002	-	0.003	0.000	-	7.00	2.41	0.13	0.45	132	0.51	0.58	0.01	0.01	
		1	-	1.61	0.22	-	0.59	0.08	-	946	135	-	0.117	0.016	-	0.026	0.004	-	7.00	2.41	0.08	0.45	135	2.94	4.92	0.10	0.08	
	SSD	0	-	0.93	0.10	-	0.30	0.04	-	498	65	-	0.059	0.008	-	0.015	0.002	-	7.00	2.41	0.08	0.45	135	2.71	2.28	0.04	0.05	
		1	-	4.57	0.59	-	1.50	0.22	-	2,442	373	-	0.291	0.043	-	0.075	0.010	-	7.00	2.41	0.06	0.45	135	13.83	13.01	0.22	0.29	
		2	-	0.50	0.06	-	0.16	0.02	-	268	39	-	0.032	0.004	-	0.008	0.001	-	7.00	2.41	0.09	0.45	135	1.25	1.22	0.03	0.03	
Grand Total			0.09	24.23	5.31	0.17	7.73	1.93	0.50	12,586	3,328	790	1.570	0.386	0.027	0.380	0.087	0.011	7.00	2.41	0.05	0.47	251	94.51	190.21	2.76	2.38	

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.82	16.4
Robyn J (Barge Tori J)	0.14	16.4
Grand Total	1.00	16.4

Assist Tugs

Baseline

13/14 SP avg of 21% -

Ships		Maneuvering Emissions (lbs)																								Hotel Time (hr)	Aux Time (hr)	Hotel Auxiliary LF
Ship Type	Engine Type	Emission Tier	DPM Aux	Boiler	Main	PM2.5 Aux	Boiler	Main	ROG Aux	Boiler	Main	CO Aux	Boiler	Main	SOx Aux	Boiler	Main	CO2 Aux	Boiler	Main	CH4 Aux	Boiler	Main	N2O Aux	Boiler			
AUTO CARRIER	SSD	1	0.13	0.02	0.12	0.12	0.02	1.00	0.27	0.02	0.89	0.58	0.03	0.12	0.21	0.09	196	365	138	0.090	0.042	0.005	0.007	0.010	0.002	24.0	24.0	0.26
BULK CARRIER	MSD	1	0.04	0.00	0.03	0.03	0.00	0.17	0.07	0.00	0.21	0.16	0.00	0.04	0.06	0.01	61	98	13	0.021	0.011	0.000	0.002	0.003	0.000	24.0	24.0	0.10
	SSD	0	0.03	0.00	0.03	0.03	0.00	0.15	0.06	0.00	0.19	0.12	0.00	0.04	0.04	0.01	61	77	13	0.014	0.009	0.000	0.002	0.002	0.000	24.0	24.0	0.10
		1	0.07	0.00	0.08	0.06	0.00	0.55	0.14	0.00	0.61	0.30	0.01	0.11	0.11	0.02	172	186	32	0.049	0.022	0.001	0.005	0.005	0.000	24.0	24.0	0.10
		2	0.03	0.00	0.03	0.03	0.00	0.19	0.06	0.00	0.22	0.13	0.00	0.04	0.05	0.01	66	79	13	0.017	0.009	0.000	0.002	0.002	0.000	24.0	24.0	0.10
BULK CARRIER, HL	MSD	0	0.02	0.00	0.02	0.02	0.00	0.08	0.05	0.00	0.13	0.10	0.00	0.04	0.04	0.01	58	64	13	0.010	0.007	0.000	0.002	0.002	0.000	24.0	24.0	0.10
CONTAINER SHIP	SSD	0	2.33	0.08	0.97	2.15	0.08	8.23	4.85	0.07	7.32	10.27	0.13	1.01	3.73	0.36	1,618	6,440	579	0.739	0.747	0.020	0.054	0.168	0.008	24.0	22.3	0.35
GENERAL CARGO	1	0.20	0.02	0.16	0.18	0.02	1.39	0.41	0.02	1.24	0.86	0.03	0.17	0.31	0.09	274	540	142	0.125	0.063	0.005	0.009	0.014	0.002	24.0	24.0	0.35	
	MSD	0	0.01	0.00	0.01	0.01	0.00	0.05	0.02	0.00	0.07	0.05	0.00	0.02	0.02	0.00	26	32	7	0.004	0.004	0.000	0.001	0.001	0.000	24.0	24.0	0.10
	1	0.07	0.00	0.05	0.07	0.00	0.31	0.15	0.00	0.36	0.31	0.01	0.07	0.11	0.02	108	196	33	0.027	0.023	0.001	0.003	0.005	0.000	24.0	24.0	0.10	
	SSD	0	0.05	0.00	0.04	0.04	0.00	0.27	0.10	0.00	0.32	0.20	0.00	0.06	0.07	0.01	96	127	20	0.024	0.015	0.001	0.003	0.003	0.000	24.0	24.0	0.10
		1	0.19	0.01	0.20	0.18	0.01	1.42	0.40	0.01	1.50	0.85	0.02	0.24	0.31	0.05	392	531	73	0.128	0.062	0.003	0.012	0.014	0.001	24.0	24.0	0.10
Grand Total			3.19	0.16	1.77	2.93	0.14	13.96	6.63	0.13	13.24	14.03	0.24	1.98	5.10	0.69	3,188	8,803	1,089	1.262	1.008	0.038	0.103	0.230	0.015	24.0	18.3	0.25

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.81	16.4
Robyn J (Barge Tori J)	0.15	16.4
Grand Total	1.00	16.4

18.888

Assist Tugs		
Tug	Calls	Hours
Scout	1.00	0.70
Tioga	1.00	0.70
Grand Total	2.00	0.70

Demo/Rail Project - 2020 - with CAP

80% SP

Reduction in hoteling time

0%

Ships		Maneuvering Emissions (lbs)																								Hotel Time (hr)	Aux Time (hr)	Hot Auxiliary LF
Ship Type	Engine Type	Emission Tier	DPM Aux	Boiler	Main	PM2.5 Aux	Boiler	Main	ROG Aux	Boiler	Main	CO Aux	Boiler	Main	SOx Aux	Boiler	Main	CO2 Aux	Boiler	Main	CH4 Aux	Boiler	Main	N2O Aux	Boiler			
AUTO CARRIER	SSD	1	0.19	0.03	0.17	0.18	0.03	1.46	0.40	0.02	1.29	0.85	0.04	0.18	0.31	0.13	286	532	201	0.131	0.062	0.007	0.010	0.014	0.003	24.0	24.0	0.26
BULK CARRIER	MSD	1	0.04	0.00	0.03	0.03	0.00	0.17	0.07	0.00	0.21	0.16	0.00	0.04	0.06	0.01	61	98	13	0.021	0.011	0.000	0.002	0.003	0.000	24.0	24.0	0.10
	SSD	0	0.03	0.00	0.03	0.03	0.00	0.15	0.06	0.00	0.19	0.12	0.00	0.04	0.04	0.01	61	77	13	0.014	0.009	0.000	0.002	0.002	0.000	24.0	24.0	0.10
		1	0.07	0.00	0.08	0.06	0.00	0.55	0.14	0.00	0.61	0.30	0.01	0.11	0.11	0.02	172	186	32	0.049	0.022	0.001	0.005	0.005	0.000	24.0	24.0	0.10
		2	0.03	0.00	0.03	0.03	0.00	0.19	0.06	0.00	0.22	0.13	0.00	0.04	0.05	0.01	66	79	13	0.017	0.009	0.000	0.002	0.002	0.000	24.0	24.0	0.10
BULK CARRIER, HL CONTAINER SHIP	MSD	0	0.04	0.00	0.03	0.03	0.00	0.12	0.07	0.00	0.20	0.15	0.00	0.05	0.06	0.01	87	97	19	0.015	0.011	0.001	0.002	0.003	0.000	24.0	24.0	0.10
GENERAL CARGO	SSD	2	3.77	0.12	1.40	3.46	0.11	11.83	7.83	0.10	10.51	16.57	0.17	1.45	6.03	0.50	2,324	10,393	797	1.061	1.205	0.028	0.078	0.271	0.011	24.0	8.2	0.35
	MSD	0	0.01	0.00	0.01	0.01	0.00	0.05	0.02	0.00	0.07	0.05	0.00	0.02	0.02	0.00	26	32	6	0.004	0.004	0.000	0.001	0.001	0.000	24.0	24.0	0.10
		1	0.10	0.01	0.07	0.09	0.01	0.43	0.21	0.01	0.50	0.44	0.01	0.09	0.16	0.03	151	274	46	0.038	0.032	0.002	0.005	0.007	0.001	24.0	24.0	0.10
		SSD	0	0.05	0.00	0.04	0.04	0.00	0.27	0.10	0.00	0.32	0.20	0.00	0.06	0.07	0.01	96	127	20	0.024	0.015	0.001	0.003	0.003	0.000	24.0	24.0
1			0.26	0.01	0.27	0.24	0.01	1.94	0.55	0.01	2.05	1.15	0.02	0.33	0.42	0.06	535	724	99	0.174	0.084	0.003	0.016	0.019	0.001	24.0	24.0	0.10
Grand Total		2	0.02	0.00	0.03	0.02	0.00	0.15	0.05	0.00	0.19	0.11	0.00	0.04	0.04	0.01	60	68	13	0.014	0.008	0.000	0.002	0.002	0.000	24.0	24.0	0.10
			4.60	0.18	2.19	4.23	0.17	17.31	9.56	0.15	16.36	20.22	0.28	2.44	7.35	0.80	3,925	12,686	1,274	1.563	1.471	0.044	0.127	0.331	0.018	24.0	16.4	0.24

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.82	16.4
Robyn J (Barge Tori J)	0.14	16.4
Grand Total	1.00	16.4

Assist Tugs

Baseline

Ships

Ships																							
idle time																							
Bill of Materials																							
Hotelling Emissions (lbs)																							
Ship Type	Engine Type	Emission Tier	Boiler Load (kW)	NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		Cold Iron CO2e	
				Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler		
AUTO CARRIER	SSD	1	351	37.66	2.96	0.76	0.20	0.70	0.18	1.58	0.16	3.34	0.30	1.21	0.86	2,096	1,369	0.243	0.048	0.055	0.019	-	
BULK CARRIER	MSD	1	132	3.90	0.28	0.08	0.02	0.07	0.02	0.16	0.02	0.35	0.03	0.13	0.08	217	129	0.025	0.004	0.006	0.002	-	
	SSD	0	132	3.42	0.28	0.06	0.02	0.06	0.02	0.13	0.02	0.27	0.03	0.10	0.08	170	129	0.020	0.004	0.004	0.002	-	
		1	132	7.38	0.70	0.15	0.05	0.14	0.04	0.31	0.04	0.65	0.07	0.24	0.20	411	322	0.048	0.011	0.011	0.005	-	
		2	132	2.51	0.28	0.06	0.02	0.06	0.02	0.13	0.02	0.28	0.03	0.10	0.08	175	129	0.020	0.004	0.005	0.002	-	
BULK CARRIER, HL	MSD	0	132	2.87	0.28	0.05	0.02	0.05	0.02	0.11	0.02	0.23	0.03	0.08	0.08	142	129	0.017	0.004	0.004	0.002	-	
CONTAINER SHIP	SSD	0	241	830.09	12.47	14.93	0.83	13.74	0.76	31.05	0.69	65.69	1.25	23.89	3.62	41,206	5,758	4.777	0.200	1.075	0.081	3,178	
		1	362	66.82	3.06	1.35	0.20	1.24	0.19	2.80	0.17	5.93	0.31	2.16	0.89	3,718	1,413	0.431	0.049	0.097	0.020	-	
GENERAL CARGO	MSD	0	135	1.28	0.14	0.03	0.01	0.02	0.01	0.05	0.01	0.11	0.01	0.04	0.04	71	66	0.008	0.002	0.002	0.001	-	
		1	135	7.76	0.71	0.16	0.05	0.14	0.04	0.33	0.04	0.69	0.07	0.25	0.21	432	329	0.050	0.011	0.011	0.005	-	
	SSD	0	135	5.64	0.43	0.10	0.03	0.09	0.03	0.21	0.02	0.45	0.04	0.16	0.12	280	197	0.032	0.007	0.007	0.003	-	
		1	135	21.07	1.57	0.42	0.10	0.39	0.10	0.88	0.09	1.87	0.16	0.68	0.46	1,172	724	0.136	0.025	0.031	0.010	-	
		2	135	2.15	0.29	0.05	0.02	0.05	0.02	0.11	0.02	0.24	0.03	0.09	0.08	150	132	0.017	0.005	0.004	0.002	-	
Grand Total			222	992.54	23.43	18.20	1.56	16.75	1.44	37.86	1.29	80.09	2.35	29.12	6.81	50,239	10,824	5.825	0.376	1.311	0.153	3,178	

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.81	16.4
Robyn J (Barge Tori J)	0.15	16.4
Grand Total	1.00	16.4

Assist Tugs		
Tug	Calls	Hours
Scout	1.00	0.70
Tioga	1.00	0.70
Grand Total	2.00	0.70

Demo/Rail Project - 2020 - with CAP

Ships

	Rating			Hotelling Emissions (lbs)																		Cold Iron
Ship Type	Engine Type	Emission Tier	Boiler Load (kW)	NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		CO2e
				Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	
AUTO CARRIER	SSD	1	351	54.90	4.32	1.11	0.29	1.02	0.26	2.30	0.24	4.87	0.43	1.77	1.26	3,055	1,995	0.354	0.069	0.080	0.028	-
	MSD	1	135	3.90	0.29	0.08	0.02	0.07	0.02	0.16	0.02	0.35	0.03	0.13	0.08	217	132	0.025	0.005	0.006	0.002	-
BULK CARRIER	SSD	0	132	3.42	0.28	0.06	0.02	0.06	0.02	0.13	0.02	0.27	0.03	0.10	0.08	170	129	0.020	0.004	0.004	0.002	-
		1	132	7.38	0.70	0.15	0.05	0.14	0.04	0.31	0.04	0.65	0.07	0.24	0.20	411	322	0.048	0.011	0.011	0.005	-
		2	132	2.51	0.28	0.06	0.02	0.06	0.02	0.13	0.02	0.28	0.03	0.10	0.08	175	129	0.020	0.004	0.005	0.002	-
BULK CARRIER, HL	MSD	0	132	4.30	0.42	0.08	0.03	0.07	0.03	0.16	0.02	0.34	0.04	0.12	0.12	214	193	0.025	0.007	0.006	0.003	-
CONTAINER SHIP	SSD	2	325	348.90	17.15	8.81	1.14	8.11	1.05	18.33	0.95	38.77	1.72	14.10	4.99	24,317	7,923	2.819	0.275	0.634	0.112	47,891
	MSD	0	132	1.28	0.14	0.03	0.01	0.02	0.01	0.05	0.01	0.11	0.01	0.04	0.04	71	64	0.008	0.002	0.002	0.001	-
1		135	10.87	1.00	0.22	0.07	0.20	0.06	0.46	0.06	0.96	0.10	0.35	0.29	605	461	0.070	0.016	0.016	0.007	-	
GENERAL CARGO	SSD	0	135	5.64	0.43	0.10	0.03	0.09	0.03	0.21	0.02	0.45	0.04	0.16	0.12	280	197	0.032	0.007	0.007	0.003	-
		1	135	28.73	2.14	0.58	0.14	0.53	0.13	1.20	0.12	2.55	0.21	0.93	0.62	1,599	987	0.185	0.034	0.042	0.014	-
		2	135	2.15	0.29	0.05	0.02	0.05	0.02	0.11	0.02	0.24	0.03	0.09	0.08	150	132	0.017	0.005	0.004	0.002	-
Grand Total			251	473.97	27.42	11.33	1.83	10.42	1.68	23.56	1.51	49.84	2.75	18.12	7.97	31,262	12,664	3.625	0.440	0.816	0.179	47,891

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.82	16.4
Robyn J (Barge Tori J)	0.14	16.4
Grand Total	1.00	16.4

Assist Tugs

Tug	Calls	Hours per Call		Load Factors		NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		
		Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	
Scout	1.04	0.70	1.00	0.31	0.43	10.38	1.03	0.23	0.02	0.22	0.02	1.24	0.17	9.86	1.09	0.01	0.00	1,158	135	0.023	0.003	0.052	0.006	
Tioga	1.04	0.70	1.00	0.31	0.43	10.38	0.82	0.23	0.03	0.22	0.03	1.24	0.14	9.86	0.62	0.01	0.00	1,158	77	0.023	0.003	0.052	0.003	
Grand Total	2.07	0.70	1.00	0.31	0.43	20.77	1.85	0.46	0.05	0.45	0.05	2.47	0.31	19.72	1.72	0.03	0.00	2,315	211	0.046	0.006	0.104	0.010	

TAMT Plan- 2035 - with CAP

Ships

Ship Type	Engine Type	Emission Tier	Power (kW)			Service Speed (kts)	Total Transit Distance (nm)		Comp (%)	Distance (nm)	Transit - Arrival Speed (kts)		Main Load Factor		Comp (%)	Distance (nm)	Transit - Departure Speed (kts)		Main Load Factor		Time (hrs)	NC Boiler Load (kW)		NOx	
			Calls	Main	Aux		Arrival	Depart			Comp	NC	Comp	NC			Comp	NC	Comp	NC		Aux		Main	Aux
AUTO CARRIER	SSD	1	0.45	11,060	2,760	20.00	35.30	35.30	0%	15.30	12.00	20.00	0.18	0.82	0%	15.30	12.00	20.00	0.18	0.82	1.53	0.15	351	208.50	7.79
BULK CARRIER	MSD	1	0.08	9,100	2,973	16.65	30.20	23.40	0%	10.20	11.00	16.65	0.24	0.82	0%	3.40	11.20	16.65	0.25	0.82	0.82	0.17	-	12.17	0.87
	SSD	0	0.08	8,139	2,325	14.60	30.20	30.20	0%	10.20	10.70	14.60	0.32	0.82	0%	10.20	12.45	14.60	0.51	0.82	1.40	0.17	-	27.06	1.31
		1	0.19	10,705	2,250	15.92	33.94	26.46	0%	13.94	11.13	15.92	0.28	0.82	0%	6.46	11.90	15.92	0.34	0.82	1.28	0.17	-	72.48	2.58
		2	0.08	9,140	2,393	15.00	11.50	48.90	0%	-	11.05	15.00	0.33	0.82	0%	28.90	12.50	15.00	0.48	0.82	1.93	0.17	-	31.06	1.32
BULK CARRIER, HL	MSD	0	0.12	5,738	1,950	13.00	5.75	24.45	0%	-	9.45	13.00	0.32	0.82	0%	4.45	9.45	13.00	0.32	0.82	0.34	0.17	-	5.44	0.40
CONTAINER SHIP	SSD	2	1.93	19,420	11,320	19.50	11.92	12.16	0%	-	11.64	19.50	0.18	0.82	0%	-	11.93	19.50	0.19	0.82	-	0.13	132	-	-
GENERAL CARGO	MSD	0	0.04	5,738	1,950	13.00	11.50	48.90	0%	-	10.10	13.00	0.39	0.82	0%	28.90	10.10	13.00	0.39	0.82	2.22	0.17	-	11.78	0.87
		1	0.27	6,400	2,367	15.34	35.98	23.74	0%	15.98	12.57	15.34	0.45	0.82	0%	3.74	12.20	15.34	0.41	0.82	1.29	0.17	-	47.16	3.82
	SSD	0	0.12	9,268	2,557	15.23	23.97	36.43	0%	3.97	12.07	15.23	0.41	0.82	0%	16.43	12.30	15.23	0.43	0.82	1.34	0.17	-	44.30	2.06
		1	0.58	12,430	2,920	16.98	26.95	34.06	0%	6.95	11.77	16.98	0.27	0.82	0%	14.06	11.86	16.98	0.28	0.82	1.24	0.17	-	243.94	9.72
Grand Total		2	0.08	8,630	2,048	14.90	42.10	30.20	0%	22.10	10.95	14.90	0.33	0.82	0%	10.20	11.00	14.90	0.33	0.82	2.17	0.17	-	32.99	1.27
			4.00	14,524	6,799	18.04	20.86	22.44	0%	5.41	11.62	18.04	0.24	0.82	0%	6.22	11.85	18.04	0.25	0.82	0.69	0.15	103	736.88	32.02

3.8587706 =scaling factor for 2020 to 2035 (4 max daily calls / 2020 max daily calls)

Harborcraft

Tug/Barge	Calls	Hours	NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		Hours		NOx		DP
			Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Tug	Barge	Tug	Barge	
Robyn J (Barge Jake J)	0.14	16.4	27.612	1.289	0.942	0.047	0.914	0.046	2.600	0.218	20.733	0.980	0.027	0.001	2,434	121	0.048	0.004	0.110	0.005	1.0	4.5	0.08	1.05	0.00
Robyn J (Barge Payton J)	3.17	16.4	635.086	29.637	21.672	1.079	21.022	1.047	59.801	5.008	476.856	22.549	0.628	0.031	55,991	2,777	1.113	0.098	2.524	0.125	1.0	4.8	1.81	26.03	0.07
Robyn J (Barge Tori J)	0.55	16.4	110.450	5.154	3.769	0.188	3.656	0.182	10.400	0.871	82.931	3.922	0.109	0.005	9,738	483	0.194	0.017	0.439	0.022	1.0	5.3	0.31	4.99	0.01
Grand Total	3.86	16.4	773.148	36.079	26.384	1.314	25.592	1.275	72.801	6.097	580.520	27.451	0.764	0.038	68,163	3,381	1.355	0.119	3.072	0.152	1.0	4.9	2.202	32.078	0.080

Assist Tugs

Assist Tugs			Tug Running Emissions (lbs)																					
Tug	Hours per Call		Load Factors		NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O			
	Calls	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux			
Scout	4.00	0.70	1.00	0.31	0.43	40.07	3.96	0.89	0.09	0.86	0.09	4.77	0.65	38.04	4.22	0.05	0.01	4,467	519	0.089	0.013	0.201	0.023	
Tioga	4.00	0.70	1.00	0.31	0.43	40.07	3.17	0.89	0.12	0.86	0.12	4.77	0.54	38.04	2.41	0.05	0.00	4,467	297	0.089	0.010	0.201	0.013	
Grand Total	8.00	0.70	1.00	0.31	0.43	80.13	7.12	1.77	0.21	1.72	0.21	9.54	1.18	76.08	6.62	0.10	0.01	8,933	816	0.178	0.023	0.403	0.037	

Tug	Calls	Hours
		Main
Scout	1.04	0.70
Tioga	1.04	0.70
Grand Total	2.07	0.70

TAMT Plan- 2035 - with CAP

Ships		Transit Emissions (lbs)																										Comp (%)
Engine Type	Emission Tier	Boiler	Main	DPM Aux	Boiler	Main	PM2.5 Aux	Boiler	Main	ROG Aux	Boiler	Main	CO Aux	Boiler	Main	SOx Aux	Boiler	Main	CO2 Aux	Boiler	Main	CH4 Aux	Boiler	Main	N2O Aux	Boiler		
Ship Type																												
AUTO CARRIER	SSD	1	-	3.45	0.16	-	3.18	0.14	-	10.77	0.33	-	15.19	0.69	-	4.97	0.25	-	8,119	434	-	0.967	0.050	-	0.249	0.011	-	80%
BULK CARRIER	MSD	1	-	0.26	0.02	-	0.24	0.02	-	0.68	0.04	-	1.14	0.08	-	0.42	0.03	-	671	48	-	0.083	0.006	-	0.019	0.001	-	80%
	SSD	0	-	0.40	0.02	-	0.37	0.02	-	1.24	0.05	-	1.75	0.10	-	0.57	0.04	-	936	65	-	0.111	0.008	-	0.029	0.002	-	100%
		1	-	1.20	0.05	-	1.10	0.05	-	3.74	0.11	-	5.28	0.23	-	1.73	0.08	-	2,822	144	-	0.336	0.017	-	0.086	0.004	-	80%
		2	-	0.62	0.03	-	0.57	0.03	-	1.92	0.07	-	2.71	0.15	-	0.89	0.05	-	1,449	92	-	0.173	0.011	-	0.044	0.002	-	100%
BULK CARRIER, HL	MSD	0	-	0.10	0.01	-	0.09	0.01	-	0.27	0.02	-	0.45	0.03	-	0.16	0.01	-	266	20	-	0.033	0.002	-	0.007	0.001	-	100%
CONTAINER SHIP	SSD	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	88%	
GENERAL CARGO	MSD	0	-	0.22	0.02	-	0.21	0.01	-	0.58	0.03	-	0.98	0.07	-	0.36	0.03	-	576	43	-	0.071	0.005	-	0.016	0.001	-	100%
		1	-	1.01	0.08	-	0.93	0.07	-	2.62	0.16	-	4.43	0.34	-	1.61	0.12	-	2,600	213	-	0.322	0.025	-	0.073	0.006	-	80%
	SSD	0	-	0.65	0.04	-	0.60	0.03	-	2.03	0.08	-	2.87	0.16	-	0.94	0.06	-	1,532	102	-	0.182	0.012	-	0.047	0.003	-	100%
		1	-	4.04	0.20	-	3.72	0.18	-	12.60	0.41	-	17.77	0.86	-	5.82	0.31	-	9,499	541	-	1.131	0.063	-	0.291	0.014	-	91%
Grand Total		2	-	0.65	0.03	-	0.60	0.03	-	2.04	0.07	-	2.88	0.14	-	0.94	0.05	-	1,540	89	-	0.183	0.010	-	0.047	0.002	-	100%
		-	-	12.60	0.65	-	11.60	0.60	-	38.50	1.35	-	55.46	2.85	-	18.41	1.04	-	30,010	1,791	-	3.593	0.208	-	0.908	0.047	-	88%

Harborcraft		Hoteling Emissions (lbs)															
Tug/Barge	Calls	Hours	'M Barge	PM2.5		ROG		CO		SOx		CO2		CH4		N2O	
				Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge
Robyn J (Barge Jake J)	0.14	16.4	0.06	0.00	0.06	0.01	0.18	0.06	0.83	0.00	0.00	7	95	0.000	0.003	0.000	0.004
Robyn J (Barge Payton J)	3.17	16.4	1.41	0.06	1.36	0.31	4.42	1.38	20.52	0.00	0.03	169	2,347	0.006	0.080	0.008	0.109
Robyn J (Barge Tori J)	0.55	16.4	0.27	0.01	0.26	0.05	0.85	0.24	3.93	0.00	0.01	29	450	0.001	0.015	0.001	0.021
Grand Total	3.86	16.4	1.732	0.078	1.680	0.372	5.449	1.675	25.282	0.002	0.032	206.33	2,892	0.007	0.099	0.009	0.135

Assist Tugs		Hours	
Tug	Calls	Main	
Scout	4.00	0.70	
Tioga	4.00	0.70	
Grand Total	8.00	0.70	

Tug	Hours	
	Calls	Main
Scout	1.04	0.70
Tioga	1.04	0.70
Grand Total	2.07	0.70

TAMT Plan- 2035 - with CAP

Ships			VSR - Arrival						VSR - Departure						NC			Main						DPM			PM2.5			ROG	
Ship Type	Engine Type	Emission Tier	Distance (nm)	Speed (kts)		Main Load Factor		Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Time (hrs)	Aux	Boiler Load (kW)	Main	NOx Aux	Boiler	Main	DPM Aux	Boiler	Main	PM2.5 Aux	Boiler	Main	ROG Aux				
				Comp	NC	Comp	NC			Comp	NC																				
AUTO CARRIER	SSD	1	20.00	12.00	16.06	0.18	0.43	80%	20.00	12.00	15.24	0.18	0.36	3.18	0.15	351	113.47	16.18	1.85	1.90	0.33	0.12	1.75	0.30	0.11	6.23	0.68				
BULK CARRIER	MSD	1	20.00	11.00	13.60	0.24	0.45	80%	20.00	11.20	13.60	0.25	0.45	3.47	0.17	-	17.51	3.70	-	0.37	0.07	-	0.34	0.07	-	0.97	0.16				
	SSD	0	20.00	10.70	14.60	0.32	0.82	100%	20.00	12.45	14.60	0.51	0.82	3.48	0.17	-	33.54	3.25	-	0.49	0.06	-	0.45	0.05	-	1.54	0.12				
		1	20.00	11.13	13.10	0.28	0.46	80%	20.00	11.90	13.07	0.34	0.45	3.39	0.17	-	78.76	6.84	-	1.30	0.14	-	1.20	0.13	-	4.07	0.29				
		2	11.50	11.05	15.00	0.33	0.82	100%	20.00	12.50	15.00	0.48	0.82	2.64	0.17	-	21.63	1.81	-	0.43	0.05	-	0.39	0.04	-	1.34	0.10				
BULK CARRIER, HL	MSD	0	5.75	9.45	13.00	0.32	0.82	100%	20.00	9.45	13.00	0.32	0.82	2.72	0.17	-	16.64	3.20	-	0.32	0.06	-	0.29	0.05	-	0.82	0.12				
CONTAINER SHIP	SSD	2	11.92	11.64	14.78	0.18	0.36	80%	12.16	11.93	16.06	0.19	0.46	1.97	0.13	325	441.80	121.77	4.74	8.90	3.08	0.32	8.18	2.83	0.29	29.89	6.40				
GENERAL CARGO	MSD	0	11.50	10.10	13.00	0.39	0.82	100%	20.00	10.10	13.00	0.39	0.82	3.12	0.17	-	7.75	1.22	-	0.15	0.02	-	0.14	0.02	-	0.38	0.05				
		1	20.00	12.57	13.20	0.45	0.52	80%	20.00	12.20	15.10	0.41	0.78	3.15	0.17	-	66.23	9.37	-	1.42	0.19	-	1.30	0.17	-	3.68	0.39				
	SSD	0	20.00	12.07	15.23	0.41	0.82	100%	20.00	12.30	15.23	0.43	0.82	3.28	0.17	-	55.56	5.06	-	0.82	0.09	-	0.75	0.08	-	2.55	0.19				
		1	20.00	11.77	13.10	0.27	0.38	80%	20.00	11.86	15.23	0.28	0.59	3.30	0.17	-	241.99	25.88	-	4.01	0.52	-	3.69	0.48	-	12.50	1.09				
Grand Total		2	20.00	10.95	14.90	0.33	0.82	100%	20.00	11.00	14.90	0.33	0.82	3.64	0.17	-	22.17	2.14	-	0.44	0.05	-	0.40	0.05	-	1.37	0.11				
			15.44	11.62	14.42	0.24	0.44	83%	16.22	11.85	15.38	0.25	0.54	2.62	0.15	196	1,117.04	200.43	6.60	20.54	4.65	0.44	18.90	4.28	0.40	65.34	9.68				

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.14	16.4
Robyn J (Barge Payton J)	3.17	16.4
Robyn J (Barge Tori J)	0.55	16.4
Grand Total	3.86	16.4

Assist Tugs

Tug	Hours	
	Calls	Main
Scout	4.00	0.70
Tioga	4.00	0.70
Grand Total	8.00	0.70

Tug	Calls	Hours
		Main
Scout	1.04	0.70
Tioga	1.04	0.70
Grand Total	2.07	0.70

TAMT Plan- 2035 - with CAP

Ships		VSR Emissions (lbs)																		Maneuvering											
Ship Type	Engine Type	Emission Tier	CO				SOx				CO2				CH4				N2O				Speed (kts)	Time (hrs)	Load Factors		Boiler Load (kW)				
			Boiler	Main	Aux		Boiler	Main	Aux		Boiler	Main	Aux		Boiler	Main	Aux		Boiler	Main	Aux				Main	NOx Aux		Boiler	Main		
AUTO CARRIER	SSD	1	0.10	8.78	1.44	0.19	2.72	0.52	0.54	4,449	901	856	0.559	0.104	0.030	0.135	0.023	0.012	7.00	2.41	0.04	0.45	351	31.18	36.88	1.68	0.72				
BULK CARRIER	MSD	1	-	1.65	0.33	-	0.60	0.12	-	965	206	-	0.120	0.024	-	0.027	0.005	-	7.00	2.41	0.06	0.45	135	4.83	6.81	0.11	0.12				
	SSD	0	-	2.17	0.26	-	0.71	0.09	-	1,160	161	-	0.138	0.019	-	0.036	0.004	-	7.00	2.41	0.09	0.45	132	6.54	5.97	0.11	0.11				
		1	-	5.74	0.61	-	1.88	0.22	-	3,067	381	-	0.365	0.044	-	0.094	0.010	-	7.00	2.41	0.07	0.45	132	16.83	12.89	0.27	0.34				
		2	-	1.89	0.20	-	0.62	0.07	-	1,009	126	-	0.120	0.015	-	0.031	0.003	-	7.00	2.41	0.08	0.45	132	5.34	4.38	0.11	0.13				
BULK CARRIER, HL	MSD	0	-	1.39	0.25	-	0.50	0.09	-	813	159	-	0.101	0.018	-	0.023	0.004	-	7.00	2.41	0.13	0.45	132	6.65	6.70	0.16	0.14				
CONTAINER SHIP	SSD	2	0.26	41.86	13.53	0.48	12.72	4.92	1.38	20,694	8,487	2,192	2.682	0.984	0.076	0.631	0.221	0.031	7.00	2.41	0.04	0.50	325	211.33	575.42	6.66	5.86				
GENERAL CARGO	MSD	0	-	0.65	0.10	-	0.23	0.04	-	379	61	-	0.047	0.007	-	0.011	0.002	-	7.00	2.41	0.13	0.45	132	1.97	2.23	0.05	0.05				
		1	-	6.23	0.83	-	2.26	0.30	-	3,651	521	-	0.453	0.060	-	0.102	0.014	-	7.00	2.41	0.08	0.45	135	11.36	18.99	0.39	0.29				
	SSD	0	-	3.60	0.40	-	1.18	0.15	-	1,922	251	-	0.229	0.029	-	0.059	0.007	-	7.00	2.41	0.08	0.45	135	10.46	8.79	0.17	0.18				
		1	-	17.63	2.30	-	5.77	0.83	-	9,423	1,440	-	1.122	0.167	-	0.288	0.038	-	7.00	2.41	0.06	0.45	135	53.35	50.19	0.83	1.13				
Grand Total		2	-	1.94	0.24	-	0.63	0.09	-	1,034	149	-	0.123	0.017	-	0.032	0.004	-	7.00	2.41	0.09	0.45	135	4.84	4.69	0.11	0.11				
			0.36	93.50	20.47	0.66	29.83	7.45	1.92	48,567	12,843	3,047	6.059	1.489	0.106	1.468	0.335	0.043	7.00	2.41	0.05	0.47	251	364.68	733.96	10.64	9.17				

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.14	16.4
Robyn J (Barge Payton J)	3.17	16.4
Robyn J (Barge Tori J)	0.55	16.4
Grand Total	3.86	16.4

Assist Tugs

Tug	Calls	Hours
		Main
Scout	4.00	0.70
Tioga	4.00	0.70
Grand Total	8.00	0.70

Tug	Calls	Hours
		Main
Scout	1.04	0.70
Tioga	1.04	0.70
Grand Total	2.07	0.70

TAMT Plan- 2035 - with CAP

80% SP
Reduction in hoteling time 0%

Ships		Maneuvering Emissions (lbs)																								Hotel Time (hr)	Aux Time (hr)	Hot Auxiliary LF
Ship Type	Engine Type	Emission Tier	DPM Aux	Boiler	Main	PM2.5 Aux	Boiler	Main	ROG Aux	Boiler	Main	CO Aux	Boiler	Main	SOx Aux	Boiler	Main	CO2 Aux	Boiler	Main	CH4 Aux	Boiler	Main	N2O Aux	Boiler			
AUTO CARRIER	SSD	1	0.74	0.11	0.66	0.68	0.10	5.62	1.55	0.09	4.99	3.27	0.17	0.69	1.19	0.49	1,104	2,052	775	0.504	0.238	0.027	0.037	0.054	0.011	24.0	24.0	0.26
BULK CARRIER	MSD	1	0.14	0.01	0.11	0.13	0.01	0.65	0.29	0.01	0.82	0.60	0.01	0.15	0.22	0.03	234	379	51	0.080	0.044	0.002	0.007	0.010	0.001	24.0	24.0	0.10
	SSD	0	0.11	0.01	0.10	0.10	0.01	0.60	0.22	0.01	0.73	0.47	0.01	0.14	0.17	0.03	233	297	50	0.053	0.034	0.002	0.007	0.008	0.001	24.0	24.0	0.10
		1	0.26	0.02	0.32	0.24	0.02	2.11	0.54	0.01	2.36	1.14	0.03	0.41	0.42	0.08	665	717	125	0.189	0.083	0.004	0.020	0.019	0.002	24.0	24.0	0.10
		2	0.11	0.01	0.12	0.10	0.01	0.72	0.23	0.01	0.85	0.49	0.01	0.16	0.18	0.03	255	305	50	0.065	0.035	0.002	0.008	0.008	0.001	24.0	24.0	0.10
BULK CARRIER, HL	MSD	0	0.14	0.01	0.12	0.12	0.01	0.47	0.28	0.01	0.76	0.59	0.02	0.21	0.22	0.05	334	373	75	0.058	0.043	0.003	0.009	0.010	0.001	24.0	24.0	0.10
CONTAINER SHIP	SSD	2	14.53	0.44	5.39	13.37	0.41	45.64	30.22	0.37	40.57	63.94	0.67	5.60	23.25	1.94	8,969	40,105	3,075	4.096	4.650	0.107	0.302	1.046	0.043	24.0	8.2	0.35
GENERAL CARGO	MSD	0	0.05	0.00	0.04	0.04	0.00	0.19	0.09	0.00	0.25	0.20	0.01	0.06	0.07	0.02	101	124	25	0.017	0.014	0.001	0.003	0.003	0.000	24.0	24.0	0.10
		1	0.38	0.03	0.27	0.35	0.02	1.65	0.80	0.02	1.94	1.68	0.04	0.36	0.61	0.11	584	1,057	179	0.149	0.122	0.006	0.017	0.028	0.003	24.0	24.0	0.10
	SSD	0	0.18	0.01	0.17	0.16	0.01	1.05	0.37	0.01	1.23	0.78	0.02	0.23	0.28	0.05	370	489	77	0.094	0.057	0.003	0.011	0.013	0.001	24.0	24.0	0.10
		1	1.01	0.06	1.04	0.93	0.05	7.49	2.10	0.05	7.89	4.45	0.08	1.28	1.62	0.24	2,065	2,793	383	0.672	0.324	0.013	0.064	0.073	0.005	24.0	24.0	0.10
Grand Total		2	0.09	0.01	0.10	0.09	0.01	0.59	0.20	0.01	0.73	0.42	0.01	0.14	0.15	0.03	233	261	51	0.053	0.030	0.002	0.007	0.007	0.001	24.0	24.0	0.10
			17.74	0.71	8.44	16.32	0.65	66.78	36.89	0.59	63.11	78.04	1.07	9.43	28.38	3.09	15,147	48,953	4,916	6.031	5.676	0.171	0.491	1.277	0.069	24.0	16.4	0.24

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.14	16.4
Robyn J (Barge Payton J)	3.17	16.4
Robyn J (Barge Tori J)	0.55	16.4
Grand Total	3.86	16.4

Assist Tugs

Tug	Calls	Hours
		Main
Scout	4.00	0.70
Tioga	4.00	0.70
Grand Total	8.00	0.70

Tug	Calls	Hours
		Main
Scout	1.04	0.70
Tioga	1.04	0.70
Grand Total	2.07	0.70

TAMT Plan- 2035 - with CAP

Ships			Hotelling Emissions (lbs)																				Cold Iron
Ship Type	Engine	Emission	Boiler	NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		CO2e	
	Type	Tier	Load (kW)	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler		
AUTO CARRIER	SSD	1	351	211.83	16.67	4.27	1.11	3.93	1.02	8.88	0.92	18.79	1.67	6.83	4.85	11,787	7,700	1.367	0.267	0.307	0.109	-	
BULK CARRIER	MSD	1	135	15.05	1.10	0.30	0.07	0.28	0.07	0.63	0.06	1.34	0.11	0.49	0.32	838	508	0.097	0.018	0.022	0.007	-	
	SSD	0	132	13.20	1.08	0.24	0.07	0.22	0.07	0.49	0.06	1.04	0.11	0.38	0.31	655	497	0.076	0.017	0.017	0.007	-	
		1	132	28.48	2.69	0.57	0.18	0.53	0.16	1.19	0.15	2.53	0.27	0.92	0.78	1,585	1,242	0.184	0.043	0.041	0.018	-	
		2	132	9.67	1.08	0.24	0.07	0.22	0.07	0.51	0.06	1.07	0.11	0.39	0.31	674	497	0.078	0.017	0.018	0.007	-	
BULK CARRIER, HL	MSD	0	132	16.60	1.61	0.30	0.11	0.27	0.10	0.62	0.09	1.31	0.16	0.48	0.47	824	745	0.096	0.026	0.021	0.011	-	
CONTAINER SHIP	SSD	2	325	1,346.33	66.19	34.00	4.41	31.28	4.06	70.72	3.65	149.59	6.64	54.40	19.24	93,835	30,573	10.879	1.062	2.448	0.431	184,799	
GENERAL CARGO	MSD	0	132	4.94	0.54	0.10	0.04	0.09	0.03	0.21	0.03	0.44	0.05	0.16	0.16	275	248	0.032	0.009	0.007	0.004	-	
		1	135	41.94	3.85	0.85	0.26	0.78	0.24	1.76	0.21	3.72	0.39	1.35	1.12	2,334	1,778	0.271	0.062	0.061	0.025	-	
	SSD	0	135	21.77	1.65	0.39	0.11	0.36	0.10	0.81	0.09	1.72	0.17	0.63	0.48	1,081	762	0.125	0.026	0.028	0.011	-	
		1	135	110.87	8.25	2.24	0.55	2.06	0.51	4.65	0.45	9.84	0.83	3.58	2.40	6,170	3,810	0.715	0.132	0.161	0.054	-	
Grand Total		2	135	8.28	1.10	0.21	0.07	0.19	0.07	0.43	0.06	0.92	0.11	0.33	0.32	577	508	0.067	0.018	0.015	0.007	-	
			251	1,828.96	105.79	43.71	7.05	40.21	6.49	90.91	5.83	192.31	10.61	69.93	30.76	120,634	48,867	13.987	1.697	3.147	0.689	184,799	

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.14	16.4
Robyn J (Barge Payton J)	3.17	16.4
Robyn J (Barge Tori J)	0.55	16.4
Grand Total	3.86	16.4

Assist Tugs

Tug	Calls	Hours
		Main
Scout	4.00	0.70
Tioga	4.00	0.70
Grand Total	8.00	0.70

TAMT_Vessels_CAPCompliance Annual Summary

Baseline

Ships

Ship Type	Engine Type	Emission Tier	Power (kW)			Service Speed (kts)	Total Transit Distance (nm)		Comp (%)	Transit - Arrival				Transit - Departure				Time (hrs)	NC Boiler		NOx							
			Calls	Main	Aux		Arrival	Depart		Distance (nm)	Speed (kts)	Comp	NC	Main Load Factor	Comp	NC	Distance (nm)		Speed (kts)	Comp	NC	Aux	Load (kW)	Main	Aux	Boiler	Main	
AUTO CARRIER	SSD	1	8	11,060	2,760	20.00	35.30	35.30	0%	15.30	12.00	20.00	0.18	0.82	0%	15.30	12.00	20.00	0.18	0.82	1.53	0.15	351	-	1.854	0.069	-	0.031
		MSD	2	9,100	2,973	16.65	30.20	23.40	0%	10.20	11.00	16.65	0.24	0.82	0%	3.40	11.20	16.65	0.25	0.82	0.82	0.17	-	-	0.158	0.011	-	0.003
BULK CARRIER	SSD	0	2	8,139	2,325	14.60	30.20	30.20	0%	10.20	10.70	14.60	0.32	0.82	0%	10.20	12.45	14.60	0.51	0.82	1.40	0.17	-	-	0.351	0.017	-	0.005
		1	5	10,705	2,250	15.92	33.94	26.46	0%	13.94	11.13	15.92	0.28	0.82	0%	6.46	11.90	15.92	0.34	0.82	1.28	0.17	-	-	0.939	0.033	-	0.016
		2	2	9,140	2,393	15.00	11.50	48.90	0%	-	11.05	15.00	0.33	0.82	0%	28.90	12.50	15.00	0.48	0.82	1.93	0.17	-	-	0.402	0.017	-	0.008
BULK CARRIER, HL	MSD	0	2	5,738	1,950	13.00	5.75	24.45	0%	-	9.45	13.00	0.32	0.82	0%	4.45	9.45	13.00	0.32	0.82	0.34	0.17	-	-	0.047	0.003	-	0.001
CONTAINER SHIP	SSD	0	49	14,948	7,158	20.03	11.99	12.26	0%	-	11.57	20.03	0.16	0.82	0%	-	11.83	20.03	0.17	0.82	-	0.13	132	-	-	-	-	-
		1	8	13,055	3,676	18.93	11.50	11.50	0%	-	12.08	18.93	0.21	0.82	0%	-	12.53	18.93	0.24	0.82	-	0.13	-	-	-	-	-	-
GENERAL CARGO	MSD	0	1	5,738	1,950	13.00	11.50	48.90	0%	-	10.10	13.00	0.39	0.82	0%	28.90	10.10	13.00	0.39	0.82	2.22	0.17	-	-	0.153	0.011	-	0.003
		1	5	6,400	2,367	15.34	35.98	23.74	0%	15.98	12.57	15.34	0.45	0.82	0%	3.74	12.20	15.34	0.41	0.82	1.29	0.17	-	-	0.436	0.035	-	0.009
		0	3	9,268	2,557	15.23	23.97	36.43	0%	3.97	12.07	15.23	0.41	0.82	0%	16.43	12.30	15.23	0.43	0.82	1.34	0.17	-	-	0.574	0.027	-	0.008
	SSD	1	11	12,430	2,920	16.98	26.95	34.06	0%	6.95	11.77	16.98	0.27	0.82	0%	14.06	11.86	16.98	0.28	0.82	1.24	0.17	-	-	2.318	0.092	-	0.038
		2	2	8,630	2,048	14.90	42.10	30.20	0%	22.10	10.95	14.90	0.33	0.82	0%	10.20	11.00	14.90	0.33	0.82	2.17	0.17	-	-	0.428	0.016	-	0.008
		Grand Total		100	12,627	4,904	18.43	19.31	20.74	0%	4.45	11.60	18.43	0.22	0.82	0%	5.21	11.87	18.43	0.24	0.82	0.58	0.15	93	-	7.659	0.334	-

Harborcraft			Tug Running Emissions (tons)																				149.77						2.86														
			NOx				DPM				PM2.5				ROG				CO				SOx				CO2				CH4				N2O				Hours		NOx		DPM
Tug/Barge	Calls	Hours	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge							
Robyn J (Barge Jake J)	1	16.4	0.100	0.005	0.003	0.000	0.003	0.000	0.009	0.001	0.075	0.004	0.000	0.000	8.83	0.44	0.000	0.000	0.000	0.000	1.0	4.5	0.000	0.004	0.000	0.000	0.000	1.0	4.5	0.000	0.004	0.000	0.000	0.000	0.000								
Robyn J (Barge Payton J)	22	16.4	2.204	0.103	0.075	0.004	0.073	0.004	0.208	0.017	1.655	0.078	0.002	0.000	194.31	9.64	0.004	0.000	0.009	0.000	1.0	4.8	0.006	0.090	0.000	0.005	0.000	1.0	4.8	0.006	0.090	0.000	0.005	0.000	0.000								
Robyn J (Barge Tori J)	4	16.4	0.401	0.019	0.014	0.001	0.013	0.001	0.038	0.003	0.301	0.014	0.000	0.000	35.33	1.75	0.001	0.000	0.002	0.000	1.0	5.3	0.001	0.018	0.000	0.001	0.000	1.0	5.3	0.001	0.018	0.000	0.001	0.000	0.000								
Grand Total	27	16.4	2.705	0.126	0.092	0.005	0.090	0.004	0.255	0.021	2.031	0.096	0.003	0.000	238.47	11.83	0.005	0.000	0.011	0.001	1.0	4.9	0.008	0.112	0.000	0.006	0.000	1.0	4.9	0.008	0.112	0.000	0.006	0.000	0.000								

Assist Tugs						Tug Running Emissions (tons)																		
Tug	Hours per Call			Load Factors			NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O	
	Calls	Main	Aux	Main	Aux		Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux
Scout	100	0.70	1.00	0.31	0.43		0.501	0.049	0.011	0.001	0.011	0.001	0.060	0.008	0.476	0.053	0.001	0.000	55.83	6.49	0.001	0.000	0.003	0.000
Tioga	100	0.70	1.00	0.31	0.43		0.501	0.040	0.011	0.002	0.011	0.001	0.060	0.007	0.476	0.030	0.001	0.000	55.83	3.71	0.001	0.000	0.003	0.000
Grand Total	200	0.70	1.00	0.31	0.43		1.002	0.089	0.022	0.003	0.021	0.003	0.119	0.015	0.951	0.083	0.001	0.000	111.67	10.20	0.002	0.000	0.005	0.000

Demo/Rail Project - 2020 - with CAP

Ships

Ship Type	Engine Type	Emission Tier	Power (kW)				Service Speed (kts)	Total Transit Distance (nm)		Comp (%)	Transit - Arrival				Comp (%)	Transit - Departure				Time (hrs)	NC Boiler		NOx					
			Calls	Main	Aux			Arrival	Depart		Distance (nm)	Speed (kts)	Comp	NC		Main Load Factor	Comp	NC	Distance (nm)		Speed (kts)	Comp	NC	Aux	Load (kW)	Main	Aux	Boiler
AUTO CARRIER	SSD	1	12.00	11,060	2,760	20.00	35.30	35.30	0%	15.30	12.00	20.00	0.18	0.82	0%	15.30	12.00	20.00	0.18	0.82	1.53	0.15	351	2,780	0.104	-	0.046	
		MSD	1	2.00	9,100	2,973	16.65	30.20	23.40	0%	10.20	11.00	16.65	0.24	0.82	0%	3.40	11.20	16.65	0.25	0.82	0.82	0.17	-	0.158	0.011	-	0.003
BULK CARRIER	SSD	0	2.00	8,139	2,325	14.60	30.20	30.20	0%	10.20	10.70	14.60	0.32	0.82	0%	10.20	12.45	14.60	0.51	0.82	1.40	0.17	-	0.351	0.017	-	0.005	
		1	5.00	10,705	2,250	15.92	33.94	26.46	0%	13.94	11.13	15.92	0.28	0.82	0%	6.46	11.90	15.92	0.34	0.82	1.28	0.17	-	0.939	0.033	-	0.016	
		2	2.00	9,140	2,393	15.00	11.50	48.90	0%	-	11.05	15.00	0.33	0.82	0%	28.90	12.50	15.00	0.48	0.82	1.93	0.17	-	0.402	0.017	-	0.008	
BULK CARRIER, HL	MSD	0	3.00	5,738	1,950	13.00	5.75	24.45	0%	-	9.45	13.00	0.32	0.82	0%	4.45	9.45	13.00	0.32	0.82	0.34	0.17	-	0.071	0.005	-	0.001	
CONTAINER SHIP	SSD	2	50.00	19,420	11,320	19.50	11.92	12.16	0%	-	11.64	19.50	0.18	0.82	0%	-	11.93	19.50	0.19	0.82	-	0.13	132	-	-	-	-	
		MSD	0	1.00	5,738	1,950	13.00	11.50	48.90	0%	-	10.10	13.00	0.39	0.82	0%	28.90	10.10	13.00	0.39	0.82	2.22	0.17	-	0.153	0.011	-	0.003
	1		7.00	6,400	2,367	15.34	35.98	23.74	0%	15.98	12.57	15.34	0.45	0.82	0%	3.74	12.20	15.34	0.41	0.82	1.29	0.17	-	0.611	0.049	-	0.013	
GENERAL CARGO	SSD	0	3.00	9,268	2,557	15.23	23.97	36.43	0%	3.97	12.07	15.23	0.41	0.82	0%	16.43	12.30	15.23	0.43	0.82	1.34	0.17	-	0.574	0.027	-	0.008	
		1	15.00	12,430	2,920	16.98	26.95	34.06	0%	6.95	11.77	16.98	0.27	0.82	0%	14.06	11.86	16.98	0.28	0.82	1.24	0.17	-	3.161	0.126	-	0.052	
		2	2.00	8,630	2,048	14.90	42.10	30.20	0%	22.10	10.95	14.90	0.33	0.82	0%	10.20	11.00	14.90	0.33	0.82	2.17	0.17	-	0.428	0.016	-	0.008	
Grand Total				104.00	14,512	6,785	18.04	20.90	22.48	0%	5.45	11.62	18.04	0.24	0.82	0%	6.25	11.85	18.04	0.25	0.82	0.69	0.15	104	9,627	0.418	-	0.165
			0.64																									

Harborcraft			Tug Running Emissions (tons)																									
			NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		Hours		NOx		DPM		PM	
Tug/Barge	Calls	Hours	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge
Robyn J (Barge Jake J)	1	16.4	0.100	0.005	0.003	0.000	0.003	0.000	0.009	0.001	0.075	0.004	0.000	0.000	8.83	0.44	0.000	0.000	0.000	0.000	1.0	4.5	0.000	0.004	0.000	0.000	0.000	0.000
Robyn J (Barge Payton J)	23	16.4	2.304	0.108	0.079	0.004	0.076	0.004	0.217	0.018	1.730	0.082	0.002	0.000	203.14	10.08	0.004	0.000	0.009	0.000	1.0	4.8	0.007	0.094	0.000	0.005	0.000	0.000
Robyn J (Barge Tori J)	4	16.4	0.401	0.019	0.014	0.001	0.013	0.001	0.038	0.003	0.301	0.014	0.000	0.000	35.33	1.75	0.001	0.000	0.002	0.000	1.0	5.3	0.001	0.018	0.000	0.001	0.000	0.000
Grand Total	28	16.4	2.805	0.131	0.096	0.005	0.093	0.005	0.264	0.022	2.106	0.100	0.003	0.000	247.30	12.27	0.005	0.000	0.011	0.001	1.0	4.9	0.008	0.116	0.000	0.006	0.000	0.000

Assist Tugs	Tug Running Emissions (tons)										
	Hours per Call	Load Factors	NOx	DPM	PM2.5	ROG	CO	SOx	CO2	CH4	N2O

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Ship Type	Engine Type	Emission Tier	Transit Emissions (tons)																								Comp (%)	Distance (nm)	VSR - Speed Comp
			DPM			PM2.5			ROG			CO			SOx			CO2			CH4			N2O					
			Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main			
AUTO CARRIER	SSD	1	0.001	-	0.028	0.001	-	0.096	0.003	-	0.135	0.006	-	0.044	0.002	-	72.18	3.85	-	0.009	0.000	-	0.002	0.000	-	80%	20.00	12.00	
BULK CARRIER	MSD	1	0.000	-	0.003	0.000	-	0.009	0.000	-	0.015	0.001	-	0.005	0.000	-	8.70	0.63	-	0.001	0.000	-	0.000	0.000	-	80%	20.00	11.00	
	SSD	0	0.000	-	0.005	0.000	-	0.016	0.001	-	0.023	0.001	-	0.007	0.000	-	12.13	0.84	-	0.001	0.000	-	0.000	0.000	-	100%	20.00	10.70	
		1	0.001	-	0.014	0.001	-	0.049	0.001	-	0.068	0.003	-	0.022	0.001	-	36.57	1.86	-	0.004	0.000	-	0.001	0.000	-	80%	20.00	11.13	
		2	0.000	-	0.007	0.000	-	0.025	0.001	-	0.035	0.002	-	0.011	0.001	-	18.78	1.19	-	0.002	0.000	-	0.001	0.000	-	100%	11.50	11.05	
BULK CARRIER, HL	MSD	0	0.000	-	0.001	0.000	-	0.002	0.000	-	0.004	0.000	-	0.001	0.000	-	2.30	0.17	-	0.000	0.000	-	0.000	0.000	-	100%	5.75	9.45	
CONTAINER SHIP	SSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	11.99	11.57	
	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80%	11.50	12.08	
GENERAL CARGO	MSD	0	0.000	-	0.003	0.000	-	0.008	0.000	-	0.013	0.001	-	0.005	0.000	-	7.46	0.56	-	0.001	0.000	-	0.000	0.000	-	100%	11.50	10.10	
		1	0.001	-	0.009	0.001	-	0.024	0.001	-	0.041	0.003	-	0.015	0.001	-	24.06	1.97	-	0.003	0.000	-	0.001	0.000	-	80%	20.00	12.57	
	SSD	0	0.000	-	0.008	0.000	-	0.026	0.001	-	0.037	0.002	-	0.012	0.001	-	19.85	1.33	-	0.002	0.000	-	0.001	0.000	-	100%	20.00	12.07	
		1	0.002	-	0.035	0.002	-	0.120	0.004	-	0.169	0.008	-	0.055	0.003	-	90.26	5.14	-	0.011	0.001	-	0.003	0.000	-	91%	20.00	11.77	
Grand Total		2	0.000	-	0.008	0.000	-	0.026	0.001	-	0.037	0.002	-	0.012	0.001	-	19.95	1.15	-	0.002	0.000	-	0.001	0.000	-	100%	20.00	10.95	
			0.007	-	0.121	0.006	-	0.401	0.014	-	0.577	0.030	-	0.192	0.011	-	312.24	18.69	-	0.037	0.002	-	0.009	0.000	-	88%	14.85	11.60	

Harborcraft			Hoteling Emissions (tons)													
Tug/Barge	Calls	Hours	2.5	ROG		CO		SOx		CO2		CH4		N2O		
			Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	
Robyn J (Barge Jake J)	1	16.4	0.000	0.000	0.001	0.000	0.003	0.000	0.000	0.03	0.34	0.000	0.000	0.000	0.000	
Robyn J (Barge Payton J)	22	16.4	0.005	0.001	0.015	0.005	0.071	0.000	0.000	0.59	8.14	0.000	0.000	0.000	0.000	
Robyn J (Barge Tori J)	4	16.4	0.001	0.000	0.003	0.001	0.014	0.000	0.000	0.11	1.63	0.000	0.000	0.000	0.000	
Grand Total	27	16.4	0.006	0.001	0.019	0.006	0.088	0.000	0.000	0.72	10.12	0.000	0.000	0.000	0.000	

Assist Tugs

Tug	Calls	Hours	
		Main	Port
Scout	100	0.70	
Tioga	100	0.70	
Grand Total	200	0.70	

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Ship Type	Transit Emissions (tons)																							VSR -				
	Engine Type	Emission Tier	DPM Aux	Boiler	PM2.5			ROG			CO			SOx			CO2			CH4			N2O			Comp (%)	Distance (nm)	Speed Comp
					Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler			
AUTO CARRIER	SSD	1	0.002	-	0.042	0.002	-	0.144	0.004	-	0.203	0.009	-	0.066	0.003	-	108.27	5.78	-	0.013	0.001	-	0.003	0.000	-	80%	20.00	12.00
	MSD	1	0.000	-	0.003	0.000	-	0.009	0.000	-	0.015	0.001	-	0.005	0.000	-	8.70	0.63	-	0.001	0.000	-	0.000	0.000	-	80%	20.00	11.00
BULK CARRIER	SSD	0	0.000	-	0.005	0.000	-	0.016	0.001	-	0.023	0.001	-	0.007	0.000	-	12.13	0.84	-	0.001	0.000	-	0.000	0.000	-	100%	20.00	10.70
		1	0.001	-	0.014	0.001	-	0.049	0.001	-	0.068	0.003	-	0.022	0.001	-	36.57	1.86	-	0.004	0.000	-	0.001	0.000	-	80%	20.00	11.13
		2	0.000	-	0.007	0.000	-	0.025	0.001	-	0.035	0.002	-	0.011	0.001	-	18.78	1.19	-	0.002	0.000	-	0.001	0.000	-	100%	11.50	11.05
BULK CARRIER, HL	MSD	0	0.000	-	0.001	0.000	-	0.003	0.000	-	0.006	0.000	-	0.002	0.000	-	3.45	0.26	-	0.000	0.000	-	0.000	0.000	-	100%	5.75	9.45
CONTAINER SHIP	SSD	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	88%	11.92	11.64
GENERAL CARGO	MSD	0	0.000	-	0.003	0.000	-	0.008	0.000	-	0.013	0.001	-	0.005	0.000	-	7.46	0.56	-	0.001	0.000	-	0.000	0.000	-	100%	11.50	10.10
		1	0.001	-	0.012	0.001	-	0.034	0.002	-	0.057	0.004	-	0.021	0.002	-	33.68	2.75	-	0.004	0.000	-	0.001	0.000	-	80%	20.00	12.57
	SSD	0	0.000	-	0.008	0.000	-	0.026	0.001	-	0.037	0.002	-	0.012	0.001	-	19.85	1.33	-	0.002	0.000	-	0.001	0.000	-	100%	20.00	12.07
		1	0.003	-	0.048	0.002	-	0.163	0.005	-	0.230	0.011	-	0.075	0.004	-	123.08	7.01	-	0.015	0.001	-	0.004	0.000	-	91%	20.00	11.77
		2	0.000	-	0.008	0.000	-	0.026	0.001	-	0.037	0.002	-	0.012	0.001	-	19.95	1.15	-	0.002	0.000	-	0.001	0.000	-	100%	20.00	10.95
Grand Total			0.008	-	0.151	0.008	-	0.503	0.018	-	0.724	0.037	-	0.240	0.014	-	391.92	23.36	-	0.047	0.003	-	0.012	0.001	-	88%	15.46	11.62

Harborcraft		Hoteling Emissions (tons)													
Tug/Barge	Calls	Hours	2.5	ROG		CO		SOx		CO2		CH4		N2O	
			Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge
Robyn J (Barge Jake J)	1	16.4	0.000	0.000	0.001	0.000	0.003	0.000	0.000	0.03	0.34	0.000	0.000	0.000	0.000
Robyn J (Barge Payton J)	23	16.4	0.005	0.001	0.016	0.005	0.074	0.000	0.000	0.61	8.51	0.000	0.000	0.000	0.000
Robyn J (Barge Tori J)	4	16.4	0.001	0.000	0.003	0.001	0.014	0.000	0.000	0.11	1.63	0.000	0.000	0.000	0.000
Grand Total	28	16.4	0.006	0.001	0.020	0.006	0.092	0.000	0.000	0.75	10.49	0.000	0.000	0.000	0.000

Assist Tugs

			Hours	
			Main	Port

TAMT_Vessels_CAPCompliance
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Baseline

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Ship Type	Engine Type	Emission Tier	Arrival			VSR - Departure						NC Boiler			NOx			DPM			PM2.5			ROG			VSR Emissions	
			I (kts)	Main Load Factor		Comp (%)	Distance (nm)		Speed (kts)		Main Load Factor		Time (hrs)	Aux	Boiler Load (kW)	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux		
				Comp	NC		Comp	NC	Comp	NC	Comp	NC															Main	Aux
AUTO CARRIER	SSD	1	16.06	0.18	0.43	80%	20.00	12.00	15.24	0.18	0.36	3.18	0.15	351	1.009	0.144	0.016	0.017	0.003	0.001	0.016	0.003	0.001	0.055	0.006	0.001	0.078	0.013
BULK CARRIER	MSD	1	13.60	0.24	0.45	80%	20.00	11.20	13.60	0.25	0.45	3.47	0.17	-	0.227	0.048	-	0.005	0.001	-	0.004	0.001	-	0.013	0.002	-	0.021	0.004
	SSD	0	14.60	0.32	0.82	100%	20.00	12.45	14.60	0.51	0.82	3.48	0.17	-	0.435	0.042	-	0.006	0.001	-	0.006	0.001	-	0.020	0.002	-	0.028	0.003
		1	13.10	0.28	0.46	80%	20.00	11.90	13.07	0.34	0.45	3.39	0.17	-	1.021	0.089	-	0.017	0.002	-	0.016	0.002	-	0.053	0.004	-	0.074	0.008
		2	15.00	0.33	0.82	100%	20.00	12.50	15.00	0.48	0.82	2.64	0.17	-	0.280	0.023	-	0.006	0.001	-	0.005	0.001	-	0.017	0.001	-	0.024	0.003
BULK CARRIER, HL	MSD	0	13.00	0.32	0.82	100%	20.00	9.45	13.00	0.32	0.82	2.72	0.17	-	0.144	0.028	-	0.003	0.000	-	0.003	0.000	-	0.007	0.001	-	0.012	0.002
CONTAINER SHIP	SSD	0	14.78	0.16	0.33	80%	12.26	11.83	16.06	0.17	0.42	1.99	0.13	132	5.377	1.394	0.025	0.081	0.025	0.002	0.074	0.023	0.002	0.279	0.052	0.001	0.390	0.110
GENERAL CARGO	1	16.03	0.21	0.50	80%	11.50	12.53	15.40	0.24	0.44	1.79	0.13	-	0.828	0.093	-	0.014	0.002	-	0.013	0.002	-	0.043	0.004	-	0.060	0.008	
	MSD	0	13.00	0.39	0.82	100%	20.00	10.10	13.00	0.39	0.82	3.12	0.17	-	0.100	0.016	-	0.002	0.000	-	0.002	0.000	-	0.005	0.001	-	0.008	0.001
		1	13.20	0.45	0.52	80%	20.00	12.20	15.10	0.41	0.78	3.15	0.17	-	0.613	0.087	-	0.013	0.002	-	0.012	0.002	-	0.034	0.004	-	0.058	0.008
	SSD	0	15.23	0.41	0.82	100%	20.00	12.30	15.23	0.43	0.82	3.28	0.17	-	0.720	0.066	-	0.011	0.001	-	0.010	0.001	-	0.033	0.002	-	0.047	0.005
		1	13.10	0.27	0.38	80%	20.00	11.86	15.23	0.28	0.59	3.30	0.17	-	2.299	0.246	-	0.038	0.005	-	0.035	0.005	-	0.119	0.010	-	0.168	0.022
2		14.90	0.33	0.82	100%	20.00	11.00	14.90	0.33	0.82	3.64	0.17	-	0.287	0.028	-	0.006	0.001	-	0.005	0.001	-	0.018	0.001	-	0.025	0.003	
Grand Total			14.57	0.22	0.43	82%	15.53	11.87	15.41	0.24	0.51	2.51	0.15	93	13.340	2.303	0.041	0.217	0.043	0.003	0.200	0.040	0.003	0.696	0.090	0.002	0.994	0.191

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	22	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	27	16.4

Assist Tugs

Tug	Calls	Hours
		Main
Scout	100	0.70
Tioga	100	0.70
Grand Total	200	0.70

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Ships

Ship Type	Arrival					VSR - Departure						NC			VSR Emissions													
	Engine Type	Emission Tier	I (kts)	Main Load Factor		Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Time (hrs)	Aux	Boiler Load (kW)	NOx			DPM			PM2.5			ROG			CO	
				Comp	NC			Comp	NC	Comp	NC				Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux
AUTO CARRIER	SSD	1	16.06	0.18	0.43	80%	20.00	12.00	15.24	0.18	0.36	3.18	0.15	351	1.513	0.216	0.025	0.025	0.004	0.002	0.023	0.004	0.002	0.083	0.009	0.001	0.117	0.019
BULK CARRIER	MSD	1	13.60	0.24	0.45	80%	20.00	11.20	13.60	0.25	0.45	3.47	0.17	-	0.227	0.048	-	0.005	0.001	-	0.004	0.001	-	0.013	0.002	-	0.021	0.004
	SSD	0	14.60	0.32	0.82	100%	20.00	12.45	14.60	0.51	0.82	3.48	0.17	-	0.435	0.042	-	0.006	0.001	-	0.006	0.001	-	0.020	0.002	-	0.028	0.003
		1	13.10	0.28	0.46	80%	20.00	11.90	13.07	0.34	0.45	3.39	0.17	-	1.021	0.089	-	0.017	0.002	-	0.016	0.002	-	0.053	0.004	-	0.074	0.008
		2	15.00	0.33	0.82	100%	20.00	12.50	15.00	0.48	0.82	2.64	0.17	-	0.280	0.023	-	0.006	0.001	-	0.005	0.001	-	0.017	0.001	-	0.024	0.003
BULK CARRIER, HL	MSD	0	13.00	0.32	0.82	100%	20.00	9.45	13.00	0.32	0.82	2.72	0.17	-	0.216	0.042	-	0.004	0.001	-	0.004	0.001	-	0.011	0.002	-	0.018	0.003
CONTAINER SHIP	SSD	2	14.78	0.18	0.36	80%	12.16	11.93	16.06	0.19	0.46	1.97	0.13	325	5.725	1.578	0.061	0.115	0.040	0.004	0.106	0.037	0.004	0.387	0.083	0.003	0.542	0.175
GENERAL CARGO	MSD	0	13.00	0.39	0.82	100%	20.00	10.10	13.00	0.39	0.82	3.12	0.17	-	0.100	0.016	-	0.002	0.000	-	0.002	0.000	-	0.005	0.001	-	0.008	0.001
		1	13.20	0.45	0.52	80%	20.00	12.20	15.10	0.41	0.78	3.15	0.17	-	0.858	0.121	-	0.018	0.002	-	0.017	0.002	-	0.048	0.005	-	0.081	0.011
	SSD	0	15.23	0.41	0.82	100%	20.00	12.30	15.23	0.43	0.82	3.28	0.17	-	0.720	0.066	-	0.011	0.001	-	0.010	0.001	-	0.033	0.002	-	0.047	0.005
		1	13.10	0.27	0.38	80%	20.00	11.86	15.23	0.28	0.59	3.30	0.17	-	3.136	0.335	-	0.052	0.007	-	0.048	0.006	-	0.162	0.014	-	0.228	0.030
		2	14.90	0.33	0.82	100%	20.00	11.00	14.90	0.33	0.82	3.64	0.17	-	0.287	0.028	-	0.006	0.001	-	0.005	0.001	-	0.018	0.001	-	0.025	0.003
Grand Total			14.42	0.24	0.44	83%	16.23	11.85	15.38	0.25	0.53	2.62	0.15	197	14.517	2.603	0.086	0.267	0.060	0.006	0.246	0.056	0.005	0.849	0.126	0.005	1.215	0.266

64.713

1.639

1.508

3.958

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	23	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	28	16.4

Assist Tugs

Hours

TAMT_Vessels_CAPCompliance Annual Summary

Baseline

Ships

Emissions (t/ton)															Maneuvering					Other Emissions								
Ship Type	Engine Type	Emission Tier	CO2		SOx		NOx		CH4		N2O		Speed (kts)	Time (hrs)	Load Factors		Boiler Load (kW)	NOx			DPM			PM2.5				
			Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler			Main	Aux		Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux			
AUTO CARRIER	SSD	1	0.002	0.024	0.005	0.005	39.55	8.01	7.61	0.005	0.001	0.000	0.001	0.000	0.000	7.00	2.41	0.04	0.45	351	0.277	0.328	0.015	0.006	0.007	0.001	0.006	0.006
BULK CARRIER	MSD	1	-	0.008	0.002	-	12.51	2.67	-	0.002	0.000	-	0.000	0.000	-	7.00	2.41	0.06	0.45	132	0.063	0.088	0.001	0.002	0.002	0.000	0.001	0.002
	SSD	0	-	0.009	0.001	-	15.03	2.09	-	0.002	0.000	-	0.000	0.000	-	7.00	2.41	0.09	0.45	132	0.085	0.077	0.001	0.001	0.001	0.000	0.001	0.001
		1	-	0.024	0.003	-	39.74	4.93	-	0.005	0.001	-	0.001	0.000	-	7.00	2.41	0.07	0.45	132	0.218	0.167	0.004	0.004	0.003	0.000	0.004	0.003
BULK CARRIER, HL	SSD	2	-	0.008	0.001	-	13.08	1.63	-	0.002	0.000	-	0.000	0.000	-	7.00	2.41	0.08	0.45	132	0.069	0.057	0.001	0.002	0.001	0.000	0.002	0.001
		0	-	0.004	0.001	-	7.03	1.37	-	0.001	0.000	-	0.000	0.000	-	7.00	2.41	0.13	0.45	132	0.057	0.058	0.001	0.001	0.001	0.000	0.001	0.001
CONTAINER SHIP	SSD	0	0.003	0.116	0.040	0.007	187.34	69.18	11.56	0.025	0.008	0.000	0.006	0.002	0.000	7.00	2.41	0.04	0.50	241	2.571	6.487	0.063	0.053	0.117	0.004	0.049	0.107
GENERAL CARGO	MSD	1	-	0.020	0.003	-	32.24	5.20	-	0.004	0.001	-	0.001	0.000	-	7.00	2.41	0.04	0.50	362	0.386	0.485	0.015	0.009	0.010	0.001	0.008	0.009
		0	-	0.003	0.000	-	4.91	0.79	-	0.001	0.000	-	0.000	0.000	-	7.00	2.41	0.13	0.45	135	0.025	0.029	0.001	0.001	0.001	0.000	0.001	0.001
	SSD	1	-	0.021	0.003	-	33.79	4.82	-	0.004	0.001	-	0.001	0.000	-	7.00	2.41	0.08	0.45	135	0.105	0.176	0.004	0.003	0.004	0.000	0.002	0.003
		0	-	0.015	0.002	-	24.90	3.26	-	0.003	0.000	-	0.001	0.000	-	7.00	2.41	0.08	0.45	135	0.136	0.114	0.002	0.002	0.002	0.000	0.002	0.002
		1	-	0.055	0.008	-	89.54	13.68	-	0.011	0.002	-	0.003	0.000	-	7.00	2.41	0.06	0.45	135	0.507	0.477	0.008	0.011	0.010	0.001	0.010	0.009
Grand Total			-	0.008	0.001	-	13.40	1.93	-	0.002	0.000	-	0.000	0.000	-	7.00	2.41	0.09	0.45	135	0.063	0.061	0.001	0.001	0.001	0.000	0.001	0.001
			0.004	0.315	0.069	0.012	513.07	119.57	19.17	0.064	0.014	0.001	0.015	0.003	0.000	7.00	2.41	0.05	0.48	222	4.562	8.604	0.118	0.096	0.159	0.008	0.089	0.147

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	22	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	27	16.4

Assist Tugs

Tug	Calls	Hours
		Main
Scout	100	0.70
Tioga	100	0.70
Grand Total	200	0.70

Demo/Rail Project - 2020 - with CAP

Ships

Ship Type	Emissions (tons)														Maneuvering					DPM								PM2.5
	Engine Type	Emission Tier	SOx		CO2		CH4		N2O		Speed (kts)	Time (hrs)	Load Factors		Boiler Load (kW)	NOx			DPM									
			Boiler	Main	Boiler	Main	Boiler	Main	Boiler	Main			Main	Aux		Main	Aux	Main	Aux	Boiler	Main	Aux						
AUTO CARRIER	SSD	1	0.002	0.036	0.007	0.007	59.33	12.01	11.41	0.007	0.001	0.000	0.002	0.000	0.000	7.00	2.41	0.04	0.45	351	0.416	0.492	0.022	0.010	0.010	0.001	0.009	0.009
	MSD	1	-	0.008	0.002	-	12.51	2.67	-	0.002	0.000	-	0.000	0.000	-	7.00	2.41	0.06	0.45	135	0.063	0.088	0.001	0.002	0.002	0.000	0.001	0.002
BULK CARRIER		0	-	0.009	0.001	-	15.03	2.09	-	0.002	0.000	-	0.000	0.000	-	7.00	2.41	0.09	0.45	132	0.085	0.077	0.001	0.001	0.001	0.000	0.001	0.001
	SSD	1	-	0.024	0.003	-	39.74	4.93	-	0.005	0.001	-	0.001	0.000	-	7.00	2.41	0.07	0.45	132	0.218	0.167	0.004	0.004	0.003	0.000	0.004	0.003
		2	-	0.008	0.001	-	13.08	1.63	-	0.002	0.000	-	0.000	0.000	-	7.00	2.41	0.08	0.45	132	0.069	0.057	0.001	0.002	0.001	0.000	0.002	0.001
BULK CARRIER, HL	MSD	0	-	0.007	0.001	-	10.54	2.06	-	0.001	0.000	-	0.000	0.000	-	7.00	2.41	0.13	0.45	132	0.086	0.087	0.002	0.002	0.002	0.000	0.002	0.002
CONTAINER SHIP	SSD	2	0.006	0.165	0.064	0.018	268.14	109.97	28.40	0.035	0.013	0.001	0.008	0.003	0.000	7.00	2.41	0.04	0.50	325	2.738	7.456	0.086	0.076	0.188	0.006	0.070	0.173
	MSD	0	-	0.003	0.000	-	4.91	0.79	-	0.001	0.000	-	0.000	0.000	-	7.00	2.41	0.13	0.45	132	0.025	0.029	0.001	0.001	0.001	0.000	0.001	0.001
		1	-	0.029	0.004	-	47.31	6.75	-	0.006	0.001	-	0.001	0.000	-	7.00	2.41	0.08	0.45	135	0.147	0.246	0.005	0.004	0.005	0.000	0.003	0.005
GENERAL CARGO		0	-	0.015	0.002	-	24.90	3.26	-	0.003	0.000	-	0.001	0.000	-	7.00	2.41	0.08	0.45	135	0.136	0.114	0.002	0.002	0.002	0.000	0.002	0.002
	SSD	1	-	0.075	0.011	-	122.10	18.66	-	0.015	0.002	-	0.004	0.000	-	7.00	2.41	0.06	0.45	135	0.691	0.650	0.011	0.015	0.013	0.001	0.013	0.012
		2	-	0.008	0.001	-	13.40	1.93	-	0.002	0.000	-	0.000	0.000	-	7.00	2.41	0.09	0.45	135	0.063	0.061	0.001	0.001	0.001	0.000	0.001	0.001
Grand Total			0.009	0.388	0.097	0.025	630.99	166.76	39.81	0.079	0.019	0.001	0.019	0.004	0.001	7.00	2.41	0.05	0.47	251	4.737	9.524	0.139	0.119	0.230	0.009	0.110	0.219

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	23	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	28	16.4

Assist Tugs

Hours

TAMT_Vessels_CAPCompliance
Annual Summary

Baseline

Ships

Maneuvering Emissions (tons)																					Hotel Time (hr)	Aux Time (hr)	Hotelling		NOx			DI
Ship Type	Engine Type	Emission Tier	Boiler	Main	ROG Aux	Boiler	Main	CO Aux	Boiler	Main	SOx Aux	Boiler	Main	CO2 Aux	Boiler	Main	CH4 Aux	Boiler	Main	N2O Aux	Boiler		Auxiliary LF	Boiler Load (kW)	Aux	Boiler	Aux	
AUTO CARRIER	SSD	1	0.001	0.050	0.014	0.001	0.044	0.029	0.001	0.006	0.011	0.004	9.82	18.25	6.89	0.004	0.002	0.000	0.000	0.000	0.000	27.6	27.6	0.26	351	2.163	0.170	0.044
BULK CARRIER	SSD	1	0.000	0.008	0.004	0.000	0.011	0.008	0.000	0.002	0.003	0.000	3.04	4.91	0.65	0.001	0.001	0.000	0.000	0.000	0.000	37.9	37.9	0.10	132	0.308	0.022	0.006
		0	0.000	0.008	0.003	0.000	0.009	0.006	0.000	0.002	0.002	0.000	3.03	3.84	0.65	0.001	0.000	0.000	0.000	0.000	0.000	28.7	28.7	0.10	132	0.205	0.017	0.004
		1	0.000	0.027	0.007	0.000	0.031	0.015	0.000	0.005	0.005	0.001	8.61	9.29	1.62	0.002	0.001	0.000	0.000	0.000	0.000	37.8	37.8	0.10	132	0.581	0.055	0.012
BULK CARRIER, HL	SSD	2	0.000	0.009	0.003	0.000	0.011	0.006	0.000	0.002	0.002	0.000	3.30	3.95	0.65	0.001	0.000	0.000	0.000	0.000	0.000	85.1	85.1	0.10	132	0.444	0.049	0.011
		0	0.000	0.004	0.002	0.000	0.007	0.005	0.000	0.002	0.002	0.000	2.88	3.22	0.65	0.001	0.000	0.000	0.000	0.000	0.000	114.0	114.0	0.10	132	0.681	0.066	0.012
		0	0.004	0.412	0.243	0.003	0.366	0.513	0.006	0.051	0.187	0.018	80.89	322.01	28.96	0.037	0.037	0.001	0.003	0.008	0.000	61.4	49.8	0.35	241	92.640	1.595	1.666
CONTAINER SHIP	SSD	1	0.001	0.070	0.020	0.001	0.062	0.043	0.002	0.009	0.016	0.004	13.68	27.00	7.11	0.006	0.003	0.000	0.000	0.001	0.000	60.8	60.8	0.35	362	8.468	0.388	0.171
GENERAL CARGO	MSD	0	0.000	0.002	0.001	0.000	0.003	0.003	0.000	0.001	0.001	0.000	1.31	1.61	0.33	0.000	0.000	0.000	0.000	0.000	0.000	123.0	123.0	0.10	135	0.328	0.037	0.007
		1	0.000	0.015	0.007	0.000	0.018	0.016	0.000	0.003	0.006	0.001	5.40	9.78	1.66	0.001	0.001	0.000	0.000	0.000	0.000	62.5	62.5	0.10	135	1.011	0.093	0.020
	SSD	0	0.000	0.014	0.005	0.000	0.016	0.010	0.000	0.003	0.004	0.001	4.79	6.34	0.99	0.001	0.001	0.000	0.000	0.000	0.000	86.3	86.3	0.10	135	1.015	0.077	0.018
		1	0.000	0.071	0.020	0.000	0.075	0.042	0.001	0.012	0.015	0.002	19.62	26.54	3.64	0.006	0.003	0.000	0.001	0.001	0.000	45.5	45.5	0.10	135	1.996	0.149	0.040
		2	0.000	0.008	0.003	0.000	0.009	0.005	0.000	0.002	0.002	0.000	3.02	3.38	0.66	0.001	0.000	0.000	0.000	0.000	0.000	50.9	50.9	0.10	135	0.227	0.030	0.006
Grand Total			0.007	0.698	0.332	0.006	0.662	0.702	0.012	0.099	0.255	0.034	159.38	440.13	54.44	0.063	0.051	0.002	0.005	0.011	0.001	57.3	51.6	0.25	222	110.067	2.747	2.017

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	22	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	27	16.4

0.810319
0.091754

Assist Tugs

Tug	Calls	Hours
Scout	100	0.70
Tioga	100	0.70
Grand Total	200	0.70

SP
Reduction in hotelling time

80%
0%

Demo/Rail Project - 2020 - with CAP

Ships

Maneuvering Emissions (tons)																					Hotel Time (hr)	Aux Time (hr)	Hotelling		NOx			DI
Ship Type	Engine Type	Emission Tier	Boiler	Main	ROG Aux	Boiler	Main	CO Aux	Boiler	Main	SOx Aux	Boiler	Main	CO2 Aux	Boiler	Main	CH4 Aux	Boiler	Main	N2O Aux	Boiler		Auxiliary LF	Boiler Load (kW)	Aux	Boiler	Aux	
AUTO CARRIER	SSD	1	0.001	0.075	0.021	0.001	0.067	0.044	0.002	0.009	0.016	0.007	14.72	27.37	10.33	0.007	0.003	0.000	0.000	0.001	0.000	27.6	27.6	0.26	351	3.244	0.255	0.065
BULK CARRIER	SSD	1	0.000	0.008	0.004	0.000	0.011	0.008	0.000	0.002	0.003	0.000	3.04	4.91	0.66	0.001	0.001	0.000	0.000	0.000	0.000	37.9	37.9	0.10	135	0.308	0.023	0.006
		0	0.000	0.008	0.003	0.000	0.009	0.006	0.000	0.002	0.002	0.000	3.03	3.84	0.65	0.001	0.000	0.000	0.000	0.000	0.000	28.7	28.7	0.10	132	0.205	0.017	0.004
		1	0.000	0.027	0.007	0.000	0.031	0.015	0.000	0.005	0.005	0.001	8.61	9.29	1.62	0.002	0.001	0.000	0.000	0.000	0.000	37.8	37.8	0.10	132	0.581	0.055	0.012
BULK CARRIER, HL	SSD	2	0.000	0.009	0.003	0.000	0.011	0.006	0.000	0.002	0.002	0.000	3.30	3.95	0.65	0.001	0.000	0.000	0.000	0.000	0.000	85.1	85.1	0.10	132	0.444	0.049	0.011
		0	0.000	0.006	0.004	0.000	0.010	0.008	0.000	0.003	0.003	0.001	4.33	4.83	0.97	0.001	0.001	0.000	0.000	0.000	0.000	114.0	114.0	0.10	132	1.022	0.099	0.018
		2	0.005	0.591	0.392	0.005	0.526	0.828	0.009	0.073	0.301	0.025	116.22	519.66	39.85	0.053	0.060	0.001	0.004	0.014	0.001	88.9	8.2	0.35	325	17.445	3.176	0.441
GENERAL CARGO	MSD	0	0.000	0.002	0.001	0.000	0.003	0.003	0.000	0.001	0.001	0.000	1.31	1.61	0.32	0.000	0.000	0.000	0.000	0.000	0.000	123.0	123.0	0.10	132	0.328	0.036	0.007
		1	0.000	0.021	0.010	0.000	0.025	0.022	0.001	0.005	0.008	0.001	7.56	13.69	2.32	0.002	0.002	0.000	0.000	0.000	0.000	62.5	62.5	0.10	135	1.415	0.130	0.029
	SSD	0	0.000	0.014	0.005	0.000	0.016	0.010	0.000	0.003	0.004	0.001	4.79	6.34	0.99	0.001	0.001	0.000	0.000	0.000	0.000	86.3	86.3	0.10	135	1.015	0.077	0.018
		1	0.001	0.097	0.027	0.001	0.102	0.058	0.001	0.017	0.021	0.003	26.75	36.19	4.97	0.009	0.004	0.000	0.001	0.001	0.000	45.5	45.5	0.10	135	2.722	0.203	0.055
GENERAL CARGO	SSD	2	0.000	0.008	0.003	0.000	0.009	0.005	0.000	0.002	0.002	0.000	3.02	3.38	0.66	0.001	0.000	0.000	0.000	0.000	0.000	50.9	50.9	0.10	135	0.227	0.030	0.006
Grand Total			0.008	0.867	0.479	0.008	0.820	1.012	0.014	0.122	0.368	0.040	196.68	635.08	63.99	0.078	0.074	0.002	0.006	0.017	0.001	69.4	30.5	0.24	251	28.957	4.150	0.671

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	23	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	28	16.4

Assist Tugs

Hours

1 0.273973
1 0.290411
5.439681 1.579743

TAMT_Vessels_CAPCompliance
Annual Summary

Baseline

Ships

		Hotelling Emissions (tons)																Cold Iron CO2e	
Ship Type	Engine Type	Emission Tier	M	PM2.5		ROG		CO		SOx		CO2		CH4		N2O			
				Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux		
AUTO CARRIER	SSD	1		0.011	0.040	0.010	0.091	0.009	0.192	0.017	0.070	0.049	120.36	78.62	0.014	0.003	0.003	0.001	-
BULK CARRIER	MSD	1		0.001	0.006	0.001	0.013	0.001	0.027	0.002	0.010	0.006	17.14	10.16	0.002	0.000	0.000	0.000	-
	SSD	0		0.001	0.003	0.001	0.008	0.001	0.016	0.002	0.006	0.005	10.17	7.71	0.001	0.000	0.000	0.000	-
		1		0.004	0.011	0.003	0.024	0.003	0.052	0.005	0.019	0.016	32.31	25.32	0.004	0.001	0.001	0.000	-
		2		0.003	0.010	0.003	0.023	0.003	0.049	0.005	0.018	0.014	30.96	22.81	0.004	0.001	0.001	0.000	-
BULK CARRIER, HL	MSD	0		0.004	0.011	0.004	0.025	0.004	0.054	0.007	0.020	0.019	33.82	30.57	0.004	0.001	0.001	0.000	-
CONTAINER SHIP	SSD	0		0.106	1.533	0.098	3.466	0.088	7.331	0.160	2.666	0.464	4,598.66	736.92	0.533	0.026	0.120	0.010	1,091
	1		0.026	0.157	0.024	0.355	0.021	0.751	0.039	0.273	0.113	471.18	179.07	0.055	0.006	0.012	0.003	-	
GENERAL CARGO	MSD	0		0.002	0.006	0.002	0.014	0.002	0.029	0.004	0.011	0.011	18.24	16.87	0.002	0.001	0.000	0.000	-
		1		0.006	0.019	0.006	0.042	0.005	0.090	0.009	0.033	0.027	56.26	42.85	0.007	0.001	0.001	0.001	-
	SSD	0		0.005	0.017	0.005	0.038	0.004	0.080	0.008	0.029	0.022	50.37	35.52	0.006	0.001	0.001	0.001	-
		1		0.010	0.037	0.009	0.084	0.008	0.177	0.015	0.064	0.043	111.09	68.60	0.013	0.002	0.003	0.001	-
		2		0.002	0.005	0.002	0.012	0.002	0.025	0.003	0.009	0.009	15.85	13.96	0.002	0.000	0.000	0.000	-
Grand Total				0.183	1.855	0.169	4.195	0.151	8.874	0.275	3.227	0.799	5,566.40	1,268.99	0.645	0.044	0.145	0.018	1,091

SDGE rate

699.5

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	22	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	27	16.4

Assist Tugs

Tug	Calls	Hours
		Main
Scout	100	0.70
Tioga	100	0.70
Grand Total	200	0.70

Demo/Rail Project - 2020 - with CAP

Ships

Ship Type	Hotelling Emissions (tons)																		Cold Iron CO2e
	Engine Type	Emission Tier	'M		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		
			Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	
AUTO CARRIER	SSD	1	0.017	0.060	0.016	0.136	0.014	0.288	0.026	0.105	0.074	180.53	117.93	0.021	0.004	0.005	0.002	-	
	MSD	1	0.002	0.006	0.001	0.013	0.001	0.027	0.002	0.010	0.007	17.14	10.39	0.002	0.000	0.000	0.000	0.000	
BULK CARRIER	SSD	0	0.001	0.003	0.001	0.008	0.001	0.016	0.002	0.006	0.005	10.17	7.71	0.001	0.000	0.000	0.000	-	
		1	0.004	0.011	0.003	0.024	0.003	0.052	0.005	0.019	0.016	32.31	25.32	0.004	0.001	0.001	0.000	-	
		2	0.003	0.010	0.003	0.023	0.003	0.049	0.005	0.018	0.014	30.96	22.81	0.004	0.001	0.001	0.000	-	
BULK CARRIER, HL	MSD	0	0.007	0.017	0.006	0.038	0.005	0.081	0.010	0.029	0.029	50.73	45.86	0.006	0.002	0.001	0.001	-	
CONTAINER SHIP	SSD	2	0.212	0.405	0.195	0.916	0.175	1.938	0.318	0.705	0.923	1,215.87	1,467.21	0.141	0.051	0.032	0.021	8,507	
GENERAL CARGO	MSD	0	0.002	0.006	0.002	0.014	0.002	0.029	0.004	0.011	0.010	18.24	16.49	0.002	0.001	0.000	0.000	-	
		1	0.009	0.026	0.008	0.059	0.007	0.126	0.013	0.046	0.038	78.76	60.00	0.009	0.002	0.002	0.001	-	
	SSD	0	0.005	0.017	0.005	0.038	0.004	0.080	0.008	0.029	0.022	50.37	35.52	0.006	0.001	0.001	0.001	-	
		1	0.014	0.050	0.012	0.114	0.011	0.242	0.020	0.088	0.059	151.49	93.55	0.018	0.003	0.004	0.001	-	
		2	0.002	0.005	0.002	0.012	0.002	0.025	0.003	0.009	0.009	15.85	13.96	0.002	0.000	0.000	0.000	-	
Grand Total			0.277	0.617	0.255	1.396	0.229	2.953	0.416	1.074	1.206	1,852.42	1,916.74	0.215	0.067	0.048	0.027	8,507	

15,824,068.34 487.6882

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	23	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	28	16.4

Assist Tugs

Hours

TAMT_Vessels_CAPCompliance

Annual Summary

Tug	Calls	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux
Scout	104	0.70	1.00	0.31	0.43	0.521	0.051	0.012	0.001	0.011	0.001	0.062	0.008	0.495	0.055	0.001	0.000	58.07	6.75	0.001	0.000	0.003	0.000
Tioga	104	0.70	1.00	0.31	0.43	0.521	0.041	0.012	0.002	0.011	0.002	0.062	0.007	0.495	0.031	0.001	0.000	58.07	3.86	0.001	0.000	0.003	0.000
Grand Total	208	0.70	1.00	0.31	0.43	1.042	0.093	0.023	0.003	0.022	0.003	0.124	0.015	0.989	0.086	0.001	0.000	116.13	10.61	0.002	0.000	0.005	0.000

TAMT Plan- 2035 - with CAP

Ships

Ship Type	Engine Type	Emission Tier	Power (kW)				Service Speed (kts)	Total Transit Distance (nm)		Comp (%)	Distance (nm)	Transit - Arrival Speed (kts)				Main Load Factor				Transit - Departure Speed (kts)				Main Load Factor				Time (hrs)	NC Boiler			NOx																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
			Calls	Main	Aux			Arrival	Depart			Comp	NC	Comp	NC	Comp	NC	Comp	NC	Comp	NC	Aux	Load (kW)	Main	Aux	Boiler	Main																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	

Harborcraft

Harborcraft		Tug Running Emissions (tons)																									
		NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		Hours		NOx		DPM		PM	
Tug/Barge	Calls	Hours	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Tug	Barge	Tug	Barge	Tug	Barge	Tug
Robyn J (Barge Jake J)	6	16.4	0.601	0.028	0.021	0.001	0.020	0.001	0.057	0.005	0.451	0.021	0.001	0.000	52.99	2.63	0.001	0.000	0.002	0.000	1.0	4.5	0.002	0.023	0.000	0.001	0.000
Robyn J (Barge Payton J)	127	16.4	12.723	0.594	0.434	0.022	0.421	0.021	1.198	0.100	9.553	0.452	0.013	0.001	1,121.70	55.64	0.022	0.002	0.051	0.003	1.0	4.8	0.036	0.522	0.001	0.028	0.001
Robyn J (Barge Tori J)	23	16.4	2.304	0.108	0.079	0.004	0.076	0.004	0.217	0.018	1.730	0.082	0.002	0.000	203.14	10.08	0.004	0.000	0.009	0.000	1.0	5.3	0.007	0.104	0.000	0.006	0.000
Grand Total	156	16.4	15.628	0.729	0.533	0.027	0.517	0.026	1.472	0.123	11.734	0.555	0.015	0.001	1,377.83	68.34	0.027	0.002	0.062	0.003	1.0	4.9	0.045	0.649	0.002	0.035	0.002

Assist Tugs

Assist Tugs					Tug Running Emissions (tons)																		
Tug	Hours per Call		Load Factors		NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		
	Calls	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux
Scout	579	0.70	1.00	0.31	0.43	2.900	0.286	0.064	0.006	0.062	0.006	0.345	0.047	2.753	0.305	0.004	0.000	323.27	37.58	0.006	0.001	0.015	0.002
Tioga	579	0.70	1.00	0.31	0.43	2.900	0.229	0.064	0.009	0.062	0.009	0.345	0.039	2.753	0.174	0.004	0.000	323.27	21.47	0.006	0.001	0.015	0.001
Grand Total	1158	0.70	1.00	0.31	0.43	5.799	0.515	0.128	0.015	0.124	0.015	0.691	0.085	5.506	0.479	0.007	0.001	646.54	59.05	0.013	0.002	0.029	0.003

TAMT_Vessels_CAPCompliance Annual Summary

Tug	Calls	Main
Scout	104	0.70
Tioga	104	0.70
Grand Total	208	0.70

TAMT Plan- 2035 - with CAP

Ships

Ship Type	Engine Type	Emission Tier	Transit Emissions (tons)																								Comp (%)	Distance (nm)	VSR - Speed (knots)
			DPM			PM2.5			ROG			CO			SOx			CO2			CH4			N2O					
			Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main			
AUTO CARRIER	SSD	1	0.016	-	0.325	0.015	-	1.101	0.033	-	1.553	0.071	-	0.508	0.026	-	830.09	44.32	-	0.099	0.005	-	0.025	0.001	-	80%	20.00	12.00	
BULK CARRIER	MSD	1	0.002	-	0.033	0.002	-	0.092	0.005	-	0.156	0.011	-	0.057	0.004	-	91.30	6.59	-	0.011	0.001	-	0.003	0.000	-	80%	20.00	11.00	
	SSD	0	0.003	-	0.043	0.003	-	0.145	0.006	-	0.204	0.012	-	0.067	0.004	-	109.14	7.56	-	0.013	0.001	-	0.003	0.000	-	100%	20.00	10.70	
		1	0.006	-	0.132	0.006	-	0.446	0.013	-	0.629	0.027	-	0.206	0.010	-	336.47	17.15	-	0.040	0.002	-	0.010	0.000	-	80%	20.00	11.13	
		2	0.004	-	0.066	0.004	-	0.224	0.008	-	0.316	0.017	-	0.103	0.006	-	169.01	10.73	-	0.020	0.001	-	0.005	0.000	-	100%	11.50	11.05	
BULK CARRIER, HL	MSD	0	0.001	-	0.009	0.001	-	0.027	0.001	-	0.045	0.003	-	0.016	0.001	-	26.42	1.99	-	0.003	0.000	-	0.001	0.000	-	100%	5.75	9.45	
CONTAINER SHIP	SSD	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	88%	11.92	11.64	
GENERAL CARGO	MSD	0	0.002	-	0.029	0.002	-	0.083	0.005	-	0.140	0.010	-	0.051	0.004	-	82.07	6.17	-	0.010	0.001	-	0.002	0.000	-	100%	11.50	10.10	
		1	0.008	-	0.098	0.007	-	0.276	0.017	-	0.468	0.036	-	0.170	0.013	-	274.29	22.42	-	0.034	0.003	-	0.008	0.001	-	80%	20.00	12.57	
	SSD	0	0.005	-	0.078	0.004	-	0.263	0.010	-	0.371	0.021	-	0.122	0.008	-	198.53	13.28	-	0.024	0.002	-	0.006	0.000	-	100%	20.00	12.07	
		1	0.021	-	0.392	0.019	-	1.328	0.043	-	1.873	0.091	-	0.613	0.033	-	1,001.08	57.02	-	0.119	0.007	-	0.031	0.001	-	91%	20.00	11.77	
		2	0.004	-	0.082	0.004	-	0.278	0.009	-	0.392	0.019	-	0.128	0.007	-	209.48	12.05	-	0.025	0.001	-	0.006	0.000	-	100%	20.00	10.95	
Grand Total			0.072	-	1.285	0.066	-	4.263	0.150	-	6.147	0.318	-	2.041	0.116	-	3,327.88	199.28	-	0.399	0.023	-	0.101	0.005	-	88%	15.46	11.62	

Harborcraft

Harbortrac			Hoteling Emissions (tons)													
			2.5		ROG		CO		SOx		CO2		CH4		N2O	
Tug/Barge	Calls	Hours	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	
Robyn J (Barge Jake J)	6	16.4	0.001	0.000	0.004	0.001	0.018	0.000	0.000	0.16	2.07	0.000	0.000	0.000	0.000	
Robyn J (Barge Payton J)	127	16.4	0.027	0.006	0.089	0.028	0.411	0.000	0.001	3.40	47.02	0.000	0.002	0.000	0.002	
Robyn J (Barge Tori J)	23	16.4	0.005	0.001	0.018	0.005	0.082	0.000	0.000	0.61	9.39	0.000	0.000	0.000	0.000	
Grand Total	156	16.4	0.034	0.008	0.114	0.034	0.511	0.000	0.001	4.17	58.47	0.000	0.002	0.000	0.003	

Assist Tugs

Tug	Hours	
	Calls	Main
Scout	579	0.70
Tioga	579	0.70
Grand Total	1158	0.70

TAMT_Vessels_CAPCompliance
Annual Summary

Tug	Calls	Main
Scout	104	0.70
Tioga	104	0.70
Grand Total	208	0.70

TAMT Plan- 2035 - with CAP

Ships																															
Ship Type	Arrival						VSR - Departure						NC													VSR Emissions					
	Engine Type	Emission Tier	1 (kts)	Main Comp	Load Factor	NC	Comp (%)	Distance (nm)	Speed (kts)	Comp	NC	Main Comp	Load Factor	NC	Time (hrs)	Aux	Boiler Load (kW)	Main	NOx Aux	Boiler	Main	DPM Aux	Boiler	Main	PM2.5 Aux	Boiler	Main	ROG Aux	Boiler	Main	CO
AUTO CARRIER	SSD	1	16.06	0.18	0.43		80%	20.00	12.00	15.24	0.18	0.36		3.18	0.15	351		11.601	1.655	0.189	0.195	0.033	0.013	0.179	0.031	0.012	0.637	0.069	0.010	0.898	0.147
	MSD	1	13.60	0.24	0.45		80%	20.00	11.20	13.60	0.25	0.45		3.47	0.17	-		2.382	0.504	-	0.051	0.010	-	0.047	0.009	-	0.132	0.021	-	0.224	0.045
	SSD	0	14.60	0.32	0.82		100%	20.00	12.45	14.60	0.51	0.82		3.48	0.17	-		3.911	0.379	-	0.058	0.007	-	0.053	0.006	-	0.179	0.014	-	0.253	0.030
		1	13.10	0.28	0.46		80%	20.00	11.90	13.07	0.34	0.45		3.39	0.17	-		9.389	0.816	-	0.155	0.016	-	0.143	0.015	-	0.485	0.034	-	0.684	0.072
		2	15.00	0.33	0.82		100%	20.00	12.50	15.00	0.48	0.82		2.64	0.17	-		2.523	0.211	-	0.050	0.005	-	0.046	0.005	-	0.156	0.011	-	0.220	0.023
BULK CARRIER, HL CONTAINER SHIP	MSD	0	13.00	0.32	0.82		100%	20.00	9.45	13.00	0.32	0.82		2.72	0.17	-		1.653	0.318	-	0.031	0.006	-	0.029	0.005	-	0.081	0.012	-	0.138	0.025
	SSD	2	14.78	0.18	0.36		80%	12.16	11.93	16.06	0.19	0.46		1.97	0.13	325		13.739	3.787	0.148	0.277	0.096	0.010	0.255	0.088	0.009	0.930	0.199	0.008	1.302	0.421
GENERAL CARGO	MSD	0	13.00	0.39	0.82		100%	20.00	10.10	13.00	0.39	0.82		3.12	0.17	-		1.105	0.174	-	0.021	0.003	-	0.019	0.003	-	0.054	0.007	-	0.092	0.014
		1	13.20	0.45	0.52		80%	20.00	12.20	15.10	0.41	0.78		3.15	0.17	-		6.988	0.988	-	0.149	0.020	-	0.137	0.018	-	0.388	0.041	-	0.657	0.088
	SSD	0	15.23	0.41	0.82		100%	20.00	12.30	15.23	0.43	0.82		3.28	0.17	-		7.200	0.656	-	0.106	0.012	-	0.097	0.011	-	0.330	0.025	-	0.466	0.052
		1	13.10	0.27	0.38		80%	20.00	11.86	15.23	0.28	0.59		3.30	0.17	-		25.502	2.727	-	0.422	0.055	-	0.388	0.051	-	1.317	0.114	-	1.858	0.242
		2	14.90	0.33	0.82		100%	20.00	11.00	14.90	0.33	0.82		3.64	0.17	-		3.016	0.291	-	0.060	0.007	-	0.055	0.007	-	0.187	0.015	-	0.263	0.032
Grand Total			14.42	0.24	0.44		83%	16.23	11.85	15.38	0.25	0.53		2.62	0.15	197		89.009	12.506	0.337	1.575	0.271	0.022	1.449	0.249	0.021	4.877	0.563	0.019	7.055	1.191
															316.130			7.323			6.738			18.028			22.034				

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	6	16.4
Robyn J (Barge Payton J)	127	16.4
Robyn J (Barge Tori J)	23	16.4
Grand Total	156	16.4

Assist Tugs

Tug	Calls	Hours
		Main
Scout	579	0.70
Tioga	579	0.70
Grand Total	1158	0.70

TAMT_Vessels_CAPCompliance
Annual Summary

Tug	Calls	Main
Scout	104	0.70
Tioga	104	0.70
Grand Total	208	0.70

TAMT Plan- 2035 - with CAP

Ships		tons)														Maneuvering												
Ship Type	Engine Type	Emission Tier	SOx		CO2		CH4		N2O		Speed (kts)	Time (hrs)	Load Factors		Boiler Load (kW)	NOx		DPM		PM2.5								
	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Main			Aux	Main		Aux	Main	Aux	Boiler	Main	Aux							
AUTO CARRIER	SSD	1	0.019	0.278	0.053	0.055	454.86	92.07	87.47	0.057	0.011	0.003	0.014	0.002	0.001	7.00	2.41	0.04	0.45	351	3.187	3.771	0.171	0.074	0.076	0.011	0.068	0.070
BULK CARRIER	MSD	1	-	0.081	0.016	-	131.31	28.02	-	0.016	0.003	-	0.004	0.001	-	7.00	2.41	0.06	0.45	135	0.657	0.927	0.015	0.016	0.019	0.001	0.015	0.017
	SSD	0	-	0.083	0.011	-	135.28	18.81	-	0.016	0.002	-	0.004	0.000	-	7.00	2.41	0.09	0.45	132	0.763	0.697	0.013	0.013	0.013	0.001	0.012	0.012
		1	-	0.224	0.026	-	365.62	45.40	-	0.044	0.005	-	0.011	0.001	-	7.00	2.41	0.07	0.45	132	2.007	1.537	0.032	0.041	0.031	0.002	0.038	0.029
		2	-	0.072	0.009	-	117.72	14.70	-	0.014	0.002	-	0.004	0.000	-	7.00	2.41	0.08	0.45	132	0.623	0.511	0.013	0.015	0.013	0.001	0.014	0.012
BULK CARRIER, HL CONTAINER SHIP	MSD	0	-	0.050	0.009	-	80.79	15.80	-	0.010	0.002	-	0.002	0.000	-	7.00	2.41	0.13	0.45	132	0.661	0.666	0.016	0.013	0.013	0.001	0.012	0.012
GENERAL CARGO	SSD	2	0.015	0.395	0.153	0.043	643.54	263.94	68.15	0.083	0.031	0.002	0.020	0.007	0.001	7.00	2.41	0.04	0.50	325	6.572	17.894	0.207	0.182	0.452	0.014	0.168	0.416
	MSD	0	-	0.033	0.005	-	53.99	8.65	-	0.007	0.001	-	0.002	0.000	-	7.00	2.41	0.13	0.45	132	0.280	0.319	0.008	0.006	0.006	0.001	0.006	0.006
		1	-	0.239	0.032	-	385.22	54.99	-	0.048	0.006	-	0.011	0.001	-	7.00	2.41	0.08	0.45	135	1.199	2.003	0.041	0.031	0.040	0.003	0.028	0.037
		SSD	0	-	0.152	0.019	-	249.02	32.56	-	0.030	0.004	-	0.008	0.001	-	7.00	2.41	0.08	0.45	135	1.355	1.139	0.022	0.024	0.023	0.001	0.022
1	-		0.608	0.088	-	993.07	151.76	-	0.118	0.018	-	0.030	0.004	-	7.00	2.41	0.06	0.45	135	5.623	5.289	0.087	0.119	0.107	0.006	0.109	0.098	
Grand Total		2	-	0.086	0.012	-	140.75	20.26	-	0.017	0.002	-	0.004	0.001	-	7.00	2.41	0.09	0.45	135	0.658	0.639	0.015	0.015	0.013	0.001	0.014	0.012
			0.034	2.303	0.433	0.098	3,751.18	746.97	155.62	0.460	0.087	0.005	0.113	0.019	0.002	7.00	2.41	0.05	0.47	251	23.584	35.391	0.640	0.549	0.806	0.043	0.505	0.741

8,181

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	6	16.4
Robyn J (Barge Payton J)	127	16.4
Robyn J (Barge Tori J)	23	16.4
Grand Total	156	16.4

Assist Tugs

		Hours	
Tug	Calls	Main	Assist
Scout	579	0.70	
Tioga	579	0.70	
Grand Total	1158	0.70	

TAMT_Vessels_CAPCompliance
Annual Summary

Tug	Calls	Main
Scout	104	0.70
Tioga	104	0.70
Grand Total	208	0.70

TAMT Plan- 2035 - with CAP

SP 80%
Reduction in hoteling time 0%

Ships		Maneuvering Emissions (tons)																				Hotel Time (hr)	Aux Time (hr)	Hotelling		NOx		DI
Ship Type	Engine Type	Emission Tier	Boiler	Main	ROG Aux	Boiler	Main	CO Aux	Boiler	Main	SOx Aux	Boiler	Main	CO2 Aux	Boiler	Main	CH4 Aux	Boiler	Main	N2O Aux	Boiler			Auxiliary LF	Boiler Load (kW)	Aux	Boiler	Aux
AUTO CARRIER	SSD	1	0.011	0.574	0.158	0.009	0.511	0.334	0.017	0.070	0.122	0.050	112.88	209.82	79.19	0.052	0.024	0.003	0.004	0.005	0.001	27.6	27.6	0.26	351	24.874	1.957	0.501
	MSD	1	0.001	0.088	0.039	0.001	0.111	0.082	0.002	0.020	0.030	0.004	31.88	51.59	6.95	0.011	0.006	0.000	0.001	0.001	0.000	37.9	37.9	0.10	135	3.234	0.236	0.065
BULK CARRIER	SSD	0	0.001	0.069	0.026	0.001	0.085	0.055	0.001	0.017	0.020	0.004	27.23	34.58	5.83	0.006	0.004	0.000	0.001	0.001	0.000	28.7	28.7	0.10	132	1.843	0.150	0.033
		1	0.002	0.252	0.064	0.002	0.281	0.136	0.003	0.049	0.050	0.009	79.22	85.51	14.89	0.023	0.010	0.001	0.002	0.002	0.000	37.8	37.8	0.10	132	5.342	0.504	0.108
		2	0.001	0.084	0.027	0.001	0.099	0.057	0.001	0.018	0.021	0.004	29.70	35.59	5.83	0.008	0.004	0.000	0.001	0.001	0.000	85.1	85.1	0.10	132	3.997	0.444	0.101
BULK CARRIER, HL CONTAINER SHIP	MSD	0	0.001	0.047	0.028	0.001	0.075	0.059	0.002	0.021	0.021	0.005	33.17	37.06	7.45	0.006	0.004	0.000	0.001	0.001	0.000	114.0	114.0	0.10	132	7.835	0.761	0.141
	SSD	2	0.013	1.419	0.940	0.011	1.262	1.988	0.021	0.174	0.723	0.060	278.93	1,247.19	95.64	0.127	0.145	0.003	0.009	0.033	0.001	88.9	8.2	0.35	325	41.868	7.623	1.057
GENERAL CARGO	MSD	0	0.000	0.027	0.013	0.000	0.036	0.028	0.001	0.009	0.010	0.002	14.46	17.72	3.56	0.002	0.002	0.000	0.000	0.000	0.000	123.0	123.0	0.10	132	3.606	0.393	0.073
		1	0.003	0.175	0.084	0.002	0.205	0.178	0.004	0.038	0.065	0.012	61.58	111.48	18.87	0.016	0.013	0.001	0.001	0.002	0.003	0.000	62.5	62.5	0.10	135	11.525	1.058
	SSD	0	0.001	0.136	0.048	0.001	0.159	0.101	0.002	0.030	0.037	0.006	47.92	63.38	9.93	0.012	0.007	0.000	0.001	0.002	0.000	86.3	86.3	0.10	135	10.148	0.769	0.183
		1	0.005	0.790	0.222	0.005	0.832	0.469	0.009	0.135	0.171	0.025	217.58	294.33	40.39	0.071	0.034	0.001	0.007	0.008	0.001	45.5	45.5	0.10	135	22.142	1.647	0.446
Grand Total		2	0.001	0.081	0.027	0.001	0.099	0.057	0.002	0.020	0.021	0.004	31.69	35.53	6.95	0.007	0.004	0.000	0.001	0.001	0.000	50.9	50.9	0.10	135	2.388	0.317	0.060
			0.039	3.742	1.676	0.035	3.754	3.545	0.064	0.600	1.289	0.186	966.25	2,223.77	295.48	0.340	0.258	0.010	0.030	0.058	0.004	69.4	30.5	0.24	251	138.802	15.861	3.001

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	6	16.4
Robyn J (Barge Payton J)	127	16.4
Robyn J (Barge Tori J)	23	16.4
Grand Total	156	16.4

Assist Tugs

Tug	Calls	Hours
Scout	579	0.70
Tioga	579	0.70
Grand Total	1158	0.70

TAMT_Vessels_CAPCompliance
Annual Summary

Tug	Calls	Main
Scout	104	0.70
Tioga	104	0.70
Grand Total	208	0.70

TAMT Plan- 2035 - with CAP

Ships																		
Ship Type	Engine Type	Emission 'M Tier	Hotelling Emissions (tons)															
			PM2.5	PM2.5	PM2.5	ROG	ROG	CO	CO	SOx	SOx	CO2	CO2	CH4	CH4	N2O	N2O	Cold Iron CO2e
AUTO CARRIER	SSD	1	0.130	0.461	0.120	1.043	0.108	2.207	0.196	0.802	0.569	1,384.10	904.15	0.160	0.031	0.036	0.013	-
BULK CARRIER	MSD	1	0.016	0.060	0.014	0.136	0.013	0.287	0.024	0.104	0.069	179.97	109.14	0.021	0.004	0.005	0.002	-
	SSD	0	0.010	0.030	0.009	0.069	0.008	0.146	0.015	0.053	0.044	91.49	69.37	0.011	0.002	0.002	0.001	-
		1	0.034	0.099	0.031	0.224	0.028	0.474	0.051	0.172	0.147	297.25	232.93	0.034	0.008	0.008	0.003	-
		2	0.030	0.093	0.027	0.210	0.025	0.444	0.045	0.162	0.129	278.60	205.28	0.032	0.007	0.007	0.003	-
BULK CARRIER, HL	MSD	0	0.051	0.130	0.047	0.293	0.042	0.620	0.076	0.225	0.221	388.93	351.61	0.045	0.012	0.010	0.005	-
CONTAINER SHIP	SSD	2	0.508	0.973	0.468	2.199	0.420	4.652	0.764	1.692	2.216	2,918.09	3,521.30	0.338	0.122	0.076	0.050	20,416
GENERAL CARGO	MSD	0	0.026	0.067	0.024	0.151	0.022	0.320	0.039	0.116	0.114	200.67	181.41	0.023	0.006	0.005	0.003	-
	SSD	1	0.071	0.214	0.065	0.483	0.058	1.022	0.106	0.372	0.307	641.34	488.54	0.074	0.017	0.017	0.007	-
		0	0.051	0.168	0.047	0.380	0.042	0.803	0.077	0.292	0.224	503.74	355.23	0.058	0.012	0.013	0.005	-
		1	0.110	0.411	0.101	0.929	0.091	1.964	0.165	0.714	0.479	1,232.09	760.84	0.143	0.026	0.032	0.011	-
Grand Total		2	0.021	0.055	0.019	0.125	0.017	0.265	0.032	0.096	0.092	166.40	146.53	0.019	0.005	0.004	0.002	-
			1.057	2.761	0.973	6.242	0.875	13.204	1.590	4.802	4.611	8,282.67	7,326.34	0.960	0.254	0.216	0.103	20,416

37,977,764.01487.6882

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	6	16.4
Robyn J (Barge Payton J)	127	16.4
Robyn J (Barge Tori J)	23	16.4
Grand Total	156	16.4

Assist Tugs

Tug	Calls	Hours
Scout	579	0.70
Tioga	579	0.70
Grand Total	1158	0.70

TAMT_Vessels_Unmitigated
Annual Summary

Baseline 20 VSR Distance

Ships

Ship Type	Engine Type	Emission Tier	Power (kW)				Service Speed (kts)	Total Transit Distance (nm)			Comp (%)	Transit - Arrival				Transit - Departure				Time			NC Boiler		NOx		
			Calls	Main	Aux	Arrival		Depart	Distance (nm)	Speed (kts)		Main Load Factor		Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Time (hrs)	Aux	Load (kW)	Main	Aux	Boiler		
										Comp		NC	Comp			NC	Comp	NC	Comp							NC	
AUTO CARRIER	SSD	1	8	11,060	2,760	20.00	35.30	35.30	0%	15.30	12.00	20.00	0.18	0.82	0%	15.30	12.00	20.00	0.18	0.82	1.53	0.15	351	1.854	0.069	-	
BULK CARRIER	MSD	1	2	9,100	2,973	16.65	30.20	23.40	0%	10.20	11.00	16.65	0.24	0.82	0%	3.40	11.20	16.65	0.25	0.82	0.82	0.17	-	0.158	0.011	-	
	SSD	0	2	8,139	2,325	14.60	30.20	30.20	0%	10.20	10.70	14.60	0.32	0.82	0%	10.20	12.45	14.60	0.51	0.82	1.40	0.17	-	0.351	0.017	-	
		1	5	10,705	2,250	15.92	33.94	26.46	0%	13.94	11.13	15.92	0.28	0.82	0%	6.46	11.90	15.92	0.34	0.82	1.28	0.17	-	0.939	0.033	-	
		2	2	9,140	2,393	15.00	11.50	48.90	0%	-	11.05	15.00	0.33	0.82	0%	28.90	12.50	15.00	0.48	0.82	1.93	0.17	-	0.402	0.017	-	
BULK CARRIER, HL	MSD	0	2	5,738	1,950	13.00	5.75	24.45	0%	-	9.45	13.00	0.32	0.82	0%	4.45	9.45	13.00	0.32	0.82	0.34	0.17	-	0.047	0.003	-	
CONTAINER SHIP	SSD	0	49	14,948	7,158	20.03	11.99	12.26	0%	-	11.57	20.03	0.16	0.82	0%	-	11.83	20.03	0.17	0.82	-	0.13	132	-	-	-	
	1	8	13,055	3,676	18.93	11.50	11.50	0%	-	12.08	18.93	0.21	0.82	0%	-	12.53	18.93	0.24	0.82	-	0.13	-	-	-	-		
GENERAL CARGO	MSD	0	1	5,738	1,950	13.00	10.10	48.90	0%	-	10.10	13.00	0.39	0.82	0%	28.90	10.10	13.00	0.39	0.82	2.22	0.17	-	0.153	0.011	-	
		1	5	6,400	2,367	15.34	35.98	23.74	0%	15.98	12.57	15.34	0.45	0.82	0%	3.74	12.20	15.34	0.41	0.82	1.29	0.17	-	0.436	0.035	-	
	SSD	0	3	9,268	2,557	15.23	23.97	36.43	0%	3.97	12.07	15.23	0.41	0.82	0%	16.43	12.30	15.23	0.43	0.82	1.34	0.17	-	0.574	0.027	-	
		1	11	12,430	2,920	16.98	26.95	34.06	0%	6.95	11.77	16.98	0.27	0.82	0%	14.06	11.86	16.98	0.28	0.82	1.24	0.17	-	2.318	0.092	-	
		2	2	8,630	2,048	14.90	42.10	30.20	0%	22.10	10.95	14.90	0.33	0.82	0%	10.20	11.00	14.90	0.33	0.82	2.17	0.17	-	0.428	0.016	-	
		Grand Total			100	12,627	4,904	18.43	19.31	20.74	0%	4.45	11.60	18.43	0.22	0.82	0%	5.21	11.87	18.43	0.24	0.82	0.58	0.15	93	7.659	0.334

150.59

Harborcraft			Tug Running Emissions (tons)																							
			NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		Hours		NOx		DPM	
Tug/Barge	Calls	Hours	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Tug	Barge	Tug	Barge	Tug	Barge
Robyn J (Barge Jake J)	1	16.4	0.100	0.005	0.003	0.000	0.003	0.000	0.009	0.001	0.075	0.004	0.000	0.000	8.83	0.44	0.000	0.000	0.000	0.000	1.0	4.5	0.000	0.004	0.000	0.000
Robyn J (Barge Payton J)	22	16.4	2.204	0.103	0.075	0.004	0.073	0.004	0.208	0.017	1.655	0.078	0.002	0.000	194.31	9.64	0.004	0.000	0.009	0.000	1.0	4.8	0.006	0.090	0.000	0.005
Robyn J (Barge Tori J)	4	16.4	0.401	0.019	0.014	0.001	0.013	0.001	0.038	0.003	0.301	0.014	0.000	0.000	35.33	1.75	0.001	0.000	0.002	0.000	1.0	5.3	0.001	0.018	0.000	0.001
Grand Total	27	16.4	2.705	0.126	0.092	0.005	0.090	0.004	0.255	0.021	2.031	0.096	0.003	0.000	238.47	11.83	0.005	0.000	0.011	0.001	1.0	4.9	0.008	0.112	0.000	0.006

Assist Tugs

Assist Tugs						Tug Running Emissions (tons)																	
Tug	Hours per Call		Load Factors		NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		
	Calls	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux		
Scout	100	0.70	1.00	0.31	0.43	0.501	0.049	0.011	0.001	0.011	0.001	0.060	0.008	0.476	0.053	0.001	0.000	55.83	6.49	0.001	0.000	0.003	0.000
Tioga	100	0.70	1.00	0.31	0.43	0.501	0.040	0.011	0.002	0.011	0.001	0.060	0.007	0.476	0.030	0.001	0.000	55.83	3.71	0.001	0.000	0.003	0.000
Grand Total	200	0.70	1.00	0.31	0.43	1.002	0.089	0.022	0.003	0.021	0.003	0.119	0.015	0.951	0.083	0.001	0.000	111.67	10.20	0.002	0.000	0.005	0.000

Project - 2020

Ships

Ship Type	Engine		Power (kW)				Service Speed		Total Transit Distance (nm)		Transit - Arrival				Transit - Departure				Time		NC Boiler		NOx			
	Type	Tier	Calls	Main	Aux	(kts)	Arrival	Depart	Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Time (hrs)	Aux	Load (kW)	Main	Aux	Boiler
											Comp	NC	Comp	NC			Comp	NC	Comp	NC						
AUTO CARRIER	SSD	1	11.66	11,060	2,760	20.00	35.30	35.30	0%	15.30	12.00	20.00	0.18	0.82	0%	15.30	12.00	20.00	0.18	0.82	1.53	0.15	351	2.702	0.101	-
	MSD	1	2.00	9,100	2,973	16.65	30.20	23.40	0%	10.20	11.00	16.65	0.24	0.82	0%	3.40	11.20	16.65	0.25	0.82	0.82	0.17	-	0.158	0.011	-
BULK CARRIER	SSD	0	2.00	8,139	2,325	14.60	30.20	30.20	0%	10.20	10.70	14.60	0.32	0.82	0%	10.20	12.45	14.60	0.51	0.82	1.40	0.17	-	0.351	0.017	-
		1	5.00	10,705	2,250	15.92	33.94	26.46	0%	13.94	11.13	15.92	0.28	0.82	0%	6.46	11.90	15.92	0.34	0.82	1.28	0.17	-	0.939	0.033	-
		2	2.00	9,140	2,393	15.00	11.50	48.90	0%	-	11.05	15.00	0.33	0.82	0%	28.90	12.50	15.00	0.48	0.82	1.93	0.17	-	0.402	0.017	-
BULK CARRIER, HL	MSD	0	3.00	5,738	1,950	13.00	5.75	24.45	0%	-	9.45	13.00	0.32	0.82	0%	4.45	9.45	13.00	0.32	0.82	0.34	0.17	-	0.071	0.005	-
CONTAINER SHIP	SSD	2	50.00	19,420	11,320	19.50	11.92	12.16	0%	-	11.64	19.50	0.18	0.82	0%	-	11.93	19.50	0.19	0.82	-	0.13	132	-	-	-
GENERAL CARGO	MSD	0	1.00	5,738	1,950	13.00	11.50	48.90	0%	-	10.10	13.00	0.39	0.82	0%	28.90	10.10	13.00	0.39	0.82	2.22	0.17	-	0.153	0.011	-
		1	7.00	6,400	2,367	15.34	35.98	23.74	0%	15.98	12.57	15.34	0.45	0.82	0%	3.74	12.20	15.34	0.41	0.82	1.29	0.17	-	0.611	0.049	-
		0	3.00	9,268	2,557	15.23	23.97	36.43	0%	3.97	12.07	15.23	0.41	0.82	0%	16.43	12.30	15.23	0.43	0.82	1.34	0.17	-	0.574	0.027	-
	SSD	1	15.00	12,430	2,920	16.98	26.95	34.06	0%	6.95	11.77	16.98	0.27	0.82	0%	14.06	11.86	16.98	0.28	0.82	1.24	0.17	-	3.161	0.126	-
		2	2.00	8,630	2,048	14.90	42.10	30.20	0%	22.10	10.95	14.90	0.33	0.82	0%	10.20	11.00	14.90	0.33	0.82	2.17	0.17	-	0.428	0.016	-
Grand Total			103.66	14,524	6,799	18.04	20.86	22.44	0%	5.41	11.62	18.04	0.24	0.82	0%	6.22	11.85	18.04	0.25	0.82	0.69	0.15	103	9.548	0.415	-

0.74	1
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1

Harborcraft		Tug Running Emissions (tons)																				Hours						NOx		DPM	
		NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O													
Tug/Barge	Calls	Hours	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Tug	Barge	Tug	Barge	Tug	Barge					
Robyn J (Barge Jake J)	1	16.4	0.100	0.005	0.003	0.000	0.003	0.000	0.009	0.001	0.075	0.004	0.000	0.000	8.83	0.44	0.000	0.000	0.000	0.000	1.0	4.5	0.000	0.004	0.000	0.000					
Robyn J (Barge Payton J)	23	16.4	2.304	0.108	0.079	0.004	0.076	0.004	0.217	0.018	1.730	0.082	0.002	0.000	203.14	10.08	0.004	0.000	0.009	0.000	1.0	4.8	0.007	0.094	0.000	0.005					
Robyn J (Barge Tori J)	4	16.4	0.401	0.019	0.014	0.001	0.013	0.001	0.038	0.003	0.301	0.014	0.000	0.000	35.33	1.75	0.001	0.000	0.002	0.000	1.0	5.3	0.001	0.018	0.000	0.001					
Grand Total	28	16.4	2.805	0.131	0.096	0.005	0.093	0.005	0.264	0.022	2.106	0.100	0.003	0.000	247.30	12.27	0.005	0.000	0.011	0.001	1.0	4.9	0.008	0.116	0.000	0.006					

TAMT_Vessels_Unmitigated

Annual Summary

Baseline

Ships

		Transit Emissions (tons)																									
Ship Type	Engine Type	Emission Tier	DPM			PM2.5			ROG			CO			SOx			CO2			CH4			N2O			Comp (%)
			Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	
AUTO CARRIER	SSD	1	0.031	0.001	-	0.028	0.001	-	0.096	0.003	-	0.135	0.006	-	0.044	0.002	-	72.18	3.85	-	0.009	0.000	-	0.002	0.000	-	0%
	MSD	1	0.003	0.000	-	0.003	0.000	-	0.009	0.000	-	0.015	0.001	-	0.005	0.000	-	8.70	0.63	-	0.001	0.000	-	0.000	0.000	-	50%
BULK CARRIER		0	0.005	0.000	-	0.005	0.000	-	0.016	0.001	-	0.023	0.001	-	0.007	0.000	-	12.13	0.84	-	0.001	0.000	-	0.000	0.000	-	100%
	SSD	1	0.016	0.001	-	0.014	0.001	-	0.049	0.001	-	0.068	0.003	-	0.022	0.001	-	36.57	1.86	-	0.004	0.000	-	0.001	0.000	-	60%
		2	0.008	0.000	-	0.007	0.000	-	0.025	0.001	-	0.035	0.002	-	0.011	0.001	-	18.78	1.19	-	0.002	0.000	-	0.001	0.000	-	100%
BULK CARRIER, HL	MSD	0	0.001	0.000	-	0.001	0.000	-	0.002	0.000	-	0.004	0.000	-	0.001	0.000	-	2.30	0.17	-	0.000	0.000	-	0.000	0.000	-	100%
CONTAINER SHIP	SSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	63%	
GENERAL CARGO	MSD	0	0.003	0.000	-	0.003	0.000	-	0.008	0.000	-	0.013	0.001	-	0.005	0.000	-	7.46	0.56	-	0.001	0.000	-	0.000	0.000	-	100%
		1	0.009	0.001	-	0.009	0.001	-	0.024	0.001	-	0.041	0.003	-	0.015	0.001	-	24.06	1.97	-	0.003	0.000	-	0.001	0.000	-	60%
	SSD	0	0.008	0.000	-	0.008	0.000	-	0.026	0.001	-	0.037	0.002	-	0.012	0.001	-	19.85	1.33	-	0.002	0.000	-	0.001	0.000	-	100%
			1	0.038	0.002	-	0.035	0.002	-	0.120	0.004	-	0.169	0.008	-	0.055	0.003	-	90.26	5.14	-	0.011	0.001	-	0.003	0.000	-
		2	0.008	0.000	-	0.008	0.000	-	0.026	0.001	-	0.037	0.002	-	0.012	0.001	-	19.95	1.15	-	0.002	0.000	-	0.001	0.000	-	100%
Grand Total			0.131	0.007	-	0.121	0.006	-	0.401	0.014	-	0.577	0.030	-	0.192	0.011	-	312.24	18.69	-	0.037	0.002	-	0.009	0.000	-	78%

			2.88 Hoteling Emissions (tons)													
Tug/Barge	Calls	Hours	PM2.5		ROG		CO		SOx		CO2		CH4		N2O	
			Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge
Robyn J (Barge Jake J)	1	16.4	0.000	0.000	0.000	0.001	0.000	0.003	0.000	0.000	0.03	0.34	0.000	0.000	0.000	0.000
Robyn J (Barge Payton J)	22	16.4	0.000	0.005	0.001	0.015	0.005	0.071	0.000	0.000	0.59	8.14	0.000	0.000	0.000	0.000
Robyn J (Barge Tori J)	4	16.4	0.000	0.001	0.000	0.003	0.001	0.014	0.000	0.000	0.11	1.63	0.000	0.000	0.000	0.000
Grand Total			0.000	0.006	0.001	0.019	0.006	0.088	0.000	0.000	0.72	10.12	0.000	0.000	0.000	0.000

Assist Tugs

			Hours	
Tug	Calls	Main		
Scout	100	0.70		
Tioga	100	0.70		
Grand Total			200	0.70

Project - 2020

Ships

	Transit Emissions (tons)																										
Ship Type	Engine Type	Emission Tier	DPM			PM2.5			ROG			CO			SOx			CO2			CH4			N2O		Comp (%)	
			Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux		Boiler
AUTO CARRIER	SSD	1	0.045	0.002	-	0.041	0.002	-	0.140	0.004	-	0.197	0.009	-	0.064	0.003	-	105.21	5.62	-	0.013	0.001	-	0.003	0.000	-	0%
	MSD	1	0.003	0.000	-	0.003	0.000	-	0.009	0.000	-	0.015	0.001	-	0.005	0.000	-	8.70	0.63	-	0.001	0.000	-	0.000	0.000	-	50%
BULK CARRIER	SSD	0	0.005	0.000	-	0.005	0.000	-	0.016	0.001	-	0.023	0.001	-	0.007	0.000	-	12.13	0.84	-	0.001	0.000	-	0.000	0.000	-	100%
		1	0.016	0.001	-	0.014	0.001	-	0.049	0.001	-	0.068	0.003	-	0.022	0.001	-	36.57	1.86	-	0.004	0.000	-	0.001	0.000	-	60%
		2	0.008	0.000	-	0.007	0.000	-	0.025	0.001	-	0.035	0.002	-	0.011	0.001	-	18.78	1.19	-	0.002	0.000	-	0.001	0.000	-	100%
BULK CARRIER, HL	MSD	0	0.001	0.000	-	0.001	0.000	-	0.003	0.000	-	0.006	0.000	-	0.002	0.000	-	3.45	0.26	-	0.000	0.000	-	0.000	0.000	-	100%
CONTAINER SHIP	SSD	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	86%	
GENERAL CARGO	MSD	0	0.003	0.000	-	0.003	0.000	-	0.008	0.000	-	0.013	0.001	-	0.005	0.000	-	7.46	0.56	-	0.001	0.000	-	0.000	0.000	-	100%
		1	0.013	0.001	-	0.012	0.001	-	0.034	0.002	-	0.057	0.004	-	0.021	0.002	-	33.68	2.75	-	0.004	0.000	-	0.001	0.000	-	60%
	SSD	0	0.008	0.000	-	0.008	0.000	-	0.026	0.001	-	0.037	0.002	-	0.012	0.001	-	19.85	1.33	-	0.002	0.000	-	0.001	0.000	-	100%
		1	0.052	0.003	-	0.048	0.002	-	0.163	0.005	-	0.230	0.011	-	0.075	0.004	-	123.08	7.01	-	0.015	0.001	-	0.004	0.000	-	91%
		2	0.008	0.000	-	0.008	0.000	-	0.026	0.001	-	0.037	0.002	-	0.012	0.001	-	19.95	1.15	-	0.002	0.000	-	0.001	0.000	-	100%
Grand Total			0.163	0.008	-	0.150	0.008	-	0.499	0.017	-	0.719	0.037	-	0.238	0.013	-	388.86	23.20	-	0.047	0.003	-	0.012	0.001	-	75%

			Hoteling Emissions (tons)													
Tug/Barge	Calls	Hours	PM2.5		ROG		CO		SOx		CO2		CH4		N2O	
			Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge
Robyn J (Barge Jake J)	1	16.4	0.000	0.000	0.000	0.001	0.000	0.003	0.000	0.000	0.03	0.34	0.000	0.000	0.000	0.000
Robyn J (Barge Payton J)	23	16.4	0.000	0.005	0.001	0.016	0.005	0.074	0.000	0.000	0.61	8.51	0.000	0.000	0.000	0.000
Robyn J (Barge Tori J)	4	16.4	0.000	0.001	0.000	0.003	0.001	0.014	0.000	0.000	0.11	1.63	0.000	0.000	0.000	0.000
Grand Total			28	16.4	0.000	0.006	0.001	0.020	0.006	0.092	0.000	0.000	0.75	10.49	0.000	0.000

TAMT_Vessels_Unmitigated

Annual Summary

Baseline

Ships

			VSR - Arrival				VSR - Departure				NC																	
Ship Type	Engine Type	Emission Tier	Distance (nm)	Speed (kts)		Main Load Factor		Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Time (hrs)	Aux	Boiler Load (kW)	NOx			DPM		PM2.5			ROG			
				Comp	NC	Comp	NC			Comp	NC	Main	Aux				Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux			
AUTO CARRIER	SSD	1	20.00	12.00	16.06	0.18	0.43	0%	20.00	12.00	15.24	0.18	0.36	2.56	0.15	351	1.485	0.116	-	0.025	0.002	-	0.023	0.002	-	0.077	0.005	
	MSD	1	20.00	11.00	13.60	0.24	0.45	50%	20.00	11.20	13.60	0.25	0.45	3.27	0.17	-	0.258	0.045	-	0.006	0.001	-	0.005	0.001	-	0.014	0.002	
BULK CARRIER		0	20.00	10.70	14.60	0.32	0.82	100%	20.00	12.45	14.60	0.51	0.82	3.48	0.17	-	0.435	0.042	-	0.006	0.001	-	0.006	0.001	-	0.020	0.002	
	SSD	1	20.00	11.13	13.10	0.28	0.46	40%	20.00	11.90	13.07	0.34	0.45	3.28	0.17	-	1.098	0.086	-	0.018	0.002	-	0.017	0.002	-	0.057	0.004	
		2	11.50	11.05	15.00	0.33	0.82	100%	20.00	12.50	15.00	0.48	0.82	2.64	0.17	-	0.280	0.023	-	0.006	0.001	-	0.005	0.001	-	0.017	0.001	
BULK CARRIER, HL	MSD	0	5.75	9.45	13.00	0.32	0.82	100%	20.00	9.45	13.00	0.32	0.82	2.72	0.17	-	0.144	0.028	-	0.003	0.000	-	0.003	0.000	-	0.007	0.001	
CONTAINER SHIP	SSD	0	11.99	11.57	14.78	0.16	0.33	73%	12.26	11.83	16.06	0.17	0.42	1.98	0.13	132	5.505	1.381	0.024	0.083	0.025	0.002	0.076	0.023	0.001	0.284	0.052	
		1	11.50	12.08	16.03	0.21	0.50	75%	11.50	12.53	15.40	0.24	0.44	1.74	0.13	-	0.885	0.091	-	0.015	0.002	-	0.013	0.002	-	0.046	0.004	
GENERAL CARGO	MSD	0	11.50	10.10	13.00	0.39	0.82	100%	20.00	10.10	13.00	0.39	0.82	3.12	0.17	-	0.100	0.016	-	0.002	0.000	-	0.002	0.000	-	0.005	0.001	
		1	20.00	12.57	13.20	0.45	0.52	60%	20.00	12.20	15.10	0.41	0.78	3.07	0.17	-	0.649	0.085	-	0.014	0.002	-	0.013	0.002	-	0.036	0.004	
	SSD	0	20.00	12.07	15.23	0.41	0.82	100%	20.00	12.30	15.23	0.43	0.82	3.28	0.17	-	0.720	0.066	-	0.011	0.001	-	0.010	0.001	-	0.033	0.002	
		1	20.00	11.77	13.10	0.27	0.38	45%	20.00	11.86	15.23	0.28	0.59	3.17	0.17	-	2.541	0.236	-	0.042	0.005	-	0.039	0.004	-	0.131	0.010	
		2	20.00	10.95	14.90	0.33	0.82	100%	20.00	11.00	14.90	0.33	0.82	3.64	0.17	-	0.287	0.028	-	0.006	0.001	-	0.005	0.001	-	0.018	0.001	
Grand Total			14.85	11.60	14.57	0.22	0.43	65%	15.53	11.87	15.41	0.24	0.51	2.42	0.15	93	14.386	2.242	0.024	0.234	0.042	0.002	0.216	0.039	0.001	0.745	0.088	

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	22	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	27	16.4

Assist Tugs

Tug	Calls	Hours
Scout	100	0.70
Tioga	100	0.70
Grand Total	200	0.70

Project - 2020

Ships

			VSR - Arrival					VSR - Departure					NC															
Ship Type	Engine Type	Emission Tier	Distance (nm)	Speed (kts)		Main Load Factor		Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Time (hrs)	Boiler Load (kW)		NOx			DPM			PM2.5			ROG		
				Comp	NC	Comp	NC			Comp	NC	Aux	Boiler		Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux			
AUTO CARRIER	SSD	1	20.00	12.00	16.06	0.18	0.43	0%	20.00	12.00	15.24	0.18	0.36	2.56	0.15	351	2.164	0.169	-	0.036	0.003	-	0.033	0.003	-	0.112	0.007	
	MSD	1	20.00	11.00	13.60	0.24	0.45	50%	20.00	11.20	13.60	0.25	0.45	3.27	0.17	-	0.258	0.045	-	0.006	0.001	-	0.005	0.001	-	0.014	0.002	
BULK CARRIER		0	20.00	10.70	14.60	0.32	0.82	100%	20.00	12.45	14.60	0.51	0.82	3.48	0.17	-	0.435	0.042	-	0.006	0.001	-	0.006	0.001	-	0.020	0.002	
	SSD	1	20.00	11.13	13.10	0.28	0.46	40%	20.00	11.90	13.07	0.34	0.45	3.28	0.17	-	1.098	0.086	-	0.018	0.002	-	0.017	0.002	-	0.057	0.004	
		2	11.50	11.05	15.00	0.33	0.82	100%	20.00	12.50	15.00	0.48	0.82	2.64	0.17	-	0.280	0.023	-	0.006	0.001	-	0.005	0.001	-	0.017	0.001	
BULK CARRIER, HL	MSD	0	5.75	9.45	13.00	0.32	0.82	100%	20.00	9.45	13.00	0.32	0.82	2.72	0.17	-	0.216	0.042	-	0.004	0.001	-	0.004	0.001	-	0.011	0.002	
	SSD	2	11.92	11.64	14.78	0.18	0.36	74%	12.16	11.93	16.06	0.19	0.46	1.94	0.13	325	5.889	1.560	0.058	0.118	0.039	0.004	0.109	0.036	0.004	0.396	0.082	
CONTAINER SHIP		0	11.50	10.10	13.00	0.39	0.82	100%	20.00	10.10	13.00	0.39	0.82	3.12	0.17	-	0.100	0.016	-	0.002	0.000	-	0.002	0.000	-	0.005	0.001	
	MSD	1	20.00	12.57	13.20	0.45	0.52	60%	20.00	12.20	15.10	0.41	0.78	3.07	0.17	-	0.908	0.118	-	0.019	0.002	-	0.018	0.002	-	0.050	0.005	
GENERAL CARGO		0	20.00	12.07	15.23	0.41	0.82	100%	20.00	12.30	15.23	0.43	0.82	3.28	0.17	-	0.720	0.066	-	0.011	0.001	-	0.010	0.001	-	0.033	0.002	
	SSD	1	20.00	11.77	13.10	0.27	0.38	45%	20.00	11.86	15.23	0.28	0.59	3.17	0.17	-	3.465	0.322	-	0.057	0.006	-	0.053	0.006	-	0.179	0.014	
		2	20.00	10.95	14.90	0.33	0.82	100%	20.00	11.00	14.90	0.33	0.82	3.64	0.17	-	0.287	0.028	-	0.006	0.001	-	0.005	0.001	-	0.018	0.001	
Grand Total			15.44	11.62	14.42	0.24	0.44	62%	16.22	11.85	15.38	0.25	0.54	2.50	0.15	196	15.820	2.517	0.058	0.289	0.059	0.004	0.266	0.054	0.004	0.912	0.122	

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	23	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	28	16.4

TAMT_Vessels_Unmitigated

Annual Summary

Baseline

Ships

		VSR Emissions (tons)																		Maneuvering								
Ship Type	Engine Type	Emission Tier	CO		SOx		CO2		CH4		N2O		Speed (kts)	Time (hrs)	Load Factors		Boiler Load (kW)	NOx										
			Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler			Main	Aux		Main	Aux	Boiler	Main							
AUTO CARRIER	SSD	1	-	0.108	0.010	-	0.035	0.004	-	57.81	6.44	-	0.007	0.001	-	0.002	0.000	-	7.00	2.41	0.04	0.45	351	0.277	0.328	0.015	0.006	
	MSD	1	-	0.024	0.004	-	0.009	0.001	-	14.21	2.52	-	0.002	0.000	-	0.000	0.000	-	7.00	2.41	0.06	0.45	132	0.063	0.088	0.001	0.002	
BULK CARRIER		0	-	0.028	0.003	-	0.009	0.001	-	15.03	2.09	-	0.002	0.000	-	0.000	0.000	-	7.00	2.41	0.09	0.45	132	0.085	0.077	0.001	0.001	
	SSD	1	-	0.080	0.008	-	0.026	0.003	-	42.74	4.77	-	0.005	0.001	-	0.001	0.000	-	7.00	2.41	0.07	0.45	132	0.218	0.167	0.004	0.004	
		2	-	0.024	0.003	-	0.008	0.001	-	13.08	1.63	-	0.002	0.000	-	0.000	0.000	-	7.00	2.41	0.08	0.45	132	0.069	0.057	0.001	0.002	
BULK CARRIER, HL	MSD	0	-	0.012	0.002	-	0.004	0.001	-	7.03	1.37	-	0.001	0.000	-	0.000	0.000	-	7.00	2.41	0.13	0.45	132	0.057	0.058	0.001	0.001	
CONTAINER SHIP	SSD	0	0.001	0.397	0.109	0.002	0.118	0.040	0.007	191.72	68.56	11.11	0.026	0.008	0.000	0.006	0.002	0.000	7.00	2.41	0.04	0.50	241	2.571	6.487	0.063	0.053	
		1	-	0.064	0.008	-	0.021	0.003	-	34.46	5.06	-	0.004	0.001	-	0.001	0.000	-	7.00	2.41	0.04	0.50	362	0.386	0.485	0.015	0.009	
	MSD	0	-	0.008	0.001	-	0.003	0.000	-	4.91	0.79	-	0.001	0.000	-	0.000	0.000	-	7.00	2.41	0.13	0.45	135	0.025	0.029	0.001	0.001	
		1	-	0.061	0.007	-	0.022	0.003	-	35.77	4.70	-	0.004	0.001	-	0.001	0.000	-	7.00	2.41	0.08	0.45	135	0.105	0.176	0.004	0.003	
GENERAL CARGO		0	-	0.047	0.005	-	0.015	0.002	-	24.90	3.26	-	0.003	0.000	-	0.001	0.000	-	7.00	2.41	0.08	0.45	135	0.136	0.114	0.002	0.002	
	SSD	1	-	0.185	0.021	-	0.061	0.008	-	98.95	13.15	-	0.012	0.002	-	0.003	0.000	-	7.00	2.41	0.06	0.45	135	0.507	0.477	0.008	0.011	
		2	-	0.025	0.003	-	0.008	0.001	-	13.40	1.93	-	0.002	0.000	-	0.000	0.000	-	7.00	2.41	0.09	0.45	135	0.063	0.061	0.001	0.001	
Grand Total			0.001	1.065	0.185	0.002	0.340	0.067	0.007	554.02	116.27	11.11	0.069	0.013	0.000	0.017	0.003	0.000	7.00	2.41	0.05	0.48	222	4.562	8.604	0.118	0.096	

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	22	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	27	16.4

Assist Tugs

Tug	Calls	Hours
		Main
Scout	100	0.70
Tioga	100	0.70
Grand Total	200	0.70

Project - 2020

Ships

Ship Type	VSR Emissions (tons)																Maneuvering										
	Engine Type	Emission Tier	CO				SOx		CO2		CH4		N2O		Speed (kts)	Time (hrs)	Load Factors		Boiler Load (KW)								
			Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux			Main	Aux		Main	Aux						
AUTO CARRIER	SSD	1	-	0.158	0.015	-	0.052	0.005	-	84.26	9.39	-	0.010	0.001	-	0.003	0.000	-	7.00	2.41	0.04	0.45	351	0.404	0.478	0.022	0.009
	MSD	1	-	0.024	0.004	-	0.009	0.001	-	14.21	2.52	-	0.002	0.000	-	0.000	0.000	-	7.00	2.41	0.06	0.45	135	0.063	0.088	0.001	0.002
BULK CARRIER	SSD	0	-	0.028	0.003	-	0.009	0.001	-	15.03	2.09	-	0.002	0.000	-	0.000	0.000	-	7.00	2.41	0.09	0.45	132	0.085	0.077	0.001	0.001
		1	-	0.080	0.008	-	0.026	0.003	-	42.74	4.77	-	0.005	0.001	-	0.001	0.000	-	7.00	2.41	0.07	0.45	132	0.218	0.167	0.004	0.004
		2	-	0.024	0.003	-	0.008	0.001	-	13.08	1.63	-	0.002	0.000	-	0.000	0.000	-	7.00	2.41	0.08	0.45	132	0.069	0.057	0.001	0.002
BULK CARRIER, HL	MSD	0	-	0.018	0.003	-	0.007	0.001	-	10.54	2.06	-	0.001	0.000	-	0.000	0.000	-	7.00	2.41	0.13	0.45	132	0.086	0.087	0.002	0.002
CONTAINER SHIP	SSD	2	0.003	0.555	0.173	0.006	0.169	0.063	0.017	275.80	108.75	26.92	0.036	0.013	0.001	0.008	0.003	0.000	7.00	2.41	0.04	0.50	325	2.738	7.456	0.086	0.076
GENERAL CARGO	MSD	0	-	0.008	0.001	-	0.003	0.000	-	4.91	0.79	-	0.001	0.000	-	0.000	0.000	-	7.00	2.41	0.13	0.45	132	0.025	0.029	0.001	0.001
		1	-	0.085	0.010	-	0.031	0.004	-	50.08	6.59	-	0.006	0.001	-	0.001	0.000	-	7.00	2.41	0.08	0.45	135	0.147	0.246	0.005	0.004
	SSD	0	-	0.047	0.005	-	0.015	0.002	-	24.90	3.26	-	0.003	0.000	-	0.001	0.000	-	7.00	2.41	0.08	0.45	135	0.136	0.114	0.002	0.002
		1	-	0.252	0.029	-	0.083	0.010	-	134.93	17.93	-	0.016	0.002	-	0.004	0.000	-	7.00	2.41	0.06	0.45	135	0.691	0.650	0.011	0.015
		2	-	0.025	0.003	-	0.008	0.001	-	13.40	1.93	-	0.002	0.000	-	0.000	0.000	-	7.00	2.41	0.09	0.45	135	0.063	0.061	0.001	0.001
Grand Total			0.003	1.306	0.258	0.006	0.420	0.094	0.017	683.89	161.70	26.92	0.085	0.019	0.001	0.021	0.004	0.000	7.00	2.41	0.05	0.47	251	4.725	9.510	0.138	0.119

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	23	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	28	16.4

TAMT_Vessels_Unmitigated

Annual Summary

Baseline

Ships

Ship Type	Engine Type	Emission Tier	Maneuvering Emissions (tons)																								Hotel Time (hr)	Aux Time (hr)
			DPM		PM2.5			ROG			CO			SOx			CO2			CH4			N2O					
			Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler			
AUTO CARRIER	SSD	1	0.007	0.001	0.006	0.006	0.001	0.050	0.014	0.001	0.044	0.029	0.001	0.006	0.011	0.004	9.82	18.25	6.89	0.004	0.004	0.000	0.000	0.000	0.000	27.6	27.6	
BULK CARRIER	MSD	1	0.002	0.000	0.001	0.002	0.000	0.008	0.004	0.000	0.011	0.008	0.000	0.002	0.003	0.000	3.04	4.91	0.65	0.001	0.001	0.000	0.000	0.000	0.000	37.9	37.9	
	SSD	0	0.001	0.000	0.001	0.001	0.000	0.008	0.003	0.000	0.009	0.006	0.000	0.002	0.002	0.000	3.03	3.84	0.65	0.001	0.000	0.000	0.000	0.000	0.000	28.7	28.7	
		1	0.003	0.000	0.004	0.003	0.000	0.027	0.007	0.000	0.031	0.015	0.000	0.005	0.005	0.001	8.61	9.29	1.62	0.002	0.001	0.000	0.000	0.000	0.000	37.8	37.8	
		2	0.001	0.000	0.002	0.001	0.000	0.009	0.003	0.000	0.011	0.006	0.000	0.002	0.002	0.000	3.30	3.95	0.65	0.001	0.000	0.000	0.000	0.000	0.000	85.1	85.1	
BULK CARRIER, HL	MSD	0	0.001	0.000	0.001	0.001	0.000	0.004	0.002	0.000	0.007	0.005	0.000	0.002	0.002	0.000	2.88	3.22	0.65	0.001	0.000	0.000	0.000	0.000	0.000	114.0	114.0	
CONTAINER SHIP	SSD	0	0.117	0.004	0.049	0.107	0.004	0.412	0.243	0.003	0.366	0.513	0.006	0.051	0.187	0.018	80.89	322.01	28.96	0.037	0.037	0.001	0.003	0.008	0.000	61.4	49.7	
		1	0.010	0.001	0.008	0.009	0.001	0.070	0.020	0.001	0.062	0.043	0.002	0.009	0.016	0.004	13.68	27.00	7.11	0.006	0.003	0.000	0.000	0.001	0.000	60.8	60.8	
GENERAL CARGO	MSD	0	0.001	0.000	0.001	0.001	0.000	0.002	0.001	0.000	0.003	0.003	0.000	0.001	0.001	0.000	1.31	1.61	0.33	0.000	0.000	0.000	0.000	0.000	0.000	123.0	123.0	
		1	0.004	0.000	0.002	0.003	0.000	0.015	0.007	0.000	0.018	0.016	0.000	0.003	0.006	0.001	5.40	9.78	1.66	0.001	0.001	0.000	0.000	0.000	0.000	62.5	62.5	
	SSD	0	0.002	0.000	0.002	0.002	0.000	0.014	0.005	0.000	0.016	0.010	0.000	0.003	0.004	0.001	4.79	6.34	0.99	0.001	0.001	0.000	0.000	0.000	0.000	86.3	86.3	
		1	0.010	0.001	0.010	0.009	0.000	0.071	0.020	0.000	0.075	0.042	0.001	0.012	0.015	0.002	19.62	26.54	3.64	0.006	0.003	0.000	0.001	0.001	0.000	45.5	45.5	
Grand Total		2	0.001	0.000	0.001	0.001	0.000	0.008	0.003	0.000	0.009	0.005	0.000	0.002	0.002	0.000	3.02	3.38	0.66	0.001	0.000	0.000	0.000	0.000	0.000	50.9	50.9	
			0.159	0.008	0.089	0.147	0.007	0.698	0.332	0.006	0.662	0.702	0.012	0.099	0.255	0.034	159.38	440.13	54.44	0.063	0.051	0.002	0.005	0.011	0.001	57.3	51.6	

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	22	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	27	16.4

Assist Tugs		
Tug	Calls	Hours
Scout	100	0.70
Tioga	100	0.70
Grand Total	200	0.70

Project - 2020

Reduction in hoteling time

0%

Ships

Ship Type	Engine Type	Emission Tier	Maneuvering Emissions (tons)																								Hotel Time (hr)	Aux Time (hr)
			DPM		PM2.5			ROG			CO			SOx			CO2			CH4			N2O					
			Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler			
AUTO CARRIER	SSD	1	0.010	0.001	0.009	0.009	0.001	0.073	0.020	0.001	0.065	0.042	0.002	0.009	0.015	0.006	14.31	26.59	10.04	0.007	0.003	0.000	0.000	0.001	0.000	27.6	27.6	
	MSD	1	0.002	0.000	0.001	0.002	0.000	0.008	0.004	0.000	0.011	0.008	0.000	0.002	0.003	0.000	3.04	4.91	0.66	0.001	0.001	0.000	0.000	0.000	0.000	37.9	37.9	
BULK CARRIER	SSD	0	0.001	0.000	0.001	0.001	0.000	0.008	0.003	0.000	0.009	0.006	0.000	0.002	0.002	0.000	3.03	3.84	0.65	0.001	0.000	0.000	0.000	0.000	0.000	28.7	28.7	
1		0.003	0.000	0.004	0.003	0.000	0.027	0.007	0.000	0.031	0.015	0.000	0.005	0.005	0.001	8.61	9.29	1.62	0.002	0.001	0.000	0.000	0.000	0.000	37.8	37.8		
2		0.001	0.000	0.002	0.001	0.000	0.009	0.003	0.000	0.011	0.006	0.000	0.002	0.002	0.000	3.30	3.95	0.65	0.001	0.000	0.000	0.000	0.000	0.000	0.000	85.1	85.1	
BULK CARRIER, HL	MSD	0	0.002	0.000	0.002	0.002	0.000	0.006	0.004	0.000	0.010	0.008	0.000	0.003	0.003	0.001	4.33	4.83	0.97	0.001	0.001	0.000	0.000	0.000	0.000	114.0	114.0	
CONTAINER SHIP	SSD	2	0.188	0.006	0.070	0.173	0.005	0.591	0.392	0.005	0.526	0.828	0.009	0.073	0.301	0.025	116.22	519.66	39.85	0.053	0.060	0.001	0.004	0.014	0.001	88.9	77.2	
	MSD	0	0.001	0.000	0.001	0.001	0.000	0.002	0.001	0.000	0.003	0.003	0.000	0.001	0.001	0.000	1.31	1.61	0.32	0.000	0.000	0.000	0.000	0.000	0.000	123.0	123.0	
		1	0.005	0.000	0.003	0.005	0.000	0.021	0.010	0.000	0.025	0.022	0.001	0.005	0.008	0.001	7.56	13.69	2.32	0.002	0.002	0.000	0.000	0.000	0.000	62.5	62.5	
GENERAL CARGO	SSD	0	0.002	0.000	0.002	0.002	0.000	0.014	0.005	0.000	0.016	0.010	0.000	0.003	0.004	0.001	4.79	6.34	0.99	0.001	0.001	0.000	0.000	0.000	0.000	86.3	86.3	
		1	0.013	0.001	0.013	0.012	0.001	0.097	0.027	0.001	0.102	0.058	0.001	0.017	0.021	0.003	26.75	36.19	4.97	0.009	0.004	0.000	0.001	0.001	0.000	45.5	45.5	
		2	0.001	0.000	0.001	0.001	0.000	0.008	0.003	0.000	0.009	0.005	0.000	0.002	0.002	0.000	3.02	3.38	0.66	0.001	0.000	0.000	0.000	0.000	0.000	50.9	50.9	
Grand Total			0.230	0.009	0.109	0.211	0.008	0.865	0.478	0.008	0.818	1.011	0.014	0.122	0.368	0.040	196.27	634.30	63.70	0.078	0.074	0.002	0.006	0.017	0.001	69.5	63.9	

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	23	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	28	16.4

TAMT_Vessels_Unmitigated

Annual Summary

Baseline

Ships

Ship Type	Engine Type	Emission Tier	Hotelling		Hotelling Emissions (tons)																		Cold Iron CO2e
			Auxiliary	Boiler	NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		
			LF	Load (kW)	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	
AUTO CARRIER	SSD	1	0.26	351	2.163	0.170	0.044	0.011	0.040	0.010	0.091	0.009	0.192	0.017	0.070	0.049	120.36	78.62	0.014	0.003	0.003	0.001	-
BULK CARRIER	MSD	1	0.10	132	0.308	0.022	0.006	0.001	0.006	0.001	0.013	0.001	0.027	0.002	0.010	0.006	17.14	10.16	0.002	0.000	0.000	0.000	-
	SSD	0	0.10	132	0.205	0.017	0.004	0.001	0.003	0.001	0.008	0.001	0.016	0.002	0.006	0.005	10.17	7.71	0.001	0.000	0.000	0.000	-
		1	0.10	132	0.581	0.055	0.012	0.004	0.011	0.003	0.024	0.003	0.052	0.005	0.019	0.016	32.31	25.32	0.004	0.001	0.001	0.000	-
		2	0.10	132	0.444	0.049	0.011	0.003	0.010	0.003	0.023	0.003	0.049	0.005	0.018	0.014	30.96	22.81	0.004	0.001	0.001	0.000	-
BULK CARRIER, HL	MSD	0	0.10	132	0.681	0.066	0.012	0.004	0.011	0.004	0.025	0.004	0.054	0.007	0.020	0.019	33.82	30.57	0.004	0.001	0.001	0.000	-
CONTAINER SHIP	SSD	0	0.35	241	92.482	1.595	1.663	0.106	1.530	0.098	3.460	0.088	7.319	0.160	2.661	0.464	4,590.83	736.92	0.532	0.026	0.120	0.010	1,099
GENERAL CARGO	SSD	1	0.35	362	8.468	0.388	0.171	0.026	0.157	0.024	0.355	0.021	0.751	0.039	0.273	0.113	471.18	179.07	0.055	0.006	0.012	0.003	-
		MSD	0	0.10	135	0.328	0.037	0.007	0.002	0.006	0.002	0.014	0.002	0.029	0.004	0.011	0.011	18.24	16.87	0.002	0.001	0.000	0.000
	SSD	1	0.10	135	1.011	0.093	0.020	0.006	0.019	0.006	0.042	0.005	0.090	0.009	0.033	0.027	56.26	42.85	0.007	0.001	0.001	0.001	-
		0	0.10	135	1.015	0.077	0.018	0.005	0.017	0.005	0.038	0.004	0.080	0.008	0.029	0.022	50.37	35.52	0.006	0.001	0.001	0.001	-
		1	0.10	135	1.996	0.149	0.040	0.010	0.037	0.009	0.084	0.008	0.177	0.015	0.064	0.043	111.09	68.60	0.013	0.002	0.003	0.001	-
Grand Total	SSD	2	0.10	135	0.227	0.030	0.006	0.002	0.005	0.002	0.012	0.002	0.025	0.003	0.009	0.009	15.85	13.96	0.002	0.000	0.000	0.000	-
					0.25	222	109.909	2.747	2.014	0.183	1.853	0.169	4.189	0.151	8.861	0.275	3.222	0.799	5,558.57	1,268.99	0.644	0.044	0.145

Harborcraft			0.80894 0.868903
Tug/Barge	Calls	Hours	
Robyn J (Barge Jake J)	1	16.4	
Robyn J (Barge Payton J)	22	16.4	
Robyn J (Barge Tori J)	4	16.4	
Grand Total	27	16.4	

Assist Tugs			Hours:
Tug	Calls	Main	
Scout	100	0.70	
Tioga	100	0.70	
Grand Total	200	0.70	

Project - 2020

Ships

	Hotelling				Hotelling Emissions (tons)																		Cold Iron CO2e
Ship Type	Engine Type	Emission Tier	Auxiliary LF	Boiler Load (kW)	NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		
					Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	
AUTO CARRIER	SSD	1	0.26	351	3.152	0.248	0.064	0.017	0.058	0.015	0.132	0.014	0.280	0.025	0.102	0.072	175.42	114.59	0.020	0.004	0.005	0.002	-
	MSD	1	0.10	135	0.308	0.023	0.006	0.002	0.006	0.001	0.013	0.001	0.027	0.002	0.010	0.007	17.14	10.39	0.002	0.000	0.000	0.000	-
BULK CARRIER		0	0.10	132	0.205	0.017	0.004	0.001	0.003	0.001	0.008	0.001	0.016	0.002	0.006	0.005	10.17	7.71	0.001	0.000	0.000	0.000	-
	SSD	1	0.10	132	0.581	0.055	0.012	0.004	0.011	0.003	0.024	0.003	0.052	0.005	0.019	0.016	32.31	25.32	0.004	0.001	0.001	0.000	-
		2	0.10	132	0.444	0.049	0.011	0.003	0.010	0.003	0.023	0.003	0.049	0.005	0.018	0.014	30.96	22.81	0.004	0.001	0.001	0.000	-
BULK CARRIER, HL	MSD	0	0.10	132	1.022	0.099	0.018	0.007	0.017	0.006	0.038	0.005	0.081	0.010	0.029	0.029	50.73	45.86	0.006	0.002	0.001	0.001	-
CONTAINER SHIP	SSD	2	0.35	325	165.203	3.176	4.172	0.212	3.838	0.195	8.677	0.175	18.356	0.318	6.675	0.923	11,514.15	1,467.21	1.335	0.051	0.300	0.021	1,645
	MSD	0	0.10	132	0.328	0.036	0.007	0.002	0.006	0.002	0.014	0.002	0.029	0.004	0.011	0.010	18.24	16.49	0.002	0.001	0.000	0.000	-
		1	0.10	135	1.415	0.130	0.029	0.009	0.026	0.008	0.059	0.007	0.126	0.013	0.046	0.038	78.76	60.00	0.009	0.002	0.002	0.001	-
GENERAL CARGO		0	0.10	135	1.015	0.077	0.018	0.005	0.017	0.005	0.038	0.004	0.080	0.008	0.029	0.022	50.37	35.52	0.006	0.001	0.001	0.001	-
	SSD	1	0.10	135	2.722	0.203	0.055	0.014	0.050	0.012	0.114	0.011	0.242	0.020	0.088	0.059	151.49	93.55	0.018	0.003	0.004	0.001	-
			2	0.10	135	0.227	0.030	0.006	0.002	0.005	0.002	0.012	0.002	0.025	0.003	0.009	0.009	15.85	13.96	0.002	0.000	0.000	0.000
Grand Total			0.24	251	176.623	4.142	4.401	0.276	4.049	0.254	9.153	0.228	19.363	0.415	7.041	1.204	12,145.58	1,913.40	1.408	0.066	0.317	0.027	1,645

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	23	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	28	16.4

TAMT_Vessels_Unmitigated

Annual Summary

Assist Tugs			Tug Running Emissions (tons)																						
			Hours per Call			Load Factors		NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O	
Tug	Calls	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux
Scout	103.66	0.70	1.00	0.31	0.43	0.519	0.051	0.011	0.001	0.011	0.001	0.062	0.008	0.493	0.055	0.001	0.000	57.88	6.73	0.001	0.000	0.003	0.000		
Tioga	103.66	0.70	1.00	0.31	0.43	0.519	0.041	0.011	0.002	0.011	0.002	0.062	0.007	0.493	0.031	0.001	0.000	57.88	3.84	0.001	0.000	0.003	0.000		
Grand Total	207.32	0.70	1.00	0.31	0.43	1.038	0.092	0.023	0.003	0.022	0.003	0.124	0.015	0.986	0.086	0.001	0.000	115.75	10.57	0.002	0.000	0.005	0.000		

Project - 2035

Ships																												
			Engine Type	Emission Tier	Power (kW)		Service Speed	Total Transit Distance (nm)		Transit - Arrival				Transit - Departure				Time		NC Boiler								
Ship Type	Type	Tier	Calls	Main	Aux	(kts)	Arrival	Depart	Comp (%)	Distance (nm)	Comp	NC	Comp	NC	Comp (%)	Distance (nm)	Comp	NC	Comp	NC	(hrs)	Aux	Load (kW)	Main	NOx Aux	Boiler		
AUTO CARRIER	SSD	1	92	11,060	2,760	20.00	35.30	35.30	0%	15.30	12.00	20.00	0.18	0.82	0%	15.30	12.00	20.00	0.18	0.82	1.53	0.15	351	21.317	0.797	-		
	MSD	1	21	9,100	2,973	16.65	30.20	23.40	0%	10.20	11.00	16.65	0.24	0.82	0%	3.40	11.20	16.65	0.25	0.82	0.82	0.17	-	1.656	0.118	-		
BULK CARRIER	SSD	0	18	8,139	2,325	14.60	30.20	30.20	0%	10.20	10.70	14.60	0.32	0.82	0%	10.20	12.45	14.60	0.51	0.82	1.40	0.17	-	3.155	0.152	-		
		1	46	10,705	2,250	15.92	33.94	26.46	0%	13.94	11.13	15.92	0.28	0.82	0%	6.46	11.90	15.92	0.34	0.82	1.28	0.17	-	8.641	0.308	-		
		2	18	9,140	2,393	15.00	11.50	48.90	0%	-	11.05	15.00	0.33	0.82	0%	28.90	12.50	15.00	0.48	0.82	1.93	0.17	-	3.622	0.154	-		
			0	23	5,738	1,950	13.00	5.75	24.45	0%	-	9.45	13.00	0.32	0.82	0%	4.45	9.45	13.00	0.32	0.82	0.34	0.17	-	0.541	0.040	-	
BULK CARRIER, HL CONTAINER SHIP	SSD	2	120	19,420	11,320	19.50	11.92	12.16	0%	-	11.64	19.50	0.18	0.82	0%	-	11.93	19.50	0.19	0.82	-	0.13	132	-	-	-		
	MSD	0	11	5,738	1,950	13.00	11.50	48.90	0%	-	10.10	13.00	0.39	0.82	0%	28.90	10.10	13.00	0.39	0.82	2.22	0.17	-	1.680	0.124	-		
1		57	6,400	2,367	15.34	35.98	23.74	0%	15.98	12.57	15.34	0.45	0.82	0%	3.74	12.20	15.34	0.41	0.82	1.29	0.17	-	4.976	0.403	-			
GENERAL CARGO	SSD	0	30	9,268	2,557	15.23	23.97	36.43	0%	3.97	12.07	15.23	0.41	0.82	0%	16.43	12.30	15.23	0.43	0.82	1.34	0.17	-	5.740	0.268	-		
		1	122	12,430	2,920	16.98	26.95	34.06	0%	6.95	11.77	16.98	0.27	0.82	0%	14.06	11.86	16.98	0.28	0.82	1.24	0.17	-	25.708	1.025	-		
		2	21	8,630	2,048	14.90	42.10	30.20	0%	22.10	10.95	14.90	0.33	0.82	0%	10.20	11.00	14.90	0.33	0.82	2.17	0.17	-	4.489	0.173	-		
			579	14,524	6,799	18.04	20.86	22.44	0%	5.41	11.62	18.04	0.24	0.82	0%	6.22	11.85	18.04	0.25	0.82	0.69	0.15	103	81.523	3.562	-		
Grand Total			579	14,524	6,799	18.04	20.86	22.44	0%	5.41	11.62	18.04	0.24	0.82	0%	6.22	11.85	18.04	0.25	0.82	0.69	0.15	103	81.523	3.562	-		

Harborcraft			Tug Running Emissions (tons)																								
Tug/Barge	Calls	Hours	NOx		DPM		PM2.5		ROG	CO		SOx		CO2		CH4		N2O		Hours			NOx		DPM		
			Main	Aux	Main	Aux	Main	Aux		Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Tug	Barge	Tug	Barge	Tug	Barge	
Robyn J (Barge Jake J)	6	16.4	0.601	0.028	0.021	0.001	0.020	0.001	0.057	0.005	0.451	0.021	0.001	0.000	52.99	2.63	0.001	0.000	0.002	0.000	1.0	4.5	0.002	0.023	0.000	0.001	
Robyn J (Barge Payton J)	127	16.4	12.723	0.594	0.434	0.022	0.421	0.021	1.198	0.100	9.553	0.452	0.013	0.001	1,121.70	55.64	0.022	0.002	0.051	0.003	1.0	4.8	0.036	0.522	0.001	0.028	
Robyn J (Barge Tori J)	23	16.4	2.304	0.108	0.079	0.004	0.076	0.004	0.217	0.018	1.730	0.082	0.002	0.000	203.14	10.08	0.004	0.000	0.009	0.000	1.0	5.3	0.007	0.104	0.000	0.006	
Grand Total	156	16.4	15.628	0.729	0.533	0.027	0.517	0.026	1.472	0.123	11.734	0.555	0.015	0.001	1,377.83	68.34	0.027	0.002	0.062	0.003	1.0	4.9	0.045	0.649	0.002	0.035	

Assist Tugs						Tug Running Emissions (tons)																	
Tug	Hours per Call			Load Factors		NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O	
	Calls	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux
Scout	579	0.70	1.00	0.31	0.43	2.900	0.286	0.064	0.006	0.062	0.006	0.345	0.047	2.753	0.305	0.004	0.000	323.27	37.58	0.006	0.001	0.015	0.002
Tioga	579	0.70	1.00	0.31	0.43	2.900	0.229	0.064	0.009	0.062	0.009	0.345	0.039	2.753	0.174	0.004	0.000	323.27	21.47	0.006	0.001	0.015	0.001
Grand Total	1158	0.70	1.00	0.31	0.43	5.799	0.515	0.128	0.015	0.124	0.015	0.691	0.085	5.506	0.479	0.007	0.001	646.54	59.05	0.013	0.002	0.029	0.003

TAMT_Vessels_Unmitigated

Annual Summary

Assist Tugs			Hours	
Tug	Calls	Main		
Scout	103.66	0.70		
Tioga	103.66	0.70		
Grand Total	207.32	0.70		

Project - 2035

Ships			Transit Emissions (tons)																								Comp (%)
Ship Type	Engine	Emission	DPM			PM2.5			ROG			CO			SOx			CO2			CH4			N2O			
	Type	Tier	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	
AUTO CARRIER	SSD	1	0.353	0.016	-	0.325	0.015	-	1.101	0.033	-	1.553	0.071	-	0.508	0.026	-	830.09	44.32	-	0.099	0.005	-	0.025	0.001	-	0%
BULK CARRIER	MSD	1	0.035	0.002	-	0.033	0.002	-	0.092	0.005	-	0.156	0.011	-	0.057	0.004	-	91.30	6.59	-	0.011	0.001	-	0.003	0.000	-	50%
	SSD	0	0.046	0.003	-	0.043	0.003	-	0.145	0.006	-	0.204	0.012	-	0.067	0.004	-	109.14	7.56	-	0.013	0.001	-	0.003	0.000	-	100%
		1	0.143	0.006	-	0.132	0.006	-	0.446	0.013	-	0.629	0.027	-	0.206	0.010	-	336.47	17.15	-	0.040	0.002	-	0.010	0.000	-	60%
		2	0.072	0.004	-	0.066	0.004	-	0.224	0.008	-	0.316	0.017	-	0.103	0.006	-	169.01	10.73	-	0.020	0.001	-	0.005	0.000	-	100%
BULK CARRIER, HL	MSD	0	0.010	0.001	-	0.009	0.001	-	0.027	0.001	-	0.045	0.003	-	0.016	0.001	-	26.42	1.99	-	0.003	0.000	-	0.001	0.000	-	100%
CONTAINER SHIP	SSD	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	86%	
GENERAL CARGO	MSD	0	0.032	0.002	-	0.029	0.002	-	0.083	0.005	-	0.140	0.010	-	0.051	0.004	-	82.07	6.17	-	0.010	0.001	-	0.002	0.000	-	100%
		1	0.106	0.008	-	0.098	0.007	-	0.276	0.017	-	0.468	0.036	-	0.170	0.013	-	274.29	22.42	-	0.034	0.003	-	0.008	0.001	-	60%
	SSD	0	0.084	0.005	-	0.078	0.004	-	0.263	0.010	-	0.371	0.021	-	0.122	0.008	-	198.53	13.28	-	0.024	0.002	-	0.006	0.000	-	100%
		1	0.426	0.021	-	0.392	0.019	-	1.328	0.043	-	1.873	0.091	-	0.613	0.033	-	1,001.08	57.02	-	0.119	0.007	-	0.031	0.001	-	91%
Grand Total		2	0.089	0.004	-	0.082	0.004	-	0.278	0.009	-	0.392	0.019	-	0.128	0.007	-	209.48	12.05	-	0.025	0.001	-	0.006	0.000	-	100%
			1.397	0.072	-	1.285	0.066	-	4.263	0.150	-	6.147	0.318	-	2.041	0.116	-	3,327.88	199.28	-	0.399	0.023	-	0.101	0.005	-	75%

Harborcraft																
Hoteling Emissions (tons)																
			PM2.5		ROG		CO		SOx		CO2		CH4		N2O	
Tug/Barge	Calls	Hours	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge
Robyn J (Barge Jake J)	6	16.4	0.000	0.001	0.000	0.004	0.001	0.018	0.000	0.000	0.16	2.07	0.000	0.000	0.000	0.000
Robyn J (Barge Payton J)	127	16.4	0.001	0.027	0.006	0.089	0.028	0.411	0.000	0.001	3.40	47.02	0.000	0.002	0.000	0.002
Robyn J (Barge Tori J)	23	16.4	0.000	0.005	0.001	0.018	0.005	0.082	0.000	0.000	0.61	9.39	0.000	0.000	0.000	0.000
Grand Total	156	16.4	0.002	0.034	0.008	0.110	0.034	0.511	0.000	0.001	4.17	58.47	0.000	0.002	0.000	0.003

Assist Tugs			Hours	
Tug	Calls	Main		
Scout	579	0.70		
Tioga	579	0.70		
Grand Total	1158	0.70		

TAMT_Vessels_Unmitigated

Annual Summary

Assist Tugs			Hours	
Tug	Calls	Main		
Scout	103.66	0.70		
Tioga	103.66	0.70		
Grand Total	207.32	0.70		

Project - 2035

Ships																											
Ship Type	Engine Type	Emission Tier	Distance (nm)	VSR - Arrival Speed (kts)				Comp (%)	Distance (nm)	VSR - Departure Speed (kts)				Time (hrs)	Aux	NC Boiler Load (kW)	NOx			DPM			PM2.5			ROG	
				Comp	NC	Main Load Factor	Comp		NC	Main Load Factor	Comp	NC	Main				Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler
AUTO CARRIER	SSD	1	20.00	12.00	16.06	0.18	0.43	0%	20.00	12.00	15.24	0.18	0.36	2.56	0.15	351	17.074	1.332	-	0.283	0.027	-	0.260	0.025	-	0.882	0.056
BULK CARRIER	MSD	1	20.00	11.00	13.60	0.24	0.45	50%	20.00	11.20	13.60	0.25	0.45	3.27	0.17	-	2.707	0.475	-	0.058	0.010	-	0.053	0.009	-	0.150	0.020
	SSD	0	20.00	10.70	14.60	0.32	0.82	100%	20.00	12.45	14.60	0.51	0.82	3.48	0.17	-	3.911	0.379	-	0.058	0.007	-	0.053	0.006	-	0.179	0.014
		1	20.00	11.13	13.10	0.28	0.46	40%	20.00	11.90	13.07	0.34	0.45	3.28	0.17	-	10.097	0.788	-	0.167	0.016	-	0.154	0.015	-	0.522	0.033
		2	11.50	11.05	15.00	0.33	0.82	100%	20.00	12.50	15.00	0.48	0.82	2.64	0.17	-	2.523	0.211	-	0.050	0.005	-	0.046	0.005	-	0.156	0.011
BULK CARRIER, HL	MSD	0	5.75	9.45	13.00	0.32	0.82	100%	20.00	9.45	13.00	0.32	0.82	2.72	0.17	-	1.653	0.318	-	0.031	0.006	-	0.029	0.005	-	0.081	0.012
CONTAINER SHIP	SSD	2	11.92	11.64	14.78	0.18	0.36	74%	12.16	11.93	16.06	0.19	0.46	1.94	0.13	325	14.134	3.745	0.140	0.284	0.095	0.009	0.262	0.087	0.009	0.951	0.197
GENERAL CARGO	MSD	0	11.50	10.10	13.00	0.39	0.82	100%	20.00	10.10	13.00	0.39	0.82	3.12	0.17	-	1.105	0.174	-	0.021	0.003	-	0.019	0.003	-	0.054	0.007
		1	20.00	12.57	13.20	0.45	0.52	60%	20.00	12.20	15.10	0.41	0.78	3.07	0.17	-	7.397	0.964	-	0.158	0.019	-	0.145	0.018	-	0.411	0.040
	SSD	0	20.00	12.07	15.23	0.41	0.82	100%	20.00	12.30	15.23	0.43	0.82	3.28	0.17	-	7.200	0.656	-	0.106	0.012	-	0.097	0.011	-	0.330	0.025
		1	20.00	11.77	13.10	0.27	0.38	45%	20.00	11.86	15.23	0.28	0.59	3.17	0.17	-	28.182	2.621	-	0.467	0.053	-	0.429	0.049	-	1.456	0.110
		2	20.00	10.95	14.90	0.33	0.82	100%	20.00	11.00	14.90	0.33	0.82	3.64	0.17	-	3.016	0.291	-	0.060	0.007	-	0.055	0.007	-	0.187	0.015
Grand Total			15.44	11.62	14.42	0.24	0.44	62%	16.22	11.85	15.38	0.25	0.54	2.50	0.15	196	99.000	11.953	0.140	1.742	0.259	0.009	1.603	0.239	0.009	5.360	0.539
																	679.990			16.421		15.108			37.103		

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	6	16.4
Robyn J (Barge Payton J)	127	16.4
Robyn J (Barge Tori J)	23	16.4
Grand Total	156	16.4

Assist Tugs			Hours	
Tug	Calls	Main		
Scout	579	0.70		
Tioga	579	0.70		
Grand Total	1158	0.70		

TAMT_Vessels_Unmitigated

Annual Summary

Assist Tugs			Hours	
Tug	Calls	Main		
Scout	103.66	0.70		
Tioga	103.66	0.70		
Grand Total	207.32	0.70		

Project - 2035

Ships		VSR Emissions (tons)																		Maneuvering											
Ship Type	Engine	Emission	CO				SOx				CO2				CH4				N2O				Speed (kts)	Time (hrs)	Load Factors		Boiler Load (kW)	NOx			
	Type	Tier	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Main	Aux	Boiler			Main						
AUTO CARRIER	SSD	1	-	1.244	0.118	-	0.407	0.043	-	664.87	74.09	-	0.079	0.009	-	0.020	0.002	-	-	7.00	2.41	0.04	0.45	351	3.187	3.771	0.171	0.074			
BULK CARRIER	MSD	1	-	0.255	0.042	-	0.093	0.015	-	149.25	26.42	-	0.019	0.003	-	0.004	0.001	-	-	7.00	2.41	0.06	0.45	135	0.657	0.927	0.015	0.016			
	SSD	0	-	0.253	0.030	-	0.083	0.011	-	135.28	18.81	-	0.016	0.002	-	0.004	0.000	-	-	7.00	2.41	0.09	0.45	132	0.763	0.697	0.013	0.013			
		1	-	0.736	0.070	-	0.241	0.025	-	393.19	43.88	-	0.047	0.005	-	0.012	0.001	-	-	7.00	2.41	0.07	0.45	132	2.007	1.537	0.032	0.041			
		2	-	0.220	0.023	-	0.072	0.009	-	117.72	14.70	-	0.014	0.002	-	0.004	0.000	-	-	7.00	2.41	0.08	0.45	132	0.623	0.511	0.013	0.015			
	BULK CARRIER, HL	MSD	0	-	0.138	0.025	-	0.050	0.009	-	80.79	15.80	-	0.010	0.002	-	0.002	0.000	-	-	7.00	2.41	0.13	0.45	132	0.661	0.666	0.016	0.013		
CONTAINER SHIP	SSD	2	0.008	1.333	0.416	0.014	0.407	0.151	0.041	661.92	261.00	64.61	0.085	0.030	0.002	0.020	0.007	0.001	-	7.00	2.41	0.04	0.50	325	6.572	17.894	0.207	0.182			
GENERAL CARGO	MSD	0	-	0.092	0.014	-	0.033	0.005	-	53.99	8.65	-	0.007	0.001	-	0.002	0.000	-	-	7.00	2.41	0.13	0.45	132	0.280	0.319	0.008	0.006			
		1	-	0.695	0.085	-	0.253	0.031	-	407.80	53.63	-	0.051	0.006	-	0.011	0.001	-	-	7.00	2.41	0.08	0.45	135	1.199	2.003	0.041	0.031			
	SSD	0	-	0.466	0.052	-	0.152	0.019	-	249.02	32.56	-	0.030	0.004	-	0.008	0.001	-	-	7.00	2.41	0.08	0.45	135	1.355	1.139	0.022	0.024			
		1	-	2.053	0.232	-	0.672	0.085	-	1,097.42	145.82	-	0.131	0.017	-	0.034	0.004	-	-	7.00	2.41	0.06	0.45	135	5.623	5.289	0.087	0.119			
			2	-	0.263	0.032	-	0.086	0.012	-	140.75	20.26	-	0.017	0.002	-	0.004	0.001	-	-	7.00	2.41	0.09	0.45	135	0.658	0.639	0.015	0.015		
Grand Total				0.008	7.747	1.141	0.014	2.549	0.415	0.041	4,152.00	715.62	64.61	0.504	0.083	0.002	0.125	0.019	0.001	-	7.00	2.41	0.05	0.47	251	23.584	35.391	0.640	0.549		

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	6	16.4
Robyn J (Barge Payton J)	127	16.4
Robyn J (Barge Tori J)	23	16.4
Grand Total	156	16.4

Assist Tugs			Hours	
Tug	Calls	Main		
Scout	579	0.70		
Tioga	579	0.70		
Grand Total	1158	0.70		

TAMT_Vessels_Unmitigated
Annual Summary

Assist Tugs

10.290411
5.4396811.579743

Tug	Calls	Hours
Scout	103.66	0.70
Tioga	103.66	0.70
Grand Total	207.32	0.70

Project - 2035

Reduction in hoteling time0%

Ships																												
Ship Type	Engine Type	Emission Tier	Maneuvering Emissions (tons)																								Hotel Time (hr)	Aux Time (hr)
			DPM			PM2.5			ROG			CO			SOx			CO2			CH4			N2O				
			Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler			
AUTO CARRIER	SSD	1	0.076	0.011	0.068	0.070	0.011	0.574	0.158	0.009	0.511	0.334	0.017	0.070	0.122	0.050	112.88	209.82	79.19	0.052	0.024	0.003	0.004	0.005	0.001	27.6	27.6	
BULK CARRIER	MSD	1	0.019	0.001	0.015	0.017	0.001	0.088	0.039	0.001	0.111	0.082	0.002	0.020	0.030	0.004	31.88	51.59	6.95	0.011	0.006	0.000	0.001	0.001	0.000	37.9	37.9	
	SSD	0	0.013	0.001	0.012	0.012	0.001	0.069	0.026	0.001	0.085	0.055	0.001	0.017	0.020	0.004	27.23	34.58	5.83	0.006	0.004	0.000	0.001	0.001	0.000	28.7	28.7	
		1	0.031	0.002	0.038	0.029	0.002	0.252	0.064	0.002	0.281	0.136	0.003	0.049	0.050	0.009	79.22	85.51	14.89	0.023	0.010	0.001	0.002	0.002	0.000	37.8	37.8	
		2	0.013	0.001	0.014	0.012	0.001	0.084	0.027	0.001	0.099	0.057	0.001	0.018	0.021	0.004	29.70	35.59	5.83	0.008	0.004	0.000	0.001	0.001	0.000	85.1	85.1	
BULK CARRIER, HL CONTAINER SHIP	MSD	0	0.013	0.001	0.012	0.012	0.001	0.047	0.028	0.001	0.075	0.059	0.002	0.021	0.021	0.005	33.17	37.06	7.45	0.006	0.004	0.000	0.001	0.001	0.000	114.0	114.0	
	SSD	2	0.452	0.014	0.168	0.416	0.013	1.419	0.940	0.011	1.262	1.988	0.021	0.174	0.723	0.060	278.93	1,247.19	95.64	0.127	0.145	0.003	0.009	0.033	0.001	88.9	77.2	
	MSD	0	0.006	0.001	0.006	0.006	0.000	0.027	0.013	0.000	0.036	0.028	0.001	0.009	0.010	0.002	14.46	17.72	3.56	0.002	0.002	0.000	0.000	0.000	0.000	123.0	123.0	
		1	0.040	0.003	0.028	0.037	0.003	0.175	0.084	0.002	0.205	0.178	0.004	0.038	0.065	0.012	61.58	111.48	18.87	0.016	0.013	0.001	0.002	0.003	0.000	62.5	62.5	
GENERAL CARGO	SSD	0	0.023	0.001	0.022	0.021	0.001	0.136	0.048	0.001	0.159	0.101	0.002	0.030	0.037	0.006	47.92	63.38	9.93	0.012	0.007	0.000	0.001	0.002	0.000	86.3	86.3	
		1	0.107	0.006	0.109	0.098	0.005	0.790	0.222	0.005	0.832	0.469	0.009	0.135	0.171	0.025	217.58	294.33	40.39	0.071	0.034	0.001	0.007	0.008	0.001	45.5	45.5	
		2	0.013	0.001	0.014	0.012	0.001	0.081	0.027	0.001	0.099	0.057	0.002	0.020	0.021	0.004	31.69	35.53	6.95	0.007	0.004	0.000	0.001	0.001	0.000	50.9	50.9	
Grand Total			0.806	0.043	0.505	0.741	0.039	3.742	1.676	0.035	3.754	3.545	0.064	0.600	1.289	0.186	966.25	2,223.77	295.48	0.340	0.258	0.010	0.030	0.058	0.004	69.5	63.9	

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	6	16.4
Robyn J (Barge Payton J)	127	16.4
Robyn J (Barge Tori J)	23	16.4
Grand Total	156	16.4

Assist Tugs

Tug	Calls	Hours
Scout	579	0.70
Tioga	579	0.70
Grand Total	1158	0.70

TAMT_Vessels_Unmitigated

Annual Summary

Assist Tugs			Hours
Tug	Calls	Main	
Scout	103.66	0.70	
Tioga	103.66	0.70	
Grand Total	207.32	0.70	

Project - 2035

Ships																								
Ship Type	Hotelling				Hotelling Emissions (tons)																			Cold Iron CO2e
	Engine	Emission	Auxiliary	Boiler	NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O			
	Type	Tier	LF	Load (kW)	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler		
AUTO CARRIER	SSD	1	0.26	351	24.874	1.957	0.501	0.130	0.461	0.120	1.043	0.108	2.207	0.196	0.802	0.569	1,384.10	904.15	0.160	0.031	0.036	0.013	-	
BULK CARRIER	MSD	1	0.10	135	3.234	0.236	0.065	0.016	0.060	0.014	0.136	0.013	0.287	0.024	0.104	0.069	179.97	109.14	0.021	0.004	0.005	0.002	-	
	SSD	0	0.10	132	1.843	0.150	0.033	0.010	0.030	0.009	0.069	0.008	0.146	0.015	0.053	0.044	91.49	69.37	0.011	0.002	0.002	0.001	-	
		1	0.10	132	5.342	0.504	0.108	0.034	0.099	0.031	0.224	0.028	0.474	0.051	0.172	0.147	297.25	232.93	0.034	0.008	0.008	0.003	-	
		2	0.10	132	3.997	0.444	0.101	0.030	0.093	0.027	0.210	0.025	0.444	0.045	0.162	0.129	278.60	205.28	0.032	0.007	0.007	0.003	-	
		BULK CARRIER, HL	MSD	0	0.10	132	7.835	0.761	0.141	0.051	0.130	0.047	0.293	0.042	0.620	0.076	0.225	0.221	388.93	351.61	0.045	0.012	0.010	0.005
CONTAINER SHIP	SSD	2	0.35	325	396.487	7.623	10.012	0.508	9.211	0.468	20.826	0.420	44.054	0.764	16.020	2.216	27,633.96	3,521.30	3.204	0.122	0.721	0.050	3,949	
GENERAL CARGO	MSD	0	0.10	132	3.606	0.393	0.073	0.026	0.067	0.024	0.151	0.022	0.320	0.039	0.116	0.114	200.67	181.41	0.023	0.006	0.005	0.003	-	
		1	0.10	135	11.525	1.058	0.232	0.071	0.214	0.065	0.483	0.058	1.022	0.106	0.372	0.307	641.34	488.54	0.074	0.017	0.017	0.007	-	
	SSD	0	0.10	135	10.148	0.769	0.183	0.051	0.168	0.047	0.380	0.042	0.803	0.077	0.292	0.224	503.74	355.23	0.058	0.012	0.013	0.005	-	
		1	0.10	135	22.142	1.647	0.446	0.110	0.411	0.101	0.929	0.091	1.964	0.165	0.714	0.479	1,232.09	760.84	0.143	0.026	0.032	0.011	-	
		2	0.10	135	2.388	0.317	0.060	0.021	0.055	0.019	0.125	0.017	0.265	0.032	0.096	0.092	166.40	146.53	0.019	0.005	0.004	0.002	-	
																								-
Grand Total			0.24	251	493.421	15.861	11.956	1.057	11.000	0.973	24.868	0.875	52.606	1.590	19.130	4.611	32,998.54	7,326.34	3.826	0.254	0.861	0.103	3,949	

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	6	16.4
Robyn J (Barge Payton J)	127	16.4
Robyn J (Barge Tori J)	23	16.4
Grand Total	156	16.4

Assist Tugs			Hours
Tug	Calls	Main	
Scout	579	0.70	
Tioga	579	0.70	
Grand Total	1158	0.70	

TAMT_Vessels_Unmitigated

Daily Summary

Baseline

20 VSR Distance

Ships

Ship Type	Engine Type	Emission Tier	Power (kW)				Service Speed (kts)	Total Transit Distance (nm)		Comp (%)	Distance (nm)	Transit - Arrival Speed (kts)		Main Load Factor		Comp (%)	Distance (nm)	Transit - Departure Speed (kts)		Main Load Factor		Time (hrs)	Aux	Boiler Load (kW)	NOx		
			Calls	Main	Aux			Arrival	Depart			Comp	NC	Comp	NC			Comp	NC	Comp	NC				Main	Aux	Boiler
AUTO CARRIER	SSD	1	0.08	11,060	2,760	20.00	35.30	35.30	0%	15.30	12.00	20.00	0.18	0.82	0%	15.30	12.00	20.00	0.18	0.82	1.53	0.15	351	37.07	1.39	-	
BULK CARRIER	MSD	1	0.02	9,100	2,973	16.65	30.20	23.40	0%	10.20	11.00	16.65	0.24	0.82	0%	3.40	11.20	16.65	0.25	0.82	0.82	0.17	-	3.15	0.23	-	
	SSD	0	0.02	8,139	2,325	14.60	30.20	30.20	0%	10.20	10.70	14.60	0.32	0.82	0%	10.20	12.45	14.60	0.51	0.82	1.40	0.17	-	7.01	0.34	-	
		1	0.05	10,705	2,250	15.92	33.94	26.46	0%	13.94	11.13	15.92	0.28	0.82	0%	6.46	11.90	15.92	0.34	0.82	1.28	0.17	-	18.78	0.67	-	
		2	0.02	9,140	2,393	15.00	11.50	48.90	0%	-	11.05	15.00	0.33	0.82	0%	28.90	12.50	15.00	0.48	0.82	1.93	0.17	-	8.05	0.34	-	
BULK CARRIER, HL	MSD	0	0.02	5,738	1,950	13.00	5.75	24.45	0%	-	9.45	13.00	0.32	0.82	0%	4.45	9.45	13.00	0.32	0.82	0.34	0.17	-	0.94	0.07	-	
CONTAINER SHIP	SSD	0	0.49	14,948	7,158	20.03	11.99	12.26	0%	-	11.57	20.03	0.16	0.82	0%	-	11.83	20.03	0.17	0.82	-	0.13	132	-	-	-	
		1	0.08	13,055	3,676	18.93	11.50	11.50	0%	-	12.08	18.93	0.21	0.82	0%	-	12.53	18.93	0.24	0.82	-	0.13	-	-	-	-	
GENERAL CARGO	MSD	0	0.01	5,738	1,950	13.00	11.50	48.90	0%	-	10.10	13.00	0.39	0.82	0%	28.90	10.10	13.00	0.39	0.82	2.22	0.17	-	3.05	0.23	-	
		1	0.05	6,400	2,367	15.34	35.98	23.74	0%	15.98	12.57	15.34	0.45	0.82	0%	3.74	12.20	15.34	0.41	0.82	1.29	0.17	-	8.73	0.71	-	
	SSD	0	0.03	9,268	2,557	15.23	23.97	36.43	0%	3.97	12.07	15.23	0.41	0.82	0%	16.43	12.30	15.23	0.43	0.82	1.34	0.17	-	11.48	0.54	-	
		1	0.11	12,430	2,920	16.98	26.95	34.06	0%	6.95	11.77	16.98	0.27	0.82	0%	14.06	11.86	16.98	0.28	0.82	1.24	0.17	-	46.36	1.85	-	
			2	0.02	8,630	2,048	14.90	42.10	30.20	0%	22.10	10.95	14.90	0.33	0.82	0%	10.20	11.00	14.90	0.33	0.82	2.17	0.17	-	8.55	0.33	-
Grand Total			1.00	12,627	4,904	18.43	19.31	20.74	0%	4.45	11.60	18.43	0.22	0.82	0%	5.21	11.87	18.43	0.24	0.82	0.58	0.15	93	153.18	6.68	-	
			1.06																								

Harborcraft

Harborcraft			Tug Running Emissions (lbs)																				Hours		NOx		DPM	
			NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		Tug	Barge	Tug	Barge	Tug	Barge		
Tug/Barge	Calls	Hours	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Tug	Barge	Tug	Barge	Tug	Barge		
Robyn J (Barge Jake J)	0.04	16.4	7.42	0.35	0.25	0.01	0.25	0.01	0.70	0.06	5.57	0.26	0.01	0.00	654	32	0.013	0.001	0.029	0.001	1.0	4.5	0.02	0.28	0.00	0.02		
Robyn J (Barge Payton J)	0.81	16.4	163.26	7.62	5.57	0.28	5.40	0.27	15.37	1.29	122.58	5.80	0.16	0.01	14,393	714	0.286	0.025	0.649	0.032	1.0	4.8	0.46	6.69	0.02	0.36		
Robyn J (Barge Tori J)	0.15	16.4	29.68	1.39	1.01	0.05	0.98	0.05	2.80	0.23	22.29	1.05	0.03	0.00	2,617	130	0.052	0.005	0.118	0.006	1.0	5.3	0.08	1.34	0.00	0.07		
Grand Total	1.00	16.4	200.36	9.35	6.84	0.34	6.63	0.33	18.87	1.58	150.44	7.11	0.20	0.01	17,664	876	0.351	0.031	0.796	0.039	1.0	4.9	0.57	8.32	0.02	0.45		

Assist Tugs

Assist Tugs			Tug Running Emissions (lbs)																				
Tug	Hours per Call		Load Factors		NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		
	Calls	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux
Scout	1.00	0.70	1.00	0.31	0.43	10.02	0.99	0.22	0.02	0.21	0.02	1.19	0.16	9.51	1.05	0.01	0.00	1,117	130	0.022	0.003	0.050	0.006
Tioga	1.00	0.70	1.00	0.31	0.43	10.02	0.79	0.22	0.03	0.21	0.03	1.19	0.13	9.51	0.60	0.01	0.00	1,117	74	0.022	0.003	0.050	0.003
Grand Total	2.00	0.70	1.00	0.31	0.43	20.03	1.78	0.44	0.05	0.43	0.05	2.39	0.30	19.02	1.66	0.03	0.00	2,233	204	0.044	0.006	0.101	0.009

Demo/Rail Project - 2020

Ships

Ship Type	Engine Type	Emission Tier	Power (kW)				Service Speed (kts)	Total Transit Distance (nm)		Transit - Arrival				Transit - Departure				Time (hrs)		NC Boiler Load (kW)	NOx					
			Calls	Main	Aux	Arrival		Depart	Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Main	Aux	Boiler			
											Comp	NC	Comp	NC			Comp	NC	Comp					NC		
AUTO CARRIER	SSD	1	0.117	11,060	2,760	20.00	35.30	35.30	0%	15.30	12.00	20.00	0.18	0.82	0%	15.30	12.00	20.00	0.18	0.82	1.53	0.15	351	54.03	2.02	-
BULK CARRIER	MSD	1	0.02	9,100	2,973	16.65	30.20	23.40	0%	10.20	11.00	16.65	0.24	0.82	0%	3.40	11.20	16.65	0.25	0.82	0.82	0.17	-	3.15	0.23	-
	SSD	0	0.02	8,139	2,325	14.60	30.20	30.20	0%	10.20	10.70	14.60	0.32	0.82	0%	10.20	12.45	14.60	0.51	0.82	1.40	0.17	-	7.01	0.34	-
		1	0.05	10,705	2,250	15.92	33.94	26.46	0%	13.94	11.13	15.92	0.28	0.82	0%	6.46	11.90	15.92	0.34	0.82	1.28	0.17	-	18.78	0.67	-
		2	0.02	9,140	2,393	15.00	11.50	48.90	0%	-	11.05	15.00	0.33	0.82	0%	28.90	12.50	15.00	0.48	0.82	1.93	0.17	-	8.05	0.34	-
BULK CARRIER, HL	MSD	0	0.03	5,738	1,950	13.00	5.75	24.45	0%	-	9.45	13.00	0.32	0.82	0%	4.45	9.45	13.00	0.32	0.82	0.34	0.17	-	1.41	0.10	-
CONTAINER SHIP	SSD	2	0.50	19,420	11,320	19.50	11.92	12.16	0%	-	11.64	19.50	0.18	0.82	0%	-	11.93	19.50	0.19	0.82	-	0.13	132	-	-	-
GENERAL CARGO	MSD	0	0.01	5,738	1,950	13.00	11.50	48.90	0%	-	10.10	13.00	0.39	0.82	0%	28.90	10.10	13.00	0.39	0.82	2.22	0.17	-	3.05	0.23	-
		1	0.07	6,400	2,367	15.34	35.98	23.74	0%	15.98	12.57	15.34	0.45	0.82	0%	3.74	12.20	15.34	0.41	0.82	1.29	0.17	-	12.22	0.99	-
	SSD	0	0.03	9,268	2,557	15.23	23.97	36.43	0%	3.97	12.07	15.23	0.41	0.82	0%	16.43	12.30	15.23	0.43	0.82	1.34	0.17	-	11.48	0.54	-
		1	0.15	12,430	2,920	16.98	26.95	34.06	0%	6.95	11.77	16.98	0.27	0.82	0%	14.06	11.86	16.98	0.28	0.82	1.24	0.17	-	63.22	2.52	-
Grand Total		2	0.02	8,630	2,048	14.90	42.10	30.20	0%	22.10	10.95	14.90	0.33	0.82	0%	10.20	11.00	14.90	0.33	0.82	2.17	0.17	-	8.55	0.33	-
			1.0366	14,524	6,799	18.04	20.86	22.44	0%	5.41	11.62	18.04	0.24	0.82	0%	6.22	11.85	18.04	0.25	0.82	0.69	0.15	103	190.96	8.30	-
1.0365996 =scaling factor for baseline to 2020 (Baseline x 6% increase in annual calls)																										

TAMT_Vessels_Unmitigated

Daily Summary

Baseline

Ships			Transit Emissions (lbs)																								Comp (%)	Distance (nm)
Ship Type	Engine Type	Emission Tier	Main	DPM Aux	Boiler	Main	PM2.5 Aux	Boiler	Main	ROG Aux	Boiler	Main	CO Aux	Boiler	Main	SOx Aux	Boiler	Main	CO2 Aux	Boiler	Main	CH4 Aux	Boiler	Main	N2O Aux	Boiler		
AUTO CARRIER	SSD	1	0.61	0.03	-	0.56	0.03	-	1.92	0.06	-	2.70	0.12	-	0.88	0.04	-	1,444	77	-	0.172	0.009	-	0.044	0.002	-	0%	20.00
BULK CARRIER	MSD	1	0.07	0.00	-	0.06	0.00	-	0.18	0.01	-	0.30	0.02	-	0.11	0.01	-	174	13	-	0.022	0.001	-	0.005	0.000	-	50%	20.00
	SSD	0	0.10	0.01	-	0.09	0.01	-	0.32	0.01	-	0.45	0.03	-	0.15	0.01	-	243	17	-	0.029	0.002	-	0.007	0.000	-	100%	20.00
		1	0.31	0.01	-	0.29	0.01	-	0.97	0.03	-	1.37	0.06	-	0.45	0.02	-	731	37	-	0.087	0.004	-	0.022	0.001	-	60%	20.00
		2	0.16	0.01	-	0.15	0.01	-	0.50	0.02	-	0.70	0.04	-	0.23	0.01	-	376	24	-	0.045	0.003	-	0.011	0.001	-	100%	11.50
BULK CARRIER, HL	MSD	0	0.02	0.00	-	0.02	0.00	-	0.05	0.00	-	0.08	0.01	-	0.03	0.00	-	46	3	-	0.006	0.000	-	0.001	0.000	-	100%	5.75
CONTAINER SHIP	SSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	11.99
	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	63%	11.50
GENERAL CARGO	MSD	0	0.06	0.00	-	0.05	0.00	-	0.15	0.01	-	0.25	0.02	-	0.09	0.01	-	149	11	-	0.019	0.001	-	0.004	0.000	-	100%	11.50
		1	0.19	0.01	-	0.17	0.01	-	0.48	0.03	-	0.82	0.06	-	0.30	0.02	-	481	39	-	0.060	0.005	-	0.013	0.001	-	60%	20.00
	SSD	0	0.17	0.01	-	0.16	0.01	-	0.53	0.02	-	0.74	0.04	-	0.24	0.02	-	397	27	-	0.047	0.003	-	0.012	0.001	-	100%	20.00
		1	0.77	0.04	-	0.71	0.03	-	2.39	0.08	-	3.38	0.16	-	1.11	0.06	-	1,805	103	-	0.215	0.012	-	0.055	0.003	-	91%	20.00
2		0.17	0.01	-	0.16	0.01	-	0.53	0.02	-	0.75	0.04	-	0.24	0.01	-	399	23	-	0.048	0.003	-	0.012	0.001	-	100%	20.00	
Grand Total			2.62	0.14	-	2.41	0.12	-	8.01	0.28	-	11.54	0.60	-	3.83	0.22	-	6,245	374	-	0.748	0.043	-	0.189	0.010	-	78%	14.85

Harborcraft			Hoteling Emissions (lbs)													
			PM2.5		ROG		CO		SOx		CO2		CH4		N2O	
Tug/Barge	Calls	Hours	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge
Robyn J (Barge Jake J)	0.04	16.4	0.00	0.01	0.00	0.05	0.02	0.22	0.00	0.00	2	26	0.000	0.001	0.000	0.001
Robyn J (Barge Payton J)	0.81	16.4	0.02	0.35	0.08	1.14	0.35	5.27	0.00	0.01	44	603	0.002	0.021	0.002	0.028
Robyn J (Barge Tori J)	0.15	16.4	0.00	0.07	0.01	0.23	0.06	1.06	0.00	0.00	8	121	0.000	0.004	0.000	0.006
Grand Total			1.00	0.44	0.10	1.41	0.43	6.55	0.00	0.01	53	750	0.002	0.026	0.002	0.035

Assist Tugs			Hours	
Tug	Calls	Main		
Scout	1.00	0.70		
Tioga	1.00	0.70		
Grand Total			2.00	0.70

Demo/Rail Project - 2020

Ships			Transit Emissions (lbs)																								Comp (%)	Distance (nm)
Ship Type	Engine Type	Emission Tier	Main	DPM Aux	Boiler	Main	PM2.5 Aux	Boiler	Main	ROG Aux	Boiler	Main	CO Aux	Boiler	Main	SOx Aux	Boiler	Main	CO2 Aux	Boiler	Main	CH4 Aux	Boiler	Main	N2O Aux	Boiler		
AUTO CARRIER	SSD	1	0.89	0.04	-	0.82	0.04	-	2.79	0.08	-	3.94	0.18	-	1.29	0.07	-	2,104	112	-	0.250	0.013	-	0.064	0.003	-	0%	20.00
BULK CARRIER	MSD	1	0.07	0.00	-	0.06	0.00	-	0.18	0.01	-	0.30	0.02	-	0.11	0.01	-	174	13	-	0.022	0.001	-	0.005	0.000	-	50%	20.00
	SSD	0	0.10	0.01	-	0.09	0.01	-	0.32	0.01	-	0.45	0.03	-	0.15	0.01	-	243	17	-	0.029	0.002	-	0.007	0.000	-	100%	20.00
		1	0.31	0.01	-	0.29	0.01	-	0.97	0.03	-	1.37	0.06	-	0.45	0.02	-	731	37	-	0.087	0.004	-	0.022	0.001	-	60%	20.00
		2	0.16	0.01	-	0.15	0.01	-	0.50	0.02	-	0.70	0.04	-	0.23	0.01	-	376	24	-	0.045	0.003	-	0.011	0.001	-	100%	11.50
BULK CARRIER, HL	MSD	0	0.03	0.00	-	0.02	0.00	-	0.07	0.00	-	0.12	0.01	-	0.04	0.00	-	69	5	-	0.009	0.001	-	0.002	0.000	-	100%	5.75
CONTAINER SHIP	SSD	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	86%	11.92
GENERAL CARGO	MSD	0	0.06	0.00	-	0.05	0.00	-	0.15	0.01	-	0.25	0.02	-	0.09	0.01	-	149	11	-	0.019	0.001	-	0.004	0.000	-	100%	11.50
		1	0.26	0.02	-	0.24	0.02	-	0.68	0.04	-	1.15	0.09	-	0.42	0.03	-	674	55	-	0.084	0.006	-	0.019	0.001	-	60%	20.00
	SSD	0	0.17	0.01	-	0.16	0.01	-	0.53	0.02	-	0.74	0.04	-	0.24	0.02	-	397	27	-	0.047	0.003	-	0.012	0.001	-	100%	20.00
		1	1.05	0.05	-	0.96	0.05	-	3.27	0.11	-	4.61	0.22	-	1.51	0.08	-	2,462	140	-	0.293	0.016	-	0.075	0.004	-	91%	20.00
Grand Total		2	0.17	0.01	-	0.16	0.01	-	0.53	0.02	-	0.75	0.04	-	0.24	0.01	-	399	23	-	0.048	0.003	-	0.012	0.001	-	100%	20.00
			3.27	0.17	-	3.01	0.15	-	9.98	0.35	-	14.37	0.74	-	4.77	0.27	-	7,777	464	-	0.931	0.054	-	0.235	0.012	-	75%	15.44

Harborcraft			Hoteling Emissions (lbs)													
			PM2.5		ROG		CO		SOx		CO2		CH4		N2O	
Tug/Barge	Calls	Hours	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge
Robyn J (Barge Jake J)	0.04	16.4	0.00	0.02	0.00	0.05	0.02	0.23	0.00	0.00	2	26	0.000	0.001	0.000	0.001
Robyn J (Barge Payton J)	0.84	16.4	0.02	0.36	0.08	1.18	0.37	5.47	0.00	0.01	45	625	0.002	0.021	0.002	0.029
Robyn J (Barge Tori J)	0.15	16.4	0.00	0.07	0.01	0.24	0.07	1.10	0.00	0.00	8	125	0.000	0.004	0.000	0.006
Grand Total			1.04	0.45	0.10	1.46	0.45	6.79	0.00	0.01	55	777	0.002	0.027	0.002	0.036

Assist Tugs

TAMT_Vessels_Unmitigated

Daily Summary

Baseline

			VSR - Arrival				VSR - Departure																							
Ship Type	Engine Type	Emission Tier	Speed (kts)		Main Load Factor		Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Time (hrs)	Aux	Boiler Load (kW)	NOx		Boiler	Main	DPM		Boiler	Main	PM2.5		Boiler	Main	ROG		Boiler
			Comp	NC	Comp	NC			Comp	NC	Comp	NC				Main	Aux			Boiler	Aux			Boiler	Aux			Boiler		
AUTO CARRIER	SSD	1	12.00	16.06	0.18	0.43	0%	20.00	12.00	15.24	0.18	0.36	2.56	0.15	351	29.69	2.32	-	0.49	0.05	-	-	0.45	0.04	-	-	1.53	0.10	-	
BULK CARRIER	MSD	1	11.00	13.60	0.24	0.45	50%	20.00	11.20	13.60	0.25	0.45	3.27	0.17	-	5.16	0.90	-	0.11	0.02	-	-	0.10	0.02	-	-	0.29	0.04	-	
	SSD	0	10.70	14.60	0.32	0.82	100%	20.00	12.45	14.60	0.51	0.82	3.48	0.17	-	8.69	0.84	-	0.13	0.02	-	-	0.12	0.01	-	-	0.40	0.03	-	
		1	11.13	13.10	0.28	0.46	40%	20.00	11.90	13.07	0.34	0.45	3.28	0.17	-	21.95	1.71	-	0.36	0.03	-	-	0.33	0.03	-	-	1.13	0.07	-	
		2	11.05	15.00	0.33	0.82	100%	20.00	12.50	15.00	0.48	0.82	2.64	0.17	-	5.61	0.47	-	0.11	0.01	-	-	0.10	0.01	-	-	0.35	0.02	-	
BULK CARRIER, HL	MSD	0	9.45	13.00	0.32	0.82	100%	20.00	9.45	13.00	0.32	0.82	2.72	0.17	-	2.88	0.55	-	0.05	0.01	-	-	0.05	0.01	-	-	0.14	0.02	-	
CONTAINER SHIP	SSD	0	11.57	14.78	0.16	0.33	73%	12.26	11.83	16.06	0.17	0.42	1.98	0.13	132	110.10	27.62	0.48	1.65	0.50	0.03	-	1.52	0.46	0.03	-	5.69	1.03	0.03	
		1	12.08	16.03	0.21	0.50	75%	11.50	12.53	15.40	0.24	0.44	1.74	0.13	-	17.70	1.82	-	0.29	0.04	-	-	0.27	0.03	-	-	0.91	0.08	-	
GENERAL CARGO	MSD	0	10.10	13.00	0.39	0.82	100%	20.00	10.10	13.00	0.39	0.82	3.12	0.17	-	2.01	0.32	-	0.04	0.01	-	-	0.04	0.01	-	-	0.10	0.01	-	
		1	12.57	13.20	0.45	0.52	60%	20.00	12.20	15.10	0.41	0.78	3.07	0.17	-	12.98	1.69	-	0.28	0.03	-	-	0.26	0.03	-	-	0.72	0.07	-	
	SSD	0	12.07	15.23	0.41	0.82	100%	20.00	12.30	15.23	0.43	0.82	3.28	0.17	-	14.40	1.31	-	0.21	0.02	-	-	0.19	0.02	-	-	0.66	0.05	-	
		1	11.77	13.10	0.27	0.38	45%	20.00	11.86	15.23	0.28	0.59	3.17	0.17	-	50.82	4.73	-	0.84	0.10	-	-	0.77	0.09	-	-	2.63	0.20	-	
		2	10.95	14.90	0.33	0.82	100%	20.00	11.00	14.90	0.33	0.82	3.64	0.17	-	5.74	0.55	-	0.11	0.01	-	-	0.10	0.01	-	-	0.36	0.03	-	
Grand Total			11.60	14.57	0.22	0.43	65%	15.53	11.87	15.41	0.24	0.51	2.42	0.15	93	287.72	44.84	0.48	4.69	0.84	0.03	-	4.31	0.78	0.03	-	14.90	1.75	0.03	

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.81	16.4
Robyn J (Barge Tori J)	0.15	16.4
Grand Total	1.00	16.4

Assist Tugs		
Tug	Calls	Hours
Scout	1.00	0.70
Tioga	1.00	0.70
Grand Total	2.00	0.70

Demo/Rail Project - 2020

Ships			VSR - Arrival						VSR - Departure						NC															
Ship Type	Engine Type	Emission Tier	Speed (kts)		Main Load Factor		Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Time (hrs)	Aux	Boiler Load (kW)	NOx		Boiler	Main	DPM		Boiler	Main	PM2.5		Boiler	Main	ROG		Boiler
			Comp	NC	Comp	NC			Comp	NC	Main	Aux				Aux	Boiler			Aux	Boiler			Aux	Boiler					
AUTO CARRIER	SSD	1	12.00	16.06	0.18	0.43	0%	20.00	12.00	15.24	0.18	0.36	2.56	0.15	351	43.28	3.38	-	0.72	0.07	-	0.66	0.06	-	-	2.24	0.14	-		
BULK CARRIER	MSD	1	11.00	13.60	0.24	0.45	50%	20.00	11.20	13.60	0.25	0.45	3.27	0.17	-	5.16	0.90	-	0.11	0.02	-	0.10	0.02	-	-	0.29	0.04	-		
	SSD	0	10.70	14.60	0.32	0.82	100%	20.00	12.45	14.60	0.51	0.82	3.48	0.17	-	8.69	0.84	-	0.13	0.02	-	0.12	0.01	-	-	0.40	0.03	-		
		1	11.13	13.10	0.28	0.46	40%	20.00	11.90	13.07	0.34	0.45	3.28	0.17	-	21.95	1.71	-	0.36	0.03	-	0.33	0.03	-	-	1.13	0.07	-		
		2	11.05	15.00	0.33	0.82	100%	20.00	12.50	15.00	0.48	0.82	2.64	0.17	-	5.61	0.47	-	0.11	0.01	-	0.10	0.01	-	-	0.35	0.02	-		
BULK CARRIER, HL	MSD	0	9.45	13.00	0.32	0.82	100%	20.00	9.45	13.00	0.32	0.82	2.72	0.17	-	4.31	0.83	-	0.08	0.01	-	0.08	0.01	-	-	0.21	0.03	-		
CONTAINER SHIP	SSD	2	11.64	14.78	0.18	0.36	74%	12.16	11.93	16.06	0.19	0.46	1.94	0.13	325	117.78	31.21	1.17	2.37	0.79	0.08	2.18	0.72	0.07	-	7.93	1.64	0.06		
GENERAL CARGO	MSD	0	10.10	13.00	0.39	0.82	100%	20.00	10.10	13.00	0.39	0.82	3.12	0.17	-	2.01	0.32	-	0.04	0.01	-	0.04	0.01	-	-	0.10	0.01	-		
		1	12.57	13.20	0.45	0.52	60%	20.00	12.20	15.10	0.41	0.78	3.07	0.17	-	18.17	2.37	-	0.39	0.05	-	0.36	0.04	-	-	1.01	0.10	-		
	SSD	0	12.07	15.23	0.41	0.82	100%	20.00	12.30	15.23	0.43	0.82	3.28	0.17	-	14.40	1.31	-	0.21	0.02	-	0.19	0.02	-	-	0.66	0.05	-		
		1	11.77	13.10	0.27	0.38	45%	20.00	11.86	15.23	0.28	0.59	3.17	0.17	-	69.30	6.44	-	1.15	0.13	-	1.06	0.12	-	-	3.58	0.27	-		
		2	10.95	14.90	0.33	0.82	100%	20.00	11.00	14.90	0.33	0.82	3.64	0.17	-	5.74	0.55	-	0.11	0.01	-	0.10	0.01	-	-	0.36	0.03	-		
Grand Total			11.62	14.42	0.24	0.44	62%	16.22	11.85	15.38	0.25	0.54	2.50	0.15	196	316.40	50.33	1.17	5.78	1.17	0.08	5.32	1.08	0.07	-	18.24	2.44	0.06		

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.84	16.4
Robyn J (Barge Tori J)	0.15	16.4
Grand Total	1.04	16.4

Assist Tugs

TAMT_Vessels_Unmitigated

Daily Summary

Baseline

Ships		VSR Emissions (lbs)															Maneuvering										
Ship Type	Engine Type	Emission Tier	CO			SOx			CO2			CH4			N2O			Speed (kts)	Time (hrs)	Load Factors		Boiler Load (kW)	NOx		DPM		
			Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler			Main	Aux		Boiler	Main	Aux		
AUTO CARRIER	SSD	1	2.16	0.21	-	0.71	0.07	-	1,156	129	-	0.138	0.015	-	0.035	0.003	-	7.00	2.41	0.04	0.45	351	5.54	6.56	0.30	0.13	0.13
BULK CARRIER	MSD	1	0.48	0.08	-	0.18	0.03	-	284	50	-	0.035	0.006	-	0.008	0.001	-	7.00	2.41	0.06	0.45	132	1.25	1.77	0.03	0.03	0.04
	SSD	0	0.56	0.07	-	0.18	0.02	-	301	42	-	0.036	0.005	-	0.009	0.001	-	7.00	2.41	0.09	0.45	132	1.70	1.55	0.03	0.03	0.03
		1	1.60	0.15	-	0.52	0.06	-	855	95	-	0.102	0.011	-	0.026	0.002	-	7.00	2.41	0.07	0.45	132	4.36	3.34	0.07	0.09	0.07
		2	0.49	0.05	-	0.16	0.02	-	262	33	-	0.031	0.004	-	0.008	0.001	-	7.00	2.41	0.08	0.45	132	1.38	1.13	0.03	0.03	0.03
BULK CARRIER, HL	MSD	0	0.24	0.04	-	0.09	0.02	-	141	27	-	0.017	0.003	-	0.004	0.001	-	7.00	2.41	0.13	0.45	132	1.15	1.16	0.03	0.02	0.02
CONTAINER SHIP	SSD	0	7.94	2.19	0.05	2.36	0.79	0.14	3,834	1,371	222	0.510	0.159	0.008	0.117	0.036	0.003	7.00	2.41	0.04	0.50	241	51.42	129.74	1.25	1.06	2.33
		1	1.29	0.16	-	0.42	0.06	-	689	101	-	0.082	0.012	-	0.021	0.003	-	7.00	2.41	0.04	0.50	362	7.72	9.70	0.31	0.18	0.20
GENERAL CARGO	MSD	0	0.17	0.03	-	0.06	0.01	-	98	16	-	0.012	0.002	-	0.003	0.000	-	7.00	2.41	0.13	0.45	135	0.51	0.58	0.01	0.01	0.01
		1	1.22	0.15	-	0.44	0.05	-	715	94	-	0.089	0.011	-	0.020	0.002	-	7.00	2.41	0.08	0.45	135	2.10	3.51	0.07	0.05	0.07
	SSD	0	0.93	0.10	-	0.30	0.04	-	498	65	-	0.059	0.008	-	0.015	0.002	-	7.00	2.41	0.08	0.45	135	2.71	2.28	0.04	0.05	0.05
		1	3.70	0.42	-	1.21	0.15	-	1,979	263	-	0.236	0.030	-	0.061	0.007	-	7.00	2.41	0.06	0.45	135	10.14	9.54	0.16	0.21	0.19
Grand Total		2	0.50	0.06	-	0.16	0.02	-	268	39	-	0.032	0.004	-	0.008	0.001	-	7.00	2.41	0.09	0.45	135	1.25	1.22	0.03	0.03	0.02
			21.29	3.71	0.05	6.81	1.35	0.14	11,080	2,325	222	1.379	0.270	0.008	0.335	0.061	0.003	7.00	2.41	0.05	0.48	222	91.25	172.07	2.36	1.92	3.19

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.81	16.4
Robyn J (Barge Tori J)	0.15	16.4
Grand Total	1.00	16.4

Assist Tugs		
Tug	Calls	Hours
Scout	1.00	0.70
Tioga	1.00	0.70
Grand Total	2.00	0.70

Demo/Rail Project - 2020

Ships		VSR Emissions (lbs)															Maneuvering										
Ship Type	Engine Type	Emission Tier	CO			SOx			CO2			CH4			N2O			Speed (kts)	Time (hrs)	Load Factors		Boiler Load (kW)	NOx		DPM		
			Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler			Main	Aux		Boiler	Main	Aux	Boiler	Main
AUTO CARRIER	SSD	1	3.15	0.30	-	1.03	0.11	-	1,685	188	-	0.201	0.022	-	0.052	0.005	-	7.00	2.41	0.04	0.45	351	8.08	9.56	0.43	0.19	0.19
BULK CARRIER	MSD	1	0.48	0.08	-	0.18	0.03	-	284	50	-	0.035	0.006	-	0.008	0.001	-	7.00	2.41	0.06	0.45	135	1.25	1.77	0.03	0.03	0.04
	SSD	0	0.56	0.07	-	0.18	0.02	-	301	42	-	0.036	0.005	-	0.009	0.001	-	7.00	2.41	0.09	0.45	132	1.70	1.55	0.03	0.03	0.03
		1	1.60	0.15	-	0.52	0.06	-	855	95	-	0.102	0.011	-	0.026	0.002	-	7.00	2.41	0.07	0.45	132	4.36	3.34	0.07	0.09	0.07
		2	0.49	0.05	-	0.16	0.02	-	262	33	-	0.031	0.004	-	0.008	0.001	-	7.00	2.41	0.08	0.45	132	1.38	1.13	0.03	0.03	0.03
BULK CARRIER, HL	MSD	0	0.36	0.07	-	0.13	0.02	-	211	41	-	0.026	0.005	-	0.006	0.001	-	7.00	2.41	0.13	0.45	132	1.72	1.74	0.04	0.04	0.04
CONTAINER SHIP	SSD	2	11.11	3.47	0.12	3.39	1.26	0.34	5,516	2,175	538	0.711	0.252	0.019	0.168	0.057	0.008	7.00	2.41	0.04	0.50	325	54.77	149.12	1.73	1.52	3.77
GENERAL CARGO	MSD	0	0.17	0.03	-	0.06	0.01	-	98	16	-	0.012	0.002	-	0.003	0.000	-	7.00	2.41	0.13	0.45	132	0.51	0.58	0.01	0.01	0.01
		1	1.71	0.21	-	0.62	0.08	-	1,002	132	-	0.124	0.015	-	0.028	0.003	-	7.00	2.41	0.08	0.45	135	2.94	4.92	0.10	0.08	0.10
	SSD	0	0.93	0.10	-	0.30	0.04	-	498	65	-	0.059	0.008	-	0.015	0.002	-	7.00	2.41	0.08	0.45	135	2.71	2.28	0.04	0.05	0.05
		1	5.05	0.57	-	1.65	0.21	-	2,699	359	-	0.321	0.042	-	0.083	0.009	-	7.00	2.41	0.06	0.45	135	13.83	13.01	0.22	0.29	0.26
2		0.50	0.06	-	0.16	0.02	-	268	39	-	0.032	0.004	-	0.008	0.001	-	7.00	2.41	0.09	0.45	135	1.25	1.22	0.03	0.03	0.02	
Grand Total			26.11	5.16	0.12	8.40	1.87	0.34	13,678	3,234	538	1.691	0.375	0.019	0.414	0.084	0.008	7.00	2.41	0.05	0.47	251	94.51	190.21	2.76	2.38	4.60

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.84	16.4
Robyn J (Barge Tori J)	0.15	16.4
Grand Total	1.04	16.4

Assist Tugs

TAMT_Vessels_Unmitigated

Daily Summary

Baseline

Ships

13/14 SP avg of 21% - idle time

Ship Type	Engine Type	Emission Tier	Maneuvering Emissions (lbs)																								Hotel Time (hr)	Aux Time (hr)	Hotelling					
			PM2.5				ROG				CO				SOx				CO2				CH4								N2O			
			Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux					Boiler	Auxiliary LF	Boiler Load (kW)	
AUTO CARRIER	SSD	1	0.02	0.12	0.12	0.02	1.00	0.27	0.02	0.89	0.58	0.03	0.12	0.21	0.09		196	365	138	0.090	0.042	0.005	0.007	0.010	0.002	24.0	24.0	0.26	351					
BULK CARRIER	MSD	1	0.00	0.03	0.03	0.00	0.17	0.07	0.00	0.21	0.16	0.00	0.04	0.06	0.01		61	98	13	0.021	0.011	0.000	0.002	0.003	0.000	24.0	24.0	0.10	132					
	SSD	0	0.00	0.03	0.03	0.00	0.15	0.06	0.00	0.19	0.12	0.00	0.04	0.04	0.01		61	77	13	0.014	0.009	0.000	0.002	0.002	0.000	24.0	24.0	0.10	132					
		1	0.00	0.08	0.06	0.00	0.55	0.14	0.00	0.61	0.30	0.01	0.11	0.11	0.02		172	186	32	0.049	0.022	0.001	0.005	0.005	0.000	24.0	24.0	0.10	132					
		2	0.00	0.03	0.03	0.00	0.19	0.06	0.00	0.22	0.13	0.00	0.04	0.05	0.01		66	79	13	0.017	0.009	0.000	0.002	0.002	0.000	24.0	24.0	0.10	132					
BULK CARRIER, HL	MSD	0	0.00	0.02	0.02	0.00	0.08	0.05	0.00	0.13	0.10	0.00	0.04	0.04	0.01		58	64	13	0.010	0.007	0.000	0.002	0.002	0.000	24.0	24.0	0.10	132					
CONTAINER SHIP	SSD	0	0.08	0.97	2.15	0.08	8.23	4.85	0.07	7.32	10.27	0.13	1.01	3.73	0.36	1,618	6,440	579	0.739	0.747	0.020	0.054	0.168	0.008	24.0	18.9	0.35	241						
GENERAL CARGO	1	1	0.02	0.16	0.18	0.02	1.39	0.41	0.02	1.24	0.86	0.03	0.17	0.31	0.09		274	540	142	0.125	0.063	0.005	0.009	0.014	0.002	24.0	24.0	0.35	362					
	MSD	0	0.00	0.01	0.01	0.00	0.05	0.02	0.00	0.07	0.05	0.00	0.02	0.02	0.00		26	32	7	0.004	0.004	0.000	0.001	0.001	0.000	24.0	24.0	0.10	135					
		1	0.00	0.05	0.07	0.00	0.31	0.15	0.00	0.36	0.31	0.01	0.07	0.11	0.02		108	196	33	0.027	0.023	0.001	0.003	0.005	0.000	24.0	24.0	0.10	135					
	SSD	0	0.00	0.04	0.04	0.00	0.27	0.10	0.00	0.32	0.20	0.00	0.06	0.07	0.01		96	127	20	0.024	0.015	0.001	0.003	0.003	0.000	24.0	24.0	0.10	135					
		1	0.01	0.20	0.18	0.01	1.42	0.40	0.01	1.50	0.85	0.02	0.24	0.31	0.05		392	531	73	0.128	0.062	0.003	0.012	0.014	0.001	24.0	24.0	0.10	135					
Grand Total		2	0.00	0.03	0.02	0.00	0.15	0.05	0.00	0.19	0.11	0.00	0.04	0.04	0.01		60	68	13	0.014	0.008	0.000	0.002	0.002	0.000	24.0	24.0	0.10	135					

Harborcraft

18.888

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.81	16.4
Robyn J (Barge Tori J)	0.15	16.4
Grand Total	1.00	16.4

Assist Tugs

Tug	Calls	Hours
Scout	1.00	0.70
Tioga	1.00	0.70
Grand Total	2.00	0.70

Demo/Rail Project - 2020

for AQ, 80% SP; baseline for GHG

Reduction in hoteling time

0%

Ships

Ship Type	Maneuvering Emissions (lbs)																								Hotel Time (hr)	Aux Time (hr)	Hotelling					
	Engine Type	Emission Tier	PM2.5				ROG				CO				SOx				CO2				CH4				N2O					
			Boiler	Main	Aux		Boiler	Main	Aux		Boiler	Main	Aux		Boiler	Main	Aux		Boiler	Main	Aux		Boiler	Main			Aux		Auxiliary LF	Boiler Load (kW)		
AUTO CARRIER	SSD	1	0.03	0.17	0.18	0.03	1.46	0.40	0.02	1.29	0.85	0.04	0.18	0.31	0.13	286	532	201	0.131	0.062	0.007	0.010	0.014	0.003	24.0	24.0	0.26	351				
BULK CARRIER	MSD	1	0.00	0.03	0.03	0.00	0.17	0.07	0.00	0.21	0.16	0.00	0.04	0.06	0.01	61	98	13	0.021	0.011	0.000	0.002	0.003	0.000	24.0	24.0	0.10	135				
	SSD	0	0.00	0.03	0.03	0.00	0.15	0.06	0.00	0.19	0.12	0.00	0.04	0.04	0.01	61	77	13	0.014	0.009	0.000	0.002	0.002	0.000	24.0	24.0	0.10	132				
		1	0.00	0.08	0.06	0.00	0.55	0.14	0.00	0.61	0.30	0.01	0.11	0.11	0.02	172	186	32	0.049	0.022	0.001	0.005	0.005	0.000	24.0	24.0	0.10	132				
		2	0.00	0.03	0.03	0.00	0.19	0.06	0.00	0.22	0.13	0.00	0.04	0.05	0.01	66	79	13	0.017	0.009	0.000	0.002	0.002	0.000	24.0	24.0	0.10	132				
BULK CARRIER, HL	MSD	0	0.00	0.03	0.03	0.00	0.12	0.07	0.00	0.20	0.15	0.00	0.05	0.06	0.01	87	97	19	0.015	0.011	0.001	0.002	0.003	0.000	24.0	24.0	0.10	132				
CONTAINER SHIP	SSD	2	0.12	1.40	3.46	0.11	11.83	7.83	0.10	10.51	16.57	0.17	1.45	6.03	0.50	2,324	10,393	797	1.061	1.205	0.028	0.078	0.271	0.011	24.0	8.2	0.35	325				
GENERAL CARGO	MSD	0	0.00	0.01	0.01	0.00	0.05	0.02	0.00	0.07	0.05	0.00	0.02	0.02	0.00	26	32	6	0.004	0.004	0.000	0.001	0.001	0.000	24.0	24.0	0.10	132				
		1	0.01	0.07	0.09	0.01	0.43	0.21	0.01	0.50	0.44	0.01	0.09	0.16	0.03	151	274	46	0.038	0.032	0.002	0.005	0.007	0.001	24.0	24.0	0.10	135				
	SSD	0	0.00	0.04	0.04	0.00	0.27	0.10	0.00	0.32	0.20	0.00	0.06	0.07	0.01	96	127	20	0.024	0.015	0.001	0.003	0.003	0.000	24.0	24.0	0.10	135				
		1	0.01	0.27	0.24	0.01	1.94	0.55	0.01	2.05	1.15	0.02	0.33	0.42	0.06	535	724	99	0.174	0.084	0.003	0.016	0.019	0.001	24.0	24.0	0.10	135				
Grand Total		2	0.00	0.03	0.02	0.00	0.15	0.05	0.00	0.19	0.11	0.00	0.04	0.04	0.01	60	68	13	0.014	0.008	0.000	0.002	0.002	0.000	24.0	24.0	0.10	135				
			0.18	2.19	4.23	0.17	17.31	9.56	0.15	16.36	20.22	0.28	2.44	7.35	0.80	3,925	12,686	1,274	1.563	1.471	0.044	0.127	0.331	0.018	24.0	16.4	0.24	251				

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.84	16.4
Robyn J (Barge Tori J)	0.15	16.4
Grand Total	1.04	16.4

Assist Tugs

TAMT_Vessels_Unmitigated

Daily Summary

Baseline

Ships

			Hotelling Emissions (lbs)																	
Ship Type	Engine Type	Emission Tier	NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O	
			Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler
AUTO CARRIER	SSD	1	37.66	2.96	0.76	0.20	0.70	0.18	1.58	0.16	3.34	0.30	1.21	0.86	2,096	1,369	0.243	0.048	0.055	0.019
BULK CARRIER	MSD	1	3.90	0.28	0.08	0.02	0.07	0.02	0.16	0.02	0.35	0.03	0.13	0.08	217	129	0.025	0.004	0.006	0.002
	SSD	0	3.42	0.28	0.06	0.02	0.06	0.02	0.13	0.02	0.27	0.03	0.10	0.08	170	129	0.020	0.004	0.004	0.002
		1	7.38	0.70	0.15	0.05	0.14	0.04	0.31	0.04	0.65	0.07	0.24	0.20	411	322	0.048	0.011	0.011	0.005
		2	2.51	0.28	0.06	0.02	0.06	0.02	0.13	0.02	0.28	0.03	0.10	0.08	175	129	0.020	0.004	0.005	0.002
BULK CARRIER, HL	MSD	0	2.87	0.28	0.05	0.02	0.05	0.02	0.11	0.02	0.23	0.03	0.08	0.08	142	129	0.017	0.004	0.004	0.002
CONTAINER SHIP	SSD	0	705.19	12.47	12.68	0.83	11.67	0.76	26.38	0.69	55.81	1.25	20.29	3.62	35,006	5,758	4.059	0.200	0.913	0.081
GENERAL CARGO	1	1	66.82	3.06	1.35	0.20	1.24	0.19	2.80	0.17	5.93	0.31	2.16	0.89	3,718	1,413	0.431	0.049	0.097	0.020
	MSD	0	1.28	0.14	0.03	0.01	0.02	0.01	0.05	0.01	0.11	0.01	0.04	0.04	71	66	0.008	0.002	0.002	0.001
	1	1	7.76	0.71	0.16	0.05	0.14	0.04	0.33	0.04	0.69	0.07	0.25	0.21	432	329	0.050	0.011	0.011	0.005
	SSD	0	5.64	0.43	0.10	0.03	0.09	0.03	0.21	0.02	0.45	0.04	0.16	0.12	280	197	0.032	0.007	0.007	0.003
		1	21.07	1.57	0.42	0.10	0.39	0.10	0.88	0.09	1.87	0.16	0.68	0.46	1,172	724	0.136	0.025	0.031	0.010
Grand Total		2	2.15	0.29	0.05	0.02	0.05	0.02	0.11	0.02	0.24	0.03	0.09	0.08	150	132	0.017	0.005	0.004	0.002
			867.64	23.43	15.96	1.56	14.68	1.44	33.19	1.29	70.21	2.35	25.53	6.81	44,039	10,824	5.106	0.376	1.149	0.153

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.81	16.4
Robyn J (Barge Tori J)	0.15	16.4
Grand Total	1.00	16.4

Assist Tugs

Tug	Calls	Hours
Scout	1.00	0.70
Tioga	1.00	0.70
Grand Total	2.00	0.70

Demo/Rail Project - 2020

Ships

			Hotelling Emissions (lbs)																	
Ship Type	Engine	Emission	NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O	
	Type	Tier	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler
AUTO CARRIER	SSD	1	54.90	4.32	1.11	0.29	1.02	0.26	2.30	0.24	4.87	0.43	1.77	1.26	3,055	1,995	0.354	0.069	0.080	0.028
BULK CARRIER	MSD	1	3.90	0.29	0.08	0.02	0.07	0.02	0.16	0.02	0.35	0.03	0.13	0.08	217	132	0.025	0.005	0.006	0.002
	SSD	0	3.42	0.28	0.06	0.02	0.06	0.02	0.13	0.02	0.27	0.03	0.10	0.08	170	129	0.020	0.004	0.004	0.002
		1	7.38	0.70	0.15	0.05	0.14	0.04	0.31	0.04	0.65	0.07	0.24	0.20	411	322	0.048	0.011	0.011	0.005
		2	2.51	0.28	0.06	0.02	0.06	0.02	0.13	0.02	0.28	0.03	0.10	0.08	175	129	0.020	0.004	0.005	0.002
BULK CARRIER, HL	MSD	0	4.30	0.42	0.08	0.03	0.07	0.03	0.16	0.02	0.34	0.04	0.12	0.12	214	193	0.025	0.007	0.006	0.003
CONTAINER SHIP	SSD	2	348.90	17.15	8.81	1.14	8.11	1.05	18.33	0.95	38.77	1.72	14.10	4.99	24,317	7,923	2.819	0.275	0.634	0.112
GENERAL CARGO	MSD	0	1.28	0.14	0.03	0.01	0.02	0.01	0.05	0.01	0.11	0.01	0.04	0.04	71	64	0.008	0.002	0.002	0.001
		1	10.87	1.00	0.22	0.07	0.20	0.06	0.46	0.06	0.96	0.10	0.35	0.29	605	461	0.070	0.016	0.016	0.007
	SSD	0	5.64	0.43	0.10	0.03	0.09	0.03	0.21	0.02	0.45	0.04	0.16	0.12	280	197	0.032	0.007	0.007	0.003
		1	28.73	2.14	0.58	0.14	0.53	0.13	1.20	0.12	2.55	0.21	0.93	0.62	1,599	987	0.185	0.034	0.042	0.014
		2	2.15	0.29	0.05	0.02	0.05	0.02	0.11	0.02	0.24	0.03	0.09	0.08	150	132	0.017	0.005	0.004	0.002
Grand Total			473.97	27.42	11.33	1.83	10.42	1.68	23.56	1.51	49.84	2.75	18.12	7.97	31,262	12,664	3.625	0.440	0.816	0.179

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.84	16.4
Robyn J (Barge Tori J)	0.15	16.4
Grand Total	1.04	16.4

Assist Tugs

TAMT_Vessels_Unmitigated

Daily Summary

Tug	Calls	Hours per Call		Load Factors		NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		
		Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	
Scout	1.04	0.70	1.00	0.31	0.43	10.38	1.03	0.23	0.02	0.22	0.02	1.24	0.17	9.86	1.09	0.01	0.00	1,158	135	0.023	0.003	0.052	0.006	
Tioga	1.04	0.70	1.00	0.31	0.43	10.38	0.82	0.23	0.03	0.22	0.03	1.24	0.14	9.86	0.62	0.01	0.00	1,158	77	0.023	0.003	0.052	0.003	
Grand Total	2.07	0.70	1.00	0.31	0.43	20.77	1.85	0.46	0.05	0.45	0.05	2.47	0.31	19.72	1.72	0.03	0.00	2,315	211	0.046	0.006	0.104	0.010	

TAMT Plan- 2035

Ships

Ship Type	Engine Type	Emission Tier	Power (kW)			Service Speed (kts)	Total Transit Distance (nm)		Comp (%)	Distance (nm)	Transit - Arrival Speed (kts)		Main Load Factor		Comp (%)	Distance (nm)	Transit - Departure Speed (kts)		Main Load Factor		Time (hrs)	Aux	NC Boiler Load (kW)	NOx			
			Calls	Main	Aux		Arrival	Depart			Comp	NC	Comp	NC			Comp	NC	Comp	NC				Main	Aux	Boiler	
AUTO CARRIER	SSD	1	0.45	11,060	2,760	20.00	35.30	35.30	0%	15.30	12.00	20.00	0.18	0.82	0%	15.30	12.00	20.00	0.18	0.82	1.53	0.15	351	208.50	7.79	-	
BULK CARRIER	MSD	1	0.08	9,100	2,973	16.65	30.20	23.40	0%	10.20	11.00	16.65	0.24	0.82	0%	3.40	11.20	16.65	0.25	0.82	0.82	0.17	-	12.17	0.87	-	
	SSD	0	0.08	8,139	2,325	14.60	30.20	30.20	0%	10.20	10.70	14.60	0.32	0.82	0%	10.20	12.45	14.60	0.51	0.82	1.40	0.17	-	27.06	1.31	-	
		1	0.19	10,705	2,250	15.92	33.94	26.46	0%	13.94	11.13	15.92	0.28	0.82	0%	6.46	11.90	15.92	0.34	0.82	1.28	0.17	-	72.48	2.58	-	
		2	0.08	9,140	2,393	15.00	11.50	48.90	0%	-	11.05	15.00	0.33	0.82	0%	28.90	12.50	15.00	0.48	0.82	1.93	0.17	-	31.06	1.32	-	
BULK CARRIER, HL	MSD	0	0.12	5,738	1,950	13.00	5.75	24.45	0%	-	9.45	13.00	0.32	0.82	0%	4.45	9.45	13.00	0.32	0.82	0.34	0.17	-	5.44	0.40	-	
CONTAINER SHIP	SSD	2	1.93	19,420	11,320	19.50	11.92	12.16	0%	-	11.64	19.50	0.18	0.82	0%	-	11.93	19.50	0.19	0.82	-	0.13	132	-	-	-	
GENERAL CARGO	MSD	0	0.04	5,738	1,950	13.00	11.50	48.90	0%	-	10.10	13.00	0.39	0.82	0%	28.90	10.10	13.00	0.39	0.82	2.22	0.17	-	11.78	0.87	-	
		1	0.27	6,400	2,367	15.34	35.98	23.74	0%	15.98	12.57	15.34	0.45	0.82	0%	3.74	12.20	15.34	0.41	0.82	1.29	0.17	-	47.16	3.82	-	
	SSD	0	0.12	9,268	2,557	15.23	23.97	36.43	0%	3.97	12.07	15.23	0.41	0.82	0%	16.43	12.30	15.23	0.43	0.82	1.34	0.17	-	44.30	2.06	-	
		1	0.58	12,430	2,920	16.98	26.95	34.06	0%	6.95	11.77	16.98	0.27	0.82	0%	14.06	11.86	16.98	0.28	0.82	1.24	0.17	-	243.94	9.72	-	
		2	0.08	8,630	2,048	14.90	42.10	30.20	0%	22.10	10.95	14.90	0.33	0.82	0%	10.20	11.00	14.90	0.33	0.82	2.17	0.17	-	32.99	1.27	-	
Grand Total			4.00	14,524	6,799	18.04	20.86	22.44	0%	5.41	11.62	18.04	0.24	0.82	0%	6.22	11.85	18.04	0.25	0.82	0.69	0.15	103	736.88	32.02	-	
3.8587706 =scaling factor for 2020 to 2035 (4 max daily calls / 2020 max daily calls)																											

Harborcraft

Tug/Barge	Calls	Hours	NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		Hours		NOx		DPM	
			Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Tug	Barge	Tug	Barge	Tug	Barge
Robyn J (Barge Jake J)	0.15	16.4	29.683	1.385	1.013	0.050	0.983	0.049	2.795	0.234	22.288	1.054	0.029	0.001	2,617	130	0.052	0.005	0.118	0.006	1.0	4.5	0.08	1.13	0.00	0.06
Robyn J (Barge Payton J)	3.26	16.4	653.029	30.474	22.285	1.110	21.616	1.077	61.490	5.150	490.328	23.186	0.645	0.032	57,573	2,856	1.144	0.101	2.595	0.129	1.0	4.8	1.86	26.77	0.07	1.44
Robyn J (Barge Tori J)	0.59	16.4	118.733	5.541	4.052	0.202	3.930	0.196	11.180	0.936	89.151	4.216	0.117	0.006	10,468	519	0.208	0.018	0.472	0.023	1.0	5.3	0.34	5.37	0.01	0.29
Grand Total	4.00	16.4	801.445	37.400	27.349	1.362	26.529	1.321	75.465	6.320	601.767	28.455	0.792	0.039	70,658	3,505	1.404	0.124	3.185	0.158	1.0	4.9	2.282	33.267	0.083	1.796

Assist Tugs

Tug	Calls	Hours per Call		Load Factors		Tug Running Emissions (lbs)				PM2.5		ROG		CO		SOx		CO2		CH4		N2O		
		Main	Aux	Main	Aux	NOx	DPM			Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	
Scout	4.00	0.70	1.00	0.31	0.43	40.07	3.96	0.89	0.09	0.86	0.09	4.77	0.65	38.04	4.22	0.05	0.01	4,467	519	0.089	0.013	0.201	0.023	
Tioga	4.00	0.70	1.00	0.31	0.43	40.07	3.17	0.89	0.12	0.86	0.12	4.77	0.54	38.04	2.41	0.05	0.00	4,467	297	0.089	0.010	0.201	0.013	
Grand Total	8.00	0.70	1.00	0.31	0.43	80.13	7.12	1.77	0.21	1.72	0.21	9.54	1.18	76.08	6.62	0.10	0.01	8,933	816	0.178	0.023	0.403	0.037	

TAMT_Vessels_Unmitigated

Daily Summary

Tug	Calls	Hours
		Main
Scout	1.04	0.70
Tioga	1.04	0.70
Grand Total	2.07	0.70

TAMT Plan- 2035

Ships		Transit Emissions (lbs)																										Comp (%)	Distance (nm)
		Engine Type	Emission Tier	DPM			PM2.5			ROG			CO			SOx			CO2			CH4			N2O				
Ship Type			Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler			
AUTO CARRIER	SSD	1	3.45	0.16	-	3.18	0.14	-	10.77	0.33	-	15.19	0.69	-	4.97	0.25	-	8,119	434	-	0.967	0.050	-	0.249	0.011	-	-	0%	20.00
BULK CARRIER	MSD	1	0.26	0.02	-	0.24	0.02	-	0.68	0.04	-	1.14	0.08	-	0.42	0.03	-	671	48	-	0.083	0.006	-	0.019	0.001	-	-	50%	20.00
	SSD	0	0.40	0.02	-	0.37	0.02	-	1.24	0.05	-	1.75	0.10	-	0.57	0.04	-	936	65	-	0.111	0.008	-	0.029	0.002	-	-	100%	20.00
		1	1.20	0.05	-	1.10	0.05	-	3.74	0.11	-	5.28	0.23	-	1.73	0.08	-	2,822	144	-	0.336	0.017	-	0.086	0.004	-	-	60%	20.00
		2	0.62	0.03	-	0.57	0.03	-	1.92	0.07	-	2.71	0.15	-	0.89	0.05	-	1,449	92	-	0.173	0.011	-	0.044	0.002	-	-	100%	11.50
BULK CARRIER, HL	MSD	0	0.10	0.01	-	0.09	0.01	-	0.27	0.02	-	0.45	0.03	-	0.16	0.01	-	266	20	-	0.033	0.002	-	0.007	0.001	-	-	100%	5.75
CONTAINER SHIP	SSD	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	86%	11.92
GENERAL CARGO	MSD	0	0.22	0.02	-	0.21	0.01	-	0.58	0.03	-	0.98	0.07	-	0.36	0.03	-	576	43	-	0.071	0.005	-	0.016	0.001	-	-	100%	11.50
	SSD	1	1.01	0.08	-	0.93	0.07	-	2.62	0.16	-	4.43	0.34	-	1.61	0.12	-	2,600	213	-	0.322	0.025	-	0.073	0.006	-	-	60%	20.00
		0	0.65	0.04	-	0.60	0.03	-	2.03	0.08	-	2.87	0.16	-	0.94	0.06	-	1,532	102	-	0.182	0.012	-	0.047	0.003	-	-	100%	20.00
		1	4.04	0.20	-	3.72	0.18	-	12.60	0.41	-	17.77	0.86	-	5.82	0.31	-	9,499	541	-	1.131	0.063	-	0.291	0.014	-	-	91%	20.00
Grand Total		2	0.65	0.03	-	0.60	0.03	-	2.04	0.07	-	2.88	0.14	-	0.94	0.05	-	1,540	89	-	0.183	0.010	-	0.047	0.002	-	-	100%	20.00
			12.60	0.65	-	11.60	0.60	-	38.50	1.35	-	55.46	2.85	-	18.41	1.04	-	30,010	1,791	-	3.593	0.208	-	0.908	0.047	-	-	75%	15.44

Harborcraft			Hoteling Emissions (lbs)													
			PM2.5		ROG		CO		SOx		CO2		CH4		N2O	
Tug/Barge	Calls	Hours	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge
Robyn J (Barge Jake J)	0.15	16.4	0.00	0.06	0.01	0.19	0.06	0.89	0.00	0.00	8	102	0.000	0.003	0.000	0.005
Robyn J (Barge Payton J)	3.26	16.4	0.07	1.40	0.31	4.55	1.42	21.10	0.00	0.03	174	2,413	0.006	0.083	0.008	0.112
Robyn J (Barge Tori J)	0.59	16.4	0.01	0.28	0.06	0.91	0.26	4.23	0.00	0.01	32	484	0.001	0.017	0.001	0.023
Grand Total	4.00	16.4	0.081	1.742	0.386	5.651	1.737	26.219	0.002	0.034	213.88	2,999.05	0.008	0.103	0.010	0.140

Assist Tugs		Hours	
Tug	Calls	Main	
Scout	4.00	0.70	
Tioga	4.00	0.70	
Grand Total	8.00	0.70	

TAMT_Vessels_Unmitigated

Daily Summary

Tug	Calls	Hours
		Main
Scout	1.04	0.70
Tioga	1.04	0.70
Grand Total	2.07	0.70

TAMT Plan- 2035

Ships																													
Ship Type	Engine Type	Emission Tier	VSR - Arrival				VSR - Departure						NC																
			Speed (kts)	NC	Main Load Factor	Comp	Distance (nm)	Speed (kts)	NC	Main Load Factor	Comp (%)	Time (hrs)	Aux	Boiler Load (kW)	Main	NOx Aux	Boiler	Main	DPM Aux	Boiler	Main	PM2.5 Aux	Boiler	Main	ROG Aux	Boiler			
AUTO CARRIER	SSD	1	12.00	16.06	0.18	0.43	0%	20.00	12.00	15.24	0.18	0.36	2.56	0.15	351	167.00	13.02	-	2.76	0.26	-	2.54	0.24	-	8.63	0.55	-		
BULK CARRIER	MSD	1	11.00	13.60	0.24	0.45	50%	20.00	11.20	13.60	0.25	0.45	3.27	0.17	-	19.90	3.49	-	0.43	0.07	-	0.39	0.06	-	1.11	0.15	-		
	SSD	0	10.70	14.60	0.32	0.82	100%	20.00	12.45	14.60	0.51	0.82	3.48	0.17	-	33.54	3.25	-	0.49	0.06	-	0.45	0.05	-	1.54	0.12	-		
		1	11.13	13.10	0.28	0.46	40%	20.00	11.90	13.07	0.34	0.45	3.28	0.17	-	84.70	6.61	-	1.40	0.13	-	1.29	0.12	-	4.38	0.28	-		
		2	11.05	15.00	0.33	0.82	100%	20.00	12.50	15.00	0.48	0.82	2.64	0.17	-	21.63	1.81	-	0.43	0.05	-	0.39	0.04	-	1.34	0.10	-		
BULK CARRIER, HL	MSD	0	9.45	13.00	0.32	0.82	100%	20.00	9.45	13.00	0.32	0.82	2.72	0.17	-	16.64	3.20	-	0.32	0.06	-	0.29	0.05	-	0.82	0.12	-		
CONTAINER SHIP	SSD	2	11.64	14.78	0.18	0.36	74%	12.16	11.93	16.06	0.19	0.46	1.94	0.13	325	454.50	120.42	4.50	9.14	3.04	0.30	8.41	2.80	0.28	30.59	6.32	0.25		
GENERAL CARGO	MSD	0	10.10	13.00	0.39	0.82	100%	20.00	10.10	13.00	0.39	0.82	3.12	0.17	-	7.75	1.22	-	0.15	0.02	-	0.14	0.02	-	0.38	0.05	-		
		1	12.57	13.20	0.45	0.52	60%	20.00	12.20	15.10	0.41	0.78	3.07	0.17	-	70.11	9.13	-	1.50	0.18	-	1.38	0.17	-	3.89	0.38	-		
	SSD	0	12.07	15.23	0.41	0.82	100%	20.00	12.30	15.23	0.43	0.82	3.28	0.17	-	55.56	5.06	-	0.82	0.09	-	0.75	0.08	-	2.55	0.19	-		
		1	11.77	13.10	0.27	0.38	45%	20.00	11.86	15.23	0.28	0.59	3.17	0.17	-	267.41	24.87	-	4.43	0.50	-	4.07	0.46	-	13.81	1.04	-		
Grand Total		2	10.95	14.90	0.33	0.82	100%	20.00	11.00	14.90	0.33	0.82	3.64	0.17	-	22.17	2.14	-	0.44	0.05	-	0.40	0.05	-	1.37	0.11	-		
			11.62	14.42	0.24	0.44	62%	16.22	11.85	15.38	0.25	0.54	2.50	0.15	196	1,220.92	194.23	4.50	22.30	4.52	0.30	20.52	4.16	0.28	70.40	9.40	0.25		

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.15	16.4
Robyn J (Barge Payton J)	3.26	16.4
Robyn J (Barge Tori J)	0.59	16.4
Grand Total	4.00	16.4

Assist Tugs

Tug	Calls	Hours
		Main
Scout	4.00	0.70
Tioga	4.00	0.70
Grand Total	8.00	0.70

TAMT_Vessels_Unmitigated

Daily Summary

Tug	Calls	Hours
		Main
Scout	1.04	0.70
Tioga	1.04	0.70
Grand Total	2.07	0.70

TAMT Plan- 2035

Ships		VSR Emissions (lbs)																Maneuvering									
Ship Type	Engine Type	Emission Tier	CO		SOx		CO2		CH4		N2O		Speed (kts)	Time (hrs)	Load Factors		Boiler Load (kW)	NOx		Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux
			Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux		Main	Aux		Main	Aux								
AUTO CARRIER	SSD	1	12.17	1.16	-	3.98	0.42	-	6,503	725	-	0.774	0.084	-	0.199	0.019	-	7.00	2.41	0.04	0.45	351	31.18	36.88	1.68	0.72	0.74
BULK CARRIER	MSD	1	1.87	0.31	-	0.68	0.11	-	1,097	194	-	0.136	0.023	-	0.031	0.005	-	7.00	2.41	0.06	0.45	135	4.83	6.81	0.11	0.12	0.14
	SSD	0	2.17	0.26	-	0.71	0.09	-	1,160	161	-	0.138	0.019	-	0.036	0.004	-	7.00	2.41	0.09	0.45	132	6.54	5.97	0.11	0.11	0.11
		1	6.17	0.59	-	2.02	0.21	-	3,298	368	-	0.393	0.043	-	0.101	0.010	-	7.00	2.41	0.07	0.45	132	16.83	12.89	0.27	0.34	0.26
		2	1.89	0.20	-	0.62	0.07	-	1,009	126	-	0.120	0.015	-	0.031	0.003	-	7.00	2.41	0.08	0.45	132	5.34	4.38	0.11	0.13	0.11
BULK CARRIER, HL	MSD	0	1.39	0.25	-	0.50	0.09	-	813	159	-	0.101	0.018	-	0.023	0.004	-	7.00	2.41	0.13	0.45	132	6.65	6.70	0.16	0.14	0.14
CONTAINER SHIP	SSD	2	42.85	13.38	0.45	13.08	4.87	1.31	21,285	8,393	2,078	2.745	0.973	0.072	0.649	0.219	0.029	7.00	2.41	0.04	0.50	325	211.33	575.42	6.66	5.86	14.53
GENERAL CARGO	MSD	0	0.65	0.10	-	0.23	0.04	-	379	61	-	0.047	0.007	-	0.011	0.002	-	7.00	2.41	0.13	0.45	132	1.97	2.23	0.05	0.05	0.05
		1	6.59	0.81	-	2.40	0.29	-	3,865	508	-	0.479	0.059	-	0.108	0.013	-	7.00	2.41	0.08	0.45	135	11.36	18.99	0.39	0.29	0.38
	SSD	0	3.60	0.40	-	1.18	0.15	-	1,922	251	-	0.229	0.029	-	0.059	0.007	-	7.00	2.41	0.08	0.45	135	10.46	8.79	0.17	0.18	0.18
		1	19.48	2.21	-	6.38	0.80	-	10,413	1,384	-	1.240	0.160	-	0.319	0.036	-	7.00	2.41	0.06	0.45	135	53.35	50.19	0.83	1.13	1.01
Grand Total		2	1.94	0.24	-	0.63	0.09	-	1,034	149	-	0.123	0.017	-	0.032	0.004	-	7.00	2.41	0.09	0.45	135	4.84	4.69	0.11	0.11	0.09
			100.75	19.89	0.45	32.41	7.23	1.31	52,779	12,479	2,078	6.525	1.447	0.072	1.597	0.326	0.029	7.00	2.41	0.05	0.47	251	364.68	733.96	10.64	9.17	17.74

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.15	16.4
Robyn J (Barge Payton J)	3.26	16.4
Robyn J (Barge Tori J)	0.59	16.4
Grand Total	4.00	16.4

Assist Tugs

Tug	Calls	Hours
		Main
Scout	4.00	0.70
Tioga	4.00	0.70
Grand Total	8.00	0.70

TAMT_Vessels_Unmitigated

Daily Summary

Tug	Calls	Hours
		Main
Scout	1.04	0.70
Tioga	1.04	0.70
Grand Total	2.07	0.70

TAMT Plan- 2035

for AQ, 80% SP; baseline for GHG

Reduction in hoteling time 0%

Ships

	Maneuvering Emissions (lbs)																							Hotel	Aux	Hotelling								
Ship Type	Engine	Emission	PM2.5				ROG				CO				SOx				CO2				CH4				N2O				Time (hr)	Time (hr)	Auxiliary LF	Boiler Load (kW)
	Type	Tier	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler							
AUTO CARRIER	SSD	1	0.11	0.66	0.68	0.10	5.62	1.55	0.09	4.99	3.27	0.17	0.69	1.19	0.49	1,104	2,052	775	0.504	0.238	0.027	0.037	0.054	0.011	24.0	24.0	0.26	351						
	MSD	1	0.01	0.11	0.13	0.01	0.65	0.29	0.01	0.82	0.60	0.01	0.15	0.22	0.03	234	379	51	0.080	0.044	0.002	0.007	0.010	0.001	24.0	24.0	0.10	135						
BULK CARRIER	SSD	0	0.01	0.10	0.10	0.01	0.60	0.22	0.01	0.73	0.47	0.01	0.14	0.17	0.03	233	297	50	0.053	0.034	0.002	0.007	0.008	0.001	24.0	24.0	0.10	132						
		1	0.02	0.32	0.24	0.02	2.11	0.54	0.01	2.36	1.14	0.03	0.41	0.42	0.08	665	717	125	0.189	0.083	0.004	0.020	0.019	0.002	24.0	24.0	0.10	132						
		2	0.01	0.12	0.10	0.01	0.72	0.23	0.01	0.85	0.49	0.01	0.16	0.18	0.03	255	305	50	0.065	0.035	0.002	0.008	0.008	0.001	24.0	24.0	0.10	132						
BULK CARRIER, HL	MSD	0	0.01	0.12	0.12	0.01	0.47	0.28	0.01	0.76	0.59	0.02	0.21	0.22	0.05	334	373	75	0.058	0.043	0.003	0.009	0.010	0.001	24.0	24.0	0.10	132						
CONTAINER SHIP	SSD	2	0.44	5.39	13.37	0.41	45.64	30.22	0.37	40.57	63.94	0.67	5.60	23.25	1.94	8,969	40,105	3,075	4.096	4.650	0.107	0.302	1.046	0.043	24.0	8.2	0.35	325						
GENERAL CARGO	MSD	0	0.00	0.04	0.04	0.00	0.19	0.09	0.00	0.25	0.20	0.01	0.06	0.07	0.02	101	124	25	0.017	0.014	0.001	0.003	0.003	0.000	24.0	24.0	0.10	132						
		1	0.03	0.27	0.35	0.02	1.65	0.80	0.02	1.94	1.68	0.04	0.36	0.61	0.11	584	1,057	179	0.149	0.122	0.006	0.017	0.028	0.003	24.0	24.0	0.10	135						
	SSD	0	0.01	0.17	0.16	0.01	1.05	0.37	0.01	1.23	0.78	0.02	0.23	0.28	0.05	370	489	77	0.094	0.057	0.003	0.011	0.013	0.001	24.0	24.0	0.10	135						
		1	0.06	1.04	0.93	0.05	7.49	2.10	0.05	7.89	4.45	0.08	1.28	1.62	0.24	2,065	2,793	383	0.672	0.324	0.013	0.064	0.073	0.005	24.0	24.0	0.10	135						
		2	0.01	0.10	0.09	0.01	0.59	0.20	0.01	0.73	0.42	0.01	0.14	0.15	0.03	233	261	51	0.053	0.030	0.002	0.007	0.007	0.001	24.0	24.0	0.10	135						
Grand Total			0.71	8.44	16.32	0.65	66.78	36.89	0.59	63.11	78.04	1.07	9.43	28.38	3.09	15,147	48,953	4,916	6.031	5.676	0.171	0.491	1.277	0.069	24.0	16.4	0.24	251						

Harborcraft

.35 from SP report is c

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.15	16.4
Robyn J (Barge Payton J)	3.26	16.4
Robyn J (Barge Tori J)	0.59	16.4
Grand Total	4.00	16.4

Assist Tugs

Tug	Calls	Hours
		Main
Scout	4.00	0.70
Tioga	4.00	0.70
Grand Total	8.00	0.70

TAMT_Vessels_Unmitigated

Daily Summary

Tug	Hours	
	Calls	Main
Scout	1.04	0.70
Tioga	1.04	0.70
Grand Total	2.07	0.70

TAMT Plan- 2035

Ships

Ship Type	Engine Type	Emission Tier	Hotelling Emissions (lbs)																	
			NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O	
			Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler
AUTO CARRIER	SSD	1	211.83	16.67	4.27	1.11	3.93	1.02	8.88	0.92	18.79	1.67	6.83	4.85	11,787	7,700	1.367	0.267	0.307	0.109
BULK CARRIER	MSD	1	15.05	1.10	0.30	0.07	0.28	0.07	0.63	0.06	1.34	0.11	0.49	0.32	838	508	0.097	0.018	0.022	0.007
	SSD	0	13.20	1.08	0.24	0.07	0.22	0.07	0.49	0.06	1.04	0.11	0.38	0.31	655	497	0.076	0.017	0.017	0.007
		1	28.48	2.69	0.57	0.18	0.53	0.16	1.19	0.15	2.53	0.27	0.92	0.78	1,585	1,242	0.184	0.043	0.041	0.018
		2	9.67	1.08	0.24	0.07	0.22	0.07	0.51	0.06	1.07	0.11	0.39	0.31	674	497	0.078	0.017	0.018	0.007
BULK CARRIER, HL	MSD	0	16.60	1.61	0.30	0.11	0.27	0.10	0.62	0.09	1.31	0.16	0.48	0.47	824	745	0.096	0.026	0.021	0.011
CONTAINER SHIP	SSD	2	1,346.33	66.19	34.00	4.41	31.28	4.06	70.72	3.65	149.59	6.64	54.40	19.24	93,835	30,573	10.879	1.062	2.448	0.431
GENERAL CARGO	MSD	0	4.94	0.54	0.10	0.04	0.09	0.03	0.21	0.03	0.44	0.05	0.16	0.16	275	248	0.032	0.009	0.007	0.004
		1	41.94	3.85	0.85	0.26	0.78	0.24	1.76	0.21	3.72	0.39	1.35	1.12	2,334	1,778	0.271	0.062	0.061	0.025
	SSD	0	21.77	1.65	0.39	0.11	0.36	0.10	0.81	0.09	1.72	0.17	0.63	0.48	1,081	762	0.125	0.026	0.028	0.011
		1	110.87	8.25	2.24	0.55	2.06	0.51	4.65	0.45	9.84	0.83	3.58	2.40	6,170	3,810	0.715	0.132	0.161	0.054
Grand Total		2	8.28	1.10	0.21	0.07	0.19	0.07	0.43	0.06	0.92	0.11	0.33	0.32	577	508	0.067	0.018	0.015	0.007
			1,828.96	105.79	43.71	7.05	40.21	6.49	90.91	5.83	192.31	10.61	69.93	30.76	120,634	48,867	13.987	1.697	3.147	0.689

Harborcraft

efault reefer LF

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.15	16.4
Robyn J (Barge Payton J)	3.26	16.4
Robyn J (Barge Tori J)	0.59	16.4
Grand Total	4.00	16.4

Assist Tugs

Tug	Hours	
	Calls	Main
Scout	4.00	0.70
Tioga	4.00	0.70
Grand Total	8.00	0.70

Baseline

40 VSR Distance

Ships

Ship Type	Engine Type	Emission Tier	Power (kW)				Service Speed (kts)	Total Transit Distance (nm)		Transit - Arrival				Transit - Departure				Time (hrs)	NC Boiler		NOx						
			Calls	Main	Aux	Distance (nm)		Arrival	Depart	Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Comp (%)	Distance (nm)		Speed (kts)		Main Load Factor		Comp (%)	Aux	Load (kW)	Main	Aux
							Comp					NC	Comp	NC	Comp			NC	Comp	NC	Comp	NC					
AUTO CARRIER	SSD	1	8	11,060	2,760	20.00	35.30	35.30	0%	-	12.00	20.00	0.18	0.82	0%	-	12.00	20.00	0.18	0.82	-	0.15	351	-	-	-	-
BULK CARRIER	MSD	1	2	9,100	2,973	16.65	30.20	23.40	0%	-	11.00	16.65	0.24	0.82	0%	-	11.20	16.65	0.25	0.82	-	0.17	-	-	-	-	-
	SSD	0	2	8,139	2,325	14.60	30.20	30.20	0%	-	10.70	14.60	0.32	0.82	0%	-	12.45	14.60	0.51	0.82	-	0.17	-	-	-	-	-
		1	5	10,705	2,250	15.92	33.94	26.46	0%	-	11.13	15.92	0.28	0.82	0%	-	11.90	15.92	0.34	0.82	-	0.17	-	-	-	-	-
		2	2	9,140	2,393	15.00	11.50	48.90	0%	-	11.05	15.00	0.33	0.82	0%	8.90	12.50	15.00	0.48	0.82	0.59	0.17	-	0.124	0.005	-	0.002
BULK CARRIER, HL	MSD	0	2	5,738	1,950	13.00	5.75	24.45	0%	-	9.45	13.00	0.32	0.82	0%	-	9.45	13.00	0.32	0.82	-	0.17	-	-	-	-	-
CONTAINER SHIP	SSD	0	49	14,948	7,158	20.03	11.99	12.26	0%	-	11.57	20.03	0.16	0.82	0%	-	11.83	20.03	0.17	0.82	-	0.13	132	-	-	-	-
		1	8	13,055	3,676	18.93	11.50	11.50	0%	-	12.08	18.93	0.21	0.82	0%	-	12.53	18.93	0.24	0.82	-	0.13	-	-	-	-	
	MSD	0	1	5,738	1,950	13.00	11.50	48.90	0%	-	10.10	13.00	0.39	0.82	0%	8.90	10.10	13.00	0.39	0.82	0.68	0.17	-	0.047	0.003	-	0.001
GENERAL CARGO	MSD	1	5	6,400	2,367	15.34	35.98	23.74	0%	-	12.57	15.34	0.45	0.82	0%	-	12.20	15.34	0.41	0.82	-	0.17	-	-	-	-	-
		0	3	9,268	2,557	15.23	23.97	36.43	0%	-	12.07	15.23	0.41	0.82	0%	-	12.30	15.23	0.43	0.82	-	0.17	-	-	-	-	-
		1	11	12,430	2,920	16.98	26.95	34.06	0%	-	11.77	16.98	0.27	0.82	0%	-	11.86	16.98	0.28	0.82	-	0.17	-	-	-	-	-
	SSD	2	2	8,630	2,048	14.90	42.10	30.20	0%	2.10	10.95	14.90	0.33	0.82	0%	-	11.00	14.90	0.33	0.82	0.14	0.17	-	0.028	0.001	-	0.001
Grand Total			100	12,627	4,904	18.43	19.31	20.74	0%	0.04	11.60	18.43	0.22	0.82	0%	0.27	11.87	18.43	0.24	0.82	0.02	0.15	93	0.199	0.010	-	0.001

Harborcraft			Tug Running Emissions (tons)																		143.48						2.76	
			NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		Hours		NOx		DPM		PM	
Tug/Barge	Calls	Hours	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge
Robyn J (Barge Jake J)	1	16.4	0.100	0.005	0.003	0.000	0.003	0.000	0.009	0.001	0.075	0.004	0.000	0.000	8.83	0.44	0.000	0.000	0.000	0.000	1.0	4.5	0.000	0.004	0.000	0.000	0.000	0.000
Robyn J (Barge Payton J)	22	16.4	2.204	0.103	0.075	0.004	0.073	0.004	0.208	0.017	1.655	0.078	0.002	0.000	194.31	9.64	0.004	0.000	0.009	0.000	1.0	4.8	0.006	0.090	0.000	0.005	0.000	0.000
Robyn J (Barge Tori J)	4	16.4	0.401	0.019	0.014	0.001	0.013	0.001	0.038	0.003	0.301	0.014	0.000	0.000	35.33	1.75	0.001	0.000	0.000	0.002	0.000	1.0	5.3	0.001	0.018	0.000	0.001	0.000
Grand Total	27	16.4	2.705	0.126	0.092	0.005	0.090	0.004	0.255	0.021	2.031	0.096	0.003	0.000	238.47	11.83	0.005	0.000	0.011	0.001	1.0	4.9	0.008	0.112	0.000	0.006	0.000	0.000

Assist Tugs						Tug Running Emissions (tons)																		
Tug	Hours per Call			Load Factors			NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O	
	Calls	Main	Aux	Main	Aux		Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux
Scout	100	0.70	1.00	0.31	0.43		0.501	0.049	0.011	0.001	0.011	0.001	0.060	0.008	0.476	0.053	0.001	0.000	55.83	6.49	0.001	0.000	0.003	0.000
Tioga	100	0.70	1.00	0.31	0.43		0.501	0.040	0.011	0.002	0.011	0.001	0.060	0.007	0.476	0.030	0.001	0.000	55.83	3.71	0.001	0.000	0.003	0.000
Grand Total	200	0.70	1.00	0.31	0.43		1.002	0.089	0.022	0.003	0.021	0.003	0.119	0.015	0.951	0.083	0.001	0.000	111.67	10.20	0.002	0.000	0.005	0.000

Demo/Rail Project - 2020 - VSR Beyond CAP

Ships

Ship Type	Engine		Power (kW)				Total Transit		Transit - Arrival				Transit - Departure				Time			NC Boiler			NOx				
	Type	Emission Tier	Calls	Main	Aux	Service Speed (kts)	Distance (nm)		Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Time (hrs)	Aux	Load (kW)	Main	Aux	Boiler	Main
							Arrival	Depart			Comp	NC	Comp	NC			Comp	NC	Comp	NC							
AUTO CARRIER	SSD	1	11.66	11,060	2,760	20.00	35.30	35.30	0%	-	12.00	20.00	0.18	0.82	0%	-	12.00	20.00	0.18	0.82	-	0.15	351	-	-	-	-
	MSD	1	2.00	9,100	2,973	16.65	30.20	23.40	0%	-	11.00	16.65	0.24	0.82	0%	-	11.20	16.65	0.25	0.82	-	0.17	-	-	-	-	-
BULK CARRIER	SSD	0	2.00	8,139	2,325	14.60	30.20	30.20	0%	-	10.70	14.60	0.32	0.82	0%	-	12.45	14.60	0.51	0.82	-	0.17	-	-	-	-	-
		1	5.00	10,705	2,250	15.92	33.94	26.46	0%	-	11.13	15.92	0.28	0.82	0%	-	11.90	15.92	0.34	0.82	-	0.17	-	-	-	-	
		2	2.00	9,140	2,393	15.00	11.50	48.90	0%	-	11.05	15.00	0.33	0.82	0%	8.90	12.50	15.00	0.48	0.82	0.59	0.17	-	0.124	0.005	-	0.002
BULK CARRIER, HL CONTAINER SHIP	MSD	0	3.00	5,738	1,950	13.00	5.75	24.45	0%	-	9.45	13.00	0.32	0.82	0%	-	9.45	13.00	0.32	0.82	-	0.17	-	-	-	-	-
	SSD	2	50.00	19,420	11,320	19.50	11.92	12.16	0%	-	11.64	19.50	0.18	0.82	0%	-	11.93	19.50	0.19	0.82	-	0.13	132	-	-	-	-
GENERAL CARGO	MSD	0	1.00	5,738	1,950	13.00	11.50	48.90	0%	-	10.10	13.00	0.39	0.82	0%	8.90	10.10	13.00	0.39	0.82	0.68	0.17	-	0.047	0.003	-	0.001
		1	7.00	6,400	2,367	15.34	35.98	23.74	0%	-	12.57	15.34	0.45	0.82	0%	-	12.20	15.34	0.41	0.82	-	0.17	-	-	-	-	-
	SSD	0	3.00	9,268	2,557	15.23	23.97	36.43	0%	-	12.07	15.23	0.41	0.82	0%	-	12.30	15.23	0.43	0.82	-	0.17	-	-	-	-	-
		1	15.00	12,430	2,920	16.98	26.95	34.06	0%	-	11.77	16.98	0.27	0.82	0%	-	11.86	16.98	0.28	0.82	-	0.17	-	-	-	-	-
Grand Total		2	2.00	8,630	2,048	14.90	42.10	30.20	0%	2.10	10.95	14.90	0.33	0.82	0%	-	11.00	14.90	0.33	0.82	0.14	0.17	-	0.028	0.001	-	0.001
			103.66	14,524	6,799	18.04	20.86	22.44	0%	0.04	11.62	18.04	0.24	0.82	0%	0.26	11.85	18.04	0.25	0.82	0.02	0.15	103	0.199	0.010	-	0.004

Harborcraft		Tug Running Emissions (tons)																				Hours		NOx		DPM		PM	
Tug/Barge	Calls	NOx		DPM		PM2.5		ROG	CO		SOx		CO2		CH4		N2O		Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge			
		Main	Aux	Main	Aux	Main	Aux		Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux											
Robyn J (Barge Jake J)	1	16.4	0.100	0.005	0.003	0.000	0.003	0.000	0.009	0.001	0.075	0.004	0.000	0.000	8.83	0.44	0.000	0.000	0.000	0.000	1.0	4.5	0.000	0.004	0.000	0.000	0.000		
Robyn J (Barge Payton J)	23	16.4	2.304	0.108	0.079	0.004	0.076	0.004	0.217	0.018	1.730	0.082	0.002	0.000	203.14	10.08	0.004	0.000	0.009	0.000	1.0	4.8	0.007	0.094	0.000	0.005	0.000		
Robyn J (Barge Tori J)	4	16.4	0.401	0.019	0.014	0.001	0.013	0.001	0.038	0.003	0.301	0.014	0.000	0.000	35.33	1.75	0.001	0.000	0.002	0.000	1.0	5.3	0.001	0.018	0.000	0.001	0.000		
Grand Total	28	16.4	2.805	0.131	0.096	0.005	0.093	0.005	0.264	0.022	2.106	0.100	0.003	0.000	247.30	12.27	0.005	0.000	0.011	0.001	1.0	4.9	0.008	0.116	0.000	0.006	0.000		

Assist Tugs

Tug Running Emissions (tons)

Baseline

Ships

Ship Type	Engine Type	Emission Tier	Transit Emissions (tons)																								Comp (%)	Distance (nm)	VSR -
			DPM			PM2.5			ROG			CO			SOx			CO2			CH4			N2O					Speed
			Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Comp			
AUTO CARRIER	SSD	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	35.30	12.00	
	MSD	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	30.20	11.00	
BULK CARRIER	SSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	30.20	10.70	
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	33.94	11.13		
		2	0.000	-	0.002	0.000	-	0.008	0.000	-	0.011	0.001	-	0.004	0.000	-	5.78	0.37	-	0.001	0.000	-	0.000	0.000	-	100%	11.50	11.05	
BULK CARRIER, HL	MSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	5.75	9.45	
CONTAINER SHIP	SSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	11.99	11.57	
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	11.50	12.08		
GENERAL CARGO	MSD	0	0.000	-	0.001	0.000	-	0.002	0.000	-	0.004	0.000	-	0.001	0.000	-	2.30	0.17	-	0.000	0.000	-	0.000	0.000	-	100%	11.50	10.10	
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	35.98	12.57		
	SSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	23.97	12.07	
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	91%	26.95	11.77	
Grand Total		2	0.000	-	0.001	0.000	-	0.002	0.000	-	0.002	0.000	-	0.001	0.000	-	1.30	0.07	-	0.000	0.000	-	0.000	0.000	-	100%	40.00	10.95	
			0.000	-	0.004	0.000	-	0.012	0.000	-	0.017	0.001	-	0.006	0.000	-	9.38	0.61	-	0.001	0.000	-	0.000	0.000	-	91%	19.27	11.60	

Harborcraft			Hoteling Emissions (tons)													
			2.5		ROG		CO		SOx		CO2		CH4		N2O	
Tug/Barge	Calls	Hours	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	
Robyn J (Barge Jake J)	1	16.4	0.000	0.000	0.001	0.000	0.003	0.000	0.000	0.03	0.34	0.000	0.000	0.000	0.000	
Robyn J (Barge Payton J)	22	16.4	0.005	0.001	0.015	0.005	0.071	0.000	0.000	0.59	8.14	0.000	0.000	0.000	0.000	
Robyn J (Barge Tori J)	4	16.4	0.001	0.000	0.003	0.001	0.014	0.000	0.000	0.11	1.63	0.000	0.000	0.000	0.000	
Grand Total	27	16.4	0.006	0.001	0.019	0.006	0.088	0.000	0.000	0.72	10.12	0.000	0.000	0.000	0.000	

Assist Tugs

		Hours per Call	
Tug	Calls	Main	Standby
Scout	100	0.70	0.00
Tioga	100	0.70	0.00
Grand Total	200	0.70	0.00

Demo/Rail Project - 2020 - VSR Beyond

Ships

	Transit Emissions (tons)																							VSR - Speed				
Ship Type	Engine Type	Emission Tier	DPM Aux	Boiler	Main	PM2.5 Aux	Boiler	Main	ROG Aux	Boiler	Main	CO Aux	Boiler	Main	SOx Aux	Boiler	Main	CO2 Aux	Boiler	Main	CH4 Aux	Boiler	Main	N2O Aux	Boiler	Comp (%)	Distance (nm)	Comp
AUTO CARRIER	SSD	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	35.30	12.00
	MSD	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	30.20	11.00
BULK CARRIER	SSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	30.20	10.70
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	33.94	11.13	
		2	0.000	-	0.002	0.000	-	0.008	0.000	-	0.011	0.001	-	0.004	0.000	-	5.78	0.37	-	0.001	0.000	-	0.000	0.000	-	100%	11.50	11.05
BULK CARRIER, HL	MSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	5.75	9.45	
CONTAINER SHIP	SSD	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	11.92	11.64
GENERAL CARGO	MSD	0	0.000	-	0.001	0.000	-	0.002	0.000	-	0.004	0.000	-	0.001	0.000	-	2.30	0.17	-	0.000	0.000	-	0.000	0.000	-	100%	11.50	10.10
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	35.98	12.57	
	SSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	23.97	12.07	
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	91%	26.95	11.77	
		2	0.000	-	0.001	0.000	-	0.002	0.000	-	0.002	0.000	-	0.001	0.000	-	1.30	0.07	-	0.000	0.000	-	0.000	0.000	-	100%	40.00	10.95
Grand Total			0.000	-	0.004	0.000	-	0.012	0.000	-	0.017	0.001	-	0.006	0.000	-	9.38	0.61	-	0.001	0.000	-	0.000	0.000	-	91%	20.82	11.62

Harborcraft		Hoteling Emissions (tons)													
		2.5		ROG		CO		SOx		CO2		CH4		N2O	
Tug/Barge	Calls	Hours	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge
Robyn J (Barge Jake J)	1	16.4	0.000	0.000	0.001	0.000	0.003	0.000	0.000	0.03	0.34	0.000	0.000	0.000	0.000
Robyn J (Barge Payton J)	23	16.4	0.005	0.001	0.016	0.005	0.074	0.000	0.000	0.61	8.51	0.000	0.000	0.000	0.000
Robyn J (Barge Tori J)	4	16.4	0.001	0.000	0.003	0.001	0.014	0.000	0.000	0.11	1.63	0.000	0.000	0.000	0.000
Grand Total	28	16.4	0.006	0.001	0.020	0.006	0.092	0.000	0.000	0.75	10.49	0.000	0.000	0.000	0.000

Assist Tugs

Baseline

Ships

Ship Type	Arrival					VSR - Departure						NC			VSR Emissions												
	Engine Type	Emission Tier	Speed (kts)		Main Load Factor		Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Time (hrs)	Aux	Boiler Load (kW)	NOx			DPM		PM2.5			ROG			VSR Emissions
			NC	Comp	NC	Comp			NC	Comp	NC	Aux				Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	
AUTO CARRIER	SSD	1	16.06	0.18	0.43	90%	20.00	12.00	15.24	0.18	0.36	4.50	0.15	351	1.315	0.204	0.026	0.022	0.004	0.002	0.020	0.004	0.002	0.073	0.009	0.001	0.103
BULK CARRIER	MSD	1	13.60	0.24	0.45	90%	20.00	11.20	13.60	0.25	0.45	4.45	0.17	-	0.271	0.061	-	0.006	0.001	-	0.005	0.001	-	0.015	0.003	-	0.025
	SSD	0	14.60	0.32	0.82	100%	20.00	12.45	14.60	0.51	0.82	4.43	0.17	-	0.529	0.054	-	0.008	0.001	-	0.007	0.001	-	0.024	0.002	-	0.034
		1	13.10	0.28	0.46	90%	20.00	11.90	13.07	0.34	0.45	4.67	0.17	-	1.319	0.122	-	0.022	0.002	-	0.020	0.002	-	0.068	0.005	-	0.096
		2	15.00	0.33	0.82	100%	20.00	12.50	15.00	0.48	0.82	2.64	0.17	-	0.280	0.023	-	0.006	0.001	-	0.005	0.001	-	0.017	0.001	-	0.024
BULK CARRIER, HL	MSD	0	13.00	0.32	0.82	100%	20.00	9.45	13.00	0.32	0.82	2.72	0.17	-	0.144	0.028	-	0.003	0.000	-	0.003	0.000	-	0.007	0.001	-	0.012
CONTAINER SHIP	SSD	0	14.78	0.16	0.33	90%	12.26	11.83	16.06	0.17	0.42	2.02	0.13	132	5.178	1.413	0.027	0.078	0.025	0.002	0.072	0.023	0.002	0.272	0.053	0.001	0.380
	1	16.03	0.21	0.50	90%	11.50	12.53	15.40	0.24	0.44	1.83	0.13	-	0.782	0.096	-	0.013	0.002	-	0.012	0.002	-	0.040	0.004	-	0.057	
	MSD	0	13.00	0.39	0.82	100%	20.00	10.10	13.00	0.39	0.82	3.12	0.17	-	0.100	0.016	-	0.002	0.000	-	0.002	0.000	-	0.005	0.001	-	0.008
		1	13.20	0.45	0.52	90%	20.00	12.20	15.10	0.41	0.78	4.46	0.17	-	0.835	0.123	-	0.018	0.002	-	0.016	0.002	-	0.046	0.005	-	0.078
GENERAL CARGO	SSD	0	15.23	0.41	0.82	100%	20.00	12.30	15.23	0.43	0.82	3.61	0.17	-	0.790	0.072	-	0.012	0.001	-	0.011	0.001	-	0.036	0.003	-	0.051
		1	13.10	0.27	0.38	90%	20.00	11.86	15.23	0.28	0.59	3.92	0.17	-	2.606	0.292	-	0.043	0.006	-	0.040	0.005	-	0.135	0.012	-	0.190
	MSD	1	14.90	0.33	0.82	100%	20.00	11.00	14.90	0.33	0.82	5.47	0.17	-	0.430	0.042	-	0.009	0.001	-	0.008	0.001	-	0.027	0.002	-	0.038
		2	14.57	0.22	0.43	91%	15.53	11.87	15.41	0.24	0.51	2.92	0.15	93	14.579	2.545	0.052	0.240	0.048	0.003	0.221	0.044	0.003	0.766	0.100	0.003	1.097

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	22	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	27	16.4

Assist Tugs

Tug	Calls	Hours
Scout	100	0.70
Tioga	100	0.70
Grand Total	200	0.70

Demo/Rail Project - 2020 - VSR Beyou

Ships

Ship Type	Arrival					VSR - Departure					NC			VSR Emissions													
	Engine Type	Emission Tier	I (kts)	Main Load Factor		Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Time (hrs)	Aux	Boiler Load (kW)	NOx		DPM		PM2.5		ROG			Main			
				Comp	NC			Comp	NC	Comp	NC				Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler		Main	Aux	Boiler
AUTO CARRIER	SSD	1	16.06	0.18	0.43	90%	20.00	12.00	15.24	0.18	0.36	4.50	0.15	351	1.917	0.297	0.037	0.032	0.006	0.002	0.030	0.006	0.002	0.106	0.012	0.002	0.150
BULK CARRIER	MSD	1	13.60	0.24	0.45	90%	20.00	11.20	13.60	0.25	0.45	4.45	0.17	-	0.271	0.061	-	0.006	0.001	-	0.005	0.001	-	0.015	0.003	-	0.025
	SSD	0	14.60	0.32	0.82	100%	20.00	12.45	14.60	0.51	0.82	4.43	0.17	-	0.529	0.054	-	0.008	0.001	-	0.007	0.001	-	0.024	0.002	-	0.034
		1	13.10	0.28	0.46	90%	20.00	11.90	13.07	0.34	0.45	4.67	0.17	-	1.319	0.122	-	0.022	0.002	-	0.020	0.002	-	0.068	0.005	-	0.096
		2	15.00	0.33	0.82	100%	20.00	12.50	15.00	0.48	0.82	2.64	0.17	-	0.280	0.023	-	0.006	0.001	-	0.005	0.001	-	0.017	0.001	-	0.024
BULK CARRIER, HL	MSD	0	13.00	0.32	0.82	100%	20.00	9.45	13.00	0.32	0.82	2.72	0.17	-	0.216	0.042	-	0.004	0.001	-	0.004	0.001	-	0.011	0.002	-	0.018
CONTAINER SHIP	SSD	2	14.78	0.18	0.36	90%	12.16	11.93	16.06	0.19	0.46	1.99	0.13	325	5.495	1.602	0.066	0.111	0.040	0.004	0.102	0.037	0.004	0.374	0.084	0.004	0.524
GENERAL CARGO	MSD	0	13.00	0.39	0.82	100%	20.00	10.10	13.00	0.39	0.82	3.12	0.17	-	0.100	0.016	-	0.002	0.000	-	0.002	0.000	-	0.005	0.001	-	0.008
		1	13.20	0.45	0.52	90%	20.00	12.20	15.10	0.41	0.78	4.46	0.17	-	1.169	0.172	-	0.025	0.003	-	0.023	0.003	-	0.065	0.007	-	0.110
	SSD	0	15.23	0.41	0.82	100%	20.00	12.30	15.23	0.43	0.82	3.61	0.17	-	0.790	0.072	-	0.012	0.001	-	0.011	0.001	-	0.036	0.003	-	0.051
		1	13.10	0.27	0.38	90%	20.00	11.86	15.23	0.28	0.59	3.92	0.17	-	3.554	0.399	-	0.059	0.008	-	0.054	0.007	-	0.184	0.017	-	0.259
		2	14.90	0.33	0.82	100%	20.00	11.00	14.90	0.33	0.82	5.47	0.17	-	0.430	0.042	-	0.009	0.001	-	0.008	0.001	-	0.027	0.002	-	0.038
Grand Total			14.42	0.24	0.44	91%	16.22	11.85	15.38	0.25	0.54	3.10	0.15	196	16.070	2.900	0.103	0.294	0.067	0.007	0.270	0.061	0.006	0.932	0.138	0.006	1.338

66.454

1.671

1.537

4.048

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	23	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	28	16.4

Assist Tugs

Baseline

Ships

Ship Type	Emissions (tons)																Maneuvering					Performance							
	Engine Type	Emission Tier	CO			SOx			CO2			CH4			N2O			Speed (kts)	Time (hrs)	Load Factors		Boiler Load (kW)	NOx		DPM		Boiler	Main	
			Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main			Aux	Boiler		Main	Aux	Boiler	Main			Aux
AUTO CARRIER	SSD	1	0.018	0.003	0.032	0.007	0.007	51.64	11.33	11.83	0.007	0.001	0.000	0.002	0.000	0.000	7.00	2.41	0.04	0.45	351	0.277	0.328	0.015	0.006	0.007	0.001	0.006	
BULK CARRIER	MSD	1	0.005	-	0.009	0.002	-	14.93	3.42	-	0.002	0.000	-	0.000	0.000	-	7.00	2.41	0.06	0.45	132	0.063	0.088	0.001	0.002	0.002	0.000	0.001	
	SSD	0	0.004	-	0.011	0.002	-	18.29	2.66	-	0.002	0.000	-	0.001	0.000	-	7.00	2.41	0.09	0.45	132	0.085	0.077	0.001	0.001	0.001	0.000	0.001	
		1	0.011	-	0.031	0.004	-	51.35	6.79	-	0.006	0.001	-	0.002	0.000	-	7.00	2.41	0.07	0.45	132	0.218	0.167	0.004	0.004	0.003	0.000	0.004	
		2	0.003	-	0.008	0.001	-	13.08	1.63	-	0.002	0.000	-	0.000	0.000	-	7.00	2.41	0.08	0.45	132	0.069	0.057	0.001	0.002	0.001	0.000	0.002	
BULK CARRIER, HL	MSD	0	0.002	-	0.004	0.001	-	7.03	1.37	-	0.001	0.000	-	0.000	0.000	-	7.00	2.41	0.13	0.45	132	0.057	0.058	0.001	0.001	0.001	0.000	0.001	
CONTAINER SHIP	SSD	0	0.112	0.003	0.111	0.041	0.008	180.55	70.14	12.25	0.024	0.008	0.000	0.005	0.002	0.000	7.00	2.41	0.04	0.50	241	2.571	6.487	0.063	0.053	0.117	0.004	0.049	
	1	0.008	-	0.019	0.003	-	30.44	5.32	-	0.004	0.001	-	0.001	0.000	-	7.00	2.41	0.04	0.50	362	0.386	0.485	0.015	0.009	0.010	0.001	0.008		
GENERAL CARGO	MSD	0	0.001	-	0.003	0.000	-	4.91	0.79	-	0.001	0.000	-	0.000	0.000	-	7.00	2.41	0.13	0.45	135	0.025	0.029	0.001	0.001	0.001	0.000	0.001	
		1	0.011	-	0.029	0.004	-	46.02	6.82	-	0.006	0.001	-	0.001	0.000	-	7.00	2.41	0.08	0.45	135	0.105	0.176	0.004	0.003	0.004	0.000	0.002	
	SSD	0	0.006	-	0.017	0.002	-	27.32	3.58	-	0.003	0.000	-	0.001	0.000	-	7.00	2.41	0.08	0.45	135	0.136	0.114	0.002	0.002	0.002	0.000	0.002	
		1	0.026	-	0.062	0.009	-	101.48	16.27	-	0.012	0.002	-	0.003	0.000	-	7.00	2.41	0.06	0.45	135	0.507	0.477	0.008	0.011	0.010	0.001	0.010	
		2	0.005	-	0.012	0.002	-	20.08	2.90	-	0.002	0.000	-	0.001	0.000	-	7.00	2.41	0.09	0.45	135	0.063	0.061	0.001	0.001	0.001	0.000	0.001	
Grand Total			0.212	0.005	0.349	0.077	0.015	567.11	133.03	24.08	0.071	0.015	0.001	0.017	0.003	0.000	7.00	2.41	0.05	0.48	222	4.562	8.604	0.118	0.096	0.159	0.008	0.089	

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	22	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	27	16.4

Assist Tugs		
Tug	Calls	Hours
Scout	100	0.70
Tioga	100	0.70
Grand Total	200	0.70

Demo/Rail Project - 2020 - VSR Beyou

Ships

Ship Type	Emissions (tons)															Maneuvering												
	Engine Type	Emission Tier	CO			SOx		CO2			CH4		N2O			Speed (kts)	Time (hrs)	Load Factors		Boiler Load (kW)	NOx			DPM				
			Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux			Boiler	Main		Aux	Boiler	Main	Aux	Boiler	Main		
AUTO CARRIER	SSD	1	0.026	0.004	0.046	0.010	0.011	75.27	16.52	17.24	0.010	0.002	0.001	0.002	0.000	0.000	7.00	2.41	0.04	0.45	351	0.404	0.478	0.022	0.009	0.010	0.001	0.009
	MSD	1	0.005	-	0.009	0.002	-	14.93	3.42	-	0.002	0.000	-	0.000	0.000	-	7.00	2.41	0.06	0.45	135	0.063	0.088	0.001	0.002	0.002	0.000	0.001
BULK CARRIER	SSD	0	0.004	-	0.011	0.002	-	18.29	2.66	-	0.002	0.000	-	0.001	0.000	-	7.00	2.41	0.09	0.45	132	0.085	0.077	0.001	0.001	0.001	0.000	0.001
		1	0.011	-	0.031	0.004	-	51.35	6.79	-	0.006	0.001	-	0.002	0.000	-	7.00	2.41	0.07	0.45	132	0.218	0.167	0.004	0.004	0.003	0.000	0.004
		2	0.003	-	0.008	0.001	-	13.08	1.63	-	0.002	0.000	-	0.000	0.000	-	7.00	2.41	0.08	0.45	132	0.069	0.057	0.001	0.002	0.001	0.000	0.002
BULK CARRIER, HL	MSD	0	0.003	-	0.007	0.001	-	10.54	2.06	-	0.001	0.000	-	0.000	0.000	-	7.00	2.41	0.13	0.45	132	0.086	0.087	0.002	0.002	0.002	0.000	0.002
CONTAINER SHIP	SSD	2	0.178	0.007	0.158	0.065	0.019	257.46	111.63	30.35	0.034	0.013	0.001	0.008	0.003	0.000	7.00	2.41	0.04	0.50	325	2.738	7.456	0.086	0.076	0.188	0.006	0.070
GENERAL CARGO	MSD	0	0.001	-	0.003	0.000	-	4.91	0.79	-	0.001	0.000	-	0.000	0.000	-	7.00	2.41	0.13	0.45	132	0.025	0.029	0.001	0.001	0.001	0.000	0.001
		1	0.015	-	0.040	0.006	-	64.43	9.55	-	0.008	0.001	-	0.002	0.000	-	7.00	2.41	0.08	0.45	135	0.147	0.246	0.005	0.004	0.005	0.000	0.003
	SSD	0	0.006	-	0.017	0.002	-	27.32	3.58	-	0.003	0.000	-	0.001	0.000	-	7.00	2.41	0.08	0.45	135	0.136	0.114	0.002	0.002	0.002	0.000	0.002
		1	0.035	-	0.085	0.013	-	138.38	22.19	-	0.016	0.003	-	0.004	0.001	-	7.00	2.41	0.06	0.45	135	0.691	0.650	0.011	0.015	0.013	0.001	0.013
Grand Total		2	0.005	-	0.012	0.002	-	20.08	2.90	-	0.002	0.000	-	0.001	0.000	-	7.00	2.41	0.09	0.45	135	0.063	0.061	0.001	0.001	0.001	0.000	0.001
			0.293	0.010	0.428	0.107	0.030	696.04	183.72	47.59	0.087	0.021	0.002	0.021	0.005	0.001	7.00	2.41	0.05	0.47	251	4.725	9.510	0.138	0.119	0.230	0.009	0.109

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	23	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	28	16.4

Assist Tugs

Baseline

Ships

Ship Type	Engine Type	Emission Tier	Maneuvering Emissions (tons)																				Hotel Time (hr)	Aux Time (hr)	Hotelling		NOx	
			PM2.5		ROG		CO		SOx		CO2		CH4		N2O		Auxiliary LF	Boiler Load (kW)										
			Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler			Main	Aux	Boiler							
AUTO CARRIER	SSD	1	0.006	0.001	0.050	0.014	0.001	0.044	0.029	0.001	0.006	0.011	0.004	9.82	18.25	6.89	0.004	0.002	0.000	0.000	0.000	0.000	27.6	27.6	0.26	351	2.163	0.170
BULK CARRIER	MSD	1	0.002	0.000	0.008	0.004	0.000	0.011	0.008	0.000	0.002	0.003	0.000	3.04	4.91	0.65	0.001	0.001	0.000	0.000	0.000	0.000	37.9	37.9	0.10	132	0.308	0.022
	SSD	0	0.001	0.000	0.008	0.003	0.000	0.009	0.006	0.000	0.002	0.002	0.000	3.03	3.84	0.65	0.001	0.000	0.000	0.000	0.000	0.000	28.7	28.7	0.10	132	0.205	0.017
		1	0.003	0.000	0.027	0.007	0.000	0.031	0.015	0.000	0.005	0.005	0.001	8.61	9.29	1.62	0.002	0.001	0.000	0.000	0.000	0.000	37.8	37.8	0.10	132	0.581	0.055
		2	0.001	0.000	0.009	0.003	0.000	0.011	0.006	0.000	0.002	0.002	0.000	3.30	3.95	0.65	0.001	0.000	0.000	0.000	0.000	0.000	85.1	85.1	0.10	132	0.444	0.049
BULK CARRIER, HL	MSD	0	0.001	0.000	0.004	0.002	0.000	0.007	0.005	0.000	0.002	0.002	0.000	2.88	3.22	0.65	0.001	0.000	0.000	0.000	0.000	0.000	114.0	114.0	0.10	132	0.681	0.066
CONTAINER SHIP	SSD	0	0.107	0.004	0.412	0.243	0.003	0.366	0.513	0.006	0.051	0.187	0.018	80.89	322.01	28.96	0.037	0.037	0.001	0.003	0.008	0.000	61.4	49.8	0.35	241	92.640	1.595
GENERAL CARGO	MSD	1	0.009	0.001	0.070	0.020	0.001	0.062	0.043	0.002	0.009	0.016	0.004	13.68	27.00	7.11	0.006	0.003	0.000	0.000	0.001	0.000	60.8	60.8	0.35	362	8.468	0.388
		0	0.001	0.000	0.002	0.001	0.000	0.003	0.003	0.000	0.001	0.001	0.000	1.31	1.61	0.33	0.000	0.000	0.000	0.000	0.000	0.000	123.0	123.0	0.10	135	0.328	0.037
	SSD	1	0.003	0.000	0.015	0.007	0.000	0.018	0.016	0.000	0.003	0.006	0.001	5.40	9.78	1.66	0.001	0.001	0.000	0.000	0.000	0.000	62.5	62.5	0.10	135	1.011	0.093
		0	0.002	0.000	0.014	0.005	0.000	0.016	0.010	0.000	0.003	0.004	0.001	4.79	6.34	0.99	0.001	0.001	0.000	0.000	0.000	0.000	86.3	86.3	0.10	135	1.015	0.077
Grand Total		1	0.009	0.000	0.071	0.020	0.000	0.075	0.042	0.001	0.012	0.015	0.002	19.62	26.54	3.64	0.006	0.003	0.000	0.001	0.001	0.000	45.5	45.5	0.10	135	1.996	0.149
		2	0.001	0.000	0.008	0.003	0.000	0.009	0.005	0.000	0.002	0.002	0.000	3.02	3.38	0.66	0.001	0.000	0.000	0.000	0.000	0.000	50.9	50.9	0.10	135	0.227	0.030
			0.147	0.007	0.698	0.332	0.006	0.662	0.702	0.012	0.099	0.255	0.034	159.38	440.13	54.44	0.063	0.051	0.002	0.005	0.011	0.001	57.3	51.6	0.25	222	110.067	2.747

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	22	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	27	16.4

0.810319
0.091754

Assist Tugs

Tug	Calls	Hours
Scout	100	0.70
Tioga	100	0.70
Grand Total	200	0.70

Demo/Rail Project - 2020 - VSR Beyou

Sp 80%
Reduction in hoteling time 0%

Ships

Ship Type	Engine Type	Emission Tier	Maneuvering Emissions (tons)																				Hotel Time (hr)	Aux Time (hr)	Hotelling				NOx	
			PM2.5		ROG		CO		SOx		CO2		CH4		N2O		Auxiliary LF	Boiler Load (kW)	Aux	Boiler										
			Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler					Main	Aux			Boiler					
AUTO CARRIER	SSD	1	0.009	0.001	0.073	0.020	0.001	0.065	0.042	0.002	0.009	0.015	0.006	14.31	26.59	10.04	0.007	0.003	0.000	0.000	0.001	0.000	27.6	27.6	0.26	351	3.152	0.248		
	MSD	1	0.002	0.000	0.008	0.004	0.000	0.011	0.008	0.000	0.002	0.003	0.000	3.04	4.91	0.66	0.001	0.001	0.000	0.000	0.000	0.000	37.9	37.9	0.10	135	0.308	0.023		
BULK CARRIER	SSD	0	0.001	0.000	0.008	0.003	0.000	0.009	0.006	0.000	0.002	0.002	0.000	3.03	3.84	0.65	0.001	0.000	0.000	0.000	0.000	0.000	28.7	28.7	0.10	132	0.205	0.017		
		1	0.003	0.000	0.027	0.007	0.000	0.031	0.015	0.000	0.005	0.005	0.001	8.61	9.29	1.62	0.002	0.001	0.000	0.000	0.000	0.000	37.8	37.8	0.10	132	0.581	0.055		
		2	0.001	0.000	0.009	0.003	0.000	0.011	0.006	0.000	0.002	0.002	0.000	3.30	3.95	0.65	0.001	0.000	0.000	0.000	0.000	0.000	85.1	85.1	0.10	132	0.444	0.049		
BULK CARRIER, HL	MSD	0	0.002	0.000	0.006	0.004	0.000	0.010	0.008	0.000	0.003	0.003	0.001	4.33	4.83	0.97	0.001	0.001	0.000	0.000	0.000	0.000	114.0	114.0	0.10	132	1.022	0.099		
CONTAINER SHIP	SSD	2	0.173	0.005	0.591	0.392	0.005	0.526	0.828	0.009	0.073	0.301	0.025	116.22	519.66	39.85	0.053	0.060	0.001	0.004	0.014	0.001	88.9	8.2	0.35	325	17.445	3.176		
GENERAL CARGO	MSD	0	0.001	0.000	0.002	0.001	0.000	0.003	0.003	0.000	0.001	0.001	0.000	1.31	1.61	0.32	0.000	0.000	0.000	0.000	0.000	0.000	123.0	123.0	0.10	132	0.328	0.036		
		1	0.005	0.000	0.021	0.010	0.000	0.025	0.022	0.001	0.005	0.008	0.001	7.56	13.69	2.32	0.002	0.002	0.000	0.000	0.000	0.000	62.5	62.5	0.10	135	1.415	0.130		
	SSD	0	0.002	0.000	0.014	0.005	0.000	0.016	0.010	0.000	0.003	0.004	0.001	4.79	6.34	0.99	0.001	0.001	0.000	0.000	0.000	0.000	86.3	86.3	0.10	135	1.015	0.077		
		1	0.012	0.001	0.097	0.027	0.001	0.102	0.058	0.001	0.017	0.021	0.003	26.75	36.19	4.97	0.009	0.004	0.000	0.001	0.001	0.000	45.5	45.5	0.10	135	2.722	0.203		
Grand Total		2	0.001	0.000	0.008	0.003	0.000	0.009	0.005	0.000	0.002	0.002	0.000	3.02	3.38	0.66	0.001	0.000	0.000	0.000	0.000	0.000	50.9	50.9	0.10	135	0.227	0.030		
			0.211	0.008	0.865	0.478	0.008	0.818	1.011	0.014	0.122	0.368	0.040	196.27	634.30	63.70	0.078	0.074	0.002	0.006	0.017	0.001	69.5	30.6	0.24	251	28.865	4.142		

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	23	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	28	16.4

1 0.273973
1 0.290411

Assist Tugs

5.439681 1.579743

Baseline

Ships

		Hotelling Emissions (tons)																Cold Iron CO2e	
Ship Type	Engine Type	Emission Tier	DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		
			Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux		Boiler
AUTO CARRIER	SSD	1	0.044	0.011	0.040	0.010	0.091	0.009	0.192	0.017	0.070	0.049	120.36	78.62	0.014	0.003	0.003	0.001	-
	MSD	1	0.006	0.001	0.006	0.001	0.013	0.001	0.027	0.002	0.010	0.006	17.14	10.16	0.002	0.000	0.000	0.000	-
BULK CARRIER		0	0.004	0.001	0.003	0.001	0.008	0.001	0.016	0.002	0.006	0.005	10.17	7.71	0.001	0.000	0.000	0.000	-
	SSD	1	0.012	0.004	0.011	0.003	0.024	0.003	0.052	0.005	0.019	0.016	32.31	25.32	0.004	0.001	0.001	0.000	-
		2	0.011	0.003	0.010	0.003	0.023	0.003	0.049	0.005	0.018	0.014	30.96	22.81	0.004	0.001	0.001	0.000	-
BULK CARRIER, HL	MSD	0	0.012	0.004	0.011	0.004	0.025	0.004	0.054	0.007	0.020	0.019	33.82	30.57	0.004	0.001	0.001	0.000	-
CONTAINER SHIP	SSD	0	1.666	0.106	1.533	0.098	3.466	0.088	7.331	0.160	2.666	0.464	4,598.66	736.92	0.533	0.026	0.120	0.010	1,091
		1	0.171	0.026	0.157	0.024	0.355	0.021	0.751	0.039	0.273	0.113	471.18	179.07	0.055	0.006	0.012	0.003	-
GENERAL CARGO	MSD	0	0.007	0.002	0.006	0.002	0.014	0.002	0.029	0.004	0.011	0.011	18.24	16.87	0.002	0.001	0.000	0.000	-
			1	0.020	0.006	0.019	0.006	0.042	0.005	0.090	0.009	0.033	0.027	56.26	42.85	0.007	0.001	0.001	0.001
	SSD	0	0.018	0.005	0.017	0.005	0.038	0.004	0.080	0.008	0.029	0.022	50.37	35.52	0.006	0.001	0.001	0.001	-
			1	0.040	0.010	0.037	0.009	0.084	0.008	0.177	0.015	0.064	0.043	111.09	68.60	0.013	0.002	0.003	0.001
		2	0.006	0.002	0.005	0.002	0.012	0.002	0.025	0.003	0.009	0.009	15.85	13.96	0.002	0.000	0.000	0.000	-
Grand Total			2.017	0.183	1.855	0.169	4.195	0.151	8.874	0.275	3.227	0.799	5,566.40	1,268.99	0.645	0.044	0.145	0.018	1,091

SDGE rate

699.5

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	22	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	27	16.4

Assist Tugs

Tug	Calls	Hours
Scout	100	0.70
Tioga	100	0.70
Grand Total	200	0.70

Demo/Rail Project - 2020 - VSR Beyou

Ships

	Hotelling Emissions (tons)																		Cold Iron CO2e
Ship Type	Engine Type	Emission Tier	DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		
			Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	
AUTO CARRIER	SSD	1	0.064	0.017	0.058	0.015	0.132	0.014	0.280	0.025	0.102	0.072	175.42	114.59	0.020	0.004	0.005	0.002	-
	MSD	1	0.006	0.002	0.006	0.001	0.013	0.001	0.027	0.002	0.010	0.007	17.14	10.39	0.002	0.000	0.000	0.000	-
BULK CARRIER	SSD	0	0.004	0.001	0.003	0.001	0.008	0.001	0.016	0.002	0.006	0.005	10.17	7.71	0.001	0.000	0.000	0.000	-
		1	0.012	0.004	0.011	0.003	0.024	0.003	0.052	0.005	0.019	0.016	32.31	25.32	0.004	0.001	0.001	0.000	-
		2	0.011	0.003	0.010	0.003	0.023	0.003	0.049	0.005	0.018	0.014	30.96	22.81	0.004	0.001	0.001	0.000	-
BULK CARRIER, HL	MSD	0	0.018	0.007	0.017	0.006	0.038	0.005	0.081	0.010	0.029	0.029	50.73	45.86	0.006	0.002	0.001	0.001	-
CONTAINER SHIP	SSD	2	0.441	0.212	0.405	0.195	0.916	0.175	1.938	0.318	0.705	0.923	1,215.87	1,467.21	0.141	0.051	0.032	0.021	8,507
GENERAL CARGO	MSD	0	0.007	0.002	0.006	0.002	0.014	0.002	0.029	0.004	0.011	0.010	18.24	16.49	0.002	0.001	0.000	0.000	-
		1	0.029	0.009	0.026	0.008	0.059	0.007	0.126	0.013	0.046	0.038	78.76	60.00	0.009	0.002	0.002	0.001	-
	SSD	0	0.018	0.005	0.017	0.005	0.038	0.004	0.080	0.008	0.029	0.022	50.37	35.52	0.006	0.001	0.001	0.001	-
		1	0.055	0.014	0.050	0.012	0.114	0.011	0.242	0.020	0.088	0.059	151.49	93.55	0.018	0.003	0.004	0.001	-
		2	0.006	0.002	0.005	0.002	0.012	0.002	0.025	0.003	0.009	0.009	15.85	13.96	0.002	0.000	0.000	0.000	-
Grand Total			0.669	0.276	0.616	0.254	1.392	0.228	2.945	0.415	1.071	1.204	1,847.30	1,913.40	0.214	0.066	0.048	0.027	8,507

487.6882

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	1	16.4
Robyn J (Barge Payton J)	23	16.4
Robyn J (Barge Tori J)	4	16.4
Grand Total	28	16.4

Assist Tugs

Tug	Calls	Hours per Call		Load Factors		NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O	
		Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux
Scout	103.66	0.70	1.00	0.31	0.43	0.519	0.051	0.011	0.001	0.011	0.001	0.062	0.008	0.493	0.055	0.001	0.000	57.88	6.73	0.001	0.000	0.003	0.000
Tioga	103.66	0.70	1.00	0.31	0.43	0.519	0.041	0.011	0.002	0.011	0.002	0.062	0.007	0.493	0.031	0.001	0.000	57.88	3.84	0.001	0.000	0.003	0.000
Grand Total	207.32	0.70	1.00	0.31	0.43	1.038	0.092	0.023	0.003	0.022	0.003	0.124	0.015	0.986	0.086	0.001	0.000	115.75	10.57	0.002	0.000	0.005	0.000

TAMT Plan- 2035 - VSR Beyond CAP

Ships

Ship Type	Engine Type	Emission Tier	Power (kW)			Service Speed (kts)	Total Transit Distance (nm)		Comp (%)	Distance (nm)	Transit - Arrival Speed (kts)				Main Load Factor		Transit - Departure Speed (kts)				Main Load Factor		Time (hrs)	NC Boiler Load (kW)		NOx			
			Calls	Main	Aux		Arrival	Depart			Comp	NC	Comp	NC	Comp	NC	Comp (%)	Distance (nm)	Comp	NC	Comp	NC		Aux	Load (kW)	Main	Aux	Boiler	Main
AUTO CARRIER	SSD	1	92	11,060	2,760	20.00	35.30	35.30	0%	-	12.00	20.00	0.18	0.82	0%	-	12.00	20.00	0.18	0.82	-	0.15	351	-	-	-	-	-	
	MSD	1	21	9,100	2,973	16.65	30.20	23.40	0%	-	11.00	16.65	0.24	0.82	0%	-	11.20	16.65	0.25	0.82	-	0.17	-	-	-	-	-	-	
BULK CARRIER	SSD	0	18	8,139	2,325	14.60	30.20	30.20	0%	-	10.70	14.60	0.32	0.82	0%	-	12.45	14.60	0.51	0.82	-	0.17	-	-	-	-	-	-	
		1	46	10,705	2,250	15.92	33.94	26.46	0%	-	11.13	15.92	0.28	0.82	0%	-	11.90	15.92	0.34	0.82	-	0.17	-	-	-	-	-		
		2	18	9,140	2,393	15.00	11.50	48.90	0%	-	11.05	15.00	0.33	0.82	0%	8.90	12.50	15.00	0.48	0.82	0.59	0.17	-	1.115	0.047	-	0.022		
BULK CARRIER, HL	MSD	0	23	5,738	1,950	13.00	5.75	24.45	0%	-	9.45	13.00	0.32	0.82	0%	-	9.45	13.00	0.32	0.82	-	0.17	-	-	-	-	-	-	
CONTAINER SHIP	SSD	2	120	19,420	11,320	19.50	11.92	12.16	0%	-	11.64	19.50	0.18	0.82	0%	-	11.93	19.50	0.19	0.82	-	0.13	132	-	-	-	-	-	
GENERAL CARGO	MSD	0	11	5,738	1,950	13.00	11.50	48.90	0%	-	10.10	13.00	0.39	0.82	0%	8.90	10.10	13.00	0.39	0.82	0.68	0.17	-	0.517	0.038	-	0.010		
		1	57	6,400	2,367	15.34	35.98	23.74	0%	-	12.57	15.34	0.45	0.82	0%	-	12.20	15.34	0.41	0.82	-	0.17	-	-	-	-	-		
	SSD	0	30	9,268	2,557	15.23	23.97	36.43	0%	-	12.07	15.23	0.41	0.82	0%	-	12.30	15.23	0.43	0.82	-	0.17	-	-	-	-	-		
		1	122	12,430	2,920	16.98	26.95	34.06	0%	-	11.77	16.98	0.27	0.82	0%	-	11.86	16.98	0.28	0.82	-	0.17	-	-	-	-	-		
		2	21	8,630	2,048	14.90	42.10	30.20	0%	2.10	10.95	14.90	0.33	0.82	0%	-	11.00	14.90	0.33	0.82	0.14	0.17	-	0.292	0.011	-	0.006		
Grand Total			579	14,524	6,799	18.04	20.86	22.44	0%	0.04	11.62	18.04	0.24	0.82	0%	0.26	11.85	18.04	0.25	0.82	0.02	0.15	103	1.924	0.097	-	0.038		

Harborcraft

Tug/Barge	Calls	Hours	NOx		DPM		PM2.5		ROG	Aux	CO		SOx		CO2		CH4		N2O		Hours		NOx		DPM		PM
			Main	Aux	Main	Aux	Main	Aux			Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Tug	Barge	Tug	Barge	Tug	Barge	Tug
Robyn J (Barge Jake J)	6	16.4	0.601	0.028	0.021	0.001	0.020	0.001	0.057	0.005	0.451	0.021	0.001	0.000	52.99	2.63	0.001	0.000	0.002	0.000	1.0	4.5	0.002	0.023	0.000	0.001	0.000
Robyn J (Barge Payton J)	127	16.4	12.723	0.594	0.434	0.022	0.421	0.021	1.198	0.100	9.553	0.452	0.013	0.001	1,121.70	55.64	0.022	0.002	0.051	0.003	1.0	4.8	0.036	0.522	0.001	0.028	0.001
Robyn J (Barge Tori J)	23	16.4	2.304	0.108	0.079	0.004	0.076	0.004	0.217	0.018	1.730	0.082	0.002	0.000	203.14	10.08	0.004	0.000	0.009	0.000	1.0	5.3	0.007	0.104	0.000	0.006	0.000
Grand Total	156	16.4	15.628	0.729	0.533	0.027	0.517	0.026	1.472	0.123	11.734	0.555	0.015	0.001	1,377.83	68.34	0.027	0.002	0.062	0.003	1.0	4.9	0.045	0.649	0.002	0.035	0.002

Assist Tugs

Tug	Calls	Hours per Call		Load Factors		NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O	
		Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux
Scout	579	0.70	1.00	0.31	0.43	2.900	0.286	0.064	0.006	0.062	0.006	0.345	0.047	2.753	0.305	0.004	0.000	323.27	37.58	0.006	0.001	0.015	0.002
Tioga	579	0.70	1.00	0.31	0.43	2.900	0.229	0.064	0.009	0.062	0.009	0.345	0.039	2.753	0.174	0.004	0.000	323.27	21.47	0.006	0.001	0.015	0.001
Grand Total	1158	0.70	1.00	0.31	0.43	5.799	0.515	0.128	0.015	0.124	0.015	0.691	0.085	5.506	0.479	0.007	0.001	646.54	59.05	0.013	0.002	0.029	0.003

Tug	Calls	Hours f
		Main
Scout	103.66	0.70
Tioga	103.66	0.70
Grand Total	207.32	0.70

TAMT Plan- 2035 - VSR Beyond CAP

Ships		Transit Emissions (tons)																								Comp (%)	Distance (nm)	VSR - Speed (kts)
Ship Type	Engine Type	Emission Tier	DPM Aux	Boiler	Main	PM2.5 Aux	Boiler	Main	ROG Aux	Boiler	Main	CO Aux	Boiler	Main	SOx Aux	Boiler	Main	CO2 Aux	Boiler	Main	CH4 Aux	Boiler	Main	N2O Aux	Boiler			
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	35.30	12.00
AUTO CARRIER	SSD	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	35.30	12.00
BULK CARRIER	MSD	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	30.20	11.00
	SSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	30.20	10.70
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	33.94	11.13
		2	0.001	-	0.020	0.001	-	0.069	0.002	-	0.097	0.005	-	0.032	0.002	-	52.05	3.30	-	0.006	0.000	-	0.002	0.000	-	100%	11.50	11.05
BULK CARRIER, HL	MSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	5.75	9.45
CONTAINER SHIP	SSD	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	11.92	11.64
GENERAL CARGO	MSD	0	0.001	-	0.009	0.001	-	0.025	0.001	-	0.043	0.003	-	0.016	0.001	-	25.27	1.90	-	0.003	0.000	-	0.001	0.000	-	100%	11.50	10.10
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	35.98	12.57
	SSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	23.97	12.07
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	91%	26.95	11.77
Grand Total		2	0.000	-	0.005	0.000	-	0.018	0.001	-	0.025	0.001	-	0.008	0.000	-	13.62	0.78	-	0.002	0.000	-	0.000	0.000	-	100%	40.00	10.95
			0.002	-	0.035	0.002	-	0.113	0.005	-	0.166	0.010	-	0.056	0.003	-	90.94	5.99	-	0.011	0.001	-	0.003	0.000	-	91%	20.82	11.62

Harborcraft			Hoteling Emissions (tons)													
Tug/Barge	Calls	Hours	2.5		ROG		CO		SOx		CO2		CH4		N2O	
			Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	
Robyn J (Barge Jake J)	6	16.4	0.001	0.000	0.004	0.001	0.018	0.000	0.000	0.16	2.07	0.000	0.000	0.000	0.000	
Robyn J (Barge Payton J)	127	16.4	0.027	0.006	0.089	0.028	0.411	0.000	0.001	3.40	47.02	0.000	0.002	0.000	0.002	
Robyn J (Barge Tori J)	23	16.4	0.005	0.001	0.018	0.005	0.082	0.000	0.000	0.61	9.39	0.000	0.000	0.000	0.000	
Grand Total	156	16.4	0.034	0.008	0.110	0.034	0.511	0.000	0.001	4.17	58.47	0.000	0.002	0.000	0.003	

Assist Tugs		Hours f	
Tug	Calls	Main	
Scout	579	0.70	
Tioga	579	0.70	
Grand Total	1158	0.70	

Tug	Calls	Hours f Main
Scout	103.66	0.70
Tioga	103.66	0.70
Grand Total	207.32	0.70

TAMT Plan- 2035 - VSR Beyond CAP

Ships		Arrival					VSR - Departure					NC			VSR Emission																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
Ship Type	Engine Type	Emission Tier	I (kts)		Main Load Factor	NC	Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Time (hrs)	Aux	Boiler Load (kW)	Main	NOx	Boiler	Main	DPM	Boiler	Main	PM2.5			Boiler	Main	ROG		Boiler	Main																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
			Comp	NC					Comp	NC	Comp	NC											Aux	Boiler	Aux			Boiler	Aux			Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	6	16.4
Robyn J (Barge Payton J)	127	16.4
Robyn J (Barge Tori J)	23	16.4
Grand Total	156	16.4

Assist Tugs

Tug	Calls	Hours f Main
Scout	579	0.70
Tioga	579	0.70
Grand Total	1158	0.70

Tug	Calls	Hours
		Main
Scout	103.66	0.70
Tioga	103.66	0.70
Grand Total	207.32	0.70

TAMT Plan- 2035 - VSR Beyond CAP

Ships		missions (tons)															Maneuvering											
		Engine Type	Emission Tier	CO Aux	Boiler	Main	SOx Aux	Boiler	Main	CO2 Aux	Boiler	Main	CH4 Aux	Boiler	Main	N2O Aux	Boiler	Speed (kts)	Time (hrs)	Load Factors		Boiler Load (kW)	Main	NOx Aux	Boiler	Main	DPM Aux	Boiler
Ship Type																												
AUTO CARRIER	SSD	1	0.208	0.030	0.364	0.076	0.086	593.88	130.32	136.04	0.075	0.015	0.005	0.018	0.003	0.002	7.00	2.41	0.04	0.45	351	3.187	3.771	0.171	0.074	0.076	0.011	0.068
	MSD	1	0.057	-	0.097	0.021	-	156.80	35.90	-	0.019	0.004	-	0.004	0.001	-	7.00	2.41	0.06	0.45	135	0.657	0.927	0.015	0.016	0.019	0.001	0.015
BULK CARRIER	SSD	0	0.038	-	0.101	0.014	-	164.59	23.97	-	0.020	0.003	-	0.005	0.001	-	7.00	2.41	0.09	0.45	132	0.763	0.697	0.013	0.013	0.013	0.001	0.012
		1	0.100	-	0.289	0.036	-	472.40	62.46	-	0.056	0.007	-	0.014	0.002	-	7.00	2.41	0.07	0.45	132	2.007	1.537	0.032	0.041	0.031	0.002	0.038
		2	0.023	-	0.072	0.009	-	117.72	14.70	-	0.014	0.002	-	0.004	0.000	-	7.00	2.41	0.08	0.45	132	0.623	0.511	0.013	0.015	0.013	0.001	0.014
BULK CARRIER, HL	MSD	0	0.025	-	0.050	0.009	-	80.79	15.80	-	0.010	0.002	-	0.002	0.000	-	7.00	2.41	0.13	0.45	132	0.661	0.666	0.016	0.013	0.013	0.001	0.012
CONTAINER SHIP	SSD	2	0.427	0.016	0.380	0.155	0.046	617.90	267.92	72.83	0.081	0.031	0.003	0.019	0.007	0.001	7.00	2.41	0.04	0.50	325	6.572	17.894	0.207	0.182	0.452	0.014	0.168
GENERAL CARGO	MSD	0	0.014	-	0.033	0.005	-	53.99	8.65	-	0.007	0.001	-	0.002	0.000	-	7.00	2.41	0.13	0.45	132	0.280	0.319	0.008	0.006	0.006	0.001	0.006
		1	0.124	-	0.325	0.045	-	524.64	77.75	-	0.065	0.009	-	0.015	0.002	-	7.00	2.41	0.08	0.45	135	1.199	2.003	0.041	0.031	0.040	0.003	0.028
	SSD	0	0.057	-	0.167	0.021	-	273.24	35.82	-	0.033	0.004	-	0.008	0.001	-	7.00	2.41	0.08	0.45	135	1.355	1.139	0.022	0.024	0.023	0.001	0.022
		1	0.288	-	0.689	0.105	-	1,125.52	180.44	-	0.134	0.021	-	0.034	0.005	-	7.00	2.41	0.06	0.45	135	5.623	5.289	0.087	0.119	0.107	0.006	0.109
Grand Total		2	0.048	-	0.129	0.018	-	210.80	30.42	-	0.025	0.004	-	0.006	0.001	-	7.00	2.41	0.09	0.45	135	0.658	0.639	0.015	0.015	0.013	0.001	0.014
			1.410	0.045	2.697	0.513	0.131	4,392.29	884.16	208.87	0.539	0.103	0.007	0.132	0.023	0.003	7.00	2.41	0.05	0.47	251	23.584	35.391	0.640	0.549	0.806	0.043	0.505

5,582

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	6	16.4
Robyn J (Barge Payton J)	127	16.4
Robyn J (Barge Tori J)	23	16.4
Grand Total	156	16.4

Assist Tugs

Tug	Calls	Hours
		Main
Scout	579	0.70
Tioga	579	0.70
Grand Total	1158	0.70

Tug	Calls	Hours
		Main
Scout	103.66	0.70
Tioga	103.66	0.70
Grand Total	207.32	0.70

TAMT Plan- 2035 - VSR Beyond CAP

Sp 80+%
Reduction in hoteling time 0%

Ships		Maneuvering Emissions (tons)																				Hotel	Aux	Hotelling				
Ship Type	Engine Type	Emission Tier	PM2.5 Aux	Boiler	Main	ROG Aux	Boiler	Main	CO Aux	Boiler	Main	SOx Aux	Boiler	Main	CO2 Aux	Boiler	Main	CH4 Aux	Boiler	Main	N2O Aux	Boiler	Time (hr)	Time (hr)	Auxiliary LF	Boiler Load (kW)	NOx	
AUTO CARRIER	SSD	1	0.070	0.011	0.574	0.158	0.009	0.511	0.334	0.017	0.070	0.122	0.050	112.88	209.82	79.19	0.052	0.024	0.003	0.004	0.005	0.001	27.6	27.6	0.26	351	24.874	1.957
BULK CARRIER	MSD	1	0.017	0.001	0.088	0.039	0.001	0.111	0.082	0.002	0.020	0.030	0.004	31.88	51.59	6.95	0.011	0.006	0.000	0.001	0.001	0.000	37.9	37.9	0.10	135	3.234	0.236
	SSD	0	0.012	0.001	0.069	0.026	0.001	0.085	0.055	0.001	0.017	0.020	0.004	27.23	34.58	5.83	0.006	0.004	0.000	0.001	0.001	0.000	28.7	28.7	0.10	132	1.843	0.150
		1	0.029	0.002	0.252	0.064	0.002	0.281	0.136	0.003	0.049	0.050	0.009	79.22	85.51	14.89	0.023	0.010	0.001	0.002	0.002	0.000	37.8	37.8	0.10	132	5.342	0.504
		2	0.012	0.001	0.084	0.027	0.001	0.099	0.057	0.001	0.018	0.021	0.004	29.70	35.59	5.83	0.008	0.004	0.000	0.001	0.001	0.000	85.1	85.1	0.10	132	3.997	0.444
BULK CARRIER, HL	MSD	0	0.012	0.001	0.047	0.028	0.001	0.075	0.059	0.002	0.021	0.021	0.005	33.17	37.06	7.45	0.006	0.004	0.000	0.001	0.001	0.000	114.0	114.0	0.10	132	7.835	0.761
CONTAINER SHIP	SSD	2	0.416	0.013	1.419	0.940	0.011	1.262	1.988	0.021	0.174	0.723	0.060	278.93	1,247.19	95.64	0.127	0.145	0.003	0.009	0.033	0.001	88.9	8.2	0.35	325	41.868	7.623
GENERAL CARGO	MSD	0	0.006	0.000	0.027	0.013	0.000	0.036	0.028	0.001	0.009	0.010	0.002	14.46	17.72	3.56	0.002	0.002	0.000	0.000	0.000	0.000	123.0	123.0	0.10	132	3.606	0.393
		1	0.037	0.003	0.175	0.084	0.002	0.205	0.178	0.004	0.038	0.065	0.012	61.58	111.48	18.87	0.016	0.013	0.001	0.002	0.003	0.000	62.5	62.5	0.10	135	11.525	1.058
	SSD	0	0.021	0.001	0.136	0.048	0.001	0.159	0.101	0.002	0.030	0.037	0.006	47.92	63.38	9.93	0.012	0.007	0.000	0.001	0.002	0.000	86.3	86.3	0.10	135	10.148	0.769
		1	0.098	0.005	0.790	0.222	0.005	0.832	0.469	0.009	0.135	0.171	0.025	217.58	294.33	40.39	0.071	0.034	0.001	0.007	0.008	0.001	45.5	45.5	0.10	135	22.142	1.647
Grand Total		2	0.012	0.001	0.081	0.027	0.001	0.099	0.057	0.002	0.020	0.021	0.004	31.69	35.53	6.95	0.007	0.004	0.000	0.001	0.001	0.000	50.9	50.9	0.10	135	2.388	0.317
			0.741	0.039	3.742	1.676	0.035	3.754	3.545	0.064	0.600	1.289	0.186	966.25	2,223.77	295.48	0.340	0.258	0.010	0.030	0.058	0.004	69.5	30.6	0.24	251	138.802	15.861

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	6	16.4
Robyn J (Barge Payton J)	127	16.4
Robyn J (Barge Tori J)	23	16.4
Grand Total	156	16.4

Assist Tugs

Tug	Calls	Hours
		Main
Scout	579	0.70
Tioga	579	0.70
Grand Total	1158	0.70

Tug	Calls	Hours
		Main
Scout	103.66	0.70
Tioga	103.66	0.70
Grand Total	207.32	0.70

TAMT Plan- 2035 - VSR Beyond CAP

Ships		Hotelling Emissions (tons)																	Cold Iron CO2e
Ship Type	Engine Type	Emission Tier	DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		
			Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	
AUTO CARRIER	SSD	1	0.501	0.130	0.461	0.120	1.043	0.108	2.207	0.196	0.802	0.569	1,384.10	904.15	0.160	0.031	0.036	0.013	-
	MSD	1	0.065	0.016	0.060	0.014	0.136	0.013	0.287	0.024	0.104	0.069	179.97	109.14	0.021	0.004	0.005	0.002	-
BULK CARRIER	SSD	0	0.033	0.010	0.030	0.009	0.069	0.008	0.146	0.015	0.053	0.044	91.49	69.37	0.011	0.002	0.002	0.001	-
		1	0.108	0.034	0.099	0.031	0.224	0.028	0.474	0.051	0.172	0.147	297.25	232.93	0.034	0.008	0.008	0.003	-
	SSD	2	0.101	0.030	0.093	0.027	0.210	0.025	0.444	0.045	0.162	0.129	278.60	205.28	0.032	0.007	0.007	0.003	-
		MSD	0	0.141	0.051	0.130	0.047	0.293	0.042	0.620	0.076	0.225	0.221	388.93	351.61	0.045	0.012	0.010	0.005
BULK CARRIER, HL CONTAINER SHIP	SSD	2	1.057	0.508	0.973	0.468	2.199	0.420	4.652	0.764	1.692	2.216	2,918.09	3,521.30	0.338	0.122	0.076	0.050	20,416
	MSD	0	0.073	0.026	0.067	0.024	0.151	0.022	0.320	0.039	0.116	0.114	200.67	181.41	0.023	0.006	0.005	0.003	-
GENERAL CARGO		MSD	1	0.232	0.071	0.214	0.065	0.483	0.058	1.022	0.106	0.372	0.307	641.34	488.54	0.074	0.017	0.017	0.007
	SSD		0	0.183	0.051	0.168	0.047	0.380	0.042	0.803	0.077	0.292	0.224	503.74	355.23	0.058	0.012	0.013	0.005
		SSD	1	0.446	0.110	0.411	0.101	0.929	0.091	1.964	0.165	0.714	0.479	1,232.09	760.84	0.143	0.026	0.032	0.011
	Grand Total			2	0.060	0.021	0.055	0.019	0.125	0.017	0.265	0.032	0.096	0.092	166.40	146.53	0.019	0.005	0.004
		3.001		1.057	2.761	0.973	6.242	0.875	13.204	1.590	4.802	4.611	8,282.67	7,326.34	0.960	0.254	0.216	0.103	20,416

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	6	16.4
Robyn J (Barge Payton J)	127	16.4
Robyn J (Barge Tori J)	23	16.4
Grand Total	156	16.4

Assist Tugs

Tug	Calls	Hours
		Main
Scout	579	0.70
Tioga	579	0.70
Grand Total	1158	0.70

Baseline

90% 40 VSR Distance

Ships

Ship Type	Engine Type	Emission Tier	Power (kW)			Service Speed (kts)	Total Transit Distance (nm)		Comp (%)	Distance (nm)	Transit - Arrival Speed (kts)		Main Load Factor		Comp (%)	Distance (nm)	Transit - Departure Speed (kts)		Main Load Factor		Time (hrs)	Aux	Boiler Load (kW)	NOx		
			Calls	Main	Aux		Arrival	Depart			Comp	NC	Comp	NC			Comp	NC	Comp	NC				Main	Aux	Boiler
AUTO CARRIER	SSD	1	0.08	11,060	2,760	20.00	35.30	35.30	90%	-	12.00	20.00	0.18	0.82	90%	-	12.00	20.00	0.18	0.82	-	0.15	351	-	-	-
BULK CARRIER	MSD	1	0.02	9,100	2,973	16.65	30.20	23.40	90%	-	11.00	16.65	0.24	0.82	90%	-	11.20	16.65	0.25	0.82	-	0.17	-	-	-	-
	SSD	0	0.02	8,139	2,325	14.60	30.20	30.20	100%	-	10.70	14.60	0.32	0.82	100%	-	12.45	14.60	0.51	0.82	-	0.17	-	-	-	-
		1	0.05	10,705	2,250	15.92	33.94	26.46	90%	-	11.13	15.92	0.28	0.82	90%	-	11.90	15.92	0.34	0.82	-	0.17	-	-	-	-
		2	0.02	9,140	2,393	15.00	11.50	48.90	100%	-	11.05	15.00	0.33	0.82	100%	8.90	12.50	15.00	0.48	0.82	0.71	0.17	-	1.72	0.13	-
BULK CARRIER, HL	MSD	0	0.02	5,738	1,950	13.00	5.75	24.45	100%	-	9.45	13.00	0.32	0.82	100%	-	9.45	13.00	0.32	0.82	-	0.17	-	-	-	-
CONTAINER SHIP	SSD	0	0.49	14,948	7,158	20.03	11.99	12.26	90%	-	11.57	20.03	0.16	0.82	90%	-	11.83	20.03	0.17	0.82	-	0.13	132	-	-	-
	1	0.08	13,055	3,676	18.93	11.50	11.50		90%	-	12.08	18.93	0.21	0.82	90%	-	12.53	18.93	0.24	0.82	-	0.13	-	-	-	-
GENERAL CARGO	MSD	0	0.01	5,738	1,950	13.00	11.50	48.90	100%	-	10.10	13.00	0.39	0.82	100%	8.90	10.10	13.00	0.39	0.82	0.88	0.17	-	0.57	0.09	-
		1	0.05	6,400	2,367	15.34	35.98	23.74	90%	-	12.57	15.34	0.45	0.82	90%	-	12.20	15.34	0.41	0.82	-	0.17	-	-	-	-
	SSD	0	0.03	9,268	2,557	15.23	23.97	36.43	100%	-	12.07	15.23	0.41	0.82	100%	-	12.30	15.23	0.43	0.82	-	0.17	-	-	-	-
		1	0.11	12,430	2,920	16.98	26.95	34.06	91%	-	11.77	16.98	0.27	0.82	90%	-	11.86	16.98	0.28	0.82	-	0.17	-	-	-	-
		2	0.02	8,630	2,048	14.90	42.10	30.20	100%	2.10	10.95	14.90	0.33	0.82	100%	-	11.00	14.90	0.33	0.82	0.19	0.17	-	0.30	0.03	-
Grand Total			1.00	12,627	4,904	18.43	19.31	20.74	91%	0.04	11.60	18.43	0.22	0.82	91%	0.27	11.87	18.43	0.24	0.82	0.03	0.15	93	2.59	0.25	-

Harborcraft

			NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		Hours		NOx		DPM	
Tug/Barge	Calls	Hours	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Tug	Barge	Tug	Barge	Tug	Barge
Robyn J (Barge Jake J)	0.04	16.4	7.42	0.35	0.25	0.01	0.25	0.01	0.70	0.06	5.57	0.26	0.01	0.00	654	32	0.013	0.001	0.029	0.001	1.0	4.5	0.02	0.28	0.00	0.02
Robyn J (Barge Payton J)	0.81	16.4	163.26	7.62	5.57	0.28	5.40	0.27	15.37	1.29	122.58	5.80	0.16	0.01	14,393	714	0.286	0.025	0.649	0.032	1.0	4.8	0.46	6.69	0.02	0.36
Robyn J (Barge Tori J)	0.15	16.4	29.68	1.39	1.01	0.05	0.98	0.05	2.80	0.23	22.29	1.05	0.03	0.00	2,617	130	0.052	0.005	0.118	0.006	1.0	5.3	0.08	1.34	0.00	0.07
Grand Total	1.00	16.4	200.36	9.35	6.84	0.34	6.63	0.33	18.87	1.58	150.44	7.11	0.20	0.01	17,664	876	0.351	0.031	0.796	0.039		4.9	0.57	8.32	0.02	0.45

Assist Tugs

Tug	Hours per Call				Load Factors		NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		
	Main	Aux			Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	
Scout	1.00	0.70	1.00	0.31	0.43	10.02	0.99	0.22	0.02	0.21	0.02	1.19	0.16	9.51	1.05	0.01	0.00	1,117	130	0.022	0.003	0.050	0.006		
Tioga	1.00	0.70	1.00	0.31	0.43	10.02	0.79	0.22	0.03	0.21	0.03	1.19	0.13	9.51	0.60	0.01	0.00	1,117	74	0.022	0.003	0.050	0.003		
Grand Total	2.00	0.70	1.00	0.31	0.43	20.03	1.78	0.44	0.05	0.43	0.05	2.39	0.30	19.02	1.66	0.03	0.00	2,233	204	0.044	0.006	0.101	0.009		

Demo/Rail Project - 2020 - VSR Beyond CAP

Ships

Ship Type	Engine Type	Emission Tier	Power (kW)			Service Speed (kts)	Total Transit Distance (nm)		Comp (%)	Distance (nm)	Transit - Arrival Speed (kts)		Main Load Factor		Comp (%)	Distance (nm)	Transit - Departure Speed (kts)		Main Load Factor		Time (hrs)	Aux	NC Boiler Load (kW)	NOx		
			Calls	Main	Aux		Arrival	Depart			Comp	NC	Comp	NC			Comp	NC	Comp	NC				Main	Aux	Boiler
AUTO CARRIER	SSD	1	0.12	11,060	2,760	20.00	35.30	35.30	90%	-	12.00	20.00	0.18	0.82	90%	-	12.00	20.00	0.18	0.82	-	0.15	351	-	-	-
BULK CARRIER	MSD	1	0.02	9,100	2,973	16.65	30.20	23.40	90%	-	11.00	16.65	0.24	0.82	90%	-	11.20	16.65	0.25	0.82	-	0.17	-	-	-	-
	SSD	0	0.02	8,139	2,325	14.60	30.20	30.20	100%	-	10.70	14.60	0.32	0.82	100%	-	12.45	14.60	0.51	0.82	-	0.17	-	-	-	-
		1	0.05	10,705	2,250	15.92	33.94	26.46	90%	-	11.13	15.92	0.28	0.82	90%	-	11.90	15.92	0.34	0.82	-	0.17	-	-	-	-
		2	0.02	9,140	2,393	15.00	11.50	48.90	100%	-	11.05	15.00	0.33	0.82	100%	8.90	12.50	15.00	0.48	0.82	0.71	0.17	-	1.72	0.13	-
BULK CARRIER, HL	MSD	0	0.03	5,738	1,950	13.00	5.75	24.45	100%	-	9.45	13.00	0.32	0.82	100%	-	9.45	13.00	0.32	0.82	-	0.17	-	-	-	-
CONTAINER SHIP	SSD	2	0.50	19,420	11,320	19.50	11.92	12.16	90%	-	11.64	19.50	0.18	0.82	90%	-	11.93	19.50	0.19	0.82	-	0.13	132	-	-	-
	MSD	0	0.01	5,738	1,950	13.00	11.50	48.90	100%	-	10.10	13.00	0.39	0.82	100%	8.90	10.10	13.00	0.39	0.82	0.88	0.17	-	0.57	0.09	-
		1	0.07	6,400	2,367	15.34	35.98	23.74	90%	-	12.57	15.34	0.45	0.82	90%	-	12.20	15.34	0.41	0.82	-	0.17	-	-	-	-
		0	0.03	9,268	2,557	15.23	23.97	36.43	100%	-	12.07	15.23	0.41	0.82	100%	-	12.30	15.23	0.43	0.82	-	0.17	-	-	-	-
	SSD	1	0.15	12,430	2,920	16.98	26.95	34.06	91%	-	11.77	16.98	0.27	0.82	90%	-	11.86	16.98	0.28	0.82	-	0.17	-	-	-	-
		2	0.02	8,630	2,048	14.90	42.10	30.20	100%	2.10	10.95	14.90	0.33	0.82	100%	-	11.00	14.90	0.33	0.82	0.19	0.17	-	0.30	0.03	-
Grand Total			1.037	14,524	6,799	18.04	20.86	22.44	91%	0.04	11.62	18.04	0.24	0.82	91%	0.26	11.85	18.04	0.25	0.82	0.03	0.15	103	2.59	0.25	-

1.03659959 =scaling factor for baseline to 2020 (Baseline x 6% increase in annual calls)

Harborcraft

			Tug Running Emissions (lbs)																				Hours		NOx		DPM	
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Baseline

Ships			Transit Emissions (lbs)																								Comp (%)	Distance (nm)
Ship Type	Engine Type	Emission Tier	Main	DPM Aux	Boiler	Main	PM2.5 Aux	Boiler	Main	ROG Aux	Boiler	Main	CO Aux	Boiler	Main	SOx Aux	Boiler	Main	CO2 Aux	Boiler	Main	CH4 Aux	Boiler	Main	N2O Aux	Boiler		
			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
AUTO CARRIER	SSD	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	35.30	
BULK CARRIER	MSD	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	30.20	
	SSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	30.20	
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	33.94	
		2	0.03	0.00	-	0.03	0.00	-	0.11	0.01	-	0.15	0.01	-	0.05	0.01	-	80	9	-	0.010	0.001	-	0.002	0.000	-	100%	11.50
BULK CARRIER, HL	MSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	5.75		
CONTAINER SHIP	SSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	11.99	
GENERAL CARGO	MSD	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	11.50	
		0	0.01	0.00	-	0.01	0.00	-	0.03	0.00	-	0.05	0.01	-	0.02	0.00	-	28	4	-	0.003	0.001	-	0.001	0.000	-	100%	11.50
	SSD	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	35.98	
		0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	23.97	
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	91%	26.95	
		2	0.01	0.00	-	0.01	0.00	-	0.02	0.00	-	0.03	0.00	-	0.01	0.00	-	14	2	-	0.002	0.000	-	0.000	0.000	-	100%	40.00
Grand Total			0.05	0.01	-	0.05	0.01	-	0.15	0.01	-	0.22	0.02	-	0.07	0.01	-	122	15	-	0.015	0.002	-	0.004	0.000	-	91%	19.27

Harborcraft			Hoteling Emissions (lbs)													
			PM2.5		ROG		CO		SOx		CO2		CH4		N2O	
Tug/Barge	Calls	Hours	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge
Robyn J (Barge Jake J)	0.04	16.4	0.00	0.01	0.00	0.05	0.02	0.22	0.00	0.00	2	26	0.000	0.001	0.000	0.001
Robyn J (Barge Payton J)	0.81	16.4	0.02	0.35	0.08	1.14	0.35	5.27	0.00	0.01	44	603	0.002	0.021	0.002	0.028
Robyn J (Barge Tori J)	0.15	16.4	0.00	0.07	0.01	0.23	0.06	1.06	0.00	0.00	8	121	0.000	0.004	0.000	0.006
Grand Total	1.00	16.4	0.02	0.44	0.10	1.41	0.43	6.55	0.00	0.01	53	750	0.002	0.026	0.002	0.035

Assist Tugs			Hours	
Tug	Calls	Main		
Scout	1.00	0.70		
Tioga	1.00	0.70		
Grand Total	2.00	0.70		

Demo/Rail Project - 2020 - VSR Beyor

Ships																												
Ship Type	Engine Type	Emission Tier	Transit Emissions (lbs)																								Comp (%)	Distance (nm)
			Main	DPM Aux	Boiler	Main	PM2.5 Aux	Boiler	Main	ROG Aux	Boiler	Main	CO Aux	Boiler	Main	SOx Aux	Boiler	Main	CO2 Aux	Boiler	Main	CH4 Aux	Boiler	Main	N2O Aux	Boiler		
AUTO CARRIER	SSD	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	35.30	
BULK CARRIER	MSD	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	30.20	
	SSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	30.20	
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	33.94	
		2	0.03	0.00	-	0.03	0.00	-	0.11	0.01	-	0.15	0.01	-	0.05	0.01	-	80	9	-	0.010	0.001	-	0.002	0.000	-	100%	11.50
BULK CARRIER, HL	MSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	5.75		
CONTAINER SHIP	SSD	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	11.92	
GENERAL CARGO	MSD	0	0.01	0.00	-	0.01	0.00	-	0.03	0.00	-	0.05	0.01	-	0.02	0.00	-	28	4	-	0.003	0.001	-	0.001	0.000	-	100%	11.50
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	35.98	
	SSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	23.97	
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	91%	26.95	
Grand Total		2	0.01	0.00	-	0.01	0.00	-	0.02	0.00	-	0.03	0.00	-	0.01	0.00	-	14	2	-	0.002	0.000	-	0.000	0.000	-	100%	40.00
		0.05	0.01	-	0.05	0.01	-	0.15	0.01	-	0.22	0.02	-	0.07	0.01	-	122	15	-	0.015	0.002	-	0.004	0.000	-	91%	20.82	

Harborcraft			Hoteling Emissions (lbs)													
Tug/Barge	Calls	Hours	PM2.5		ROG		CO		SOx		CO2		CH4		N2O	
			Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge
Robyn J (Barge Jake J)	0.04	16.4	0.00	0.01	0.00	0.05	0.02	0.22	0.00	0.00	2	25	0.000	0.001	0.000	0.001
Robyn J (Barge Payton J)	0.82	16.4	0.02	0.35	0.08	1.15	0.36	5.32	0.00	0.01	44	608	0.002	0.021	0.002	0.028
Robyn J (Barge Tori J)	0.14	16.4	0.00	0.07	0.01	0.22	0.06	1.02	0.00	0.00	8	117	0.000	0.004	0.000	0.005
Grand Total	1.00	16.4	0.02	0.44	0.10	1.41	0.43	6.55	0.00	0.01	53	749	0.002	0.026	0.002	0.035

Assist Tugs			Hours	

Baseline

			VSR - Arrival						VSR - Departure																					
Ship Type	Engine Type	Emission Tier	Speed (kts)		Main Load Factor		Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Time (hrs)	Aux	Boiler Load (kW)	NOx		Boiler	Main	DPM		Boiler	Main	PM2.5		Boiler	Main	ROG		Boiler
			Comp	NC	Comp	NC			Comp	NC	Main	Aux				Aux	Aux			Aux										
AUTO CARRIER	SSD	1	12.00	16.06	0.18	0.43	90%	35.30	12.00	15.24	0.18	0.36	5.75	0.15	351	33.51	5.20	0.65	0.56	0.10	0.04	0.52	0.10	0.04	1.86	0.22	0.04			
BULK CARRIER	MSD	1	11.00	13.60	0.24	0.45	90%	23.40	11.20	13.60	0.25	0.45	4.75	0.17	-	5.79	1.31	-	0.12	0.03	-	0.11	0.02	-	0.32	0.05	-			
	SSD	0	10.70	14.60	0.32	0.82	100%	30.20	12.45	14.60	0.51	0.82	5.25	0.17	-	13.12	1.27	-	0.19	0.02	-	0.18	0.02	-	0.60	0.05	-			
		1	11.13	13.10	0.28	0.46	90%	26.46	11.90	13.07	0.34	0.45	5.21	0.17	-	29.76	2.72	-	0.49	0.05	-	0.45	0.05	-	1.54	0.11	-			
		2	11.05	15.00	0.33	0.82	100%	40.00	12.50	15.00	0.48	0.82	4.24	0.17	-	9.47	0.75	-	0.19	0.02	-	0.17	0.02	-	0.59	0.04	-			
BULK CARRIER, HL	MSD	0	9.45	13.00	0.32	0.82	100%	24.45	9.45	13.00	0.32	0.82	3.20	0.17	-	3.37	0.65	-	0.06	0.01	-	0.06	0.01	-	0.17	0.02	-			
CONTAINER SHIP	SSD	0	11.57	14.78	0.16	0.33	90%	12.26	11.83	16.06	0.17	0.42	2.02	0.13	132	103.56	28.26	0.53	1.56	0.51	0.04	1.44	0.47	0.03	5.44	1.06	0.03			
		1	12.08	16.03	0.21	0.50	90%	11.50	12.53	15.40	0.24	0.44	1.83	0.13	-	15.63	1.91	-	0.26	0.04	-	0.24	0.04	-	0.81	0.08	-			
GENERAL CARGO	MSD	0	10.10	13.00	0.39	0.82	100%	40.00	10.10	13.00	0.39	0.82	5.10	0.17	-	3.28	0.52	-	0.06	0.01	-	0.06	0.01	-	0.16	0.02	-			
		1	12.57	13.20	0.45	0.52	90%	23.74	12.20	15.10	0.41	0.78	4.76	0.17	-	17.80	2.62	-	0.38	0.05	-	0.35	0.05	-	0.99	0.11	-			
	SSD	0	12.07	15.23	0.41	0.82	100%	36.43	12.30	15.23	0.43	0.82	4.95	0.17	-	21.83	1.98	-	0.32	0.04	-	0.30	0.03	-	1.00	0.07	-			
		1	11.77	13.10	0.27	0.38	90%	34.06	11.86	15.23	0.28	0.59	5.08	0.17	-	68.24	7.58	-	1.13	0.15	-	1.04	0.14	-	3.53	0.32	-			
		2	10.95	14.90	0.33	0.82	100%	30.20	11.00	14.90	0.33	0.82	6.40	0.17	-	10.08	0.97	-	0.20	0.02	-	0.18	0.02	-	0.62	0.05	-			
Grand Total			11.60	14.57	0.22	0.43	91%	20.47	11.87	15.41	0.24	0.51	3.33	0.15	93	335.46	55.74	1.18	5.54	1.06	0.08	5.09	0.98	0.07	17.62	2.21	0.07			

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.81	16.4
Robyn J (Barge Tori J)	0.15	16.4
Grand Total	1.00	16.4

Assist Tugs		
Tug	Calls	Hours
Scout	1.00	0.70
Tioga	1.00	0.70
Grand Total	2.00	0.70

Demo/Rail Project - 2020 - VSR Beyor

Ships																											
Ship Type	Engine Type	Emission Tier	VSR - Arrival				VSR - Departure				NC Boiler																
			Speed (kts)		Main Load Factor		Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Time (hrs)	Aux	Load (kW)	NOx		Boiler	DPM		Boiler	PM2.5		Boiler	ROG		
	Comp	NC	Comp	NC	Comp	NC			Comp	NC	Main	Aux				Aux	Main		Aux	Main		Aux	Main		Aux	Main	Aux
AUTO CARRIER	SSD	1	12.00	16.06	0.18	0.43	90%	35.30	12.00	15.24	0.18	0.36	5.75	0.15	351	48.84	7.58	0.95	0.82	0.15	0.06	0.76	0.14	0.06	2.71	0.32	0.05
BULK CARRIER	MSD	1	11.00	13.60	0.24	0.45	90%	23.40	11.20	13.60	0.25	0.45	4.75	0.17	-	5.79	1.31	-	0.12	0.03	-	0.11	0.02	-	0.32	0.05	-
	SSD	0	10.70	14.60	0.32	0.82	100%	30.20	12.45	14.60	0.51	0.82	5.25	0.17	-	13.12	1.27	-	0.19	0.02	-	0.18	0.02	-	0.60	0.05	-
		1	11.13	13.10	0.28	0.46	90%	26.46	11.90	13.07	0.34	0.45	5.21	0.17	-	29.76	2.72	-	0.49	0.05	-	0.45	0.05	-	1.54	0.11	-
		2	11.05	15.00	0.33	0.82	100%	40.00	12.50	15.00	0.48	0.82	4.24	0.17	-	9.47	0.75	-	0.19	0.02	-	0.17	0.02	-	0.59	0.04	-
BULK CARRIER, HL	MSD	0	9.45	13.00	0.32	0.82	100%	24.45	9.45	13.00	0.32	0.82	3.20	0.17	-	5.06	0.97	-	0.10	0.02	-	0.09	0.02	-	0.25	0.04	-
CONTAINER SHIP	SSD	2	11.64	14.78	0.18	0.36	90%	12.16	11.93	16.06	0.19	0.46	1.99	0.13	325	109.90	32.03	1.31	2.22	0.81	0.09	2.04	0.74	0.08	7.48	1.68	0.07
	MSD	0	10.10	13.00	0.39	0.82	100%	40.00	10.10	13.00	0.39	0.82	5.10	0.17	-	3.28	0.52	-	0.06	0.01	-	0.06	0.01	-	0.16	0.02	-
		1	12.57	13.20	0.45	0.52	90%	23.74	12.20	15.10	0.41	0.78	4.76	0.17	-	24.92	3.66	-	0.53	0.07	-	0.49	0.07	-	1.38	0.15	-
GENERAL CARGO	SSD	0	12.07	15.23	0.41	0.82	100%	36.43	12.30	15.23	0.43	0.82	4.95	0.17	-	21.83	1.98	-	0.32	0.04	-	0.30	0.03	-	1.00	0.07	-
		1	11.77	13.10	0.27	0.38	90%	34.06	11.86	15.23	0.28	0.59	5.08	0.17	-	93.06	10.33	-	1.54	0.21	-	1.42	0.19	-	4.81	0.43	-
		2	10.95	14.90	0.33	0.82	100%	30.20	11.00	14.90	0.33	0.82	6.40	0.17	-	10.08	0.97	-	0.20	0.02	-	0.18	0.02	-	0.62	0.05	-
Grand Total			11.62	14.42	0.24	0.44	91%	22.18	11.85	15.38	0.25	0.54	3.60	0.15	196	375.12	64.11	2.27	6.79	1.45	0.15	6.24	1.34	0.14	21.47	3.02	0.12

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.82	16.4
Robyn J (Barge Tori J)	0.14	16.4
Grand Total	1.00	16.4

Assist Tugs		
Hours		

Baseline

Ships		VSR Emissions (lbs)															Maneuvering										
Ship Type	Engine Type	Emission Tier	CO			SOx			CO2			CH4			N2O			Speed (kts)	Time (hrs)	Load Factors		Boiler Load (kW)					
			Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler			Main	Aux		Boiler	Main	NOx Aux	Boiler	Main
AUTO CARRIER	SSD	1	2.62	0.46	0.07	0.81	0.17	0.19	1,316	290	302	0.167	0.034	0.010	0.040	0.008	0.004	7.00	2.41	0.04	0.45	351	5.54	6.56	0.30	0.13	0.13
BULK CARRIER	MSD	1	0.54	0.12	-	0.20	0.04	-	319	73	-	0.040	0.008	-	0.009	0.002	-	7.00	2.41	0.06	0.45	132	1.25	1.77	0.03	0.03	0.04
	SSD	0	0.85	0.10	-	0.28	0.04	-	454	63	-	0.054	0.007	-	0.014	0.002	-	7.00	2.41	0.09	0.45	132	1.70	1.55	0.03	0.03	0.03
		1	2.17	0.24	-	0.71	0.09	-	1,159	151	-	0.138	0.018	-	0.035	0.004	-	7.00	2.41	0.07	0.45	132	4.36	3.34	0.07	0.09	0.07
		2	0.83	0.08	-	0.27	0.03	-	442	52	-	0.053	0.006	-	0.014	0.001	-	7.00	2.41	0.08	0.45	132	1.38	1.13	0.03	0.03	0.03
BULK CARRIER, HL	MSD	0	0.28	0.05	-	0.10	0.02	-	165	32	-	0.020	0.004	-	0.005	0.001	-	7.00	2.41	0.13	0.45	132	1.15	1.16	0.03	0.02	0.02
CONTAINER SHIP	SSD	0	7.59	2.24	0.05	2.23	0.81	0.15	3,611	1,403	245	0.488	0.163	0.009	0.110	0.037	0.003	7.00	2.41	0.04	0.50	241	51.42	129.74	1.25	1.06	2.33
	1	1.14	0.17	-	0.37	0.06	-	609	106	-	0.072	0.012	-	0.019	0.003	-	7.00	2.41	0.04	0.50	362	7.72	9.70	0.31	0.18	0.20	
GENERAL CARGO	MSD	0	0.27	0.04	-	0.10	0.01	-	161	26	-	0.020	0.003	-	0.004	0.001	-	7.00	2.41	0.13	0.45	135	0.51	0.58	0.01	0.01	0.01
	SSD	1	1.67	0.23	-	0.61	0.08	-	981	146	-	0.122	0.017	-	0.027	0.004	-	7.00	2.41	0.08	0.45	135	2.10	3.51	0.07	0.05	0.07
		0	1.41	0.16	-	0.46	0.06	-	755	98	-	0.090	0.011	-	0.023	0.003	-	7.00	2.41	0.08	0.45	135	2.71	2.28	0.04	0.05	0.05
		1	4.97	0.67	-	1.63	0.24	-	2,657	422	-	0.316	0.049	-	0.081	0.011	-	7.00	2.41	0.06	0.45	135	10.14	9.54	0.16	0.21	0.19
		2	0.88	0.11	-	0.29	0.04	-	470	68	-	0.056	0.008	-	0.014	0.002	-	7.00	2.41	0.09	0.45	135	1.25	1.22	0.03	0.03	0.02
Grand Total			25.24	4.67	0.12	8.05	1.70	0.34	13,099	2,930	547	1.636	0.340	0.019	0.395	0.076	0.008	7.00	2.41	0.05	0.48	222	91.25	172.07	2.36	1.92	3.19

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.81	16.4
Robyn J (Barge Tori J)	0.15	16.4
Grand Total	1.00	16.4

Assist Tugs		
Tug	Calls	Hours
Scout	1.00	0.70
Tioga	1.00	0.70
Grand Total	2.00	0.70

Demo/Rail Project - 2020 - VSR Beyor

			VSR Emissions (lbs)															Maneuvering									
Ship Type	Engine Type	Emission Tier	CO			SOx			CO2			CH4			N2O			Speed (kts)	Time (hrs)	Load Factors		Boiler Load (kW)	NOx			DPM	
			Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler			Main	Aux		Main	Aux	Boiler	Main	Aux
AUTO CARRIER	SSD	1	3.82	0.67	0.10	1.17	0.24	0.28	1,918	422	440	0.243	0.049	0.015	0.058	0.011	0.006	7.00	2.41	0.04	0.45	351	8.08	9.56	0.43	0.19	0.19
BULK CARRIER	MSD	1	0.54	0.12	-	0.20	0.04	-	319	73	-	0.040	0.008	-	0.009	0.002	-	7.00	2.41	0.06	0.45	135	1.25	1.77	0.03	0.03	0.04
	SSD	0	0.85	0.10	-	0.28	0.04	-	454	63	-	0.054	0.007	-	0.014	0.002	-	7.00	2.41	0.09	0.45	132	1.70	1.55	0.03	0.03	0.03
		1	2.17	0.24	-	0.71	0.09	-	1,159	151	-	0.138	0.018	-	0.035	0.004	-	7.00	2.41	0.07	0.45	132	4.36	3.34	0.07	0.09	0.07
BULK CARRIER, HL	MSD	2	0.83	0.08	-	0.27	0.03	-	442	52	-	0.053	0.006	-	0.014	0.001	-	7.00	2.41	0.08	0.45	132	1.38	1.13	0.03	0.03	0.03
		0	0.42	0.08	-	0.15	0.03	-	247	48	-	0.031	0.006	-	0.007	0.001	-	7.00	2.41	0.13	0.45	132	1.72	1.74	0.04	0.04	0.04
CONTAINER SHIP	SSD	2	10.48	3.56	0.13	3.17	1.29	0.38	5,149	2,233	607	0.672	0.259	0.021	0.157	0.058	0.009	7.00	2.41	0.04	0.50	325	54.77	149.12	1.73	1.52	3.77
GENERAL CARGO	MSD	0	0.27	0.04	-	0.10	0.01	-	161	26	-	0.020	0.003	-	0.004	0.001	-	7.00	2.41	0.13	0.45	132	0.51	0.58	0.01	0.01	0.01
		1	2.34	0.32	-	0.85	0.12	-	1,374	204	-	0.170	0.024	-	0.038	0.005	-	7.00	2.41	0.08	0.45	135	2.94	4.92	0.10	0.08	0.10
	SSD	0	1.41	0.16	-	0.46	0.06	-	755	98	-	0.090	0.011	-	0.023	0.003	-	7.00	2.41	0.08	0.45	135	2.71	2.28	0.04	0.05	0.05
		1	6.78	0.92	-	2.22	0.33	-	3,624	575	-	0.431	0.067	-	0.111	0.015	-	7.00	2.41	0.06	0.45	135	13.83	13.01	0.22	0.29	0.26
Grand Total		2	0.88	0.11	-	0.29	0.04	-	470	68	-	0.056	0.008	-	0.014	0.002	-	7.00	2.41	0.09	0.45	135	1.25	1.22	0.03	0.03	0.02
			30.80	6.40	0.23	9.87	2.33	0.66	16,071	4,013	1,047	1.997	0.465	0.036	0.485	0.105	0.015	7.00	2.41	0.05	0.47	251	94.51	190.21	2.76	2.38	4.60

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.82	16.4
Robyn J (Barge Tori J)	0.14	16.4
Grand Total	1.00	16.4

Assist Tugs		
Hours		

Baseline

13/14 SP avg of 21% - idle time

Ships

Ship Type	Engine Type	Emission Tier	Maneuvering Emissions (lbs)																								Hotel Time (hr)	Aux Time (hr)	Hotelling					
			PM2.5				ROG				CO				SOx				CO2				CH4						N2O				Auxiliary LF	Boiler Load (kW)
			Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux			Boiler					
AUTO CARRIER	SSD	1	0.02	0.12	0.12	0.02	1.00	0.27	0.02	0.89	0.58	0.03	0.12	0.21	0.09	196	365	138	0.090	0.042	0.005	0.007	0.010	0.002	24.0	24.0	0.26	351						
BULK CARRIER	MSD	1	0.00	0.03	0.03	0.00	0.17	0.07	0.00	0.21	0.16	0.00	0.04	0.06	0.01	61	98	13	0.021	0.011	0.000	0.002	0.003	0.000	24.0	24.0	0.10	132						
	SSD	0	0.00	0.03	0.03	0.00	0.15	0.06	0.00	0.19	0.12	0.00	0.04	0.04	0.01	61	77	13	0.014	0.009	0.000	0.002	0.002	0.000	24.0	24.0	0.10	132						
		1	0.00	0.08	0.06	0.00	0.55	0.14	0.00	0.61	0.30	0.01	0.11	0.11	0.02	172	186	32	0.049	0.022	0.001	0.005	0.005	0.000	24.0	24.0	0.10	132						
		2	0.00	0.03	0.03	0.00	0.19	0.06	0.00	0.22	0.13	0.00	0.04	0.05	0.01	66	79	13	0.017	0.009	0.000	0.002	0.002	0.000	24.0	24.0	0.10	132						
BULK CARRIER, HL	MSD	0	0.00	0.02	0.02	0.00	0.08	0.05	0.00	0.13	0.10	0.00	0.04	0.04	0.01	58	64	13	0.010	0.007	0.000	0.002	0.002	0.000	24.0	24.0	0.10	132						
CONTAINER SHIP	SSD	0	0.08	0.97	2.15	0.08	8.23	4.85	0.07	7.32	10.27	0.13	1.01	3.73	0.36	1,618	6,440	579	0.739	0.747	0.020	0.054	0.168	0.008	24.0	22.3	0.35	241						
GENERAL CARGO	MSD	1	0.02	0.16	0.18	0.02	1.39	0.41	0.02	1.24	0.86	0.03	0.17	0.31	0.09	274	540	142	0.125	0.063	0.005	0.009	0.014	0.002	24.0	24.0	0.35	362						
		0	0.00	0.01	0.01	0.00	0.05	0.02	0.00	0.07	0.05	0.00	0.02	0.02	0.00	26	32	7	0.004	0.004	0.000	0.001	0.001	0.000	24.0	24.0	0.10	135						
	SSD	1	0.00	0.05	0.07	0.00	0.31	0.15	0.00	0.36	0.31	0.01	0.07	0.11	0.02	108	196	33	0.027	0.023	0.001	0.003	0.005	0.000	24.0	24.0	0.10	135						
		0	0.00	0.04	0.04	0.00	0.27	0.10	0.00	0.32	0.20	0.00	0.06	0.07	0.01	96	127	20	0.024	0.015	0.001	0.003	0.003	0.000	24.0	24.0	0.10	135						
		1	0.01	0.20	0.18	0.01	1.42	0.40	0.01	1.50	0.85	0.02	0.24	0.31	0.05	392	531	73	0.128	0.062	0.003	0.012	0.014	0.001	24.0	24.0	0.10	135						
		2	0.00	0.03	0.02	0.00	0.15	0.05	0.00	0.19	0.11	0.00	0.04	0.04	0.01	60	68	13	0.014	0.008	0.000	0.002	0.002	0.000	24.0	24.0	0.10	135						
Grand Total			0.16	1.77	2.93	0.14	13.96	6.63	0.13	13.24	14.03	0.24	1.98	5.10	0.69	3,188	8,803	1,089	1.262	1.021	0.038	0.103	0.230	0.015	24.0	18.3	0.25	222						

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.81	16.4
Robyn J (Barge Tori J)	0.15	16.4
Grand Total	1.00	16.4

18.888

Assist Tugs

Tug	Calls	Hours
		Main
Scout	1.00	0.70
Tioga	1.00	0.70
Grand Total	2.00	0.70

80% SP

Demo/Rail Project - 2020 - VSR Beyor

Reduction in hoteling time

0%

Ships

Ship Type	Maneuvering Emissions (lbs)																							Hotel Time (hr)	Aux Time (hr)	Hotelling		
	Engine Type	Emission Tier	PM2.5		ROG		CO		SOx		CO2		CH4		N2O		Auxiliary LF	Boiler Load (kW)										
			Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main			Aux	Boiler								
AUTO CARRIER	SSD	1	0.03	0.17	0.18	0.03	1.46	0.40	0.02	1.29	0.85	0.04	0.18	0.31	0.13	286	532	201	0.131	0.062	0.007	0.010	0.014	0.003	24.0	24.0	0.26	351
	MSD	1	0.00	0.03	0.03	0.00	0.17	0.07	0.00	0.21	0.16	0.00	0.04	0.06	0.01	61	98	13	0.021	0.011	0.000	0.002	0.003	0.000	24.0	24.0	0.10	135
BULK CARRIER	SSD	0	0.00	0.03	0.03	0.00	0.15	0.06	0.00	0.19	0.12	0.00	0.04	0.04	0.01	61	77	13	0.014	0.009	0.000	0.002	0.002	0.000	24.0	24.0	0.10	132
		1	0.00	0.08	0.06	0.00	0.55	0.14	0.00	0.61	0.30	0.01	0.11	0.11	0.02	172	186	32	0.049	0.022	0.001	0.005	0.005	0.000	24.0	24.0	0.10	132
		2	0.00	0.03	0.03	0.00	0.19	0.06	0.00	0.22	0.13	0.00	0.04	0.05	0.01	66	79	13	0.017	0.009	0.000	0.002	0.002	0.000	24.0	24.0	0.10	132
BULK CARRIER, HL	MSD	0	0.00	0.03	0.03	0.00	0.12	0.07	0.00	0.20	0.15	0.00	0.05	0.06	0.01	87	97	19	0.015	0.011	0.001	0.002	0.003	0.000	24.0	24.0	0.10	132
CONTAINER SHIP	SSD	2	0.12	1.40	3.46	0.11	11.83	7.83	0.10	10.51	16.57	0.17	1.45	6.03	0.50	2,324	10,393	797	1.061	1.205	0.028	0.078	0.271	0.011	24.0	8.2	0.35	325
GENERAL CARGO	MSD	0	0.00	0.01	0.01	0.00	0.05	0.02	0.00	0.07	0.05	0.00	0.02	0.02	0.00	26	32	6	0.004	0.004	0.000	0.001	0.001	0.000	24.0	24.0	0.10	132
		1	0.01	0.07	0.09	0.01	0.43	0.21	0.01	0.50	0.44	0.01	0.09	0.16	0.03	151	274	46	0.038	0.032	0.002	0.005	0.007	0.001	24.0	24.0	0.10	135
	SSD	0	0.00	0.04	0.04	0.00	0.27	0.10	0.00	0.32	0.20	0.00	0.06	0.07	0.01	96	127	20	0.024	0.015	0.001	0.003	0.003	0.000	24.0	24.0	0.10	135
		1	0.01	0.27	0.24	0.01	1.94	0.55	0.01	2.05	1.15	0.02	0.33	0.42	0.06	535	724	99	0.174	0.084	0.003	0.016	0.019	0.001	24.0	24.0	0.10	135
		2	0.00	0.03	0.02	0.00	0.15	0.05	0.00	0.19	0.11	0.00	0.04	0.04	0.01	60	68	13	0.014	0.008	0.000	0.002	0.002	0.000	24.0	24.0	0.10	135
Grand Total			0.18	2.19	4.23	0.17	17.31	9.56	0.15	16.36	20.22	0.28	2.44	7.35	0.80	3,925	12,686	1,274	1.563	1.471	0.044	0.127	0.331	0.018	24.0	16.4	0.24	251

Harborcraft		
Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.82	16.4
Robyn J (Barge Tori J)	0.14	16.4
Grand Total	1.00	16.4

Assist Tugs

Hours

Baseline

Ships

Ship Type	Engine Type	Emission Tier	Hotelling Emissions (lbs)																		Cold Iron CO2e
			NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		
			Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	
AUTO CARRIER	SSD	1	37.66	2.96	0.76	0.20	0.70	0.18	1.58	0.16	3.34	0.30	1.21	0.86	2,096	1,369	0.243	0.048	0.055	0.019	-
BULK CARRIER	MSD	1	3.90	0.28	0.08	0.02	0.07	0.02	0.16	0.02	0.35	0.03	0.13	0.08	217	129	0.025	0.004	0.006	0.002	-
	SSD	0	3.42	0.28	0.06	0.02	0.06	0.02	0.13	0.02	0.27	0.03	0.10	0.08	170	129	0.020	0.004	0.004	0.002	-
		1	7.38	0.70	0.15	0.05	0.14	0.04	0.31	0.04	0.65	0.07	0.24	0.20	411	322	0.048	0.011	0.011	0.005	-
		2	2.51	0.28	0.06	0.02	0.06	0.02	0.13	0.02	0.28	0.03	0.10	0.08	175	129	0.020	0.004	0.005	0.002	-
BULK CARRIER, HL	MSD	0	2.87	0.28	0.05	0.02	0.05	0.02	0.11	0.02	0.23	0.03	0.08	0.08	142	129	0.017	0.004	0.004	0.002	-
CONTAINER SHIP	SSD	0	830.09	12.47	14.93	0.83	13.74	0.76	31.05	0.69	65.69	1.25	23.89	3.62	41,206	5,758	4.777	0.200	1.075	0.081	3,178
	1	66.82	3.06	1.35	0.20	1.24	0.19	2.80	0.17	5.93	0.31	2.16	0.89	3,718	1,413	0.431	0.049	0.097	0.020	-	
GENERAL CARGO	MSD	0	1.28	0.14	0.03	0.01	0.02	0.01	0.05	0.01	0.11	0.01	0.04	0.04	71	66	0.008	0.002	0.002	0.001	-
		1	7.76	0.71	0.16	0.05	0.14	0.04	0.33	0.04	0.69	0.07	0.25	0.21	432	329	0.050	0.011	0.011	0.005	-
	SSD	0	5.64	0.43	0.10	0.03	0.09	0.03	0.21	0.02	0.45	0.04	0.16	0.12	280	197	0.032	0.007	0.007	0.003	-
		1	21.07	1.57	0.42	0.10	0.39	0.10	0.88	0.09	1.87	0.16	0.68	0.46	1,172	724	0.136	0.025	0.031	0.010	-
		2	2.15	0.29	0.05	0.02	0.05	0.02	0.11	0.02	0.24	0.03	0.09	0.08	150	132	0.017	0.005	0.004	0.002	-
Grand Total			992.54	23.43	18.20	1.56	16.75	1.44	37.86	1.29	80.09	2.35	29.12	6.81	50,239	10,824	5.825	0.376	1.311	0.153	3,178

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.81	16.4
Robyn J (Barge Tori J)	0.15	16.4
Grand Total	1.00	16.4

Assist Tugs

Tug	Calls	Hours Main
Scout	1.00	0.70
Tioga	1.00	0.70
Grand Total	2.00	0.70

Demo/Rail Project - 2020 - VSR Beyor

Ships

Ship Type	Engine Emission		Hotelling Emissions (lbs)																		Cold Iron
	Type	Tier	NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		
			Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	
AUTO CARRIER	SSD	1	54.90	4.32	1.11	0.29	1.02	0.26	2.30	0.24	4.87	0.43	1.77	1.26	3,055	1,995	0.354	0.069	0.080	0.028	-
	MSD	1	3.90	0.29	0.08	0.02	0.07	0.02	0.16	0.02	0.35	0.03	0.13	0.08	217	132	0.025	0.005	0.006	0.002	-
BULK CARRIER	SSD	0	3.42	0.28	0.06	0.02	0.06	0.02	0.13	0.02	0.27	0.03	0.10	0.08	170	129	0.020	0.004	0.004	0.002	-
		1	7.38	0.70	0.15	0.05	0.14	0.04	0.31	0.04	0.65	0.07	0.24	0.20	411	322	0.048	0.011	0.011	0.005	-
		2	2.51	0.28	0.06	0.02	0.06	0.02	0.13	0.02	0.28	0.03	0.10	0.08	175	129	0.020	0.004	0.005	0.002	-
BULK CARRIER, HL	MSD	0	4.30	0.42	0.08	0.03	0.07	0.03	0.16	0.02	0.34	0.04	0.12	0.12	214	193	0.025	0.007	0.006	0.003	-
CONTAINER SHIP	SSD	2	348.90	17.15	8.81	1.14	8.11	1.05	18.33	0.95	38.77	1.72	14.10	4.99	24,317	7,923	2.819	0.275	0.634	0.112	47,891
GENERAL CARGO	MSD	0	1.28	0.14	0.03	0.01	0.02	0.01	0.05	0.01	0.11	0.01	0.04	0.04	71	64	0.008	0.002	0.002	0.001	-
		1	10.87	1.00	0.22	0.07	0.20	0.06	0.46	0.06	0.96	0.10	0.35	0.29	605	461	0.070	0.016	0.016	0.007	-
	SSD	0	5.64	0.43	0.10	0.03	0.09	0.03	0.21	0.02	0.45	0.04	0.16	0.12	280	197	0.032	0.007	0.007	0.003	-
		1	28.73	2.14	0.58	0.14	0.53	0.13	1.20	0.12	2.55	0.21	0.93	0.62	1,599	987	0.185	0.034	0.042	0.014	-
		2	2.15	0.29	0.05	0.02	0.05	0.02	0.11	0.02	0.24	0.03	0.09	0.08	150	132	0.017	0.005	0.004	0.002	-
Grand Total			473.97	27.42	11.33	1.83	10.42	1.68	23.56	1.51	49.84	2.75	18.19	7.97	31,262	12,664	3.625	0.440	0.816	0.179	47,891

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.04	16.4
Robyn J (Barge Payton J)	0.82	16.4
Robyn J (Barge Tori J)	0.14	16.4
Grand Total	1.00	16.4

Assist Tugs

Hours

Tug	Calls	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux	Main	Aux
Scout	1.04	0.70	1.00	0.31	0.43	10.38	1.03	0.23	0.02	0.22	0.02	1.24	0.17	9.86	1.09	0.01	0.00	1,158	135	0.023	0.003	0.052	0.006
Tioga	1.04	0.70	1.00	0.31	0.43	10.38	0.82	0.23	0.03	0.22	0.03	1.24	0.14	9.86	0.62	0.01	0.00	1,158	77	0.023	0.003	0.052	0.003
Grand Total	2.07	0.70	1.00	0.31	0.43	20.77	1.85	0.46	0.05	0.45	0.05	2.47	0.31	19.72	1.72	0.03	0.00	2,315	211	0.046	0.006	0.104	0.010

TAMT Plan- 2035 - VSR Beyond CAP

Ships

Ship Type	Engine Type	Emission Tier	Power (kW)				Service Speed (kts)	Total Transit Distance (nm)		Transit - Arrival						Transit - Departure						Time			NC Boiler			NOx		
			Calls	Main	Aux	Arrival		Depart	Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Time (hrs)	Aux	Load (kW)	Main	Aux	Boiler				
											Comp	NC	Comp	NC			Comp	NC	Comp	NC										
AUTO CARRIER	SSD	1	0.45	11,060	2,760	20.00	35.30	35.30	90%	-	12.00	20.00	0.18	0.82	90%	-	12.00	20.00	0.18	0.82	-	0.15	351	-	-	-				
	MSD	1	0.08	9,100	2,973	16.65	30.20	23.40	90%	-	11.00	16.65	0.24	0.82	90%	-	11.20	16.65	0.25	0.82	-	0.17	-	-	-	-				
BULK CARRIER	SSD	0	0.08	8,139	2,325	14.60	30.20	30.20	100%	-	10.70	14.60	0.32	0.82	100%	-	12.45	14.60	0.51	0.82	-	0.17	-	-	-	-				
		1	0.19	10,705	2,250	15.92	33.94	26.46	90%	-	11.13	15.92	0.28	0.82	90%	-	11.90	15.92	0.34	0.82	-	0.17	-	-	-					
		2	0.08	9,140	2,393	15.00	11.50	48.90	100%	-	11.05	15.00	0.33	0.82	100%	8.90	12.50	15.00	0.48	0.82	0.71	0.17	-	6.64	0.49	-				
BULK CARRIER, HL	MSD	0	0.12	5,738	1,950	13.00	5.75	24.45	100%	-	9.45	13.00	0.32	0.82	100%	-	9.45	13.00	0.32	0.82	-	0.17	-	-	-	-				
CONTAINER SHIP	SSD	2	1.93	19,420	11,320	19.50	11.92	12.16	90%	-	11.64	19.50	0.18	0.82	90%	-	11.93	19.50	0.19	0.82	-	0.13	132	-	-	-				
	MSD	0	0.04	5,738	1,950	13.00	11.50	48.90	100%	-	10.10	13.00	0.39	0.82	100%	8.90	10.10	13.00	0.39	0.82	0.88	0.17	-	2.19	0.35	-				
GENERAL CARGO	SSD	1	0.27	6,400	2,367	15.34	35.98	23.74	90%	-	12.57	15.34	0.45	0.82	90%	-	12.20	15.34	0.41	0.82	-	0.17	-	-	-	-				
		0	0.12	9,268	2,557	15.23	23.97	36.43	100%	-	12.07	15.23	0.41	0.82	100%	-	12.30	15.23	0.43	0.82	-	0.17	-	-	-	-				
		1	0.58	12,430	2,920	16.98	26.95	34.06	91%	-	11.77	16.98	0.27	0.82	90%	-	11.86	16.98	0.28	0.82	-	0.17	-	-	-	-				
		2	0.08	8,630	2,048	14.90	42.10	30.20	100%	2.10	10.95	14.90	0.33	0.82	100%	-	11.00	14.90	0.33	0.82	0.19	0.17	-	1.16	0.11	-				
Grand Total			4.00	14,524	6,799	18.04	20.86	22.44	91%	0.04	11.62	18.04	0.24	0.82	91%	0.26	11.85	18.04	0.25	0.82	0.03	0.15	103	9.99	0.95	-				

3.85877057 =scaling factor for 2020 to 2035 (4 max daily calls / 2020 max daily calls)

Harborcraft

Tug/Barge	Tug Running Emissions (lbs)																				Hours		NOx		DPM	
	Calls	Hours	NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		Tug	Barge	Tug	Barge	Tug	Barge
Robyn J (Barge Jake J)	0.14	16.4	27.612	1.289	0.942	0.047	0.914	0.046	2.600	0.218	20.733	0.980	0.027	0.001	2,434	121	0.048	0.004	0.110	0.005	1.0	4.5	0.08	1.05	0.00	0.06
Robyn J (Barge Payton J)	3.17	16.4	635.086	29.637	21.672	1.079	21.022	1.047	59.801	5.008	476.856	22.549	0.628	0.031	55,991	2,777	1.113	0.098	2.524	0.125	1.0	4.8	1.81	26.03	0.07	1.41
Robyn J (Barge Tori J)	0.55	16.4	110.450	5.154	3.769	0.188	3.656	0.182	10.400	0.871	82.931	3.922	0.109	0.005	9,738	483	0.194	0.017	0.439	0.022	1.0	5.3	0.31	4.99	0.01	0.27
Grand Total	3.86	16.4	773.148	36.079	26.384	1.314	25.592	1.275	72.801	6.097	580.520	27.451	0.764	0.038	68,163	3,381	1.355	0.119	3.072	0.152	1.0	4.9	2.202	32.078	0.080	1.732

Assist Tugs

Tug	Hours per Call		Load Factors			Tug Running Emissions (lbs)										CO2		CH4		N2O	
	Calls	Main	Aux	Main	Aux	NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4	
Scout	4.00	0.70	1.00	0.31	0.43	40.07	3.96	0.89	0.09	0.86	0.09	4.77	0.65	38.04	4.22	0.05	0.01	4,467	519	0.089	0.013
Tioga	4.00	0.70	1.00	0.31	0.43	40.07	3.17	0.89	0.12	0.86	0.12	4.77	0.54	38.04	2.41	0.05	0.00	4,467	297	0.089	0.010
Grand Total	8.00	0.70	1.00	0.31	0.43	80.13	7.12	1.77	0.21	1.72	0.21	9.54	1.18	76.08	6.62	0.10	0.01	8,933	816	0.178	0.023

Tug	Calls	Main
Scout	1.04	0.70
Tioga	1.04	0.70
Grand Total	2.07	0.70

TAMT Plan- 2035 - VSR Beyond CAP

Ships		Transit Emissions (lbs)																						Comp (%)	Distance (nm)				
Ship Type	Engine Type	Emission Tier	Main	DPM Aux	Boiler	Main	PM2.5 Aux	Boiler	Main	ROG Aux	Boiler	Main	CO Aux	Boiler	Main	SOx Aux	Boiler	Main	CO2 Aux	Boiler	Main	CH4 Aux	Boiler			Main	N2O Aux	Boiler	
AUTO CARRIER	SSD	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	35.30
	MSD	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	30.20
BULK CARRIER	SSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	30.20
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	33.94	
		2	0.13	0.01	-	0.12	0.01	-	0.41	0.03	-	0.58	0.05	-	0.19	0.02	-	310	34	-	0.037	0.004	-	0.009	0.001	-	-	100%	11.50
BULK CARRIER, HL CONTAINER SHIP	MSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	5.75
	SSD	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	11.92
GENERAL CARGO	MSD	0	0.04	0.01	-	0.04	0.01	-	0.11	0.01	-	0.18	0.03	-	0.07	0.01	-	107	17	-	0.013	0.002	-	0.003	0.000	-	-	100%	11.50
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90%	35.98
	SSD	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100%	23.97
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	91%	26.95
		2	0.02	0.00	-	0.02	0.00	-	0.07	0.01	-	0.10	0.01	-	0.03	0.00	-	54	8	-	0.006	0.001	-	0.002	0.000	-	-	100%	40.00
Grand Total			0.20	0.02	-	0.18	0.02	-	0.59	0.04	-	0.86	0.09	-	0.29	0.03	-	471	59	-	0.057	0.007	-	0.014	0.002	-	91%	20.82	

Harborcraft			Hoteling Emissions (lbs)															
Tug/Barge	Calls	Hours	PM2.5		ROG		CO		SOx		CO2		CH4		N2O			
			Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge	Tug	Barge		
Robyn J (Barge Jake J)	0.14	16.4	0.00	0.06	0.01	0.18	0.06	0.83	0.00	0.00	7	95	0.000	0.003	0.000	0.004		
Robyn J (Barge Payton J)	3.17	16.4	0.06	1.36	0.31	4.42	1.38	20.52	0.00	0.03	169	2,347	0.006	0.080	0.008	0.109		
Robyn J (Barge Tori J)	0.55	16.4	0.01	0.26	0.05	0.85	0.24	3.93	0.00	0.01	29	450	0.001	0.015	0.001	0.021		
Grand Total	3.86	16.4	0.078	1.680	0.372	5.449	1.675	25.282	0.002	0.032	206.33	2,891.87	0.007	0.099	0.009	0.135		

Assist Tugs		Hours	
Tug	Calls	Main	
Scout	4.00	0.70	
Tioga	4.00	0.70	
Grand Total	8.00	0.70	

Tug	Calls	Main
Scout	1.04	0.70
Tioga	1.04	0.70
Grand Total	2.07	0.70

TAMT Plan- 2035 - VSR Beyond CAP

Ships

Ship Type	VSR - Arrival						VSR - Departure						NC			NOx			DPM			PM2.5			ROG		
	Engine Type	Emission Tier	Speed (kts)		Main Load Factor		Comp (%)	Distance (nm)	Speed (kts)		Main Load Factor		Boiler Load (kW)	Time (hrs)	Aux	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler
			Comp	NC	Comp	NC			Comp	NC	Comp	NC															
AUTO CARRIER	SSD	1	12.00	16.06	0.18	0.43	90%	35.30	12.00	15.24	0.18	0.36	5.75	0.15	351	188.46	29.26	3.68	3.17	0.59	0.25	2.92	0.54	0.23	10.46	1.23	0.20
	MSD	1	11.00	13.60	0.24	0.45	90%	23.40	11.20	13.60	0.25	0.45	4.75	0.17	-	22.35	5.06	-	0.48	0.10	-	0.44	0.09	-	1.24	0.21	-
BULK CARRIER	SSD	0	10.70	14.60	0.32	0.82	100%	30.20	12.45	14.60	0.51	0.82	5.25	0.17	-	50.64	4.91	-	0.74	0.09	-	0.69	0.08	-	2.32	0.18	-
		1	11.13	13.10	0.28	0.46	90%	26.46	11.90	13.07	0.34	0.45	5.21	0.17	-	114.85	10.50	-	1.90	0.21	-	1.75	0.19	-	5.93	0.44	-
		2	11.05	15.00	0.33	0.82	100%	40.00	12.50	15.00	0.48	0.82	4.24	0.17	-	36.56	2.91	-	0.73	0.07	-	0.67	0.07	-	2.26	0.15	-
BULK CARRIER, HL	MSD	0	9.45	13.00	0.32	0.82	100%	24.45	9.45	13.00	0.32	0.82	3.20	0.17	-	19.52	3.76	-	0.37	0.07	-	0.34	0.06	-	0.96	0.14	-
CONTAINER SHIP	SSD	2	11.64	14.78	0.18	0.36	90%	12.16	11.93	16.06	0.19	0.46	1.99	0.13	325	424.10	123.61	5.07	8.55	3.12	0.34	7.87	2.87	0.31	28.88	6.49	0.28
	MSD	0	10.10	13.00	0.39	0.82	100%	40.00	10.10	13.00	0.39	0.82	5.10	0.17	-	12.68	2.00	-	0.24	0.04	-	0.22	0.03	-	0.62	0.07	-
		1	12.57	13.20	0.45	0.52	90%	23.74	12.20	15.10	0.41	0.78	4.76	0.17	-	96.15	14.14	-	2.05	0.28	-	1.89	0.26	-	5.34	0.59	-
GENERAL CARGO	SSD	0	12.07	15.23	0.41	0.82	100%	36.43	12.30	15.23	0.43	0.82	4.95	0.17	-	84.23	7.63	-	1.24	0.14	-	1.14	0.13	-	3.86	0.29	-
		1	11.77	13.10	0.27	0.38	90%	34.06	11.86	15.23	0.28	0.59	5.08	0.17	-	359.09	39.88	-	5.95	0.80	-	5.47	0.74	-	18.55	1.67	-
		2	10.95	14.90	0.33	0.82	100%	30.20	11.00	14.90	0.33	0.82	6.40	0.17	-	38.88	3.75	-	0.77	0.09	-	0.71	0.09	-	2.41	0.20	-
Grand Total			11.62	14.42	0.24	0.44	91%	22.18	11.85	15.38	0.25	0.54	3.60	0.15	196	1,447.51	247.40	8.75	26.19	5.61	0.58	24.10	5.16	0.54	82.85	11.67	0.48

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.14	16.4
Robyn J (Barge Payton J)	3.17	16.4
Robyn J (Barge Tori J)	0.55	16.4
Grand Total	3.86	16.4

Assist Tugs

Tug	Calls	Hours
		Main
Scout	4.00	0.70
Tioga	4.00	0.70
Grand Total	8.00	0.70

Tug	Calls	Main
Scout	1.04	0.70
Tioga	1.04	0.70
Grand Total	2.07	0.70

TAMT Plan- 2035 - VSR Beyond CAP

Ships

Ship Type	VSR Emissions (lbs)																Maneuvering					NOx					DPM	
	Engine Type	Emission Tier	CO			SOx			CO2			CH4			N2O			Speed (kts)	Time (hrs)	Load Factors		Boiler Load (kW)	Main	Aux	Boiler	Main	Aux	
			Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler			Main	Aux							
AUTO CARRIER	SSD	1	14.75	2.60	0.37	4.53	0.94	1.07	7,399	1,628	1,699	0.939	0.189	0.059	0.225	0.042	0.024	7.00	2.41	0.04	0.45	351	31.18	36.88	1.68	0.72	0.74	
	MSD	1	2.10	0.45	-	0.76	0.16	-	1,232	282	-	0.153	0.033	-	0.034	0.007	-	7.00	2.41	0.06	0.45	135	4.83	6.81	0.11	0.12	0.14	
BULK CARRIER	SSD	0	3.28	0.39	-	1.07	0.14	-	1,752	244	-	0.209	0.028	-	0.054	0.006	-	7.00	2.41	0.09	0.45	132	6.54	5.97	0.11	0.11	0.11	
		1	8.37	0.93	-	2.74	0.34	-	4,472	584	-	0.532	0.068	-	0.137	0.015	-	7.00	2.41	0.07	0.45	132	16.83	12.89	0.27	0.34	0.26	
		2	3.19	0.32	-	1.04	0.12	-	1,706	202	-	0.203	0.023	-	0.052	0.005	-	7.00	2.41	0.08	0.45	132	5.34	4.38	0.11	0.13	0.11	
BULK CARRIER, HL	MSD	0	1.63	0.30	-	0.59	0.11	-	954	187	-	0.118	0.022	-	0.027	0.005	-	7.00	2.41	0.13	0.45	132	6.65	6.70	0.16	0.14	0.14	
CONTAINER SHIP	SSD	2	40.44	13.73	0.51	12.21	4.99	1.47	19,870	8,615	2,342	2.592	0.999	0.081	0.606	0.225	0.033	7.00	2.41	0.04	0.50	325	211.33	575.42	6.66	5.86	14.53	
GENERAL CARGO	MSD	0	1.06	0.16	-	0.38	0.06	-	619	99	-	0.077	0.012	-	0.017	0.003	-	7.00	2.41	0.13	0.45	132	1.97	2.23	0.05	0.05	0.05	
		1	9.04	1.25	-	3.29	0.46	-	5,301	787	-	0.657	0.091	-	0.148	0.021	-	7.00	2.41	0.08	0.45	135	11.36	18.99	0.39	0.29	0.38	
	SSD	0	5.45	0.60	-	1.78	0.22	-	2,913	379	-	0.347	0.044	-	0.089	0.010	-	7.00	2.41	0.08	0.45	135	10.46	8.79	0.17	0.18	0.18	
		1	26.16	3.54	-	8.56	1.29	-	13,983	2,219	-	1.665	0.257	-	0.428	0.058	-	7.00	2.41	0.06	0.45	135	53.35	50.19	0.83	1.13	1.01	
		2	3.39	0.42	-	1.11	0.15	-	1,814	261	-	0.216	0.030	-	0.056	0.007	-	7.00	2.41	0.09	0.45	135	4.84	4.69	0.11	0.11	0.09	
Grand Total			118.85	24.69	0.88	38.08	8.98	2.54	62,016	15,487	4,041	7.708	1.796	0.140	1.872	0.404	0.057	7.00	2.41	0.05	0.47	251	364.68	733.96	10.64	9.17	17.74	

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.14	16.4
Robyn J (Barge Payton J)	3.17	16.4
Robyn J (Barge Tori J)	0.55	16.4
Grand Total	3.86	16.4

Assist Tugs

Tug	Calls	Hours
		Main
Scout	4.00	0.70
Tioga	4.00	0.70
Grand Total	8.00	0.70

Tug	Calls	Main
Scout	1.04	0.70
Tioga	1.04	0.70
Grand Total	2.07	0.70

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80% SP
Reduction in hoteling time 0%

Ships																										Hotel		Aux	Hotelling					
Ship Type	Engine Type	Emission Tier	PM2.5				ROG				CO				SOx				CO2				CH4				N2O				Time (hr)	Time (hr)	Auxiliary LF	Boiler Load (kW)
			Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler	Main	Aux	Boiler							
AUTO CARRIER	SSD	1	0.11	0.66	0.68	0.10	5.62	1.55	0.09	4.99	3.27	0.17	0.69	1.19	0.49	1,104	2,052	775	0.504	0.238	0.027	0.037	0.054	0.011			24.0	24.0	0.26	351				
	MSD	1	0.01	0.11	0.13	0.01	0.65	0.29	0.01	0.82	0.60	0.01	0.15	0.22	0.03	234	379	51	0.080	0.044	0.002	0.007	0.010	0.001			24.0	24.0	0.10	135				
BULK CARRIER	SSD	0	0.01	0.10	0.10	0.01	0.60	0.22	0.01	0.73	0.47	0.01	0.14	0.17	0.03	233	297	50	0.053	0.034	0.002	0.007	0.008	0.001			24.0	24.0	0.10	132				
		1	0.02	0.32	0.24	0.02	2.11	0.54	0.01	2.36	1.14	0.03	0.41	0.42	0.08	665	717	125	0.189	0.083	0.004	0.020	0.019	0.002			24.0	24.0	0.10	132				
		2	0.01	0.12	0.10	0.01	0.72	0.23	0.01	0.85	0.49	0.01	0.16	0.18	0.03	255	305	50	0.065	0.035	0.002	0.008	0.008	0.001			24.0	24.0	0.10	132				
BULK CARRIER, HL CONTAINER SHIP	MSD	0	0.01	0.12	0.12	0.01	0.47	0.28	0.01	0.76	0.59	0.02	0.21	0.22	0.05	334	373	75	0.058	0.043	0.003	0.009	0.010	0.001			24.0	24.0	0.10	132				
	SSD	2	0.44	5.39	13.37	0.41	45.64	30.22	0.37	40.57	63.94	0.67	5.60	23.25	1.94	8,969	40,105	3,075	4.096	4.650	0.107	0.302	1.046	0.043			24.0	8.2	0.35	325				
GENERAL CARGO	MSD	0	0.00	0.04	0.04	0.00	0.19	0.09	0.00	0.25	0.20	0.01	0.06	0.07	0.02	101	124	25	0.017	0.014	0.001	0.003	0.003	0.000			24.0	24.0	0.10	132				
		1	0.03	0.27	0.35	0.02	1.65	0.80	0.02	1.94	1.68	0.04	0.36	0.61	0.11	584	1,057	179	0.149	0.122	0.006	0.017	0.028	0.003			24.0	24.0	0.10	135				
	SSD	0	0.01	0.17	0.16	0.01	1.05	0.37	0.01	1.23	0.78	0.02	0.23	0.28	0.05	370	489	77	0.094	0.057	0.003	0.011	0.013	0.001			24.0	24.0	0.10	135				
		1	0.06	1.04	0.93	0.05	7.49	2.10	0.05	7.89	4.45	0.08	1.28	1.62	0.24	2,065	2,793	383	0.672	0.324	0.013	0.064	0.073	0.005			24.0	24.0	0.10	135				
Grand Total			0.71	8.44	16.32	0.65	66.78	36.89	0.59	63.11	78.04	1.07	9.43	28.38	3.09	15,147	48,953	4,916	6.031	5.676	0.171	0.491	1.277	0.069			24.0	16.4	0.24	255				

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.14	16.4
Robyn J (Barge Payton J)	3.17	16.4
Robyn J (Barge Tori J)	0.55	16.4
Grand Total	3.86	16.4

Assist Tugs

		Hours
Tug	Calls	Main
Scout	4.00	0.70
Tioga	4.00	0.70
Grand Total	8.00	0.70

Tug	Calls	Main
Scout	1.04	0.70
Tioga	1.04	0.70
Grand Total	2.07	0.70

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Ships

			Hotelling Emissions (lbs)																		Cold Iron
Ship Type	Engine Type	Emission Tier	NOx		DPM		PM2.5		ROG		CO		SOx		CO2		CH4		N2O		
			Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	Aux	Boiler	
AUTO CARRIER	SSD	1	211.83	16.67	4.27	1.11	3.93	1.02	8.88	0.92	18.79	1.67	6.83	4.85	11,787	7,700	1.367	0.267	0.307	0.109	-
	MSD	1	15.05	1.10	0.30	0.07	0.28	0.07	0.63	0.06	1.34	0.11	0.49	0.32	838	508	0.097	0.018	0.022	0.007	-
BULK CARRIER	SSD	0	13.20	1.08	0.24	0.07	0.22	0.07	0.49	0.06	1.04	0.11	0.38	0.31	655	497	0.076	0.017	0.017	0.007	-
		1	28.48	2.69	0.57	0.18	0.53	0.16	1.19	0.15	2.53	0.27	0.92	0.78	1,585	1,242	0.184	0.043	0.041	0.018	-
		2	9.67	1.08	0.24	0.07	0.22	0.07	0.51	0.06	1.07	0.11	0.39	0.31	674	497	0.078	0.017	0.018	0.007	-
BULK CARRIER, HL	MSD	0	16.60	1.61	0.30	0.11	0.27	0.10	0.62	0.09	1.31	0.16	0.48	0.47	824	745	0.096	0.026	0.021	0.011	-
CONTAINER SHIP	SSD	2	1,346.33	66.19	34.00	4.41	31.28	4.06	70.72	3.65	149.59	6.64	54.40	19.24	93,835	30,573	10.879	1.062	2.448	0.431	184,799
GENERAL CARGO	MSD	0	4.94	0.54	0.10	0.04	0.09	0.03	0.21	0.03	0.44	0.05	0.16	0.16	275	248	0.032	0.009	0.007	0.004	-
		1	41.94	3.85	0.85	0.26	0.78	0.24	1.76	0.21	3.72	0.39	1.35	1.12	2,334	1,778	0.271	0.062	0.061	0.025	-
	SSD	0	21.77	1.65	0.39	0.11	0.36	0.10	0.81	0.09	1.72	0.17	0.63	0.48	1,081	762	0.125	0.026	0.028	0.011	-
		1	110.87	8.25	2.24	0.55	2.06	0.51	4.65	0.45	9.84	0.83	3.58	2.40	6,170	3,810	0.715	0.132	0.161	0.054	-
		2	8.28	1.10	0.21	0.07	0.19	0.07	0.43	0.06	0.92	0.11	0.33	0.32	577	508	0.067	0.018	0.015	0.007	-
Grand Total			1,828.96	105.79	43.71	7.05	40.21	6.49	90.91	5.83	192.31	10.61	69.93	30.76	120,634	48,867	13.987	1.697	3.147	0.689	184,799

Harborcraft

Tug/Barge	Calls	Hours
Robyn J (Barge Jake J)	0.14	16.4
Robyn J (Barge Payton J)	3.17	16.4
Robyn J (Barge Tori J)	0.55	16.4
Grand Total	3.86	16.4

Assist Tugs

Tug	Calls	Hours
		Main
Scout	4.00	0.70
Tioga	4.00	0.70
Grand Total	8.00	0.70

Baseline Call Information

Trip Ref.	Vessel Name	Last Port of Call	Next Port of Call	Arrived	Sailed	Hrs/Min	Berth	Vessel Type	Commodity	Commodity Type
14-0025	Dole Ecuador	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	07/14/13 20:00	07/16/13 19:06	47.10	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0058	Dole Ecuador	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	8/4/2013 3:12	8/6/2013 17:10	61.97	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0085	Dole Ecuador	Puerto Quetzal, Guatemala	Guayaquil, Ecuador	8/25/2013 0:58	8/27/2013 16:35	63.62	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0119	Dole Ecuador	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	9/15/2013 1:00	9/17/2013 17:33	64.55	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0161	Dole Ecuador	Puerto Quetzal, Guatemala	Guayaquil, Ecuador	10/6/2013 3:55	10/8/2013 16:10	60.25	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0270	Dole Ecuador	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	12/1/2013 0:57	12/3/2013 18:53	65.93	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0312	Dole Ecuador	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	12/22/2013 1:22	12/24/2013 18:00	64.63	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0339	Dole Ecuador	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	1/12/2014 16:52	1/14/2014 19:05	50.22	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0380	Dole Ecuador	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	2/2/2014 4:32	2/4/2014 17:40	61.13	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0412	Dole Ecuador	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	2/23/2014 3:30	2/25/2014 21:30	66.00	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0434	Dole Ecuador	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	3/16/2014 6:18	3/18/2014 17:25	59.12	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0473	Dole Ecuador	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	4/6/2014 3:20	4/8/2014 18:40	63.33	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0511	Dole Ecuador	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	4/26/2014 20:25	4/29/2014 17:56	69.52	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0554	Dole Ecuador	Puerto Quetzal, Guatemala	Guayaquil, Ecuador	5/17/2014 23:50	5/20/2014 16:37	64.78	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0599	Dole Ecuador	Puerto Quetzal, Guatemala	Guayaquil, Ecuador	6/8/2014 6:51	6/10/2014 17:24	58.55	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0012	Dole California	Puerto Quetzal, Guatemala	Guayaquil, Ecuador	07/07/13 03:56	07/09/13 18:35	62.65	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0040	Dole California	Puerto Quetzal, Guatemala	Guayaquil, Ecuador	07/28/13 05:15	07/30/13 18:26	61.18	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0074	Dole California	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	8/18/2013 5:05	8/20/2013 16:10	59.08	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0108	Dole California	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	9/8/2013 5:22	9/10/2013 16:42	59.33	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0148	Dole California	Puerto Quetzal, Guatemala	Guayaquil, Ecuador	9/29/2013 5:20	10/1/2013 16:38	59.30	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0184	Dole California	Puerto Quetzal, Guatemala	Guayaquil, Ecuador	10/20/2013 5:30	10/22/2013 16:31	59.02	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0223	Dole California	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	11/10/2013 5:30	11/12/2013 17:47	60.28	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0322	Dole California	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	12/28/2013 23:55	12/31/2013 16:58	65.05	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0354	Dole California	Puerto Quetzal, Guatemala	Guayaquil, Ecuador	1/19/2014 4:45	1/22/2014 4:00	71.25	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0390	Dole California	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	2/9/2014 5:30	2/11/2014 16:43	59.22	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0418	Dole California	Caldera, Costa Rica	Guayaquil, Ecuador	3/2/2014 3:18	3/4/2014 18:40	63.37	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0443	Dole California	Ulsan, Korea	Port Hueneme, CA	3/24/2014 6:45	3/25/2014 19:33	36.80	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0486	Dole California	Puerto Quetzal, Guatemala	Guayaquil, Ecuador	4/13/2014 6:20	4/15/2014 16:57	58.62	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0536	Dole California	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	5/5/2014 6:25	5/6/2014 18:35	36.17	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0569	Dole California	Puerto Quetzal, Guatemala	Guayaquil, Ecuador	5/25/2014 1:57	5/27/2014 16:33	62.60	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0608	Dole California	Puerto Quetzal, Guatemala	Guayaquil, Ecuador	6/15/2014 6:45	6/17/2014 19:05	60.33	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0032	Dole Honduras	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	07/21/13 16:50	07/23/13 16:42	47.87	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0066	Dole Honduras	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	8/10/2013 23:45	8/13/2013 17:20	65.58	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0101	Dole Honduras	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	9/1/2013 17:15	9/4/2013 16:00	70.75	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0127	Dole Honduras	Puerto Quetzal, Guatemala	Paita, Peru	9/22/2013 4:48	9/24/2013 18:55	62.12	Berth 10-04	Container	Bananas	Refrigerated Containers
14-0174	Dole Honduras	Puerto Quetzal, Guatemala	Guayaquil, Ecuador	10/13/2013 5:55	10/15/2013 16:41	58.77	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0212	Dole Honduras	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	11/3/2013 2:15	11/5/2013 16:30	62.25	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0257	Dole Honduras	Puerto Quetzal, Guatemala	Guayaquil, Ecuador	11/24/2013 5:12	11/26/2013 16:30	59.30	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0302	Dole Honduras	Puerto Quetzal, Guatemala	Guayaquil, Ecuador	12/16/2013 15:49	12/18/2013 2:06	34.28	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0334	Dole Honduras	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	1/5/2014 5:47	1/7/2014 18:50	61.05	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0370	Dole Honduras	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	1/26/2014 4:48	1/28/2014 18:00	61.20	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0405	Dole Honduras	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	2/16/2014 4:00	2/18/2014 18:57	62.95	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0428	Dole Honduras	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	3/9/2014 5:09	3/11/2014 17:06	59.95	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0452	Dole Honduras	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	3/30/2014 4:06	4/1/2014 17:55	61.82	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0496	Dole Honduras	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	4/20/2014 6:13	4/22/2014 18:08	59.92	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0548	Dole Honduras	Puerto Quetzal, Guatemala	Guayaquil, Ecuador	5/11/2014 11:14	5/13/2014 17:05	53.85	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0205	Ditlev Reefer	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	10/27/2013 5:20	10/30/2013 18:18	84.97	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0231	Ditlev Reefer	Puerto Quetzal, Guatemala	Guayaquil, Ecuador	11/18/2013 4:11	11/21/2013 18:30	86.32	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0289	Ditlev Reefer	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	12/10/2013 7:40	12/14/2013 14:06	102.43	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0408	Auriga J	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	2/19/2014 5:05	2/21/2014 19:00	61.92	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0422	Auriga J	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	3/4/2014 23:18	3/7/2014 4:09	52.85	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0439	Auriga J	Puerto Quetzal, Guatemala	Guayaquil, Ecuador	3/18/2014 22:36	3/21/2014 2:02	51.43	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0460	Auriga J	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	4/2/2014 5:35	4/4/2014 5:18	47.72	Berth 10-02	Container	Bananas	Refrigerated Containers

Baseline Call Information

TRIP Ref.	LR/IMO#	Shore Pwr	IMO	CALL	SHIP_TYPE	KEEL	MAIN_KW	DESIGN	DESIGNATIO	DISP	MAIN_EI	CATE	Aux_KW	LL_FLAC	SPEED	TEUS	GT	DWT	DWT
14-0025	8513479	0	8513479	C6FX6	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,613	1
14-0058	8513479	0	8513479	C6FX6	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,613	1
14-0085	8513479	0	8513479	C6FX6	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,613	1
14-0119	8513479	0	8513479	C6FX6	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,613	1
14-0161	8513479	0	8513479	C6FX6	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,613	1
14-0270	8513479	0	8513479	C6FX6	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,613	1
14-0312	8513479	0	8513479	C6FX6	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,613	1
14-0339	8513479	0	8513479	C6FX6	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,613	1
14-0380	8513479	0	8513479	C6FX6	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,613	1
14-0412	8513479	28.8	8513479	C6FX6	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,613	1
14-0434	8513479	57	8513479	C6FX6	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,613	1
14-0473	8513479	60.4	8513479	C6FX6	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,613	1
14-0511	8513479	28.2	8513479	C6FX6	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,613	1
14-0554	8513479	63.1	8513479	C6FX6	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,613	1
14-0599	8513479	56.9	8513479	C6FX6	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,613	1
14-0012	8513467	0	8513467	C6FY2	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,800	1
14-0040	8513467	0	8513467	C6FY2	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,800	1
14-0074	8513467	0	8513467	C6FY2	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,800	1
14-0108	8513467	0	8513467	C6FY2	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,800	1
14-0148	8513467	0	8513467	C6FY2	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,800	1
14-0184	8513467	0	8513467	C6FY2	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,800	1
14-0223	8513467	0	8513467	C6FY2	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,800	1
14-0322	8513467	0	8513467	C6FY2	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,800	1
14-0354	8513467	0	8513467	C6FY2	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,800	1
14-0390	8513467	0	8513467	C6FY2	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,800	1
14-0418	8513467	34.2	8513467	C6FY2	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,800	1
14-0443	8513467	33.8	8513467	C6FY2	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,800	1
14-0486	8513467	56.5	8513467	C6FY2	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,800	1
14-0536	8513467	33.9	8513467	C6FY2	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,800	1
14-0569	8513467	60.8	8513467	C6FY2	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,800	1
14-0608	8513467	57.4	8513467	C6FY2	CONTAINER SHIP	1985	15,189	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,488	11,800	1
14-0032	9181479	0	8900323	C6FX7	CONTAINER SHIP	1990	15,190	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,657	16,337	1
14-0066	9181479	0	8900323	C6FX7	CONTAINER SHIP	1990	15,190	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,657	16,337	1
14-0101	9181479	0	8900323	C6FX7	CONTAINER SHIP	1990	15,190	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,657	16,337	1
14-0127	9181479	0	8900323	C6FX7	CONTAINER SHIP	1990	15,190	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,657	16,337	1
14-0174	9181479	0	8900323	C6FX7	CONTAINER SHIP	1990	15,190	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,657	16,337	1
14-0212	9181479	0	8900323	C6FX7	CONTAINER SHIP	1990	15,190	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,657	16,337	1
14-0257	9181479	0	8900323	C6FX7	CONTAINER SHIP	1990	15,190	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,657	16,337	1
14-0302	9181479	0	8900323	C6FX7	CONTAINER SHIP	1990	15,190	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,657	16,337	1
14-0334	8900323	0	8900323	C6FX7	CONTAINER SHIP	1990	15,190	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,657	16,337	1
14-0370	8900323	0	8900323	C6FX7	CONTAINER SHIP	1990	15,190	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,657	16,337	1
14-0405	8900323	0	8900323	C6FX7	CONTAINER SHIP	1990	15,190	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,657	16,337	1
14-0428	8900323	0	8900323	C6FX7	CONTAINER SHIP	1990	15,190	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,657	16,337	1
14-0452	8900323	0	8900323	C6FX7	CONTAINER SHIP	1990	15,190	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,657	16,337	1
14-0496	8900323	0	8900323	C6FX7	CONTAINER SHIP	1990	15,190	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,657	16,337	1
14-0548	8900323	0	8900323	C6FX7	CONTAINER SHIP	1990	15,190	Sulzer	7RTA68	726.3	SSD	3	7,220	BAH	20.00	910	16,657	16,337	1
14-0205	8819926	0	8819926	C6ZP7	CONTAINER SHIP	1989	11,250	B&W	6L60MC	549.7	SSD	3	6,200	BAH	20.50	480	14,406	16,950	1
14-0231	8819926	0	8819926	C6ZP7	CONTAINER SHIP	1989	11,250	B&W	6L60MC	549.7	SSD	3	6,200	BAH	20.50	480	14,406	16,950	1
14-0289	8819926	0	8819926	C6ZP7	CONTAINER SHIP	1989	11,250	B&W	6L60MC	549.7	SSD	3	6,200	BAH	20.50	480	14,406	16,950	1
14-0408	9242302	0	9242302	V2BF9	CONTAINER SHIP	2000	11,060	B&W	7S50MC-C	392.7	SSD	3	2,960	TRK	18.30	1,150	14,062	18,400	2
14-0422	9242302	0	9242302	V2BF9	CONTAINER SHIP	2000	11,060	B&W	7S50MC-C	392.7	SSD	3	2,960	TRK	18.30	1,150	14,062	18,400	2
14-0439	9242302	0	9242302	V2BF9	CONTAINER SHIP	2000	11,060	B&W	7S50MC-C	392.7	SSD	3	2,960	TRK	18.30	1,150	14,062	18,400	2
14-0460	9242302	0	9242302	V2BF9	CONTAINER SHIP	2000	11,060	B&W	7S50MC-C	392.7	SSD	3	2,960	TRK	18.30	1,150	14,062	18,400	2

Baseline Call Information

Trip Ref .	DWT_RANGE	OPERATOR	STATUS	Tier	arrival dir	depart dir	Arr_Dist	Dep_Dist	Arr_Speed	Dep_Speed	Arr_Comp	Dep_Comp	Trans_Hrs	Tran_Spd
14-0025	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.9	12.1	Yes	Yes	1.92	12.00
14-0058	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.8	11.8	Yes	Yes	1.95	11.80
14-0085	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	12.7	11.3	Yes	Yes	1.92	11.96
14-0119	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	10.2	13.3	Yes	No	1.99	11.55
14-0161	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	12.2	12.2	Yes	Yes	1.89	12.20
14-0270	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	10.8	12.2	Yes	Yes	2.01	11.46
14-0312	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.0	11.9	Yes	Yes	2.01	11.43
14-0339	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.8	11.8	Yes	Yes	1.95	11.80
14-0380	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	13.2	11.4	No	Yes	1.88	12.23
14-0412	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.2	11.3	Yes	Yes	2.04	11.25
14-0434	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.8	11.3	Yes	Yes	1.99	11.54
14-0473	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.5	18.2	Yes	No	1.63	14.09
14-0511	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.7	11.3	Yes	Yes	2.00	11.50
14-0554	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.5	11.3	Yes	Yes	2.02	11.40
14-0599	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.1	12.2	Yes	Yes	1.98	11.62
14-0012	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	12.2	12.3	Yes	Yes	1.88	12.25
14-0040	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.4	16.1	Yes	No	1.72	13.35
14-0074	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.9	16.9	Yes	No	1.65	13.97
14-0108	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	12.4	17.1	Yes	No	1.60	14.38
14-0148	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	14.2	15.7	No	No	1.54	14.91
14-0184	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	10.1	11.9	Yes	Yes	2.11	10.93
14-0223	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	12.4	15.5	Yes	No	1.67	13.78
14-0322	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	12.2	15.4	Yes	No	1.69	13.61
14-0354	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.1	12.1	Yes	Yes	1.99	11.58
14-0390	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.5	12.0	Yes	Yes	1.96	11.74
14-0418	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	12.5	11.6	Yes	Yes	1.91	12.03
14-0443	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	west	north	35.3	48.9	12.9	12.1	Yes	Yes	6.78	12.42
14-0486	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.7	12.0	Yes	Yes	1.94	11.85
14-0536	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	13.0	14.7	No	No	1.67	13.80
14-0569	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.0	11.9	Yes	Yes	2.01	11.43
14-0608	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.9	11.2	Yes	Yes	1.99	11.54
14-0032	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.9	12.8	Yes	Yes	1.86	12.33
14-0066	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.2	11.6	Yes	Yes	2.02	11.40
14-0101	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	12.1	11.4	Yes	Yes	1.96	11.74
14-0127	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	12.9	11.7	Yes	Yes	1.87	12.27
14-0174	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.2	11.3	Yes	Yes	2.04	11.25
14-0212	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	10.4	11.2	Yes	Yes	2.13	10.79
14-0257	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	10.5	12.1	Yes	Yes	2.05	11.24
14-0302	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	10.5	11.9	Yes	Yes	2.06	11.16
14-0334	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.6	12.3	Yes	Yes	1.93	11.94
14-0370	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.4	12.1	Yes	Yes	1.96	11.74
14-0405	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	14.2	11.8	No	Yes	1.78	12.89
14-0428	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	10.7	12.1	Yes	Yes	2.03	11.36
14-0452	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	12.2	12.5	Yes	Yes	1.86	12.35
14-0496	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	10.9	11.8	Yes	Yes	2.03	11.33
14-0548	< 1000 TEU	Transfrut Express Ltd	In Service/Commission	0	south	south	11.5	11.5	11.1	13.4	Yes	No	1.89	12.14
14-0205	< 1000 TEU	NYKCool AB	In Service/Commission	0	south	south	11.5	11.5	11.9	15.2	Yes	No	1.72	13.35
14-0231	< 1000 TEU	NYKCool AB	In Service/Commission	0	south	south	11.5	11.5	12.3	18.6	Yes	No	1.55	14.81
14-0289	< 1000 TEU	NYKCool AB	In Service/Commission	0	south	south	11.5	11.5	19.3	18.7	No	No	1.21	19.00
14-0408	1000 - 2000 TEU	Arkas Denizcilik ve Nakliyat	In Service/Commission	1	south	south	11.5	11.5	12.7	11.8	Yes	Yes	1.88	12.23
14-0422	1000 - 2000 TEU	Arkas Denizcilik ve Nakliyat	In Service/Commission	1	south	south	11.5	11.5	12.7	12.7	Yes	Yes	1.81	12.70
14-0439	1000 - 2000 TEU	Arkas Denizcilik ve Nakliyat	In Service/Commission	1	south	south	11.5	11.5	15.5	12.8	No	Yes	1.64	14.02
14-0460	1000 - 2000 TEU	Arkas Denizcilik ve Nakliyat	In Service/Commission	1	south	south	11.5	11.5	11.0	12.5	Yes	Yes	1.97	11.70

Baseline Call Information

Trip Ref .	Vessel Name	Last Port of Call	Next Port of Call	Arrived	Sailed	Hrs/Min	Berth	Vessel Type	Commodity	Commodity Type
14-0490	Auriga J	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	4/16/2014 4:45	4/17/2014 23:53	43.13	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0516	Auriga J	Puerto Quetzal, Guatemala	Puerto Quetzal, Guatemala	4/30/2014 5:05	5/2/2014 0:04	42.98	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0577	O.M. Agarum	Puerto Quetzal, Guatemala	Guayaquil, Ecuador	5/31/2014 12:23	6/3/2014 19:00	78.62	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0620	O.M. Agarum	Puerto Quetzal, Guatemala	Guayaquil, Ecuador	6/22/2014 6:15	6/26/2014 18:15	108.00	Berth 10-02	Container	Bananas	Refrigerated Containers
14-0150	Solin	Australia	Redwood City, Ca	10/1/2013 7:45	10/3/2013 22:12	62.45	Berth 10-07	Bulk Carrier	Bauxite	Dry Bulk
14-0348	Durban Bay	Weipa, Australia	Redwood City, Ca	1/16/2014 21:37	1/19/2014 19:35	69.97	Berth 10-07	Bulk Carrier	Bauxite	Dry Bulk
14-0565	LA Carita	Guaymas	Redwood City, Ca	5/22/2014 9:45	5/24/2014 12:10	50.42	Berth 10-07	Bulk Carrier	Bauxite	Dry Bulk
14-0186	Star Kirkenes	Puerto Quetzal, Guatemala	Los Angeles, CA	10/20/2013 11:30	10/23/2013 7:53	68.38	Berth 10-04	General Cargo	Calcium Nitrate	Dry Bulk
14-0472	Star Lofoten	Lazaro Cardenas, Mexico	Los Angeles, CA	4/5/2014 16:36	4/7/2014 14:02	45.43	Berth 10-05	General Cargo	Calcium Nitrate	Dry Bulk
14-0323	Eide Transporter	Bahrain	Unknown	12/29/2013 11:35	1/3/2014 14:35	123.00	Berth 10-06	General Cargo	Containers	Multi-Purpose General Cargo
14-0037	Star Eagle	Panama Canal	Los Angeles, CA	07/25/13 05:22	07/26/13 23:00	41.63	Berth 10-05	General Cargo	Fertilizer	Dry Bulk
14-0626	Star Fuji	Corinto, Nicaragua	Los Angeles, CA	6/26/2014 14:50	6/28/2014 5:11	38.35	Berth 10-04	Bulk Carrier	Fertilizer	Dry Bulk
14-0510	Star Japan	Lazaro Cardenas, Mexico	Los Angeles, CA	4/25/2014 16:40	4/26/2014 15:55	23.25	Berth 10-07	General Cargo	fertilizer	Dry Bulk
14-0570	Star Istind	Lazaro Cardenas, Mexico	Los Angeles, CA	5/25/2014 14:35	5/26/2014 17:50	27.25	Berth 10-04	General Cargo	fertilizer	Dry Bulk
14-0415	ISUZU	South Korea	Costa Rica	2/25/2014 9:40	2/27/2014 18:00	56.33	Berth 10-07	General Cargo	Iron & Steel	Multi-Purpose General Cargo
14-0559	Eide Transporter	Unknown	Unknown	5/20/2014 8:20	5/27/2014 12:05	171.75	Berth 10-03	Barge Carrier	Military	Multi-Purpose General Cargo
14-0576	Eide Transporter	Local	Local	5/29/2014 7:43	5/31/2014 16:00	56.28	Berth 10-03	Barge Carrier	Military	Multi-Purpose General Cargo
14-0462	Palabora	Manzanillo, Mexico	Tacoma,Wa	4/2/2014 6:31	4/5/2014 17:10	82.65	Berth 10-07	General Cargo	Project Cargo	Multi-Purpose General Cargo
14-0239	Clipper Aurora	China	Topolobambo, Mexico	11/20/2013 21:30	11/22/2013 21:02	47.53	Berth 10-07	General Cargo	Project Cargo	Multi-Purpose General Cargo
14-0189	Rickmers Shanghai	Kobe, Japan	Houston, Texas	10/22/2013 5:30	10/23/2013 21:50	40.33	Berth 10-04	General Cargo	Project Cargo	Multi-Purpose General Cargo
14-0080	Fidelio	Manzanillo, Mexico	Port Hueneme, CA	8/23/2013 6:26	8/23/2013 22:32	16.10	Berth 10-04	General Cargo	Project Cargo	Multi-Purpose General Cargo
14-0321	Fidelio	Port Hueneme, CA	Tacoma,Wa	12/27/2013 15:40	12/27/2013 22:00	6.33	Berth 10-04	General Cargo	Project Cargo	Multi-Purpose General Cargo
14-0610	Kraszewski	South Korea	Puerto Bolivar, Colombia	6/16/2014 13:50	6/18/2014 14:04	48.23	Berth 10-04	General Cargo	Project Cargo	Multi-Purpose General Cargo
14-0297	Port Maubert	Vladivostok, Russia	Unknown	12/13/2013 23:13	12/15/2013 16:02	40.82	Berth 10-04	General Cargo	Project Cargo	Multi-Purpose General Cargo
14-0333	Happy Dover	Colombia	China	1/4/2014 16:05	1/6/2014 22:00	53.92	Berth 10-07	Bulk Carrier	Soda Ash	Dry Bulk
14-0603	Valdivia	Vancouver, B.C. Canada	Manzanillo, Mexico	6/11/2014 5:45	6/11/2014 18:30	12.75	Berth 10-07	Bulk Carrier	Soda Ash	Dry Bulk
14-0534	Daiwan Wisdom	New Westminster, B.C.	Mexico	5/5/2014 5:02	5/6/2014 20:54	39.87	Berth 10-07	Bulk Carrier	Soda Ash	Dry Bulk
14-0052	Pine Arrow	New Westminster, B.C.	Manzanillo, Mexico	8/1/2013 15:37	8/2/2013 10:45	19.13	Berth 10-07	Bulk Carrier	Soda Ash	Dry Bulk
14-0410	Star Lima	Topolobambo, Mexico	Los Angeles, CA	2/20/2014 17:35	2/25/2014 5:15	107.67	Berth 10-07	Bulk Carrier	Soda Ash	Dry Bulk
14-0049	Tenca Arrow	Long Beach, CA	Manzanillo, Mexico	07/31/13 14:10	08/01/13 06:00	15.83	Berth 10-07	Bulk Carrier	Soda Ash	Dry Bulk
14-0612	Daebo Yeosu	Los Angeles, CA	Houston, Texas	6/17/2014 8:32	6/25/2014 6:42	190.17	Berth 10-07	General Cargo	Steel Pipe	Multi-Purpose General Cargo
14-0315	Jean Anne	Hawaii	Hawaii	12/23/2013 16:35	12/24/2013 16:20	23.75	Berth 10-04	Auto Carrier	Vehicles	Multi-Purpose General Cargo
14-0336	Jean Anne	Hawaii	Hawaii	1/7/2014 16:13	1/8/2014 19:02	26.82	Berth 10-04	Auto Carrier	Vehicles	Multi-Purpose General Cargo
14-0359	Jean Anne	Hawaii	Hawaii	1/21/2014 14:06	1/22/2014 18:13	28.12	Berth 10-04	Auto Carrier	Vehicles	Multi-Purpose General Cargo
14-0383	Jean Anne	Hawaii	Hawaii	2/4/2014 23:57	2/6/2014 3:07	27.17	Berth 10-04	Auto Carrier	Vehicles	Multi-Purpose General Cargo
14-0407	Jean Anne	Hawaii	Hawaii	2/18/2014 13:25	2/19/2014 17:08	27.72	Berth 10-04	Auto Carrier	Vehicles	Multi-Purpose General Cargo
14-0421	Jean Anne	Hawaii	Hawaii	3/4/2014 7:15	3/5/2014 13:35	30.33	Berth 10-04	Auto Carrier	Vehicles	Multi-Purpose General Cargo
14-0438	Jean Anne	Hawaii	Hawaii	3/18/2014 8:10	3/19/2014 15:57	31.78	Berth 10-04	Auto Carrier	Vehicles	Multi-Purpose General Cargo
14-0461	Jean Anne	Hawaii	Hawaii	4/2/2014 7:15	4/3/2014 8:05	24.83	Berth 10-04	Auto Carrier	Vehicles	Multi-Purpose General Cargo
14-0244	BBC Bahrain	Chile	Ulsan, Korea	11/21/2013 22:15	11/25/2013 6:29	80.23	Berth 10-05	General Cargo	Vindmill Component	Multi-Purpose General Cargo
14-0497	Ocean Giant	Unknown	Unknown	4/20/2014 5:00	4/23/2014 21:12	88.20	Berth 10-05	General Cargo	Vindmill Component	Multi-Purpose General Cargo
14-0327	AAL Dalian	Nantong, China	Los Angeles, CA	1/2/2014 12:00	1/4/2014 16:54	52.90	Berth 10-04	General Cargo	Vindmill Component	Multi-Purpose General Cargo
14-0229	AAL Hong Kong	Los Angeles, CA	Los Angeles, CA	11/14/2013 14:00	11/16/2013 14:00	48.00	Berth 10-07	General Cargo	Vindmill Component	Multi-Purpose General Cargo
14-0326	Lucia	Nakhodka	Galveston, Texas	1/2/2014 5:15	1/2/2014 19:00	13.75	Berth 10-07	General Cargo	Vindmill Component	Multi-Purpose General Cargo
14-0630	BBC Kimberley	China	Port Everglades, Florida	6/30/2014 4:16	6/30/2014 18:10	13.90	Berth 10-07	General Cargo	Yachts	Multi-Purpose General Cargo
14-0313	Ocean Giant	Portland	Unknown	12/22/2013 16:20	12/23/2013 14:13	21.88	Berth 10-05	Bulk Carrier	Yachts	Multi-Purpose General Cargo
14-0061	Maersk Texas	Houston, Texas	Guam	8/6/2013 19:50	8/12/2013 18:00	142.17	Berth 10-07	General Cargo	Yachts	Multi-Purpose General Cargo

Baseline Call Information

Trip Ref.	LR/IMO#	Shore Pwr	IMO	CALL	SHIP_TYPE	KEEL	MAIN_KW	DESIGN	DESIGNATIO	DISP	MAIN_EI	CATE	Aux_KW	LL_FLAC	SPEED	TEUS	GT	DWT	DWT
14-0490	9242302	0	9242302	V2BF9	CONTAINER SHIP	2000	11,060	B&W	7S50MC-C	392.7	SSD	3	2,960	TRK	18.30	1,150	14,062	18,400	2
14-0516	9242302	0	9242302	V2BF9	CONTAINER SHIP	2000	11,060	B&W	7S50MC-C	392.7	SSD	3	2,960	TRK	18.30	1,150	14,062	18,400	2
14-0577	9339856	0	9339856	A8PN6	CONTAINER SHIP	2006	19,040	B&W	8S60ME-C	678.6	SSD	3	5,824	LIB	20.80	2,015	23,633	27,131	3
14-0620	9339856	0	9339856	A8PN6	CONTAINER SHIP	2006	19,040	B&W	8S60ME-C	678.6	SSD	3	5,824	LIB	20.80	2,015	23,633	27,131	3
14-0150	9629483	0	9629483	9AA8522	BULK CARRIER	2011	7500	B&W	6S50MC-C8	392.7	SSD	3	2,190	CRO	14.50	-	30,092	51,545	4
14-0348	9531662	0	9531662	3FEY2	BULK CARRIER	2010	8100	B&W	6S50MC-C8	392.7	SSD	3	1,500	PAN	14.20	-	32,726	58,186	4
14-0565	9440930	0	9440930	3FNI2	BULK CARRIER	2008	8400	B&W	6S50MC-C	392.7	SSD	3	1,440	PAN	14.50	-	32,415	58,707	4
14-0186	9396127	0	9396127	LAHR7	GENERAL CARGO	2009	11,300	B&W	5S60MC-C	678.6	SSD	3	3,450	NIS	16.00	1,453	37,158	49,924	4
14-0472	9593892	0	9593892	LAQL7	GENERAL CARGO	2013	10780	B&W	5S60ME-C8	678.6	SSD	3	2,595	NIS	15.50	1,411	37,447	50,728	4
14-0323	8030130	0	8030130	C6OC2	GENERAL CARGO	1981	5,738	Pielstick	6PC2-5L-400	57.8	MSD	3	1,950	BAH	13.00	-	19,579	11,434	1
14-0037	8005109	0	8005109	LAWO2	GENERAL CARGO	1981	9,635	B&W	6L67GFCA	599.4	SSD	3	2,400	NIS	15.00	1,448	24,479	39,749	3
14-0626	8309830	0	8309830	LAVX4	BULK CARRIER	1984	7,377	B&W	7L60MCE	549.7	SSD	3	2,250	NIS	15.00	1,064	25,345	40,850	3
14-0510	9254654	0	9254654	LAZV5	GENERAL CARGO	2003	10,519	B&W	6S60MC	648.0	SSD	3	3,500	NIS	16.55	2,070	32,844	44,807	3
14-0570	9182954	0	9182954	LAMP5	GENERAL CARGO	1998	10,519	B&W	6S60MC	648.0	SSD	3	3,320	NIS	16.20	2,096	32,628	46,428	4
14-0415	9624902	0	9624902	3FSN6	GENERAL CARGO	2010	6480	B&W	6S42MC	244.4	SSD	3	1,500	PAN	14.30	568	14,122	20,352	1
14-0559	8030130	0	8030130	C6OC2	BULK CARRIER, HL	1981	5,738	Pielstick	6PC2-5L-400	57.8	MSD	3	1,950	BAH	13.00	-	19,579	11,434	1
14-0576	8030130	0	8030130	C6OC2	BULK CARRIER, HL	1981	5,738	Pielstick	6PC2-5L-400	57.8	MSD	3	1,950	BAH	13.00	-	19,579	11,434	1
14-0462	9501875	0	9501875	V2ES2	GENERAL CARGO	2008	7200	MAN	6L48/60B	108.6	MSD	3	2,930	ABB	16.20	604	11,473	10,052	1
14-0239	9367073	0	9367073	PHJP	GENERAL CARGO	2004	6,000	MaK	6M43	88.6	MSD	3	2,290	NTH	12.50	684	8,999	12,000	1
14-0189	9244544	0	9244544	V7EE3	GENERAL CARGO	2002	15,785	B&W	7S60MC-C	678.6	SSD	3	3,030	MAI	18.00	1,888	23,119	30,095	2
14-0080	9332937	0	9332937	SLKR	GENERAL CARGO	2007	15,820	B&W	7S60MC-C	678.6	SSD	3	3,838	SWD	19.00	-	71,583	30,137	2
14-0321	9332937	0	9332937	SLKR	GENERAL CARGO	2007	15,820	B&W	7S60MC-C	678.6	SSD	3	3,838	SWD	19.00	-	71,583	30,137	2
14-0610	9432153	0	9432153	5BKf3	GENERAL CARGO	2010	16520	Sulzer	7RT-flex60C	636.2	SSD	3	2,880	CYP	19.20	1,904	24,221	30,435	2
14-0297	9358864	0	9358864	V7NL2	GENERAL CARGO	2007	9,480	B&W	6S50MC-C	392.7	SSD	3	2,040	MAI	14.70	-	32,486	53,828	4
14-0333	9551959	0	9551959	PBXH	BULK CARRIER	2009	8400	Wartsila	8L46	96.4	MSD	3	2,896	NTH	15.80	1,049	14,784	18,074	1
14-0603	9333395	0	9333395	V7LJ5	BULK CARRIER	2004	16,980	B&W	6L70ME-C	908.2	SSD	3	3,800	MAI	21.00	1,875	17,360	22,229	1
14-0534	9427134	0	9427134	3FWQ8	BULK CARRIER	2008	7470	Mitsubishi	6UEC45LSE	292.6	SSD	3	1,360	PAN	14.40	-	19,825	31,833	2
14-0052	9107306	0	9107306	C6N23	BULK CARRIER	1995	8,900	B&W	5S60MC	648.0	SSD	3	2,400	BAH	14.20	1,556	32,520	48,041	4
14-0410	9593866	0	9593866	LAPE7	BULK CARRIER	2012	10780	B&W	5S60ME-C8	678.6	SSD	3	2,595	NIS	15.50	1,411	37,447	50,761	4
14-0049	9385489	0	9385489	C6YC3	BULK CARRIER	2006	12,577	B&W	6S60ME-C8	678.6	SSD	3	3,148	BAH	15.50	445	44,684	72,863	4
14-0612	9083275	0	9083275	DSPZ3	GENERAL CARGO	1994	7,649	Sulzer	6RTA52U	382.3	SSD	3	1,950	KRS	14.50	-	26,823	46,601	4
14-0315	9233167	0	9233167	WDC3786	AUTO CARRIER	2000	11,060	B&W	7S50MC-C	392.7	SSD	3	2,760	USA	20.00	-	37,548	12,561	2
14-0336	9233167	0	9233167	WDC3786	AUTO CARRIER	2000	11,060	B&W	7S50MC-C	392.7	SSD	3	2,760	USA	20.00	-	37,548	12,561	2
14-0359	9233167	0	9233167	WDC3786	AUTO CARRIER	2000	11,060	B&W	7S50MC-C	392.7	SSD	3	2,760	USA	20.00	-	37,548	12,561	2
14-0383	9233167	0	9233167	WDC3786	AUTO CARRIER	2000	11,060	B&W	7S50MC-C	392.7	SSD	3	2,760	USA	20.00	-	37,548	12,561	2
14-0407	9233167	0	9233167	WDC3786	AUTO CARRIER	2000	11,060	B&W	7S50MC-C	392.7	SSD	3	2,760	USA	20.00	-	37,548	12,561	2
14-0421	9233167	0	9233167	WDC3786	AUTO CARRIER	2000	11,060	B&W	7S50MC-C	392.7	SSD	3	2,760	USA	20.00	-	37,548	12,561	2
14-0438	9233167	0	9233167	WDC3786	AUTO CARRIER	2000	11,060	B&W	7S50MC-C	392.7	SSD	3	2,760	USA	20.00	-	37,548	12,561	2
14-0461	9233167	0	9233167	WDC3786	AUTO CARRIER	2000	11,060	B&W	7S50MC-C	392.7	SSD	3	2,760	USA	20.00	-	37,548	12,561	2
14-0244	9578751	0	9578751	V2FY2	GENERAL CARGO	2008	3000	MaK	6M32C	38.6	MSD	3	1,664	ABB	14.00	459	6,309	8,000	1
14-0497	9437335	0	9437335	WDG4379	GENERAL CARGO	2009	9800	MAN	7L58/64CD	169.1	MSD	3	3,050	USA	17.50	1,011	15,549	18,389	1
14-0327	9498470	0	9498470	V7CO2	GENERAL CARGO	2009	11640	Sulzer	7RT-flex50	402.5	SSD	3	2,850	MAI	16.80	2,029	23,930	31,000	2
14-0229	9498468	0	9498468	V7BD5	GENERAL CARGO	2009	11640	Sulzer	7RT-flex50	402.5	SSD	3	2,850	MAI	16.80	2,029	23,930	32,124	2
14-0326	9331749	0	9331749	9V3224	GENERAL CARGO	2007	9,481	B&W	6S50MC-C	392.7	SSD	3	2,040	LIB	14.70	-	32,578	53,000	4
14-0630	9407586	0	9407586	V2ED5	GENERAL CARGO	2008	6,000	MaK	6M43C	88.6	MSD	3	1,900	ABB	16.50	636	8,750	10,293	1
14-0313	9437335	0	9437335	WDG4379	BULK CARRIER	2009	9800	MAN	7L58/64CD	169.1	MSD	3	3,050	USA	17.50	1,011	15,549	18,389	1
14-0061	9469780	0	9469780	V7DX5	GENERAL CARGO	2008	8730	Sulzer	6RTA48T	361.9	SSD	3	1,800	MAI	16.00	964	13,816	19,638	1

Baseline Call Information

Trip Ref .	DWT_RANGE	OPERATOR	STATUS	Tier	arrival dir	depart dir	Arr_Dist	Dep_Dist	Arr_Speed	Dep_Speed	Arr_Comp	Dep_Comp	Trans_Hrs	Tran_Spd
14-0490	1000 - 2000 TEU	Arkas Denizcilik ve Nakliyat	In Service/Commission	1	south	south	11.5	11.5	11.8	12.5	Yes	Yes	1.89	12.14
14-0516	1000 - 2000 TEU	Arkas Denizcilik ve Nakliyat	In Service/Commission	1	south	south	11.5	11.5	12.2	12.9	Yes	Yes	1.83	12.54
14-0577	2000 - 3000 TEU	Sea Consortium Pte Ltd	In Service/Commission	1	south	south	11.5	11.5	19.1	17.6	No	No	1.26	18.32
14-0620	2000 - 3000 TEU	Sea Consortium Pte Ltd	In Service/Commission	1	south	south	11.5	11.5	13.5	13.2	No	No	1.72	13.35
14-0150	45,000 - 90,000	Jadroplov International Mtn	In Service/Commission	2	south	north	11.5	48.9	11.6	12.7	Yes	Yes	4.84	12.47
14-0348	45,000 - 90,000	Doun Kisen KK	In Service/Commission	1	south	north	11.5	48.9	9.6	12.3	Yes	Yes	5.17	11.67
14-0565	45,000 - 90,000	Kambara Kisen Co Ltd	In Service/Commission	1	south	north	11.5	48.9	12.3	13.0	Yes	No	4.70	12.86
14-0186	45,000 - 90,000	Grieg Star Shipping AS	In Service/Commission	1	south	north	11.5	48.9	10.7	12.0	Yes	Yes	5.15	11.73
14-0472	45,000 - 90,000	Grieg Star AS	In Service/Commission	2	north	north	48.9	48.9	11.9	11.6	Yes	Yes	8.32	11.75
14-0323	< 25,000	Eide Marine Services AS	In Service/Commission	0	south	unknown	11.5	48.9	10.1	10.1	Yes	Yes	5.98	10.10
14-0037	35,000 - 45,000	Grieg Star Shipping AS	In Service/Commission	0	south	north	11.5	48.9	11.6	12.6	Yes	Yes	4.87	12.40
14-0626	35,000 - 45,000	Atlantic Cargo Services AB	In Service/Commission	0	south	north	11.5	48.9	10.9	12.2	Yes	Yes	5.06	11.93
14-0510	35,000 - 45,000	Grieg Star Shipping AS	In Service/Commission	1	south	north	11.5	48.9	11.0	10.5	Yes	Yes	5.70	10.59
14-0570	45,000 - 90,000	Grieg Star Shipping AS	In Service/Commission	0	south	north	11.5	48.9	11.8	12.1	Yes	Yes	5.02	12.04
14-0415	< 25,000	NYK Bulk & Projects Carriers	In Service/Commission	2	west	south	35.3	11.5	10.0	10.4	Yes	Yes	4.64	10.10
14-0559	< 25,000	Eide Marine Services AS	In Service/Commission	0	unknown	unknown	11.5	48.9	9.2	9.2	Yes	Yes	6.57	9.20
14-0576	< 25,000	Eide Marine Services AS	In Service/Commission	0	local	local	-	-	9.7	9.7	Yes	Yes	-	-
14-0462	< 25,000	Combi Lift GmbH	In Service/Commission	1	north	north	48.9	48.9	13.2	14.3	No	No	7.12	13.73
14-0239	< 25,000	CT Drent Beheer BV	In Service/Commission	1	west	south	35.3	11.5	13.2	12.6	No	Yes	3.59	13.05
14-0189	25,000 - 35,000	Rickmers-Linie	In Service/Commission	1	west	south	35.3	11.5	11.4	11.4	Yes	Yes	4.11	11.40
14-0080	25,000 - 35,000	Wallenius Wilhelmsen Logist	In Service/Commission	1	south	north	11.5	48.9	12.0	17.2	Yes	No	3.80	15.89
14-0321	25,000 - 35,000	Wallenius Wilhelmsen Logist	In Service/Commission	1	north	north	48.9	48.9	12.5	17.0	Yes	No	6.79	14.41
14-0610	25,000 - 35,000	CHIPOLBROK	In Service/Commission	1	west	south	35.3	11.5	10.8	14.3	Yes	No	4.07	11.49
14-0297	45,000 - 90,000	Stella Navigation GmbH & Co	In Service/Commission	1	south	unknown	11.5	11.5	11.8	14.3	Yes	No	1.78	12.93
14-0333	< 25,000	BigLift Shipping BV	In Service/Commission	1	south	west	11.5	35.3	13.6	13.6	No	No	3.44	13.60
14-0603	< 25,000	MCC Transport Singapore Pt	In Service/Commission	1	north	south	48.9	11.5	13.1	13.1	No	No	4.61	13.10
14-0534	25,000 - 35,000	Wisdom Marine Lines SA	In Service/Commission	1	north	south	48.9	11.5	11.5	11.5	Yes	Yes	5.25	11.50
14-0052	45,000 - 90,000	Gearbulk Pool Ltd	In Service/Commission	0	north	south	48.9	11.5	10.5	12.7	Yes	Yes	5.56	10.86
14-0410	45,000 - 90,000	Grieg Star AS	In Service/Commission	2	south	north	11.5	48.9	10.5	12.3	Yes	Yes	5.07	11.91
14-0049	45,000 - 90,000	Gearbulk Pool Ltd	In Service/Commission	1	north	south	48.9	11.5	13.1	13.1	No	No	4.61	13.10
14-0612	45,000 - 90,000	Daebo Shipmanagement Co	In Service/Commission	0	north	south	48.9	11.5	12.8	12.2	Yes	Yes	4.76	12.68
14-0315	10,000 - 20,000	Pasha Group	In Service/Commission	1	west	west	35.3	35.3	18.1	15.0	No	No	4.30	16.40
14-0336	10,000 - 20,000	Pasha Group	In Service/Commission	1	west	west	35.3	35.3	15.0	14.5	No	No	4.79	14.75
14-0359	10,000 - 20,000	Pasha Group	In Service/Commission	1	west	west	35.3	35.3	18.2	14.1	No	No	4.44	15.89
14-0383	10,000 - 20,000	Pasha Group	In Service/Commission	1	west	west	35.3	35.3	15.4	15.3	No	No	4.60	15.35
14-0407	10,000 - 20,000	Pasha Group	In Service/Commission	1	west	west	35.3	35.3	15.5	13.2	No	No	4.95	14.26
14-0421	10,000 - 20,000	Pasha Group	In Service/Commission	1	west	west	35.3	35.3	14.8	16.5	No	No	4.52	15.60
14-0438	10,000 - 20,000	Pasha Group	In Service/Commission	1	west	west	35.3	35.3	15.4	16.6	No	No	4.42	15.98
14-0461	10,000 - 20,000	Pasha Group	In Service/Commission	1	west	west	35.3	35.3	16.1	16.7	No	No	4.31	16.39
14-0244	< 25,000	BBC Chartering & Logistic Gr	In Service/Commission	1	south	west	11.5	35.3	12.5	11.7	Yes	Yes	3.94	11.89
14-0497	< 25,000	Intermarine LLC	In Service/Commission	1	unknown	unknown	48.9	11.5	12.5	15.9	Yes	No	4.64	13.03
14-0327	25,000 - 35,000	Austral Asia Line BV	In Service/Commission	1	west	north	35.3	48.9	12.3	12.9	Yes	Yes	6.66	12.64
14-0229	25,000 - 35,000	Austral Asia Line BV	In Service/Commission	1	north	north	48.9	48.9	12.7	15.0	Yes	No	7.11	13.75
14-0326	45,000 - 90,000	Columbia Shipmanagement-	In Service/Commission	1	west	south	35.3	11.5	12.5	12.5	Yes	Yes	3.74	12.50
14-0630	< 25,000	BBC Chartering & Logistic Gr	In Service/Commission	1	west	south	35.3	11.5	12.7	12.3	Yes	Yes	3.71	12.60
14-0313	< 25,000	Intermarine LLC	In Service/Commission	1	north	unknown	48.9	11.5	11.0	11.2	Yes	Yes	5.47	11.04
14-0061	< 25,000	Thorco Shipping A/S	In Service/Commission	1	south	west	11.5	35.3	13.1	13.6	No	No	3.47	13.47

Baseline Tug/Fuel Barge Calls

Trip Ref .	Vessel Name	Last Port of Call	Next Port of Call	Arrived	Sailed	Hrs/Min	Berth	Vessel Type	Commodity
14-0121	Robyn J (Barge Jake J)	San Pedro, CA	San Pedro, CA	9/15/2013 20:40	09/18/2013 15:05	66.42	Berth 10-03	Tug	Fuel
14-0044	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	7/17/2013 21:30	07/22/2013 23:50	122.33	Berth 10-03	Tug	Fuel
14-0056	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	8/1/2013 0:30	08/06/2013 22:02	141.53	Berth 10-03	Tug	Fuel
14-0105	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	9/7/2013 16:45	09/10/2013 10:30	65.75	Berth 10-03	Tug	Fuel
14-0105	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	9/12/2013 10:55	09/14/2013 08:25	45.50	Berth 10-03	Tug	Fuel
14-0155	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	10/12/2013 7:35	10/15/2013 20:00	84.42	Berth 10-03	Tug	Fuel
14-0155	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	10/31/2013 6:15	11/05/2013 18:16	132.02	Berth 10-03	Tug	Fuel
14-0216	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	11/2/2013 22:35	11/6/2013 12:25	85.83	Berth 10-03	Tug	Fuel
14-0216	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	11/9/2013 7:35	11/14/2013 9:05	121.50	Berth 10-03	Tug	Fuel
14-0216	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	11/16/2013 1:45	11/16/2013 19:55	18.17	Berth 10-03	Tug	Fuel
14-0216	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	11/27/2013 3:00	11/28/2013 0:45	21.75	Berth 10-03	Tug	Fuel
14-0216	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	11/30/2013 8:30	11/30/2013 13:35	5.08	Berth 10-03	Tug	Fuel
14-0261	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	12/2/2013 4:45	12/12/2013 12:00	247.25	Berth 10-03	Tug	Fuel
14-0261	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	12/15/2013 7:30	12/16/2013 21:30	38.00	Berth 10-03	Tug	Fuel
14-0261	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	12/19/2013 10:35	12/26/2013 13:30	170.92	Berth 10-03	Tug	Fuel
14-0329	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	1/17/2014 4:25	1/17/2014 8:30	4.08	Berth 10-03	Tug	Fuel
14-0329	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	1/19/2014 11:10	1/21/2014 17:05	53.92	Berth 10-03	Tug	Fuel
14-0329	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	1/20/2014 13:55	1/23/2014 3:55	62.00	Berth 10-03	Tug	Fuel
14-0329	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	2/1/2014 0:39	2/5/2014 23:15	118.60	Berth 10-03	Tug	Fuel
14-0329	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	2/7/2014 21:33	2/9/2014 13:52	40.32	Berth 10-03	Tug	Fuel
14-0329	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	2/13/2014 7:31	2/16/2014 18:45	83.23	Berth 10-03	Tug	Fuel
14-0329	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	3/3/2014 7:00	3/4/2014 18:45	35.75	Berth 10-03	Tug	Fuel
14-0329	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	3/15/2014 9:00	3/16/2014 12:45	27.75	Berth 10-03	Tug	Fuel
14-0329	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	3/18/2014 6:00	3/19/2014 15:45	33.75	Berth 10-03	Tug	Fuel
14-0329	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	3/22/2014 15:00	3/23/2014 12:45	21.75	Berth 10-03	Tug	Fuel
14-0329	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	3/29/2014 11:00	3/30/2014 17:45	30.75	Berth 10-03	Tug	Fuel
14-0329	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	4/1/2014 13:00	4/3/2014 4:00	39.00	Berth 10-03	Tug	Fuel
14-0329	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	4/13/2014 19:45	4/16/2014 12:10	64.42	Berth 10-03	Tug	Fuel
14-0329	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	4/18/2014 11:15	4/19/2014 4:20	17.08	Berth 10-03	Tug	Fuel
14-0329	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	4/27/2014 20:15	4/28/2014 12:05	15.83	Berth 10-03	Tug	Fuel
14-0329	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	4/30/2014 8:35	4/30/2014 19:00	10.42	Berth 10-03	Tug	Fuel
14-0329	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	5/3/2014 3:05	5/8/2014 12:10	129.08	Berth 10-03	Tug	Fuel
14-0329	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	5/13/2014 3:00	5/14/2014 15:10	36.17	Berth 10-03	Tug	Fuel
14-0329	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	5/17/2014 5:25	5/17/2014 13:25	8.00	Berth 10-03	Tug	Fuel
14-0329	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	5/20/2014 5:25	5/20/2014 16:55	11.50	Berth 10-03	Tug	Fuel
14-0579	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	6/3/2014 8:05	6/5/2014 12:10	52.08	Berth 10-03	Tug	Fuel
14-0579	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	6/13/2014 7:30	6/15/2014 18:45	59.25	Berth 10-03	Tug	Fuel
14-0579	Robyn J (Barge Payton J)	San Pedro, CA	San Pedro, CA	6/25/2014 4:30	6/26/2014 19:30	39.00	Berth 10-03	Tug	Fuel
14-0129	Robyn J (Barge Tori J)	San Pedro, CA	San Pedro, CA	9/21/2013 19:45	09/24/2013 09:00	61.25	Berth 10-03	Tug	Fuel
14-0160	Robyn J (Barge Tori J)	San Pedro, CA	San Pedro, CA	10/03/2013 10:55	10/07/2013 13:15	98.33	Berth 10-03	Tug	Fuel
14-0160	Robyn J (Barge Tori J)	San Pedro, CA	San Pedro, CA	10/15/2013 02:25	10/17/2013 12:35	58.17	Berth 10-03	Tug	Fuel
14-0216	Robyn J (Barge Tori J)	San Pedro, CA	San Pedro, CA	11/18/2013 13:30	11/20/2013 20:15	54.75	Berth 10-03	Tug	Fuel
14-0271	Robyn J (Barge Tori J)	San Pedro, CA	San Pedro, CA	12/8/2013 12:45	12/10/2013 23:45	59.00	Berth 10-03	Tug	Fuel
14-0271	Robyn J (Barge Tori J)	San Pedro, CA	San Pedro, CA	12/29/2013 22:10	12/31/2013 5:30	31.33	Berth 10-03	Tug	Fuel

Vessel and Call Info

			Data								Ave	
SHIP_TYPE	MAIN_ENGIN	Tier	Count of CALL	Average of	Average of Aux_KW	Average of SPEED	Avei	Average of Tran_Spd	Average of Hrs/Min	Average of Shore Pwr	Trans Dist	
AUTO CARRIER	SSD	1	8	11,060	2,760	20.00	##	15.57798784	27.56	-	70.75357195	
BULK CARRIER	MSD	1	2	9,100	2,973	16.65	##	12.31876353	37.90	-	54.90113649	
	SSD	0	2	8,139	2,325	14.60	##	11.39361971	28.74	-	60.53371625	
		1	5	10,705	2,250	15.92	##	12.44709378	37.77	-	60.60134518	
		2	2	9,140	2,393	15.00	##	12.19299606	85.06	-	60.43227355	
BULK CARRIER, HL	MSD	0	2	5,738	1,950	13.00	##	9.2	114.02	-	30.2	
CONTAINER SHIP	SSD	0	49	14,948	7,158	20.03	##	12.3363013	61.44	11.65	24.48394957	
		1	8	13,055	3,676	18.93	##	13.37557698	60.83	-	23.41424616	
GENERAL CARGO	MSD	0	1	5,738	1,950	13.00	##	10.1	123.00	-	60.4	
		1	5	6,400	2,367	15.34	##	12.85842213	62.50	-	59.14338773	
	SSD	0	3	9,268	2,557	15.23	##	12.37316492	86.35	-	60.42709659	
		1	11	12,430	2,920	16.98	##	12.80065367	45.48	-	60.96299835	
		2	2	8,630	2,048	14.90	##	10.92174852	50.88	-	70.77582559	
Grand Total			100	12,627	4,904	18.43	##	12.66177578	57.34	5.71		

Count of CALL			
SHIP_TYPE	Tier	DWT_RANGE	Total
CONTAINER SHIP	0	< 1000 TEU	49
	1	1000 - 2000 T	6
		2000 - 3000 T	2
Grand Total			57

0
1
2

Count of CALL							
SHIP_TYPE	MAIN_ENGIN	Tier	Commodity	Total	2020 Ratio	2035 Ratio	
AUTO CARRIER	SSD	1	Vehicles	8	146%	1148%	
BULK CARRIER	MSD	1 Total		8	146%	1148%	
		1	Soda Ash Yachts	1	100%	914%	
		1		1	146%	1148%	
	SSD	1 Total		2	123%	1031%	
		0	Fertilizer Soda Ash	1	100%	914%	
		1		1	100%	914%	
		0 Total		2	100%	914%	
		1	Bauxite Soda Ash	2	100%	914%	
		3		3	100%	914%	
		1 Total		5	100%	914%	
		2	Bauxite Soda Ash	1	100%	914%	
		1		1	100%	914%	
2 Total		2	100%	914%			
BULK CARRIER, HL	MSD	0	Military	2	146%	1148%	
0 Total		2	146%	1148%			
CONTAINER SHIP	SSD	0	Bananas	49	108%	359%	
0 Total		49	108%	359%			
1	Bananas	8	108%	359%			
1 Total		8	108%	359%			
GENERAL CARGO	MSD	0	Containers	1	146%	1148%	
		0 Total		1	146%	1148%	
		1	Project Cargo Windmill Components Yachts	2	146%	1148%	
		2		2	146%	1148%	
		1		1	146%	1148%	
		1 Total		5	146%	1148%	
	SSD	0	Fertilizer Steel Pipe	2	100%	914%	
		1		1	146%	1148%	
		0 Total		3	115%	992%	
		1	Calcium Nitrate Fertilizer Project Cargo Windmill Components Yachts	1	100%	914%	
		1		1	100%	914%	
		5		5	146%	1148%	
		3		3	146%	1148%	
		1		1	146%	1148%	
		1 Total		11	137%	1106%	
		2	Calcium Nitrate Iron & Steel	1	100%	914%	
		1		1	146%	1148%	
		2 Total		2	123%	1031%	
Grand Total				100	117%	663%	

SHIP_TYPE	MAIN_ENGIN	Tier	2020	2035
AUTO CARRIER	SSD	1	146%	1148%
BULK CARRIER	MSD	1	123%	1031%
	SSD	0	100%	914%
		1	100%	914%
		2	100%	914%
BULK CARRIER, HL	MSD	0	146%	1148%
CONTAINER SHIP	SSD	2	108%	359%
GENERAL CARGO	MSD	0	146%	1148%
		1	146%	1148%
	SSD	0	115%	992%
		1	137%	1106%
		2	123%	1031%

Match to Throughput Metrics				
Windmill Components	Multi-Purpose General Cargo			
Soda Ash	Dry Bulk			
Bananas	Refrigerated Containers			
Vehicles	Multi-Purpose General Cargo			
Bauxite	Dry Bulk			
Fuel	Liquid Bulk			
Iron & Steel	Multi-Purpose General Cargo			
Project Cargo	Multi-Purpose General Cargo			
Calcium Nitrate	Dry Bulk			
Repairs	Multi-Purpose General Cargo			
fertilizer	Dry Bulk			
Military	Multi-Purpose General Cargo			
Steel Pipe	Multi-Purpose General Cargo			
Yachts	Multi-Purpose General Cargo			
Containers	Multi-Purpose General Cargo			
Container Ships			13/14 Calls	daily
2013/2014	51,359	Total TEUs Shipped	57	0.57
		Average TEUs/Ship		
2020 Buildout	55,223	Total TEUs Shipped		
TEUs per New Ship	1540			
2020 New Container Ca	50		52	0.52
2035 Buildout	184,204	Total TEUs Shipped		
TEUs per New Ship	1540			
2035 New Container Ca	120			

New Ship Hoteling Time	88.89	24.00	hrs
Aux time for Dole - 100% SP	3.36	3.36	hrs
Aux time for Dole - 80% SP	21.13	8.16	
Idle time for Dole - existing SP/new vessels	88.89	18.95	
	total	dly	

Arrival Compliance

Column Labels									Compliance	
Row Labels	No		Yes		Totz Total Count of VESSNAME Total Average of Arr_Dist					
	Average of Arr_Speed	Count of VES	Average of Arr_Dist	Average of	Count of VESSNAME	Average of Arr_Dist				
AUTO CARRIER	16.0625	8	35.3			16	8	35.3	0%	
SSD	16.0625	8	35.3			16	8	35.3	0%	
1	16.0625	8	35.3			16	8	35.3	0%	
BULK CARRIER	13.26666667	3	36.43333333	10.9875	8	25.525	12	28.5	73%	
MSD	13.6	1	11.5	11	1	48.9	12	2	30.2	50%
1	13.6	1	11.5	11	1	48.9	12	2	30.2	50%
SSD	13.1	2	48.9	10.98571	7	22.18571429	11	9	28.12222222	78%
0				10.7	2	30.2	11	2	30.2	100%
1	13.1	2	48.9	11.13333	3	23.96666667	12	5	33.94	60%
2				11.05	2	11.5	11	2	11.5	100%
BULK CARRIER, HL				9.45	2	5.75	9.5	2	5.75	100%
MSD				9.45	2	5.75	9.5	2	5.75	100%
0				9.45	2	5.75	9.5	2	5.75	100%
CONTAINER SHIP	15.25	8	11.5	11.62449	49	11.98571429	12	57	11.91754386	86%
SSD	15.25	8	11.5	11.62449	49	11.98571429	12	57	11.91754386	86%
0	14.78	5	11.5	11.57273	44	12.04090909	12	49	11.98571429	90%
1	16.03333333	3	11.5	12.08	5	11.5	14	8	11.5	63%
GENERAL CARGO	13.16666667	3	31.9	11.76842	19	28.85789474	12	22	29.27272727	86%
MSD	13.2	2	42.1	11.95	4	26.8	12	6	31.9	67%
0				10.1	1	11.5	10	1	11.5	100%
1	13.2	2	42.1	12.56667	3	31.9	13	5	35.98	60%
SSD	13.1	1	11.5	11.72	15	29.40666667	12	16	28.2875	94%
0				12.06667	3	23.96666667	12	3	23.96666667	100%
1	13.1	1	11.5	11.77	10	28.5	12	11	26.95454545	91%
2				10.95	2	42.1	11	2	42.1	100%
Grand Total	14.99090909	22	26.33636364	11.53846	78	17.32435897	12	100	19.307	78%

Departure Compliance

Column Labels								Compliance		
Row Labels	No		Yes		Totz Total Count of VESSNAME Total Average of Dep_Dist					
	Average of Dep_Speed	Count of VES	Average of Dep_Dist	Average of	Count of VESSNAME	Average of Dep_Dist				
AUTO CARRIER	15.2375	8	35.3			15	8	35.3	0%	
SSD	15.2375	8	35.3			15	8	35.3	0%	
1	15.2375	8	35.3			15	8	35.3	0%	
BULK CARRIER	13.2	4	26.8	12.12857	7	32.87142857	13	11	30.66363636	64%
MSD	13.6	1	35.3	11.2	1	11.5	12	2	23.4	50%
1	13.6	1	35.3	11.2	1	11.5	12	2	23.4	50%
SSD	13.06666667	3	23.96666667	12.28333	6	36.43333333	13	9	32.27777778	67%
0				12.45	2	30.2	12	2	30.2	100%
1	13.06666667	3	23.96666667	11.9	2	30.2	13	5	26.46	40%
2				12.5	2	48.9	13	2	48.9	100%
BULK CARRIER, HL				9.45	2	24.45	9.5	2	24.45	100%
MSD				9.45	2	24.45	9.5	2	24.45	100%
0				9.45	2	24.45	9.5	2	24.45	100%
CONTAINER SHIP	15.97333333	15	11.5	11.92857	42	12.39047619	13	57	12.15614035	74%
SSD	15.97333333	15	11.5	11.92857	42	12.39047619	13	57	12.15614035	74%
0	16.06153846	13	11.5	11.82778	36	12.53888889	13	49	12.26326531	73%
1	15.4	2	11.5	12.53333	6	11.5	13	8	11.5	75%
GENERAL CARGO	15.2	8	33.175	11.77857	14	31.9	13	22	32.36363636	64%
MSD	15.1	2	30.2	11.675	4	26.8	13	6	27.93333333	67%
0				10.1	1	48.9	10	1	48.9	100%
1	15.1	2	30.2	12.2	3	19.43333333	13	5	23.74	60%
SSD	15.23333333	6	34.16666667	11.82	10	33.94	13	16	34.025	63%
0				12.3	3	36.43333333	12	3	36.43333333	100%
1	15.23333333	6	34.16666667	11.86	5	33.94	14	11	34.06363636	45%
2				11	2	30.2	11	2	30.2	100%
Grand Total	15.31142857	35	23.64285714	11.84154	65	19.16923077	13	100	20.735	65%

Emission Factors

Tier 0 Emission Factors (g/kWh)

Engine	NOx	DPM	PM2.5	ROG	CO	SOx	CO2	CH4	N2O
SSD	17.0	0.25	0.23	0.78	1.10	0.36	588	0.07	0.018
MSD	13.2	0.25	0.23	0.65	1.10	0.40	645	0.08	0.018
Auxiliary	13.9	0.25	0.23	0.52	1.10	0.40	690	0.08	0.018
Boiler	1.995	0.133	0.122	0.11	0.2	0.58	921.5	0.032	0.013

From Table II-6, 11-8, and II-9 ARB 2011

California Air Resources Board, *Emissions Estimation Methodology for Ocean-Going Vessels*, May 2011

<http://www.arb.ca.gov/regact/2011/ogv11/ogv11appd.pdf>

Higher Tier NOX Emission Factors

Engine	1	2	3
SSD	15.1	12.6	3.0
MSD	11.7	9.2	2.3
Auxiliary	12.4	9.9	2.5

From EPA C3 RIA

U.S. Environmental Protection Agency, *Regulatory Impact Analysis: Control of Emissions of Air Pollution from Category 3 Marine Diesel Engines*, EPA Report EPA-420-R-09-019, December 2009.

<http://www.epa.gov/otaq/regs/nonroad/marine/ci/420r09019.pdf>

Low Load Adjustment Factors (multiplied by emission factors)

Load	NOx	DPM	PM2.5	ROG	CO	SOx	CO2	CH4	N2O
2%	4.63	7.29	7.29	21.18	9.68	3.36	3.28	21.18	4.63
3%	2.92	4.33	4.33	11.68	6.46	2.49	2.44	11.68	2.92
4%	2.21	3.09	3.09	7.71	4.86	2.05	2.01	7.71	2.21
5%	1.83	2.44	2.44	5.61	3.89	1.79	1.76	5.61	1.83
6%	1.60	2.04	2.04	4.35	3.25	1.61	1.59	4.35	1.60
7%	1.45	1.79	1.79	3.52	2.79	1.49	1.47	3.52	1.45
8%	1.35	1.61	1.61	2.95	2.45	1.39	1.38	2.95	1.35
9%	1.27	1.48	1.48	2.52	2.18	1.32	1.31	2.52	1.27
10%	1.22	1.38	1.38	2.20	1.96	1.26	1.25	2.20	1.22
11%	1.17	1.30	1.30	1.96	1.79	1.21	1.21	1.96	1.17
12%	1.14	1.24	1.24	1.76	1.64	1.18	1.17	1.76	1.14
13%	1.11	1.19	1.19	1.60	1.52	1.14	1.14	1.60	1.11
14%	1.08	1.15	1.15	1.47	1.41	1.11	1.11	1.47	1.08
15%	1.06	1.11	1.11	1.36	1.32	1.09	1.08	1.36	1.06
16%	1.05	1.08	1.08	1.26	1.24	1.07	1.06	1.26	1.05
17%	1.03	1.06	1.06	1.18	1.17	1.05	1.04	1.18	1.03
18%	1.02	1.04	1.04	1.11	1.11	1.03	1.03	1.11	1.02
19%	1.01	1.02	1.02	1.05	1.05	1.01	1.01	1.05	1.01
20%	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Auxiliary Engine Load Factors

	Transit	Maneuver	Hotel	From Table II-5 ARB 2011
Auto	0.15	0.45	0.26	
Bulk	0.17	0.45	0.10	
Bulk, HL	0.17	0.45	0.10	
Container	0.13	0.50	0.35	Hotel load for container sh
General	0.17	0.45	0.10	
Reefer	0.15	0.45	0.32	

Service Speed/Maximum Speed 0.937

One way Distances

South	11.5 nm	
West	35.3 nm	
North	48.9 nm	
Maneuver	6.7 nm	From Google Earth

Speeds

Maneuver	7 kts
Transit	From VSR report

Berthing time per call 0.5 hrs

Boiler Loads (kW)

	Transit	Maneuver	Hotel
Auto	351	351	351
Bulk	132	132	132 Transit only applied if LF le
Bulk, HL	132	132	132
Container	241	241	241 0 - 1000 TEU
Container	325	325	325 1000 - 2000 TEU
Container	474	474	474 2000 - 3000 TEU
General	135	135	135

Transit only applied if LF less than 20%

From 2014 Port of Long Beach Inventory

Starcrest Consulting Group, *Port of Long Beach Air Emissions Inventory --*

<http://www.polb.com/civica/filebank/blobdload.asp?BlobID=13033>

Cold Ironing CO2e Emission Rate

2013/14 average	700	lbs CO2e/MWh
2010 RPS (20%)	745	lbs CO2e/MWh
2020 RPS (33%)	654	lbs CO2e/MWh
2030 RPS (50%)	488	lbs CO2e/MWh

Tug and Barge Emission Factor Calculations

Taken from 2013 Port of Long Beach Inventory

Zero Hour Tug Emission Factors (g/kWh)										
Tug	Engine	NOx	DPM	PM2.5	ROG	CO	SOx	CO2	CH4	N2O
Robyn J	Propulsion	7.41	0.27	0.26	0.91	5.00	0.17	652	0.018	0.031
	Auxiliary	7.13	0.29	0.28	1.58	5	0.17	652	0.032	0.031
Scout	Propulsion	5.86	0.13	0.13	0.91	5.00	0.17	652	0.018	0.031
	Auxiliary	5.09	0.12	0.12	1.09	5	0.17	652	0.022	0.031
Tioga	Propulsion	5.86	0.13	0.13	0.91	5.00	0.17	652	0.018	0.031
	Auxiliary	7.13	0.29	0.28	1.58	5	0.17	652	0.032	0.031

Zero Hour Barge Emission Factors (g/kWh)									
Barge	NOx	DPM	PM2.5	ROG	CO	SOx	CO2	CH4	N2O
Payton J	7.13	0.40	0.39	1.58	5.00	0.17	652.00	0.031	0.032
Jake J	7.13	0.40	0.39	1.58	5.00	0.17	652.00	0.031	0.032
Tori J	7.13	0.40	0.39	1.58	5.00	0.17	652.00	0.031	0.032

Harborcraft ULSD Correction Factors									
Years	NOx	DPM	PM2.5	ROG	CO	SOx	CO2	CH4	N2O
Pre-1995	0.930	0.720	0.720	0.720	1.000	0.043	1.000	0.720	0.930
1996-2010	0.948	0.800	0.800	0.720	1.000	0.043	1.000	0.720	0.948
2011 +	0.948	0.852	0.852	0.720	1.000	0.043	1.000	0.720	0.948

ULSD Tug Emission Factors (g/kWh)										
Tug	Engine	NOx	DPM	PM2.5	ROG	CO	SOx	CO2	CH4	N2O
Robyn J	Propulsion	7.02	0.22	0.21	0.66	5.00	0.01	652	0.013	0.029
	Auxiliary	6.76	0.23	0.23	1.14	5.00	0.01	652	0.023	0.029
Scout	Propulsion	5.56	0.11	0.11	0.66	5.00	0.01	652	0.013	0.029
	Auxiliary	4.83	0.10	0.10	0.78	5.00	0.01	652	0.016	0.029
Tioga	Propulsion	5.56	0.11	0.11	0.66	5.00	0.01	652	0.013	0.029
	Auxiliary	6.76	0.25	0.24	1.14	5.00	0.01	652	0.023	0.029

ULSD Barge Emission Factors (g/kWh)									
Barge	NOx	DPM	PM2.5	ROG	CO	SOx	CO2	CH4	N2O
Payton J	6.76	0.32	0.31	1.14	5.00	0.01	652	0.022	0.030
Jake J	6.76	0.32	0.31	1.14	5.00	0.01	652	0.022	0.030
Tori J	6.76	0.32	0.31	1.14	5.00	0.01	652	0.022	0.030

Engine	Useful Life	Annual Hours	Det Cap Years	
Propulsion	21	2274	5.28	Taken from ARB CHC Methodology
Auxiliary	23	2486	4.83	
Pump	21		10.50	

Engine Deterioration Factor

KW Range	NOx	PM	CO	ROG
< 186	0.14	0.44	0.28	0.16
> 186	0.21	0.67	0.44	0.25

Fully Deteriorated Tug Emission Factors (g/kWh)											
Tug	Engine	NOx	DPM	PM2.5	ROG	CO	SOx	CO2	CH4	N2O	LF
Robyn J	Propulsion	7.40	0.25	0.24	0.70	5.55	0.01	652	0.013	0.029	0.50
	Auxiliary	6.96	0.25	0.25	1.18	5.29	0.01	652	0.023	0.029	0.31
Scout	Propulsion	5.85	0.13	0.13	0.70	5.55	0.01	652	0.013	0.029	0.31
	Auxiliary	4.97	0.11	0.11	0.81	5.29	0.01	652	0.016	0.029	0.43
Tioga	Propulsion	5.85	0.13	0.13	0.70	5.55	0.01	652	0.013	0.029	0.31
	Auxiliary	6.96	0.27	0.26	1.18	5.29	0.01	652	0.023	0.029	0.43

Fully Deteriorated Barge Emission Factors (g/kWh)										
Barge	NOx	DPM	PM2.5	ROG	CO	SOx	CO2	CH4	N2O	LF
Payton J	7.23	0.39	0.38	1.23	5.70	0.01	652	0.022	0.030	0.71
Jake J	7.23	0.39	0.38	1.23	5.70	0.01	652	0.022	0.030	0.71
Tori J	7.23	0.39	0.38	1.23	5.70	0.01	652	0.022	0.030	0.71

Robyn J	Tug	
Repowered	2010	2 engines each
Propulsion	1500 kW	
Auxiliary	120 kW	

Travel Time Estimate per call			
Maneuver	2.41	hrs	Assumed 7 knots North
Transit	13.97	hrs	
Total	16.39	hrs	
Pump Rate	2000 bbl/hr		
	Tugs	Ships	
Total Fuel	132,981	382,270 bbls	515,251
Calls	19	55	74

Assist Tugs

Barge	Hrs	
Payton J	4.84	Based upon 2000 bbls/
Jake J	4.50	Plus 0.5 hours to conn
Tori J	5.33	From Jankovich

From Crowley to Ships	0.5 nm	0.7
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Truck Trip Emissions										Daily ADT/VMT		Daily Emissions (pounds)							Annual ADT/VMT		Annual Emissions (Tons)							Annual Emissions (MT)				Annual Gallons
Condition	Year	cargo	location	Speed	VMT per trip (or idle	Daily ADT/VMT		Trips per day	VMT (idle) per day	ROG	NOX	CO	SOX	PM10	PM2.5	DPM	VMT (idle) per		Trips/Yr	year	ROG	NOX	CO	SOX	PM10	PM2.5	CO2	CH4	N2O	CO2e		
					hrs)	Trip Gen	Trips										year	year														
Baseline	2013/2014	Dry Bulk	Regional	aggregate	62	28	2	3472		1.45	77.84	4.76	0.13	2.16	0.95	0.46	10080	1,249,920		0.26	14.01	0.86	0.02	0.08	0.08	2201	0.01102	0.07	2222		215604	
Baseline	2013/2014	Dry Bulk	Onsite		10	28	2	28		0.08	1.44	0.18	0.00	0.02	0.01	0.01	10080	10,080		0.01	0.26	0.03	0.00	0.00	0.00	32	0.00062	0.00	33		3167	
Baseline	2013/2014	Dry Bulk	on Harbor		40	28	2	89.6		0.03	1.94	0.11	0.00	0.05	0.02	0.01	10080	32,256		0.01	0.35	0.02	0.00	0.00	0.00	56	0.00024	0.00	57		5492	
Baseline	2013/2014	Dry Bulk	on Cesar Chavez		25	28	2	16.8		0.01	0.44	0.04	0.00	0.01	0.00	0.00	10080	6,048		0.00	0.08	0.01	0.00	0.00	0.00	12	9.4E-05	0.00	13		1217	
Baseline	2013/2014	Dry Bulk	on 28th		25	28	2	16.8		0.01	0.44	0.04	0.00	0.01	0.00	0.00	10080	6,048		0.00	0.08	0.01	0.00	0.00	0.00	12	9.4E-05	0.00	13		1217	
Baseline	2013/2014	Dry Bulk	idling	idling	0.25	28	2	14		0.04	2.56	0.20	0.00	0.01	0.00	0.00	10080	5,040		0.01	0.46	0.04	0.00	0.00	0.00	36	0.00033	0.00	36		3508	
Baseline	2013/2014	Refrigerated Containers	Regional	aggregate	62	62	2	7688		3.22	172.36	10.54	0.28	4.78	2.10	1.01	24120	2,990,880		0.63	33.53	2.05	0.06	0.20	0.19	5266	0.02637	0.17	5317		515910	
Baseline	2013/2014	Refrigerated Containers	Onsite		10	62	2	62		0.18	3.19	0.40	0.00	0.05	0.03	0.02	24120	24,120		0.03	0.62	0.08	0.00	0.00	0.00	77	0.00147	0.00	78		7578	
Baseline	2013/2014	Refrigerated Containers	on Harbor		40	62	2	198.4		0.07	4.29	0.24	0.01	0.12	0.05	0.02	24120	77,184		0.01	0.83	0.05	0.00	0.00	0.00	134	0.00057	0.00	135		13142	
Baseline	2013/2014	Refrigerated Containers	on Cesar Chavez		25	62	2	37.2		0.03	0.97	0.09	0.00	0.02	0.01	0.01	24120	14,472		0.01	0.19	0.02	0.00	0.00	0.00	30	0.00023	0.00	30		2913	
Baseline	2013/2014	Refrigerated Containers	on 28th		25	62	2	37.2		0.03	0.97	0.09	0.00	0.02	0.01	0.01	24120	14,472		0.01	0.19	0.02	0.00	0.00	0.00	30	0.00023	0.00	30		2913	
Baseline	2013/2014	Refrigerated Containers	idling	idling	0.25	62	2	31		0.10	5.67	0.44	0.00	0.02	0.01	0.01	24120	12,060		0.02	1.10	0.09	0.00	0.00	0.00	86	0.00079	0.00	87		8393	
Baseline	2013/2014	Neo-Bulk	Regional	aggregate	62	3	2	372		0.16	8.34	0.51	0.01	0.23	0.10	0.05	1800	223,200		0.05	2.50	0.15	0.00	0.01	0.01	393	0.00197	0.01	397		38501	
Baseline	2013/2014	Neo-Bulk	Onsite		10	3	2	3		0.01	0.15	0.02	0.00	0.002	0.001	0.001	1800	1,800		0.00	0.05	0.01	0.00	0.00	0.00	6	0.00011	0.00	6		565	
Baseline	2013/2014	Neo-Bulk	on Harbor		40	3	2	9.6		0.00	0.21	0.01	0.00	0.006	0.002	0.001	1800	5,760		0.00	0.06	0.00	0.00	0.00	0.00	10	4.3E-05	0.00	10		981	
Baseline	2013/2014	Neo-Bulk	on Cesar Chavez		25	3	2	1.8		0.00	0.05	0.00	0.00	0.001	0.000	0.000	1800	1,080		0.00	0.01	0.00	0.00	0.00	0.00	2	1.7E-05	0.00	2		217	
Baseline	2013/2014	Neo-Bulk	on 28th		25	3	2	1.8		0.00	0.05	0.00	0.00	0.001	0.000	0.000	1800	1,080		0.00	0.01	0.00	0.00	0.00	0.00	2	1.7E-05	0.00	2		217	
Baseline	2013/2014	Neo-Bulk	idling	idling	0.25	3	2	1.5		0.00	0.27	0.02	0.00	0.001	0.000	0.000	1800	900		0.00	0.08	0.01	0.00	0.00	0.00	6	5.9E-05	0.00	6		626	
Project Increment	2020	Dry Bulk	Regional	aggregate	62	0	2	0		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0		0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0		0	
Project Increment	2020	Dry Bulk	Onsite		10	0	2	0		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0		0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0		0	
Project Increment	2020	Dry Bulk	on Harbor		40	0	2	0		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0		0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0		0	
Project Increment	2020	Dry Bulk	on Cesar Chavez		25	0	2	0		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0		0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0		0	
Project Increment	2020	Dry Bulk	on 28th		25	0	2	0		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0		0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0		0	
Project Increment	2020	Dry Bulk	idling	idling	0.25	0	2	0		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0		0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0		0	
Project Increment	2020	Refrigerated Containers	Regional	aggregate	62	5	2	620		0.24	6.73	0.90	0.02	0.33	0.12	0.03	1800	223,200		0.04	1.21	0.16	0.00	0.01	0.01	372	0.00179	0.01	376		36495	
Project Increment	2020	Refrigerated Containers	Onsite		10	5	2	5		0.01	0.18	0.04	0.00	0.00	0.00	0.00	1800	1,800		0.00	0.03	0.01	0.00	0.00	0.00	5	8.6E-05	0.00	5		507	
Project Increment	2020	Refrigerated Containers	on Harbor		40	5	2	16		0.01	0.16	0.02	0.00	0.01	0.00	0.00	1800	5,760		0.00	0.03	0.00	0.00	0.00	0.00	10	4.1E-05	0.00	10		939	
Project Increment	2020	Refrigerated Containers	on Cesar Chavez		25	5	2	3		0.00	0.04	0.01	0.00	0.00	0.00	0.00	1800	1,080		0.00	0.01	0.00	0.00	0.00	0.00	2	1.9E-05	0.00	2		206	
Project Increment	2020	Refrigerated Containers	on 28th		25	5	2	3		0.00	0.04	0.01	0.00	0.00	0.00	0.00	1800	1,080		0.00	0.01	0.00	0.00	0.00	0.00	2	1.9E-05	0.00	2		206	
Project Increment	2020	Refrigerated Containers	idling	idling	0.25	5	2	2.5		0.01	0.19	0.03	0.00	0.00	0.00	0.00	1800	900		0.00	0.03	0.00	0.00	0.00	0.00	6	5.3E-05	0.00	6		593	
Project Increment	2020	Neo-Bulk	Regional	aggregate	62	2	2	248		0.09	2.69	0.36	0.01	0.13	0.05	0.01	720	89,280		0.02	0.48	0.06	0.00	0.00	0.00	149	0.00072	0.00	150		14598	
Project Increment	2020	Neo-Bulk	Onsite		10	2	2	2		0.00	0.07	0.02	0.00	0.00	0.00	0.00	720	720		0.00	0.01	0.00	0.00	0.00	0.00	2	3.5E-05	0.00	2		203	
Project Increment	2020	Neo-Bulk	on Harbor		40	2	2	6.4		0.00	0.07	0.01	0.00	0.00	0.00	0.00	720	2,304		0.00	0.01	0.00	0.00	0.00	0.00	4	1.7E-05	0.00	4		375	
Project Increment	2020	Neo-Bulk	on Cesar Chavez		25	2	2	1.2		0.00	0.02	0.00	0.00	0.00	0.00	0.00	720	432		0.00	0.00	0.00	0.00	0.00	0.00	1	7.7E-06	0.00	1		82	
Project Increment	2020	Neo-Bulk	on 28th		25	2	2	1.2		0.00	0.02	0.00	0.00	0.00	0.00	0.00	720	432		0.00	0.00	0.00	0.00	0.00	0.00	1	7.7E-06	0.00	1		82	
Project Increment	2020	Neo-Bulk	idling	idling	0.25	2	2	1		0.00	0.07	0.01	0.00	0.00	0.00	0.00	720	360		0.00	0.01	0.00	0.00	0.00	0.00	2	2.1E-05	0.00	2		237	
Program Increment	2035	Dry Bulk	Regional	aggregate	62	227	2	28148		5.22	89.38	30.79	0.86	14.16	4.49	0.38	81720	10,133,280		0.94	16.09	5.54	0.16	0.07	0.07	14790	0.03955	0.48	14934		1449083	
Program Increment	2035	Dry Bulk	Onsite		10	227	2	227		0.25	8.51	1.48	0.01	0.12	0.04	0.01	81720	81,720		0.05	1.53	0.27	0.00	0.00	0.00	202	0.00191	0.01	204		19772	
Program Increment	2035	Dry Bulk	on Harbor		40	227	2	726.4		0.12	1.37	0.71	0.02	0.37	0.12	0.01	81720	261,504		0.02	0.25	0.13	0.00	0.00	0.00	380	0.00091	0.01	384		37243	
Program Increment	2035	Dry Bulk	on Cesar Chavez		25	227	2	136.2		0.06	0.90	0.33	0.00	0.07	0.02	0.00	81720	49,032		0.01	0.16	0.06	0.00	0.00	0.00	82	0.00043	0.00	83		8025	
Program Increment	2035	Dry Bulk	on 28th		25	227	2	136.2		0.06	0.90	0.33	0.00	0.07	0.02	0.00	81720	49,032		0.01												

Worker Trip Emissions						Daily ADT/VMT			Daily Emissions (pounds)						Annual ADT/VMT		Annual Emissions (tons)						Annual Emissions (MT)				Annual Gallons
Condition	Year	cargo	location	Speed	VMT per trip (or idle hrs)	Trip Gen	Trips per	VMT (idle) per day	ROG	NOX	CO	SOX	PM10	PM2.5	Trips/Yr	VMT (idle) per year	ROG	NOX	CO	SOX	PM10	PM2.5	CO2	CH4	N2O	CO2e	
Baseline	2013	Dry Bulk	Regional	aggregate	9.5	87	3	2491.516	0.37	1.22	11.02	0.02	1.48	0.48	31472	896,946	0.066	0.220	1.984	0.004	0.047	0.020	349	0.01	0.01	352	39806
Baseline	2013	Liquid Bulk	Regional	aggregate	9.5	10	3	270.9291	0.04	0.13	1.20	0.00	0.16	0.05	3422	97,534	0.007	0.024	0.216	0.000	0.005	0.002	38	0.00	0.00	38	4329
Baseline	2013	Refrigerated Containers	Regional	aggregate	9.5	192	3	5483.314	0.81	2.69	24.26	0.05	3.26	1.05	69263	1,973,993	0.146	0.484	4.367	0.009	0.104	0.044	769	0.03	0.02	775	87604
Baseline	2013	Neo-Bulk	Regional	aggregate	9.5	26	3	731.7406	0.11	0.36	3.24	0.01	0.44	0.14	9243	263,427	0.019	0.065	0.583	0.001	0.014	0.006	103	0.00	0.00	103	11691
Project Increment	2020	Dry Bulk	Regional	aggregate	9.5	0	3	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.000	0.000	0.000	0.000	0.000	0.000	0	0.00	0.00	0	0
Project Increment	2020	Liquid Bulk	Regional	aggregate	9.5	0	3	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.000	0.000	0.000	0.000	0.000	0.000	0	0.00	0.00	0	0
Project Increment	2020	Refrigerated Containers	Regional	aggregate	9.5	51	3	1447.503	0.07	0.32	2.90	0.01	0.86	0.28	18284	521,101	0.013	0.058	0.522	0.002	0.027	0.011	170	0.01	0.00	171	19358
Project Increment	2020	Neo-Bulk	Regional	aggregate	9.5	41	3	1174.497	0.06	0.26	2.35	0.01	0.70	0.22	14836	422,819	0.010	0.047	0.423	0.002	0.022	0.009	138	0.00	0.00	138	15707
Program Increment	2035	Dry Bulk	Regional	aggregate	9.5	274	3	7804.418	0.15	0.63	6.75	0.04	4.61	1.47	98582	2,809,591	0.027	0.114	1.216	0.007	0.142	0.058	592	0.01	0.00	594	67477
Program Increment	2035	Liquid Bulk	Regional	aggregate	9.5	23	3	657.7137	0.01	0.05	0.57	0.00	0.39	0.12	8308	236,777	0.002	0.010	0.102	0.001	0.012	0.005	50	0.00	0.00	50	5687
Program Increment	2035	Refrigerated Containers	Regional	aggregate	9.5	120	3	3406.157	0.06	0.28	2.95	0.02	2.01	0.64	43025	1,226,216	0.012	0.050	0.531	0.003	0.062	0.025	258	0.01	0.00	259	29450
Program Increment	2035	Neo-Bulk	Regional	aggregate	9.5	108	3	3065.711	0.06	0.25	2.65	0.01	1.81	0.58	38725	1,103,656	0.010	0.045	0.478	0.003	0.056	0.023	233	0.01	0.00	233	26506

Emission Factor Summary

		speed	metric	year		ROG	NOX	CO	SOX	PM10	PM2.5	CO2	CH4	N2O
Trucks	regional	aggregate	g/vmt	2013/2014	aggregate2013/2014	0.19	10.17	0.62	0.02	0.06	0.06	1760.56	0.009	calculated off fuel in calcs
	travel on Harbor Dr	40	g/vmt	2013/2014	402013/2014	0.16	9.80	0.56	0.02	0.0517	0.05	1737.89	0.007	
	travel on Cesar Chavez	25	g/vmt	2013/2014	252013/2014	0.34	11.77	1.06	0.02	0.0616	0.06	2054.17	0.016	
	travel on 28th St	25	g/vmt	2013/2014	252013/2014	0.34	11.77	1.06	0.02	0.0616	0.06	2054.17	0.016	
	onsite	10	g/vmt	2013/2014	102013/2014	1.31	23.35	2.91	0.03	0.13	0.12	3206.53	0.061	
	idling	idling	g/idle-hr	2013/2014	idling2013/2014	1.41	83.01	6.42	0.07	0.08	0.08	7103.03	0.065	
	regional	aggregate	g/vmt	2020	aggregate2020	0.17	4.93	0.66	0.02	0.02	0.02	1668.84	0.008	
	travel on Harbor Dr	40	g/vmt	2020	402020	0.15	4.63	0.58	0.02	0.0231	0.02	1663.11	0.007	
	travel on Cesar Chavez	25	g/vmt	2020	252020	0.38	6.70	1.45	0.02	0.0288	0.03	1946.65	0.018	
	travel on 28th St	25	g/vmt	2020	252020	0.38	6.70	1.45	0.02	0.0288	0.03	1946.65	0.018	
	onsite	10	g/vmt	2020	102020	1.03	16.29	3.89	0.03	0.04	0.04	2875.40	0.048	
	idling	idling	g/idle-hr	2020	idling2020	1.27	33.79	5.03	0.06	0.01	0.01	6724.03	0.059	
	regional	aggregate	g/vmt	2035	aggregate2035	0.08	1.44	0.50	0.01	0.01	0.01	1459.55	0.004	
	travel on Harbor Dr	40	g/vmt	2035	402035	0.08	0.85	0.44	0.01	0.01	0.01	1453.61	0.003	
	travel on Cesar Chavez	25	g/vmt	2035	252035	0.19	3.00	1.11	0.02	0.01	0.01	1670.43	0.009	
	travel on 28th St	25	g/vmt	2035	252035	0.19	3.00	1.11	0.02	0.01	0.01	1670.43	0.009	
	onsite	10	g/vmt	2035	102035	0.50	17.01	2.96	0.02	0.01	0.01	2469.38	0.023	
	idling	idling	g/idle-hr	2035	idling2035	0.51	15.51	1.88	0.05	0.00	0.00	5565.14	0.024	
Employees	All travel	bwtw	g/vmt	All						0.098	0.035			
	All travel	road dust	g/vmt	All						0.124	0.031			
	regional	aggregate	g/vmt	2013	aggregate2013	0.07	0.22	2.01	0.00	0.05	0.02	389.54	0.01	0.009
	regional	aggregate	g/vmt	2020	aggregate2020	0.02	0.10	0.91	0.00	0.05	0.02	326.07	0.01	0.004
	regional	aggregate	g/vmt	2035	aggregate2035	0.01	0.04	0.39	0.00	0.05	0.02	210.81	0.005	0.002

Metrics

0.001 kW to MW	
52 weeks/yr	
360 days/year	
24 hours/day	
10.76391 m2 to ft2	
0.001 kw to mw	
1000 kg/mt	
0.002204623 grams to pounds	
1.00E-06 g to MT	
0.000453592 lbs to MT	
0.0005 lbs to ton	
1.10E-06 grams to ton	
0.000025 N2O_CO2 Diesel Equipment	Climate Registry 2015
0.000057 CH4_CO2 Diesel Equipment	Climate Registry 2015
2 trips per truck	
3 trips per employee	
9.5 employee trip length	Caleemod, C-W, urban SD
8.7775 kg CO2/gallon gas	Climate Registry 2016
10.21 kg CO2/gallon diesel	Climate Registry 2016
25 GWP CH4	
298 GWP N2O	
0.1243374 road dust ef (g/vmt) PM10	
0.03108435 road dust ef (g/vmt) Pm2.5	
0.3316 N2O g/gallon - diesel	http://www.arb.ca.gov/msei/emfac2011-faq.htm#emfac2011_web_db_qstn07
4.16% N2O - fraction of NOX	

Line-haul and Switching Emission Calculations

Daily

		Existing												
Activity	Node	hp-hrs	Emission Rates					O	Pounds per Day					
			ROG	NOX	CO	PM10	PM2.5		ROG	NOX	CO	PM10	PM2.5	SO2
2013 Line Haul	Bulk	21,099	0.20	5.30	0.63	0.13	0.13		9.1	246.6	29.4	6.2	6.0	1.1
	Intermodal+Auto	21,099	0.20	5.30	0.63	0.13	0.13		9.1	246.6	29.4	6.2	6.0	1.1
	<i>total line haul</i>								18.3	493.3	58.9	12.3	12.0	2.1
Switcher	Bulk	2,462	0.43	10.6	0.4	0.16	0.16		2.3	57.5	2.2	0.9	0.8	0.0
	Intermodal+Auto	5,266	0.43	10.6	0.4	0.16	0.16		5.0	123.1	4.6	1.9	1.8	0.1
	<i>total switching</i>								7.4	180.6	6.8	2.7	2.6	0.1
		Project 2020												
Activity	Node	hp-hrs	Emission Rates					O	Pounds per Day					
			ROG	NOX	CO	PM10	PM2.5		ROG	NOX	CO	PM10	PM2.5	SO2
2020 Line Haul	Bulk	21,099	0.17	4.55	0.54	0.11	0.11		7.9	211.7	25.3	5.3	5.2	1.1
	Intermodal+Auto	21,099	0.17	4.55	0.54	0.11	0.11		7.9	211.7	25.3	5.3	5.2	1.1
	<i>total line haul</i>								15.8	423.4	50.6	10.7	10.3	2.1
Switcher	Bulk	2,462	0.43	10.6	0.4	0.16	0.16		2.3	57.5	2.2	0.9	0.8	0.0
	Intermodal+Auto	5,266	0.43	10.6	0.4	0.16	0.16		5.0	123.1	4.6	1.9	1.8	0.1
	<i>total switching</i>								7.4	180.6	6.8	2.7	2.6	0.1
		Plan 2035												
Activity	Node	hp-hrs	Emission Rates					O	Pounds per Day					
			ROG	NOX	CO	PM10	PM2.5		ROG	NOX	CO	PM10	PM2.5	SO2
2035 Line Haul	Bulk	21,099	0.10	3.05	0.29	0.07	0.06		4.7	141.9	13.3	3.1	3.0	1.1
	Intermodal+Auto	36,961	0.10	3.05	0.29	0.07	0.06		8.3	248.5	23.2	5.5	5.3	1.9
	<i>total line haul</i>								13.1	390.4	36.5	8.6	8.3	2.9
Switcher	Bulk	2,462	0.43	10.6	0.4	0.16	0.16		2.3	57.5	2.2	0.9	0.8	0.0
	Intermodal+Auto	5,266	0.43	10.6	0.4	0.16	0.16		5.0	123.1	4.6	1.9	1.8	0.1
	<i>total switching</i>								7.4	180.6	6.8	2.7	2.6	0.1

Line-haul and Switching Emission Calculations

Annual

		Existing									
Activity	Node	Tons per Year						MT per year			
		ROG	NOX	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CO2eq
2013 Line Haul	Bulk	0.1	2.7	0.3	0.1	0.1	0.0	229.3	0.0	0.0	232
	Intermodal+Auto	0.1	1.5	0.2	0.0	0.0	0.0	124.0	0.0	0.0	125
	<i>total line haul</i>	<i>0.2</i>	<i>4.2</i>	<i>0.5</i>	<i>0.1</i>	<i>0.1</i>	<i>0.0</i>	<i>353.3</i>	<i>0.0</i>	<i>0.0</i>	<i>357</i>
Switcher	Bulk	0.0	0.6	0.0	0.0	0.0	0.0	36.7	0.0	0.0	37
	Intermodal+Auto	0.0	0.9	0.0	0.0	0.0	0.0	50.0	0.0	0.0	50
	<i>total switching</i>	<i>0.1</i>	<i>1.5</i>	<i>0.1</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>86.7</i>	<i>0.0</i>	<i>0.0</i>	<i>88</i>
		Project 2020									
Activity	Node	Tons per Year						MT per year			
		ROG	NOX	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CO2eq
2020 Line Haul	Bulk	0.1	2.3	0.3	0.1	0.1	0.0	229.3	0.0	0.0	232
	Intermodal+Auto	0.1	1.7	0.2	0.0	0.0	0.0	167.0	0.0	0.0	169
	<i>total line haul</i>	<i>0.2</i>	<i>4.0</i>	<i>0.5</i>	<i>0.1</i>	<i>0.1</i>	<i>0.0</i>	<i>396.3</i>	<i>0.0</i>	<i>0.0</i>	<i>400</i>
Switcher	Bulk	0.0	0.6	0.0	0.0	0.0	0.0	36.7	0.0	0.0	37
	Intermodal+Auto	0.0	1.2	0.0	0.0	0.0	0.0	67.8	0.0	0.0	68
	<i>total switching</i>	<i>0.1</i>	<i>1.8</i>	<i>0.1</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>104.6</i>	<i>0.0</i>	<i>0.0</i>	<i>106</i>
		Plan 2035									
Activity	Node	Tons per Year						MT per year			
		ROG	NOX	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CO2eq
2035 Line Haul	Bulk	0.5	14.2	1.3	0.3	0.3	0.1	2084.6	0.2	0.1	2105
	Intermodal+Auto	0.3	8.5	0.8	0.2	0.2	0.1	1252.7	0.1	0.0	1265
	<i>total line haul</i>	<i>0.8</i>	<i>22.7</i>	<i>2.1</i>	<i>0.5</i>	<i>0.5</i>	<i>0.2</i>	<i>3337.3</i>	<i>0.3</i>	<i>0.1</i>	<i>3370</i>
Switcher	Bulk	0.2	5.8	0.2	0.1	0.1	0.0	333.8	0.0	0.0	337
	Intermodal+Auto	0.4	8.7	0.3	0.1	0.1	0.0	507.0	0.0	0.0	512
	<i>total switching</i>	<i>0.6</i>	<i>14.5</i>	<i>0.5</i>	<i>0.2</i>	<i>0.2</i>	<i>0.0</i>	<i>840.8</i>	<i>0.1</i>	<i>0.0</i>	<i>849</i>

Line Haul Activity Calcs

			# of locomotives		time (hrs)	Load					Trips per Year			Trips per Day			Hp-hrs per year			Hp-hrs per day		
node	in/outbound		active	idle		active			Hp-hrs per trip		Existing	Project	Plan	Existing	Project	Plan	Existing	Project	Plan	Existing	Project	Plan
						loco	HP	(line-haul)														
Bulk	inbound	Without Dist Power	loaded	4	0	2.16	4,400	27.8%	0.4%	10,550	22	22	200	1	1	1	232,089	232,089	2,109,903	10,550	10,550	10,550
	outbound	Without Dist Power	loaded	4	0	2.16	4,400	27.8%	0.4%	10,550	22	22	200	1	1	1	232,089	232,089	2,109,903	10,550	10,550	10,550
	inbound	Without Dist Power	empty	1	3	2.16	4,400	27.8%	0.4%	2,751	0	0	0	0	0	0	0	0	0	0	0	0
	outbound	Without Dist Power	empty	1	3	2.16	4,400	27.8%	0.4%	2,751	0	0	0	0	0	0	0	0	0	0	0	0
Container	inbound	Without Dist Power	loaded	4	0	2.16	4,400	27.8%	0.4%	10,550	4	5	38	1	1	1	42,198	52,748	400,882	10,550	10,550	10,550
	outbound	Without Dist Power	loaded	4	0	2.16	4,400	27.8%	0.4%	10,550	7	9	70	1	1	1	73,847	94,946	738,466	10,550	10,550	10,550
	inbound	Without Dist Power	empty	3	1	2.16	4,400	27.8%	0.4%	7,950	3	4	32	1	1	1	23,850	31,801	254,405	7,950	7,950	7,950
	outbound	Without Dist Power	empty	2	2	2.16	4,400	27.8%	0.4%	5,351	0	0	0	0	0	0	0	0	0	0	0	0
Auto	inbound	Without Dist Power	loaded	4	0	2.16	4,400	27.8%	0.4%	10,550	0	0	0	0	0	0	0	0	0	0	0	0
	outbound	Without Dist Power	loaded	3	0	2.16	4,400	27.8%	0.4%	7,912	7	10	72	1	1	1	55,385	79,121	569,674	7,912	7,912	7,912
	inbound	Without Dist Power	empty	3	1	2.16	4,400	27.8%	0.4%	7,950	7	10	72	1	1	1	55,651	79,502	572,411	7,950	7,950	7,950
	outbound	Without Dist Power	empty	3	0	2.16	4,400	27.8%	0.4%	7,912	0	0	0	0	0	0	0	0	0	0	0	0
											72	82	684	1.0	1.0	2.0	modeling without dist power					

Time = 1.6 miles from terminal to Ash ave at 10 mph; 60 miles from Ash Ave to OC

HP = always 4,400

Load = See LF calcs

Hp-hrs = weighted sum of active and idle locomotives

Switching Activity Calcs

							Trips per Year			Trips per Day (rounded up)				Hp-hrs per year			Hp-hrs per day		
node	in/outbound	active	time (hrs)	HP	Load	Hp-hrs per trip	Existing	Project	Plan	Existing	Project	Plan		Existing	Project	Plan	Existing	Project	Plan
Bulk	inbound	2	2	3,600	8.5%	1,231	22	22	200	1	1	1		27,082	27,082	246,197	1,231	1,231	1,231
	outbound	2	2	3,600	8.5%	1,231	22	22	200	1	1	1		27,082	27,082	246,197	1,231	1,231	1,231
Intermodal and Auto	inbound	4	2	4,400	8.5%	3,009	14	19	142	1	1	1		42,127	57,172	427,288	3,009	3,009	3,009
	outbound	3	2	4,400	8.5%	2,257	14	19	142	1	1	1		31,595	42,879	320,466	2,257	2,257	2,257
							72	82	684	1.0	1.0	2.0		127,886	154,215	1,240,148	7,728	7,728	7,728

350 work days/year

Locomotive Emission Factors

						Emission Factors (in g/bhp-hr)									
	Name	Tier	HP	year	conc	NOX	PM10	ROG	CO	PM2.5	SO2	CO2	CH4	N2O	source
Switcher	GP-60	precont	3,600	2013	Switcher2013	10.6	0.16	0.43	0.4	0.16	0.01	678	0.05	0.02	NOX, CO, PM, HC from EPA cert data; others from POLB for tier 0 switchers
Line Haul		BNSF mix		2013	Line Haul2013	5.30	0.13	0.20	0.63	0.13	0.02	494	0.04	0.01	NOX, CO, PM, HC from EPA cert data; others from POLB for line-haul
Line Haul		BNSF mix		2020	Line Haul2020	4.55	0.11	0.17	0.54	0.11	0.02	494	0.04	0.01	NOX, CO, PM, HC from EPA cert data; others from POLB for line-haul
Line Haul		BNSF mix		2035	Line Haul2035	3.05	0.07	0.10	0.29	0.06	0.02	494	0.04	0.01	NOX, CO, PM, HC from EPA cert data; others from POLB for line-haul
Switcher	GP-60	precont	3,600	2020	Switcher2020	10.6	0.16	0.43	0.4	0.16	0.01	678	0.05	0.02	same as 2013, just for lookup (may change if fleet turnover assumed)
Switcher	GP-60	precont	3,600	2035	Switcher2035	10.6	0.16	0.43	0.4	0.16	0.01	678	0.05	0.02	same as 2013, just for lookup (may change if fleet turnover assumed)

Emission Factor Calculation by Year - Line Haul

BNSF Fleet Composition; California Air Resources Board web page

<http://www.arb.ca.gov/railyard/1998agree/1998agree.htm>

Railroad fleet turnover time (40 years); Environmental Protection Agency, Locomotive Emissions

Standards Regulatory Support Document, April 1998, page 15

01234								weighted g/bhp-hr								weighted grams per gallon									
Pre Tier 0	Tier 0	Tier 1	Tier 2	Tier 3	Tier 4	Total	NOX	PM10	ROG	CO	PM2.5	SO2	CO2	CH4	N2O	NOX	PM10	ROG	CO	PM2.5	SO2	CO2	CH4	N2O	
2013	0.2%	5.1%	24.0%	58.2%	12.5%	0.0%	100%	5.39	0.13	0.20	0.63	0.13	0.02	494	0.04	0.013	112.2	2.8	4.1	13.2	2.7	0.5	10275	0.8	0.3
2014	0.1%	4.7%	25.3%	53.9%	16.0%	0.0%	100%	5.21	0.13	0.20	0.63	0.13	0.02	494	0.04	0.013	108.4	2.8	4.1	13.2	2.7	0.5	10275	0.8	0.3
2015	0%	5%	25%	53%	16%	2%	100%	5.11	0.13	0.19	0.62	0.13	0.02	494	0.04	0.013	106.2	2.7	4.0	12.9	2.6	0.5	10275	0.8	0.3
2016	0%	4%	24%	52%	15%	4%	100%	4.99	0.13	0.19	0.61	0.12	0.02	494	0.04	0.013	103.8	2.6	3.9	12.6	2.6	0.5	10275	0.8	0.3
2017	0%	2%	24%	52%	15%	7%	100%	4.88	0.12	0.18	0.59	0.12	0.02	494	0.04	0.013	101.4	2.6	3.8	12.3	2.5	0.5	10275	0.8	0.3
2018	0%	1%	24%	51%	15%	9%	100%	4.77	0.12	0.18	0.58	0.12	0.02	494	0.04	0.013	99.1	2.5	3.7	12.0	2.4	0.5	10275	0.8	0.3
2019	0%	0%	24%	50%	15%	11%	100%	4.66	0.12	0.17	0.56	0.11	0.02	494	0.04	0.013	96.9	2.4	3.6	11.7	2.4	0.5	10275	0.8	0.3
2020	0%	0%	23%	50%	15%	13%	100%	4.55	0.11	0.17	0.54	0.11	0.02	494	0.04	0.013	94.7	2.4	3.5	11.3	2.3	0.5	10275	0.8	0.3
2021	0%	0%	21%	50%	15%	15%	100%	4.44	0.11	0.17	0.52	0.11	0.02	494	0.04	0.013	92.5	2.3	3.4	10.9	2.2	0.5	10275	0.8	0.3
2022	0%	0%	19%	50%	15%	17%	100%	4.34	0.11	0.16	0.50	0.10	0.02	494	0.04	0.013	90.3	2.2	3.3	10.5	2.2	0.5	10275	0.8	0.3
2023	0%	0%	17%	49%	15%	19%	100%	4.24	0.10	0.16	0.48	0.10	0.02	494	0.04	0.013	88.1	2.2	3.2	10.1	2.1	0.5	10275	0.8	0.3
2024	0%	0%	15%	49%	15%	21%	100%	4.13	0.10	0.15	0.47	0.10	0.02	494	0.04	0.013	86.0	2.1	3.1	9.7	2.0	0.5	10275	0.8	0.3
2025	0%	0%	14%	49%	15%	23%	100%	4.03	0.10	0.15	0.45	0.09	0.02	494	0.04	0.013	83.8	2.0	3.0	9.3	2.0	0.5	10275	0.8	0.3
2026	0%	0%	12%	49%	14%	25%	100%	3.93	0.09	0.14	0.43	0.09	0.02	494	0.04	0.013	81.7	2.0	2.9	8.9	1.9	0.5	10275	0.8	0.3
2027	0%	0%	10%	49%	14%	27%	100%	3.83	0.09	0.14	0.41	0.09	0.02	494	0.04	0.013	79.6	1.9	2.8	8.5	1.8	0.5	10275	0.8	0.3
2028	0%	0%	9%	48%	14%	29%	100%	3.73	0.09	0.13	0.39	0.09	0.02	494	0.04	0.013	77.5	1.8	2.7	8.1	1.8	0.5	10275	0.8	0.3
2029	0%	0%	7%	48%	14%	31%	100%	3.63	0.08	0.13	0.37	0.08	0.02	494	0.04	0.013	75.5	1.8	2.6	7.7	1.7	0.5	10275	0.8	0.3
2030	0%	0%	5%	48%	14%	32%	100%	3.53	0.08	0.12	0.35	0.08	0.02	494	0.04	0.013	73.4	1.7	2.5	7.4	1.6	0.5	10275	0.8	0.3
2031	0%	0%	4%	48%	14%	34%	100%	3.43	0.08	0.12	0.34	0.08	0.02	494	0.04	0.013	71.4	1.6	2.4	7.0	1.6	0.5	10275	0.8	0.3
2032	0%	0%	2%	48%	14%	36%	100%	3.33	0.08	0.11	0.32	0.07	0.02	494	0.04	0.013	69.3	1.6	2.4	6.6	1.5	0.5	10275	0.8	0.3
2033	0%	0%	0%	47%	14%	38%	100%	3.24	0.07	0.11	0.30	0.07	0.02	494	0.04	0.013	67.3	1.5	2.3	6.2	1.5	0.5	10275	0.8	0.3
2034	0%	0%	0%	45%	14%	40%	100%	3.14	0.07	0.11	0.29	0.07	0.02	494	0.04	0.013	65.4	1.4	2.2	6.0	1.4	0.5	10275	0.8	0.3
2035	0%	0%	0%	43%	14%	43%	100%	3.05	0.07	0.10	0.29	0.06	0.02	494	0.04	0.013	63.4	1.4	2.1	5.9	1.4	0.5	10275	0.8	0.3
2036	0%	0%	0%	40%	15%	46%	100%	2.95	0.06	0.10	0.28	0.06	0.02	494	0.04	0.013	61.4	1.3	2.1	5.8	1.3	0.5	10275	0.8	0.3
2037	0%	0%	0%	37%	15%	49%	100%	2.85	0.06	0.10	0.27	0.06	0.02	494	0.04	0.013	59.3	1.3	2.0	5.7	1.2	0.5	10275	0.8	0.3
2038	0%	0%	0%	34%	15%	51%	100%	2.75	0.06	0.09	0.27	0.06	0.02	494	0.04	0.013	57.2	1.2	1.9	5.6	1.2	0.5	10275	0.8	0.3
2039	0%	0%	0%	30%	15%	54%	100%	2.64	0.06	0.09	0.26	0.05	0.02	494	0.04	0.013	55.0	1.2	1.8	5.4	1.1	0.5	10275	0.8	0.3
2040	0%	0%	0%	27%	16%	57%	100%	2.53	0.05	0.08	0.25	0.05	0.02	494	0.04	0.013	52.7	1.1	1.8	5.3	1.1	0.5	10275	0.8	0.3

from POLB, Table 5.5 (SO2) and 5.6 (GHGs). Constant over time.

Avg./MW 2.82 25.43 44.67 93.89 55.26 55.26

g/bhphr	Pre Tier 0	Tier 0	Tier 1	Tier 2	Tier 3	Tier 4	
NOX	13	7.7	6.4	4.6	4.6	1.00	pre-0 to Tier 3 from MOU webpage; Tier 4 from EPA technical highlights
PM	0.32	0.2	0.2	0.11	0.08	0.02	Tier 2-4 based on testing; other based on EPA technical highlights
HC	0.48	0.3	0.29	0.15	0.11	0.04	Tier 2-3 based on testing; other based on EPA technical highlights
CO	1.28	1.28	1.28	0.4	0.2	0.2	Tier 2-4 based on testing; other based on EPA technical highlights

conversions

HC to ROG 1.053 EPA 40 CFR part 1033 Technical Highlights
 PM10 to PM2.5 0.97 EPA 40 CFR part 1033 Technical Highlights
 g/hp-hr to g/gallon conver 20.8 EPA 40 CFR part 1033 Technical Highlights

References

EPA 40 CFR part 1033 Technical Highlights
<http://www3.epa.gov/nonroad/locomotv/420f09025.pdf>
 EPA locomotive emission standards
<http://www3.epa.gov/otag/standards/nonroad/locomotives.htm>
 Port of Long Beach Inventory, Locomotives
<http://www.polb.com/civica/filebank/blobdload.asp?BlobID=12245>
 EPA Certification Data
<http://www3.epa.gov/otag/certdata.htm#locomotive>

Load Factor Calculations

% of full power in notch from POLB. Differs from RSD since RSD assigned no power to DB and idle (Table 5.8 of POLB)

<http://www.polb.com/civica/filebank/blobdload.asp?BlobID=13033>

Time in notch for line haul and switch from RSD, and matches POLB and 2012 rulemaking

<http://www3.epa.gov/otaq/documents/420r98101.pdf>

<https://www.law.cornell.edu/cfr/text/40/1033.530>

Load by activity -->		Switching		Regional, SDR to OC (Line-Haul)		Regional, SDR to Ash Ave (Line-Haul, Notch 2)		Idling Only	
Notch	% of Full Power in Notch	% of Operating Time in Notch	% Full Power x % Time	% of Operating Time in Notch	% Full Power x % Time	% of Operating Time in Notch	% Full Power x % Time	% of Operating Time in Notch	% Full Power x % Time
DB	2.1%	0.0%	0.0%	12.5%	0.3%	0.0%	0.0%	0.0%	0.0%
Idle	0.4%	59.8%	0.2%	38.0%	0.2%	0.0%	0.0%	100.0%	0.4%
1	5.0%	12.4%	0.6%	6.5%	0.3%	0.0%	0.0%	0.0%	0.0%
2	11.4%	12.3%	1.4%	6.5%	0.7%	100.0%	11.4%	0.0%	0.0%
3	23.5%	5.8%	1.4%	5.2%	1.2%	0.0%	0.0%	0.0%	0.0%
4	34.3%	3.6%	1.2%	4.4%	1.5%	0.0%	0.0%	0.0%	0.0%
5	48.1%	3.6%	1.7%	3.8%	1.8%	0.0%	0.0%	0.0%	0.0%
6	64.3%	1.5%	1.0%	3.9%	2.5%	0.0%	0.0%	0.0%	0.0%
7	86.6%	0.2%	0.2%	3.0%	2.6%	0.0%	0.0%	0.0%	0.0%
8	102.5%	0.8%	0.8%	16.2%	16.6%	0.0%	0.0%	0.0%	0.0%
average load -->		8.5%		27.8%		11.4%		0.4%	

Conversions

0.002204623 grams to pounds

0.00000100 g to MT

0.00000110 grams to ton

350 workdays per year

25 AR4 GWP, CH4

298 AR4 GWP, N2O

0.16 hours from TAMT to Ash Av (10 mph speed zone)

2.16 hours for entire trip, TAMT to OC border

Distances

268.8 mile marker, MTDB Yard

267.2 mile marker, CP Ash

1.6 mile distance from TAMT to Sante Fe Depot, limited to 10mph

267.2 mile marker, CP Ash

207.4 mile marker, OC County line

59.8 mile distance from Sante Fe Depot to OC Border, line-haul

61.4 entire length

source for mile markers:

http://www.socalrailfan.com/subdivisions/bnsf_sd_sub.html

10 mph speed til Ash Ave

0.5 NCMT to TAMT, hours

2.5 hours from NCMT to OC

Table 4-1. Cargo handling equipment - population by type.

Equipment Type	Equip Population	% Total
CHE		
Container Handling Equipment	7	6%
Forklift	91	77%
Yard Tractor	15	13%
OFFROAD		
Aerial Lifts	1	1%
Rubber Tired Loaders	3	3%
Sweepers/Scrubbers	1	1%
Total	118	100%

0.7456999 hp to kw

283.11178 g/kWh CO2e SDGE - 2020 RPS (33%)

211.27745 g/kWh CO2e SDGE - 2030 RPS (50%)

Table 4-2. Cargo handling equipment - Average horsepower and actual hours of operation by equipment type and horsepower range.

Equipment Type	HP Bin	Equipment Population	Average HP	Average Annual Operation (Hours)	Avg LF	avg g/hphr of CO2	MTCO2/yr/ piece	annual kWhrs/each	MTCO2/yr/ piece/if electric	2020	2030	MTCO2e savings per piece	2020	2030	avg g/hphr of NOX	lbs/day/ea
CHE																
Container Handling Equipment	100	1	99	245	0.59	531	8	10671	3	2	-5	-5	0.26	0.02		
	300	2	253	190	0.59	531	15	21149	6	4	-9	-11	0.26	0.05		
	600	4	353	485	0.59	531	54	75324	21	16	-32	-38	0.26	0.17		
Forklift	75	11	69	429	0.3	340	3	6622	2	1	-1	-2	0.26	0.01		
	100	7	85	868	0.3	340	8	16505	5	3	-3	-4	0.26	0.04		
	175	73	133	301	0.3	340	4	8956	3	2	-2	-2	0.26	0.02		
Yard Tractor	300	15	200	959	0.39	531	40	55780	16	12	-24	-28	0.26	0.12		
OFFROAD																
Aerial Lifts	75	1	70	240	0.31	531	3	3884	1	1	-2	-2	0.26	0.01		
Rubber Tired Loaders	300	3	238	431	0.36	531	20	27537	8	6	-12	-14	0.26	0.06		
Sweepers/Scrubbers	50	1	34	240	0.68	531	3	4138	1	1	-2	-2	0.26	0.01		

TAMT CHE Emissions

Emissions based on POSD Inventory for 2012 year at TAMT (in tons)

Converted to daily based on 360 days per year; average daily

Apportioned to each cargo type by percentage of throughput

Increased for Project and Plan based on increase in throughput for each cargo type

days 360

lbs/ton 2000

TAMT CHE Emissions from Inventory, Table 4-5

Terminal	ROG	CO	NOx	SO2	PM a 10	PM2.5	CO2	CH4	N Ob 2	CO2e
CST	0.02	0.26	0.39	0.00	0.01	0.00	49	0.00	0.00	49
TAMT	0.68	4.00	7.59	0.01	0.19	0.17	1,172	0.21	0.00	1,176
NCMT	0.42	5.49	3.94	0.00	0.08	0.08	453	0.11	0.00	455
Total	1.12	9.75	11.92	0.02	0.28	0.25	1,674	0.32	0.00	1,680

Calculation of Average Daily at the terminal, apportioned into cargo types

ANNUAL TONS	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e	% of total
baseline	0.7	4.0	7.6	0.0	0.19	0.2	1172.0	0.2	0.0	1176.0	-
Dry Bulk	0.2	1.1	2.2	0.0	0.1	0.0	335.4	0.1	0.0	336.5	29%
Liquid Bulk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%
Refrigerated Containers	0.4	2.5	4.8	0.0	0.1	0.1	738.1	0.1	0.0	740.6	63%
Multi-Purpose General Cargo	0.1	0.3	0.6	0.0	0.0	0.0	98.5	0.0	0.0	98.8	8%
project buildout	0.7	4.3	8.2	0.0	0.2	0.2	1269.6	0.2	0.0	1273.9	
Dry Bulk	0.2	1.1	2.2	0.0	0.1	0.0	335.4	0.1	0.0	336.5	26%
Liquid Bulk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%
Refrigerated Containers	0.5	2.7	5.1	0.0	0.1	0.1	791.8	0.1	0.0	794.5	62%
Multi-Purpose General Cargo	0.1	0.5	0.9	0.0	0.0	0.0	143.2	0.0	0.0	143.7	11%
Plan buildout	4.0	23.6	44.7	0.1	1.12	1.0	6906.0	1.2	0.0	6929.6	
Dry Bulk	1.8	10.6	20.0	0.0	0.5	0.4	3093.8	0.6	0.0	3104.3	45%
Liquid Bulk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%
Refrigerated Containers	1.5	9.1	17.3	0.0	0.4	0.4	2671.2	0.5	0.0	2680.3	39%
Multi-Purpose General Cargo	0.7	3.9	7.4	0.0	0.2	0.2	1141.1	0.2	0.0	1145.0	17%
DAILY POUNDS	ROG	CO	NOx	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e	% of total
baseline	3.8	22.2	42.2	0.1	1.1	0.9	6511.1	1.2	0.0	6533.3	-
Dry Bulk	1.1	6.4	12.1	0.0	0.3	0.3	1863.3	0.3	0.0	1869.6	29%
Liquid Bulk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%
Refrigerated Containers	2.4	14.0	26.6	0.0	0.7	0.6	4100.6	0.7	0.0	4114.6	63%
Multi-Purpose General Cargo	0.3	1.9	3.5	0.0	0.1	0.1	547.2	0.1	0.0	549.1	8%
project buildout	4.1	24.1	45.7	0.1	1.1	1.0	7053.1	1.3	0.0	7077.2	
Dry Bulk	1.1	6.3	12.0	0.0	0.3	0.3	1858.8	0.3	0.0	1865.2	26%
Liquid Bulk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%
Refrigerated Containers	2.6	15.0	28.5	0.0	0.7	0.6	4398.7	0.8	0.0	4413.7	62%
Multi-Purpose General Cargo	0.5	2.7	5.2	0.0	0.1	0.1	795.7	0.1	0.0	798.4	11%
Plan buildout	22.3	130.9	248.5	0.3	6.2	5.6	38366.8	6.9	0.0	38497.8	
Dry Bulk	10.0	58.7	111.3	0.1	2.8	2.5	17187.7	3.1	0.0	17246.4	45%
Liquid Bulk	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%
Refrigerated Containers	8.6	50.6	96.1	0.1	2.4	2.2	14839.8	2.7	0.0	14890.4	39%
Multi-Purpose General Cargo	3.7	21.6	41.1	0.1	1.0	0.9	6339.3	1.1	0.0	6361.0	17%

Gantry Crane Calculations										g/kwhr										lbs/day									
TAMT	RTG	Crane	avg my 2005	kw	hp	451 diesel	LF	0.2 YTI	hrs/daannua	kwhrs	kwhrs/yr	pm10	pm2.5	dpm	nox	sox	co	voc	co2	ch4	n2o	pm10	pm2.5	dpm	nox	sox	co		
					336				24	8,640	1,613	580,608	0.03	0.02	0.03	2.9	0.01	1.49	0.29	761	0.01	0.01	0	0	0	10	0	5	
																						MT/YR							
																						co2		ch4		n2o		co2e	
																						1371		0.02		0.02			
																						442		0.01		0.01		444	
			3.84 kw/hr/teu		YTI																								
			29 mt per teu		TIA																								
			0.132413793 kw/hr/mt																										
			MT refrig		kw/hr		2013		2020		2030																		
							321.13369		283.11178		211.277		g/kwhr																
<u>ELECTRIC CRANE calc</u>			sdge ef																										
			ex		637,931		0		0		0		##### g per mt																
			project		685,931		0		0		0																		
			plan		2,288,000		302,963		97		86		64																
			MT mutli																										
			ex		85,131		0		0		0		0																
			project		124,078		0		0		0		0																
			plan		977,400		129,421		42		37		27																
RTG 1 diesel RTG, 451 hp, 24 hours of use per day, 360 days/yr																													
e-Grar 1 e crane, 3.84 kw/hr/teu, based on annual throughput																													

Dry Bulk Operations Emissions

soda ash imported by train. Moderate controls assumed.
bauxite in by vessel and clamshell drop bauxite into trucks for onsite storage or taken offsite. No controls assumed.

Dry Bulk Throughput (metric tons)	Existing	Project	Plan
Total Throughput	289,864	289,864	2,650,000
by vessel	158,205	158,205	1,446,345
by truck	131,659	131,659	1,203,655
Existing by vessel and truck from PD; No change in 2020 due to rail and demo project and based; 2035 plan throughput based on increases shown in PD (914%), assuming similar vessel/truck split			

Throughput by commodity (MT)	Existing	Project	Plan	% of throughput, 2013/2014 avg
soda ash	70,243	70,243	642,178	24%
bauxite	104,920	104,920	959,202	36%
cement	0	0	108,000	-
fertilizers	no dust emissions			

Emission Factor	uncontrolled	controlled	
all in lbs PM10 per ton			
Soda ash	5.2	0.0051	Soda ash storage/loading and unloadingc (SCC 3-01-023-99)
Bauxite	1.1	0.055	material handling and transfer--bauxite/alumina (SCC 3-03-024-04); low moisture ore; applies to each loading and unloading. Assume 2 dumps (from vessel to truck, truck to storage)
cement	1.1	0.0049	Cement supplement unloading to elevated storage silo (pneumatic)

PM2.5/PM10 ratio			
Soda ash	1.0	PM2.5 = PM10; cannot find reference that says otherwise	
Bauxite loading	0.292	loading/unloading of bulk mineral products	
cement	0.161	AP-42 Table 11.12-3, ratio of uncontrolled PM2.5 to PM10 k factors from Truck Loading	

Emission Calculation	Uncontrolled						Controlled						
	PM10 annual tons			PM10 Daily Pounds			PM10 annual tons			PM10 Daily Pounds			
	Existing	Project	Plan	Existing	Project	Plan	Existing	Project	Plan	Existing	Project	Plan	
	soda ash	331	331	3029	1841	1841	16830	0.3	0.3	3.0	2	2	17
	bauxite	105	105	957	582	582	5318	5	5	48	29	29	266
cement	0	0	108	0	0	599	0	0	0.5	0	0	3	
	436	436	4094	2423	2423	22746	6	6	51	31	31	285	
	PM2.5 annual tons			PM2.5 Daily Pounds			PM2.5 annual tons			PM2.5 Daily Pounds			
	Existing	Project	Plan	Existing	Project	Plan	Existing	Project	Plan	Existing	Project	Plan	
	soda ash	331	331	3029	1841	1841	16830	0	0	3	2	2	17
	bauxite	31	31	279	170	170	1553	2	2	14	8	8	78
	cement	0	0	17	0	0	97	0	0	0	0	0	0.4
	362	362	3326	2011	2011	18479	2	2	17	10	10	95	

Increase in dry bulk, project	0% from PD
Increase in dry bulk, plan	914% from PD
ton to mt	0.907184741
lbs per ton	2000
days per year	360
2035 cement storage	108,000 MT per PD
transfers on-site	2

Emission Factors for each dry bulk type

Soda Ash	AP-42, 8.12	https://www3.epa.gov/ttnchie1/ap42/ch08/final/c08s12.pdf			
Table 8.12-2	total PM per ton, uncontrolled	lb/ton, filterable		total PM per ton, controlled	
		lb/ton, total		lb/ton, filterable lb/ton, total	
Soda ash storage/loading and unloading ^c (SCC 3-01-023-99)	-	5.2		0.0041	0.0051

Bauxite	AP-42, 11.24	https://www3.epa.gov/ttnchie1/ap42/ch11/final/c11s24.pdf				
Table 11.24-2, low moisture ore	total PM per ton, uncontrolled		total PM per ton, controlled			
	filterable PM	filterable PM10	filterable PM	filterable PM10		
Material handling and transfer--bauxite/alumina (SCC 3-03-024-04)g,h	1.1	1.1	0.055	0.055	0.33	
control efficiency - existing			70%	70%		
control efficiency - project			95%	95%		
no controlled "rates", but text says between 70-99% decrease from controls						
assumed 95%						

Cement	AP-42, 11.12	https://www3.epa.gov/ttnchie1/ap42/ch11/final/c11s12.pdf		
Table 11.12-2	PM10 per ton			to silo
	Uncontrolled	Controlled from ap42	Controlled from WRAP	
	Cement supplement unloading to elevated storage silo (pneumatic) ^{b,c}	1.1	0.0049	
Cement unloading to elevated storage silo (pneumatic) ^c	0.47	0.00034	0.039	
PM2.5 = PM10 = PM				
lowest from WRAP; loading for truck mix				

99.6%

99.9%

Table 11-8. PM10 Control Efficiencies for Mineral Processing Operations

Mineral Products Industry	Source	Control Device	PM10 Control Efficiency (%)
Cement batching	Unloading into silo	Wet scrubber	99.9
	Mixer loading (central mix)	Wet scrubber	96.5
	Truck loading (truck mix)	Wet scrubber	91.6
min			91.60

0.92

http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf

<http://www.baaqmd.gov/~media/files/engineering/bact-tbact-workshop/miscellaneous-sources/29-1.pdf?la=en>

		Baseline		Project Buildout 2020			Plan Buildout 2035						
Tenant	cargo type	kwh	therms	% inc. over baseline	kwh	therms	% inc. over baseline	kwh	therms				
Serless Valley	dry bulk	255,403		100%	255,403		914%	2,334,950					
Cemex	dry bulk	350,028		100%	350,028		914%	3,200,032					
Dole	refrigerated containers	4,110,100		108%	4,419,357		359%	14,741,263		conv			
Port	total	1,458,525	531	108%	1,579,943	575	589%	8,594,385	3,129				
		into mmbtu	56			60			328				
				0.746268657						1 therm			
										0.1047 mmbtu			
										360 days per year			
										0.000453592 lbs to MT			
										25 ch4			
										298 n2o			
										0.001 kwh to mwh			
										for refrigerated, minus out shore power			
Emission Factors													
Electricity		2013	2020	2030	2035								
	lbs/mwh of CO2e	708	624	466	466	(includes non-co2)							
	g/kwh	321	283	211	211	(includes non-co2)							
	% RPS	24%	33%	50%	50%								
Natural Gas													
				ROG	NOX	CO2	SO2	PM10	PM2.5	Co2	Ch4	N2O	CO2e
from Caleemod, lbs/mmbtu				0.0108	0.0980	0.0824	0.0006	0.0075	0.0075	117.6471	0.0023	0.0022	

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WATER
for Vessels

Cargo Type	Gallons Existing	Scaling Factor 2020	Gallons 2020	Scaling Factor 2035	Gallons 2035
Refrigerated Containers	703,114	108%	756,019	359%	2,521,785
Multi-Purpose General Cargo	89,480	146%	130,417	1148%	1,027,331
Dry Bulk	0	100%	0	914%	0
Liquid Bulk	0	100%	0	100%	0
Total Gallons for all Project Baseline vessels	792,594		886,435		3,549,116

kwh	Existing	2020	2035	
Refrigerated Containers	7,812	8,399	28,017	outdoor
Multi-Purpose General Cargo	994	1,449	11,414	
Dry Bulk	-	-	-	
Liquid Bulk	-	-	-	

mtco2e	Existing	2020	2035	
Refrigerated Containers	2.48	2.49	6.20	outdoor
Multi-Purpose General Cargo	0.32	0.43	2.52	
Dry Bulk	-	-	-	
Liquid Bulk	-	-	-	

Employees	Existing	2020	2035
Employees	315	407	839.00
Program's avg daily water use per employee	50	50	50
Daily gallons	15750	20,466	42,189.00

City of SD UWMP 2010:
1 SF Home=255 gal/day Water demand project=500 SF homes

Equivalent to # of SF Homes Year 2020	Equivalent to # of SF Homes Year 2035
8.1226815	27.09411773
1.401199521	11.03767317
9.523881021	38.1317909
13 homes with Demo and Initial I 41 homes with TAMT buildout	

	existing EF			adjusted EF	
	Existing	2020	2035	2020	2035
Dry Bulk	56.92	56.92	236.54	53.17	164.91
Liquid Bulk	6.19	6.19	21.33	5.78	14.87
Refrigerated Containers	127.74	137.35	210.42	128.32	146.71
Multi-Purpose General Cargo	17.03	24.82	89.77	23.19	62.59
	207.87	225.28	558.07		
	2	3	4		

HFC emissions from refrigerated units

HFC Emission Factors

Equipment Type	Unit	Refrigerant	GWP	Average Charge Size (kg)	Average Annual Leak (Loss) Rate	Dwell time (days)	Dwell time (percent of year)	Annual HFC Emissions (kg) per container	Annual CO2e Emissions (MT) per container
Refrigerated unit - Carrier	per unit	R-134a	1430	4.54	5%	2.8	0.007671233	0.002	0.002
Refrigerated unit - Starcool	per unit	R-134a	1430	4.5	5%	2.8	0.007671233	0.002	0.002
Refrigerated unit - Thermoking	per unit	R-404A	3922	4.0	5%	2.8	0.007671233	0.002	0.006

Existing HFC Emissions

Equipment Type	Number of units	Annual HFC		Annual CO2e Emissions per unit (MT)	Annual HFC Emissions (MT)	Annual CO2e Emissions (MT)
		Emissions per unit (kg)	per unit (MT)			
Refrigerated unit - Carrier	1560	0.002	0.002	0.003	3.885	
Refrigerated unit - Starcool	220	0.002	0.002	0.000	0.543	
Refrigerated unit - Thermoking	1746	0.002	0.006	0.003	10.506	
Total Existing	3526	-	-	0.006	14.934	

Project 2020 HFC Emissions

Increase = 108%

Equipment Type	Number of units	Annual HFC		Annual CO2e Emissions per unit (MT)	Annual HFC Emissions (MT)	Annual CO2e Emissions (MT)
		Emissions per unit (kg)	per unit (MT)			
Refrigerated unit - Carrier	1677	0.002	0.002	0.003	4.177	
Refrigerated unit - Starcool	237	0.002	0.002	0.000	0.584	
Refrigerated unit - Thermoking	1877	0.002	0.006	0.003	11.297	
Total With Project	3791	-	-	0.006	16.058	
				Net	0.000	1.124

Plan 2035 HFC Emissions

Increase = 359%

Equipment Type	Number of units	Annual HFC		Annual CO2e Emissions per unit (MT)	Annual HFC Emissions (MT)	Annual CO2e Emissions (MT)
		Emissions per unit (kg)	per unit (MT)			
Refrigerated unit - Carrier	5595	0.002	0.002	0.010	13.933	
Refrigerated unit - Starcool	789	0.002	0.002	0.001	1.948	
Refrigerated unit - Thermoking	6262	0.002	0.006	0.010	37.682	
Total With Project	12646	-	-	0.021	53.562	
				Net	0.015	38.628

Table S4: Input Factors for Emission Calculations, Refrigeration and AC (stationary, transport refrigerated units, and refrigerated shipping containers), 2008

Equipment Type or Emissions sub-sector	Units in CA	Ave. Charge (amount) of F-gas in lbs.	Ave. Annual Leak (loss) Rate	Annual Loss in lbs. (units* charge* loss rate)	EOL units in CA	Ave. Charge (amount) in lbs. at EOL	Ave. EOL Loss Rate	EOL Loss in lbs. (units* charge* loss rate)	total loss in lbs. (annual + EOL)
Refrigeration Large Centralized System ≥ 907.2 kg (2,000 lbs.)	1,090	2,486	21.0%	568,914	62	2,486	20%	30,908	599,822
Refrigeration Medium Centralized System 90.7- < 907.2 kg (200- < 2,000 lbs.)	33,269	704	15.0%	3,513,168	1,924	704	20%	270,845	3,784,013
AC Large Centrifugal Chiller ≥ 907.2 kg (2,000 lbs.)	4,231	3,978	2.4%	403,915	177	3,883	20%	137,808	542,000
AC Medium Centrifugal Chiller 90.7- < 907.2 kg (200- < 2,000 lbs.)	1,330	1,007	1.4%	18,751	56	993	20%	11,108	30,000
AC Chiller - Packaged 90.7- < 907.2 kg (200- < 2,000 lbs.)	8,379	526	6.9%	304,111	352	490	20%	34,505	339,000
Refrigeration Large Cold Storage ≥ 907.2 kg (2,000 lbs.)	1,166	7,546	21.6%	1,899,770	48	5,509	16%	42,581	1,942,000
Refrigeration Medium Cold Storage 90.7- < 907.2 kg (200- < 2,000 lbs.)	4,806	565	28.8%	782,075	202	362	16%	11,660	794,000
Refrigeration Process Cooling ≥ 907.2 kg (2,000 lbs.)	395	3,640	6.8%	97,798	17	3,393	20%	11,322	109,120
Refrigerated Condensing units 22.7- ≤ 90.7 kg (50- ≤ 200 lbs.)	65,154	122	14.5%	1,152,583	2,738	122	20%	66,817	1,219,000
Unitary AC 22.7- ≤ 90.7 kg (50- ≤ 200 lbs.)	65,265	100	11.3%	737,490	3,708	77	20%	57,106	795,000
Refrigerated Condensing Units ≤ 22.7 kg (50-lbs. or less) ^(a)	262,854	31.4	15%	1,238,043	11,010	22	34%	82,351	1,320,394
Refrigerated stand-alone display cases ^(a)	577,457	7.1	0%	0	24,446	7	100%	173,566	173,566
Refrigerated vending machines ^(a)	452,086	0.66	0%	0	25,524	0.66	100%	16,846	16,846
Unitary A/C ≤ 22.7 kg (50-lbs. or less) (central) ^(b)	2,367,328	15.1	10%	3,574,665	133,608	12	56%	905,326	4,480,000
Unitary A/C ≤ 22.7 kg (50- lbs. or less) (window unit) ^(b)	639,511	1.54	2%	19,697	50,929	1.2	100%	59,587	79,000
Residential Appliance (refrigerator-freezer)	16,189,879	0.5	1%	80,949	946,725	0.4	77%	313,461	394,000
Residential A/C (central) ^(b)	5,994,796	7.5	10%	4,496,097	322,452	6	56%	1,083,440	5,580,000
Residential A/C (window unit) ^(b)	3,558,891	1.54	2%	109,614	283,422	1.2	100%	331,604	441,000
Transport Refrigerated Units (TRUs)	57,603	20.7	18.3%	218,208	4,580	17.4	15%	11,953	230,161
Refrigerated Shipping Containers	42,941	33.1	5%	71,068	12,853	33.1	19%	80,835	151,903

Supporting Information document for Manuscript:

"High-global Warming Potential F-gas Emissions in California: Comparison of Ambient-based versus Inventory-based Emission Estimates, and Implications of Refined Estimates".

Container Dwell Times

Vessels arrive weekly and discharge Sunday/Monday/Tuesday.

Weekly dispatch from the terminal resembles an inverted bell curve.

Monday 25%, Tuesday 25%, Wednesday 15%, Thursday 15% and Friday 20%.

Average container dwell time in days calculated based on maximum possible dwell time assuming a Sunday arrival and departure per day based on % provided by applicant.

	Su	M	T	W	Th	F	Sa	total
Arrival	33%	33%	33%					
Departure		25%	25%	15%	15%	20%		
Max dwell time (days)	-	1	2	3	4	5	6	
weighting (departure % (x) max dwell time)		0.25	0.5	0.45	0.6	1	0	2.8 days

Container Refrigerant Info

<u>Container</u>	<u>Charge size (kg)</u>	<u>Source</u>	<u>Refrigerant</u>	<u>GWP</u>	<u>Source</u>
carrier	4.54	http://www.flex-box.com/common/documents/T-362.pdf	R134A	1430	EPA and ARB Scoping Plan (from AR4)
starcool	4.5	Specs from applicant	R134A	1430	EPA and ARB Scoping Plan (from AR4)
thermoking	4.0	Specs from applicant	R404A	3922	EPA (AR4)

Sources:

Global Warming Potentials and Ozone Depletion Potentials of Some Ozone-Depleting Substances and Alternatives Listed by the SNAP Program

<http://www.epa.gov/ozone/snap/subsgwps.html#Table 3>

AB32 First Update

http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf

Construction Emission Calculation Sheets

Construction Summary - Daily

[illegible]

Construction Summary - Annual

Phase		Tons per year								Metric tons per year			
		ROG	NOX	CO	PM10	PM2.5	PM10 D	PM2.5 D	SO2	CO2	CH4	N2O	CO2e
TS#1Demolition of Roofing and Steel	2017	0	0	0	0	0	0	0	0	61	1.49E-02	1.56E-03	62
TS#1Demolition of Concrete Walls	2017	0	1	1	0	0	0	0	0	97	2.09E-02	2.47E-03	98
TS#1Demolition of Asphalt, Foundati	2017	0	0	0	0	0	0	0	0	31	5.86E-03	7.93E-04	32
TS#1Demolition and Removal of Asbe	2017	0	0	0	0	0	0	0	0	11	2.20E-03	2.80E-04	11
TS#1Earthwork & Grading	2017	0	1	0	0	0	0	0	0	92	1.49E-02	2.34E-03	93
TS#1Paving	2017	0	0	0	0	0	0	0	0	13	1.56E-03	3.26E-04	13
TS#1Utilities, Lighting, Misc.	2017	0	0	0	0	0	0	0	0	19	4.17E-03	4.69E-04	19
TS#2Demolition of Roofing and Steel	2018	0	1	0	0	0	0	0	0	76	1.99E-02	1.93E-03	77
TS#2Demolition of Concrete Walls	2018	0	1	1	0	0	0	0	0	132	3.09E-02	3.37E-03	134
TS#2Demolition of Asphalt, Foundati	2018	0	0	0	0	0	0	0	0	44	7.86E-03	1.12E-03	45
TS#2Demolition and Removal of Asbe	2018	0	0	0	0	0	0	0	0	11	2.68E-03	2.68E-04	11
TS#2Earthwork & Grading	2018	0	1	0	0	0	0	0	0	112	1.55E-02	2.86E-03	114
TS#2Paving	2018	0	0	0	0	0	0	0	0	16	1.85E-03	3.92E-04	16
TS#2Utilities, Lighting, Misc.	2018	0	0	0	0	0	0	0	0	24	5.21E-03	6.12E-04	25
Rail Install	2019	0	0	0	0	0	0	0	0	3	3.27E-04	6.46E-05	3

Year	Tons per year								Metric tons per year			
	ROG	NOX	CO	PM10	PM2.5	PM10 D	PM2.5 D	SO2	CO2	CH4	N2O	CO2e
2017	0.3	2.7	1.7	0.1	0.1	0.1	0.0	0.0	325	0.1	0.0	329
2018	0.3	3.1	2.2	0.1	0.1	0.2	0.0	0.0	416	0.1	0.0	421
2019	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3	0.0	0.0	3
Total	0.6	5.8	3.9	0.3	0.3	0.3	0.1	0.0	743	0.1	0.0	752

Offroad Emissions Calculations

TS#	Phase	Year	Days	Equip	#/day	hrs/day	CMOD	HP Bin	HP	LF	Pounds per day					Metric tons per day				Tons per year					Metric tons per year				
											ROG					CO2				ROG				CO2					
											NOX	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CO2e	NOX	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CO2e	
TS#1	Demolition of Roofing and Steel Frame	2017	15	Excavator-Shear	2	8	Excavators	175	163	0.38	0.7	8.1	6.9	0.4	0.4	0.0	0.5	0.0	0.0	0.5	0.0	0.1	0.0	0.0	0.0	7.4	0.0	0.0	7.5
TS#1	Demolition of Roofing and Steel Frame	2017	20	Excavator	1	8	Excavators	175	163	0.38	0.4	4.0	3.4	0.2	0.2	0.0	0.2	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	4.9	0.0	0.0	5.0
TS#1	Demolition of Roofing and Steel Frame	2017	20	Loader CAT 977	2	8	Tractors/Loaders/Backhoes	120	190	0.37	1.2	11.9	9.4	0.9	0.8	0.0	0.6	0.0	0.0	0.6	0.0	0.1	0.1	0.0	0.0	11.3	0.0	0.0	11.5
TS#1	Demolition of Roofing and Steel Frame	2017	25	Skid Steer Loader CAT 246	3	8	Skid Steer Loaders	120	80	0.37	0.4	5.1	5.2	0.3	0.3	0.0	0.4	0.0	0.0	0.4	0.0	0.1	0.1	0.0	0.0	8.9	0.0	0.0	9.0
TS#1	Demolition of Roofing and Steel Frame	2017	25	Forklift	3	8	Forklifts	120	89	0.2	0.6	5.5	3.7	0.5	0.4	0.0	0.2	0.0	0.0	0.2	0.0	0.1	0.0	0.0	0.0	5.3	0.0	0.0	5.4
TS#1	Demolition of Roofing and Steel Frame	2017	25	Manlift	5	8	aerial lifts	120	63	0.31	0.2	4.1	5.5	0.1	0.1	0.0	0.4	0.0	0.0	0.4	0.0	0.1	0.1	0.0	0.0	9.7	0.0	0.0	9.9
TS#1	Demolition of Concrete Walls	2017	35	Backhoe	1	8	Tractors/Loaders/Backhoes	120	190	0.37	0.6	6.0	4.7	0.4	0.4	0.0	0.3	0.0	0.0	0.3	0.0	0.1	0.1	0.0	0.0	9.9	0.0	0.0	10.0
TS#1	Demolition of Concrete Walls	2017	15	Excavator-Breaker (pneumatic)	2	8	Excavators	175	163	0.38	0.7	8.1	6.9	0.4	0.4	0.0	0.5	0.0	0.0	0.5	0.0	0.1	0.1	0.0	0.0	7.4	0.0	0.0	7.5
TS#1	Demolition of Concrete Walls	2017	35	Loader CAT 977	2	8	Tractors/Loaders/Backhoes	120	190	0.37	1.2	11.9	9.4	0.9	0.8	0.0	0.6	0.0	0.0	0.6	0.0	0.2	0.2	0.0	0.0	19.8	0.0	0.0	20.1
TS#1	Demolition of Concrete Walls	2017	20	Excavator - pulverizer	2	8	Excavators	175	163	0.38	0.7	8.1	6.9	0.4	0.4	0.0	0.5	0.0	0.0	0.5	0.0	0.1	0.1	0.0	0.0	9.9	0.0	0.0	10.0
TS#1	Demolition of Concrete Walls	2017	25	Crusher	3	8	Crushing/Proc. Equipment	120	85	0.78	2.3	14.9	13.3	1.2	1.2	0.0	0.9	0.0	0.0	0.9	0.0	0.2	0.2	0.0	0.0	22.6	0.0	0.0	22.8
TS#1	Demolition of Concrete Walls	2017	35	Skid Steer Loader CAT 246	3	8	Skid Steer Loaders	120	80	0.37	0.4	5.1	5.2	0.3	0.3	0.0	0.4	0.0	0.0	0.4	0.0	0.1	0.1	0.0	0.0	12.4	0.0	0.0	12.6
TS#1	Demolition of Asphalt, Foundation, and Pile Caps	2017	10	Doser CAT D-9	1	8	Rubber Tired Dozers	250	464	0.4	2.3	25.1	8.7	1.2	1.1	0.0	0.7	0.0	0.0	0.8	0.0	0.1	0.0	0.0	0.0	7.4	0.0	0.0	7.6
TS#1	Demolition of Asphalt, Foundation, and Pile Caps	2017	10	Blade CAT 140	1	6	Tractors/Loaders/Backhoes	120	190	0.37	0.5	4.5	3.5	0.3	0.3	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	2.2
TS#1	Demolition of Asphalt, Foundation, and Pile Caps	2017	15	Loader CAT 980	1	8	Rubber Tired Loaders	250	270	0.36	0.6	8.2	2.4	0.3	0.3	0.0	0.4	0.0	0.0	0.4	0.0	0.1	0.0	0.0	0.0	5.8	0.0	0.0	5.9
TS#1	Demolition of Asphalt, Foundation, and Pile Caps	2017	5	Saw Cut Equipment	1	8	Concrete/Industrial Saws	120	81	0.73	0.6	4.3	3.7	0.3	0.3	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	1.4
TS#1	Demolition of Asphalt, Foundation, and Pile Caps	2017	10	Air Compressor (Ingersoll-Rand C-185)	1	6	Air Compressors	120	48	0.48	0.2	1.3	1.1	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.8
TS#1	Demolition of Asphalt, Foundation, and Pile Caps	2017	10	Excavator-Breaker (CAT 330)	1	8	Excavators	175	163	0.38	0.4	4.0	3.4	0.2	0.2	0.0	0.2	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	2.5
TS#1	Demolition and Removal of Asbestos/ Lead / Hazardous Waste	2017	20	Scissor Lifts	4	8	aerial lifts	120	63	0.31	0.2	3.3	4.4	0.1	0.1	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	6.2	0.0	0.0	6.3
TS#1	Demolition and Removal of Asbestos/ Lead / Hazardous Waste	2017	20	Air Compressor (Ingersoll-Rand C-185)	1	8	Air Compressors	120	48	0.48	0.3	1.8	1.5	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	2.1
TS#1	Earthwork & Grading	2017	25	Doser CAT D-9	1	8	Rubber Tired Dozers	250	464	0.4	2.3	25.1	8.7	1.2	1.1	0.0	0.7	0.0	0.0	0.8	0.0	0.3	0.1	0.0	0.0	18.6	0.0	0.0	18.9
TS#1	Earthwork & Grading	2017	7	Scarper CAT 637	2	8	Scrapers	500	450	0.48	3.2	40.7	25.4	1.6	1.5	0.0	1.7	0.0	0.0	1.7	0.0	0.1	0.1	0.0	0.0	12.1	0.0	0.0	12.2
TS#1	Earthwork & Grading	2017	25	Blade CAT 140	1	6	Tractors/Loaders/Backhoes	120	190	0.37	0.5	4.5	3.5	0.3	0.3	0.0	0.2	0.0	0.0	0.2	0.0	0.1	0.0	0.0	0.0	5.3	0.0	0.0	5.4
TS#1	Earthwork & Grading	2017	7	Compactor CAT CB54	1	8	Plate Compactors	15	137	0.43	0.7	4.3	3.6	0.2	0.2	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	1.9
TS#1	Earthwork & Grading	2017	25	Loader CAT 950	1	8	Rubber Tired Loaders	250	270	0.36	0.6	8.2	2.4	0.3	0.3	0.0	0.4	0.0	0.0	0.4	0.0	0.1	0.0	0.0	0.0	9.6	0.0	0.0	9.8
TS#1	Earthwork & Grading	2017	25	Air Compressor (Ingersoll-Rand C-185)	1	8	Air Compressors	120	48	0.48	0.3	1.8	1.5	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	2.6
TS#1	Paving	2017	10	Spreader Finisher AC	1	8	paving equipment	120	131	0.36	0.5	4.3	3.1	0.3	0.3	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	1.9
TS#1	Paving	2017	10	Vibratory Steel Roller	1	8	Rollers	120	81	0.38	0.3	2.9	2.0	0.2	0.2	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	1.3
TS#1	Paving	2017	10	Finish Roller	1	8	Rollers	120	81	0.38	0.3	2.9	2.0	0.2	0.2	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	1.3
TS#1	Paving	2017	8	Air Compressor	1	8	Air Compressors	120	48	0.48	0.3	1.8	1.5	0.1	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.8
TS#1	Utilities, Lighting, Misc.	2017	20	Excavator	1	8	Excavators	175	163	0.38	0.4	4.0	3.4	0.2	0.2	0.0	0.2	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	4.9	0.0	0.0	5.0
TS#1	Utilities, Lighting, Misc.	2017	20	Loader	1	8	Tractors/Loaders/Backhoes	120	190	0.37	0.6	6.0	4.7	0.4	0.4	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	5.7	0.0	0.0	5.7
TS#1	Utilities, Lighting, Misc.	2017	10	Manlift	1	8	aerial lifts	120	63	0.31	0.0	0.8	1.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.8
TS#1	Utilities, Lighting, Misc.	2017	5	Saw Cut Equipment	1	8	Concrete/Industrial Saws	120	81	0.73	0.6	4.3	3.7	0.3	0.3	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	1.4
TS#1	Utilities, Lighting, Misc.	2017	15	Compactor	1	8	Plate Compactors	15	137	0.43	0.7	4.3	3.6	0.2	0.2	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	4.1
TS#2	Demolition of Roofing and Steel Frame	2018	20	Excavator-Shear	3	8	Excavators	175	163	0.38	0.9	9.6	10.1	0.5	0.4	0.0	0.7	0.0	0.0	0.7	0.0	0.1	0.1	0.0	0.0	14.6	0.0	0.0	14.8
TS#2	Demolition of Roofing and Steel Frame	2018	25	Excavator	1	8	Excavators	175	163	0.38	0.3	3.2	3.4	0.2	0.1	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	6.1	0.0	0.0	6.2
TS#2	Demolition of Roofing and Steel Frame	2018	25	Loader CAT 977	2	8	Tractors/Loaders/Backhoes	120	190	0.37	1.0	10.3	9.2	0.7	0.7	0.0	0.6	0.0	0.0	0.6	0.0	0.1	0.1	0.0	0.0	13.9	0.0	0.0	14.1
TS#2	Demolition of Roofing and Steel Frame	2018	30	Skid Steer Loader CAT 246	3	8	Skid Steer Loaders	120	80	0.37	0.3	4.5	5.1	0.2	0.2	0.0	0.3	0.0	0.0	0.4	0.0	0.1	0.1	0.0	0.0	10.4	0.0	0.0	10.6
TS#2	Demolition of Roofing and Steel Frame	2018	30	Forklift	3	8	Forklifts	120	89	0.2	0.5	4.7	3.6	0.4	0.3	0.0	0.2	0.0	0.0	0.2	0.0	0.1	0.1	0.0	0.0	6.3	0.0	0.0	6.4
TS#2	Demolition of Roofing and Steel Frame	2018	30	Manlift	5	8	aerial lifts	120	63	0.31	0.2	3.6	5.5	0.1	0.1	0.0	0.4	0.0	0.0	0.4	0.0	0.1	0.1	0.0	0.0	11.5	0.0	0.0	11.7
TS#2	Demolition of Concrete Walls	2018	40	Backhoe	1	8	Tractors/Loaders/Backhoes	120	190	0.37	0.5	5.2	4.6	0.4	0.3	0.0	0.3	0.0	0.0	0.3	0.0	0.1	0.1	0.0	0.0	11.1	0.0	0.0	11.3
TS#2	Demolition of Concrete Walls	2018	40	Excavator-Breaker (pneumatic)	2	8	Excavators	175	163	0.38	0.6	6.4	6.8	0.3	0.3	0.0	0.5	0.0	0.0	0.5	0.0								

Onroad Emissions Calculations

Building	Phase	Year	Concat	Vehicle	Days	Employ Trip/Day	Truck Trip/Day	Truck Trip/Yr	Hrs Day	Daily VMT	Annual VMT	Vehicle	Pounds per day								Tons per year								Metric tons per year					
													ROG	NOX	CO	PM10	PM2.5	PM10 D	PM2.5 D	SO2	ROG	NOX	CO	PM10	PM2.5	PM10 D	PM2.5 D	SO2	CO2	CH4	N2O	CO2e		
TS#1	Demolition of Roofing and Steel Frame	2017	LDA/LDT2017	Employee	25	45				428	10,688	LDA/LDT	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1	0.0	0.0	1
TS#1	Demolition of Concrete Walls	2017	LDA/LDT2017	Employee	35	45				428	14,963	LDA/LDT	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2	0.0	0.0	2	
TS#1	Demolition of Asphalt, Foundation, and Pile Caps	2017	LDA/LDT2017	Employee	15	45				428	6,413	LDA/LDT	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1	0.0	0.0	1	
TS#1	Demolition and Removal of Asbestos/ Lead / Hazardous Waste	2017	LDA/LDT2017	Employee	20	15						LDA/LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0	
TS#1	Earthwork & Grading	2017	LDA/LDT2017	Employee	25	60				143	2,850	LDA/LDT	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2	0.0	0.0	2	
TS#1	Paving	2017	LDA/LDT2017	Employee	10	40				380	3,800	LDA/LDT	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0	
TS#1	Utilities, Lighting, Misc.	2017	LDA/LDT2017	Employee	20	50				475	9,500	LDA/LDT	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1	0.0	0.0	1	
TS#2	Demolition of Roofing and Steel Frame	2018	LDA/LDT2018	Employee	30	45				428	12,825	LDA/LDT	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1	0.0	0.0	1	
TS#2	Demolition of Concrete Walls	2018	LDA/LDT2018	Employee	40	45				428	17,100	LDA/LDT	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2	0.0	0.0	2	
TS#2	Demolition of Asphalt, Foundation, and Pile Caps	2018	LDA/LDT2018	Employee	15	45				428	6,413	LDA/LDT	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1	0.0	0.0	1	
TS#2	Demolition and Removal of Asbestos/ Lead / Hazardous Waste	2018	LDA/LDT2018	Employee	25	15				143	3,563	LDA/LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0	
TS#2	Earthwork & Grading	2018	LDA/LDT2018	Employee	25	53				503	12,574	LDA/LDT	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1	0.0	0.0	1	
TS#2	Paving	2018	LDA/LDT2018	Employee	12	35				335	4,024	LDA/LDT	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0	
TS#2	Utilities, Lighting, Misc.	2018	LDA/LDT2018	Employee	25	44				419	10,478	LDA/LDT	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1	0.0	0.0	1	
Rail Install	-	2019	LDA/LDT2019	Employee	10	18				168	1,676	LDA/LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0	
TS#1	Demolition of Roofing and Steel Frame	2017	T7Hwy2017	End Dump (16 Ton)	20		10	204		204	4,085	T7Hwy	0.1	2.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7	0.0	0.0	7	
TS#1	Demolition of Concrete Walls	2017	T7Hwy2017	End Dump (16 Ton)	25		7	170		136	3,404	T7Hwy	0.1	1.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6	0.0	0.0	6	
TS#1	Demolition of Asphalt, Foundation, and Pile Caps	2017	T7Hwy2017	Dump Truck (20 Ton)	15		14	204		272	4,085	T7Hwy	0.1	3.3	0.4	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7	0.0	0.0	7	
TS#1	Demolition and Removal of Asbestos/ Lead / Hazardous Waste	2017	T7Hwy2017	Dump Truck (16 Ton)	10		3	34		68	681	T7Hwy	0.0	0.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1	0.0	0.0	1	
TS#1	Earthwork & Grading to Landfill (not used)	2017	T7Hwy2017	Dump Truck (20 Ton)	20		53	1,050		1,050	21,000	T7Hwy	0.4	12.6	1.4	0.1	0.1	0.2	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	34	0.0	0.0	35		
TS#1	Paving	2017	T7Hwy2017	Dump Truck (20 Ton)	10		10	100		200	2,000	T7Hwy	0.1	2.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3	0.0	0.0	3	
TS#2	Demolition of Roofing and Steel Frame	2018	T7Hwy2018	End Dump (16 Ton)	25		5	135		108	2,709	T7Hwy	0.0	1.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5	0.0	0.0	5	
TS#2	Demolition of Concrete Walls	2018	T7Hwy2018	End Dump (16 Ton)	32		4	116		72	2,312	T7Hwy	0.0	0.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4	0.0	0.0	4	
TS#2	Demolition of Asphalt, Foundation, and Pile Caps	2018	T7Hwy2018	Dump Truck (16 Ton)	16		2	29		36	578	T7Hwy	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1	0.0	0.0	1	
TS#2	Demolition of Asphalt, Foundation, and Pile Caps	2018	T7Hwy2018	Dump Truck (20 Ton)	15		18	271		361	5,418	T7Hwy	0.1	4.3	0.5	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9	0.0	0.0	9		
TS#2	Earthwork & Grading to Landfill (not used)	2018	T7Hwy2018	Dump Truck (20Ton)	25		65	1,631		1,305	32,625	T7Hwy	0.5	15.6	1.8	0.1	0.1	0.3	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	55	0.0	0.0	55		
TS#2	Paving	2018	T7Hwy2018	Dump Truck (20 Ton)	12		10	120		200	2,400	T7Hwy	0.1	2.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4	0.0	0.0	4		
TS#1	Earthwork & Grading	2017	T7Hwy2017	Dump Truck (20 Ton)	20		53	1050		1050	21000	T7Hwy	0.4	12.6	1.4	0.1	0.1	0.2	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	34	0.0	0.0	35		
TS#2	Earthwork & Grading	2017	T7Hwy2017	Dump Truck (20 Ton)	25		65	1631		1305	32625	T7Hwy	0.5	15.7	1.8	0.1	0.1	0.3	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	53	0.0	0.0	54		
TS#1	Demolition of Roofing and Steel Frame	2017	T7onsite2017	End Dump (16 Ton)	20	-	-	8	40	800	T7onsite	0.1	1.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3	0.0	0.0	3		
TS#1	Demolition of Concrete Walls	2017	T7onsite2017	End Dump (16 Ton)	25	-	-	8	40	1,000	T7onsite	0.1	1.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3	0.0	0.0	3		
TS#1	Demolition of Asphalt, Foundation, and Pile Caps	2017	T7onsite2017	Dump Truck (20 Ton)	15	-	-	8	40	600	T7onsite	0.1	1.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2	0.0	0.0	2		
TS#1	Demolition and Removal of Asbestos/ Lead / Hazardous Waste	2017	T7onsite2017	Dump Truck (16 Ton)	10	-	-	8	40	400	T7onsite	0.1	1.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1	0.0	0.0	1		
TS#1	Earthwork & Grading	2017	T7onsite2017	Dump Truck (20 Ton)	20	-	-	8	40	800	T7onsite	0.1	1.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3	0.0	0.0	3		
TS#1	Paving	2017	T7onsite2017	Dump Truck (20 Ton)	10	-	-	8	40	400	T7onsite	0.1	1.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1	0.0	0.0	1		
TS#2	Demolition of Roofing and Steel Frame	2018	T7onsite2018	End Dump (16 Ton)	25	-	-	8	40	1,000	T7onsite	0.1	1.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3	0.0	0.0	3		
TS#2	Demolition of Concrete Walls	2018	T7onsite2018	End Dump (16 Ton)	32	-	-	8	40	1,280	T7onsite	0.1	1.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4	0.0	0.0	4		
TS#2	Demolition of Asphalt, Foundation, and Pile Caps	2018	T7onsite2018	Dump Truck (16 Ton)	16	-	-	8	40	640	T7onsite	0.1	1.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2	0.0	0.0	2		
TS#2	Demolition of Asphalt, Foundation, and Pile Caps	2018	T7onsite2018	Dump Truck (20 Ton)	15	-	-	8	40	600	T7onsite	0.1	1.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2	0.0	0.0	2		
TS#2	Earthwork & Grading	2018	T7onsite2018	Dump Truck (20Ton)	25	-	-	8	40	1,000	T7onsite	0.1	1.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0												

Re-entrained Paved Road Dust Emission Factor Calculation

Methodology

Calculation Methodology: USEPA AP-42, Paved Roads, Section 13.2.1, Revised January 2011:
<http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s0201.pdf>

Precip days:

<http://www.wrcc.dri.edu/cgi-bin/cliGCSTP.pl?ca7740>

Avg Vehicle Weight from ARB's method update (2014):

http://www.arb.ca.gov/ei/areasrc/fullpdf/full7-9_2014.pdf

Emission Factor Calculation

$$E_{ext} = [k (sL)^{0.91} \times (W)^{1.02}] (1 - P/4N)$$

Pollutant	Variables					Factor (g per mi)
	k	sL	W	P	N	
PM ₁₀	1.00	0.1	2.4	43.0	365	0.29163
PM _{2.5}	0.25	0.1	2.4	43.0	365	0.07291

E = particulate emission factor (grams of particulate matter/VMT)

k = particle size multiplier (lb/VMT)

sL = roadway silt loading (g/m²)

W = average weight of vehicles on the road (tons)

P = number of wet days with at least 0.254mm of precipitation

N = number of days in the averaging period

default from AP-42

Calemod default

ARB 2014

WRCC for SAN airport

annual days (365)

PM Emissions (daily)

Phase	Year	Pounds per Day		Daily VMT
		PM10	PM2.5	
TS#1Demolition of Roofing and Steel Frame	2017	0.46	0.11	712
TS#1Demolition of Concrete Walls	2017	0.41	0.10	644
TS#1Demolition of Asphalt, Foundation, and Pile Caps	2017	0.50	0.13	780
TS#1Demolition and Removal of Asbestos/ Lead / Hazardous Waste	2017	0.16	0.04	251
TS#1Earthwork & Grading	2017	1.09	0.27	1,700
TS#1Paving	2017	0.46	0.12	720
TS#1Utilities, Lighting, Misc.	2017	0.32	0.08	505
TS#2Demolition of Roofing and Steel Frame	2018	0.40	0.10	616
TS#2Demolition of Concrete Walls	2018	0.37	0.09	580
TS#2Demolition of Asphalt, Foundation, and Pile Caps	2018	0.61	0.15	945
TS#2Demolition and Removal of Asbestos/ Lead / Hazardous Waste	2018	0.09	0.02	143
TS#2Earthwork & Grading	2018	1.21	0.30	1,888
TS#2Paving	2018	0.43	0.11	675
TS#2Utilities, Lighting, Misc.	2018	0.29	0.07	449
Rail Install	2019	0.13	0.03	208

PM Emissions (annual)

Phase	Year	Tons per Year		Annual VMT
		PM10	PM2.5	
TS#1Demolition of Roofing and Steel Frame	2017	0.01	0.00	16,572
TS#1Demolition of Concrete Walls	2017	0.01	0.00	20,767
TS#1Demolition of Asphalt, Foundation, and Pile Caps	2017	0.00	0.00	11,697
TS#1Demolition and Removal of Asbestos/ Lead / Hazardous Waste	2017	0.00	0.00	3,931
TS#1Earthwork & Grading	2017	0.01	0.00	37,050
TS#1Paving	2017	0.00	0.00	7,120
TS#1Utilities, Lighting, Misc.	2017	0.00	0.00	9,800
TS#2Demolition of Roofing and Steel Frame	2018	0.01	0.00	17,734
TS#2Demolition of Concrete Walls	2018	0.01	0.00	22,292
TS#2Demolition of Asphalt, Foundation, and Pile Caps	2018	0.00	0.00	14,248
TS#2Demolition and Removal of Asbestos/ Lead / Hazardous Waste	2018	0.00	0.00	3,563
TS#2Earthwork & Grading	2018	0.02	0.00	47,199
TS#2Paving	2018	0.00	0.00	8,024
TS#2Utilities, Lighting, Misc.	2018	0.00	0.00	10,928
Rail Install	2019	1.34	0.33	2,076

Fugitive Dust from Earhtwork/grading/demo

	days	Grading acres	Exca tons	Demo tons	Paving acres	Emission factors			PM10	PM2.5		PM10	PM2.5	
TS#1Demolition of Roofing and Steel Frame	25			1702		0.02143896	0.0032499	lbs/ton						
TS#1Demolition of Concrete Walls	35			1702		0.02143896	0.0032499	lbs/ton						
TS#1Demolition of Asphalt, Foundation, and Pile Caps	15			1702		0.02143896	0.0032499	lbs/ton						
TS#1Demolition and Removal of Asbestos/ Lead / Hazardous Waste	20			1702		0.02143896	0.0032499	lbs/ton						
TS#1Earthwork & Grading	25	5.7392	35143.82			1.0605000	0.1145000	lbs/acre	3.89593E-05	5.89954E-06	lbs/ton			
TS#1Paving	10				5.7392			lbs/acre						
TS#1Utilities, Lighting, Misc.	20													
TS#2Demolition of Roofing and Steel Frame	30			2311.5		0.02143896	0.0032499	lbs/ton						
TS#2Demolition of Concrete Walls	40			2311.5		0.02143896	0.0032499	lbs/ton						
TS#2Demolition of Asphalt, Foundation, and Pile Caps	15			2311.5		0.02143896	0.0032499	lbs/ton						
TS#2Demolition and Removal of Asbestos/ Lead / Hazardous Waste	25			2311.5		0.02143896	0.0032499	lbs/ton						
TS#2Earthwork & Grading	25	7.346176	45004.317			1.0605000	0.1145000	lbs/acre	3.89593E-05	5.89954E-06	lbs/ton			
TS#2Paving	12				7.346176			lbs/acre						
TS#2Utilities, Lighting, Misc.	25													

demo tons split evenly

demo rate including both demo and loadig

Volumes for dust and truck haul

	earthwork	export	grading	paving		demo								
	CY	CY	ft2	ft2	acres	L	W	ft2						
Transit Shed #1	27,800	16,400	250,000	250,000	5.7	740	200	148,000	(inlcudes 7,000 sf headhouse)	TS1	excavation	18500	16400	
Transit Shed #2	35,600	21,500	320,000	320,000	7.3	970	200	194,000		TS2		24200	21500	
Head House								7,000		stormwater		9200	9200	
Warehouse C												51900	47100	
Trucks	ts1 earth	ts2 earth	ts1 demo	ts2 demo		to CV								
vol to export	21000	26100	6808	9246		47100			truck capacity					
truck size	16	16	20	20		16			16 CY, or					
truck loads	1313	1631	340	462		2944			20 tons					
	CY	CY	tons	tons		CY								
days	25	25	10	16		50								
trucks/day	53	65	34	29	(use this)	59								
given by applciant	20	20	10	16		20								
	trips/day from applicant	trips/day here												
TS#1Demolition of Roofing and Steel Frame	3	10												
TS#1Demolition of Concrete Walls	2	7												
TS#1Demolition of Asphalt, Foundation, and Pile Caps	4	14												
TS#1Demolition and Removal of Asbestos/ Lead / Hazardous Waste	1	3	10	34										
TS#1Earthwork & Grading	20	53							overall		for soils			
TS#1Paving		12							was	53	68	41	54	
TS#1Utilities, Lighting, Misc.		0	20	65					now	65	79	53	65	
TS#2Demolition of Roofing and Steel Frame	3	5												
TS#2Demolition of Concrete Walls	2	4												
TS#2Demolition of Asphalt, Foundation, and Pile Caps	1	2												
TS#2Demolition and Removal of Asbestos/ Lead / Hazardous Waste	10	18	16	29										
TS#2Earthwork & Grading	20	65												
TS#2Paving		12												
TS#2Utilities, Lighting, Misc.		0												
Rail Install		2	20	79										

in calcs, revised demo and earthwork daily truck loads based on info in green. Trips were higher when calculated.

PAVING	Pounds per day	Tons per year	<i>metrics</i>			
	ROG	ROG				
TS#1Demolition of Roofing and Steel Frame						
TS#1Demolition of Concrete Walls						
TS#1Demolition of Asphalt, Foundation, and Pile Caps						
#1Demolition and Removal of Asbestos/ Lead / Hazardous Waste						
TS#1Earthwork & Grading			days	acres	EF	
TS#1Paving	1.50	0.0075	10	5.7392	2.62	
TS#1Utilities, Lighting, Misc.						
TS#2Demolition of Roofing and Steel Frame						
TS#2Demolition of Concrete Walls						
TS#2Demolition of Asphalt, Foundation, and Pile Caps						
#2Demolition and Removal of Asbestos/ Lead / Hazardous Waste						
TS#2Earthwork & Grading						
TS#2Paving	1.60	0.0096	12	7.346176	2.62	
TS#2Utilities, Lighting, Misc.						
Rail Install						

General Assumptions

N2O_CO2 Diesel Equipment	0.000026	Climate Registry 2015
CH4_CO2 Diesel Equipment	0.000057	Climate Registry 2015
N2O_NOX Gasoline	0.041600	ARB EMFAC FAQs
lbs/gram	0.002204623	
kg/mt	1000	
mt/gram	0.000001	
mt/lbs	0.000453592	
ton/lbs	0.0005	
ton/gram	1.10E-06	
ton per cy conversion	1.2641662	CalEEMod
ton per SF conversion	0.046	CalEEMod
acre per SF conversion	2.30E-05	
CH4 GWP	25	AR4
N2O GWP	298	AR4
Employee Trip Milage	9.5	CalEEMod (H-W, SD)
Haul Truck Mileage (landfill)	20	Default
Haul Truck Mileage (middle CV Bayfront) - not used	15	7.5 mi one-way per google
Haul Truck Mileage (southern end of CV Bayfront)	20	10 mi one-way to per google
Water Truck	5	mph on-site travel
Employee per Piece of Equipment	1.25	Caleemod default
Rail Delivery Mileage	20	(same as haul)
Paving ROG EF	2.62	lbs/acre CalEEMod (no mitigation)
Grading PM10 EF	1.0605	lbs/acre CalEEMod (no mitigation)
Grading PM2.5 EF	0.1145	lbs/acre CalEEMod (no mitigation)
Bulldozing PM10 EF	0.752760759	lbs/hr CalEEMod (no mitigation)
Bulldozing PM2.5 EF	0.413778428	lbs/hr CalEEMod (no mitigation)
Truck loading PM10 EF	0.000039	lb/ton CalEEMod (no mitigation)
Truck loading PM2.5 EF	0.000006	lb/ton CalEEMod (no mitigation)
Demo PM10 EF	0.021400	lb/ton CalEEMod (no mitigation, includes loading)
Demo PM2.5 EF	0.003244	lb/ton CalEEMod (no mitigation, includes loading)
Max Daily Employees	50	apportion into phases by equipment
Trips per employee	3	TIA

Phase	Start Date	End Date	Working Days
TS#1Demolition of Roofing and Steel Frame	7/1/2017	8/3/2017	25
TS#1Demolition of Concrete Walls	8/4/2017	9/22/2017	35
TS#1Demolition of Asphalt, Foundation, and Pile Caps	9/23/2017	10/14/2017	15
TS#1Demolition and Removal of Asbestos/ Lead / Hazardous Waste	10/15/2017	11/11/2017	20
TS#1Earthwork & Grading	11/12/2017	12/15/2017	25
TS#1Paving	12/16/2017	12/30/2017	10
TS#1Utilities, Lighting, Misc.	12/30/2017	1/26/2018	20
TS#2Demolition of Roofing and Steel Frame	1/27/2018	3/7/2018	30
TS#2Demolition of Concrete Walls	3/8/2018	5/2/2018	40
TS#2Demolition of Asphalt, Foundation, and Pile Caps	5/3/2018	5/25/2018	15
TS#2Demolition and Removal of Asbestos/ Lead / Hazardous Waste	5/26/2018	6/28/2018	25
TS#2Earthwork & Grading	6/29/2018	8/1/2018	25
TS#2Paving	8/2/2018	8/19/2018	12
TS#2Utilities, Lighting, Misc.	8/20/2018	9/23/2018	25
Rail Install	1/1/2019	1/13/2019	10

EMFAC Emission Rates

Model	Year	Concat	ROG	NOX	CO	PM10	PM2.5	PM10D	PM2.5D	SO2	CO2(pav)	CH4	N2O
LDA/LDT	2017	LDA/LDT2017	0.01	0.04	0.33	0.00	0.00	0.02	0.01	0.00	113.55	1.33E-02	1.56E-03
LDA/LDT	2018	LDA/LDT2018	0.01	0.03	0.29	0.00	0.00	0.02	0.01	0.00	110.82	1.20E-02	1.41E-03
LDA/LDT	2019	LDA/LDT2019	0.01	0.03	0.27	0.00	0.00	0.02	0.01	0.00	107.72	1.09E-02	1.28E-03
LDA/LDT	2020	LDA/LDT2020	0.01	0.03	0.25	0.00	0.00	0.02	0.01	0.00	104.46	9.85E-03	1.17E-03
T7Hwy	2017	T7Hwy2017	0.18	5.45	0.61	0.03	0.02	0.09	0.03	0.02	1630.53	8.59E-03	4.18E-02
T7Hwy	2018	T7Hwy2018	0.18	5.42	0.64	0.02	0.02	0.10	0.04	0.02	1683.48	8.35E-03	4.31E-02
T7Hwy	2019	T7Hwy2019	0.19	5.55	0.68	0.03	0.02	0.10	0.04	0.02	1763.55	8.22E-03	4.52E-02
T7Hwy	2020	T7Hwy2020	0.19	5.61	0.72	0.03	0.02	0.11	0.04	0.02	1833.58	8.03E-03	4.70E-02
T7Onsite	2017	T7Onsite2017	1.37	18.24	4.63	0.05	0.05	0.09	0.03	0.03	3304.10	6.36E-02	8.46E-02
T7Onsite	2018	T7Onsite2018	1.33	18.78	4.69	0.05	0.05	0.10	0.04	0.03	3274.86	6.18E-02	8.39E-02
T7Onsite	2019	T7Onsite2019	1.31	19.40	4.78	0.05	0.05	0.10	0.04	0.03	3260.70	6.08E-02	8.35E-02
T7Onsite	2020	T7Onsite2020	1.28	20.00	4.81	0.05	0.04	0.11	0.04	0.03	3235.61	5.94E-02	8.29E-02

Equipment HP, Bin, and Load

Equipment	Caleemod	HP	HP Bin	Load	source
Excavator-Shear	Excavators	163	175	0.38	Caleemod default
Excavator	Excavators	163	175	0.38	Caleemod default
Loader CAT 977	Tractors/Loaders/Backhoes	190	250	0.37	Manufacturer specs
Skid Steer Loader CAT 246	Skid Steer Loaders	80	120	0.37	Manufacturer specs
Forklift	Forklifts	89	120	0.2	Caleemod default
Manlift	aerial lifts	63	120	0.31	Caleemod default
Backhoe	Tractors/Loaders/Backhoes	98	120	0.37	Caleemod default
Excavator-Breaker (pneumatic)	Excavators	163	175	0.38	Caleemod default
Excavator - pulverizer	Excavators	163	175	0.38	Caleemod default
Crusher	Crushing/Proc. Equipment	85	120	0.78	Caleemod default
Dozer CAT D-9	Rubber Tired Dozers	464	500	0.40	Manufacturer specs
Blade CAT 140	Tractors/Loaders/Backhoes	185	250	0.37	Manufacturer specs
Loader CAT 980	Rubber Tired Loaders	270	500	0.36	Manufacturer specs
Saw Cut Equipment	Concrete/Industrial Saws	81	120	0.73	Caleemod default
Air Compressor (Ingersoll-Rand C-185)	Air Compressors	48	50	0.48	Manufacturer specs
Excavator-Breaker (CAT 330)	Excavators	270	250	0.38	Manufacturer specs
Scissor Lifts	aerial lifts	63	120	0.31	Caleemod default
Scarper CAT 637	Scrapers	450	500	0.48	Manufacturer specs
Compactor CAT CB54	Plate Compactors	137	175	0.43	Manufacturer specs
Loader CAT 950	Rubber Tired Loaders	130	175	0.36	Manufacturer specs
Spreader Finisher AC	paving equipment	131	120	0.36	Caleemod default
Vibratory Steel Roller	Rollers	81	120	0.38	Caleemod default
Finish Roller	Rollers	81	120	0.38	Caleemod default
Air Compressor	Air Compressors	78	120	0.48	Caleemod default
Loader	Tractors/Loaders/Backhoes	98	120	0.37	Caleemod default
Compactor	Plate Compactors	8	15	0.43	Caleemod default
Man Lift	aerial lifts	63	120	0.31	Caleemod default

Health Risk Assessment Sheets

- **Risk Calculation Sheets**
- **AERMOD outputs (upon request)**

Emission Rate Calculations

	DPM									
	Baseline		Demo/Rail				Full TAMT Plan			
	tons/year	grams/second	Baseline Shore Power tons/year	grams/second	New Dole Shore Power tons/year	grams/second	Baseline Shore Power tons/year	grams/second	New Dole Shore Power plus MMs tons/year	grams/second
Dry Bulk										
Vessel Transit (in harbor)	0.04	1.10E-03	0.05	1.32E-03	0.05	1.32E-03	0.40	1.14E-02	0.40	1.14E-02
Vessel Hoteling	0.12	3.53E-03	0.15	4.34E-03	0.15	4.34E-03	1.29	3.72E-02	1.29	3.72E-02
Assist Tug Transit	0.004	1.07E-04	0.004	1.08E-04	0.004	1.08E-04	0.036	1.04E-03	0.036	1.04E-03
Tug/Barge Transit	0.002	6.16E-05	0.002	6.20E-05	0.002	6.20E-05	0.021	5.98E-04	0.021	5.98E-04
Tug/Barge Hoteling	0.001	2.73E-05	0.001	2.75E-05	0.001	2.75E-05	0.009	2.66E-04	0.009	2.66E-04
Terminal Equipment	0.05	4.33E-09	0.05	4.32E-09	0.05	4.32E-09	0.50	3.99E-08	0.50	3.99E-08
Locomotives	0.01	2.75E-04	0.01	2.75E-04	0.01	2.75E-04	0.09	2.50E-03	0.09	2.50E-03
Truck Travel	-		-	-	-	-	-	-		
Refrigerated Containers										
Vessel Transit (in harbor)	0.19	5.56E-03	0.27	7.76E-03	0.27	7.76E-03	0.65	1.86E-02	0.65	1.86E-02
Vessel Hoteling	1.97	5.65E-02	4.38	1.26E-01	0.65	1.88E-02	10.52	3.02E-01	1.57	4.50E-02
Assist Tug Transit	0.014	4.07E-04	0.012	3.59E-04	0.012	3.59E-04	0.030	8.56E-04	0.030	8.56E-04
Tug/Barge Transit	0.008	2.34E-04	0.007	2.07E-04	0.007	2.07E-04	0.017	4.91E-04	0.017	4.91E-04
Tug/Barge Hoteling	0.004	1.04E-04	0.003	9.18E-05	0.003	9.18E-05	0.008	2.18E-04	0.008	2.18E-04
Terminal Equipment	0.12	9.53E-09	0.13	1.02E-08	0.13	1.02E-08	0.43	3.45E-08	0.43	3.45E-08
Locomotives	-		-	-	-	-	-	-		
Truck Travel				0.00E+00	0.00	0.00E+00		-		
Multi-Purpose General Cargo										
Vessel Transit (in harbor)	0.03	9.14E-04	0.04	1.21E-03	0.04	1.21E-03	0.35	1.01E-02	0.35	1.01E-02
Vessel Hoteling	0.11	3.10E-03	0.14	4.09E-03	0.14	4.09E-03	1.20	3.45E-02	1.20	3.45E-02
Assist Tug Transit	0.007	2.00E-04	0.009	2.72E-04	0.009	2.72E-04	0.078	2.23E-03	0.078	2.23E-03
Tug/Barge Transit	0.004	1.15E-04	0.005	1.57E-04	0.005	1.57E-04	0.045	1.28E-03	0.045	1.28E-03
Tug/Barge Hoteling	0.002	5.10E-05	0.002	6.96E-05	0.002	6.96E-05	0.020	5.69E-04	0.020	5.69E-04
Terminal Equipment	0.02	1.27E-09	0.02	1.85E-09	0.02	1.85E-09	0.18	1.47E-08	0.18	1.47E-08
Locomotives	0.01	3.74E-04	0.02	5.07E-04	0.02	5.07E-04	0.13	3.79E-03	0.13	3.79E-03
Truck Travel					0.00			-		
ALL										
Vessel Transit (in harbor)	0.26	0.01	0.36	0.01	0.36	0.01	1.40	0.04	1.40	0.04
Vessel Hoteling	2.20	0.06	4.68	0.13	0.95	0.03	13.01	0.37	4.06	0.12
Assist Tug Transit	0.02	0.00	0.03	0.00	0.03	0.00	0.14	0.00	0.14	0.00
Tug/Barge Transit	0.01	0.00	0.01	0.00	0.01	0.00	0.08	0.00	0.08	0.00
Tug/Barge Hoteling	0.01	0.00	0.01	0.00	0.01	0.00	0.04	0.00	0.04	0.00
Terminal Equipment	0.19	0.00	0.21	0.00	0.21	0.00	1.12	0.00	1.12	0.00
Locomotives	0.02	0.00	0.03	0.00	0.03	0.00	0.22	0.01	0.22	0.01
Truck Travel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Existing				Demo/Rail Unmit				Demo/Rail Mit	
	Refrigerated Containers	Multi-Purpose General Cargo	Dry Bulk	All	Refrigerated Containers	Multi-Purpose General Cargo	Dry Bulk	All	Refrigerated Containers	Multi-Purpose General Cargo
	g	Existing	Existing	Existing	emo/Rail Unmit	CargoDemo/Rail Unmit	ail Unmit	AllDemo/Rail Unmit	I Mit	CargoDemo/Rail Mit
Vessel Transit (in harbor)	5.56E-03	9.14E-04	1.10E-03	7.58E-03	7.76E-03	1.21E-03	1.32E-03	1.03E-02	7.76E-03	1.21E-03
Vessel Hoteling	5.65E-02	3.10E-03	3.53E-03	6.32E-02	1.26E-01	4.09E-03	4.34E-03	1.34E-01	1.88E-02	4.09E-03
Assist Tug Transit	4.07E-04	2.00E-04	1.07E-04	7.13E-04	3.59E-04	2.72E-04	1.08E-04	7.39E-04	3.59E-04	2.72E-04
Tug/Barge Transit	2.34E-04	1.15E-04	6.16E-05	4.10E-04	2.07E-04	1.57E-04	6.20E-05	4.26E-04	2.07E-04	1.57E-04
Tug/Barge Hoteling	1.04E-04	5.10E-05	2.73E-05	1.82E-04	9.18E-05	6.96E-05	2.75E-05	1.89E-04	9.18E-05	6.96E-05
Terminal Equipment	9.53E-09	1.27E-09	4.33E-09	1.51E-08	1.02E-08	1.85E-09	4.32E-09	1.64E-08	1.02E-08	1.85E-09
Locomotives	0.00E+00	3.74E-04	2.75E-04	6.48E-04	-	5.07E-04	2.75E-04	7.82E-04	-	5.07E-04
Truck Travel										

CHE size 361022.60 m2

for %

	Existing				Demo/Rail Unmit				Demo/Rail Mit	
	Refrigerated Containers	Multi-Purpose General Cargo	Dry Bulk	All	Refrigerated Containers	Multi-Purpose General Cargo	Dry Bulk	All	Refrigerated Containers	Multi-Purpose General Cargo
	g	Existing	Existing	Existing	emo/Rail Unmit	CargoDemo/Rail Unmit	ail Unmit	AllDemo/Rail Unmit	I Mit	CargoDemo/Rail Mit
Vessel Transit (in harbor)	73%	12%	15%	100%	75%	12%	13%	100%	75%	12%
Vessel Hoteling	89%	5%	6%	100%	94%	3%	3%	100%	69%	15%
Assist Tug Transit	57%	28%	15%	100%	49%	37%	15%	100%	49%	37%
Tug/Barge Transit	57%	28%	15%	100%	49%	37%	15%	100%	49%	37%
Tug/Barge Hoteling	57%	28%	15%	100%	49%	37%	15%	100%	49%	37%
Terminal Equipment	63%	8%	29%	100%	62%	11%	26%	100%	62%	11%
Locomotives	0%	58%	42%	100%	0%	65%	35%	100%	0%	65%
Truck Travel	67%	3%	30%	100%	67%	4%	29%	100%	67%	4%

% of emissions for "all" sources	Vessel Transit (in harbor)			Terminal Equipment		
	existing	demo/rail unmit	demo/rail mit	full tamt plan	existing	demo/rail
Dry Bulk	15%	#VALUE!		25%		
Refrigerated Containers	73%			21%		
Multi-Purpose General Cargo	12%			54%		
Total	100%	100%		100%		

Emission Rate Calculations							
	Long Term Strategies						
	All Vessel At-Berth Reg		SP at 10-5/10-6		All Vessel At-Berth Reg+CHE		
	tons/year	grams/second	tons/year	grams/second	tons/year	grams/second	30yr / 2020
Dry Bulk							
Vessel Transit (in harbor)	0.40	1.14E-02	0.40	1.14E-02	0.40	3.16E-08	864%
Vessel Hoteling	0.48	1.39E-02	1.29	3.72E-02	0.48	3.84E-08	856%
Assist Tug Transit	0.04	1.04E-03	0.04	1.04E-03	0.04	2.88E-09	967%
Tug/Barge Transit	0.02	5.98E-04	0.02	5.98E-04	0.02	1.66E-09	
Tug/Barge Hoteling	0.01	2.66E-04	0.01	2.66E-04	0.01	7.36E-10	
Terminal Equipment	0.50	3.99E-08	0.50	3.99E-08	0.21	1.68E-08	925%
Locomotives	0.09	2.50E-03	0.09	2.50E-03	0.09	6.92E-09	909%
Truck Travel							
Refrigerated Containers							
Vessel Transit (in harbor)	0.65	1.86E-02	0.65	1.86E-02	0.65	5.16E-08	240%
Vessel Hoteling	0.94	2.71E-02	0.94	2.71E-02	0.94	7.51E-08	1613%
Assist Tug Transit	0.03	8.56E-04	0.03	8.56E-04	0.03	2.37E-09	238%
Tug/Barge Transit	0.02	4.91E-04	0.02	4.91E-04	0.02	1.36E-09	
Tug/Barge Hoteling	0.01	2.18E-04	0.01	2.18E-04	0.01	6.05E-10	
Terminal Equipment	0.43	3.45E-08	0.43	3.45E-08	0.18	1.45E-08	337%
Locomotives							
Truck Travel							
Multi-Purpose General Cargo							
Vessel Transit (in harbor)	0.35	1.01E-02	0.35	1.01E-02	0.35	2.81E-08	840%
Vessel Hoteling	0.46	1.31E-02	0.46	1.31E-02	0.46	3.63E-08	844%
Assist Tug Transit	0.08	2.23E-03	0.08	2.23E-03	0.08	6.18E-09	819%
Tug/Barge Transit	0.04	1.28E-03	0.04	1.28E-03	0.04	3.55E-09	
Tug/Barge Hoteling	0.02	5.69E-04	0.02	5.69E-04	0.02	1.58E-09	
Terminal Equipment	0.18	1.47E-08	0.18	1.47E-08	0.08	6.20E-09	797%
Locomotives	0.13	3.79E-03	0.13	3.79E-03	0.13	1.05E-08	747%
Truck Travel							
ALL					42%		
Vessel Transit (in harbor)	1.40	0.04	1.40	0.04			
Vessel Hoteling	1.88	0.05	2.69	0.08			
Assist Tug Transit	0.14	0.00	0.14	0.00			
Tug/Barge Transit	0.08	0.00	0.08	0.00			
Tug/Barge Hoteling	0.04	0.00	0.04	0.00			
Terminal Equipment	1.12	0.00	1.12	0.00			
Locomotives	0.22	0.01	0.22	0.01			
Truck Travel	0.00	0.00	0.00	0.00			

			full TAMT plan unmit				full TAMT plan
			Refrigerated Containersfull	Multi-Purpose General Cargofull	Dry Bulkfull TAMT	Allfull TAMT	Refrigerated Containersfu
	Dry BulkDemo/Rail Mit	AllDemo/Rail Mit	TAMT plan unmit	TAMT plan unmit	plan unmit	plan unmit	II TAMT plan mit
Vessel Transit (in harbor)	1.32E-03	1.03E-02	1.86E-02	1.01E-02	1.14E-02	4.02E-02	1.86E-02
Vessel Hoteling	4.34E-03	2.72E-02	3.02E-01	3.45E-02	3.72E-02	3.74E-01	4.50E-02
Assist Tug Transit	1.08E-04	7.39E-04	8.56E-04	2.23E-03	1.04E-03	4.13E-03	8.56E-04
Tug/Barge Transit	6.20E-05	4.26E-04	4.91E-04	1.28E-03	5.98E-04	2.37E-03	4.91E-04
Tug/Barge Hoteling	2.75E-05	1.89E-04	2.18E-04	5.69E-04	2.66E-04	1.05E-03	2.18E-04
Terminal Equipment	4.32E-09	1.64E-08	3.45E-08	1.47E-08	3.99E-08	8.91E-08	3.45E-08
Locomotives	2.75E-04	7.82E-04	-	3.79E-03	2.50E-03	6.29E-03	0.00E+00
Truck Travel							
CHE size							
tor %							

			full TAMT plan unmit				full TAMT plan
			Refrigerated Containersfull	Multi-Purpose General Cargofull	Dry Bulkfull TAMT	Allfull TAMT	Refrigerated Containersfu
	Dry BulkDemo/Rail Mit	AllDemo/Rail Mit	TAMT plan unmit	TAMT plan unmit	plan unmit	plan unmit	II TAMT plan mit
Vessel Transit (in harbor)	13%	100%	46%	25%	28%	100%	46%
Vessel Hoteling	16%	100%	81%	9%	10%	100%	39%
Assist Tug Transit	15%	100%	21%	54%	25%	100%	21%
Tug/Barge Transit	15%	100%	21%	54%	25%	100%	21%
Tug/Barge Hoteling	15%	100%	21%	54%	25%	100%	21%
Terminal Equipment	26%	100%	39%	17%	45%	100%	39%
Locomotives	35%	100%	0%	60%	40%	100%	0%
Truck Travel	29%	100%	61%	4%	35%	100%	61%

% of emissions for "all" sources

Dry Bulk
Refrigerated Containers
Multi-Purpose General Cargo
Total

Emission Rate Calculations

	TOG					
	LBS/DAY			LBS/HR		
	Baseline	Project 2020	Plan 2035	Baseline	Project 2020	Plan 2035
Dry Bulk						
Vessel Transit (in harbor)	-	-	-	-	-	-
Vessel Hoteling	0.34	0.43	1.67	0.01	0.02	0.07
Assist Tug Transit	-	-	-	-	-	-
Tug/Barge Transit	-	-	-	-	-	-
Tug/Barge Hoteling	-	-	-	-	-	-
Terminal Equipment	-	-	-	-	-	-
Locomotives	-	-	-	-	-	-
Truck Travel	-	-	-	-	-	-
Refrigerated Containers						
Vessel Transit (in harbor)	-	-	-	-	-	-
Vessel Hoteling	1.03	1.13	4.37	0.04	0.05	0.18
Assist Tug Transit	-	-	-	-	-	-
Tug/Barge Transit	-	-	-	-	-	-
Tug/Barge Hoteling	-	-	-	-	-	-
Terminal Equipment	-	-	-	-	-	-
Locomotives	-	-	-	-	-	-
Truck Travel	-	-	-	-	-	-
Multi-Purpose General Cargo						
Vessel Transit (in harbor)	-	-	-	-	-	-
Vessel Hoteling	0.02	0.03	0.27	0.00	0.00	0.01
Assist Tug Transit	-	-	-	-	-	-
Tug/Barge Transit	-	-	-	-	-	-
Tug/Barge Hoteling	-	-	-	-	-	-
Terminal Equipment	-	-	-	-	-	-
Locomotives	-	-	-	-	-	-
Truck Travel	-	-	-	-	-	-

ALL

Vessel Transit (in harbor)
Vessel Hoteling
Assist Tug Transit
Tug/Barge Transit
Tug/Barge Hoteling
Terminal Equipment
Locomotives
Truck Travel

	mit			All Vessel At-Berth Reg				SP at 10-5/10-6			
	Multi-Purpose General Cargo	Dry Bulk	Allfull	Refrigerated Containers	Multi-Purpose General Cargo	Dry Bulk	Allfull	Refrigerated Containers	Multi-Purpose General	Dry Bulk	Allfull
	TAMT plan mit	full plan mit	TAMT plan mit	l Vessel At-Berth Reg	At-Berth Reg	Vessel At-Berth Reg	At-Berth Reg	at 10-5/10-6	CargoSP at	at 10-5/10-6	At 10-5/10-6
Vessel Transit (in harbor)	1.01E-02	1.14E-02	4.02E-02	1.86E-02	1.01E-02	1.14E-02	4.02E-02	1.86E-02	1.01E-02	1.14E-02	4.02E-02
Vessel Hoteling	3.45E-02	3.72E-02	1.17E-01	2.71E-02	1.31E-02	1.39E-02	5.41E-02	2.71E-02	1.31E-02	3.72E-02	7.74E-02
Assist Tug Transit	2.23E-03	1.04E-03	4.13E-03	8.56E-04	2.23E-03	1.04E-03	4.13E-03	8.56E-04	2.23E-03	1.04E-03	4.13E-03
Tug/Barge Transit	1.28E-03	5.98E-04	2.37E-03	4.91E-04	1.28E-03	5.98E-04	2.37E-03	4.91E-04	1.28E-03	5.98E-04	2.37E-03
Tug/Barge Hoteling	5.69E-04	2.66E-04	1.05E-03	2.18E-04	5.69E-04	2.66E-04	1.05E-03	2.18E-04	5.69E-04	2.66E-04	1.05E-03
Terminal Equipment	1.47E-08	3.99E-08	8.91E-08	3.45E-08	1.47E-08	3.99E-08	8.91E-08	3.45E-08	1.47E-08	3.99E-08	8.91E-08
Locomotives	3.79E-03	2.50E-03	6.29E-03	0.00E+00	3.79E-03	2.50E-03	6.29E-03	0.00E+00	3.79E-03	2.50E-03	6.29E-03
Truck Travel											

CHE size

for %

	mit		
	Multi-Purpose General Cargo	Dry Bulk	Allfull
	TAMT plan mit	full plan mit	TAMT plan mit
Vessel Transit (in harbor)	25%	28%	100%
Vessel Hoteling	30%	32%	100%
Assist Tug Transit	54%	25%	100%
Tug/Barge Transit	54%	25%	100%
Tug/Barge Hoteling	54%	25%	100%
Terminal Equipment	17%	45%	100%
Locomotives	60%	40%	100%
Truck Travel	4%	35%	100%

% of emissions for "all" sources

Dry Bulk
Refrigerated Containers
Multi-Purpose General Cargo
Total

Emission Rate Calculations
Dry Bulk
Vessel Transit (in harbor)
Vessel Hoteling
Assist Tug Transit
Tug/Barge Transit
Tug/Barge Hoteling
Terminal Equipment
Locomotives
Truck Travel
Refrigerated Containers
Vessel Transit (in harbor)
Vessel Hoteling
Assist Tug Transit
Tug/Barge Transit
Tug/Barge Hoteling
Terminal Equipment
Locomotives
Truck Travel
Multi-Purpose General Cargo
Vessel Transit (in harbor)
Vessel Hoteling
Assist Tug Transit
Tug/Barge Transit
Tug/Barge Hoteling
Terminal Equipment
Locomotives
Truck Travel
ALL
Vessel Transit (in harbor)
Vessel Hoteling
Assist Tug Transit
Tug/Barge Transit
Tug/Barge Hoteling
Terminal Equipment
Locomotives
Truck Travel

All Vessel At-Berth Reg+CHE turnover				
	Refrigerated ContainersAll Vessel At-Berth Reg+CHE turnover	Multi-Purpose General CargoAll Vessel At-Berth Reg+CHE turnover	Dry BulkAll Vessel At-Berth Reg+CHE turnover	All Vessel At-Berth Reg+CHE turnover
Vessel Transit (in harbor)	5.16E-08	2.81E-08	3.16E-08	1.11E-07
Vessel Hoteling	7.51E-08	3.63E-08	3.84E-08	1.50E-07
Assist Tug Transit	2.37E-09	6.18E-09	2.88E-09	1.14E-08
Tug/Barge Transit	1.36E-09	3.55E-09	1.66E-09	6.57E-09
Tug/Barge Hoteling	6.05E-10	1.58E-09	7.36E-10	2.92E-09
Terminal Equipment	1.45E-08	6.20E-09	1.68E-08	3.75E-08
Locomotives	0.00E+00	1.05E-08	6.92E-09	1.74E-08
Truck Travel				

CHE size
tor %

Vessel Transit (in harbor)
Vessel Hoteling
Assist Tug Transit
Tug/Barge Transit
Tug/Barge Hoteling
Terminal Equipment
Locomotives
Truck Travel

% of emissions for "all" sources
Dry Bulk
Refrigerated Containers
Multi-Purpose General Cargo
Total

emission_rate_g_s

Truck Haul Emission Calculations (for AERMOD)

		Existing						Demo/Rail Unmit					
<u>g/s of mass DPM</u>		Dry Bulk	Refrigerated Containers	Multi-Purpose General Cargo				Dry Bulk	Refrigerated Containers	Multi-Purpose General Cargo			
on Harbor		5.36184E-05	0.000118726	5.74482E-06				5.36184E-05	0.000122996	7.45249E-06			
on Cesar Chavez		1.19827E-05	2.6533E-05	1.28386E-06				1.19827E-05	2.75328E-05	1.68376E-06			
on 28th		1.19827E-05	2.6533E-05	1.28386E-06				1.19827E-05	2.75328E-05	1.68376E-06			
<u>g/s by roadway</u>		on Harbor	on Cesar Chavez	on 28th	sum	%		on Harbor	on Cesar Chavez	on 28th	sum	%	
Dry Bulk		5.36184E-05	1.19827E-05	1.19827E-05	7.75837E-05	30%		5.36184E-05	1.19827E-05	1.19827E-05	7.75837E-05	29%	
Refrigerated Containers		0.000118726	2.6533E-05	2.6533E-05	0.000171792	67%		0.000122996	2.75328E-05	2.75328E-05	0.000178061	67%	
Multi-Purpose General Cargo		5.74482E-06	1.28386E-06	1.28386E-06	8.31254E-06	3%		7.45249E-06	1.68376E-06	1.68376E-06	1.082E-05	4%	
		0.000257689						0.000266465					
<u>g/s for AERMOD segments</u>		TR_28THExisting	TR_BAYMARExisting	TR_BOSTONExisting	TR_CROSBYExisting	TR_HARBORCExisting	TR_HARBORSExisting	TR_28THDemo/Rail Unmit	TR_BAYMARDemo/Rail Unmit	TR_BOSTONDemo/Rail Unmit	TR_CROSBYDemo/Rail Unmit	TR_HARBORC Demo/Rail Unmit	TR_HARBORS sumDemo/Rail Unmit
Dry Bulk		3.04708E-06	2.14473E-06	5.62701E-06	1.19827E-05	2.68092E-05	2.68092E-05	3.95283E-06	2.14473E-06	5.62701E-06	1.19827E-05	2.68092E-05	2.68092E-05 7.73256E-05
Refrigerated Containers		6.80963E-07	4.74905E-06	1.24598E-05	2.6533E-05	5.93632E-05	5.93632E-05	8.93075E-07	4.91982E-06	1.29293E-05	2.75328E-05	6.14978E-05	6.14978E-05 0.000169271
Multi-Purpose General Cargo		6.80963E-07	2.29793E-07	6.02893E-07	1.28386E-06	2.87241E-06	2.87241E-06	8.93075E-07	2.981E-07	7.90687E-07	1.68376E-06	3.72624E-06	3.72624E-06 1.11181E-05
ALL		4.40901E-06	7.12358E-06	1.86897E-05	3.97996E-05	8.90448E-05	8.90448E-05	5.73898E-06	7.36266E-06	1.9347E-05	4.11992E-05	9.20332E-05	9.20332E-05 0.000257714

emission_rate_g_s

Truck Haul Emission Calculator

		Demo/Rail Mit						Full TAMT Plan Unmit							
g/s of mass DPM		Refrigerated			Multi-Purpose			Refrigerated			Multi-Purpose				
		Dry Bulk	Containers	General Cargo	Dry Bulk	Containers	General Cargo	Dry Bulk	Containers	General Cargo	Dry Bulk	Containers	General Cargo		
on Harbor		5.36184E-05	0.000122996	7.45249E-06				7.9675E-05	0.000139112	1.01571E-05					
on Cesar Chavez		1.19827E-05	2.75328E-05	1.68376E-06				1.8103E-05	3.13199E-05	2.31963E-06					
on 28th		1.19827E-05	2.75328E-05	1.68376E-06				1.8103E-05	3.13199E-05	2.31963E-06					
g/s by roadway		on Harbor	on Cesar Chavez	on 28th	sum	%		on Harbor	on Cesar Chavez	on 28th	sum	%			
Dry Bulk		5.36184E-05	1.19827E-05	1.19827E-05	7.75837E-05	29%		7.9675E-05	1.8103E-05	1.8103E-05	0.000115881	35%			
Refrigerated Containers		0.000122996	2.75328E-05	2.75328E-05	0.000178061	67%		0.000139112	3.13199E-05	3.13199E-05	0.000201752	61%			
Multi-Purpose General Cargo		7.45249E-06	1.68376E-06	1.68376E-06	1.082E-05	4%		1.01571E-05	2.31963E-06	2.31963E-06	1.47963E-05	4%			
		0.000266465						0.000332429							
g/s for AERMOD segments		TR_28THDem o/Rail Mit	TR_BAYMARD emo/Rail Mit	TR_BOSTOND emo/Rail Mit	TR_CROSBYD emo/Rail Mit	HADemo/Rail Mit	AMDemo/Rail Mit	sumDemo/Rail I Mit	TR_28THFull Unmit	TR_BAYMARF ull TAMT Plan Unmit	TR_BOSTONF ull TAMT Plan Unmit	TR_CROSBYFu II TAMT Plan Unmit	TR_HARBORC HAFull TAMT Plan Unmit	TR_HARBORS AMFull TAMT Plan Unmit	sumFull TAMT Plan Unmit
Dry Bulk		3.95283E-06	2.14473E-06	5.62701E-06	1.19827E-05	2.68092E-05	2.68092E-05	7.73256E-05	5.38735E-06	3.187E-06	8.50109E-06	1.8103E-05	3.98375E-05	3.98375E-05	0.000114853
Refrigerated Containers		8.93075E-07	4.91982E-06	1.29293E-05	2.75328E-05	6.14978E-05	6.14978E-05	0.000169271	1.23034E-06	5.56448E-06	1.47077E-05	3.13199E-05	6.9556E-05	6.9556E-05	0.000191934
Multi-Purpose General Cargo		8.93075E-07	2.981E-07	7.90687E-07	1.68376E-06	3.72624E-06	3.72624E-06	1.11181E-05	1.23034E-06	4.06282E-07	1.08929E-06	2.31963E-06	5.07853E-06	5.07853E-06	1.52026E-05
ALL		5.73898E-06	7.36266E-06	1.9347E-05	4.11992E-05	9.20332E-05	9.20332E-05	0.000257714	7.84803E-06	9.15777E-06	2.4298E-05	5.17425E-05	0.000114472	0.000114472	0.00032199

emission_rate_g_s

Truck Haul Emission Calculator

		Full TAMT Plan Mit						
g/s of mass DPM		Refrigerated		Multi-Purpose				
		Dry Bulk	Containers	General Cargo				
on Harbor		7.9675E-05	0.000139112	1.01571E-05				
on Cesar Chavez		1.8103E-05	3.13199E-05	2.31963E-06				
on 28th		1.8103E-05	3.13199E-05	2.31963E-06				
g/s by roadway		on Harbor	on Cesar Chavez	on 28th	sum	%		
Dry Bulk		7.9675E-05	1.8103E-05	1.8103E-05	0.000115881	35%		
Refrigerated Containers		0.000139112	3.13199E-05	3.13199E-05	0.000201752	61%		
Multi-Purpose General Cargo		1.01571E-05	2.31963E-06	2.31963E-06	1.47963E-05	4%		
		0.000332429						
g/s for AERMOD segments		TR_28THFull	TR_BAYMARF	TR_BOSTONF	TR_CROSBYFu	TR_HARBORC	TR_HARBORS	
		TAMT Plan Mit	ull TAMT Plan Mit	ull TAMT Plan Mit	ll TAMT Plan Mit	HAFull TAMT Plan Mit	AMFull TAMT Plan Mit	sumFull TAMT Plan Mit
Dry Bulk		5.38735E-06	3.187E-06	8.50109E-06	1.8103E-05	3.98375E-05	3.98375E-05	0.000114853
Refrigerated Containers		1.23034E-06	5.56448E-06	1.47077E-05	3.13199E-05	6.9556E-05	6.9556E-05	0.000191934
Multi-Purpose General Cargo		1.23034E-06	4.06282E-07	1.08929E-06	2.31963E-06	5.07853E-06	5.07853E-06	1.52026E-05
ALL		7.84803E-06	9.15777E-06	2.4298E-05	5.17425E-05	0.000114472	0.000114472	0.00032199

SCAQMD Goods Movement Study

2023 NOX tons/day

Source	Baseline	Equal Share	100% Existing Standards	90% Cleaner	ATP1 - 25% Zero / 75% Near-Zero	ATP2 - 50% Zero / 50% Near-Zero	ATP3 - 75% Zero / 25% Near-Zero
Light HD Gas Trucks-1	10.93	3.83	4.22	4.22	3.17	2.11	1.06
Light HD Gas Trucks-2	1.00	0.35	0.48	0.48	0.36	0.24	0.12
Medium HD Gas Trucks	1.08	0.38	0.38	0.04	0.03	0.02	0.01
Heavy HD Gas Trucks	0.86	0.30	0.74	0.07	0.06	0.04	0.02
Light HD Diesel Trucks-1	9.74	3.41	2.12	2.12	1.59	1.06	0.53
Light HD Diesel Trucks-2	3.19	1.12	0.79	0.79	0.59	0.39	0.20
Medium HD Diesel Trucks	4.99	1.75	4.73	0.47	0.35	0.24	0.12
Heavy HD Diesel Trucks	31.39	10.99	28.80	2.88	2.16	1.44	0.72
Total	63.18	22.11	42.25	11.07	8.30	5.53	2.77

Source	Baseline	Equal Share	100% Existing Standards	90% Cleaner	ATP 1 - 25% Zero/ 75% Near-Zero	ATP 2 - 50% Zero/ 50% Near-Zero	ATP 3 - 75% Zero/ 25% Near-Zero
Ocean-Going Vessels	28.51	9.98	13.27	8.80	8.80	8.80	8.80
Freight Locomotives	17.77	6.22	5.48	0.55	0.41	0.28	0.14
Cargo Handling Equipment	2.23	0.78	1.20	0.12	0.09	0.06	0.03
Harbor Craft	5.89	2.06	1.62	1.39	1.39	1.39	1.39
Aircraft	2.03	0.71	0.51	0.51	0.51	0.51	0.51
Total	56.42	19.75	22.07	11.37	11.20	11.04	10.87

	Scenario -->	1	2	3	4	5	6
Heavy HD Diesel Trucks	-	35%	92%	9%	7%	5%	2%
Ocean-Going Vessels	-	35%	47%	31%	31%	31%	31%
Freight Locomotives	-	35%	31%	3%	2%	2%	1%
Cargo Handling Equipment	-	35%	54%	5%	4%	3%	1%

2032 NOX tons/day

Source	Baseline	Equal Share	100% Existing Standards	90% Cleaner	ATP1 - 25% Zero / 75% Near-Zero	ATP2 - 50% Zero / 50% Near-Zero	ATP3 - 75% Zero / 25% Near-Zero
Light HD Gas Trucks-1	7.82	2.74	4.58	4.58	3.44	2.29	1.15
Light HD Gas Trucks-2	0.77	0.25	0.52	0.52	0.39	0.26	0.13
Medium HD Gas Trucks	0.71	0.27	0.45	0.05	0.03	0.02	0.01
Heavy HD Gas Trucks	0.93	0.21	0.84	0.08	0.06	0.04	0.02
Light HD Diesel Trucks-1	4.73	2.41	2.31	2.31	1.73	1.15	0.58
Light HD Diesel Trucks-2	1.61	0.8	0.87	0.87	0.65	0.43	0.22
Medium HD Diesel Trucks	5.42	1.25	5.31	0.53	0.40	0.27	0.13
Heavy HD Diesel Trucks	34.41	7.92	33.15	3.32	2.49	1.66	0.83
Total	56.40	15.85	48.04	12.26	9.19	6.13	3.06

Source	Baseline	Equal Share	100% Existing Standards	90% Cleaner	ATP 1 - 25% Zero/ 75% Near-Zero	ATP 2 - 50% Zero/ 50% Near-Zero	ATP 3 - 75% Zero/ 25% Near-Zero
Ocean Going Vessels	27.33	7.65	19.71	13.19	13.19	13.19	13.19
Freight Locomotives	14.72	4.12	6.53	0.65	0.49	0.33	0.16
Cargo Handling Equipment	2.38	0.71	1.89	0.19	0.14	0.10	0.05
Harbor Craft	6.68	1.53	1.94	1.26	1.26	1.26	1.26
Aircraft	2.25	0.52	1.13	1.13	1.13	1.13	1.13
Total	53.36	14.54	31.19	16.39	16.12	15.91	15.70

	Scenario -->	1	2	3	4	5	6
Heavy HD Diesel Trucks	-	77%	4%	90%	93%	95%	98%
Ocean-Going Vessels	-	72%	28%	52%	52%	52%	52%
Freight Locomotives	-	72%	56%	96%	97%	98%	99%
Cargo Handling Equipment	-	70%	21%	92%	94%	96%	98%
LDT	-	65%	41%	41%	56%	71%	85%
Heavy HD Diesel Trucks	34.41	7.92	33.15	3.32	2.49	1.66	0.83
Ocean Going Vessels	27.33	7.65	19.71	13.19	13.19	13.19	13.19
Freight Locomotives	14.72	4.12	6.53	0.65	0.49	0.33	0.16
Cargo Handling Equipment	2.38	0.71	1.89	0.19	0.14	0.10	0.05
	78.84	20.40	61.28	17.35	16.31	15.28	14.23
		74%	22%	78%	79%	81%	82%

**Table 4.2-17. Estimate of
Health Risk at Nearby
Receptors - Plan Buildout**

Receptor Type	Cancer Risk Per Million	Chronic Hazard Index	Acute Hazard Index
Dry Bulk			
Residential	8	0.00	4.09E-06
Recreational/Park	1	0.00	9.86E-07
School	2	0.00	9.66E-07
Refrigerated Containers			
Residential	31	0.01	1.25E-05
Recreational/Park	3	0.01	3.01E-06
School	5	0.01	2.95E-06
Multi-Purposed General Cargo			
Residential	5	0.00	1.25E-05
Recreational/Park	0	0.00	3.01E-06
School	1	0.00	2.95E-06
Total for all cargo			
Residential	43	0.01	1.69E-05
Recreational/Park	5	0.02	4.07E-06
School	7	0.01	3.98E-06
<i>Threshold</i>	<i>10</i>	<i>1.00</i>	<i>1.00</i>
<i>Exceed Threshold?</i>	<i>Yes</i>	<i>No</i>	<i>No</i>

TAMT Risk Assessment - TOG Toxics for Acute

		AERMOD UNITIZED CONCENTRATIONS								TOG SCALED CONCENTRATIONS								CONCENTRATION BY SPECIES				ACUTE HAZARD BY SPECIES - TOTAL				ACUTE HAZARD BY SPECIES - BY NODE							
TAMT Risk Assessment - TOG Toxics for Acute		divide by number of sources (or berths) -->								4	4	4	4	2	2	2	2									Refrigerate d Containers	Multi- Purpose General Cargo	Dry Bulk					
AERMOD Output	Source Group in AERMOD	g/s -->								0.0013459	0.0013459	0.0013459	0.0013459	6.323E-05	6.323E-05	0.0008817	0.0008817					Benzene	ormaldehyd	Toluene	Xylenes	Benzene	ormaldehyd	Toluene	Xylenes	ALL	Refrigerate d Containers	Multi- Purpose General Cargo	Dry Bulk
		2	4	6	8	10	12	14	16	2	4	6	8	10	12	14	16					71432	50000	108883	1330207	71432	50000	108883	1330207	ACUTE	TOTAL G/S		
		X	Y	B10_1_BLR	B10_2_BLR	B10_3_BLR	B10_4_BLR	B10_5_BLR	B10_6_BLR	B10_7_BLR	B10_8_BLR	B10_1_BLR	B10_2_BLR	B10_3_BLR	B10_4_BLR	B10_5_BLR	B10_6_BLR	B10_7_BLR	B10_8_BLR	1HR CONC	71432	50000	108883	1330207	71432	50000	108883	1330207	ACUTE	2.99E-06	7.01E-08	9.78E-07	
recreational	485877.4	3617694	2.65	2.93	3.61	6.73	7.69	8.58	12.44	23.34	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.02	0.02	0.00	0.00	0.00	0.00	3.94E-06	8.95E-08	2.86E-09	7.61E-10	4.03E-06	2.99E-06	7.01E-08	9.78E-07		
recreational	485836.6	3617642	2.62	2.92	3.73	4.94	12.40	12.13	18.32	22.36	0.00	0.00	0.00	0.01	0.00	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00	3.93E-06	8.93E-08	2.86E-09	7.59E-10	4.02E-06	2.98E-06	7.00E-08	9.76E-07		
recreational	485958.4	3617628	2.78	3.03	3.11	4.08	9.38	8.69	12.02	20.74	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.02	0.02	0.00	0.00	0.00	0.00	3.94E-06	8.95E-08	2.86E-09	7.60E-10	4.03E-06	2.98E-06	7.01E-08	9.77E-07		
recreational	485030.6	3618425	13.45	11.40	7.05	4.20	2.82	2.57	2.55	2.71	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	3.40E-06	7.74E-08	2.47E-09	6.58E-10	3.48E-06	2.58E-06	6.06E-08	8.45E-07		
recreational	485905.3	3617589	2.83	3.03	3.12	4.26	8.37	10.47	19.34	19.60	0.00	0.00	0.00	0.01	0.00	0.00	0.02	0.02	0.02	0.00	0.00	0.00	0.00	3.93E-06	8.93E-08	2.85E-09	7.59E-10	4.02E-06	2.98E-06	6.99E-08	9.75E-07		
recreational	485934.2	3617687	2.70	2.97	3.36	6.26	6.82	7.52	11.44	19.42	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.02	0.02	0.00	0.00	0.00	0.00	3.93E-06	8.94E-08	2.86E-09	7.60E-10	4.03E-06	2.98E-06	7.00E-08	9.76E-07		
recreational	485130.6	3618525	12.60	6.69	6.58	4.50	2.45	2.66	2.69	2.67	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	3.39E-06	7.71E-08	2.46E-09	6.55E-10	3.47E-06	2.57E-06	6.04E-08	8.42E-07		
recreational	484950.3	3618481	8.73	9.85	5.39	3.53	2.73	2.71	2.66	2.90	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	3.40E-06	7.74E-08	2.47E-09	6.58E-10	3.48E-06	2.58E-06	6.06E-08	8.45E-07		
recreational	486000.5	3617683	2.80	3.06	3.08	5.83	5.66	6.61	10.00	14.75	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	3.92E-06	8.92E-08	2.85E-09	7.58E-10	4.02E-06	2.97E-06	6.98E-08	9.74E-07		
recreational	485030.6	3618525	9.65	8.68	5.55	3.51	2.44	2.72	2.73	2.74	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	3.39E-06	7.71E-08	2.46E-09	6.55E-10	3.47E-06	2.57E-06	6.04E-08	8.42E-07		
recreational	485955.6	3617717	2.69	3.02	3.82	6.75	5.67	6.62	9.55	14.53	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	3.93E-06	8.92E-08	2.85E-09	7.58E-10	4.02E-06	2.97E-06	6.99E-08	9.74E-07		
recreational	484930.6	3618525	7.17	9.12	4.57	3.20	2.49	2.75	2.68	2.95	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	3.39E-06	7.71E-08	2.46E-09	6.55E-10	3.47E-06	2.57E-06	6.04E-08	8.42E-07		
residential	485130.6	3618625	8.95	5.70	5.28	3.67	2.43	2.77	2.80	2.79	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	3.38E-06	7.67E-08	2.45E-09	6.52E-10	3.46E-06	2.56E-06	6.01E-08	8.38E-07		
recreational	485919.6	3617746	2.61	2.98	4.70	7.14	6.18	6.54	9.29	13.57	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	3.97E-06	9.03E-08	2.89E-09	7.68E-10	4.07E-06	3.01E-06	7.07E-08	9.86E-07		
recreational	484730.6	3618425	5.91	8.57	5.42	3.65	2.46	2.91	2.87	3.04	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	3.40E-06	7.74E-08	2.47E-09	6.58E-10	3.48E-06	2.58E-06	6.06E-08	8.45E-07		
residential	485230.6	3618625	8.35	4.64	4.52	4.15	2.79	2.77	2.79	2.79	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	3.38E-06	7.67E-08	2.45E-09	6.52E-10	3.46E-06	2.56E-06	6.01E-08	8.38E-07		
recreational	484630.6	3618425	4.51	7.84	3.66	2.63	2.60	2.93	2.95	3.13	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	3.40E-06	7.74E-08	2.47E-09	6.58E-10	3.48E-06	2.58E-06	6.06E-08	8.45E-07		
recreational	485030.6	3618625	7.59	6.28	4.43	3.08	2.46	2.88	2.84	2.71	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	3.38E-06	7.68E-08	2.45E-09	6.52E-10	3.46E-06	2.56E-06	6.01E-08	8.38E-07		
recreational	484930.6	3618625	5.55	7.29	3.85	2.65	2.61	2.90	2.78	2.93	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	3.38E-06	7.68E-08	2.45E-09	6.52E-10	3.46E-06	2.56E-06	6.01E-08	8.38E-07		
residential	485130.6	3618725	6.89	4.56	4.29	3.03	2.67	2.88	3.00	2.93	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	3.36E-06	7.64E-08	2.44E-09	6.50E-10	3.44E-06	2.55E-06	5.99E-08	8.35E-07		
residential	485230.6	3618725	6.37	4.04	4.03	3.43	2.66	2.91	2.84	2.92	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	3.36E-06	7.64E-08	2.44E-09	6.50E-10	3.44E-06	2.55E-06	5.99E-08	8.35E-07		
recreational	484830.6	3618625	6.24	6.16	3.23	2.40	2.68	2.81	2.88	3.08	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	3.38E-06	7.68E-08	2.45E-09	6.53E-10	3.46E-06	2.56E-06	6.01E-08	8.38E-07		
residential	485330.6	3618725	6.08	3.60	3.28	3.66	2.58	2.85	2.88	2.86	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	3.36E-06	7.64E-08	2.44E-09	6.50E-10	3.44E-06	2.55E-06	5.98E-08	8.34E-07		
residential	485330.6	3618725	5.95	4.58	3.61	2.68	2.71	3.02	2.97	2.84	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	3.36E-06	7.65E-08	2.44E-09	6.50E-10	3.44E-06	2.55E-06	5.99E-08	8.35E-07		
recreational	484630.6	3618525	4.04	5.93	3.90	2.66	2.78	3.06	2.98	3.09	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	3.39E-06	7.71E-08	2.46E-09	6.55E-10	3.47E-06	2.57E-06	6.04E-08	8.42E-07		
recreational	484930.6	3618725	4.46	5.86	3.30	2.41	2.82	2.98	2.89	2.82	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	3.36E-06	7.65E-08	2.44E-09	6.50E-10	3.44E-06	2.55E-06	5.99E-08	8.35E-07		
recreational	484530.6	3618525	3.38	5.67	2.74	2.50	2.85	3.03	2.99	3.16	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	3.39E-06	7.71E-08	2.46E-09	6.55E-10	3.47E-06	2.57E-06	6.04E-08	8.42E-07		
residential	485230.6	3618825	5.50	3.42	3.55	2.89	2.82	2.98	2.93	3.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	3.35E-06	7.61E-08	2.43E-09	6.47E-10	3.43E-06	2.54E-06	5.96E-08	8.32E-07		
residential	485130.6	3618825	5.38	3.65	3.56	2.61	2.79	2.98	3.08	3																							

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THAT file, having
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APR2002 Output

			Source Group in 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THAT file_name
DATE

APR2002 Output

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												Risk (Residential 30 yr, school 9 yr, post 15 year)										Risk (Residential 30 yr, school 9 yr, post 15 year)										Risk (Residential 30 yr, school 9 yr, post 15 year)													
												Age	Sex	100%	65%	35%	20%	10%	5%	2.5%	1.5%	0.75%	Age	Sex	100%	65%	35%	20%	10%	5%	2.5%	1.5%	0.75%	Age	Sex	100%	65%	35%	20%	10%	5%	2.5%	1.5%	0.75%	
AERROD Output																																													
school	66.06	26.03	26.04	66.04	46.04	26.04	0.000013	0.00021	1.071740E+05	8.49E+05	0.02	0.01232	0.1	1.931E+02	1.020E+02	8.620E+01	7.820E+01	7.820E+01	0	0	1.110E+24	2.40E+07	0	1.390E+06	3.920E+05	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06				
school	66.06	26.03	26.04	66.04	46.04	26.04	0.000017	0.00033	1.178022E+05	9.22E+05	0.02	0.02324	0.2	2.150E+02	1.180E+02	1.020E+02	9.22E+01	9.22E+01	0	0	1.160E+24	2.40E+07	0	1.390E+06	3.920E+05	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06	1.00E+06		
school	66.03	26.03	26.04	66.04	46.04	26.04	0.000028	0.00059	9.532301E+05	8.00E+05	0.01	0.01188	0.1	1.280E+02	7.180E+01	6.280E+01	5.580E+01	5.580E+01	0	0	1.00E+24	2.40E+07	0	1.280E+06	3.610E+05	9.53E+05	9.53E+05	9.53E+05	9.53E+05	9.53E+05	9.53E+05	9.53E+05	9.53E+05	9.53E+05	9.53E+05	9.53E+05	9.53E+05	9.53E+05	9.53E+05	9.53E+05	9.53E+05	9.53E+05	9.53E+05	9.53E+05	
school	66.03	26.03	26.04	66.04	46.04	26.04	0.000034	0.00070	9.403701E+05	7.85E+05	0.01	0.01244	0.1	1.300E+02	7.300E+01	6.400E+01	5.600E+01	5.600E+01	0	0	1.010E+24	2.40E+07	0	1.300E+06	3.660E+05	9.40E+05	9.40E+05	9.40E+05	9.40E+05	9.40E+05	9.40E+05	9.40E+05	9.40E+05	9.40E+05	9.40E+05	9.40E+05	9.40E+05	9.40E+05	9.40E+05	9.40E+05	9.40E+05	9.40E+05	9.40E+05	9.40E+05	9.40E+05
residential	66.06	26.03	26.04	66.06	46.06	26.04	0.000028	0.00079	8.850501E+05	8.07E+05	0.01	0.01134	0.1	1.302E+02	7.180E+01	6.280E+01	5.580E+01	5.580E+01	0	0	1.010E+24	2.40E+07	0	1.302E+06	3.660E+05	8.85E+05	8.85E+05	8.85E+05	8.85E+05	8.85E+05	8.85E+05	8.85E+05	8.85E+05	8.85E+05	8.85E+05	8.85E+05	8.85E+05	8.85E+05	8.85E+05	8.85E+05	8.85E+05	8.85E+05	8.85E+05	8.85E+05	8.85E+05
residential	66.06	26.03	26.04	66.06	46.06	26.04	0.000034	0.00090	8.740501E+05	7.96E+05	0.01	0.01190	0.1	1.320E+02	7.300E+01	6.400E+01	5.600E+01	5.600E+01	0	0	1.020E+24	2.40E+07	0	1.320E+06	3.660E+05	8.74E+05	8.74E+05	8.74E+05	8.74E+05	8.74E+05	8.74E+05	8.74E+05	8.74E+05	8.74E+05	8.74E+05	8.74E+05	8.74E+05	8.74E+05	8.74E+05	8.74E+05	8.74E+05	8.74E+05	8.74E+05	8.74E+05	8.74E+05
residential	66.06	26.03	26.04	66.06	46.06	26.04	0.000040	0.00101	8.630501E+05	7.87E+05	0.01	0.01246	0.1	1.340E+02	7.500E+01	6.600E+01	5.800E+01	5.800E+01	0	0	1.030E+24	2.40E+07	0	1.340E+06	3.660E+05	8.63E+05	8.63E+05	8.63E+05	8.63E+05	8.63E+05	8.63E+05	8.63E+05	8.63E+05	8.63E+05	8.63E+05	8.63E+05	8.63E+05	8.63E+05	8.63E+05	8.63E+05	8.63E+05	8.63E+05	8.63E+05	8.63E+05	8.63E+05
residential	66.06	26.03	26.04	66.06	46.06	26.04	0.000046	0.00112	8.520501E+05	7.78E+05	0.01	0.01302	0.1	1.360E+02	7.700E+01	6.800E+01	6.000E+01	6.000E+01	0	0	1.040E+24	2.40E+07	0	1.360E+06	3.660E+05	8.52E+05	8.52E+05	8.52E+05	8.52E+05	8.52E+05	8.52E+05	8.52E+05	8.52E+05	8.52E+05	8.52E+05	8.52E+05	8.52E+05	8.52E+05	8.52E+05	8.52E+05	8.52E+05	8.52E+05	8.52E+05	8.52E+05	8.52E+05
residential	66.06	26.03	26.04	66.06	46.06	26.04	0.000052	0.00123	8.410501E+05	7.69E+05	0.01	0.01358	0.1	1.380E+02	7.900E+01	7.000E+01	6.200E+01	6.200E+01	0	0	1.050E+24	2.40E+07	0	1.380E+06	3.660E+05	8.41E+05	8.41E+05	8.41E+05	8.41E+05	8.41E+05	8.41E+05	8.41E+05	8.41E+05	8.41E+05	8.41E+05	8.41E+05	8.41E+05	8.41E+05	8.41E+05	8.41E+05	8.41E+05	8.41E+05	8.41E+05	8.41E+05	8.41E+05
residential	66.06	26.03	26.04	66.06	46.06	26.04	0.000058	0.00134	8.300501E+05	7.60E+05	0.01	0.01414	0.1	1.400E+02	8.100E+01	7.200E+01	6.400E+01	6.400E+01	0	0	1.060E+24	2.40E+07	0	1.400E+06	3.660E+05	8.30E+05	8.30E+05	8.30E+05	8.30E+05	8.30E+05	8.30E+05	8.30E+05	8.30E+05	8.30E+05	8.30E+05	8.30E+05	8.30E+05	8.30E+05	8.30E+05	8.30E+05	8.30E+05	8.30E+05	8.30E+05	8.30E+05	8.30E+05
residential	66.06	26.03	26.04	66.06	46.06	26.04	0.000064	0.00145	8.190501E+05	7.51E+05	0.01	0.01470	0.1	1.420E+02	8.300E+01	7.400E+01	6.600E+01	6.600E+01	0	0	1.070E+24	2.40E+07	0	1.420E+06	3.660E+05	8.19E+05	8.19E+05	8.19E+05	8.19E+05	8.19E+05	8.19E+05	8.19E+05	8.19E+05	8.19E+05	8.19E+05	8.19E+05	8.19E+05	8.19E+05	8.19E+05	8.19E+05	8.19E+05	8.19E+05	8.19E+05	8.19E+05	8.19E+05
residential	66.06	26.03	26.04	66.06	46.06	26.04	0.000070	0.00156	8.080501E+05	7.42E+05	0.01	0.01526	0.1	1.440E+02	8.500E+01	7.600E+01	6.800E+01	6.800E+01	0	0	1.080E+24	2.40E+07	0	1.440E+06	3.660E+05	8.08E+05	8.08E+05	8.08E+05	8.08E+05	8.08E+05	8.08E+05	8.08E+05	8.08E+05	8.08E+05	8.08E+05	8.08E+05	8.08E+05	8.08E+05	8.08E+05	8.08E+05	8.08E+05	8.08E+05	8.08E+05	8.08E+05	8.08E+05
residential	66.06	26.03	26.04	66.06	46.06	26.04	0.000076	0.00167	7.970501E+05	7.33E+05	0.01	0.01582	0.1	1.460E+02	8.700E+01	7.800E+01	7.000E+01	7.000E+01	0	0	1.090E+24	2.40E+07	0	1.460E+06	3.660E+05	7.97E+05	7.97E+05	7.97E+05	7.97E+05	7.97E+05	7.97E+05	7.97E+05	7.97E+05	7.97E+05	7.97E+05	7.97E+05	7.97E+05	7.97E+05	7.97E+05	7.97E+05	7.97E+05	7.97E+05	7.97E+05	7.97E+05	7.97E+05
residential	66.06	26.03	26.04	66.06	46.06	26.04	0.000082	0.00178	7.860501E+05	7.24E+05	0.01	0.01638	0.1	1.480E+02	8.900E+01	8.000E+01	7.200E+01	7.200E+01	0	0	1.100E+24	2.40E+07	0	1.480E+06	3.660E+05	7.86E+05	7.86E+05	7.86E+05	7.86E+05	7.86E+05	7.86E+05	7.86E+05	7.86E+05	7.86E+05	7.86E+05	7.86E+05	7.86E+05	7.86E+05	7.86E+05	7.86E+05	7.86E+05	7.86E+05	7.86E+05	7.86E+05	7.86E+05
residential	66.06	26.03	26.04	66.06	46.06	26.04	0.000088	0.00189	7.750501E+05	7.15E+05	0.01	0.01694	0.1	1.500E+02	9.100E+01	8.200E+01	7.400E+01	7.400E+01	0	0	1.110E+24	2.40E+07	0	1.500E+06	3.660E+05	7.75E+05	7.75E+05	7.75E+05	7.75E+05	7.75E+05	7.75E+05	7.75E+05	7.75E+05	7.75E+05	7.75E+05	7.75E+05	7.75E+05	7.75E+05	7.75E+05	7.75E+05	7.75E+05	7.75E+05	7.75E+05	7.75E+05	7.75E+05
residential	66.06	26.03	26.04	66.06	46.06	26.04	0.000094	0.00200	7.640501E+05	7.06E+05	0.01	0.01750	0.1	1.520E+02	9.300E+01	8.400E+01	7.600E+01	7.600E+01	0	0	1.120E+24	2.40E+07	0	1.520E+06	3.660E+05	7.64E+05	7.64E+05	7.64E+05	7.64E+05	7.64E+05	7.64E+05	7.64E+05	7.64E+05	7.64E+05	7.64E+05	7.64E+05	7.64E+05	7.64E+05	7.64E+05	7.64E+05	7.64E+05	7.64E+05	7.64E+05	7.64E+05	
residential	66.06	26.03	26.04	66.06	46.06	26.04	0.000100	0.00211	7.530501E+05	6.97E+05	0.01	0.01806	0.1	1.540E+02	9.500E+01	8.600E+01	7.800E+01	7.800E+01	0	0	1.130E+24	2.40E+07	0	1.540E+06	3.660E+05	7.53E+05	7.53E+05	7.53E+05	7.53E+05	7.53E+05	7.53E+05	7.53E+05	7.53E+05	7.53E+05	7.53E+05	7.53E+05	7.53E+05	7.53E+05	7.53E+05	7.53E+05	7.53E+05	7.53E+05	7.53E+05	7.53E+05	7.53E+05
residential	66.06	26.03	26.04	66.06	46.06	26.04	0.000106	0.00222	7.420501E+05	6.88E+05	0.01	0.01862	0.1	1.560E+02	9.700E+01	8.800E+01	8.000E+01	8.000E+01	0	0	1.140E+24	2.40E+07	0	1.560E+06	3.660E+05	7.42E+05	7.42E+05	7.42E+05	7.42E+05	7.42E+05	7.42E+05	7.42E+05	7.42E+05	7.42E+05	7.42E+05	7.42E+05	7.42E+05	7.42E+05	7.42E+05	7.42E+05	7.42E+05	7.42E+05	7.42E+05	7.42E+05	

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APR2002 Output

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[illegible]

AERMOD Output

HRA Factors and values

Dose factors		3rd tri	0<2	2<9	2<16	16<30	16-70	source
Daily Breath Rate (L/kg-day)	residential	361	1090	631	572	261	233	OEHHA 2015, Table 5.6, 95th %ile for 3rdtri-2yrs old; 80th for other age groups
	recreational	0	1200	640	520	240	230	OEHHA 2015, Table 5.8 (95th, moderate) for all bins but 3rd tri; assume no 3rd tri receptors;
	school	0	1200	640	520	240	230	same as park
A		1	1	1	1	1	1	constant
EF, Fraction of time exposed	residential	0.96	0.96	0.96	0.96	0.96	0.96	OEHHA 2015, page 5-24, 350 days/yr
	recreational	0.08	0.08	0.08	0.08	0.08	0.08	yearly, based on estimated 350 day/yr, 2 hrs/day exposure
	school	0.12	0.12	0.12	0.12	0.12	0.12	based on 180 days/yr, 6 hrs/day
Conversion Factor		1.0E-06	1.0E-06	1.0E-06	1.0E-06	1.0E-06	1.0E-06	(mg/ug + m3/L)
WAF		-	-	-	-	1	1	Source is constant; WAF of 1 assumed per OEHHA 2015 page 5-31

Risk Factors		3rd tri	0<2	2<9	2<16	16<30	16-70	source
CPF, DPM $([mg/kg-day]^{-1})$		1.1	1.1	1.1	1.1	1.1	1.1	OEHHA 2015, Table 7.1
ASF		10	10	3	3	1	1	Table 8.3, OEHHA 2015
Adjustment Factor (schools)		3.36	3.36	3.36	3.36	3.36	3.36	OEHHA 2015, Page 4-44 and Equation 4.1; the long term residential exposure is adjusted upward to represent the exposure to a wor
ED, Exposure Duration (years)								
	Residential - 30yr	0.25	2.00		14.00	14.00		Equation 8.2.4 A, OEHHA 2015
	Recreational		2.00	7.00		6.00		Equation 8.2.4 B, OEHHA 2015
	School - 9yr		0.00	7.00	2.00			BAAQMD HRSA Guidelines, Jan 2010, page 3
AT, Average Time (days)		70	70	70	70	70	70	Averaging time for lifetime cancer risk (years), always 70
FAH		1.00	1.00	1.00	1.00	1.00	1.00	Table 8.4, OEHHA 2015 (only for residential, but worst-case to assume 1.0; recreation assumed to be 1.0)

Hazard Index

Chronic Inhalation Reference Exposure Level, respiratory,	5							OEHHA 2015, Table 6.3
---	---	--	--	--	--	--	--	-----------------------

conversions:

Second per hour	3600
Grams per ton	907184.74
Million	1,000,000
days per year	365

TAMU Risk Assessment - DPM Cancer and Chronic HI

[illegible]

AERMOD Output

DPM SCALED CONCENTR

Vessel Hoisting				Vessel Transit			
	Refrigerated Containers/Demo/Rail Unmit	Multi-Purpose General Cargo/Demo/Rail Unmit	Dry Bulk/Demo/Rail Unmit		Refrigerated Containers/Demo/Rail Unmit	Multi-Purpose General Cargo/Demo/Rail Unmit	Dry Bulk/Demo/Rail Unmit
All 100%	82%	9%	9%	All 100%	75%	12%	13%

TAMT Rpt Assumptions - DPM Cover and Densities

AERMOD Output

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DPM SCALED CONCENTRATIONS

DPM SCALED CONCENTRATIONS

Vessel	Vessel Rotating					Vessel Transit				
	Reinforced/ Conventional	Multi- Component	Dry Landing	Dry Landing	Dry Landing	Reinforced/ Conventional	Multi- Component	Dry Landing	Dry Landing	Dry Landing
10%	82%	91%	9%	100%	73%	12%	13%			
02	90:03	90:04	15:03	15:03	15:03	10:03	90:04	15:04	15:04	15:04
02	80:03	80:04	15:03	15:03	15:03	10:03	80:04	15:04	15:04	15:04
02	70:03	80:04	80:04	15:03	15:03	10:03	70:04	15:04	15:04	15:04
02	60:03	70:04	70:04	15:04	15:04	10:04	60:04	15:04	15:04	15:04
02	50:03	60:04	60:04	15:04	15:04	90:04	50:04	15:04	15:04	15:04
02	40:03	50:04	50:04	15:04	15:04	90:04	40:04	15:04	15:04	15:04
02	30:03	40:04	40:04	15:04	15:04	90:04	30:04	15:04	15:04	15:04
02	20:03	30:04	30:04	15:04	15:04	90:04	20:04	15:04	15:04	15:04
02	10:03	20:04	20:04	15:04	15:04	90:04	10:04	15:04	15:04	15:04
02	00:03	10:04	10:04	15:04	15:04	90:04	00:04	15:04	15:04	15:04
02	90:04	90:05	15:04	20:03	15:03	20:03	10:03	20:04	20:04	20:04
02	80:04	90:05	15:04	40:03	15:03	40:03	10:03	40:04	40:04	40:04
02	70:04	90:05	15:04	60:03	15:03	60:03	10:03	60:04	60:04	60:04
02	60:04	90:05	15:04	80:03	15:03	80:03	10:03	80:04	80:04	80:04
02	50:04	90:05	15:04	90:03	15:03	90:03	10:03	90:04	90:04	90:04
02	40:04	90:05	15:04	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	30:04	90:05	15:04	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	20:04	90:05	15:04	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	10:04	90:05	15:04	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	00:04	90:05	15:04	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	90:05	90:06	15:03	20:03	15:03	20:03	10:03	20:04	20:04	20:04
02	80:05	90:06	15:03	40:03	15:03	40:03	10:03	40:04	40:04	40:04
02	70:05	90:06	15:03	60:03	15:03	60:03	10:03	60:04	60:04	60:04
02	60:05	90:06	15:03	80:03	15:03	80:03	10:03	80:04	80:04	80:04
02	50:05	90:06	15:03	90:03	15:03	90:03	10:03	90:04	90:04	90:04
02	40:05	90:06	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	30:05	90:06	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	20:05	90:06	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	10:05	90:06	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	00:05	90:06	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	90:06	90:07	15:03	20:03	15:03	20:03	10:03	20:04	20:04	20:04
02	80:06	90:07	15:03	40:03	15:03	40:03	10:03	40:04	40:04	40:04
02	70:06	90:07	15:03	60:03	15:03	60:03	10:03	60:04	60:04	60:04
02	60:06	90:07	15:03	80:03	15:03	80:03	10:03	80:04	80:04	80:04
02	50:06	90:07	15:03	90:03	15:03	90:03	10:03	90:04	90:04	90:04
02	40:06	90:07	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	30:06	90:07	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	20:06	90:07	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	10:06	90:07	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	00:06	90:07	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	90:07	90:08	15:03	20:03	15:03	20:03	10:03	20:04	20:04	20:04
02	80:07	90:08	15:03	40:03	15:03	40:03	10:03	40:04	40:04	40:04
02	70:07	90:08	15:03	60:03	15:03	60:03	10:03	60:04	60:04	60:04
02	60:07	90:08	15:03	80:03	15:03	80:03	10:03	80:04	80:04	80:04
02	50:07	90:08	15:03	90:03	15:03	90:03	10:03	90:04	90:04	90:04
02	40:07	90:08	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	30:07	90:08	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	20:07	90:08	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	10:07	90:08	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	00:07	90:08	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	90:08	90:09	15:03	20:03	15:03	20:03	10:03	20:04	20:04	20:04
02	80:08	90:09	15:03	40:03	15:03	40:03	10:03	40:04	40:04	40:04
02	70:08	90:09	15:03	60:03	15:03	60:03	10:03	60:04	60:04	60:04
02	60:08	90:09	15:03	80:03	15:03	80:03	10:03	80:04	80:04	80:04
02	50:08	90:09	15:03	90:03	15:03	90:03	10:03	90:04	90:04	90:04
02	40:08	90:09	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	30:08	90:09	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	20:08	90:09	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	10:08	90:09	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	00:08	90:09	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	90:09	90:10	15:03	20:03	15:03	20:03	10:03	20:04	20:04	20:04
02	80:09	90:10	15:03	40:03	15:03	40:03	10:03	40:04	40:04	40:04
02	70:09	90:10	15:03	60:03	15:03	60:03	10:03	60:04	60:04	60:04
02	60:09	90:10	15:03	80:03	15:03	80:03	10:03	80:04	80:04	80:04
02	50:09	90:10	15:03	90:03	15:03	90:03	10:03	90:04	90:04	90:04
02	40:09	90:10	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	30:09	90:10	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	20:09	90:10	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	10:09	90:10	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	00:09	90:10	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	90:10	90:11	15:03	20:03	15:03	20:03	10:03	20:04	20:04	20:04
02	80:10	90:11	15:03	40:03	15:03	40:03	10:03	40:04	40:04	40:04
02	70:10	90:11	15:03	60:03	15:03	60:03	10:03	60:04	60:04	60:04
02	60:10	90:11	15:03	80:03	15:03	80:03	10:03	80:04	80:04	80:04
02	50:10	90:11	15:03	90:03	15:03	90:03	10:03	90:04	90:04	90:04
02	40:10	90:11	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	30:10	90:11	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	20:10	90:11	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	10:10	90:11	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	00:10	90:11	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	90:11	90:12	15:03	20:03	15:03	20:03	10:03	20:04	20:04	20:04
02	80:11	90:12	15:03	40:03	15:03	40:03	10:03	40:04	40:04	40:04
02	70:11	90:12	15:03	60:03	15:03	60:03	10:03	60:04	60:04	60:04
02	60:11	90:12	15:03	80:03	15:03	80:03	10:03	80:04	80:04	80:04
02	50:11	90:12	15:03	90:03	15:03	90:03	10:03	90:04	90:04	90:04
02	40:11	90:12	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	30:11	90:12	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	20:11	90:12	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	10:11	90:12	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	00:11	90:12	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	90:12	90:13	15:03	20:03	15:03	20:03	10:03	20:04	20:04	20:04
02	80:12	90:13	15:03	40:03	15:03	40:03	10:03	40:04	40:04	40:04
02	70:12	90:13	15:03	60:03	15:03	60:03	10:03	60:04	60:04	60:04
02	60:12	90:13	15:03	80:03	15:03	80:03	10:03	80:04	80:04	80:04
02	50:12	90:13	15:03	90:03	15:03	90:03	10:03	90:04	90:04	90:04
02	40:12	90:13	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	30:12	90:13	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	20:12	90:13	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	10:12	90:13	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	00:12	90:13	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	90:13	90:14	15:03	20:03	15:03	20:03	10:03	20:04	20:04	20:04
02	80:13	90:14	15:03	40:03	15:03	40:03	10:03	40:04	40:04	40:04
02	70:13	90:14	15:03	60:03	15:03	60:03	10:03	60:04	60:04	60:04
02	60:13	90:14	15:03	80:03	15:03	80:03	10:03	80:04	80:04	80:04
02	50:13	90:14	15:03	90:03	15:03	90:03	10:03	90:04	90:04	90:04
02	40:13	90:14	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	30:13	90:14	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	20:13	90:14	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	10:13	90:14	15:03	90:04	15:03	90:04	10:03	90:04	90:04	90:04
02	00:13	90:14								

AERMOD UNITS/UNIT CONCENTRATIONS

DPM SCALES CONCENTRATIONS

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DPM SCALED CONCENTRATIONS

Vessel Hoteling

82%	Unmit	9%
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[illegible]

[illegible]

DPM SCALED CONCENTRATIONS

Vessel Hor

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[illegible]

DPM SCALED CONCENTRATION

Vessel Housing				Vessel Transit			
	Refrigerated Containers o/Rail Unmit	Multi-Purpose General Cargo o/Rail Unmit	Dry Bulk o/Rail Unmit		Refrigerated Containers o/Rail Unmit	Multi-Purpose General Cargo o/Rail Unmit	Dry Bulk o/Rail Unmit
All 100%	93%		9%	All 100%	Unmit	93%	

0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00
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[illegible]

[illegible]

[illegible]

-46.05	25.05	15.05	66.06	15.04	66.05	15.05	36.05	25.05	06.00	15.05	88.06	36.06	25.06	15.07	15.06	25.03	0.000126	4.935670	1.311506	7.6670	6.896707	3.146707	1.7080606	4.1258507	0	4.54676507	6.91553208	9.5358707	0.935490	0.0002151	25.04	76.08	25.07	15.07	15.07	56.08	36.09	66.08	06.00	76.08	15.08	1.56707	0.146	1.85479505	25.04	76.08	25.07	15.07	15.07	56.08	36.09	76.08	06.00	76.08	15.08	1.6607	0.156	4.10756605
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[illegible]

residential	2.6405E-06	6.24	0.01	residential	8.3483E-06	8.35	0.00
recreational	3.0394E-06	1.07	0.01	recreational	5.4326E-07	0.56	0.00
school	4.386E-06	4.29	0.01	school	1.5450E-06	1.55	0.00

TAMT Risk Assessment - TOG Toxics for Acute

DPM SCALED CONC

divide by

1.2E-03 |

Verbal

SPIN	TYPE	Y	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	7																						

[illegible]

0.05	
0.083037573	
0.053794486	

Tag/Barge Trans										Transit Equipment										Locomotives										Trucks										Refrigerated Containers										Multi-Purpose General Cargo										Dry Bulk									
Tag/Barge Trans										Transit Equipment										Locomotives										Trucks										Refrigerated Containers										Multi-Purpose General Cargo										Dry Bulk									
Tag/Barge Trans										Transit Equipment										Locomotives										Trucks										Refrigerated Containers										Multi-Purpose General Cargo										Dry Bulk									
Tag/Barge Trans										Transit Equipment										Locomotives										Trucks										Refrigerated Containers										Multi-Purpose General Cargo										Dry Bulk									
Tag/Barge Trans										Transit Equipment										Locomotives										Trucks										Refrigerated Containers										Multi-Purpose General Cargo										Dry Bulk									
Tag/Barge Trans										Transit Equipment										Locomotives										Trucks										Refrigerated Containers										Multi-Purpose General Cargo										Dry Bulk									
Tag/Barge Trans										Transit Equipment										Locomotives										Trucks										Refrigerated Containers										Multi-Purpose General Cargo										Dry Bulk									
Tag/Barge Trans										Transit Equipment										Locomotives										Trucks										Refrigerated Containers										Multi-Purpose General Cargo										Dry Bulk									
Tag/Barge Trans										Transit Equipment										Locomotives										Trucks										Refrigerated Containers										Multi-Purpose General Cargo										Dry Bulk									
Tag/Barge Trans										Transit Equipment										Locomotives										Trucks										Refrigerated Containers										Multi-Purpose General Cargo										Dry Bulk									
Tag/Barge Trans										Transit Equipment										Locomotives										Trucks										Refrigerated Containers										Multi-Purpose General Cargo										Dry Bulk									
Tag/Barge Trans										Transit Equipment										Locomotives										Trucks										Refrigerated Containers										Multi-Purpose General Cargo										Dry Bulk									
Tag/Barge Trans										Transit Equipment										Locomotives										Trucks										Refrigerated Containers										Multi-Purpose General Cargo										Dry Bulk									
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[illegible]

TAMT Risk Assessment - TOG Toxics for Acute

DPM SCALED CONCENTRATIONS

Hoteling	Vessel Transit
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Hoteling	Vessel Transit
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TAMT Risk Assessment - CPM Cause and Consequence

Source Group in ARMS										6A-10										6.0E-01										6.0E-02										6.0E-03										1.7E-02										1.7E-02										1.5E-02										1.5E-02										6.0E-03										4.0E-02										2.0E-03										100%										27%										35%										38%										100%										40%										2%										20%										100%										21%										54%										25%										100%										10%																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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95:05	25:04	25:04	05:04	10:04	75:05	4:23:06	2:53:06	1:35:07	1:35:06	0.01	0.00229	7.94617	2.46106	1.395106	1.338106	5.74507	3.11548	7.53107	0	8.83017	1.35107	1.7913106	1.74053	0.00044	25:01	65:07	25:06	10:06	15:06	15:07	45:07	25:08	65:07	05:07	05:07	95:08	1:35:08	1.280	0.00014	25:01	65:07	25:06	10:06	15:06	15:07	35:08	65:07	05:07	75:07	15:07	1:45:08	1.409	0.00037	0.000	4:430	0.001	25%	59%	4%	9%	3%	0%
95:05	25:04	25:04	05:04	10:04	75:05	4:23:06	2:53:06	1:35:07	1:35:06	0.01	0.00228	8.94817	2.46106	1.445106	1.338106	5.74507	3.11548	7.53107	0	8.83017	1.35107	1.8066106	1.74053	0.00044	25:01	65:07	25:06	10:06	15:06	15:07	35:08	65:07	05:07	75:07	15:07	1:45:08	1.453	0.00038	0.000	4:368	0.001	23%	58%	3%	8%	3%	0%															
95:05	25:04	25:04	05:04	10:04	85:05	4:23:06	2:53:06	1:35:07	1:35:06	0.01	0.00247	8.53517	2.535106	1.495106	1.335106	5.835107	3.45408	8.13107	0	8.83017	1.45107	1.8755106	1.73651	0.00049	25:01	65:07	25:06	10:06	15:06	15:07	25:08	65:07	05:07	75:07	15:07	1:55:09	1.502	0.0004	0.000	4:747	0.001	23%	61%	5%	9%	3%	0%															
95:05	25:04	25:04	05:04	10:04	85:05	4:23:06	2:53:06	1:35:07	1:35:06	0.01	0.00254	8.63117	2.535106	1.545106	1.345106	5.935107	3.55408	8.64107	0	9.24107	1.45107	1.9315106	1.73551	0.00051	25:01	65:07	25:06	10:06	15:06	15:07	35:08	65:07	05:07	75:07	15:07	1:55:09	1.539	0.00051	0.000	4:677	0.001	23%	61%	5%	8%	3%	0%															
95:05	25:04	25:04	05:04	10:04	85:05	4:23:06	2:53:06	1:35:07	1:35:06	0.01	0.00256	8.55117	2.535106	1.615106	1.345106	6.035107	3.65408	8.75107	0	9.65107	1.55107	2.0075106	1.69251	0.00053	25:01	65:07	25:06	10:06	15:06	15:07	35:08	65:07	05:07	75:07	15:07	1:55:09	1.601	0.00052	0.000	4:589	0.001	22%	62%	5%	8%	3%	0%															
95:05	25:04	25:04	05:04	10:04	85:05	4:23:06	2:53:06	1:35:07	1:35:06	0.01	0.00276	9.05117	2.685106	1.675106	1.335106	6.155107	3.85408	9.16107	0	10.06	1.55107	2.0955106	1.69251	0.00055	25:01	75:07	25:06	10:06	15:06	15:07	35:08	75:07	05:07	75:07	15:07	1:55:09	1.555	0.0004	0.000	4:775	0.001	22%	62%	5%	8%	3%	0%															
95:05	25:04	25:04	05:04	10:04	85:05	4:45:06	2:75:06	1:35:07	1:35:06	0.01	0.00258	9.85117	2.935106	1.735106	1.335106	6.255107	3.95408	9.45107	0	10.06	1.65107	2.2055106	1.59451	0.00057	25:01	75:07	25:06	10:06	15:06	15:07	35:08	75:07	05:07	75:07	15:07	1:55:09	1.703	0.00055	0.000	5:438	0.001	21%	63%	5%	8%	3%	0%															
95:05	25:04	25:04	05:04	10:04	85:05	4:45:06	2:75:06	1:35:07	1:35:06	0.01	0.00261	1.005106	1.35106	1.795106	1.335106	6.425107	4.05408	9.75107	0	1.12106	1.65107	2.2515106	1.59451	0.00059	25:01	75:07	25:06	10:06	15:06	15:07	35:08	75:07	05:07	75:07	15:07	1:55:09	1.763	0.00056	0.000	5:583	0.001	21%	63%	5%	8%	3%	0%															
15:04	25:04	25:04	05:04	10:04	95:05	4:55:06	2:75:06	1:35:07	1:35:06	0.01	0.00311	1.235106	1.35106	1.885106	1.335106	6.755107	4.25408	1.05106	0	1.12106	1.75107	2.3555106	1.58551	0.00062	25:01	85:07	25:06	10:06	15:06	15:07	35:08	85:07	05:07	75:07	15:07	1:55:09	1.856	0.00045	0.000	5:891	0.002	20%	64%	5%	7%	3%	0%															
15:04	25:04	25:04	05:04	10:04	95:05	4:55:06	2:75:06	1:35:07	1:35:06	0.01	0.00314	1.245106	1.35106	1.895106	1.335106	6.855107	4.35408	1.15106	0	1.22106	1.85107	2.4555106	1.61551	0.00065	25:01	85:07	25:06	10:06	15:06	15:07	35:08	85:07	05:07	75:07	15:07	1:55:09	1.764	0.00066	0.000	6:131	0.002	20%	64%	5%	7%	3%	0%															
15:04	25:04	25:04	05:04	10:04	95:05	4:55:06	2:80:06	1:35:07	1:35:06	0.01	0.00313	1.114106	1.335106	1.945106	1.755106	6.955107	4.45408	1.15106	0	1.22106	1.85107	2.4455106	1.64551	0.00064	25:01	85:07	25:06	10:06	15:06	15:07	35:08	85:07	05:07	75:07	15:07	1:55:09	1.888	0.00055	0.000	6:075	0.002	20%	65%	5%	7%	3%	0%															
15:04	25:04	25:04	05:04	10:04	95:05	4:55:06	2:80:06	1:35:07	1:35:06	0.01	0.00315	0	1.215107	1.715107	1.935107	6.855108	0	15107	57:08	0	0	0	0	0	0	25:01	10:06	15:06	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	1:55:09	1.619	0.00068	0.000	6:467	0.002	19%	65%	5%	7%	3%	0%														
15:04	25:04	25:04	05:04	10:04	15:04	4:55:06	2:80:06	1:33:07	1:34:06	0.01	0.00347	0	1.315107	1.775107	1.445107	6.655108	0	15107	58:08	0	0	0	0	0	0	25:01	10:06	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	1:55:09	1.477	0.00069	0.000	6:467	0.002	19%	66%	5%	7%	3%	0%														
15:04	25:04	25:04	05:04	10:04	15:04	4:55:06	2:80:06	1:33:07	1:34:06	0.01	0.00355	0	1.415107	1.825107	1.485107	6.855108	0	15107	60:08	0	0	0	0	0	0	25:01	10:06	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	1:55:09	1.611	0.00071	0.000	6:461	0.002	19%	66%	5%	7%	3%	0%														
15:04	25:04	25:04	05:04	10:04	15:04	4:75:06	2:80:06	1:33:07	1:34:06	0.01	0.00366	0	1.515107	1.875107	1.525107	7.015108	0	15107	62:08	0	0	0	0	0	0	25:01	10:06	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	1:55:09	1.647	0.00072	0.000	6:441	0.002	19%	66%	5%	7%	3%	0%														
15:04	25:04	25:04	05:04	10:04	15:04	4:75:06	2:80:06	1:33:07	1:34:06	0.01	0.00375	0	1.595107	1.925107	1.535107	7.195108	0	15107	64:08	0	0	0	0	0	0	25:01	10:06	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	1:55:09	1.687	0.00073	0.000	6:477	0.002	19%	67%	5%	7%	3%	0%														
15:04	25:04	25:04	05:04	10:04	15:04	4:85:06	2:80:06	1:33:07	1:34:06	0.01	0.00382	0	1.685107	1.995107	1.535107	7.335108	0	15107	66:08	0	0	0	0	0	0	25:01	10:06	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	1:55:09	1.733	0.00074	0.000	6:483	0.002	19%	68%	5%	7%	3%	0%														
15:04	25:04	25:04	05:04	10:04	15:04	4:85:06	2:80:06	1:33:07	1:34:06	0.01	0.00393	0	1.785107	1.995107	1.625107	7.475108	0	15107	68:08	0	0	0	0	0	0	25:01	10:06	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	1:55:09	1.816	0.00076	0.000	6:477	0.002	19%	68%	5%	7%	3%	0%														
15:04	25:04	25:04	05:04	10:04	15:04	4:85:06	2:80:06	1:33:07	1:34:06	0.01	0.00398	0	1.815107	2.035107	1.635107	7.635108	0	15107	70:08	0	0	0	0	0	0	25:01	10:06	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	1:55:09	1.847	0.00077	0.000	6:481	0.002	18%	67%	5%	7%	3%	0%														
15:04	25:04	25:04	05:04	10:04	15:04	4:85:06	2:80:06	1:33:07	1:34:06	0.01	0.00405	0	1.885107	2.075107	1.685107	7.795108	0	15107	72:08	0	0	0	0	0	0	25:01	10:06	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	1:55:09	1.887	0.00078	0.000	6:486	0.002	18%	67%	5%	7%	3%	0%														
15:04	25:04	25:04	05:04	10:04	15:04	4:85:06	2:80:06	1:33:07	1:34:06	0.01	0.00411	0	1.915107	2.115107	1.715107	7.855108	0	15107	74:08	0	0	0	0	0	0	25:01	10:06	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	1:55:09	1.947	0.00079	0.000	6:481	0.002	18%	67%	5%	7%	3%	0%														
15:04	25:04	25:04	05:04	10:04	15:04	4:85:06	2:80:06	1:33:07	1:34:06	0.01	0.00421	0	2.015107	2.115107	1.715107	8.015108	0	15107	76:08	0	0	0	0	0	0	25:01	10:06	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	1:55:09	2.007	0.00081	0.000	6:486	0.002	18%	67%	5%	7%	3%	0%														
15:04	25:04	25:04	05:04	10:04	15:04	4:85:06	2:80:06	1:33:07	1:34:06	0.01	0.00423	0	2.085107	2.185107	1.785107	8.135108	0	15107	78:08	0	0	0	0	0	0	25:01	10:06	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	1:55:09	2.047	0.00081	0.000	6:514	0.002	18%	68%	5%	7%	3%	0%														
15:04	25:04	25:04	05:04	10:04	15:04	4:85:06	2:80:06	1:33:07	1:34:06	0.01	0.00426	0	2.085107	2.185107	1.775107	8.235108	0	15107	80:08	0	0	0	0	0	0	25:01	10:06	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	1:55:09	2.087	0.00081	0.000	6:514	0.002	18%	68%	5%	7%	3%	0%														
15:04	25:04	25:04	05:04	10:04	15:04	4:85:06	2:80:06	1:33:07	1:34:06	0.01	0.00428	0	2.115107	2.185107	1.775107	8.335108	0	15107	82:08	0	0	0	0	0	0	25:01	10:06	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	15:07	1:55:09	2.127	0.00081	0.000	6:514	0.002	18%	68%	5%	7%	3%	0%														
15:04	25:04	25:04	05:04	10:04	15:04	4:85:06	2:80:06	1:33:07	1:34:06	0.01	0.00429	0	2.11																																																	

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TAMT Risk Assessment - TOG Toxics for Acute

AERMOD Output

Discrete		AERMOD UNITIZED CONCENTRATIONS																TOG SCALED CONCENTRATIONS																CONCENTRATION BY SPECIES																ACUTE HAZARD BY SPECIES - TOTAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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X	Y	B10.1_BUR	B10.2_BUR	B10.3_BUR	B10.4_BUR	B10.5_BUR	B10.6_BUR	B10.7_BUR	B10.8_BUR	B10.9_BUR	B10.10_BUR	B10.11_BUR	B10.12_BUR	B10.13_BUR	B10.14_BUR	B10.15_BUR	B10.16_BUR	B10.17_BUR	B10.18_BUR	B10.19_BUR	B10.20_BUR	B10.21_BUR	B10.22_BUR	B10.23_BUR	B10.24_BUR	B10.25_BUR	B10.26_BUR	B10.27_BUR	B10.28_BUR	B10.29_BUR	B10.30_BUR	B10.31_BUR	B10.32_BUR	B10.33_BUR	B10.34_BUR	B10.35_BUR	B10.36_BUR	B10.37_BUR	B10.38_BUR	B10.39_BUR	B10.40_BUR	B10.41_BUR	B10.42_BUR	B10.43_BUR	B10.44_BUR	B10.45_BUR	B10.46_BUR	B10.47_BUR	B10.48_BUR	B10.49_BUR	B10.50_BUR	B10.51_BUR	B10.52_BUR	B10.53_BUR	B10.54_BUR	B10.55_BUR	B10.56_BUR	B10.57_BUR	B10.58_BUR	B10.59_BUR	B10.60_BUR	B10.61_BUR	B10.62_BUR	B10.63_BUR	B10.64_BUR	B10.65_BUR	B10.66_BUR	B10.67_BUR	B10.68_BUR	B10.69_BUR	B10.70_BUR	B10.71_BUR	B10.72_BUR	B10.73_BUR	B10.74_BUR	B10.75_BUR	B10.76_BUR	B10.77_BUR	B10.78_BUR	B10.79_BUR	B10.80_BUR	B10.81_BUR	B10.82_BUR	B10.83_BUR	B10.84_BUR	B10.85_BUR	B10.86_BUR	B10.87_BUR	B10.88_BUR	B10.89_BUR	B10.90_BUR	B10.91_BUR	B10.92_BUR	B10.93_BUR	B10.94_BUR	B10.95_BUR	B10.96_BUR	B10.97_BUR	B10.98_BUR	B10.99_BUR	B10.100_BUR	B10.101_BUR	B10.102_BUR	B10.103_BUR	B10.104_BUR	B10.105_BUR	B10.106_BUR	B10.107_BUR	B10.108_BUR	B10.109_BUR	B10.110_BUR	B10.111_BUR	B10.112_BUR	B10.113_BUR	B10.114_BUR	B10.115_BUR	B10.116_BUR	B10.117_BUR	B10.118_BUR	B10.119_BUR	B10.120_BUR	B10.121_BUR	B10.122_BUR	B10.123_BUR	B10.124_BUR	B10.125_BUR	B10.126_BUR	B10.127_BUR	B10.128_BUR	B10.129_BUR	B10.130_BUR	B10.131_BUR	B10.132_BUR	B10.133_BUR	B10.134_BUR	B10.135_BUR	B10.136_BUR	B10.137_BUR	B10.138_BUR	B10.139_BUR	B10.140_BUR	B10.141_BUR	B10.142_BUR	B10.143_BUR	B10.144_BUR	B10.145_BUR	B10.146_BUR	B10.147_BUR	B10.148_BUR	B10.149_BUR	B10.150_BUR	B10.151_BUR	B10.152_BUR	B10.153_BUR	B10.154_BUR	B10.155_BUR	B10.156_BUR	B10.157_BUR	B10.158_BUR	B10.159_BUR	B10.160_BUR	B10.161_BUR	B10.162_BUR	B10.163_BUR	B10.164_BUR	B10.165_BUR	B10.166_BUR	B10.167_BUR	B10.168_BUR	B10.169_BUR	B10.170_BUR	B10.171_BUR	B10.172_BUR	B10.173_BUR	B10.174_BUR	B10.175_BUR	B10.176_BUR	B10.177_BUR	B10.178_BUR	B10.179_BUR	B10.180_BUR	B10.181_BUR	B10.182_BUR	B10.183_BUR	B10.184_BUR	B10.185_BUR	B10.186_BUR	B10.187_BUR	B10.188_BUR	B10.189_BUR	B10.190_BUR	B10.191_BUR	B10.192_BUR	B10.193_BUR	B10.194_BUR	B10.195_BUR	B10.196_BUR	B10.197_BUR	B10.198_BUR	B10.199_BUR	B10.200_BUR	B10.201_BUR	B10.202_BUR	B10.203_BUR	B10.204_BUR	B10.205_BUR	B10.206_BUR	B10.207_BUR	B10.208_BUR	B10.209_BUR	B10.210_BUR	B10.211_BUR	B10.212_BUR	B10.213_BUR	B10.214_BUR	B10.215_BUR	B10.216_BUR	B10.217_BUR	B10.218_BUR	B10.219_BUR	B10.220_BUR	B10.221_BUR	B10.222_BUR	B10.223_BUR	B10.224_BUR	B10.225_BUR	B10.226_BUR	B10.227_BUR	B10.228_BUR	B10.229_BUR	B10.230_BUR	B10.231_BUR	B10.232_BUR	B10.233_BUR	B10.234_BUR	B10.235_BUR	B10.236_BUR	B10.237_BUR	B10.238_BUR	B10.239_BUR	B10.240_BUR	B10.241_BUR	B10.242_BUR	B10.243_BUR	B10.244_BUR	B10.245_BUR	B10.246_BUR	B10.247_BUR	B10.248_BUR	B10.249_BUR	B10.250_BUR	B10.251_BUR	B10.252_BUR	B10.253_BUR	B10.254_BUR	B10.255_BUR	B10.256_BUR	B10.257_BUR	B10.258_BUR	B10.259_BUR	B10.260_BUR	B10.261_BUR	B10.262_BUR	B10.263_BUR	B10.264_BUR	B10.265_BUR	B10.266_BUR	B10.267_BUR	B10.268_BUR	B10.269_BUR	B10.270_BUR	B10.271_BUR	B10.272_BUR	B10.273_BUR	B10.274_BUR	B10.275_BUR	B10.276_BUR	B10.277_BUR	B10.278_BUR	B10.279_BUR	B10.280_BUR	B10.281_BUR	B10.282_BUR	B10.283_BUR	B10.284_BUR	B10.285_BUR	B10.286_BUR	B10.287_BUR	B10.288_BUR	B10.289_BUR	B10.290_BUR	B10.291_BUR	B10.292_BUR	B10.293_BUR	B10.294_BUR	B10.295_BUR	B10.296_BUR	B10.297_BUR	B10.298_BUR	B10.299_BUR	B10.300_BUR	B10.301_BUR	B10.302_BUR	B10.303_BUR	B10.304_BUR	B10.305_BUR	B10.306_BUR	B10.307_BUR	B10.308_BUR	B10.309_BUR	B10.310_BUR	B10.311_BUR	B10.312_BUR	B10.313_BUR	B10.314_BUR	B10.315_BUR	B10.316_BUR	B10.317_BUR	B10.318_BUR	B10.319_BUR	B10.320_BUR	B10.321_BUR	B10.322_BUR	B10.323_BUR	B10.324_BUR	B10.325_BUR	B10.326_BUR	B10.327_BUR	B10.328_BUR	B10.329_BUR	B10.330_BUR	B10.331_BUR	B10.332_BUR	B10.333_BUR	B10.334_BUR	B10.335_BUR	B10.336_BUR	B10.337_BUR	B10.338_BUR	B10.339_BUR	B10.340_BUR	B10.341_BUR	B10.342_BUR	B10.343_BUR	B10.344_BUR	B10.345_BUR	B10.346_BUR	B10.347_BUR	B10.348_BUR	B10.349_BUR	B10.350_BUR	B10.351_BUR	B10.352_BUR	B10.353_BUR	B10.354_BUR	B10.355_BUR	B10.356_BUR	B10.357_BUR	B10.358_BUR	B10.359_BUR	B10.360_BUR	B10.361_BUR	B10.362_BUR	B10.363_BUR	B10.364_BUR	B10.365_BUR	B10.366_BUR	B10.367_BUR	B10.368_BUR	B10.369_BUR	B10.370_BUR	B10.371_BUR	B10.372_BUR	B10.373_BUR	B10.374_BUR	B10.375_BUR	B10.376_BUR	B10.377_BUR	B10.378_BUR	B10.379_BUR	B10.380_BUR	B10.381_BUR	B10.382_BUR	B10.383_BUR	B10.384_BUR	B10.385_BUR	B10.386_BUR	B10.387_BUR	B10.388_BUR	B10.389_BUR	B10.390_BUR	B10.391_BUR	B10.392_BUR	B10.393_BUR	B10.394_BUR	B10.395_BUR	B10.396_BUR	B10.397_BUR	B10.398_BUR	B10.399_BUR	B10.400_BUR	B10.401_BUR	B10.402_BUR	B10.403_BUR	B10.404_BUR	B10.405_BUR	B10.406_BUR	B10.407_BUR	B10.408_BUR	B10.409_BUR	B10.410_BUR	B10.411_BUR	B10.412_BUR	B10.413_BUR	B10.414_BUR	B10.415_BUR	B10.416_BUR	B10.417_BUR	B10.418_BUR	B10.419_BUR	B10.420_BUR	B10.421_BUR	B10.422_BUR	B10.423_BUR	B10.424_BUR	B10.425_BUR	B10.426_BUR	B10.427_BUR	B10.428_BUR	B10.429_BUR	B10.430_BUR	B10.431_BUR	B10.432_BUR	B10.433_BUR	B10.434_BUR	B10.435_BUR	B10.436_BUR	B10.437_BUR	B10.438_BUR	B10.439_BUR	B10.440_BUR	B10.441_BUR	B10.442_BUR	B10.443_BUR	B10.444_BUR	B10.445_BUR	B10.446_BUR	B10.447_BUR	B10.448_BUR	B10.449_BUR	B10.450_BUR	B10.451_BUR	B10.452_BUR	B10.453_BUR	B10.454_BUR	B10.455_BUR	B10.456_BUR	B10.457_BUR	B10.458_BUR	B10.459_BUR	B10.460_BUR	B10.461_BUR	B10.462_BUR	B10.463_BUR	B10.464_BUR	B10.465_BUR	B10.466_BUR	B10.467_BUR	B10.468_BUR	B10.469_BUR	B10.470_BUR	B10.471_BUR	B10.472_BUR	B10.473_BUR	B10.474_BUR	B10.475_BUR	B10.476_BUR	B10.477_BUR	B10.478_BUR	B10.479_BUR	B10.480_BUR	B10.481_BUR	B10.482_BUR	B10.483_BUR	B10.484_BUR	B10.485_BUR	B10.486_BUR	B10.487_BUR	B10.488_BUR	B10.489_BUR	B10.490_BUR	B10.491_BUR	B10.492_BUR	B10.493_BUR	B10.494_BUR	B10.495_BUR	B10.496_BUR	B10.497_BUR	B10.498_BUR	B10.499_BUR	B10.500_BUR	B10.501_BUR	B10.502_BUR	B10.503_BUR	B10.504_BUR	B10.505_BUR	B10.506_BUR	B10.507_BUR	B10.508_BUR	B10.509_BUR	B10.510_BUR	B10.511_BUR	B10.512_BUR	B10.513_BUR	B10.514_BUR	B10.515_BUR	B10.516_BUR	B10.517_BUR	B10.518_BUR	B10.519_BUR	B10.520_BUR	B10.521_BUR	B10.522_BUR	B10.523_BUR	B10.524_BUR	B10.525_BUR	B10.526_BUR	B10.527_BUR	B10.528_BUR	B10.529_BUR	B10.530_BUR	B10.531_BUR	B10.532_BUR	B10.533_BUR	B10.534_BUR	B10.535_BUR	B10.536_BUR	B10.537_BUR	B10.538_BUR	B10.539_BUR	B10.540_BUR	B10.541_BUR	B10.542_BUR	B10.543_BUR	B10.544_BUR	B10.545_BUR	B10.546_BUR	B10.547_BUR	B10.548_BUR	B10.549_BUR	B10.550_BUR	B10.551_BUR	B10.552_BUR	B10.553_BUR	B10.554_BUR	B10.555_BUR	B10.556_BUR	B10.557_BUR	B10.558_BUR	B10.559_BUR	B10.560_BUR	B10.561_BUR	B10.562_BUR	B10.563_BUR	B10.564_BUR	B10.565_BUR	B10.566_BUR	B10.567_BUR	B10.568_BUR	B10.569_BUR	B10.570_BUR	B10.571_BUR	B10.572_BUR	B10.573_BUR	B10.574_BUR	B10.575_BUR	B10.576_BUR	B10.577_BUR	B10.578_BUR	B10.579_BUR	B10.580_BUR	B10.581_BUR	B10.582_BUR	B10.583_BUR	B10.584_BUR	B10.585_BUR	B10.586_BUR	B10.587_BUR	B10.588_BUR	B10.589_BUR	B10.590_BUR	B10.591_BUR	B10.592_BUR	B10.593_BUR	B10.594_BUR	B10.595_BUR	B10.596_BUR	B10.597_BUR	B10.598_BUR	B10.599_BUR	B10.600_BUR	B10.601_BUR	B10.602_BUR	B10.603_BUR	B10.604_BUR	B10.605_BUR	B10.606_BUR	B10.607_BUR	B10.608_BUR	B10.609_BUR	B10.610_BUR	B10.611_BUR	B10.612_BUR	B10.613_BUR	B10.614_BUR	B10.615_BUR	B10.616_BUR	B10.617_BUR	B10.618_BUR	B10.619_BUR	B10.620_BUR	B10.621_BUR	B10.622_BUR	B10.623_BUR	B10.624_BUR	B10.625_BUR	B10.626_BUR	B10.627_BUR	B10.628_BUR	B10.629_BUR	B10.630_BUR	B10.631_BUR	B10.632_BUR	B10.633_BUR	B10.634_BUR	B10.635_BUR	B10.636_BUR	B10.637_BUR	B10.638_BUR	B10.639_BUR	B10.640_BUR	B10.641_BUR	B10.642_BUR	B10.643_BUR	B10.644_BUR	B10.645_BUR	B10.646_BUR	B10.647_BUR	B10.648_BUR	B10.649_BUR	B10.650_BUR	B10.651_BUR	B10.652_BUR	B10.653_BUR	B10.654_BUR	B10.655_BUR	B10.656_BUR	B10.657_BUR	B10.658_BUR	B10.659_BUR	B10.660_BUR	B10.661_BUR	B10.662_BUR	B10.663_BUR	B10.664_BUR	B10.665_BUR	B10.666_BUR	B10.667_BUR	B10.668_BUR	B10.669_BUR	B10.670_BUR	B10.671_BUR	B10.672_BUR	B10.673_BUR	B10.674_BUR	B10.675_BUR	B10.676_BUR	B10.677_BUR	B10.678_BUR	B10.679_BUR	B10.680_BUR	B10.681_BUR	B10.682_BUR	B10.683_BUR	B10.684_BUR	B10.685_BUR	B10.686_BUR	B10.687_BUR	B10.688_BUR	B10.689_BUR	B10.690_BUR	B10.691_BUR	B10.692_BUR	B10.693_BUR	B10.694_BUR	B10.695_BUR	B10.696_BUR	B10.697_BUR	B10.698_BUR	B10.699_BUR	B10.700_BUR	B10.701_BUR	B10.702_BUR	B10.703_BUR	B10.704_BUR	B10.705_BUR	B10.706_BUR	B10.707_BUR	B10.708_BUR	B10.709_BUR	B10.710_BUR	B10.711_BUR	B10.712_BUR	B10.713_BUR	B10.714_BUR	B10.715_BUR	B10.716_BUR	B10.717_BUR	B10.718_BUR	B10.719_BUR	B10.720_BUR	B10.721_BUR	B10.722_BUR	B10.723_BUR	B10.724_BUR	B10.725_BUR	B10.726_BUR	B10.727_BUR	B10.728_BUR	B10.729_BUR	B10.730_BUR	B10.731_BUR	B10.732_BUR	B10.733_BUR	B10.734_BUR	B10.735_BUR	B10.736_BUR	B10.737_BUR	B10.738_BUR	B10.739_BUR	B10.740_BUR	B10.741_BUR	B10.742_BUR	B10.743_BUR	B10.744_BUR	B10.745_BUR	B10.746_BUR	B10.747_BUR	B10.748_BUR	B10.749_BUR	B10.750_BUR	B10.751_BUR	B10.752_BUR	B10.753_BUR	B10.754_BUR	B10.755_BUR	B10.756_BUR	B10.757_BUR	B10.758_BUR	B10.759_BUR	B10.760_BUR	B10.761_BUR	B10.762_BUR	B10.763_BUR	B10.764_BUR	B10.765_BUR	B10.766_BUR	B10.767_BUR	B10.768_BUR	B10.769_BUR	B10.770_BUR	B10.771_BUR	B10.772_BUR	B10.773_BUR	B10.774_BUR	B10.775_BUR	B10.776_BUR	B10.777_BUR	B10.778_BUR	B10.779_BUR	B10.780_BUR	B10.781_BUR	B10.782_BUR	B10.783_BUR	B10.784_BUR	B10.785_BUR	B10.786_BUR	B10.787_BUR	B10.788_BUR	B10.789_BUR	B10.790_BUR	B10.791_BUR	B10.792_BUR	B10.793_BUR	B10.794_BUR	B10.795_BUR	B10.796_BUR	B10.797_BUR	B10.798_BUR	B10.799_BUR	B10.800_BUR	B10.801_BUR	B10.802_BUR	B10.803_BUR	B10.804_BUR	B10.805_BUR	B10.806_BUR	B10.807_BUR	B10.808_BUR	B10.809_BUR	B10.810_BUR	B10.811_BUR	B10.812_BUR	B10.813_BUR	B10.814_BUR	B10.815_BUR	B10.816_BUR	B10.817_BUR	B10.818_BUR	B10.819_BUR	B10.820_BUR	B10.821_BUR	B10.822_BUR	B10.823_BUR	B10.824_BUR	B10.825_BUR	B10.826_BUR	B10.827_BUR	B10.828_BUR	B10.829_BUR	B10.830_BUR	B10.831_BUR	B10.832_BUR	B10.833_BUR	B10.834_BUR	B10.835_BUR	B10.836_BUR	B10.837_BUR	B10.838_BUR	B10.839_BUR	B10.840_BUR	B10.841_BUR	B10.842_BUR	B10.843_BUR	B10.844_BUR	B10.845_BUR	B10.846_BUR	B10.847_BUR	B10.848_BUR	B10.849_BUR	B10.850_BUR	B10.851_BUR	B10.852_BUR	B10.853_BUR	B10.854_BUR	B10.855_BUR	B10.856_BUR	B10.857_BUR	B10.858_BUR	B10.859_BUR	B10.860_BUR	B10.861_BUR	B10.862_BUR	B10.863_BUR	B10.864_BUR	B10.865_BUR	B10.866_BUR	B10.867_BUR	B10.868_BUR	B10.869_BUR	B10.870_BUR	B10.871_BUR	B10.872_BUR	B10.873_BUR	B10.874_BUR	B10.875_BUR	B10.876_BUR	B10.877_BUR	B10.878_BUR	B10.879_BUR	B10.880_BUR	B10.881_BUR	B10.882_BUR	B10.883_BUR	B10.884_BUR	B10.885_BUR	B10.886_BUR	B10.887_BUR	B10.888_BUR	B10.889_BUR	B10.890_BUR	B10.891_BUR	B10.892_BUR	B10.893_BUR	B10.894_BUR	B10.895_BUR	B10.896_BUR	B10.897_BUR	B10.898_BUR	B10.899_BUR	B10.900_BUR	B10.901_BUR	B10.902_BUR	B10.903_BUR	B10.904_BUR	B10.905_BUR	B10.906_BUR	B10.907_BUR	B10.908_BUR	B10.909_BUR	B10.910_BUR	B10.911_BUR	B10.912_BUR	B10.913_BUR	B10.914_BUR	B10.915_BUR	B10.916_BUR	B10.917_BUR	B10.918_BUR	B10.919_BUR	B10.920_BUR	B10.921_BUR	B10.922_BUR	B10.923_BUR	B10.924_BUR	B10.925_BUR	B10.926_BUR	B10.927_BUR	B10.928_BUR	B10.929_BUR	B10.930_BUR	B10.931_BUR	B10.932_BUR	B10.933_BUR	B10.934_BUR	B10.935_BUR	B10.936_BUR	B10.937_BUR	B10.938_BUR	B10.939_BUR	B10.940_BUR	B10.941_BUR	B10.942_BUR	B10.943_BUR

[illegible]

[illegible]

[illegible]

HRA Factors and values

Dose factors		3rd tri	0<2	2<9	2<16	16<30	16-70	source
Daily Breath Rate (L/kg-day)	residential	361	1090	631	572	261	233	OEHHA 2015, Table 5.6, 95th %ile for 3rdtri-2yrs old; 80th for other age groups
	recreational	0	1200	640	520	240	230	OEHHA 2015, Table 5.8 (95th, moderate) for all bins but 3rd tri; assume no 3rd tri receptors;
	school	0	1200	640	520	240	230	same as park
A		1	1	1	1	1	1	constant
EF, Fraction of time exposed	residential	0.96	0.96	0.96	0.96	0.96	0.96	OEHHA 2015, page 5-24, 350 days/yr
	recreational	0.08	0.08	0.08	0.08	0.08	0.08	yearly, based on estimated 350 day/yr, 2 hrs/day exposure
	school	0.12	0.12	0.12	0.12	0.12	0.12	based on 180 days/yr, 6 hrs/day
Conversion Factor		1.0E-06	1.0E-06	1.0E-06	1.0E-06	1.0E-06	1.0E-06	(mg/ug + m3/L)
WAF		-	-	-	-	1	1	Source is constant; WAF of 1 assumed per OEHHA 2015 page 5-31

Risk Factors		3rd tri	0<2	2<9	2<16	16<30	16-70	source
CPF, DPM ([mg/kg-day] ⁻¹)		1.1	1.1	1.1	1.1	1.1	1.1	OEHHA 2015, Table 7.1
ASF		10	10	3	3	1	1	Table 8.3, OEHHA 2015
Adjustment Factor (schools)		3.36	3.36	3.36	3.36	3.36	3.36	OEHHA 2015, Page 4-44 and Equation 4.1; the long term residential exposure is adjusted upward to represent th
ED, Exposure Duration (years)								
	Residential - 30yr	0.25	2.00		14.00	14.00		Equation 8.2.4 A, OEHHA 2015
	Recreational		2.00	7.00		6.00		Equation 8.2.4 B, OEHHA 2015
	School - 9yr		0.00	7.00	2.00			BAAQMD HRSA Guidalines, Jan 2010, page 3
AT, Average Time (days)		70	70	70	70	70	70	Averaging time for lifetime cancer risk (years), always 70
FAH		1.00	1.00	1.00	1.00	1.00	1.00	Table 8.4, OEHHA 2015 (only for residential, but worst-case to assume 1.0; recreation assumed to be 1.0)

Hazard Index

Chronic Inhalation Reference Exposure Level, respiratory,	5							OEHHA 2015, Table 6.3
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conversions:

Second per hour	3600
Grams per ton	907184.74
Million	1,000,000
days per year	365

AERMOD Outputs are 5,000+ pages and
available upon request

Sea Level Rise Calculation Sheet

Sea Level Rise Assessment

for TAMT site

3.28084 m to ft conversion

Existing Setting

	Existing tidal at POSD	
	Meters	Feet
Highest Tide Observed	2.4	7.87
Mean Higher High Water (MHHW)	1.72	5.64
Mean High Water	1.47	4.82
Mean Sea Level (MSL)	0.88	2.89
Mean Lower Low Water	0.00	0.00
Lowest Tide Observed	0.66	2.17

<https://www.portofsandiego.org/maritime/check-port-and-harbor-conditions/424-tides-and-currents.html>

Existing Height at TAMT: 7 "22-feet above mean sea level (amsl) in the southern portion of the site to 26 feet amsl in the northern portion of the site"
Dole lease out to approx 2036 24.5 yr signed Aug 2012

SLR Projections

Table 1. Sea-Level Rise Projections using 2000 as the Baseline

Time Period	North of Cape Mendocino ³	South of Cape Mendocino
2000 - 2030	-4 to 23 cm (-0.13 to 0.75 ft)	4 to 30 cm (0.13 to 0.98 ft)
2000 - 2050	-3 to 48 cm (-0.1 to 1.57 ft)	12 to 61 cm (0.39 to 2.0 ft)
2000 - 2100	10 to 143 cm (0.3 to 4.69 ft)	42 to 167 cm (1.38 to 5.48 ft)

http://www.opc.ca.gov/webmaster/ftp/pdf/docs/2013_SLR_Guidance_Update_FINAL1.pdf

100-yr surge event

"The 1% annual exceedance probability levels are 0.73 meters (2.40 feet) above Mean Higher High Water and 0.82 meters (2.69 feet) below Mean Lower Low Water"

100-yr event above MHHW 2.40 ft

<http://tidesandcurrents.noaa.gov/est/curves.shtml?stnid=9410170>

Calculations for permanent and temporary SLR

Table XX Sea Level Rise Elevation and Projections at Harbor Island West Marina

Year	Existing Tidal Datum ¹		Sea Level Rise Projection ²		Project Elevation Relative to Projections ³ - Permanent SLR		Project Elevation Relative to Projections plus Storm Surge ⁴ - Temporary SLR	
	Site Elevation above MSL	MHHW above MSL	Lower End	Upper End	Lower End	Upper End	Lower End	Upper End
2030	7.00	2.76	0.13	0.98	4.11	3.26	1.71	0.86
2050	7.00	2.76	0.39	2.00	3.85	2.24	1.45	-0.16
2100	7.00	2.76	1.38	5.48	2.86	-1.24	0.46	-3.64

¹ Mean High Water Elevation above MSL calculated based on the difference between mean higher high water (5.64 feet) and MSL (2.89 feet). Obtained from: <https://www.portofsandiego.org/maritime/check-port-and-harbor-conditions/424-tides-and-currents.html>

² Based on projections for south of Cape Mendocino. Obtained from: http://www.opc.ca.gov/webmaster/ftp/pdf/docs/2013_SLR_Guidance_Update_FINAL1.pdf

³ Based on the difference between site elevation, Mean High Water Elevation above MSL, and sea level rise projects. For example, the lower end elevation for 2030 is calculated as follows: 7.00 - 2.76 - 0.13 = 4.11 feet.

⁴ Based on the difference between permanent SLR above MHHW and 100-yr (1% return probability) surge events. For example, the lower end elevation for 2030 is calculated as follows: 4.11 - 2.40 = 1.71 feet.

Appendix G

Transportation Impact Analysis

Transportation Impact Analysis

Tenth Avenue Marine Terminal Redevelopment Plan

Revised Draft Report

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June 22, 2016

Executive Summary

The purpose of this Transportation Impact Analysis (TIA) is to identify and document potential transportation impacts related to the implementation of the Tenth Avenue Marine Terminal Redevelopment Plan (proposed project), as well as to recommend mitigation measures, as necessary, for any identified transportation related impacts associated with the proposed project.

ES.1 Study Purpose and Project Description

The Tenth Avenue Marine Terminal (TAMT) Redevelopment Plan was developed to meet current and future market conditions at the terminal and replace the outdated 2008 Maritime Business Plan. The proposed Redevelopment Plan includes a series of infrastructure investments and other various operational improvements that may be undertaken over the short- and long-term to accommodate the need to increase the terminal's capabilities and capacity. Short-term improvements include demolition of Transit Sheds #1 and #2 to provide additional open storage space as well as an on-dock rail lubrication system and the capability to provide on-dock air brake testing. Long-term improvements include up to five gantry cranes, additional and consolidated dry bulk storage capacity, enhancements to the existing conveyor system, demolition of the molasses tanks and Warehouse C, and a new entry gate facility.

Since the proposed project is a market-based redevelopment plan and will not be implemented all at once or even in set phases. Instead, cargo throughput is anticipated to increase overtime based on market demands. However, it is anticipated that with the implementation of the proposed on-site physical improvements associated with the proposed project (demolition of the Transit Sheds #1 and #2, as well as improvements to the existing on-dock intermodal rail facilities) will allow for the terminal to serve latent throughput demand that it cannot service under current conditions. To understand the potential transportation related impacts associated with these physical improvements, which are scheduled to be constructed by Year 2021, an additional interim project scenario is also analyzed within the study.

ES.2 Project Trip Generation and Study Area

There are two main trip generators at the Tenth Avenue Marine Terminal which include freight movement (trucks) and employees. Based on the anticipated increase in site operations, the proposed project is anticipated to require 524 additional employees and 423 additional truckloads of cargo on a daily basis under full buildout conditions. This equates to 4,110 new PCE (Passenger Car Equivalent) trips, including 477 trips during the AM peak hour and 477 trips during the PM peak hour.

Interim Project Trip Generation

Based on the anticipated increase in site operations under interim project conditions, the proposed project is anticipated to require 91 additional employees and 7 additional truckloads of cargo on a daily basis under full buildout conditions. This equates to 318 new PCE trips, including 71 trips during the AM peak hour and 71 trips during the PM peak hour.

Based on the project trip assignment, the City of San Diego Traffic Impact Study Guidelines, and input from Port District staff, the following key study roadway segments were analyzed in this study:

Harbor Drive between:

- Beardsley Street & Cesar Chavez Parkway
- Cesar Chavez Parkway & Sampson Street
- Sampson Street & Schley Street
- Schley Street & 28th Street
- 28th Street & Belt Street

28th Street between:

- Harbor Drive & Main Street
- Main Street & Boston Avenue
- Boston Avenue & National Avenue

32nd Street between:

- Harbor Drive & Norman Scott Road

The following eleven (11) key study area intersections were analyzed in the study:

1. Harbor Drive / Cesar Chavez Parkway
2. Harbor Drive / Sampson Street
3. Harbor Drive / Schley Street
4. Harbor Drive / 28th Street
5. 28th Street / Main Street
6. 28th Street / Boston Avenue
7. 28th Street / National Avenue
8. I-5 NB Off-Ramp / National Avenue
9. Harbor Drive / Belt Street
10. Harbor Drive / 32nd Street
11. Norman Scott Road / 32nd Street / Wabash Boulevard

Based on the project trip assignment, the following nine (9) key freeway mainline segments were analyzed:

- I-5 between SR-94 & Imperial Avenue
- I-5 between Imperial Avenue & SR-75
- I-5 between SR-75 & 28th Street
- I-5 between 28th Street & SR-15
- I-5 between SR-15 & Main Street
- SR-15 between SR-94 & Market Street
- SR-15 between Market Street & Ocean View Boulevard
- SR-15 between Ocean View Boulevard & I-5
- SR-15 between I-5 & Norman Scott Road

It should be noted that the interim project scenarios are not projected to generate enough traffic to warrant freeway mainline analyses (50 peak hour trips on any single freeway mainline segment). Therefore, freeway mainline analyses were only conducted for the following scenarios:

- Existing
- Existing Plus Project
- Future Year 2035 Base
- Future Year 2035 Base Plus Project

ES.3 Project Impacts and Mitigation Measures

Table ES-1 summarizes the transportation related impacts that would be associated with the proposed project, and a recommended mitigation measure, for each study scenario.

**Table ES-1
Project Impact and Mitigation Summary**

Scenario	Impact Type	Roadway		Intersection		Freeway Mainline	
		Impact	Mitigation	Impact	Mitigation	Impact	Mitigation
Existing Plus Project	Direct	28th Street, between Boston Avenue and National Avenue	Improve roadway to a Four-Lane Major configuration.	Norman Scott Road / 32nd Street / Wabash Boulevard	Implement a westbound right-turn overlap phase.	None	N/A
Existing Plus Project-Alternative Gate	Direct	28th Street, between Boston Avenue and National Avenue	Improve roadway to a Four-Lane Major configuration.	Norman Scott Road / 32nd Street / Wabash Boulevard	Implement a westbound right-turn overlap phase.	None	N/A
Existing Plus Interim Project	Direct	None	N/A	Norman Scott Road / 32nd Street / Wabash Boulevard.	Implement a westbound right-turn overlap phase.	N/A	N/A
Existing Plus Interim Project-Alternative Gate	Direct	None	N/A	Norman Scott Road / 32nd Street / Wabash Boulevard	Implement a westbound right-turn overlap phase.	N/A	N/A
Near-Term Year 2021 Base Plus Interim Project	Direct	None	N/A	Norman Scott Road / 32nd Street / Wabash Boulevard	Implement a westbound right-turn overlap phase.	N/A	N/A
Near-Term Year 2021 Base Plus Interim Project-Alternative Gate	Direct	None	N/A	Norman Scott Road / 32nd Street / Wabash Boulevard	Implement a westbound right-turn overlap phase.	N/A	N/A
Future Year 2035 Base Plus Project	Cumulative	28th Street, between Boston Avenue and National Avenue	Improve roadway to a Four-Lane Major configuration.	Norman Scott Road / 32nd Street / Wabash Boulevard	Implement a westbound right-turn overlap phase.	<ul style="list-style-type: none"> I-5 NB between SR-94 & Imperial Avenue I-5 NB between 28th Street & I-15 I-5 NB between I-15 & Main Street I-15 SB between Market Street & Ocean View Boulevard 	No Feasible Mitigation
Future Year 2035 Base Plus Project-Alternative Gate	Cumulative	28th Street, between Boston Avenue and National Avenue	Improve roadway to a Four-Lane Major configuration.	Norman Scott Road / 32nd Street / Wabash Boulevard	Implement a westbound right-turn overlap phase.	<ul style="list-style-type: none"> I-5 NB between SR-94 & Imperial Avenue I-5 NB between 28th Street & I-15 I-5 NB between I-15 & Main Street I-15 SB between Market Street & Ocean View Boulevard 	No Feasible Mitigation

Table ES-1
Project Impact and Mitigation Summary

Scenario	Impact Type	Roadway		Intersection		Freeway Mainline	
		Impact	Mitigation	Impact	Mitigation	Impact	Mitigation
Existing Plus Project Construction	Direct	None	N/A	Norman Scott Road / 32nd Street / Wabash Boulevard	Develop TDM Plan during project construction phase.	None	N/A
Near-Term Year 2021 Base Plus Project Constriction	Cumulative	None	N/A	Norman Scott Road / 32nd Street / Wabash Boulevard	Develop TDM Plan during project construction phase.	None	N/A

Active Transportation and Transit

Potential impacts relate to pedestrian, bicycle and transit circulation would be considered significant if the proposed project would substantially increase hazards due to a design feature, or would conflict with the adopted policies, plans, or programs supporting alternative transportation, as outlined in Appendix G of the *California Environmental Quality Act (CEQA) Guidelines*. The project is not proposing to make any improvements to roadways or other transportation related facilities outside of the TAMT. Therefore, the proposed project would not conflict with or generate any significant impacts associated with existing pedestrian, bicycle or transit facilities, as well as the planned facilities and policies

ES.4 Site Access

Current Access

Employees will access the site (both enter and exit) from the main Tenth Avenue Marine Terminal gate located south of the Harbor Drive / Cesar Chavez Parkway intersection. Truck traffic will enter and exit the Tenth Avenue Marine Terminal through the main gate; however, Refrigerated Truck traffic will exit the terminal via another gate located on Switzer Street, to the north of the Harbor Drive and Cesar Chavez Parkway intersection.

Access gates to the TAMT are not adjacent to the external street network, therefore, no anticipated operational impacts were identified. Under this scenario there are currently no proposed changes to the existing project access points including location and traffic control; therefore, no additional sight distance analysis should be required with this study.

Alternative Gate Scenario

The Tenth Avenue Marine Terminal Plan also identifies an alternative gate concept that would serve as the primary entry and exit location for the Refrigerated Container node and the Multi-Purpose General Cargo node. The alternative gate would be located in the north-east corner of the terminal and provide access directly onto Harbor Drive. According to the Plan, the Dry Bulk and Liquid Bulk Nodes would continue to utilize the existing gate off Cesar Chavez Parkway, particularly for domestic bulk shipments.

The alternative gate should be designed to take into account project sight distance and traffic queueing at all approaches. It is assumed that the alternative access point will create new signalized intersection along Harbor Drive. The alternative gate was identified as operated at LOS D or better under all scenarios that were analyzed. Therefore, the alternative gate is not projected to be associated with any additional transportation related impacts.

ES.5 Parking

Parking should be provided on-site for all anticipated new employees that are associated with the proposed project. Similar to trip generation, as a worst case scenario, it is assumed that all new employees associated with the proposed project will drive to the project site alone. Since

new employees associated with the proposed project will be split into 3 separate shifts, the proposed project will need to provide or account for additional parking spaces for the maximum number of new employees will be on the site at any given time, as well as an allowance for turn-over.

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1.0 Introduction

1.1 Purpose of the Report

The purpose of this Transportation Impact Analysis (TIA) is to identify and document potential transportation related impacts associated with the implementation of the Tenth Avenue Marine Terminal Redevelopment Plan (proposed project), as well as to recommend mitigation measures, as necessary, for any identified transportation related impacts associated with the proposed project.

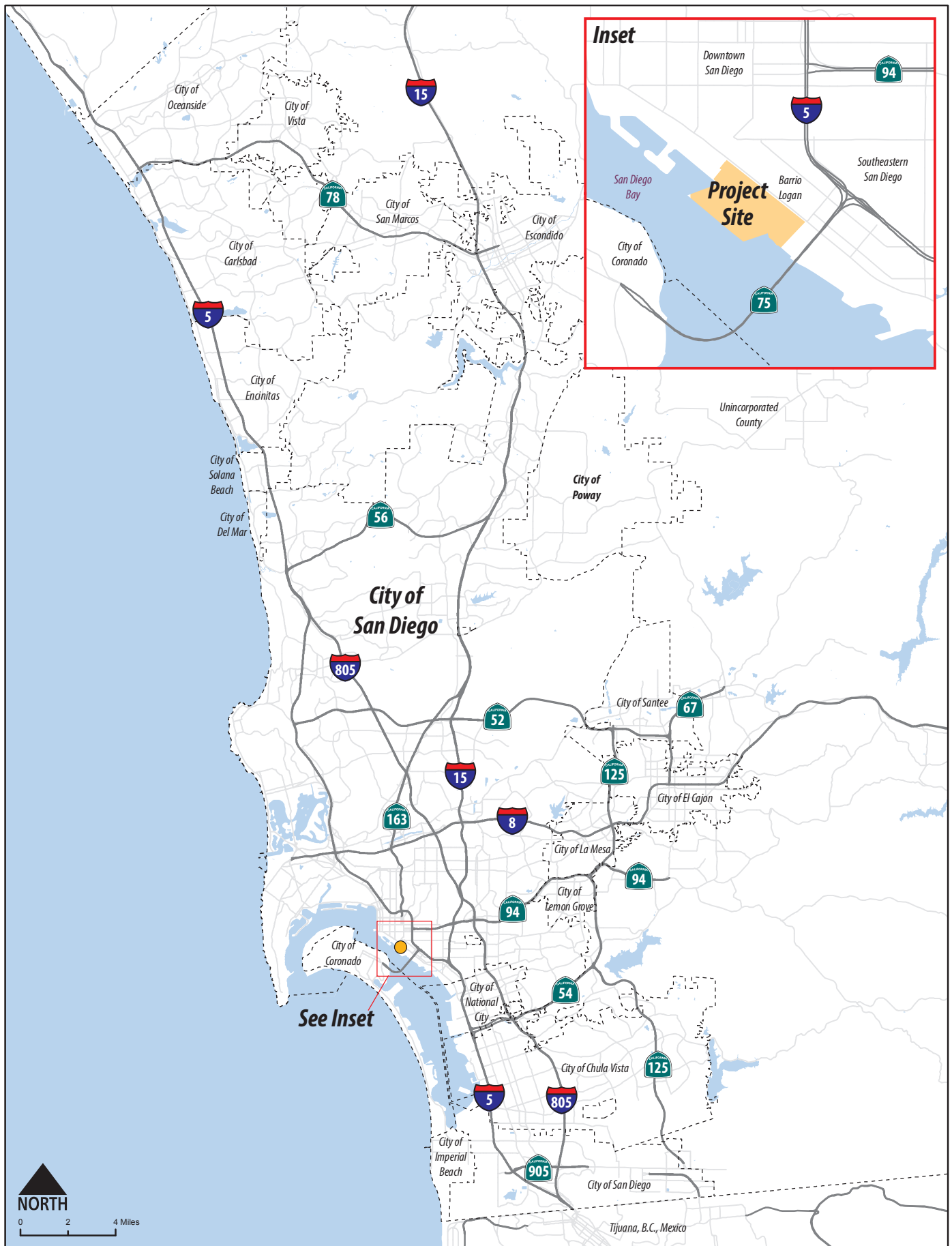
1.2 Project Background

The Tenth Avenue Marine Terminal (TAMT) Redevelopment Plan was developed to meet current and future market conditions at the terminal and replace the outdated 2008 Maritime Business Plan. The proposed Redevelopment Plan includes a series of infrastructure investments and other various operational improvements that may be undertaken over the short- and long-term to accommodate the need to increase the terminal's capabilities and capacity. Short-term improvements include demolition of Transit Sheds #1 and #2 to provide additional open storage space as well as an on-dock rail lubrication system and the capability to provide on-dock air brake testing. Long-term improvements include up to five gantry cranes, additional and consolidated dry bulk storage capacity, enhancements to the existing conveyor system, demolition of the molasses tanks and Warehouse C, and a new entry gate facility.

The entire extent of the project site is located within the Tenth Avenue Marine Terminal in San Diego, California. The regional location of the proposed project is displayed in **Figure 1-1**.

Aside from the near-term projects that include demolition of the two transit sheds, the installation of a rail lubrication system and air brake testing within the terminal, it should be noted that the remainder of the Redevelopment Plan is to be implemented over the long-term; therefore, the timing of its implementation will be based on ongoing market conditions, which means the exact timing and phasing is unknown. However, an analysis of Near-Term Year 2021 conditions (opening year) was conducted based on the anticipated market demands of cargo throughout, as well as associated with the increased capacity generated by the proposed project. Mitigation triggers, based on project traffic, have been identified for both direct and cumulative impacts to specify when the improvements are required.

Since the proposed project is a market-based redevelopment plan and will not be implemented all at once or even in set phases. Instead, cargo throughput is anticipated to increase overtime based on market demands. However, it is anticipated that with the implementation of the proposed on-site physical improvements associated with the proposed project (demolition of the Transit Sheds #1 and #2, as well as improvements to the existing on-dock intermodal rail facilities) will allow for the terminal to serve latent throughput demand that it cannot service under current conditions. To understand the potential transportation related impacts associated with these physical improvements, which are scheduled to be constructed by Year 2021, an additional interim project scenario is also analyzed within the study.



1.3 Report Organization

Following this Introduction chapter, this report is organized into the following chapters:

- 2.0 Analysis Methodology – This chapter describes the methodologies and standards utilized to analyze roadway and intersection traffic conditions.
- 3.0 Project Description – This chapter describes the proposed project including project trip generation, trip distribution patterns, and project trip assignments.
- 4.0 Existing Conditions – This chapter describes the existing traffic operations under no project, interim project and full project conditions. Direct transportation related impacts are identified under both full and interim project conditions, and associated mitigation measures are identified, if necessary.
- 5.0 Near-Term Year 2021 Conditions – This chapter describes near-term developments that are anticipated to generate additional trips within the project study area by Year 2021, the proposed project opening year. Analysis results are provided for the Year 2021 Base and Year 2021 Base Plus Interim Project conditions, along with recommended mitigation measures, if necessary.
- 6.0 Future Year 2035 Traffic Conditions – This chapter describes projected long-range traffic conditions both with and without project traffic. Mitigation measures for project-related impacts are identified for Future Year 2035 Base Plus Project conditions, if necessary.
- 7.0 Pedestrian, Bicycle and Transit Access – This chapter focuses on alternative modes of travel to and from the project (walking, bicycling and transit).
- 8.0 Project Construction – This chapter describes projected traffic operations during project construction.
- 9.0 Site Access and Parking – This chapter addresses access to the project site, and discusses the required parking within the project site.

2.0 Analysis Methodology

This TIA was performed in accordance with the requirements of the City of San Diego *Traffic Impact Study Manual*, and the District's California Environmental Quality Act (CEQA) project review process. Detailed information on roadway segment and intersection analysis methodologies, standards, and thresholds are discussed in the following sections.

2.1 Level of Service Definition

Level of Service (LOS) is a quantitative measure describing operational conditions within a traffic stream, and the motorist's and/or passengers' perception of operations. A LOS definition generally describes these conditions in terms of such factors as delay, speed, travel time, freedom to maneuver, interruptions in traffic flow, queuing, comfort, and convenience. **Table 2.1** describes generalized definitions of the various LOS categories (A through F) as applied to roadway operations.

Table 2.1 LOS Definitions

LOS Category	Definition of Operation
A	This LOS represents a completely free-flow condition, where the operation of vehicles is virtually unaffected by the presence of other vehicles and only constrained by the geometric features of the highway and by driver preferences.
B	This LOS represents a relatively free-flow condition, although the presence of other vehicles becomes noticeable. Average travel speeds are the same as in LOS A, but drivers have slightly less freedom to maneuver.
C	At this LOS the influence of traffic density on operations becomes marked. The ability to maneuver within the traffic stream is clearly affected by other vehicles.
D	At this LOS, the ability to maneuver is notably restricted due to traffic congestion, and only minor disruptions can be absorbed without extensive queues forming and the service deteriorating.
E	This LOS represents operations at or near capacity. LOS E is an unstable level, with vehicles operating with minimum spacing for maintaining uniform flow. At LOS E, disruptions cannot be dissipated readily thus causing deterioration down to LOS F.
F	At this LOS, forced or breakdown of traffic flow occurs, although operations appear to be at capacity, queues form behind these breakdowns. Operations within queues are highly unstable, with vehicles experiencing brief periods of movement followed by stoppages.

Source: *Highway Capacity Manual 2010*

2.2 Roadway Segment LOS Standards and Thresholds

Roadway segment LOS standards and thresholds provide the basis for analysis of arterial roadway segment performance. The analysis of roadway segment LOS is based on the functional classification of the roadway, the maximum capacity, roadway geometrics, and existing or forecast Average Daily Traffic (ADT) volumes. **Table 2.2** presents the roadway segment capacity and LOS standards utilized to analyze roadways evaluated in this report.

Table 2.2 City of San Diego Roadway Classifications and LOS Standards

Roadway Classification	LOS A	LOS B	LOS C	LOS D	LOS E
Expressway	30,000	42,000	60,000	70,000	80,000
Primer Arterial	25,000	35,000	50,000	55,000	60,000
Major Arterial (6-lane, divided)	< 20,000	< 28,000	< 40,000	< 45,000	< 50,000
Major Arterial (4-lane, divided)	< 15,000	< 21,000	< 30,000	< 35,000	< 40,000
Collector (4-lane w/ center lane)	< 10,000	< 14,000	< 20,000	< 25,000	< 30,000
Collector (4-lane w/o center lane)	< 5,000	< 10,000	< 13,000	< 15,000	< 20,000
Collector (2-lane w/ continuous left-turn lane)	< 5,000	< 10,000	< 13,000	< 15,000	< 20,000
Collector (2-lane no fronting property)	< 4,000	< 5,500	< 7,500	< 9,000	< 10,000
Collector (2-lane commercial-industrial fronting)	< 2,500	< 3,500	< 5,000	< 6,500	< 8,000
Collector (2-lane multi-family)	< 2,500	< 3,500	< 5,000	< 6,500	< 8,000
Sub-Collector (2-lane single family)	-	-	2,200	-	-

Source: City of San Diego, Traffic Impact Study Manual, July 1998

Note:

Bold numbers indicate the ADT thresholds for acceptable LOS.

These standards are generally used as long-range planning guidelines to determine the functional classification of roadways. The actual capacity of a roadway facility varies according to its physical attributes. Typically, the performance and LOS of a roadway segment is heavily influenced by the ability of its intersections to accommodate peak hour traffic volumes. For the purposes of this traffic analysis, LOS D is considered acceptable for the analyzed roadway segments.

2.3 Peak Hour Intersection LOS Standards and Thresholds

This section presents the methodologies used to perform peak hour intersection capacity analysis for signalized intersections. The following assumptions were utilized in conducting all intersection LOS analyses:

- *Pedestrian Calls per Hour:* 10 calls per hour for each pedestrian movement was assumed.
- *Signal Timing:* Based on existing signal timing plans (as of January 2015), provided in Appendix A.
- *Peak Hour Factor:* Based on existing peak hour count data for existing conditions included in Appendix A, and 0.92 for all future conditions.

It should be noted that no unsignalized intersections, warranting analysis, are located within the project study area.

Signalized Intersection Analysis

The analysis of signalized intersections utilized the operational analysis procedures as outlined in the *2010 Highway Capacity Manual (HCM)*. This method defines LOS in terms of delay, or more specifically, average stopped delay per vehicle. Delay is a measure of driver and/or

passenger discomfort, frustration, fuel consumption and lost travel time. This technique uses 1,900 vehicles per hour per lane (VPHPL) as the maximum saturation volume of an intersection. This saturation volume is adjusted to account for lane width, on-street parking, pedestrians, traffic composition (i.e., percentage trucks) and shared lane movements (i.e. through and right-turn movements originating from the same lane). The LOS criteria used for this technique are described in **Table 2.3**. The computerized analysis of intersection operations was performed utilizing the *Vistro 2.0-11* traffic analysis software.

Table 2.3 Signalized Intersection LOS Criteria

Average Stopped Delay Per Vehicle (seconds)	Level of Service (LOS) Characteristics
<10.0	LOS A describes operations with very low delay. This occurs when progression is extremely favorable, and most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
10.1 – 20.0	LOS B describes operations with generally good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
20.1 – 35.0	LOS C describes operations with higher delays, which may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
35.1 – 55.0	LOS D describes operations with high delay, resulting from some combination of unfavorable progression, long cycle lengths, or high volumes. The influence of congestion becomes more noticeable, and individual cycle failures are noticeable.
55.1 – 80.0	LOS E is considered the limit of acceptable delay. Individual cycle failures are frequent occurrences.
>80.0	LOS F describes a condition of excessively high delay, considered unacceptable to most drivers. This condition often occurs when arrival flow rates exceed the LOS D capacity of the intersection. Poor progression and long cycle lengths may also be major contributing causes to such delay.

Source: *Highway Capacity Manual 2010*

2.4 Ramp Intersection Capacity Analysis

Consistent with Caltrans requirements, all signalized intersections at freeway ramps were analyzed using Intersecting Lane Volume (ILV) procedures as described in Topic 406 of the Caltrans *Highway Design Manual* (HDM). This methodology is based upon an assessment of each intersection as an isolated unit, without consideration of the effects from adjacent intersections. For this reason, the ILV analysis is utilized as an additional validation of signalized ramp intersection operations derived from the 2010 Highway Capacity Manual methodology. **Table 2.4** provides values of ILV/hr associated with various traffic flow thresholds. Neither Caltrans nor the City uses ILV results in determining significance of project impacts, but the analyses are included for informational purposes.

Table 2.4 Traffic Flow Conditions at Ramp Intersections at Various Levels of Operation

<i>ILV/hr</i>	<i>Description</i>
<i><1200: (Under Capacity)</i>	Stable flow with slight, but acceptable delay. Occasional signal loading may develop. Free midblock operations.
<i>1200-1500: (At Capacity)</i>	Unstable flow with considerable delays possible. Some vehicles occasionally wait two or more cycles to pass through the intersection. Continuous backup occurs on some approaches.
<i>>1500: (Over Capacity)</i>	Stop-and-go operation with severe delay and heavy congestion ⁽¹⁾ . Traffic volume is limited by maximum discharge rates of each phase. Continuous backup in varying degrees occurs on all approaches. Where downstream capacity is restrictive, mainline congestion can impede orderly discharge through the intersection.

Source: Caltrans Highway Design Manual, Topic 406

Note:

(1) The amount of congestion depends on how much the ILV/hr value exceeds 1500. Observed flow rates will normally not exceed 1500ILV/hr, and the excess will be delayed in a queue.

2.5 Freeway Level of Service Standards and Thresholds

Freeway level of service analysis is based upon procedures developed by the California Department of Transportation (Caltrans). The procedure for calculating freeway level of service involves estimating a peak hour volume to capacity (V/C) ratio. Peak hour volumes are estimated from the application of design hour ("K"), directional ("D") and truck ("T") factors to Average Daily Traffic (ADT) volumes. The base capacities for Interstate 5 were assumed to be 2,350 passenger-car per hour per main lane (pc/h/ln) and 1,410 pc/h/ln (60% of the main lane capacity) for auxiliary lane, respectively.

The resulting V/C ratio is then compared to acceptable ranges of V/C values corresponding to the various levels of service for each facility classification, as shown in **Table 2.5**. The corresponding level of service represents an approximation of existing or anticipated future freeway operating conditions in the peak direction of travel during the peak hour. For the purpose of this study, LOS D is considered as the threshold for acceptable freeway operations. LOS D is the level at which speeds begin to decline slightly with increasing flows and density begins to increase somewhat more quickly. Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort levels.

Table 2.5 Freeway Segment LOS Definitions

LOS	V/C	Congestion/Delay	Traffic Description
<i>Used for freeways, expressways and conventional highways</i>			
"A"	<0.30	None	Free flow.
"B"	0.31-0.50	None	Free to stable flow, light to moderate volumes.
"C"	0.51-0.71	None to minimal	Stable flow, moderate volumes, freedom to maneuver noticeably restricted.
"D"	0.71-0.89	Minimal to substantial	Approaches unstable flow, heavy volumes, very limited freedom to maneuver.
"E"	0.90-1.00	Significant	Extremely unstable flow, maneuverability and psychological comfort extremely poor.
<i>Used for conventional highways</i>			
"F"	>1.00	Considerable	Forced or breakdown flow. Delay measured in average travel speed (MPH). Signalized segments experience delays >60.0 seconds/vehicle.

Source: Caltrans – Guide for the Preparation of Traffic Impact Studies; December 2002

2.6 Determination of Significant Impacts

The City of San Diego Significance Determination Thresholds, January 2011 defines project impact thresholds by facility type. These thresholds are generally based upon an acceptable increase in the Volume / Capacity (V/C) ratio for roadway and freeway segments, and upon increases in vehicle delays for intersections and ramps.

Within the City of San Diego's jurisdiction, LOS D is considered acceptable for roadway and intersection operations. A project is considered to have a significant impact if it degrades the operations of a roadway or intersection from an acceptable LOS (D or better) to an unacceptable LOS (E or F), or if it adds additional delay to a facility already operating an unacceptable level. **Table 2.6** summarizes the impact significant thresholds as identified within the City of San Diego's guidelines beyond which mitigation measures are required.

Table 2.6 City of San Diego Measure of Significant Project Traffic Impacts

LOS with Project	Allowable Change Due to Impact					
	Freeways		Roadway Segments		Intersections	Ramp Metering
	V/C	Speed (mph)	V/C	Speed (mph)	Delay (sec)	Delay (min.)
E (or ramp meter delays above 15 min.)	0.01	1.0	0.02	1.0	2.0	2.0
F (or ramp meter delays above 15 min.)	0.005	0.5	0.01	0.5	1.0	1.0

Source: City of San Diego, Significance Determination Thresholds, January 2011

3.0 Proposed Project

This section describes the proposed project, including land uses and estimated trip generation, trip distribution, trip assignment, and project study area.

3.1 Project Description

The Tenth Avenue Marine Terminal (TAMT) Redevelopment Plan would set to meet current and future market conditions at the terminal and replace the outdated 2008 Maritime Business Plan. The proposed Redevelopment Plan includes a series of infrastructure investments and improvements that may be undertaken over the short- and long-term to accommodate the need to increase the terminal's capabilities and capacity. Short-term improvements include demolition of Transit Sheds #1 and #2 to provide additional open storage space as well as an on-dock rail lubrication system and the capability to provide on-dock air brake testing. Long-term improvements include up to five gantry cranes, additional and consolidated dry bulk storage capacity, enhancements to the existing conveyor system, demolition of the molasses tanks and Warehouse C, and a new entry gate facility.

The proposed project would establish the following nodes and infrastructure improvements:

- **Dry Bulk:** The dry bulk node will be located in the general area of the southeastern portion of the terminal, also referred to as the terminal's "backlands." This node will be served by Berths 10-5/10-6 and Berths 10-7/10-8. Infrastructure improvements would include adding a consolidated dry bulk discharge facility, upgrades to the existing bulk cargo handling and conveyor system, and new semi-permanent storage facilities for dry bulk products.
- **Liquid Bulk:** The liquid bulk node and associated terminal infrastructure will be acknowledged by the proposed plan, but no changes in location, capacity or infrastructure improvements are proposed. Preferred berths would be 10-1/10-2. This TIA does include growth associated with increased liquid bulk throughput even though the Redevelopment Plan would not directly call for any changes to existing capacity or operations at this node.
- **Refrigerated Container:** The refrigerated container node will be located on the northern portion of the terminal and served by Berths 10-3/10-4, and overflow will be handled at Berths 10-5/10-6. The boundary between the refrigerated container node and the multipurpose general cargo node will fluctuate depending on need at any one time. This open area will allow the terminal to be used for the handling of diverse cargos as market conditions and vessel schedules permit. As such, construction of the refrigerated container node and Break Bulk / Multi-purpose General Cargo node will happen simultaneously. Infrastructure improvements will include one 100-foot mobile harbor crane at Berths 10- 1/10-2 and up to three 100-foot electrical cranes at Berths 10-3/10-4 including associated electrical utility improvements to operate the cranes.

- Break Bulk / Multi-purpose General Cargo:** The Break bulk / Multi-purpose General Cargo node will include an intermodal rail facility and would be located on the southern portion of the terminal in the area that is currently occupied by the eastern portion of Warehouse C and it would share Berths 10-3/10-4 and 10-5/10-6 with the refrigerated container node. Similar to the refrigerated container node, the boundary will fluctuate depending on need at any one time. This open area will allow the terminal to be used for the handling of diverse cargos as market conditions and vessel schedules permit. As such, construction of the refrigerated container and multi-purpose nodes will happen simultaneously. Infrastructure improvements include two gantry cranes at Berths 10-5/10-6 as well as various intermodal yard and backland improvements. Intermodal yard and backland improvements could include a bridge crane, full wheel container module with gantry cranes, rubber tired cranes for load-on and load-off, straddle carrier (stacked for the intermodal facility), additional paving to 600-per-square-foot live load and container handling equipment to handle 100kip wheel live load. Improvements will include upgrades to shore-side power capabilities to provide shore power to two vessels at the same time.
- Central Gate Facility:** The Central gate facility is the fifth redevelopment node contemplated by the proposed Plan. It will create a common gate facility, with a new truck weigh station, in the general location of the existing gate. It will be utilized by all terminal tenants and customers.

The layout of the Tenth Avenue Marine Terminal is displayed in **Figure 3-1**.

Table 3.1 summarizes the existing cargo throughput and truck load demands of TAMT on an annual basis.

Table 3.1 TAMT Existing Operations and Demand

Type	Existing Throughput (MT)	Existing Trucks (per year)
Dry Bulk	289,864	9,995
Liquid Bulk	31,520	292
Refrigerated Containers	637,931	21,998
Multi-Purpose Cargo	85,131	1,064
Total	1,044,446	33,349

Source: Chen Ryan Associates, June 2016

As shown, The TAMT has an existing total annual throughout of 1,044,446 metric tons (FY 2013), which required 33,349 truckloads of goods distributed from the terminal.



**Tenth Avenue Marine Terminal
Redevelopment Plan**
CHEN RYAN

**Figure 3-1
Terminal Layout**

The improvements proposed in TAMT Redevelopment Plan will allow for significant increases in the terminal's overall maximum practical throughput capacity. **Table 3.2** compares the terminals existing annual throughput to the projected annual maximum practical throughput capacity under buildout of the redevelopment plan.

Table 3.2 Existing Terminal Throughput vs Projected Maximum Practical Capacity

Type	Existing Throughput (MT)	Maximum Practical Capacity (MT)	Projected Increase in Throughput (MT)	Growth
Dry Bulk	289,864	2,650,000	2,360,136	814%
Liquid Bulk	31,520	239,017	207,497	658%
Refrigerated Containers	637,931	2,288,000	1,650,069	359%
Multi-Purpose Cargo	85,131	977,400	892,269	1048%
Total	1,044,446	6,154,417	5,109,971	489%

Source: Tenth Avenue Marine Terminal (TAMT) Redevelopment Plan

Note:

MT: Metric Tons of Cargo

As shown, under the buildout of the TAMT Redevelopment Plan, cargo throughput at the TAMT is projected to increase by almost 500% or more than 5 million metric tons.

3.2 Project Trip Generation, Distribution, and Assignment

Project Trip Generation

There are two main trip generators at the Tenth Avenue Marine Terminal, freight movement (trucks) and employees.

Trucks

Increases in trucking activities under the buildout of the redevelopment plan (or maximum practical capacity) conditions were developed based on existing ratios for cargo throughput per truck by cargo type. To develop this ratio, cargo throughout and the number trucks accessing the TAMT onsite was collected between July 2013 and June 2014, which is provided in **Appendix B. Table 3.3** displays the truck ratios by cargo type.

Table 3.3 Existing Cargo to Truck Ratios

Cargo Type	Average Throughput Per Truck
Dry Bulk	29 Metric Tons / Truck
Liquid Bulk	108 Metric Tons / Truck
Refrigerated Containers	29 Metric Tons / Truck
Multi-Purpose Cargo	80 Metric Tons / Truck

Source: Port of San Diego and Chen Ryan Associates, June 2016

To determine the increase in trucking activities associated with the proposed project, the cargo throughput ratios noted in Table 3.3 were applied to the anticipated annual growth in cargo

throughput, as noted in Table 3.2. **Table 3.4** displays the anticipated annual increase in truck activities associated with the proposed project. The TAMT operates seven days a week and closes on very few holidays. Therefore, to determine the increase in daily truck activities, it was assumed that the TAMT operates 360 days a year.

Table 3.4 Increase in Truck Activity

Type	Projected Increase in Throughput (MT)	New Trucks / Year ¹	New Trucks / Day ²
Dry Bulk	2,360,136	81,384	227
Liquid Bulk	207,497	1,921	6
Refrigerated Containers	1,650,069	56,899	159
Multi-Purpose Cargo	892,269	11,153	31
Total	5,109,971	151,358	423

Source: Chen Ryan Associates, June 2016

Notes:

MT: Metric Tons of Cargo

¹ Projected increase in throughput / throughput per truck (see Table 3.2)

² New trucks per year / 360 operational days per year

As shown in Table 3.3, the proposed project is anticipated to generate 423 additional truckloads of cargo at the TAMT each day.

Employees

District staff anticipates that the additional cargo throughout will require 63 additional administrative employees, as well as 461 additional dock workers (daily) to unload the ships.

Assumptions

The following assumptions were made in regards to truck and employee traffic:

- It is assumed that the percent of total cargo shipped via rail and barge from the TAMT will remain the same. Therefore, the cargo to truck and employ ratios remain the same under build out of the proposed project.
- Trucking will be active 24 hours a day
- New administrative employees will work daily between 8:00 AM and 5:00 PM.
- New dock workers will be spread between the following shifts:
 - Day shift: 8:00 am to 5:00 pm
 - Evening shift: 5:00 pm to 3:00 am
 - Night shift 3:00 am to 8:00 am
- To be conservative, it is assumed that additional employees will drive a personal vehicle to the Tenth Avenue Marine Terminal and no carpooling will occur.

Table 3.5 outlines the projected trip generation in both the number of trucks and employees that will access the Tenth Avenue Marine Terminal with the implementation of the proposed project.

Table 3.5 Project Trip Generation

Type	Units	Rate	PCE	ADT	AM			PM		
					Total	In	Out	Total	In	Out
Trucks	423	2 / Truck	3	2,538	106	53	53	106	53	53
Dock Workers	461	3 / Employee	1	1,383	308	154	154	308	154	154
Administrative	63	3 / Employee	1	189	63	63	0	63	0	63
Total				4,110	477	270	207	477	207	270

Source: Chen Ryan Associates; June 2016

Note:

PCE = Passenger Car Equivalent, based on industry standards.

As shown, the proposed project is anticipated to generate 4,110 new PCE trips, including 477 trips during the AM peak hour and 477 trips during the PM peak hour.

Project Trip Distribution

The assumed project trip distribution for employees and trucks are displayed in **Figures 3-2A & B**, respectively. Project trip distribution for trucks was determined based on the *Port Access Projects – 10th Avenue Marine Terminal Truck O-D Study* as well as on existing truck routes. Project trip distribution for employees was based on SANDAG's *San Diego Region Major Statistical Areas*. The aforementioned documents as well as the trip calculations used to determine project trip distribution are provided in Appendix B.

Project Trip Assignment

Based upon the assumed project trip distribution, daily and AM/PM peak hour project trips were assigned to the adjacent roadway network, as displayed in **Figures 3-3A & B** for employees and **Figures 3-4A & B** for trucks.

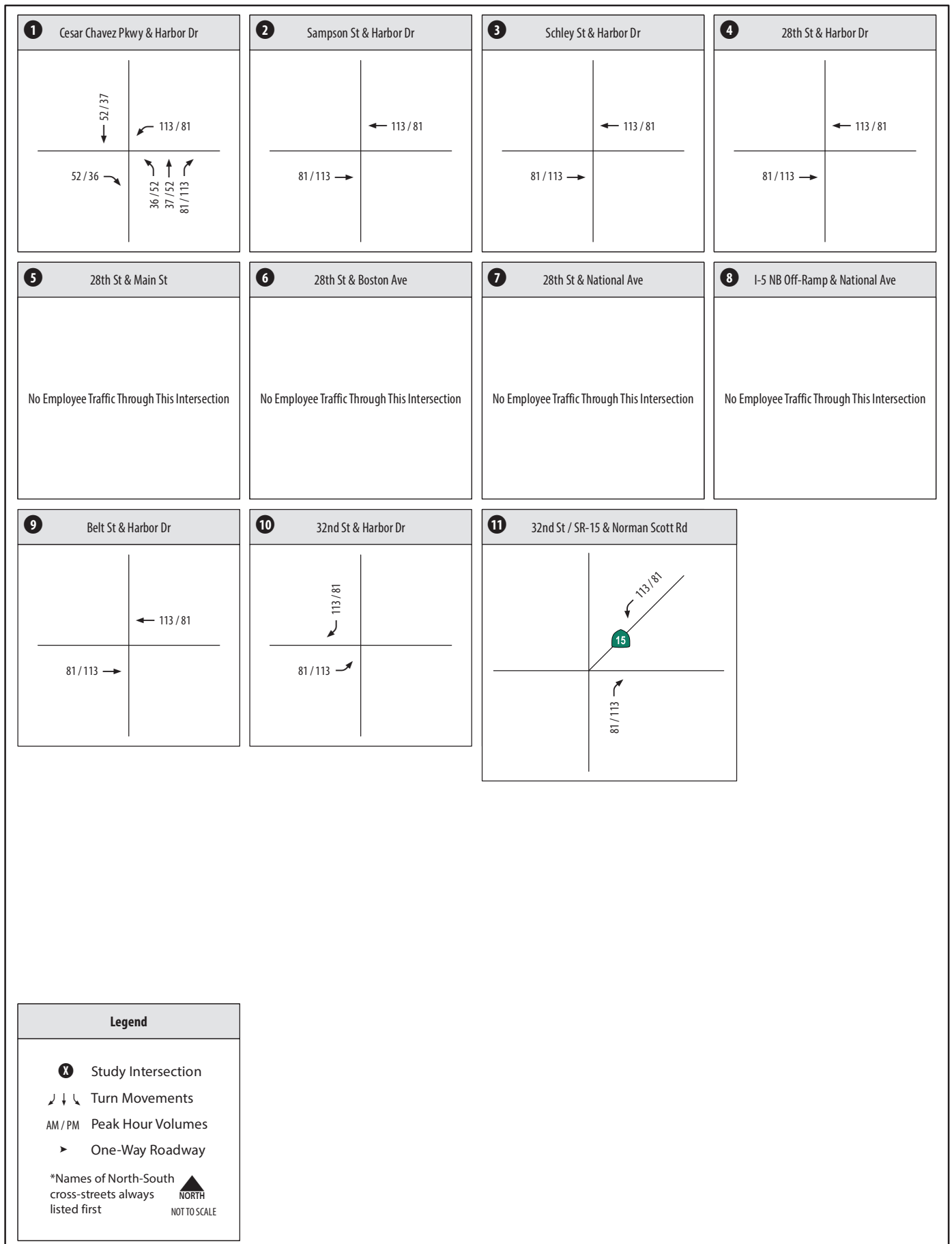
3.3 Interim Project Trip Generation

The proposed project is a market-based redevelopment plan and will not be implemented all at once or even in set phases. Instead, cargo throughput is anticipated to increase overtime based on market demands. However, it is anticipated that with the implementation of the proposed on-site physical improvements associated with the proposed project (demolition of the Transit Sheds #1 and #2, as well as improvements to the existing on-dock intermodal rail facilities) will allow for the terminal to serve latent throughput demand that it cannot service under current conditions.

Based on this anticipated demand an interim increase in the overall throughput was derived by the District. The projected interim increase in throughput is outline in **Table 3.6**.









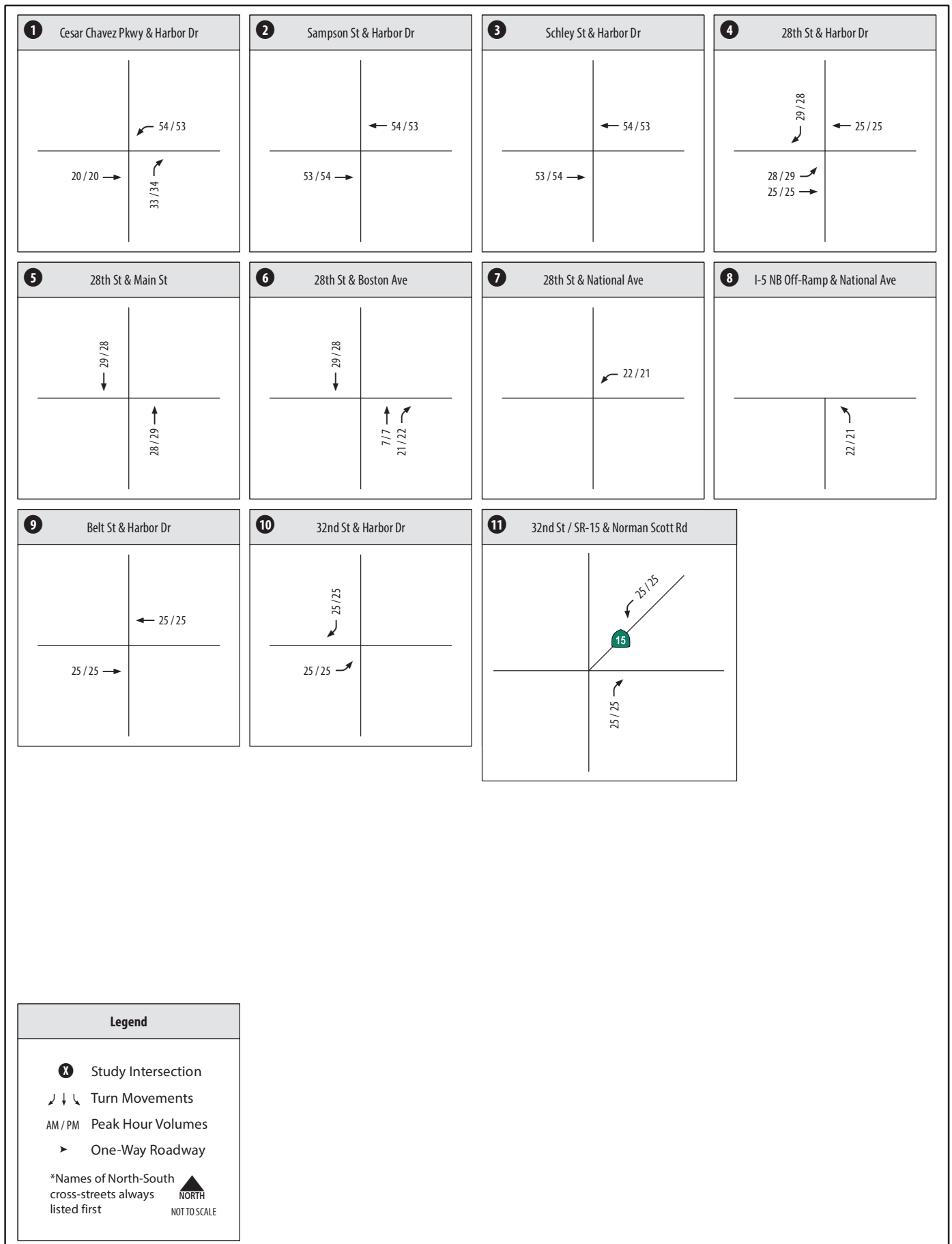


Table 3.6 Existing Terminal Throughput vs Interim Throughput

Type	Existing Throughput (MT)	Interim Throughput (MT)	Projected Increase in Throughput (MT)	Growth
Dry Bulk	289,864	289,864	0	0%
Liquid Bulk	31,520	31,520	0	0%
Refrigerated Containers	637,931	685,931	48,000	8%
Multi-Purpose Cargo	85,131	124,078	38,947	46%
Total	1,044,446	1,131,393	86,947	8%

Source: Tenth Avenue Marine Terminal (TAMT) Redevelopment Plan

Note:

MT: Metric Tons of Cargo

To determine the increase in trucking and employment activities associated with the interim condition, the cargo throughput ratios noted in Table 3.3 were applied to the anticipated annual growth in cargo throughput, as noted in Table 3.6. **Table 3.7** displays the anticipated annual increase in truck activities associated with the proposed project. The TAMT operates seven days a week and closes on very few holidays. Therefore, to determine the increase in daily truck activities, it was assumed that the TAMT operates 360 days a year.

Table 3.7 Increase in Truck Activity – Interim Conditions

Type	Projected Increase in Throughput (MT)	New Trucks / Year ¹	New Trucks / Day ²
Dry Bulk	0	0	0
Liquid Bulk	0	0	0
Refrigerated Containers	48,000	1,655	5
Multi-Purpose Cargo	38,947	487	2
Total	86,947	2,142	7

Source: Chen Ryan Associates, June 2016

Notes:

MT: Metric Tons of Cargo

¹ Projected increase in throughput / throughput per truck (see Table 3.2)

² New trucks per year / 360 operational days per year

As shown, the proposed project is anticipated to generate 7 additional truckloads of cargo each day under interim conditions.

Employees

District staff anticipates that the additional cargo throughout will require 10 additional administrative employees, as well as 82 additional dock workers (daily) to unload the ships.

Table 3.8 outlines the projected trip generation in both the number of trucks and employees that will access the TAMT under interim project conditions. It should be noted that the same trip generation assumptions outlined in Section 3.2 (employee shifts, days of work, etc.) were also applied to the interim condition.

Table 3.8 Project Trip Generation – Interim Conditions

Type	Units	Rate	PCE	ADT	AM			PM		
					Total	In	Out	Total	In	Out
Trucks	7	2 / Truck	3	42	2	1	1	2	1	1
Dock Workers	82	3 / Employee	1	246	59	35	24	59	24	35
Administrative	10	3 / Employee	1	30	10	10	0	10	0	10
Total				318	71	46	25	71	25	46

Source: Chen Ryan Associates, June 2016

Note:

PCE = Passenger Car Equivalent, based on industry standards.

As shown, the proposed project is anticipated to generate 318 new PCE trips, including 71 trips during the AM peak hour and 71 trips during the PM peak hour.

Interim Project Trip Distribution

The same trip distribution parameters assumed for trucks and employees under the full project scenario (displayed in Figures 3-2A & B, respectively) was assumed under interim project conditions.

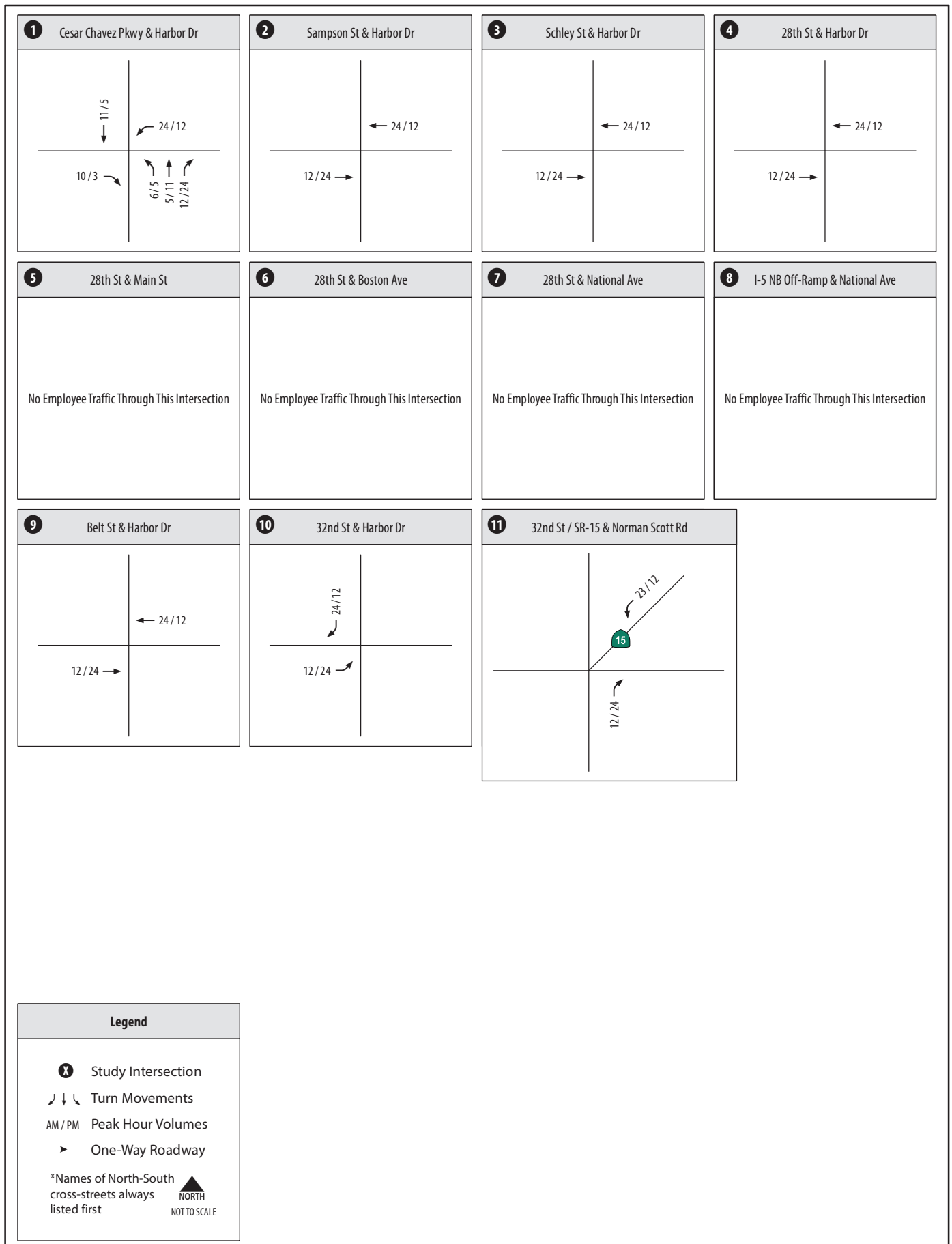
Interim Project Trip Assignment

Based upon the assumed project trip distribution, daily and AM/PM peak hour project trips were assigned to the adjacent roadway network, as displayed in **Figures 3-5A & B** for employees and **Figures 3-6A & B** for trucks.

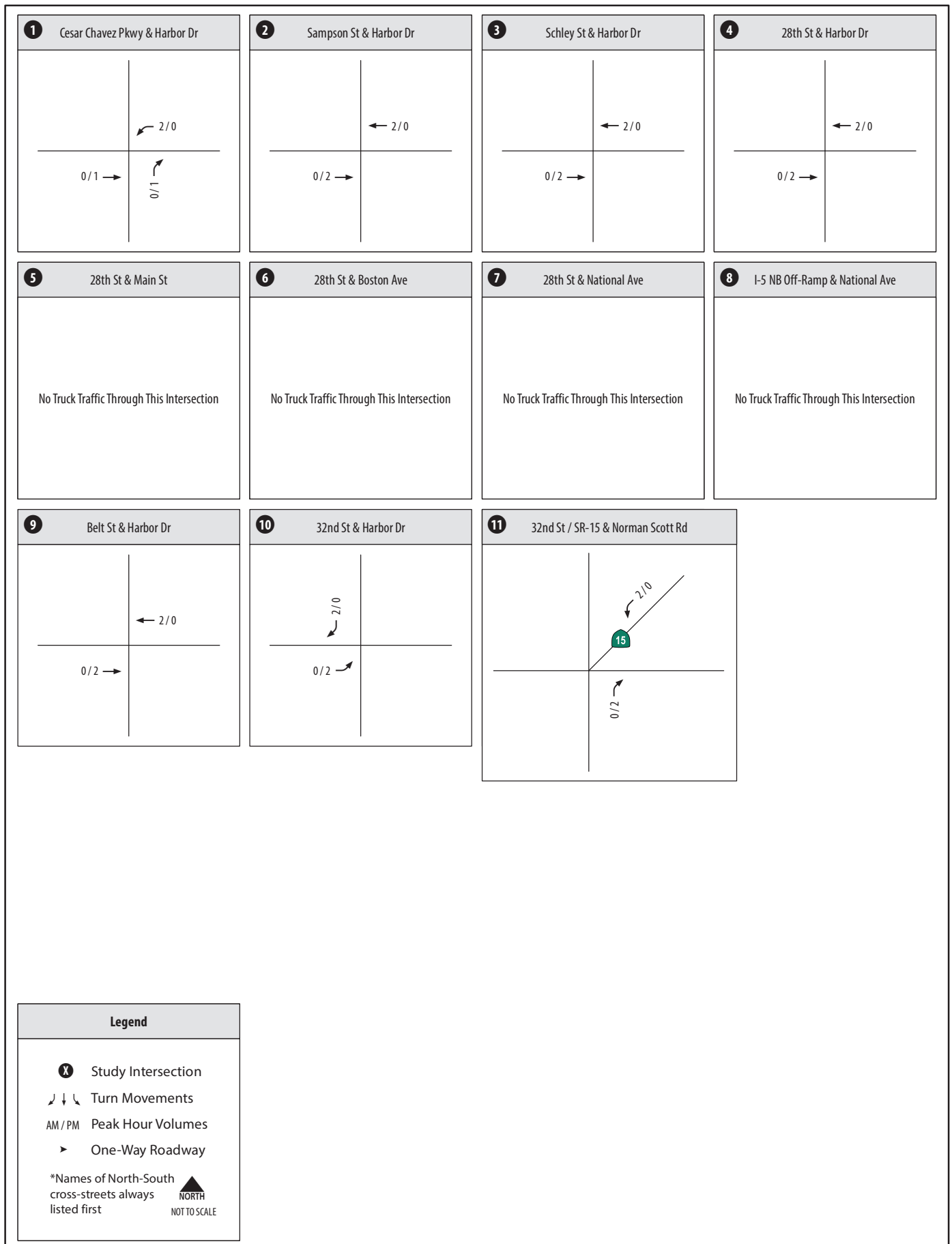
3.4 Site Access and Egress

Employees will access the site (both enter and exit) from the main Tenth Avenue Marine Terminal gate located south of the Harbor Drive / Cesar Chavez Parkway intersection. Truck traffic will enter the Tenth Avenue Marine Terminal through the main gate; however, the Refrigerated Trucks will exit the terminal via another gate located on Switzer Street, to the north of the Harbor Drive and Cesar Chavez Parkway intersection.









3.5 Alternative Gate

The Tenth Avenue Marine Terminal Plan also identifies an alternative gate concept that would serve as the primary entry and exit location for the Refrigerated Container node and the Multi-Purpose General Cargo node. The alternative gate would be located in the north-east corner of the terminal and provide access directly onto Harbor Drive. According to the Plan, the Dry Bulk and Liquid Bulk Nodes would continue to utilize the existing gate off Cesar Chavez Parkway, particularly for domestic bulk shipments. Both access alternatives were analyzed as part of this study. The alternative gate location is displayed in **Figure 3-7**.

3.6 Project Study Area

This TIA was performed in accordance with the requirements of the City of San Diego Traffic Impact Study Manual, July 1998 requirements. The City of San Diego Traffic Impact Study Manual requires that the defined study area include all freeway segments, roadway segments, and intersections where the proposed project would add 50 or more peak hour trips in either direction.

Study Roadway Segments

Based on the project trip assignment and input from Port District staff, the following key study area roadway segments were analyzed:

Harbor Drive between:

- Beardsley Street & Cesar Chavez Parkway
- Cesar Chavez Parkway & Sampson Street
- Sampson Street & Schley Street
- Schley Street & 28th Street
- 28th Street & Belt Street
- Belt Street & 32nd Street

28th Street between:

- Harbor Drive & Main Street
- Main Street & Boston Avenue
- Boston Avenue & National Avenue

32nd Street between:

- Harbor Drive & Norman Scott Road

The proposed project is not anticipated to contribute more than 50 peak hour trips on Interstate 5 (I-5) nor in Interstate 15 (I-15) in either direction as shown in Figures 3-3B and 3-4B; therefore, freeway impact analyses was not conducted, as specified in the City of San Diego Traffic Impact Study Guidelines.

Study Intersections

Based on the project trip assignment, the following eleven (11) key study area intersections were analyzed:

- | | |
|--|--|
| 1. Harbor Drive / Cesar Chavez Parkway | 7. 28th Street / National Avenue |
| 2. Harbor Drive / Sampson Street | 8. I-5 NB Off-Ramp / National Avenue |
| 3. Harbor Drive / Schley Street | 9. Harbor Drive / Belt Street |
| 4. Harbor Drive / 28th Street | 10. Harbor Drive / 32 nd Street |
| 5. 28th Street / Main Street | 11. Norman Scott Road / 32 nd Street / Wabash |
| 6. 28th Street / Boston Avenue | Boulevard |



Study Freeway Mainline Segments

Based on the project trip assignment, the following nine (9) key freeway mainline segments were analyzed:

- I-5 between SR-94 & Imperial Avenue
- I-5 between Imperial Avenue & SR-75
- I-5 between SR-75 & 28th Street
- I-5 between 28th Street & SR-15
- I-5 between SR-15 & Main Street
- SR-15 between SR-94 & Market Street
- SR-15 between Market Street & Ocean View Boulevard
- SR-15 between Ocean View Boulevard & I-5
- SR-15 between I-5 & Norman Scott Road

It should be noted that the interim project scenarios are not projected to generate enough traffic to warrant freeway analysis (50 peak hour trips on any single freeway mainline segment). Therefore, freeway mainline analyses were only conducted for the following scenarios:

- Existing
- Existing Plus Project
- Future Year 2035 Base
- Future Year 2035 Base Plus Project

Figure 3-8 displays the project study area. All key study facilities are located within the City of San Diego.



4.0 Existing Conditions

This section provides an analysis of the current traffic conditions for the following scenarios:

- Existing Conditions
- Existing Plus Project Conditions
- Existing Plus Project Conditions – Alternative Gate
- Existing Plus Interim Project Conditions
- Existing Plus Interim Project Conditions – Alternative Gate

4.1 Existing Roadway Network

Two locally significant roadways traverse the study area. Each of the key roadways included in the study area are discussed below.

North-South Facilities

28th Street – Within the project study area, 28th Street is configured as follows:

- Between Harbor Drive and Main Street - Four-lane divided (raised median) roadway;
- Between Main Street and Boston Avenue - Four-lane roadway with a continuous two-way left-turn lane;
- Between Boston Avenue and National Avenue – Three-lane (2 northbound and 1 southbound) roadway with a continuous two-way left-turn lane.

The roadway has paved widths that range from 64 and 76 feet and a posted speed limit of 30 MPH. Parking is allowed on both sides of the roadway between Harbor Drive and Main Street, but is prohibited between Main Street and National Avenue. Pedestrian facilities (sidewalks) are present on both sides of the roadway, but bicycle facilities are not. There is currently one transit stop, serving MTS Bus Route 11, located at the intersection of 28th Street and National Avenue within the project study area.

32nd Street – Within the project study area, 32nd Street is a six-lane roadway with a raised median, a posted speed limit of 30 MPH, and a paved width of 86 feet. Parking is not allowed on either side of the roadway. Within the project study area, pedestrian facilities are present on both sides of the roadway, but bicycle facilities are not. 32nd Street intersects Wabash Boulevard, which provides access to I-15, functioning as an on-off ramp. There is currently one transit station (Pacific Fleet Station) serving the Blue Line Trolley located along 32nd Street within the project study area.

East-West Facilities

Harbor Drive – Within the project study area, Harbor Drive is a four-lane roadway with a raised median. Harbor Drive has posted speed limits of 45 and 40 MPH between Park Boulevard and Cesar Chavez Parkway, and between Cesar Chavez Parkway and 32nd Street, respectively. Paved widths along this roadway range from 85 to 110 feet. Parking is not allowed on either side of the roadway between Beardsley Street and Sampson Street; however, parking is allowed on both sides of the roadway east of Sampson Street. Within the project study area, pedestrian facilities are present on both sides of the roadway as well as Class II bicycle lanes. There are

currently two transit stations (Barrio Logan Trolley Station and Harborside Trolley Station) serving the Blue Line Trolley located along Harbor Drive within the project study area.

The existing roadway and intersection geometrics are shown in **Figure 4-1A & B**, respectively.

4.2 Existing Intersection and Roadway Volumes

Figure 4-2A shows the existing ADT volumes for study area roadway segments, while **Figure 4-2B** shows the AM/PM peak hour traffic volumes for the key study area intersections. The roadway segment and study area intersection traffic counts were conducted in July 2014. Count worksheets are provided in Appendix A. Additional 24 hour tube counts along Harbor Drive were taken in March 2015 to validate that the counts taken in July 2014 were still applicable. It was found that the counts taken in March 2015 were slightly lower than the July 2014 counts. Therefore, as a worst case scenario the July 2014 counts were used in this analysis.

4.3 Existing LOS Analysis

LOS analyses under Existing conditions were conducted using the methodologies described in Chapter 2.0. Roadway segment analysis, intersection LOS analysis, freeway ramp intersection ILV analysis, and freeway mainline analysis results are discussed in the following sections.

Roadway Segment Analysis

Table 4.1 displays the LOS analysis results for key study area roadway segments under Existing conditions.

Table 4.1 Roadway Segment LOS Results - Existing Conditions

Roadway Segment	Segment	Cross-section	Threshold (LOS E)	ADT	V/C	LOS
Harbor Drive	Between Beardsley Street and Cesar Chavez Parkway	4-Lanes w/ RM	40,000	20,194	0.505	B
	Between Cesar Chavez Parkway and Sampson Street	4-Lanes w/ RM	40,000	10,546	0.264	A
	Between Sampson Street and Schley Street	4-Lanes w/ RM	40,000	12,050	0.301	A
	Between Schley Street and 28 th Street	4-Lanes w/ RM	40,000	11,626	0.291	A
	Between 28 th Street and Belt Street	4-Lanes w/ RM	40,000	18,050	0.451	B
	Between Belt Street and 32 nd Street	4-Lanes w/ RM	40,000	16,603	0.415	B
28 th Street	Between Harbor Drive and Main Street	4-Lanes w/ RM	40,000	16,134	0.403	B
	Between Main Street and Boston Avenue	4-Lanes w/TWLT	30,000	19,563	0.652	C
	Between Boston Avenue and National Avenue	3-Lanes w/TWLT	22,500 ¹	22,112	0.983	E
32 nd Street	Between Harbor Drive and Norman Scott Road	6-lanes w/ RM	50,000	19,920	0.398	A

Source: NDS, Chen Ryan Associates; June 2016

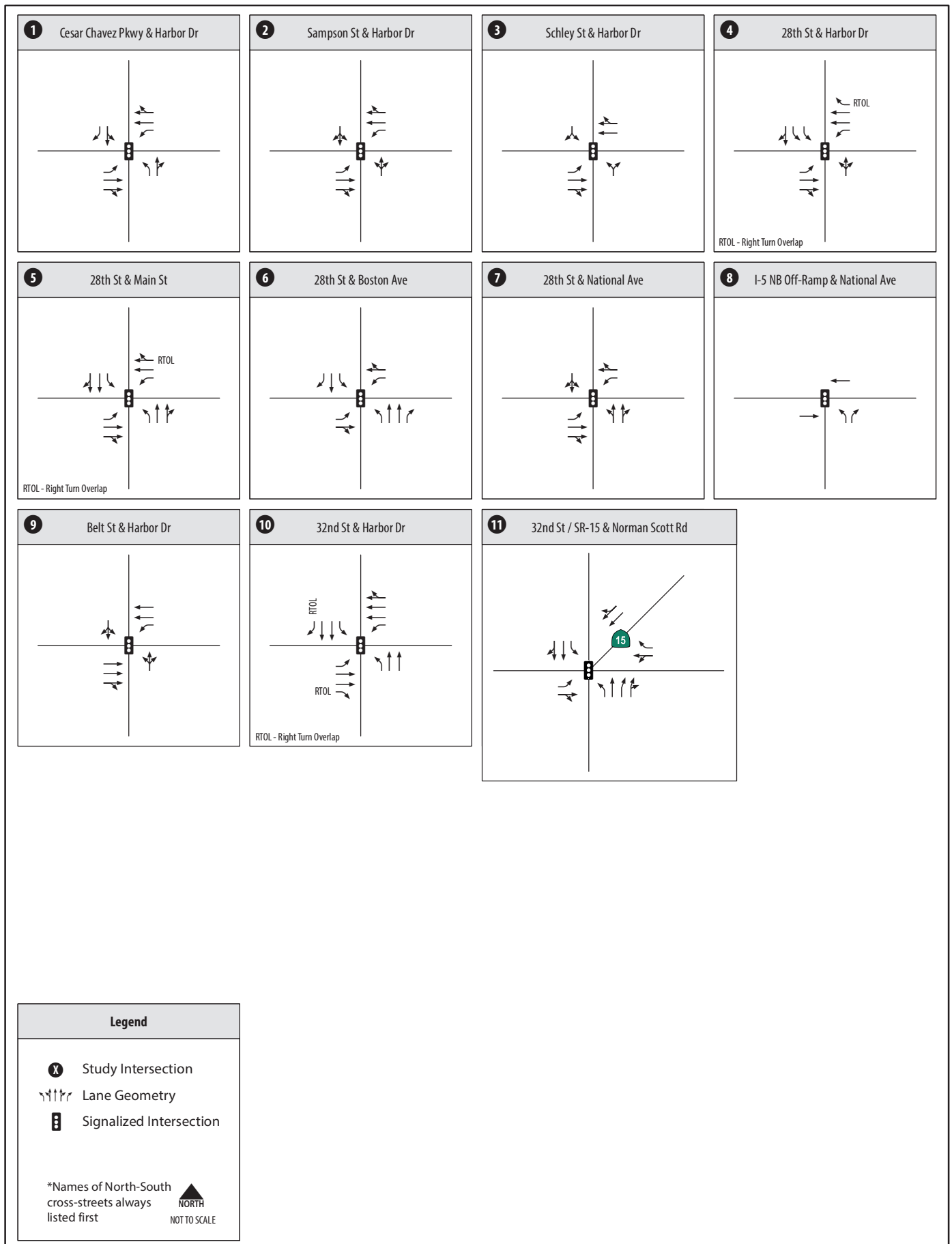
Notes:

¹ Capacity is 75% of a 4-Lane Collector w/TWLT.

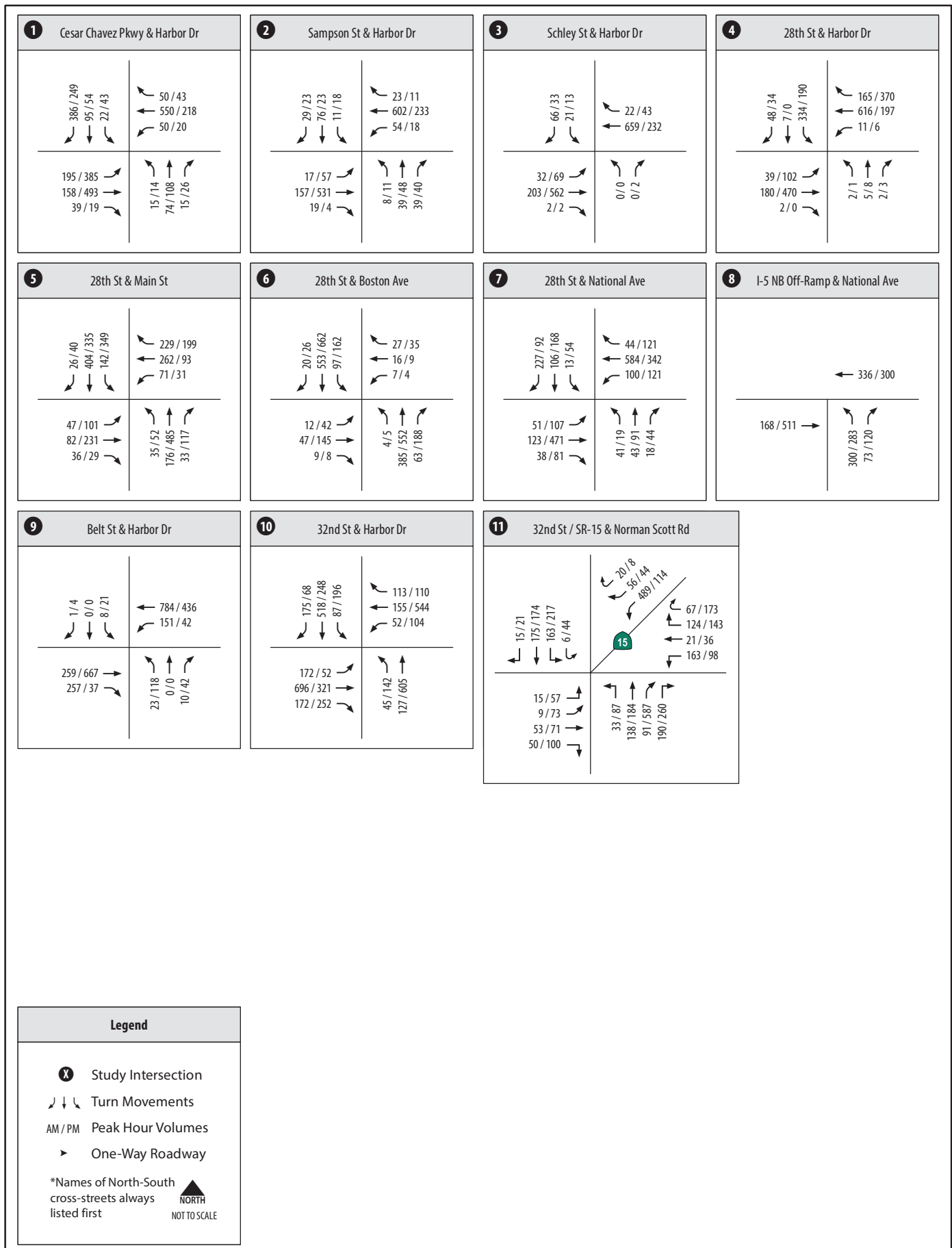
V/C = Volume to Capacity Ratio.

Bold letter indicates LOS E or F.









As shown in Table 4.1, all key study roadway segments currently operate at LOS C or better with the exception of:

- 28th Street, between Boston Avenue and National Avenue (LOS E).

Intersection Analysis

Table 4.2 displays intersection LOS and average vehicle delay results for the key study area intersections under Existing conditions. All intersections are currently. LOS calculation worksheets for Existing conditions are provided in **Appendix C**.

Table 4.2 Peak Hour Intersection LOS Results - Existing Conditions

#	Intersection	AM Peak Hour		PM Peak Hour	
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS
1	Harbor Drive / Cesar Chavez Parkway	36.8	D	33.3	C
2	Harbor Drive / Sampson Street	40.4	D	40.9	D
3	Harbor Drive / Schley Street	16.7	B	15.0	B
4	Harbor Drive / 28 th Street	23.1	C	20.3	C
5	Main Street / 28 th Street	21.4	C	34.8	C
6	Boston Avenue / 28 th Street	19.4	B	23.0	C
7	National Avenue / 28 th Street	42.3	D	29.6	C
8	National Avenue / I-5 NB Off-Ramp	14.9	B	14.7	B
9	Harbor Drive / Belt Street	18.6	B	17.1	B
10	Harbor Drive / 32 nd Street	28.6	C	39.9	D
11	Norman Scott Road / 32 nd Street / Wabash Boulevard	95.3	F	66.2	E

Source: NDS, Chen Ryan Associates; June 2016

As shown, all key study area intersections currently operate at LOS D or better, with the exception of:

- Norman Scott Road / 32nd Street / Wabash Boulevard (LOS F in the AM peak hour and LOS E in the PM peak hour).

Ramp Intersection Capacity Analysis

Consistent with Caltrans requirements, the signalized ramp intersections of National Avenue / I-5 NB off-ramp and Norman Scott Road / 32nd Street / Wabash Boulevard were analyzed using ILV procedures, as described in Section 2.4. ILV analysis results are displayed in **Table 4.3** and analysis worksheets for Existing conditions are provided in Appendix C.

Table 4.3 Ramp Intersection Capacity Analysis - Existing Conditions

#	Intersection	Peak Hour	ILV/Hour	Description
8	National Avenue / I-5 NB Off-Ramp	AM	636	Under Capacity
		PM	794	Under Capacity
11	Norman Scott Road / 32nd Street / Wabash Boulevard	AM	956	Under Capacity
		PM	1,028	Under Capacity

Source: Chen Ryan Associates; June 2016

As shown, both signalized ramp intersections are currently operating at “Under Capacity” conditions during both the AM and PM peak hours.

Freeway Analysis

Table 4.4 displays the LOS results from the freeway segment analysis under Existing Conditions. Year 2014 freeway Annual Average Daily Traffic (AADT) volumes were obtained from Caltrans’ *2014 Traffic Volumes on California State Highways* and are included in **Appendix D**.

Table 4.4 Freeway Mainline LOS Analysis Results - Existing Conditions

Freeway	Segment	ADT ^(a)	Direction	# of Lanes	Capacity ^(b)	D ^(c)	K ^(d)	HVF ^(e)	Peak Hour Volume	V/C	LOS
I-5	SR-94 & Imperial Avenue	180,000	NB	4M+1A	10,810	62.2%	8.1%	4.0%	9,600	0.89	D
			SB	4M+1A	10,810	53.2%	8.3%	4.0%	8,400	0.78	C
	Imperial Avenue & SR-75	170,000	NB	4M+1A	10,810	62.2%	8.1%	3.8%	9,100	0.84	D
			SB	4M+1A	10,810	57.7%	8.2%	3.8%	8,400	0.78	C
	SR-75 & 28th Street	167,000	NB	4M+2A	12,220	70.4%	8.4%	5.0%	10,400	0.85	D
			SB	4M+1A	10,810	57.7%	8.2%	5.0%	8,300	0.77	C
	28th Street & SR-15	165,000	NB	4M	9,400	70.4%	8.4%	5.0%	10,300	1.10	F
			SB	4M	9,400	57.7%	8.2%	5.0%	8,200	0.87	D
SR-15	SR-94 & Market Street	126,000	NB	4M+2A	12,220	70.4%	8.4%	5.0%	12,100	0.99	E
			SB	5M	11,750	65.4%	8.7%	5.0%	11,600	0.99	E
	Market Street & Ocean View Boulevard	114,000	NB	3M+1A	8,460	59.5%	8.1%	5.1%	6,400	0.76	C
			SB	3M+1A	8,460	55.2%	9.7%	5.1%	7,100	0.84	D
	Ocean View Boulevard & I-5	103,000	NB	3M	7,050	61.2%	8.1%	5.1%	5,900	0.84	D
			SB	3M	7,050	55.2%	9.6%	5.1%	6,400	0.91	D
	I-5 & Norman Scott Road	7,300	NB	3M+1A	8,460	61.2%	7.0%	5.1%	4,600	0.54	B
			SB	4M+1A	10,810	55.2%	7.8%	5.1%	4,700	0.43	B
			NB	2M	4,700	61.2%	7.0%	5.1%	300	0.06	A
			SB	2M	4,700	54.4%	7.5%	5.1%	300	0.06	A

Source: Chen Ryan Associates; June 2016

Notes:

Bold letter indicates LOS E or F.

M = Mainline. A = Auxiliary Lane.

^a Traffic volumes provided by Caltrans (2014).

^b The capacity is calculated as 2,350 ADT per main lane and 1,410 ADT (60% of the main lane capacity) per auxiliary lane.

^c D = Directional split. | ^d K = Peak hour %. | ^e HV = Heavy vehicle %.

As shown, all study freeway segments currently operate at LOS D or better with the exception of the following:

- I-5 NB between 28th Street & I-15 (LOS F)
- I-5 NB between SR-15 & Main Street (LOS E)
- I-5 SB between SR-15 & Main Street (LOS E)

4.4 Existing Plus Project Roadway Network and Traffic Volumes

Existing Plus Project traffic volumes were derived by combining the existing traffic volumes (displayed in Figure 4-2A and Figure 4-2B), the project trip assignment volumes (displayed in Figures 3-3A, 3-3B, 3-4A, and 3-4B). Daily roadway and peak hour intersection volumes are displayed in **Figure 4-3A and 4-3B**, respectively.

4.5 Existing Plus Project Traffic Conditions

Analyses were conducted using the methodologies described in Chapter 2.0. Roadway segment analysis, intersection LOS analysis, freeway ramp intersection ILV analysis, and freeway mainline analysis results are discussed in the following sections.

Roadway Segment Analysis

Table 4.5 displays the LOS analysis results for key roadway segments under Existing Plus Project conditions.

As shown in Table 4.5, all key study roadway segments would continue to operate at LOS D or better under Existing Plus Project conditions with the exception of:

- 28th Street, between Boston Avenue and National Avenue (LOS F).

Based on the City of San Diego's Significance Criteria, outlined in Section 2.6, the traffic associated with the proposed project would cause a significant change in the V/C ratio (add more than 0.01) to the aforementioned roadway segment, which is projected to operate at LOS F under Existing Plus Project conditions. Therefore, the implementation of the proposed project would result in a significant direct impact at 28th Street, between Boston Avenue and National Avenue.



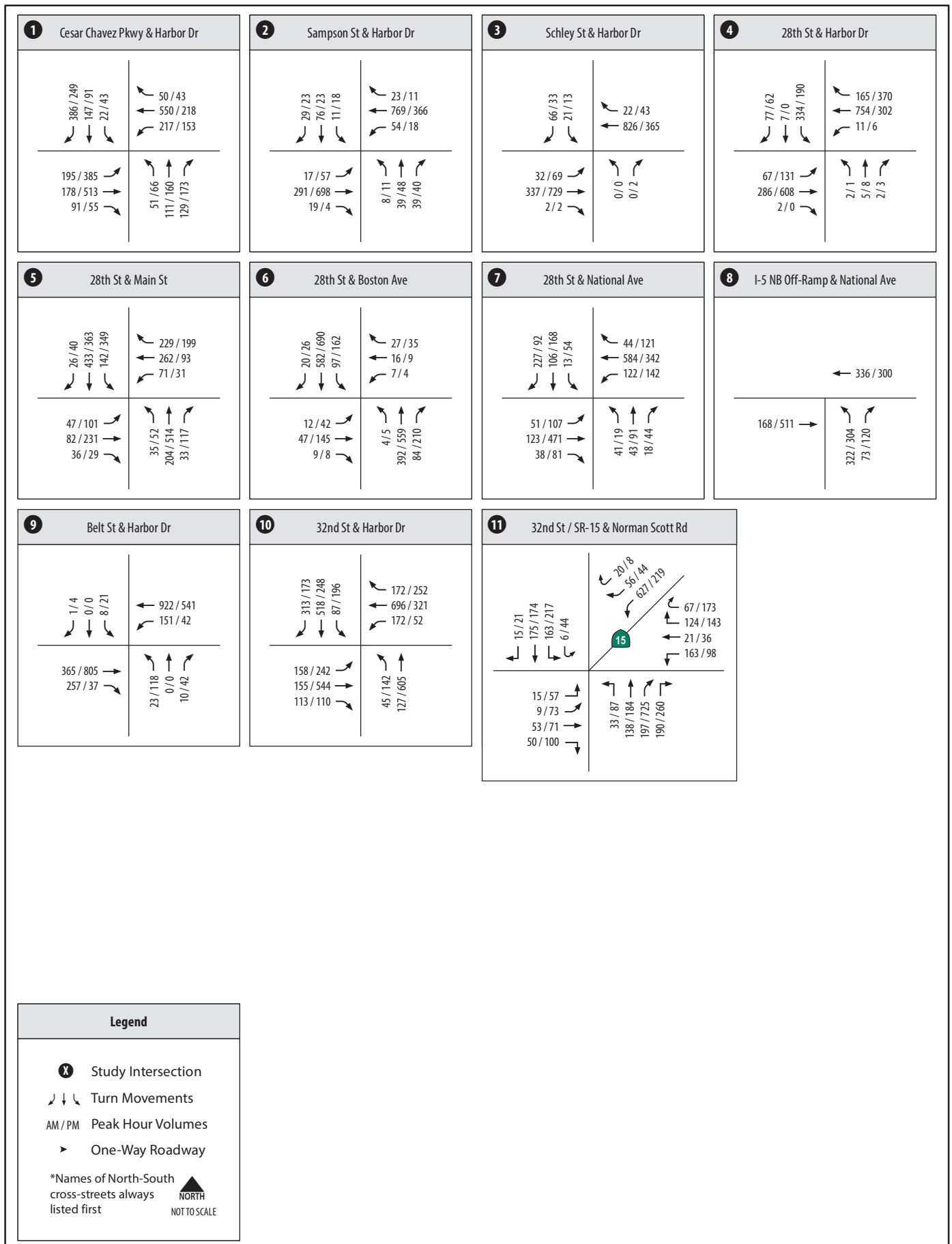


Table 4.5 Roadway Segment LOS Results - Existing Plus Project Conditions

Roadway	Segment	Cross-Section	Threshold (LOS E)	Existing + Project			Existing	Δ	S?
				ADT	V/C	LOS	ADT / V/C / LOS		
Harbor Drive	Between Beardsley Street and Cesar Chavez Parkway	4-Lanes w/ RM	40,000	21,536	0.538	C	20,194 / 0.505 / B	0.034	N
	Between Cesar Chavez Parkway and Sampson Street	4-Lanes w/ RM	40,000	13,901	0.348	A	10,546 / 0.264 / A	0.084	N
	Between Sampson Street and Schley Street	4-Lanes w/ RM	40,000	15,405	0.385	B	12,050 / 0.301 / A	0.084	N
	Between Schley Street and 28 th Street	4-Lanes w/ RM	40,000	14,981	0.375	A	11,626 / 0.291 / A	0.084	N
	Between 28 th Street and Belt Street	4-Lanes w/ RM	40,000	20,060	0.502	B	18,050 / 0.451 / B	0.050	N
	Between Belt Street and 32 nd Street	4-Lanes w/ RM	40,000	18,613	0.465	B	16,603 / 0.415 / B	0.050	N
28 th Street	Between Harbor Drive and Main Street	4-Lanes w/ RM	40,000	17,479	0.437	B	16,134 / 0.403 / B	0.034	N
	Between Main Street and Boston Avenue	4-Lanes w/TWLT	30,000	20,908	0.697	D	19,563 / 0.652 / C	0.045	N
	Between Boston Avenue and National Avenue	3-Lanes w/TWLT	22,500 ¹	22,924	1.019	F	22,112 / 0.983 / E	0.036	Y
32 nd Street	Between Harbor Drive and Norman Scott Road	6-Lanes w/ RM	50,000	21,930	0.439	B	19,920 / 0.398 / A	0.040	N

Source: Chen Ryan Associates; June 2016

Notes:

¹ Capacity is 75% of a 4-Lane Collector w/TWLT.

V/C = Volume to Capacity Ratio.

 Δ = Change in V/C Ratio.

S? = Indicates if change in V/C ratio is significant.

Bold letter indicates LOS E or F.

Intersection Analysis

Table 4.6 displays intersection LOS and average vehicle delay results under Existing Plus Project conditions. All intersections are signalized unless otherwise noted. LOS calculation worksheets for the Existing Plus Project conditions are provided in **Appendix E**.

Table 4.6 Peak Hour Intersection LOS Results - Existing Plus Project Conditions

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec.) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec.)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1	Harbor Drive / Cesar Chavez Parkway	50.4	D	45.4	D	36.8 / 33.3	D / C	13.6 / 12.1	No
2	Harbor Drive / Sampson Street	41.2	D	42.5	D	40.4 / 40.9	D / D	0.8 / 1.6	No
3	Harbor Drive / Schley Street	16.7	B	15.2	B	16.7 / 15.0	B / B	0.0 / 0.2	No
4	Harbor Drive / 28 th Street	26.5	C	22.2	C	23.1 / 20.3	C / C	3.4 / 1.9	No
5	Main Street / 28 th Street	21.6	C	35.6	D	21.4 / 34.8	C / C	0.2 / 0.8	No
6	Boston Avenue / 28 th Street	19.4	B	23.1	C	19.4 / 23.0	B / C	0.0 / 0.1	No
7	National Avenue / 28 th Street	42.3	D	30.1	C	42.3 / 29.6	D / C	0.0 / 0.5	No
8	National Avenue / I-5 NB Off-Ramp	15.4	B	15.2	B	14.9 / 14.7	B / B	0.5 / 0.5	No
9	Harbor Drive / Belt Street	19.1	B	17.4	B	18.6 / 17.1	B / B	0.5 / 0.3	No
10	Harbor Drive / 32 nd Street	38.7	D	49.4	D	28.6 / 39.9	C / D	10.1 / 9.5	No
11	Norman Scott Road / 32 nd Street / Wabash Boulevard	127.9	F	79.5	E	95.3 / 66.2	F / E	32.6 / 13.3	Yes

Source: Chen Ryan Associates; June 2016

As shown, all key study intersections are projected to operate at LOS D or better under Existing Plus Project conditions, with the exception of:

- Norman Scott Road / 32nd Street / Wabash Boulevard – LOS F during AM peak hour and LOS E during PM peak hour.

Based on the City of San Diego's Significance Criteria, outlined in Section 2.6, the traffic associated with the proposed project would add delay surpassing the acceptable threshold (greater than 1 second for intersections operating at LOS F and greater than 2 seconds for intersection operating at LOS E) to the aforementioned intersection, which is projected to operate at LOS F during the AM peak hour and LOS E during the PM peak hour. Therefore, the project would result in a significant direct impact at the Norman Scott Road / 32nd Street / Wabash Boulevard intersection.

Ramp Intersection Capacity Analysis

Consistent with Caltrans requirements, the signalized ramp intersections of National Avenue / I-5 NB off-ramp and Norman Scott Road / 32nd Street / Wabash Boulevard were analyzed using ILV procedures, as described in Section 2.4. ILV analysis results are displayed in **Table 4.7** and analysis worksheets for Existing Plus Project conditions are provided in Appendix E.

Table 4.7 Ramp Intersection Capacity Analysis - Existing Plus Project Conditions

#	Intersection	Peak Hour	ILV/Hour	Description
8	National Avenue / I-5 NB Off-Ramp	AM	658	Under Capacity
		PM	815	Under Capacity
11	Norman Scott Road / 32 nd Street / Wabash Boulevard	AM	1,148	Under Capacity
		PM	1,202	At Capacity

Source: Chen Ryan Associates; June 2016

As shown, the all key study signalized ramp intersections are projected to operate at “At Capacity” or better during both the AM and PM peak hours, under Existing Plus Project conditions.

Freeway Analysis

Table 4.8 displays the LOS results from the freeway segment analysis under Existing Plus Project conditions.

Table 4.8 Freeway Mainline LOS Analysis Results - Existing Plus Project Conditions

Freeway	Segment	ADT	Direction	Peak Hour Volume	With Project		Base		Δ V/C	S?
					V/C	LOS	V/C	LOS		
I-5	SR-94 & Imperial Avenue	180,700	NB	9,600	0.890	D	0.890	D	0.000	N
			SB	8,400	0.780	C	0.780	C	0.000	N
	Imperial Avenue & SR-75	170,700	NB	9,100	0.840	D	0.840	D	0.000	N
			SB	8,500	0.790	C	0.780	C	0.010	N
	SR-75 & 28th Street	167,600	NB	10,400	0.850	D	0.850	D	0.000	N
			SB	8,300	0.770	C	0.770	C	0.000	N
	28th Street & SR-15	166,200	NB	10,300	1.100	F	1.100	F	0.000	N
			SB	8,300	0.880	D	0.870	D	0.010	N
SR-15	SR-94 & Market Street	128,000	NB	6,500	0.770	C	0.760	C	0.010	N
			SB	7,200	0.850	D	0.840	D	0.010	N
	Market Street & Ocean View Boulevard	116,000	NB	6,100	0.870	D	0.840	D	0.030	N
			SB	6,500	0.920	D	0.910	D	0.010	N
	Ocean View Boulevard & I-5	105,000	NB	4,700	0.560	B	0.540	B	0.020	N
			SB	4,800	0.440	B	0.430	B	0.010	N
	I-5 & Norman Scott Road	9,300	NB	400	0.090	A	0.060	A	0.030	N
			SB	400	0.090	A	0.060	A	0.030	N

Source: Chen Ryan Associates; June 2016

Notes:

The capacity, Directional split, Peak hour % and Heavy vehicle % are assumed to be the same as Existing conditions.

Bold letter indicates substandard LOS E or F.

Δ = Change in V/C Ratio.

S? = Indicates if change in V/C ratio is significant

As shown, all study freeway segments currently operate at LOS D or better with the exception of the following:

- I-5 NB between 28th Street & I-15 (LOS F)
- I-5 NB between SR-15 & Main Street (LOS E)
- I-5 SB between SR-15 & Main Street (LOS E)

Based on the City of San Diego's Significance Criteria, outlined in Section 2.6, the traffic associated with the proposed project would not cause a significant change in the V/C ratio (add more than 0.010 for LOS E and 0.005 for LOS F) to any key study mainline freeway segments. Therefore, the project would not result in a significant direct impact to a freeway mainline segment.

4.6 Existing Plus Project - Alternative Gate Scenario

The Tenth Avenue Marine Terminal Plan also identifies an alternative gate concept that would serve as the primary entry and exit location for the Refrigerated Container node and the Multi-Purpose General Cargo node. The alternative gate would be located in the north-east corner of the terminal and provide access directly onto Harbor Drive. According to the Plan, the Dry Bulk and Liquid Bulk Nodes would continue to utilize the existing gate off Cesar Chavez Parkway, particularly for domestic bulk shipments.

Trip Redistribution

As stated before, the Refrigerated Container and the Multi-Purpose General Cargo nodes would utilize the alternative gate. Therefore, with the proposed implementation of the alternative gate would result in a redistribution of both existing and proposed project truck traffic from these nodes. It is assumed that employee traffic would continue to use the existing Crosby street gate. **Figure 4-4** displays the assumed redistribution of both existing and project truck traffic between the two gate locations. **Figure 4-5** displays the anticipated traffic volumes at both gates and along Harbor Drive under the Existing Plus Project – Alternative Gate Scenario.

Roadway Segment Analysis

Based on the assumed redistribution of truck trips, as displayed in Figure 4-5, Harbor Drive between Beardsley Street and Cesar Chavez Parkway is the only study roadway segment that is anticipated to experience a change in ADT due to the alternative gate. **Table 4.9** displays the LOS analysis results for the affected segment of Harbor Drive under Existing Plus Project conditions, with the proposed alternative gate.





Table 4.9 Roadway Segment LOS Results - Existing Plus Project Conditions – Alternative Gate Scenario

Roadway	Segment	Cross-Section	Threshold (LOS E)	Existing + Project			Existing	Δ	S?
				ADT	V/C	LOS	ADT / V/C / LOS		
Harbor Drive	Between Beardsley Street and Cesar Chavez Parkway	4-Lanes w/ RM	40,000	22,246	0.556	C	20,194 / 0.505 / B	0.051	N

Source: Chen Ryan Associates; June 2016

Notes:

V/C = Volume to Capacity Ratio.

Δ = Change in V/C Ratio.

S? = Indicates if change in V/C ratio is significant.

As shown, Harbor Drive between Beardsley Street and Cesar Chavez Parkway is anticipated to operate at LOS C with the addition of the proposed project and with the alternative gate.

Based on the City of San Diego's Significance Criteria, outlined in Section 2.6, the traffic associated with the proposed alternative gate would not cause any additional roadway segments to operate at LOS E or F; therefore, the implementation of the proposed alternative gate would not result in any additional impacts.

Intersection Analysis

Based on the assumed redistribution of truck trips, as displayed in Figure 4-5, the Harbor Drive / Cesar Chavez Parkway intersection (Main Gate) is the only study intersection that is anticipated to experience a change in peak hour volumes due to the alternative gate. All other key study intersections are anticipated to operate at the same conditions as Identified in Table 4.6. **Table 4.10** displays intersection LOS and average vehicle delay results under Existing Plus Project conditions, with the alternative gate assumed. Both intersections are assumed to be signalized. LOS calculation worksheets for the Existing Plus Project conditions are provided in Appendix E.

Table 4.10 Peak Hour Intersection LOS Results - Existing Plus Project Conditions – Alternative Gate Scenario

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec.) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec.)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1	Harbor Drive / Cesar Chavez Parkway	38.4	D	40.3	D	36.8 / 33.3	D / C	1.6 / 7.0	No
12	Harbor Drive / Alternative Gate	19.7	B	26.5	C	N/A	N/A	19.7 / 26.5	No

Source: Chen Ryan Associates; June 2016

As shown, both affected intersections are anticipated to operate at LOS D or better with the proposed alternative gate.

Based on the City of San Diego's Significance Criteria, outlined in Section 2.6, the traffic associated with the proposed alternative gate would not cause either intersection to operate

at LOS E or F; therefore, the implementation of the proposed alternative gate would not result in any additional impacts.

4.7 Existing Plus Interim Project Roadway Network and Traffic Volumes

Existing Plus Interim Project traffic volumes were derived by combining the existing traffic volumes (displayed in Figure 4-2A and Figure 4-2B), the interim project trip assignment volumes (displayed in Figures 3-6A, 3-6B, 3-7A, and 3-7B). Daily roadway and peak hour intersection volumes are displayed in **Figure 4-6A and 4-6B**, respectively.

4.8 Existing Plus Interim Project Traffic Conditions

Analyses were conducted using the methodologies described in Chapter 2.0. Roadway segment analysis, intersection LOS analysis, and freeway ramp intersection ILV analysis results, are discussed separately below.

Roadway Segment Analysis

Table 4.11 displays the LOS analysis results for key roadway segments under Existing Plus Interim Project conditions.

As shown in Table 4.11, all key study roadway segments would continue to operate at LOS D or better under Existing Plus Interim Project conditions with the exception of:

- 28th Street, between Boston Avenue and National Avenue (LOS E).

Based on the City of San Diego's Significance Criteria, outlined in Section 2.6, the traffic associated with the proposed project would not cause a significant change in the V/C ratio (add more than 0.01) to the aforementioned roadway segment, which is projected to operate at LOS F under Existing Plus Interim Project conditions. Therefore, the project would not result in a significant direct impact at 28th Street, between Boston Avenue and National Avenue.



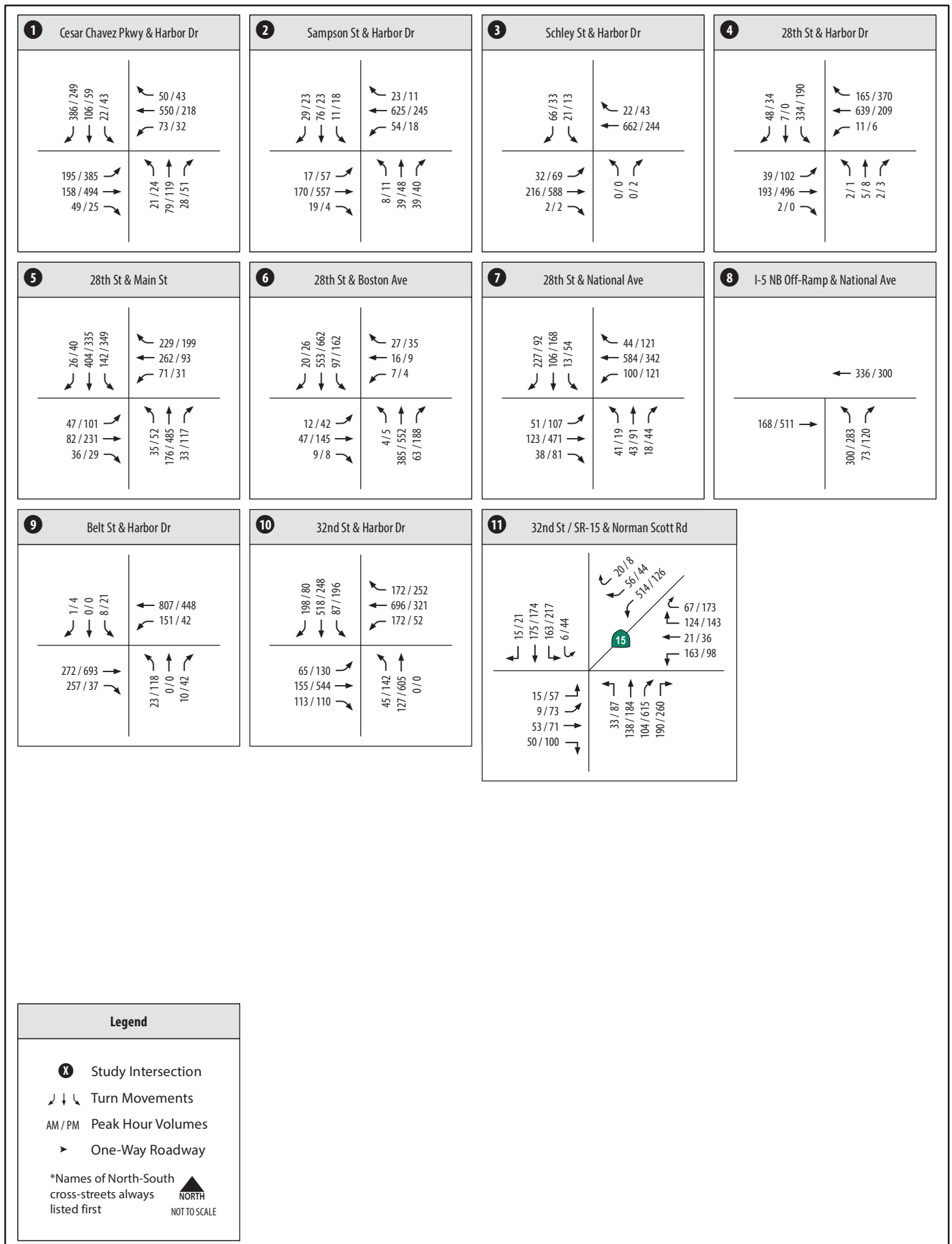


Table 4.11 Roadway Segment LOS Results – Existing Plus Interim Project Conditions

Roadway	Segment	Cross-Section	Threshold (LOS E)	Existing + Project			Existing	Δ	S?
				ADT	V/C	LOS	ADT / V/C / LOS		
Harbor Drive	Between Beardsley Street and Cesar Chavez Parkway	4-Lanes w/ RM	40,000	20,276	0.507	B	20,194 / 0.505 / B	0.002	N
	Between Cesar Chavez Parkway and Sampson Street	4-Lanes w/ RM	40,000	10,732	0.268	A	10,546 / 0.264 / A	0.004	N
	Between Sampson Street and Schley Street	4-Lanes w/ RM	40,000	12,236	0.306	A	12,050 / 0.301 / A	0.005	N
	Between Schley Street and 28 th Street	4-Lanes w/ RM	40,000	11,812	0.295	A	11,626 / 0.291 / A	0.004	N
	Between 28 th Street and Belt Street	4-Lanes w/ RM	40,000	18,213	0.455	B	18,050 / 0.451 / B	0.004	N
	Between Belt Street and 32 nd Street	4-Lanes w/ RM	40,000	16,766	0.419	B	16,603 / 0.415 / B	0.004	N
28 th Street	Between Harbor Drive and Main Street	4-Lanes w/ RM	40,000	16,156	0.404	B	16,134 / 0.403 / B	0.001	N
	Between Main Street and Boston Avenue	4-Lanes w/TWLT	30,000	19,585	0.653	C	19,563 / 0.652 / C	0.001	N
	Between Boston Avenue and National Avenue	3-Lanes w/TWLT	22,500 ¹	22,125	0.983	E	22,112 / 0.983 / E	0.000	N
32 nd Street	Between Harbor Drive and Norman Scott Road	6-Lanes w/ RM	50,000	20,083	0.402	B	19,920 / 0.398 / A	0.003	N

Source: Chen Ryan Associates; June 2016

Notes:

¹ Capacity is 75% of a 4-Lane Collector w/TWLT.

V/C = Volume to Capacity Ratio.

Δ = Change in V/C Ratio.

S? = Indicates if change in V/C ratio is significant.

Bold letter indicates LOS E or F.

Intersection Analysis

Table 4.12 displays intersection LOS and average vehicle delay results under Existing Plus Interim Project conditions. All intersections are currently signalized. LOS calculation worksheets for the Existing Plus Interim Project conditions are provided in **Appendix F**.

Table 4.12 Peak Hour Intersection LOS Results - Existing Plus Interim Project Conditions

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec.) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec.)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1	Harbor Drive / Cesar Chavez Parkway	36.8	D	34.6	C	36.8 / 33.3	D / C	0.0 / 1.3	No
2	Harbor Drive / Sampson Street	40.4	D	41.1	D	40.4 / 40.9	D / D	0.0 / 0.2	No
3	Harbor Drive / Schley Street	16.7	B	15.0	B	16.7 / 15.0	B / B	0.0 / 0.0	No
4	Harbor Drive / 28 th Street	23.5	C	20.3	C	23.1 / 20.3	C / C	0.4 / 0.0	No
5	Main Street / 28 th Street	21.4	C	34.8	C	21.4 / 34.8	C / C	0.0 / 0.0	No
6	Boston Avenue / 28 th Street	19.4	B	23.0	C	19.4 / 23.0	B / C	0.0 / 0.0	No
7	National Avenue / 28 th Street	42.3	D	29.6	C	42.3 / 29.6	D / C	0.0 / 0.0	No
8	National Avenue / I-5 NB Off-Ramp	14.9	B	14.8	B	14.9 / 14.7	B / B	0.0 / 0.1	No
9	Harbor Drive / Belt Street	18.6	B	17.1	B	18.6 / 17.1	B / B	0.0 / 0.0	No
10	Harbor Drive / 32 nd Street	28.8	C	41.9	D	28.6 / 39.9	C / D	0.2 / 2.0	No
11	Norman Scott Road / 32 nd Street / Wabash Boulevard	100.1	F	68.5	E	95.3 / 66.2	F / E	4.8 / 2.3	Yes

Source: Chen Ryan Associates; June 2016

As shown, all key study intersections are projected to operate at LOS D or better under Existing Plus Interim Project conditions, with the exception of:

- Norman Scott Road / 32nd Street / Wabash Boulevard – LOS F during AM peak hour and LOS E during PM peak hour.

Based on the City of San Diego's Significance Criteria, outlined in Section 2.6, the traffic associated with the proposed project would add delay surpassing the acceptable threshold (greater than 1 second for intersections operating at LOS F and greater than 2 seconds for intersection operating at LOS E) to the aforementioned intersection, which is projected to operate at LOS F during the AM peak hour and LOS E during the PM peak hour. Therefore, the project would result in a significant direct impact at the Norman Scott Road / 32nd Street / Wabash Boulevard intersection.

Ramp Intersection Capacity Analysis

Consistent with Caltrans requirements, the signalized ramp intersections of National Avenue / I-5 NB off-ramp and Norman Scott Road / 32nd Street / Wabash Boulevard were analyzed using ILV procedures, as described in Section 2.4. ILV analysis results are displayed in **Table 4.13** and analysis worksheets for Existing Plus Interim Project conditions are provided in Appendix F.

Table 4.13 Ramp Intersection Capacity Analysis - Existing Plus Interim Project Conditions

#	Intersection	Peak Hour	ILV/Hour	Description
8	National Avenue / I-5 NB Off-Ramp	AM	636	Under Capacity
		PM	794	Under Capacity
11	Norman Scott Road / 32 nd Street / Wabash Boulevard	AM	986	Under Capacity
		PM	1,053	Under Capacity

Source: Chen Ryan Associates; June 2016

As shown, the all key study signalized ramp intersections are projected to operate at “Under Capacity” during both the AM and PM peak hours, under Existing Interim Plus Project conditions.

4.9 Existing Plus Interim Project - Alternative Gate Scenario

The Tenth Avenue Marine Terminal Plan also identifies an alternative gate concept that would serve as the primary entry and exit location for the Refrigerated Container node and the Multi-Purpose General Cargo node. The alternative gate would be located in the north-east corner of the terminal and provide access directly onto Harbor Drive. According to the Plan, the Dry Bulk and Liquid Bulk Nodes would continue to utilize the existing gate off Cesar Chavez Parkway, particularly for domestic bulk shipments.

Trip Redistribution

As stated before, the Refrigerated Container and the Multi-Purpose General Cargo nodes would utilize the alternative gate. Therefore, with the proposed implementation of the alternative gate would result in a redistribution of both existing and proposed project truck traffic from these nodes. It is assumed that employee traffic would continue to use the existing Crosby street gate. **Figure 4-7** displays the assumed redistribution of both existing and interim project truck traffic between the two gate locations. **Figure 4-8** displays the anticipated traffic volumes at both gates and along Harbor Drive under the Existing Plus Interim Project – Alternative Gate Scenario.

Roadway Segment Analysis

Based on the assumed redistribution of truck trips, as displayed in Figure 4-7, Harbor Drive between Beardsley Street and Cesar Chavez Parkway is the only study roadway segment that is anticipated to experience a change in ADT due to the alternative gate. **Table 4.14** displays the LOS analysis results for the affected segment of Harbor Drive under Existing Plus Interim Project conditions, with the proposed alternative gate.





Table 4.14 Roadway Segment LOS Results - Existing Plus Interim Project Conditions – Alternative Gate Scenario

Roadway	Segment	Cross-Section	Threshold (LOS E)	Existing + Project			Existing	Δ	S?
				ADT	V/C	LOS	ADT / V/C / LOS		
Harbor Drive	Between Beardsley Street and Cesar Chavez Parkway	4-Lanes w/ RM	40,000	20,288	0.507	B	20,194 / 0.505 / B	0.002	N

Source: Chen Ryan Associates; June 2016

Notes:

V/C = Volume to Capacity Ratio.

Δ = Change in V/C Ratio.

S? = Indicates if change in V/C ratio is significant.

As shown, Harbor Drive between Beardsley Street and Cesar Chavez Parkway is anticipated to operate at LOS B with the addition of the interim project and with the alternative gate.

Based on the City of San Diego's Significance Criteria, outlined in Section 2.6, the traffic associated with the proposed alternative gate would not cause any additional roadway segments to operate at LOS E or F; therefore, the implementation of the proposed alternative gate would not result in any additional impacts.

Intersection Analysis

Based on the assumed redistribution of truck trips, as displayed in Figure 4-7, the Harbor Drive / Cesar Chavez Parkway intersection (Main Gate) is the only study intersection that is anticipated to experience a change in peak hour volumes due to the alternative gate. All other key study intersections are anticipated to operate at the same conditions as Identified in Table 4.12. **Table 4.15** displays intersection LOS and average vehicle delay results under Existing Plus Interim Project conditions, with the alternative gate assumed. Both intersections are assumed to be signalized. LOS calculation worksheets for the Existing Plus Interim Project conditions are provided in Appendix F.

Table 4.15 Peak Hour Intersection LOS Results - Existing Plus Interim Project Conditions – Alternative Gate Scenario

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec.) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec.)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1	Harbor Drive / Cesar Chavez Parkway	37.6	D	34.6	C	36.8 / 33.3	D / C	0.8 / 1.3	No
12	Harbor Drive / Alternative Gate	18.2	B	24.2	C	N/A	N/A	18.2 / 24.2	No

Source: Chen Ryan Associates; June 2016

As shown, both affected intersections are anticipated to operate at LOS D or better with the proposed alternative gate.

Based on the City of San Diego's Significance Criteria, outlined in Section 2.6, the traffic associated with the proposed alternative gate would not cause either intersection to operate

at LOS E or F; therefore, the implementation of the proposed alternative gate would not result in any additional impacts.

4.10 Impact Significance and Mitigation

Roadway Segments

Existing Plus Project Conditions

Based upon the significance criteria presented in Section 2.6 of this report, the addition of project traffic would have a significant direct traffic impact on the following roadway segment under the following Scenarios:

- 28th Street, between Boston Avenue and National Avenue

This section of 28th Street is currently constructed as a Three-Lane Collector with a daily capacity of 22,500 trips. However, the Barrio Logan Community Plan classifies this section of 28th Street as a Four-Lane Major Arterial which would carry a daily capacity of 40,000 trips. Improving the roadway to its ultimate classification as a Four-Lane Major Arterial would improve the traffic operations at this impacted segment to LOS C, reducing the impact to less than significant. Based on a comparison of the project traffic added to the roadway segment (838 daily trips) to the traffic projected to be on this segment under Existing Plus Project conditions (22,924) the project would be responsible for a 3.7% fair-share contribution of the cost to widen the roadway to a 4-Lane Major classification.

As noted previously, the proposed project is a long-range redevelopment plan and will not be developed all at once or even in set phases. Instead cargo throughput is anticipated to increase overtime based on market demands. Therefore, the time period in which this impact is anticipated to occur is not known at this time. Thus, the implementation of this impact should be based on when the project traffic is anticipated to reach a critical level or trigger point where the project related impact moves from less than significant to significant. It is estimated that this impact will occur when the project is 29% built out or is generating 1,175 new daily trips. This is the point in which the project will add more than 0.02 V/C to the failing segment and therefore be associated with a significant impact.

Existing Plus Project Conditions – Alternative Gate

The addition of the proposed alternative gate is not anticipated to result in any additional significant impacts to study roadway segments. However, it should be noted that all of the impacts listed above would still occur both with and without the alternative gate.

Existing Plus Interim Project Conditions

- None

Existing Plus Interim Project Conditions – Alternative Gate

- None

Intersections

Existing Plus Project Conditions

Based upon the significance criteria presented in Section 2.6 of this report, the proposed project would contribute to a direct traffic impact at the following intersection under Existing Plus Project conditions:

- Norman Scott Road / 32nd Street / Wabash Boulevard

However, as shown in **Table 4.16**, the following recommended improvement would reduce the overall intersection delay to predevelopment conditions:

- Add a westbound right-turn overlap phase.

Table 4.16 Peak Hour Intersection LOS – Mitigated Intersection - Existing Plus Project Conditions

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec.) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec.)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
11	Norman Scott Road / 32 nd Street / Wabash Boulevard	94.9	F	55.9	E	95.3 / 66.2	F / E	-0.4 / -10.3	No

Source: Chen Ryan Associates; June 2016

As noted previously, the proposed project is a long-range redevelopment plan and will not be developed all at once or even in set phases. Instead cargo throughput is anticipated to increase overtime based on market demands. Therefore, the time period in which this impact is anticipated to occur is not known at this time. Thus, the implementation of this impact should be based on when the project traffic is anticipated to reach a critical level or trigger point where the project related impact moves from less than significant to significant. It is estimated that this impact will occur when the project is 7% built out or is generating 276 new daily trips. This is the amount of traffic the project can generate before it adds more than one second of delay to the failing Norman Scott Road / 32nd Street / Wabash Boulevard intersection. However, this intersection is controlled by Caltrans and the Port District does not have jurisdiction at this intention; therefore, this impact is considered significant and unavoidable.

In addition to the aforementioned mitigation measure, Caltrans is currently working on a truck access improvement study which will identify several potential improvements to this intersection, including a potential grade separation. It is recommended that the District continues to coordinate with Caltrans as the TAMT develops to determine if the proposed mitigation measure is relevant at the time of implementation or if the District can participate in a larger improvement program for the intersection.

Existing Plus Project Conditions – Alternative Gate

The addition of the proposed alternative gate is not anticipated to result in any additional significant impacts to study intersections. However, it should be noted that all of the impacts listed above would still occur both with and without the alternative gate.

Existing Plus Interim Project Conditions

Based upon the significance criteria presented in Section 2.6 of this report, the proposed project would contribute to a direct traffic impact at the following intersection under Existing Plus Project conditions:

- Norman Scott Road / 32nd Street / Wabash Boulevard

However, as shown in **Table 4.17**, the following recommended improvement would reduce the overall intersection delay to predevelopment conditions:

- Add a westbound right-turn overlap phase.

Table 4.17 Peak Hour Intersection LOS – Mitigated Intersection - Existing Plus Interim Project Conditions

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec.) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec.)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
11	Norman Scott Road / 32 nd Street / Wabash Boulevard	94.1	F	55.7	E	95.3 / 66.2	F / E	-1.2 / -10.5	No

Source: Chen Ryan Associates; June 2016

This intersection is controlled by Caltrans and the Port District does not have jurisdiction at this intention; therefore, this impact is considered significant and unavoidable.

In addition to the aforementioned mitigation measure, Caltrans is currently working on a truck access improvement study which will identify several potential improvements to this intersection, including a potential grade separation. It is recommended that the District continues to coordinate with Caltrans as the TAMT develops to determine if the proposed mitigation measure is relevant at the time of implementation or if the District can participate in a larger improvement program for the intersection.

Existing Plus Interim Project Conditions – Alternative Gate

The addition of the proposed alternative gate is not anticipated to result in any additional significant impacts to study intersections. However, it should be noted that all of the impacts listed above would still occur both with and without the alternative gate.

Freeway Mainline Segments

Existing Plus Project Conditions

- None

Existing Plus Project Conditions – Alternative Gate

- None

5.0 Near-Term Year 2021 Base Conditions

This section provides an analysis of Year 2021 (project interim year) traffic conditions both with and without project traffic. The scenarios analyzed in this section include:

- Near-Term Year 2021 Base
- Near-Term Year 2021 Base Plus Interim Project
- Near-Term Year 2021 Base Plus Interim Project – Alternative Gate Scenario

5.1 Other Project Traffic

The Port of San Diego and the City of San Diego identified fourteen (14) cumulative projects within close proximity to the project site, which could potentially contribute traffic to the transportation network within the project study area. These projects have been included in the Near-Term Year 2021 Base conditions scenario to provide an accurate background for comparing traffic impacts associated with the construction of the project improvements. **Figure 5-1** displays the locations of these projects. **Table 5.1** displays the trip generation for the cumulative projects.

1. *Shipyards Sediment Remediation Project* – This project consists of dredging sediment adjacent to shipyards in the San Diego Bay, the dewatering, and possible solidification of the dredged material on-shore, potential treatment of decanted water, and the transport of the removed material to an appropriate landfill for disposal. The project will include numerous staging area located at the Tenth Avenue Marine Terminal, Commercial Berthing Pier adjacent to Coronado Bridge, SDG&E/BAE/BAE and NASSCO Parking lot, and 24th Street Marine Terminal. This project is anticipated to generate an average daily traffic volume of 348 with 59 trips occurring during both the AM and PM peak hours.
2. *San Diego Refrigerated Services* – This project proposes to expand the operations of the existing San Diego Refrigerated Services facility to transport approximately 2,034 additional truckloads a year. This project is anticipated to generate 148 daily trips with 24 trips occurring during both the AM and PM peak hours.
3. *Pier 1 N Drydock* – This project proposes the construction of a new drydock facility on the northside of Pier 1 at the BAE Systems facility. This project is anticipated to generate 149 daily trips with 0 occurring during either the AM or PM peak hour, since work shifts are not anticipated to begin and end during off-peak times.
4. *Metro Center Project* - This project consists of 160,600 SF regional shopping center uses, 163,300 SF of retail space and a 152,000 SF lumber store. The project is located in the block bordered by Commercial Street to the north, Newton Avenue to the west, National Avenue to the east, and 16th Street to the south. This project is anticipated to generate 12,350 daily trips with 458 trips occurring during the AM peak hour and 1,110 trips occurring during the PM peak hour.



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5. *San Diego Continuing Education Cesar Chavez Campus* - The new Cesar E. Chavez Campus will be a 67,924 SF school facility with 22 classrooms to serve 720 students. The facility will include a multi-purpose room and administrative offices. The school facility is anticipated to generate 1,152 daily trips with 138 trips occurring during the AM peak hour and 92 trips occurring during the PM peak hour.
 6. *Jack in the Box* – This project will be located at the northwest corner of 29th Street and National Avenue. The project proposes to construct a 2,588 SF fast food restaurant with drive-thru on the existing vacant pad. This project is anticipated to generate 1,812 daily trips with 72 trips occurring during the AM peak hour and 145 trips occurring during the PM peak hour.
 7. *Ballpark Village Parcel C* – This project site will be located on the block bound by Park Boulevard to the west and north, the trolley tracks/12th Avenue alignment to the east, and Imperial Avenue to the south. The project site is currently occupied by a surface parking lot. The project proposes the removal of the existing surface parking lot and the development of 646 residential units (including 280 condominiums and 366 apartments) and 41,505 SF of gross retail space. This project is anticipated to generate 3,622 daily trips with 225 trips occurring during the AM peak hour and 320 trips occurring during the PM peak hour.
 8. *Ballpark Village Parcel D* – This project site is located directly across the street from the proposed Parcel C project at the southwest corner of the 11th Avenue / Imperial Avenue intersection. Per the Parcel D developer, the project is assumed to include 1,800 hotel rooms with meeting space. This project is anticipated to generate 16,200 daily trips with 972 trips occurring during the AM peak hour and 1,296 trips occurring during the PM peak hour.
 9. *Park & G Street* – This project will be located on the block bounded by Park, G Street and 13th Street. The project proposes to construct 5,500 SF of retail space and 208 mid-rise and ground level apartments. In addition, the building will include common areas for residents at the ground floor and a rooftop deck. This project is anticipated to generate 931 daily trips with 71 trips occurring during the AM peak hour and 93 trips occurring during the PM peak hour.
 10. *15th Street & Island* – This project will be located on the block bounded by 14th Street, 15th Street, Island Avenue, and J Street in downtown San Diego. The project includes 442 apartments, 451 condos, and 17,100 SF of commercial space. This project is anticipated to generate 3,620 daily trips with 301 trips occurring during the AM peak hour and 395 trips occurring during the PM peak hour.
 11. *San Diego Convention Center Phase III Expansion and Expansion Hotel* – This project consists of approximately 315,000 SF of additional exhibition, meeting, and support space, a 500-room hotel, including banquet and conference rooms, ballroom, restaurants, and 45,000 SF of retail shops; a water transportation center. This project is anticipated to

generate 7,590 daily trips with 1,132 trips occurring during the AM peak hour and 1,309 trips occurring during the PM peak hour.

12. *Sprint Cell Tower* – The project proposes to construct, operate, and maintain an *unmanned* wireless telecommunications facility and equipment room located at Embarcadero Marina Park South. The proposed project is only anticipated to generate 2 trips each month; therefore, no daily or peak hour traffic were assumed for this project in the analysis.
13. *Dole Fresh Fruit Refrigerated Rack Improvement Project* – This project includes the installation of an additional 94 outdoor refrigerated cargo outlets to increase the site capacity from 669 outlets to 763 outlets. Improvements include five new refrigerated racks that will be stacked four containers high and five containers wide. Since existing conduits are already installed below grade at the proposed maintenance rack location, new trenching or ground disturbance will not be required. The entire project site is located within the Tenth Avenue Marine Terminal in San Diego, California. The Dole Fresh Fruit Refrigerated Rack Improvement Project is anticipated to generate 580 daily trips with 68 trips during the AM peak hour and 104 trips during the PM peak hour.
14. *Mitsubishi Cement Corporation* – This project includes the importation of an additional 750,000 metric tons of cement annually. The entire project site is located within the Tenth Avenue Marine Terminal in San Diego, California. The Mitsubishi Cement Project is anticipated to generate 450 daily trips with 24 trips during the AM peak hour and 24 trips during the PM peak hour.

Table 5.1 Cumulative Projects Vehicular Trip Generation

	Project	ADT	AM Peak Hour		PM Peak Hour	
			In	Out	In	Out
1	Shipyards Sediment Remediation Project ¹	348	44	15	15	44
2	San Diego Refrigerated Services (SDRS) ²	148	16	8	8	16
3	Pier 1N Drydock Project ³	149	0	0	0	0
4	Metro Center Project ⁴	12,350	287	171	555	555
5	San Diego Continuing Education – Cesar Chavez Campus ⁴	1,152	124	14	28	64
6	Jack in the Box ⁵	1,812	43	29	73	72
7	Ballpark Village Parcel C ⁶	3,622	52	173	217	103
8	Ballpark Village Parcel D ⁶	16,200	583	389	778	518
9	Park and G ⁶	931	15	56	63	30
10	15 th and Island ⁶	3,620	65	236	270	125
11	San Diego Convention Center Phase III Expansion and Hotel ⁷	7,590	835	298	461	848
12	Sprint Cell Tower	0	0	0	0	0

Table 5.1 Cumulative Projects Vehicular Trip Generation

Project			AM Peak Hour		PM Peak Hour	
			In	Out	In	Out
13	Dole Fresh Fruit Refrigerated Rack Improvement Project ⁸	580	53	15	51	53
14	Mitsubishi Cement Corporation ⁹	450	15	9	9	15
Total		48,952	2,132	1,413	2,528	2,443

Source: Port of San Diego, City of San Diego, June 2016

Notes:

- ¹ Trip Generation obtained from *Shipyard Sediment Remediation Project – TIA* by LSA Associates, Inc.
² Trip Generation obtained from *SDRS Negative Declaration - Traffic Analysis Memorandum* by LLG, Engineers
³ Trip Generation obtained from *BAE Systems Pier 1N Drydock - TIA* by LSA Associates, Inc.
⁴ Trip Generation obtained from *Cesar Chavez Campus – TIA* by Kimley-Horn and Associates, Inc.
⁵ Trip Generation obtained from *Jack in the Box – TIA* by Darnell and Associates, Inc.
⁶ Trip Generation obtained from *Ballpark Village Parcel C – TIA* by Fehr & Peers, Inc.
⁷ Trip Generation obtained from *SDCC Phase III Expansion and Expansion Hotel – TIA* by Fehr & Peers, Inc.
⁸ Trip Generation obtained from Dole Fresh Fruit Refrigerated Rack Improvement – TIA by Chen Ryan Associates
⁹ Trip Generation provided by the Unified Port District of San Diego.

Cumulative Trip Distribution and Assignment

The trip distribution and assignment for the various cumulative projects was obtained from their respective Traffic Impact Analysis. **Figures 5-2A and B** display the total assignment of the cumulative project trips to the study area roadways and intersections. Trip distribution and assignment data from the cumulative projects is provided in **Appendix G**.

5.2 Near-Term Year 2021 Base Roadway Network and Traffic Volumes

Roadway and intersection geometrics under Near-Term Year 2021 Base conditions were assumed to be identical to Existing conditions, as shown in Figure 4-1 previously. **Figures 5-3A and B** display average daily roadway and peak hour intersection volumes for the study roadway segments and intersections under the Near-Term Year 2021 Base conditions. These volumes were developed by adding the identified specific cumulative project traffic volumes (displayed in Figures 5-2A & B) to existing traffic volumes (displayed in Figures 4-2A & B).

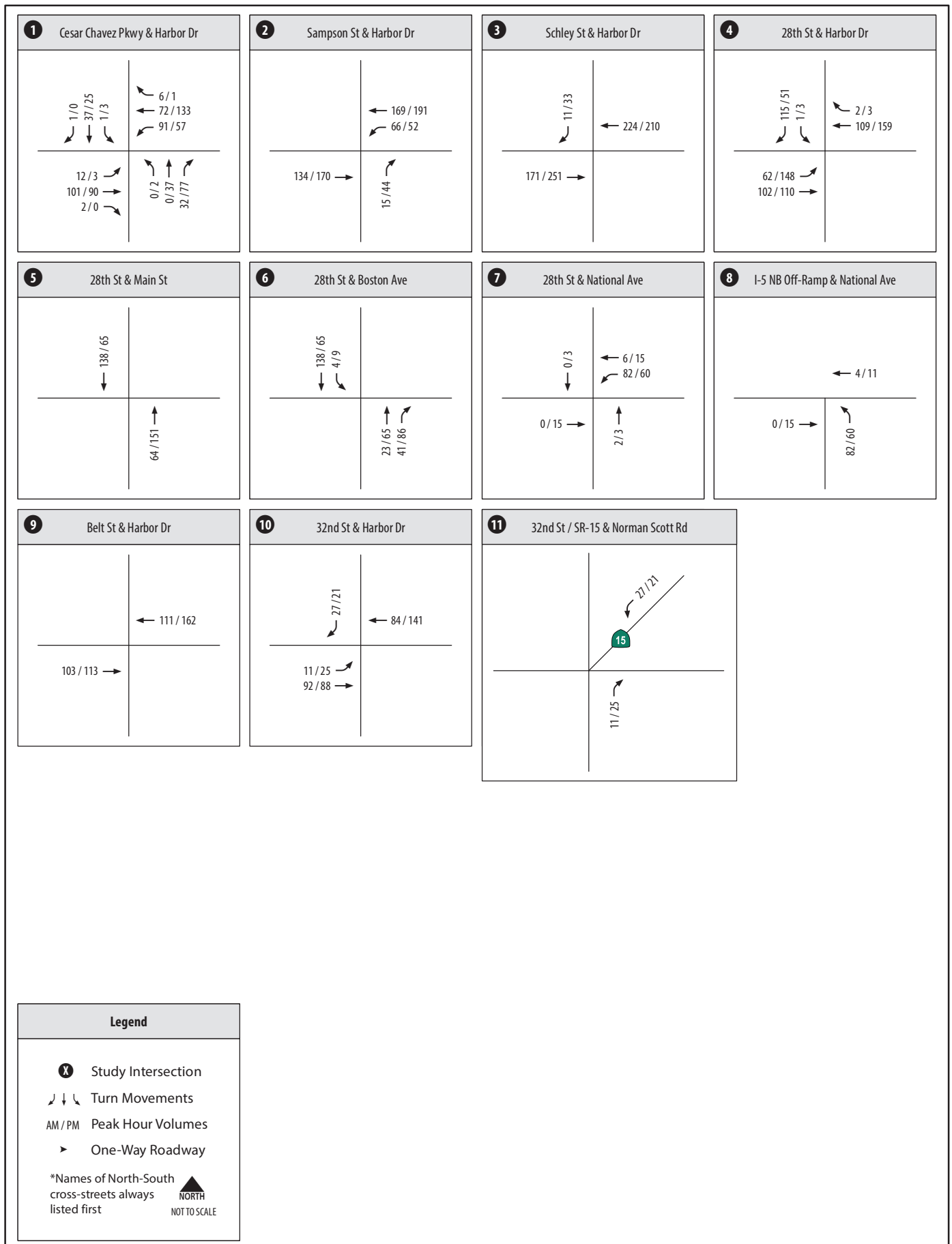
5.3 Near-Term Year 2021 Base Traffic Conditions

LOS analyses for the Near-Term Year 2021 Base conditions were conducted using the methodologies described in Chapter 2.0. Roadway segment analysis, intersection LOS analysis, and freeway ramp intersection ILV analysis results, are discussed separately below.

Roadway Segment Analysis

Table 5.2 displays the LOS analysis results for key roadway segments under Near-Term Year 2021 Base conditions.







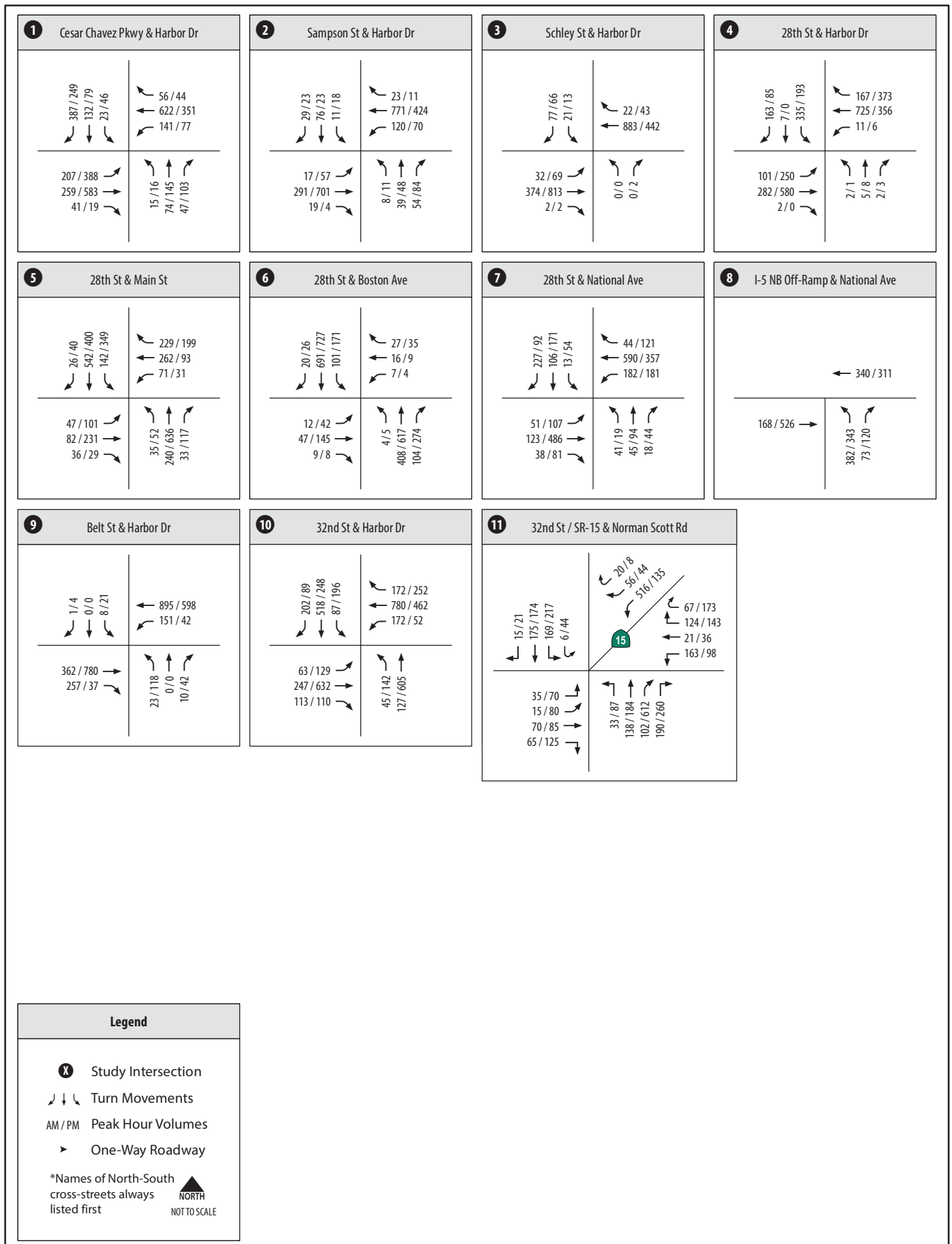


Table 5.2 Daily Roadway Segment LOS Results - Near-Term Year 2021 Base Conditions

Roadway Segment	Segment	Cross-section	Threshold (LOS E)	ADT	V/C	LOS
Harbor Drive	Between Beardsley Street and Cesar Chavez Parkway	4-Lanes w/ RM	40,000	24,460	0.612	C
	Between Cesar Chavez Parkway and Sampson Street	4-Lanes w/ RM	40,000	15,744	0.394	B
	Between Sampson Street and Schley Street	4-Lanes w/ RM	40,000	17,292	0.432	B
	Between Schley Street and 28 th Street	4-Lanes w/ RM	40,000	16,868	0.422	B
	Between 28 th Street and Belt Street	4-Lanes w/ RM	40,000	22,496	0.562	C
	Between Belt Street and 32 nd Street	4-Lanes w/ RM	40,000	21,048	0.526	C
28 th Street	Between Harbor Drive and Main Street	4-Lanes w/ RM	40,000	17,184	0.430	B
	Between Main Street and Boston Avenue	4-Lanes w/TWLT	30,000	20,613	0.687	D
	Between Boston Avenue and National Avenue	3-Lanes w/TWLT	22,500 ¹	23,076	1.026	F
32 nd Street	Between Harbor Drive and Norman Scott Road	6-lanes w/ RM	50,000	24,610	0.492	B

Source: NDS, Chen Ryan Associates; June 2016

Notes:

¹ Capacity is 75% of a 4-Lane Collector w/TWLT.

V/C = Volume to Capacity Ratio.

Bold letter indicates LOS E or F.

As shown, all key study roadway segments are projected to operate at LOS D or better under Near-Term Year 2021 Base conditions, with the exception of the following:

- 28th Street between Boston Avenue and National Avenue (LOS F)

Intersection Analysis

Table 5.3 displays intersection LOS and average vehicle delay results under Near-Term Year 2021 Base conditions. All intersections are signalized unless otherwise noted. LOS calculation worksheets for the Near-Term Year 2021 Base conditions are provided in **Appendix H**.

Table 5.3 Peak Hour Intersection LOS Results - Near-Term Year 2021 Base Conditions

#	Intersection	AM Peak Hour		PM Peak Hour	
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS
1	Harbor Drive / Cesar Chavez Parkway	41.0	D	38.0	D
2	Harbor Drive / Sampson Street	43.8	D	44.9	D
3	Harbor Drive / Schley Street	16.3	B	15.7	B
4	Harbor Drive / 28 th Street	28.2	C	26.6	C
5	Main Street / 28 th Street	22.2	C	38.8	D
6	Boston Avenue / 28 th Street	19.1	B	23.9	C
7	National Avenue / 28 th Street	42.6	D	31.5	C
8	National Avenue / I-5 NB Off-Ramp	17.4	B	14.8	B
9	Harbor Drive / Belt Street	18.8	B	17.0	B
10	Harbor Drive / 32 nd Street	29.3	C	43.3	D
11	Norman Scott Road / 32 nd Street / Wabash Boulevard	103.2	F	69.6	E

Source: Chen Ryan Associates; June 2016

As shown, all key study intersections are projected to operate at acceptable LOS D or better during the peak hours under Near-Term Year 2021 Base conditions, with the exception of the following:

- Norman Scott Road / 32nd Street / Wabash Boulevard – LOS F during the AM peak hour and LOS E during the PM peak hour.

Ramp Intersection Capacity Analysis

Consistent with Caltrans requirements, the signalized ramp intersection of National Avenue / I-5 NB off-ramp was analyzed using ILV procedures, as described in Section 2.4. ILV analysis results are displayed in **Table 5.4** and analysis worksheets for Near-Term Year 2021 Base conditions are provided in Appendix H.

Table 5.4 Ramp Intersection Capacity Analysis -Near-Term Year 2021 Base Conditions

#	Intersection	Peak Hour	ILV/Hour	Description
8	National Avenue / I-5 NB Off-Ramp	AM	722	Under Capacity
		PM	869	Under Capacity
11	Norman Scott Road / 32nd Street / Wabash Boulevard	AM	995	Under Capacity
		PM	1,061	Under Capacity

Source: Chen Ryan Associates; June 2016

As shown, the signalized ramp intersections of National Avenue / I-5 NB off-ramp and Norman Scott Road / 32nd Street / Wabash Boulevard are projected to operate at “Under Capacity” during both the AM and PM peak hours, under Near-Term Year 2021 Base conditions.

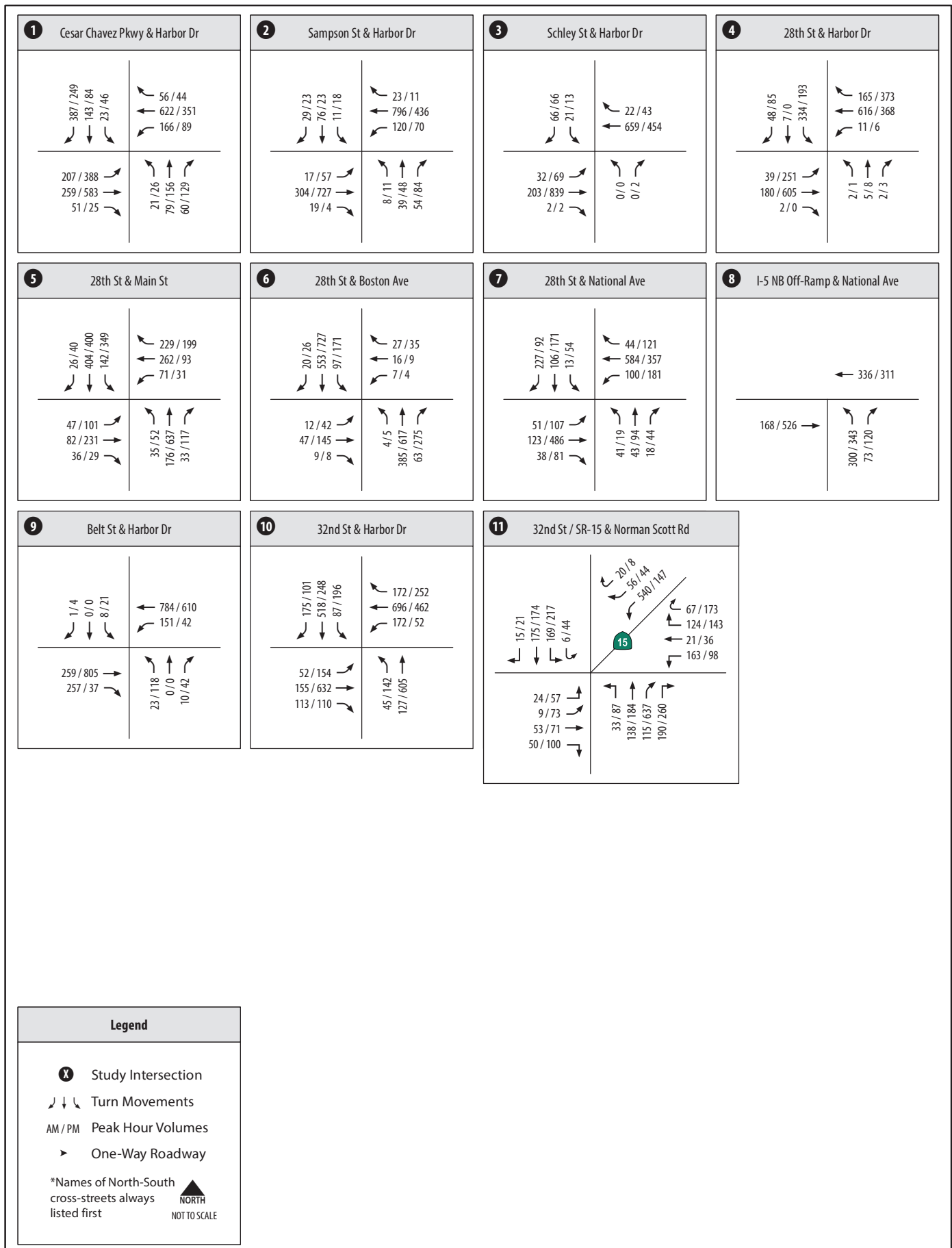
5.4 Near-Term Year 2021 Base Plus Interim Project Roadway Network and Traffic Volumes

Roadway and intersection geometrics under Near-Term Year 2021 Base Plus Interim Project conditions were assumed to be identical to Existing conditions, as shown in Figure 4-1 previously. Near-Term Year 2021 Base Plus Project traffic volumes were derived by combining the Near-Term Year 2021 Base traffic volumes (displayed in Figures 5-3A & B) and the project trip assignment volumes (displayed in Figures 3-6A and 3-6B for employees and Figures 3-7A and 3-7B for trucks). Daily and peak hour intersection volumes for this scenario are displayed in **Figures 5-4A & B**.

5.5 Near-Term Year 2021 Base Plus Interim Project Traffic Conditions

Analyses were conducted using the methodologies described in Chapter 2.0. Roadway segment analysis, intersection LOS analysis, and freeway ramp intersection ILV analysis results, are discussed separately below.





Roadway Segment Analysis

Table 5.5 displays the LOS analysis results for key roadway segments under Near-Term Year 2021 Base Plus Project conditions.

Table 5.5 Roadway Segment LOS Results - Near-Term Year 2021 Base Plus Interim Project Conditions

Roadway	Segment	Cross-Section	Threshold (LOS E)	Near-Term Base + Project			Near-Term Base		
				ADT	V/C	LOS	ADT / V/C / LOS	Δ	S?
Harbor Drive	Between Beardsley Street and Cesar Chavez Parkway	4-Lanes w/ RM	40,000	24,543	0.614	C	24,460 / 0.612 / C	0.002	N
	Between Cesar Chavez Parkway and Sampson Street	4-Lanes w/ RM	40,000	15,930	0.398	B	15,744 / 0.394 / B	0.004	N
	Between Sampson Street and Schley Street	4-Lanes w/ RM	40,000	17,478	0.437	B	17,292 / 0.432 / B	0.005	N
	Between Schley Street and 28 th Street	4-Lanes w/ RM	40,000	17,054	0.426	B	16,868 / 0.422 / B	0.004	N
	Between 28 th Street and Belt Street	4-Lanes w/ RM	40,000	22,660	0.566	C	22,496 / 0.562 / C	0.004	N
	Between Belt Street and 32 nd Street	4-Lanes w/ RM	40,000	21,212	0.530	C	21,048 / 0.526 / C	0.004	N
28 th Street	Between Harbor Drive and Main Street	4-Lanes w/ RM	40,000	17,206	0.430	B	17,184 / 0.430 / B	0.000	N
	Between Main Street and Boston Avenue	4-Lanes w/TWLT	30,000	20,635	0.688	D	20,613 / 0.687 / D	0.001	N
	Between Boston Avenue and National Avenue	3-Lanes w/TWLT	22,500 ¹	23,090	1.026	F	23,076 / 1.026 / F	0.000	N
32 nd Street	Between Harbor Drive and Norman Scott Road	6-Lanes w/ RM	50,000	24,774	0.495	B	24,610 / 0.492 / B	0.003	N

Source: Chen Ryan Associates, June 2016

Notes:

¹ Capacity is 75% of a 4-Lane Collector w/TWLT.

V/C = Volume to Capacity Ratio.

Δ = Change in V/C Ratio.

S? = Indicates if change in V/C ratio is significant.

Bold letter indicates LOS E or F.

As shown, all study area roadway segments are projected to operate at LOS D or better with the addition of project traffic under Near-Term Year 2021 Base Plus Project conditions with the exception of:

- 28th Street, between Boston Avenue and National Avenue (LOS F).

Based on the City of San Diego's Significance Criteria, outlined in Section 2.6, the traffic associated with the proposed project would not cause any significant changes (V/C ration less

than 0.01) or further deterioration in roadway segment Levels of Service under Near-Term Year 2021 Base Plus Interim Project conditions. Therefore, the project would not be associated with a significant and no mitigation is required.

Intersection Analysis

Table 5.6 displays intersection LOS and average vehicle delay results under Near-Term Year 2021 Base Plus Interim Project conditions. All intersections are currently signalized. LOS calculation worksheets for the Near-Term Year 2021 Base Plus Interim Project conditions are provided in **Appendix I**.

Table 5.6 Peak Hour Intersection LOS Results - Near-Term Year 2021 Base Plus Interim Project Conditions

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec.) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec.)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1	Harbor Drive / Cesar Chavez Parkway	41.0	D	39.6	D	41.0 / 38.0	D / D	0.0 / 1.6	No
2	Harbor Drive / Sampson Street	44.0	D	45.5	D	43.8 / 44.9	D / D	0.2 / 0.6	No
3	Harbor Drive / Schley Street	16.4	B	15.7	B	16.3 / 15.7	B / B	0.1 / 0.0	No
4	Harbor Drive / 28 th Street	28.4	C	26.7	C	28.2 / 26.6	C / C	0.2 / 0.1	No
5	Main Street / 28 th Street	22.2	C	38.8	D	22.2 / 38.8	C / D	0.0 / 0.0	No
6	Boston Avenue / 28 th Street	19.1	B	23.9	C	19.1 / 23.9	B / C	0.0 / 0.0	No
7	National Avenue / 28 th Street	42.6	D	31.5	C	42.6 / 31.5	D / C	0.0 / 0.0	No
8	National Avenue / I-5 NB Off-Ramp	17.4	B	16.4	B	17.4 / 14.8	B / B	0.0 / 1.6	No
9	Harbor Drive / Belt Street	18.9	B	17.2	B	18.8 / 17.0	B / B	0.1 / 0.2	No
10	Harbor Drive / 32 nd Street	30.2	C	44.4	D	29.3 / 43.3	C / D	0.9 / 1.1	No
11	Norman Scott Road / 32 nd Street / Wabash Boulevard	105.1	F	70.4	E	103.2 / 69.6	F/E	1.9 / 0.8	Yes

Source: Chen Ryan Associates; June 2016

As shown, all key study intersections are projected to operate at acceptable LOS D during both peak hours under Near-Term Year 2021 Base Plus Project conditions, with the exception of the following:

- Norman Scott Road / 32nd Street / Wabash Boulevard (AM: LOS F / PM: LOS E)

Based on the City of San Diego's Significance Criteria, outlined in Section 2.6, the traffic associated with the proposed project would add delay surpassing the acceptable threshold (greater than 1 second for intersections operating at LOS F and greater than 2 seconds for intersection operating at LOS E) to the aforementioned intersection, which is projected to operate at LOS F during the AM peak hour and LOS E during the PM peak hour. Therefore, the project would result in a significant cumulative impact at the Norman Scott Road / 32nd Street / Wabash Boulevard intersection.

Ramp Intersection Capacity Analysis

Consistent with Caltrans requirements, the signalized ramp intersection of National Avenue / I-5 NB off-ramp was analyzed using ILV procedures, as described in Section 2.4. ILV analysis results are displayed in **Table 5.7** and analysis worksheets for Near-Term Year 2021 Base Plus Interim Project are provided in Appendix I.

Table 5.7 Ramp Intersection Capacity Analysis - Near-Term Year 2021 Base Plus Interim Project Conditions

#	Intersection	Peak Hour	ILV/Hour	Description
8	National Avenue / I-5 NB Off-Ramp	AM	723	Under Capacity
		PM	869	Under Capacity
11	Norman Scott Road / 32nd Street / Wabash Boulevard	AM	1,026	Under Capacity
		PM	1,086	Under Capacity

Source: Chen Ryan Associates; June 2016

As shown, the signalized ramp intersections of National Avenue / I-5 NB off-ramp and Norman Scott Road / 32nd Street / Wabash Boulevard are projected to operate at “Under Capacity” during both the AM and PM peak hours, under Near-Term Year 2021 Base Plus Interim Project conditions.

5.6 Near-Term Year 2021 Base Plus Interim Project - Alternative Gate Scenario

As noted previously, the Tenth Avenue Marine Terminal Plan also identifies an alternative gate concept that would serve as the primary entry and exit location for the Refrigerated Container node and the Multi-Purpose General Cargo node. The alternative gate would be located in the north-east corner of the terminal and provide access directly onto Harbor Drive. According to the Plan, the Dry Bulk and Liquid Bulk Nodes would continue to utilize the existing gate off Cesar Chavez Parkway, particularly for domestic bulk shipments.

Trip Redistribution

As stated before, the Refrigerated Container and the Multi-Purpose General Cargo nodes would utilize the alternative gate. Therefore, with the proposed implementation of the alternative gate would result in a redistribution of both existing and proposed project truck traffic from these modes. It is assumed that employee traffic would continue to use the existing Crosby street gate. **Figure 5-5** displays the assumed redistribution of both existing and interim project truck traffic between the two gate locations. **Figure 5-6** displays the anticipated traffic volumes at both gates and along Harbor Drive under the Near-Term Year 2021 Base Plus Interim Project – Alternative Gate Scenario.





Roadway Segment Analysis

Based on the assumed redistribution of truck trips, as displayed in Figure 5-5, Harbor Drive between Beardsley Street and Cesar Chavez Parkway is the only study roadway segment that is anticipated to experience a change in ADT due to the Alternative gate. **Table 5.11** displays the LOS analysis results for the affected segment of Harbor Drive under Near-Term Year 2021 Base Plus Interim Project conditions, with the proposed Alternative Gate.

Table 5.8 Roadway Segment LOS Results - Near-Term Year 2021 Base Plus Interim Project Conditions – Alternative Gate Scenario

				Near-Term Year 2021						
				Base + Project			Existing			
Roadway	Segment	Cross-Section	Threshold (LOS E)	ADT	V/C	LOS	ADT / V/C / LOS	Δ	S?	
Harbor Drive	Between Beardsley Street and Cesar Chavez Parkway	4-Lanes w/ RM	40,000	24,550	0.614	C	24,460 / 0.612 / C	0.002	N	

Source: Chen Ryan Associates; June 2016

Notes:

V/C = Volume to Capacity Ratio.

Δ = Change in V/C Ratio.

S? = Indicates if change in V/C ratio is significant.

As shown, Harbor Drive between Beardsley Street and Cesar Chavez Parkway is anticipated to operate at LOS C with the addition of the proposed project and with the alternative gate.

Based on the City of San Diego's Significance Criteria, outlined in Section 2.6, the traffic associated with the proposed project would not cause any roadways segments to operate at LOS E or F; therefore, the implementation of the proposed alternative gate would not result in any additional impacts.

Intersection Analysis

Based on the assumed redistribution of truck trips, as displayed in Figure 5-5, the Harbor Drive / Cesar Chavez Parkway intersection (Main Gate) is the only study intersection that is anticipated to experience a change in peak hour volumes due to the alternative gate. All other key study intersections are anticipated to operate at the same conditions as identified in Table 5.6. **Table 5.9** displays intersection LOS and average vehicle delay results under Near-Term Year 2021 Base Plus Interim Project conditions, with the alternative gate assumed. Both intersections are assumed to be signalized. LOS calculation worksheets for the Near-Term Year 2021 Base Plus Interim Project conditions are provided in Appendix I.

Table 5.9 Peak Hour Intersection LOS Results - Near-Term Year 2021 Base Plus Interim Project Conditions – Alternative Gate Scenario

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec.) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec.)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1	Harbor Drive / Cesar Chavez Parkway	41.9	D	38.8	D	41.0 / 38.0	D / D	0.9 / 0.8	No
12	Harbor Drive / Alternative Gate	21.7	C	33.9	C	N/A	N/A	21.7 / 33.9	No

Source: Chen Ryan Associates; June 2016

As shown, both affected intersections are anticipated to operate at LOS D or better with the proposed alternative gate.

Based on the City of San Diego's Significance Criteria, outlined in Section 2.6, the traffic associated with the proposed project would not cause either intersection to operate at LOS E or F; therefore, the implementation of the proposed alternative gate would not result in any additional impacts.

5.7 Impact Significance and Mitigation

Roadway Segments

Near-Term Year 2021 Base Plus Interim Project Conditions

- None

Near-Term Year 2021 Base Plus Interim Project Conditions – Alternative Gate

- None

Intersections

Near-Term Year 2021 Base Plus Interim Project Conditions

Based upon the significance criteria presented in Section 2.6 of this report, the proposed project would contribute to a direct traffic impact at the following intersection under Near-Term Year 2021 Base Plus Project conditions:

- Norman Scott Road / 32nd Street / Wabash Boulevard

However, as shown in **Table 5.10**, the following recommended improvement would reduce the overall intersection delay to predevelopment conditions:

- Add a westbound right-turn overlap phase.

Table 5.10 Peak Hour Intersection LOS – Mitigated Intersection – Near-Term Year 2021 Plus Interim Project Conditions

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec.) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec.)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
11	Norman Scott Road / 32 nd Street / Wabash Boulevard	100.1	F	60.1	E	103.2 / 69.6	F/E	-3.1 / -9.5	No

Source: Chen Ryan Associates; June 2016

This intersection is controlled by Caltrans and the Port District does not have jurisdiction at this intention; therefore, this impact is considered significant and unavoidable.

In addition to the aforementioned mitigation measure, Caltrans is currently working on a truck access improvement study which will identify several potential improvements to this intersection, including a potential grade separation. It is recommended that the District continues to coordinate with Caltrans as the TAMT develops to determine if the proposed mitigation measure is relevant at the time of implementation or if the District can participate in a larger improvement program for the intersection.

Near-Term Year 2021 Base Plus Interim Project Conditions – Alternative Gate

The addition of the proposed alternative gate is not anticipated to result in any additional significant impacts to study intersections. However, it should be noted that all of the impacts listed above would still occur both with and without the alternative gate.

6.0 Future Year 2035 Traffic Conditions

This section provides a description of Future Year 2035 traffic conditions both with and without the proposed project. Scenarios analyzed in this section included:

- Future Year 2035 Base Conditions
- Future Year 2035 Base Plus Project Conditions
- Future Year 2035 Base Plus Project – Alternative Gate Scenario

6.1 Future Year 2035 Base Roadway Network and Traffic Volumes

Roadway and intersection geometrics under Future Year 2035 Base conditions were assumed to be identical to Existing conditions, as shown in Figure 4-1 previously. It should be noted that since the project is a long-range redevelopment plan, the timing of its implementation will be based on ongoing market conditions and therefore the timing of its implementation and phasing is unknown. Therefore, no mitigation measures identified under Existing Plus Project conditions were carried forward into future year conditions since it is unknown when they will actually be implemented at this time.

Figures 6-1A and 6-1B display, respectively, average daily roadway and peak hour intersection volumes for the study roadway segments and intersections under Future Year 2035 Base Conditions. Future Year 2035 Base daily roadway volumes were derived from the SANDAG Series 12 Future Year 2035 Regional Forecast Model as well as from the Barrio Logan Community Plan Update (2012) and the Southeastern Community Plan Update (2015). Peak hour intersection turning movements were developed by comparing existing daily roadway segment volumes to the forecasted Future Year 2035 daily volumes contained in the SANDAG model. Based on this comparison, the Future Year 2035 growth rates were applied to existing peak hour intersection approach and departure volumes. Manual adjustments were also made to ensure that traffic volumes among adjacent intersections are reasonably balanced. In addition, future year turning movement volumes developed for the Southeastern San Diego Community Plan were used where applicable. Barrio Logan and Southeastern San Diego Community Plan Excerpts are provided in **Appendix J**.

6.2 Future Year 2035 Base Traffic Conditions

LOS analyses for Future Year 2035 Base conditions were conducted using the methodologies described in Chapter 2.0. Roadway segment analysis, intersection LOS analysis, freeway ramp intersection ILV analysis, and freeway mainline analysis results are discussed in the following sections.

Roadway Segment Analysis

Table 6.1 displays the LOS analysis results for key roadway segments under the Future Year 2035 Base conditions.

As shown in Table 6.1, all key study area roadway segments are projected to operate at LOS D or better under Future Year 2035 Base conditions, with the exception of the following:

- 28th Street, between Boston Avenue and National Avenue (LOS F).



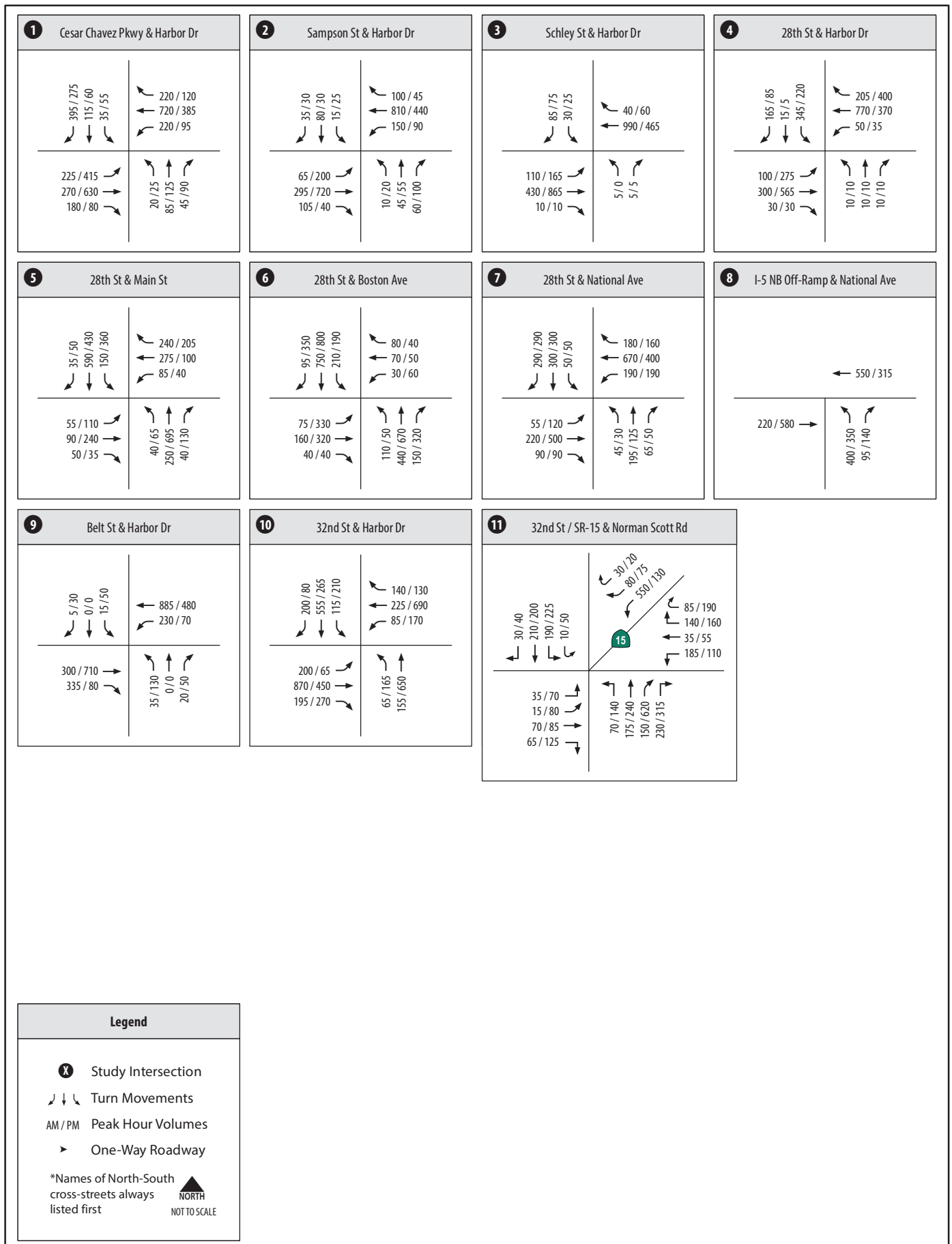


Table 6.1 Roadway Segment LOS Results - Future Year 2035 Base Conditions

Roadway	Segment	Classification	Threshold (LOS E)	ADT	V/C	LOS
Harbor Drive	Between Beardsley Street and Cesar Chavez Parkway	4-Lane Major	40,000	25,050	0.626	C
	Between Cesar Chavez Parkway and Sampson Street	4-Lane Major	40,000	18,800	0.470	B
	Between Sampson Street and Schley Street	4-Lane Major	40,000	17,050	0.426	B
	Between Schley Street and 28 th Street	4-Lane Major	40,000	17,050	0.426	B
	Between 28 th Street and Belt Street	4-Lane Major	40,000	24,000	0.600	C
	Between Belt Street and 32 nd Street	4-Lane Major	40,000	24,000	0.600	C
28 th Street	Between Harbor Drive and Main Street	4-Lane Major	40,000	16,950	0.424	B
	Between Main Street and Boston Avenue	4-Lane Collector w/TWLT	30,000	20,220	0.674	D
	Between Boston Avenue and National Avenue	3-Lane Collector w/TWLT	22,500	27,720	1.232	F
32 nd Street	Between Harbor Drive and Norman Scott Road	6-Lane Major	50,000	25,800	0.516	B

Source: Chen Ryan Associates; June 2016

Intersection Analysis

Table 6.2 displays intersection LOS and average vehicle delay results under Future Year 2035 Base conditions. All intersections are currently signalized. LOS calculation worksheets are provided in **Appendix K**. It should be noted that all intersection signal timing plans were assumed to be optimized under Future Year 2035 conditions. This may result in better signal operations at some intersections when compared to existing conditions.

Table 6.2 Peak Hour Intersection LOS Results - Future Year 2035 Base Conditions

#	Intersection	AM Peak Hour		PM Peak Hour	
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS
1	Harbor Drive / Cesar Chavez Parkway	50.6	D	39.6	D
2	Harbor Drive / Sampson Street	50.9	D	53.0	D
3	Harbor Drive / Schley Street	23.2	C	19.4	B
4	Harbor Drive / 28 th Street	28.8	C	28.2	C
5	Main Street / 28 th Street	22.2	C	39.2	D
6	Boston Avenue / 28 th Street	27.7	C	37.4	D
7	National Avenue / 28 th Street	122.5	F	71.4	E
8	National Avenue / I-5 NB Off-Ramp	18.9	B	17.5	B
9	Harbor Drive / Belt Street	22.3	C	19.1	B
10	Harbor Drive / 32 nd Street	32.3	C	44.2	D
11	Norman Scott Road / 32 nd Street / Wabash Boulevard	81.5	F	67.2	E

Source: Chen Ryan Associates; June 2016

As shown, all key study intersections are projected to operate at LOS D or better during both the peak hours under Future Year 2035 Base conditions, with the exception of the following two (2) intersections:

- National Avenue / 28th Street – LOS F during AM peak hour and LOS E during PM peak hour; and
- Norman Scott Road / 32nd Street / Wabash Boulevard – LOS F during AM peak hour and LOS E during the PM peak hour.

Ramp Intersection Capacity Analysis

Consistent with Caltrans requirements, the signalized ramp intersections of National Avenue / I-5 NB off-ramp and Norman Scott Road / 32nd Street / Wabash Boulevard were analyzed using ILV procedures, as described in Section 2.4. ILV analysis results are displayed in **Table 6.3** and analysis worksheets for Future Year 2035 Base conditions are provided in Appendix K.

Table 6.3 Ramp Intersection Capacity Analysis - Future Year 2035 Base Conditions

#	Intersection	Peak Hour	ILV/Hour	Description
8	National Avenue / I-5 NB Off-Ramp	AM	950	Under Capacity
		PM	930	Under Capacity
11	Norman Scott Road / 32nd Street / Wabash Boulevard	AM	1,095	Under Capacity
		PM	1,083	Under Capacity

Source: Chen Ryan Associates; June 2016

As shown, the key study signalized ramp intersections are projected to operate at “Under Capacity” during both the AM and PM peak hour, under Future Year 2035 Base conditions.

Freeway Analysis

Table 6.4 displays the LOS results from the freeway segment analysis under Future Year 2035 Base conditions.

As shown in Table 6.4, all study freeway segments currently operate at LOS D or better with the exception of the following:

- I-5 NB between SR-94 & Imperial Avenue (LOS F)
- I-5 SB between SR-94 & Imperial Avenue (LOS E)
- I-5 NB between Imperial Avenue & SR-75 (LOS E)
- I-5 NB between SR-75 & 28th Street (LOS F)
- I-5 SB between SR-75 & 28th Street (LOS E)
- I-5 NB between 28th Street & SR-15 (LOS F)
- I-5 NB between SR-15 & Main Street (LOS F)
- I-5 SB between SR-15 & Main Street (LOS F)
- SR-15 NB between Market Street & Ocean View Boulevard (LOS E)
- SR-15 NB between Market Street & Ocean View Boulevard (LOS F)

Table 6.4 Freeway Mainline LOS Analysis Results – Future Year 2035 Base Conditions

Freeway	Segment	ADT ^(a)	Direction	# of Lanes	Capacity ^(b)	D ^(c)	K ^(d)	HVF ^(e)	Peak Hour Volume	V/C	LOS
I-5	SR-94 & Imperial Avenue	218,400	NB	4M+1A	10,810	0.0%	8.1%	4.0%	11,600	1.07	F
			SB	4M+1A	10,810	0.0%	8.3%	4.0%	10,200	0.94	E
	Imperial Avenue & SR-75	195,700	NB	4M+1A	10,810	0.0%	8.1%	3.8%	10,400	0.96	E
			SB	4M+1A	10,810	0.0%	8.2%	3.8%	9,700	0.90	D
	SR-75 & 28th Street	191,100	NB	4M+2A	12,220	0.0%	8.4%	5.0%	11,900	0.97	E
			SB	4M+1A	10,810	0.0%	8.2%	5.0%	9,500	0.88	D
	28th Street & SR-15	176,800	NB	4M	9,400	0.0%	8.4%	5.0%	11,000	1.17	F
			SB	4M	9,400	0.0%	8.2%	5.0%	8,800	0.94	E
SR-15	SR-94 & Market Street	120,800	NB	3M+1A	8,460	0.0%	8.1%	5.1%	6,100	0.72	C
			SB	3M+1A	8,460	0.0%	9.7%	5.1%	6,800	0.80	D
	Market Street & Ocean View Boulevard	129,100	NB	3M	7,050	0.0%	8.1%	5.1%	6,700	0.95	E
			SB	3M	7,050	0.0%	9.6%	5.1%	7,200	1.02	F
	Ocean View Boulevard & I-5	122,000	NB	3M+1A	8,460	0.0%	7.0%	5.1%	5,500	0.65	C
			SB	4M+1A	10,810	0.0%	7.8%	5.1%	5,500	0.51	B
	I-5 & Norman Scott Road	30,400	NB	2M	4,700	0.0%	7.0%	5.1%	1,400	0.30	A
			SB	2M	4,700	0.0%	7.5%	5.1%	1,300	0.28	A

Source: Chen Ryan Associates; June 2016

Notes:

Bold letter indicates LOS E or F.

M = Mainline. A = Auxiliary Lane.

^a Traffic volumes provided by Caltrans (2014).

^b The capacity is calculated as 2,350 ADT per main lane and 1,410 ADT (60% of the main lane capacity) per auxiliary lane.

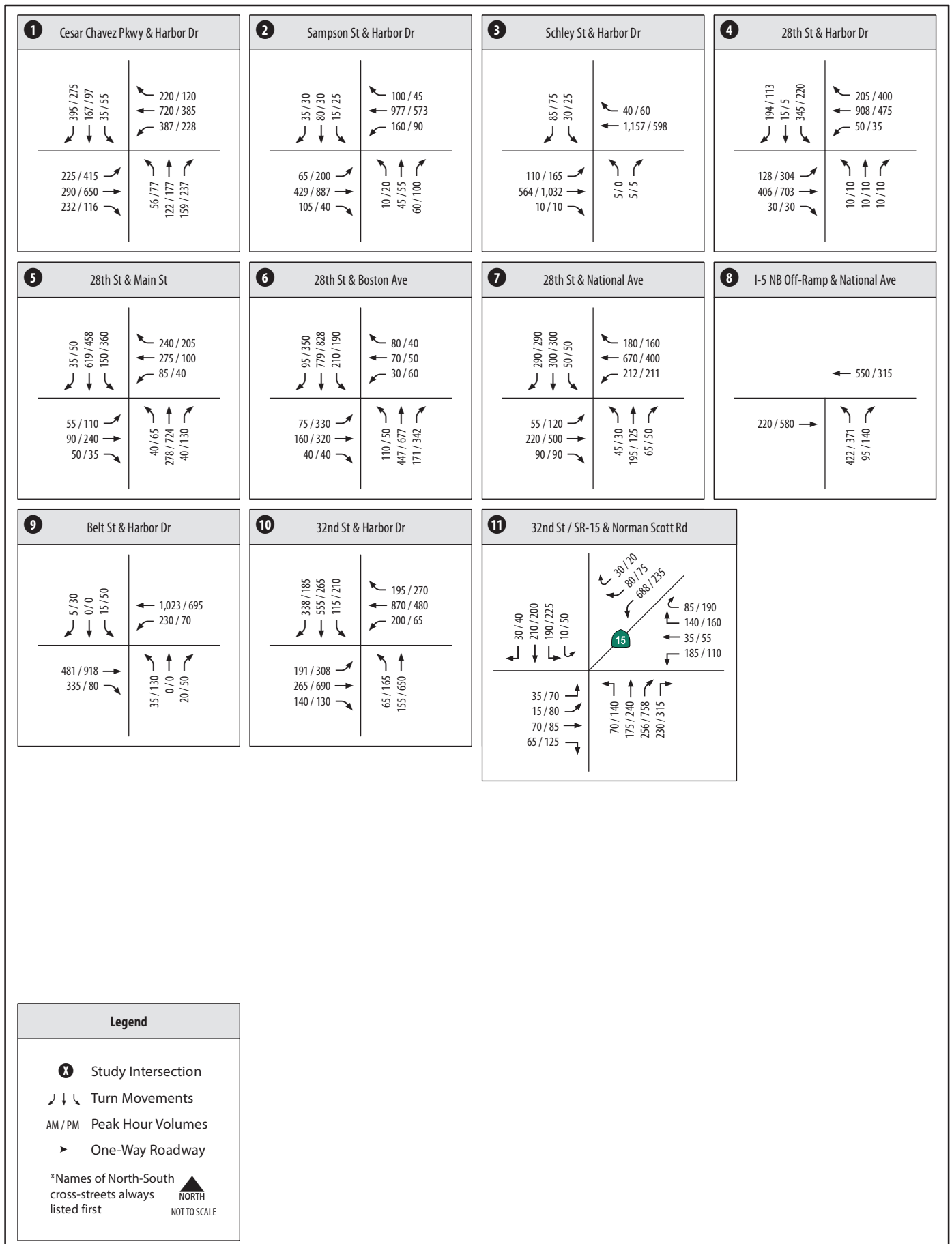
^c D = Directional split. | ^d K = Peak hour %. | ^e HV = Heavy vehicle %.

6.3 Future Year 2035 Base Plus Project Roadway Network and Traffic Volumes

Roadway and intersection geometrics under Future Year 2035 Base Plus Project conditions were assumed to be identical to Existing conditions geometrics, as shown in Figure 4-1.

Future Year 2035 Base Plus Project traffic volumes were derived by combining the Future Year 2035 Base traffic volumes (displayed in Figure 6-1A and 6-1B) and the project trip assignment volumes (displayed in Figures 3-4A and 3-4B for employees and Figures 3-5A and 3-5B for trucks). Daily and peak hour intersection volumes for this scenario are displayed in **Figure 6-2A and 6-2B**, respectively.





6.4 Future Year 2035 Base Plus Project Traffic Conditions

LOS analyses were conducted using the methodologies described in Chapter 2.0. Roadway segment analysis, intersection LOS analysis, freeway ramp intersection ILV analysis, and freeway mainline analysis results are discussed in the following sections.

Roadway Segment Analysis

Table 6.5 displays the LOS analysis results for key roadway segments under Future Year 2035 Base Plus Project conditions.

Table 6.5 Roadway Segment LOS Results - Future Year 2035 Base Plus Project Conditions

				Future Year 2035+ Project			Future Year 2035Base	Δ	S?
Roadway	Segment	Classification	Threshold (LOS E)	ADT	V/C	LOS	ADT / V/C / LOS		
Harbor Drive	Between Beardsley Street and Cesar Chavez Parkway	4-Lane Major	40,000	26,392	0.660	C	25,050 / 0.626 / C	0.034	No
	Between Cesar Chavez Parkway and Sampson Street	4-Lane Major	40,000	22,155	0.554	C	18,800 / 0.470 / B	0.084	No
	Between Sampson Street and Schley Street	4-Lane Major	40,000	20,405	0.510	B	17,050 / 0.426 / B	0.084	No
	Between Schley Street and 28 th Street	4-Lane Major	40,000	20,405	0.510	B	17,050 / 0.426 / B	0.084	No
	Between 28 th Street and Belt Street	4-Lane Major	40,000	26,010	0.650	C	24,000 / 0.600 / C	0.050	No
	Between Belt Street and 32 nd Street	4-Lane Major	40,000	26,010	0.650	C	24,000 / 0.600 / C	0.050	No
28 th Street	Between Harbor Drive and Main Street	4-Lane Major	40,000	18,295	0.457	B	16,950 / 0.424 / B	0.034	No
	Between Main Street and Boston Avenue	4-Lane Collector w/TWLT	30,000	21,565	0.719	D	20,220 / 0.674 / D	0.045	No
	Between Boston Avenue and National Avenue	3-Lanes Collector w/TWLT	22,500	28,532	1.268	F	27,720 / 1.232 / F	0.036	Yes
32 nd Street	Between Harbor Drive and Norman Scott Road	6-Lane Major	50,000	27,810	0.556	B	25,800 / 0.516 / B	0.040	No

Source: Chen Ryan Associates; June 2016

As shown, all key study roadway segments are projected to operate at acceptable LOS D or better under Future Year 2035 Base Plus Project conditions, with the exception of the following roadway segments:

- 28th Street, between Boston Avenue and National Avenue (LOS F).

Based on the City of San Diego's Significance Criteria, outlined in Section 2.6, the traffic associated with the proposed project would cause a significant change in the V/C ratio (add

more than 0.01) to the aforementioned roadway segment, which is projected to operate at LOS F under Future Year Base Project conditions. Therefore, the project would result in a significant cumulative impact on 28th Street, between Boston Avenue and National Avenue. It should be noted that this impact was also identified as a direct impact under Existing Plus Project conditions.

Intersection Analysis

Table 6.6 displays intersection LOS and average vehicle delay results under Future Year 2035 Base Plus Project conditions. All intersections are currently signalized. LOS calculation worksheets for this scenario are provided in **Appendix L**.

Table 6.6 Peak Hour Intersection LOS Results - Future Year 2035 Base Plus Project Conditions

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1	Harbor Drive / Cesar Chavez Parkway	53.5	D	52.4	D	50.6 / 39.6	D / D	2.9/12.8	No
2	Harbor Drive / Sampson Street	53.7	D	53.1	D	50.9 / 53.0	D / D	2.8 / 0.1	No
3	Harbor Drive / Schley Street	26.6	C	20.4	C	23.2 / 19.4	B / B	3.4 / 1.0	No
4	Harbor Drive / 28 th Street	32.4	C	30.1	C	28.8 / 28.2	C / C	3.6 / 1.9	No
5	Main Street / 28 th Street	22.4	C	39.9	D	22.2 / 39.2	C / D	0.2 / 0.7	No
6	Boston Avenue / 28 th Street	28.0	C	38.7	D	27.7 / 37.4	C / D	0.3 / 1.3	No
7	National Avenue / 28 th Street	122.5	F	72.0	E	122.5 / 71.4	F / E	0.0 / 0.6	No
8	National Avenue / I-5 NB Off-Ramp	19.7	B	18.2	B	18.9 / 17.5	B / B	0.8 / 0.7	No
9	Harbor Drive / Belt Street	23.2	C	20.1	C	22.3 / 19.1	C / B	0.9 / 1.0	No
10	Harbor Drive / 32 nd Street	41.8	C	53.8	D	32.3 / 44.2	C / D	9.5 / 9.6	No
11	Norman Scott Road / 32 nd Street / Wabash Boulevard	106.5	F	81.4	F	81.5 / 67.2	E / E	25.0 / 14.2	Yes

Source: Chen Ryan Associates; June 2016

As shown, all key study intersections are projected to operate at acceptable LOS D or better under Future Year 2035 Base Plus Project conditions, with the exception of the following two (2) intersections:

- National Avenue and 28th Street – LOS F during AM peak hour and LOS E during PM peak hour; and
- Norman Scott Road / 32nd Street / Wabash Boulevard – LOS F during both AM and PM peak hours.

Based on the City of San Diego's Significance Criteria, outlined in Section 2.6, the traffic associated with the proposed project would add delay surpassing the acceptable threshold (greater than 1 second for intersections operating at LOS F and greater than 2 seconds for intersection operating at LOS E) to the aforementioned intersection, which is projected to

operate at LOS F during both the AM and PM peak hours. Therefore, the project would result in a significant cumulative impact at the Norman Scott Road / 32nd Street / Wabash Boulevard intersection.

Ramp Intersection Capacity Analysis

Consistent with Caltrans requirements, the signalized ramp intersections of National Avenue / I-5 NB off-ramp and Norman Scott Road / 32nd Street / Wabash Boulevard were analyzed using ILV procedures, as described in Section 2.4. ILV analysis results are displayed in **Table 6.7** and analysis worksheets for Future Year 2035 Base Plus Project conditions are provided in Appendix L.

Table 6.7 Ramp Intersection Capacity Analysis - Future Year 2035 Base Plus Project Conditions

#	Intersection	Peak Hour	ILV/Hour	Description
8	National Avenue / I-5 NB Off-Ramp	AM	972	Under Capacity
		PM	951	Under Capacity
11	Norman Scott Road / 32nd Street / Wabash Boulevard	AM	1,286	At Capacity
		PM	1,257	At Capacity

Source: Chen Ryan Associates; June 2016

As shown in Table 6.6, the key study signalized ramp intersections are projected to operate at “At Capacity” or better during both the AM and PM peak hour, under Future Year 2035 Base Plus Project conditions.

Freeway Analysis

Table 6.8 displays the LOS results from the freeway segment analysis under Future Year 2035 Base Plus Project conditions.

Table 6.8 Freeway Mainline LOS Analysis Results - Future Year 2035 Base Plus Project Conditions

Freeway	Segment	ADT	Direction	Peak Hour Volume	With Project		Base		Δ V/C	S?
					V/C	LOS	V/C	LOS		
I-5	SR-94 & Imperial Avenue	219,100	NB	11,700	1.080	F	1.070	F	0.010	Y
			SB	10,200	0.940	E	0.940	E	0.000	N
	Imperial Avenue & SR-75	196,400	NB	10,500	0.970	E	0.960	E	0.010	N
			SB	9,700	0.900	D	0.900	D	0.000	N
	SR-75 & 28th Street	191,600	NB	11,900	0.970	E	0.970	E	0.000	N
			SB	9,500	0.880	D	0.880	D	0.000	N
	28th Street & SR-15	178,000	NB	11,100	1.180	F	1.170	F	0.010	Y
			SB	8,800	0.940	E	0.940	E	0.000	N
SR-15	SR-94 & Market Street	122,800	NB	6,200	0.730	C	0.720	C	0.010	N
			SB	6,900	0.820	D	0.800	D	0.020	N
	Market Street & Ocean View Boulevard	131,200	NB	6,800	0.960	E	0.950	E	0.010	N
			SB	7,400	1.050	F	1.020	F	0.030	Y
	Ocean View Boulevard & I-5	124,000	NB	5,600	0.660	C	0.650	C	0.010	N
			SB	5,600	0.520	B	0.510	B	0.010	N
	I-5 & Norman Scott Road	32,400	NB	1,400	0.300	A	0.300	A	0.000	N
			SB	1,400	0.300	A	0.280	A	0.020	N

Source: Chen Ryan Associates; June 2016

Notes:

The capacity, Directional split, Peak hour % and Heavy vehicle % are assumed to be the same as Existing conditions.

Bold letter indicates substandard LOS E or F.

Δ = Change in V/C Ratio.

S? = Indicates if change in V/C ratio is significant

As shown, all study freeway segments currently operate at LOS D or better with the exception of the following:

- I-5 NB between SR-94 & Imperial Avenue (LOS F)
- I-5 SB between SR-94 & Imperial Avenue (LOS E)
- I-5 NB between Imperial Avenue & SR-75 (LOS E)
- I-5 NB between SR-75 & 28th Street (LOS E)
- I-5 NB between 28th Street & SR-15 (LOS F)
- I-5 SB between 28th Street & SR-15 (LOS E)
- I-5 NB between SR-15 & Main Street (LOS F)
- I-5 SB between SR-15 & Main Street (LOS F)
- SR-15 NB between Market Street & Ocean View Boulevard (LOS E)
- SR-15 SB between Market Street & Ocean View Boulevard (LOS F).

Based on the City of San Diego's Significance Criteria, outlined in Section 2.6, the traffic associated with the proposed project would cause a significant change in the V/C ratio (add more than 0.01 for LOS E and 0.005 for LOS F) to the following key study mainline freeway segments:

- I-5 NB between SR-94 & Imperial Avenue (LOS F)
- I-5 NB between 28th Street & SR-15 (LOS F)
- I-5 NB between SR-15 & Main Street (LOS F)
- SR-15 SB between Market Street & Ocean View Boulevard (LOS F).

Therefore, the project would result in a significant cumulative impact to the aforementioned freeway mainline segments.

6.5 Future Year 2035 Plus Project - Alternative Gate Scenario

The Tenth Avenue Marine Terminal Plan also identifies an alternative gate concept that would serve as the primary entry and exit location for the Refrigerated Container node and the Multi-Purpose General Cargo node. The alternative gate would be located in the north-east corner of the terminal and provide access directly onto Harbor Drive. According to the Plan, the Dry Bulk and Liquid Bulk Nodes would continue to utilize the existing gate off Cesar Chavez Parkway, particularly for domestic bulk shipments.

Trip Redistribution

As stated before, the Refrigerated Container and the Multi-Purpose General Cargo nodes would utilize the alternative gate. Therefore, with the proposed implementation of the alternative gate would result in a redistribution of both existing and proposed project truck traffic from these modes. It is assumed that employee traffic would continue to use the existing Crosby street gate. **Figure 6-3** displays the assumed redistribution of both existing and project truck traffic between the two gate locations. **Figure 6-4** displays the anticipated traffic volumes at both gates and along Harbor Drive under the Future Year 2035 Plus Project – Alternative Gate Scenario.

Roadway Segment Analysis

Based on the assumed redistribution of truck trips, as displayed in Figure 6-3, Harbor Drive between Beardsley Street and Cesar Chavez Parkway is the only study roadway segment that is anticipated to experience a change in ADT due to the alternative gate. **Table 6.9** displays the LOS analysis results for the affected segment of Harbor Drive under Future Year 2035 Plus Project conditions, with the proposed alternative gate point.





Table 6.9 Roadway Segment LOS Results - Future Year 2035 Plus Project Conditions – Alternative Gate Scenario

Roadway	Segment	Cross-Section	Threshold (LOS E)	Existing + Project			Existing	Δ	S?
				ADT	V/C	LOS	ADT / V/C / LOS		
Harbor Drive	Between Beardsley Street and Cesar Chavez Parkway	4-Lanes w/ RM	40,000	27,102	0.678	C	25,050 / 0.626 / C	0.052	N

Source: Chen Ryan Associates; June 2016

Notes:

V/C = Volume to Capacity Ratio.

Δ = Change in V/C Ratio.

S? = Indicates if change in V/C ratio is significant.

As shown, Harbor Drive between Beardsley Street and Cesar Chavez Parkway is anticipated to operate at LOS C with the addition of the proposed project and with the alternative gate.

Based on the City of San Diego's Significance Criteria, outlined in Section 2.5, the traffic associated with the proposed project would not cause any roadways segments to operate at LOS E or F; therefore, the implementation of the proposed alternative gate would not result in any additional impacts.

Intersection Analysis

Based on the assumed redistribution of truck trips, as displayed in Figure 6-5, the Harbor Drive / Cesar Chavez Parkway intersection (Main Gate) is the only study intersection that is anticipated to experience a change in peak hour volumes due to the alternative gate. All other key study intersections are anticipated to operate at the same conditions as Identified in Table 6.6. **Table 6.10** displays intersection LOS and average vehicle delay results under Future Year 2035 Plus Project conditions, with the alternative gate assumed. Both intersections are assumed to be signalized. LOS calculation worksheets for the Future Year 2035 Plus Project conditions are provided in Appendix L.

Table 6.10 Peak Hour Intersection LOS Results - Future Year 2035 Plus Project Conditions – Alternative Gate Scenario

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec.) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec.)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
1	Harbor Drive / Cesar Chavez Parkway	53.4	D	50.6	D	50.6 / 39.6	D / D	2.8 / 11.0	No
12	Harbor Drive / Alternative Gate	33.2	C	37.0	D	N/A	N/A	33.2 / 37.0	No

Source: Chen Ryan Associates; June 2016

As shown, both affected intersections are anticipated to operate at LOS D or better with the proposed alternative gate.

Based on the City of San Diego's Significance Criteria, outlined in Section 2.5, the traffic associated with the proposed project would not cause either intersection to operate at LOS E

or F; therefore, the implementation of the proposed alternative gate would not result in any additional impacts.

6.6 Impact Significance and Mitigation

Roadway Segments

Future Year 2035 Plus Project Conditions

Based upon the significance criteria presented in Section 2.6 of this report, the addition of project traffic would have an identified significant cumulative traffic impact at the following roadway segment under Future Year 2035 Base Plus Project conditions:

- 28th Street, between Boston Avenue and National Avenue (LOS F).

As previously noted in Section 4.6, this section of 28th Street is currently constructed as a Three-Lane Collector with a daily capacity of 22,500 trips. However, the Barrio Logan Community Plan classifies this section of 28th Street as a Four-Lane Major Arterial which would carry a daily capacity of 40,000 trips. Improving the roadway to its ultimate classification as a Four-Lane Major Arterial would improve the traffic operations at this impacted segment to LOS C, reducing the impact to less than significant.

As noted previously, the proposed project is a long-range redevelopment plan and will not be developed all at once or even in set phases. Instead cargo throughput is anticipated to increase overtime based on market demands. Therefore, the time period in which this impact is anticipated to occur is not known at this time. The implementation of this impact should be based on when the project traffic is anticipated to reach a critical level or trigger point where the project related impact moves from less than significant to significant, as noted in Section 4.6.

Future Year 2035 Plus Project Conditions – Alternative Gate Scenario

The addition of the proposed alternative gate is not anticipated to result in any additional significant impacts to key study roadway segments. However, it should be noted that all of the impacts listed above would still occur both with and without the alternative gate.

Intersections

Future Year 2035 Plus Project Conditions

Based upon the significance criteria presented in Section 2.6 of this report, the proposed project would contribute to a traffic impact at the following intersection under Future Year 2035 Base Plus Project conditions:

- Norman Scott Road / 32nd Street / Wabash Boulevard

However, as shown in **Table 6.11**, the following recommended improvement would improve the overall intersection delay under Future Year 2035 Base Plus Project conditions to predevelopment conditions:

- Add a westbound right-turn overlap phase.

Table 6.11 Peak hour intersection LOS – Mitigated Intersection - Future year 2035 Base Plus Project conditions

#	Intersection	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec.) AM/PM	LOS w/o Project AM/PM	Change in Delay (sec.)	Significant Impact?
		Avg. Delay (sec.)	LOS	Avg. Delay (sec.)	LOS				
11	Norman Scott Road / 32 nd Street / Wabash Boulevard	81.1	F	59.3	E	81.5 / 67.2	F / E	-0.4 / -7.9	No

Source: Chen Ryan Associates; June 2016

As noted previously, the proposed project is a long-range redevelopment plan and will not be developed all at once or even in set phases. Instead cargo throughput is anticipated to increase overtime based on market demands. Therefore, the time period in which this impact is anticipated to occur is not known at this time. The implementation of this impact should be based on when the project traffic is anticipated to reach a critical level or trigger point where the project related impact moves from less than significant to significant, as noted in Section 4.6. However, this intersection is controlled by Caltrans and the Port District does not have jurisdiction at this intention; therefore, this impact is considered significant and unavoidable. In addition to the aforementioned mitigation measure, Caltrans is currently working on a truck access improvement study which will identify several potential improvements to this intersection, including a potential grade separation. It is recommended that the project applicant continues to coordinate with Caltrans as the TAMT develops to determine if the proposed mitigation measure is relevant at the time of implementation or if the project applicant can participate in a larger improvement program for the intersection.

Future Year 2035 Plus Project Conditions – Alternative Gate Scenario

The addition of the proposed alternative gate is not anticipated to result in any additional significant impacts to study intersections. However, it should be noted that all of the impacts listed above would still occur both with and without the alternative gate.

Freeway Mainline Segments

Future Year 2035 Plus Project Conditions

Based on the City of San Diego's Significance Criteria, outlined in Section 2.6, the traffic associated with the proposed project would cause a significant change in the V/C ratio (add more than 0.010 for LOS E and 0.005 for LOS F) to the following key study mainline freeway segments:

- I-5 NB between SR-94 & Imperial Avenue (LOS F)
- I-5 NB between 28th Street & I-15 (LOS F)
- I-5 NB between I-15 & Main Street (LOS F)
- I-15 SB between Market Street & Ocean View Boulevard (LOS F).

SANDAG has plans to construct two managed lanes (one in each direction) on Interstate 5 between I-15 and Palomar Street by the year 2030 as well as two additional lanes multi-purpose lanes and two managed lanes on SR-15 between I-5 and SR-94 by the year 2050, however, these plans are subject to budget availability and coordination with Caltrans. The following fair-share percentages, per facility, should serve as guidance to the amount the District should pay towards a program or plan for the aforementioned freeway facility improvements to be constructed:

- I-5 NB between SR-94 & Imperial Avenue – 5% of the total cost for improvements to this segment.
- I-5 NB between 28th Street & SR-15 – 7% of the total cost for improvements to this segment.
- I-5 NB between I-15 & Main Street – The Port of San Diego shall contribute with 14% of the total cost for improvements at this segment.
- SR-15 SB between Market Street & Ocean View Boulevard – 25% of the total cost for improvements to this segment.

At the moment, there is no program in place into which the District could pay its fair-share towards the cost of such improvements. Therefore, improvements are considered infeasible and the impacts along I-5 and SR-15 would remain significant and unavoidable.

7.0 Pedestrian, Bicycle and Transit Assessment

This chapter discusses the project's potential impacts to active transportation modes (bicycling and walking) and transit.

Pedestrians

As noted in the roadway facility descriptions contained in Section 4.1, Harbor Drive, 28th Street, and 32nd Street currently have sidewalk facilities on both sides of the roadway within the project study area.

Bicyclists

As shown in the diagram to the right, Harbor Drive is currently designated and signed with Class II Bicycle Lanes in each direction and is part of the Bayshore Bikeway. The Bayshore Bikeway is a 24-mile bicycle facility around the San Diego Bay.

Transit

There are currently three trolley stations located along Harbor Drive and 32nd Street within the project study area, which are:

- 28th Street Trolley Station
- Harborside Trolley Station
- Pacific Fleet Trolley Station

These stations provide service from the MTS Blue Line Trolley service which connects between San Ysidro and Downtown San Diego. There is also an MTS Bus Route 11 stop on the corner of 28th Street and National Boulevard.

Project Impacts

Potential impacts relating to pedestrian, bicycle and transit circulation would be considered significant if the proposed project would substantially increase hazards due to a design feature, or would conflict with the adopted policies, plans, or programs supporting alternative transportation, as outlined in Appendix G of the *California Environmental Quality Act (CEQA) Guidelines*. The project is not proposing to make any improvements to roadways or other transportation related facilities outside of the TAMT. Therefore, the proposed project would not conflict with or generate any significant



Bayshore Bikeway – Existing Configuration

impacts associated with existing pedestrian, bicycle or transit facilities, as well as the planned facilities and policies included in the following documents:

- The City of San Diego Bicycle Master Plan
- The City of San Diego Pedestrian Master Plan
- 2050 Regional Transportation Plan
- Riding to 2050, the San Diego Regional Bike Plan

8.0 Project Construction

As noted previously, the proposed project is a market-based redevelopment plan and will not be implemented all at once or even in set phases. Instead, cargo throughput is anticipated to increase overtime based on market demands. Therefore, the time period in which this impact is anticipated to occur is not known at this time. However, the proposed project does include certain physical improvements such as the demolition of the Transit Sheds #1 and #2, as well as improvements to the existing on-dock intermodal rail facilities including a rail lubrication system to improve train maneuverability at the TAMT and air brake testing onsite. Construction of these facilities will generate additional trips during a near-term time period and could potentially be associated with temporary impacts. Therefore, both existing (direct) and Near-Term Year 2021 (cumulative) conditions were analyzed both with and without construction traffic to identify any potential traffic related impacts associated with the construction.

8.1 Construction Trip Generation

The peak of project construction will occur with the demolition and grading of Transit Shed #2. During this phase, it is anticipated that 79 haul trucks will be required to access the project site on a daily basis, as well as 50 construction workers. As a worst case scenario, it was assumed that all workers would drive individual vehicles to the project site and would arrive and depart during the AM and PM peak hours, respectively. It was also assumed that the delivery trucks/vans would arrive and depart during each peak hour as well. **Table 8.1** displays the assumed vehicle trip generation during the peak of project construction.

Table 8.1
Project Construction Trip Generation

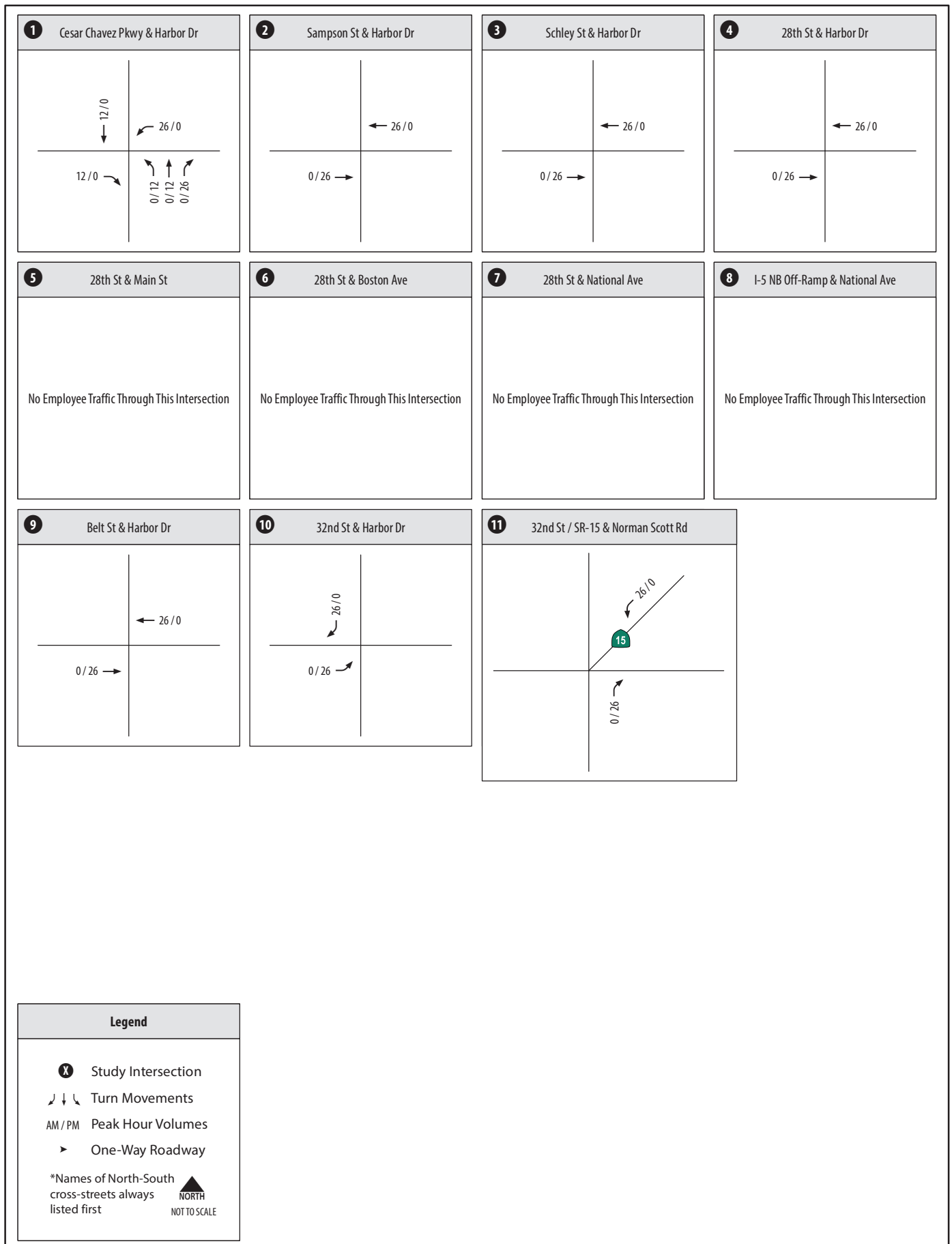
Use	Units	Vehicle Conversion Rate	Rate	ADT	AM Peak Hour			PM Peak Hour		
					Total	In	Out	Total	In	Out
Construction Worker Traffic	50	1	3 / Worker	150	50	50	0	50	0	50
Construction Truck Traffic	79	3	2 / Truck	474	63	32	31	63	31	32
Total				624	113	82	31	113	31	82

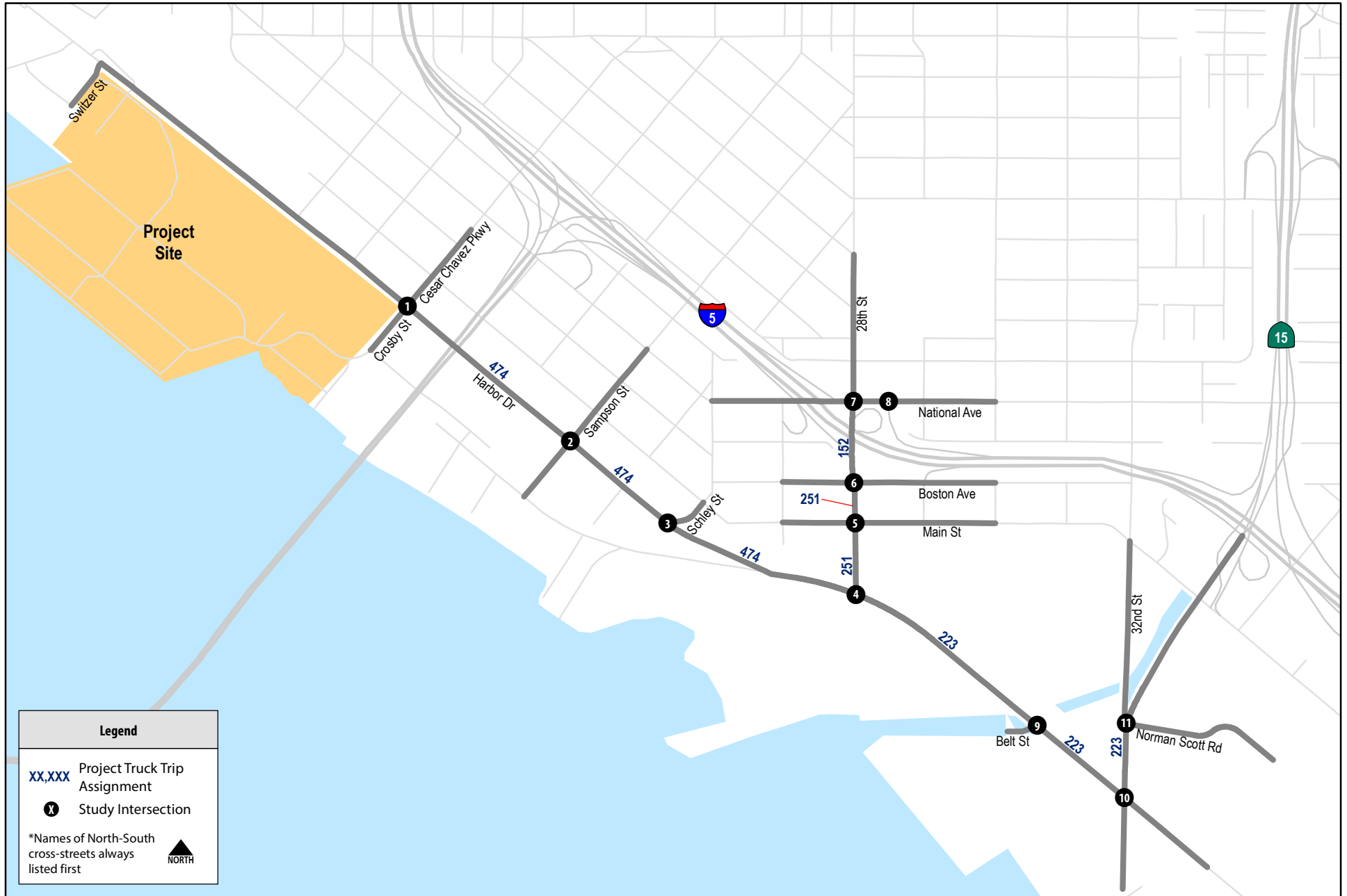
Source: Chen Ryan Associates; June 2016

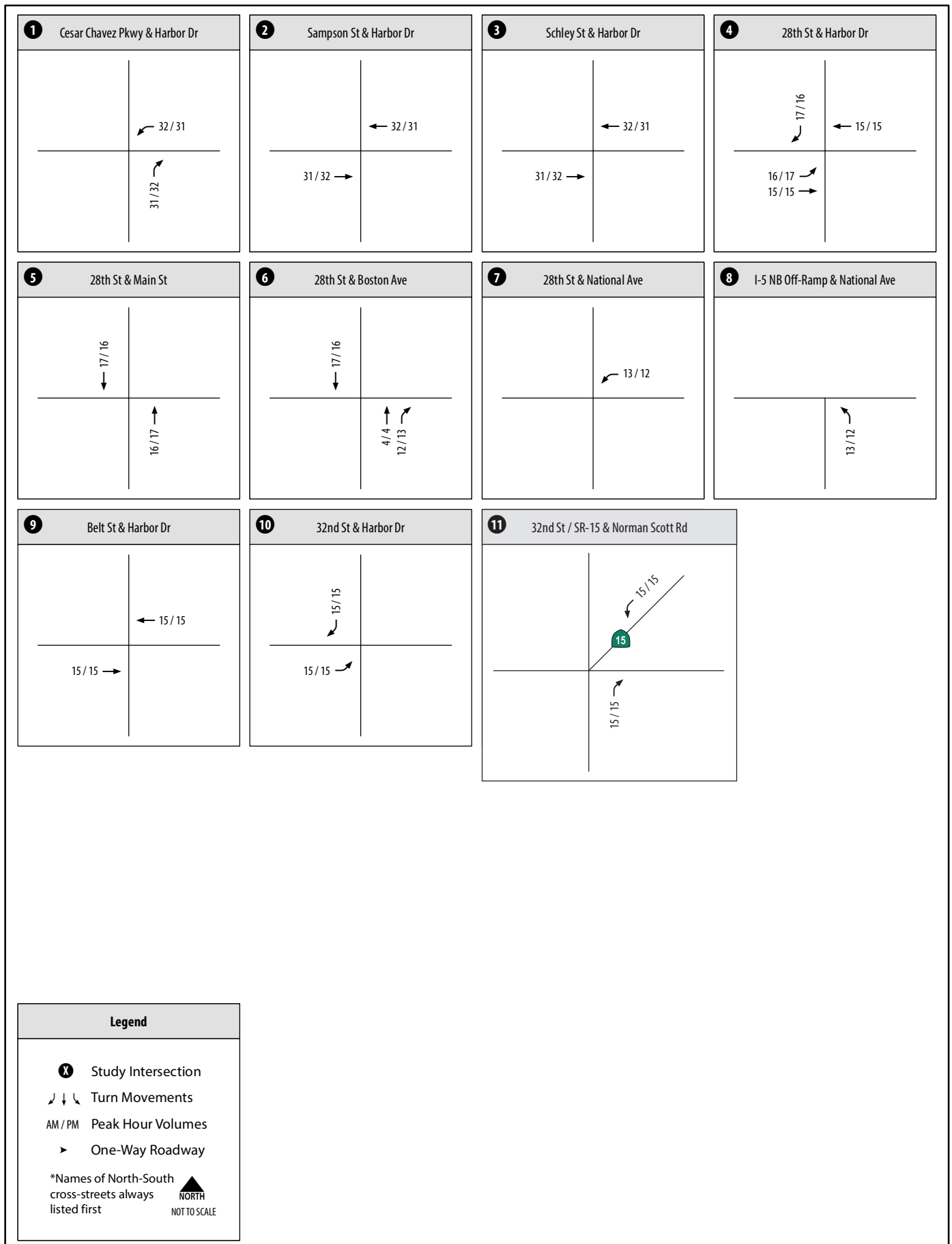
As shown, the proposed project construction is anticipated to generate approximately 624 daily trips including 113 trips during the AM and PM peak hours.

Project construction traffic were assigned to the roadway network based on the assumed project distribution patterns displayed in Figures 3-2a and 3-2b. Based upon the assumed project trip distribution, daily peak hour project trips were assigned to the adjacent roadway network, as displayed in **Figures 8-1A & B** for employees and **Figures 8-2A & B** for trucks.









8.2 Existing Plus Project Construction Conditions

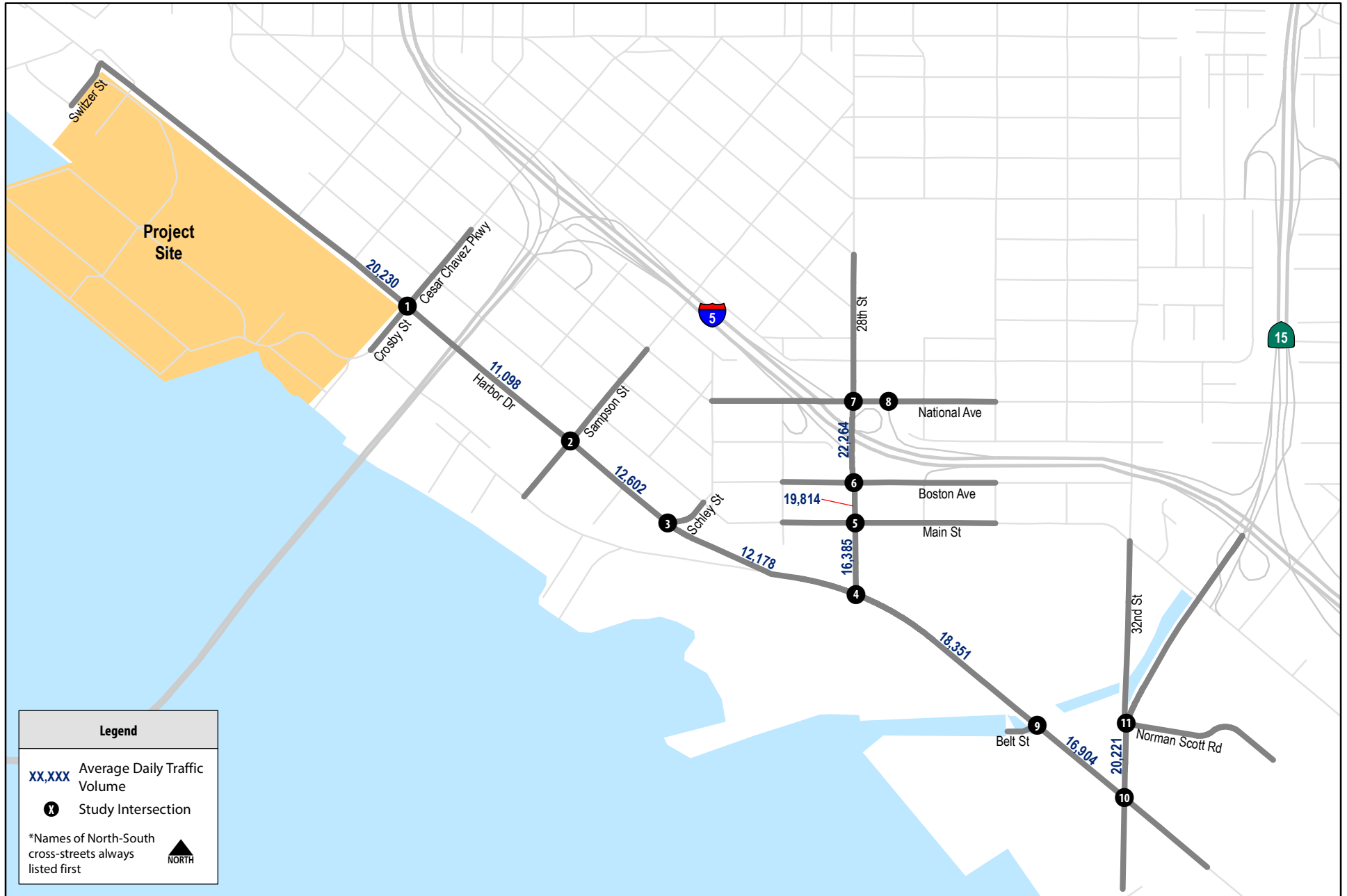
Existing Plus Project Construction traffic volumes were derived by combining the existing traffic volumes (displayed in Figure 4-2A and 4-2B) and the project trip assignment volumes (displayed in Figures 8-1A and 8-1B for employees and Figures 8-2A and 8-2B for trucks). Daily and peak hour intersection volumes for this scenario are displayed in **Figure 8-3A and 8-3B**, respectively.

LOS analyses under Existing Plus Project Construction conditions were conducted at the key study roadway segments and intersections using the methodologies described in Chapter 2.0.

Table 8.2 displays the daily roadway segment LOS results for both Existing and Existing Plus Project Construction conditions.

As shown in Table 8.2, all study area roadway segments are projected to operate at LOS D or better during the peak of project construction, with the exception of 28th Street, between Boston Avenue and National Avenue which is projected to operate at LOS E. However, the project's construction traffic is not anticipated to change the V/C ratio for this segment by more than 0.02; therefore, the construction traffic associated with the proposed project would not result in a significant impact.

Table 8.3 displays the intersection LOS and average vehicle delay results for both Existing and Existing Plus Project Construction conditions. LOS calculation worksheets are provided in **Appendix M**.



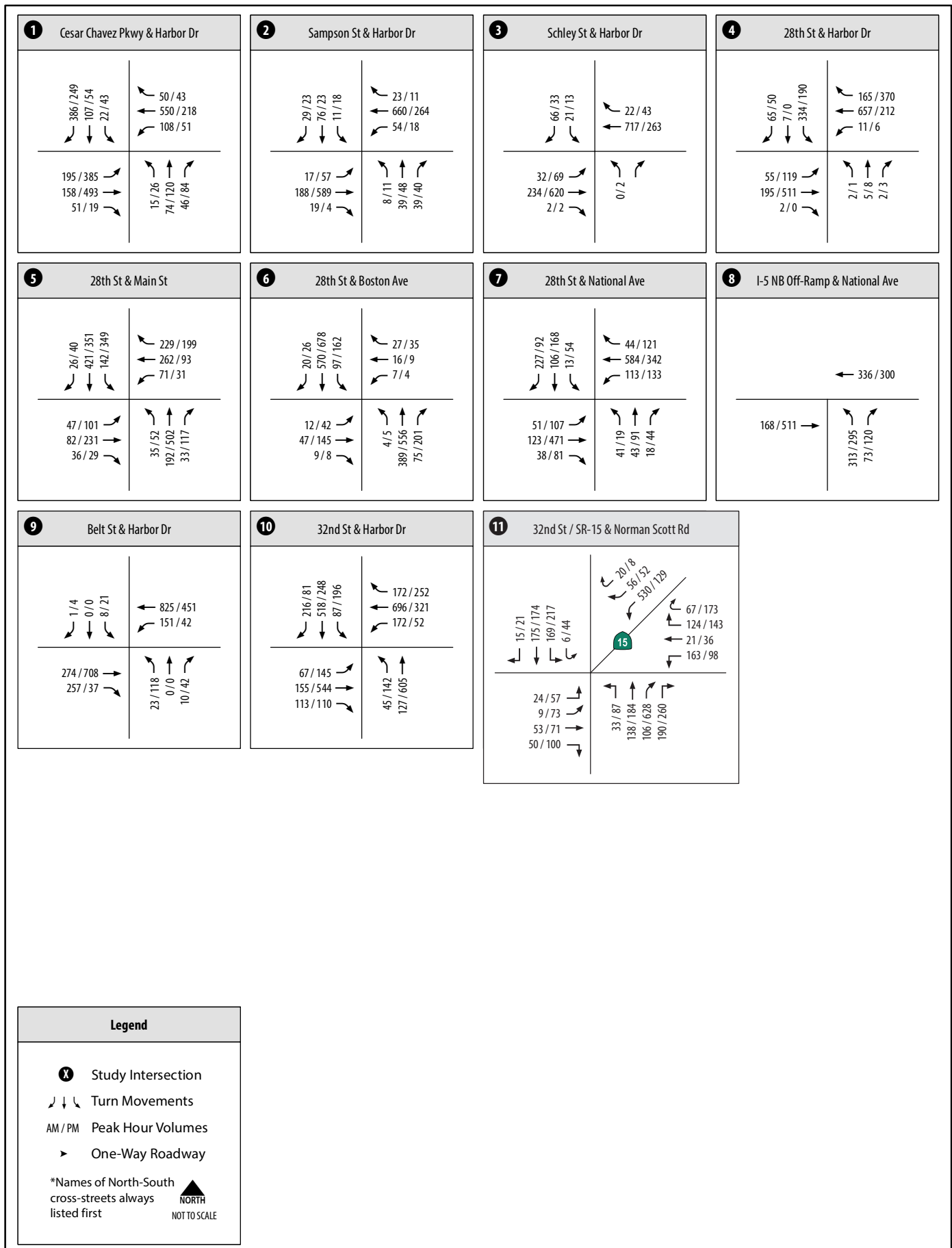


Table 8.2 Daily Roadway Segment LOS Results – Existing Plus Project Construction Conditions

Roadway Segment	Segment	Cross-section	Threshold (LOS E)	Project Construction			Existing			Change in V/C	S?
				ADT	V/C	LOS	ADT	V/C	LOS		
Harbor Drive	Between Beardsley Street and Cesar Chavez Parkway	4-Lanes w/ RM	40,000	20,230	0.506	B	20,194	0.505	B	0.001	No
	Between Cesar Chavez Parkway and Sampson Street	4-Lanes w/ RM	40,000	11,098	0.277	A	10,546	0.264	A	0.014	No
	Between Sampson Street and Schley Street	4-Lanes w/ RM	40,000	12,602	0.315	A	12,050	0.301	A	0.014	No
	Between Schley Street and 28 th Street	4-Lanes w/ RM	40,000	12,178	0.304	A	11,626	0.291	A	0.014	No
	Between 28 th Street and Belt Street	4-Lanes w/ RM	40,000	18,351	0.459	B	18,050	0.451	B	0.008	No
	Between Belt Street and 32 nd Street	4-Lanes w/ RM	40,000	16,904	0.423	B	16,603	0.415	B	0.008	No
28 th Street	Between Harbor Drive and Main Street	4-Lanes w/ RM	40,000	16,385	0.410	B	16,134	0.403	B	0.006	No
	Between Main Street and Boston Avenue	4-Lanes w/TWLT	30,000	19,814	0.660	C	19,563	0.652	C	0.008	No
	Between Boston Avenue and National Avenue	3-Lanes w/TWLT	22,500 ¹	22,264	0.989	E	22,112	0.983	E	0.007	No
32 nd Street	Between Harbor Drive and Norman Scott Road	6-lanes w/ RM	50,000	20,221	0.404	B	19,920	0.398	A	0.006	No

Source: NDS, Chen Ryan Associates; June 2016

Notes:

¹ Capacity is 75% of a 4-Lane Collector w/TWLT.

V/C = Volume to Capacity Ratio.

Bold letter indicates LOS E or F.

S?: Significant impact

Table 8.3 Peak Hour Intersection LOS Results – Existing Plus Project Construction Conditions

#	Intersection	AM Peak Hour				PM Peak Hour				Change in Delay			
		Project Construction		Existing		Project Construction		Existing		AM Peak Hour		PM Peak Hour	
		Delay (Sec)	LOS	Delay (Sec)	LOS	Delay (Sec)	LOS	Delay (Sec)	LOS	Change	S?	Change	S?
1	Harbor Drive / Cesar Chavez Parkway	37.3	D	36.8	D	35.2	D	33.3	C	0.5	No	1.9	No
2	Harbor Drive / Sampson Street	40.5	D	40.4	D	41.3	D	40.9	D	0.1	No	0.4	No
3	Harbor Drive / Schley Street	16.7	B	16.7	B	15.0	B	15.0	B	0.0	No	0.0	No
4	Harbor Drive / 28 th Street	24.6	C	23.1	C	20.9	C	20.3	C	1.5	No	0.6	No
5	Main Street / 28 th Street	21.6	C	21.4	C	35.2	D	34.8	C	0.2	No	0.4	No
6	Boston Avenue / 28 th Street	19.4	B	19.4	B	23.1	C	23.0	C	0.0	No	0.1	No
7	National Avenue / 28 th Street	42.3	D	42.3	D	29.8	C	29.6	C	0.0	No	0.2	No
8	National Avenue / I-5 NB Off-Ramp	15.2	B	14.9	B	15.0	B	14.7	B	0.3	No	0.3	No
9	Harbor Drive / Belt Street	18.6	B	18.6	B	17.2	B	17.1	B	0.0	No	0.1	No
10	Harbor Drive / 32 nd Street	28.8	C	28.6	C	47.5	D	39.9	D	0.2	No	7.6	No
11	Norman Scott Road / 32 nd Street / Wabash Boulevard	104.0	F	95.3	F	70.4	E	66.2	E	8.7	Yes	4.2	Yes

Source: Chen Ryan Associates, June 2016

Notes:

Bold letter indicates LOS E or F.

S?: Significant impact

As shown in Table 8.3, all study area intersections are projected to operate at LOS D or better during the peak of project construction, with the exception of Norman Scott Road / 32nd Street / Wabash Boulevard which is projected to operate at LOS F. The project's construction traffic is anticipated to add more than 1 second of delay to the intersection; therefore, the construction traffic associated with the proposed project would result in a significant impact.

Ramp Intersection Capacity Analysis

Consistent with Caltrans requirements, the signalized ramp intersections of National Avenue / I-5 NB off-ramp and Norman Scott Road / 32nd Street / Wabash Boulevard were analyzed using ILV procedures, as described in Section 2.4. ILV analysis results are displayed in **Table 8.4** and analysis worksheets for Existing Plus Project Construction conditions are provided in Appendix M.

Table 8.4 Ramp Intersection Capacity Analysis – Existing Plus Project Construction Conditions

#	Intersection	Project Construction Conditions			Existing Conditions		
		Peak Hour	ILV/Hour	Description	Peak Hour	ILV/Hour	Description
8	National Avenue / I-5 NB Off-Ramp	AM	649	Under Capacity	AM	636	Under Capacity
		PM	806	Under Capacity	PM	794	Under Capacity
11	Norman Scott Road / 32nd Street / Wabash Boulevard	AM	1,005	Under Capacity	AM	956	Under Capacity
		PM	1,063	Under Capacity	PM	1,028	Under Capacity

Source: Chen Ryan Associates; June 2016

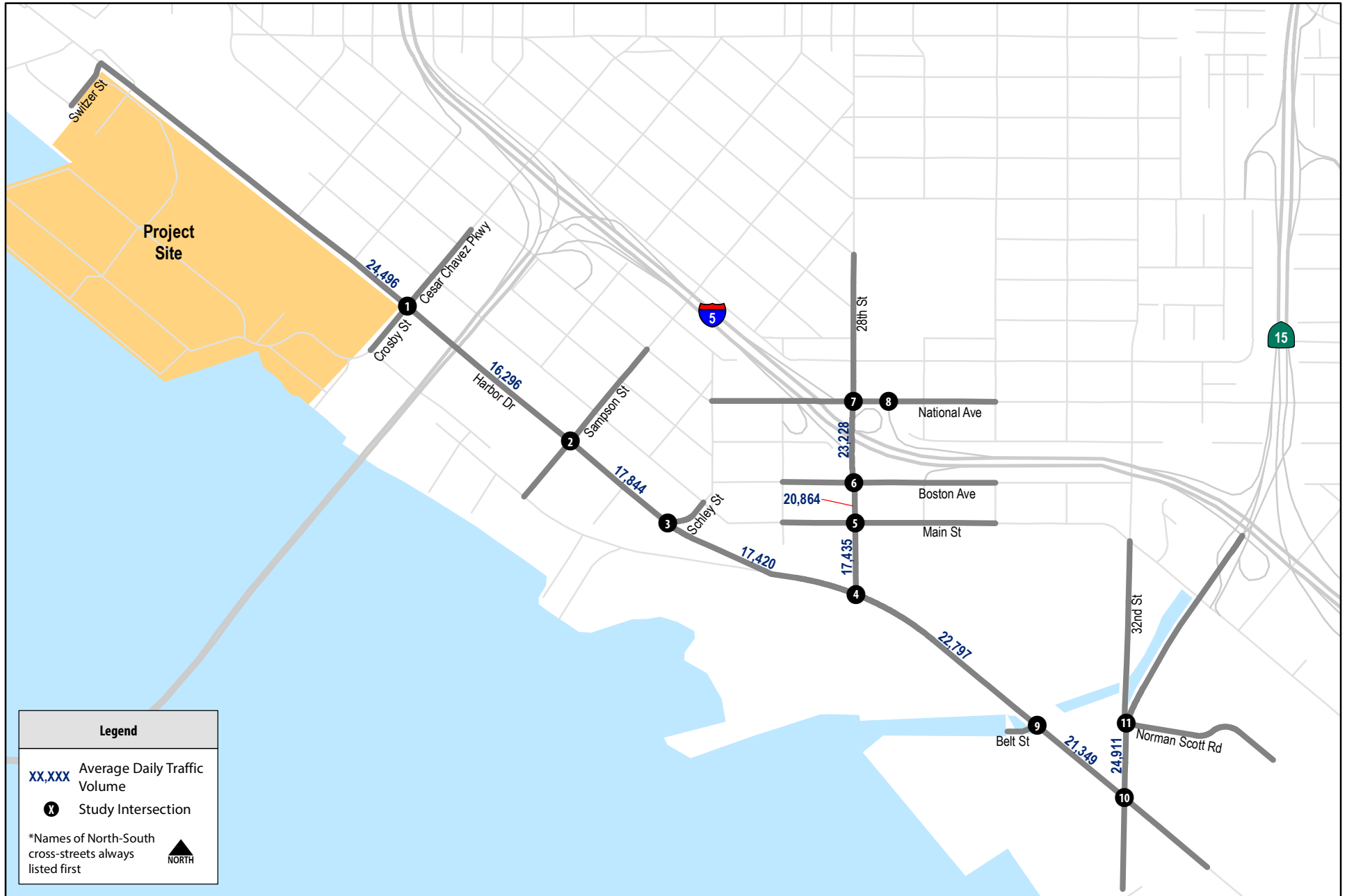
As shown in Table 8.5, the key study signalized ramp intersections are projected to operate at “Under Capacity” during both the AM and PM peak hour, under Existing Plus Project Construction conditions.

8.3 Near-Term Year 2021 Plus Construction Conditions

Near-Term Year 2021 with Project Construction traffic volumes were derived by combining the Near-Term Year 2021 Base traffic volumes (displayed in Figure 5-3a and 5-3b) and the project trip assignment volumes (displayed in Figures 8-1A and 8-1B for employees and Figures 8-2A and 8-2B for trucks). Daily and peak hour intersection volumes for this scenario are displayed in **Figure 8-4A and 8-4B**, respectively.

LOS analyses under Construction Traffic conditions were conducted at the key study roadway segments and intersections using the methodologies described in Chapter 2.0.

Table 8.5 displays the daily roadway segment LOS results for both Near-Term Year 2021 Base and Near-Term Year 2021 Base Plus Construction conditions. It should be noted that all intersection signal timing plans were assumed to be optimized under Near-Term Year 2021 conditions. This may result in better signal operations at some intersections when compared to existing conditions.



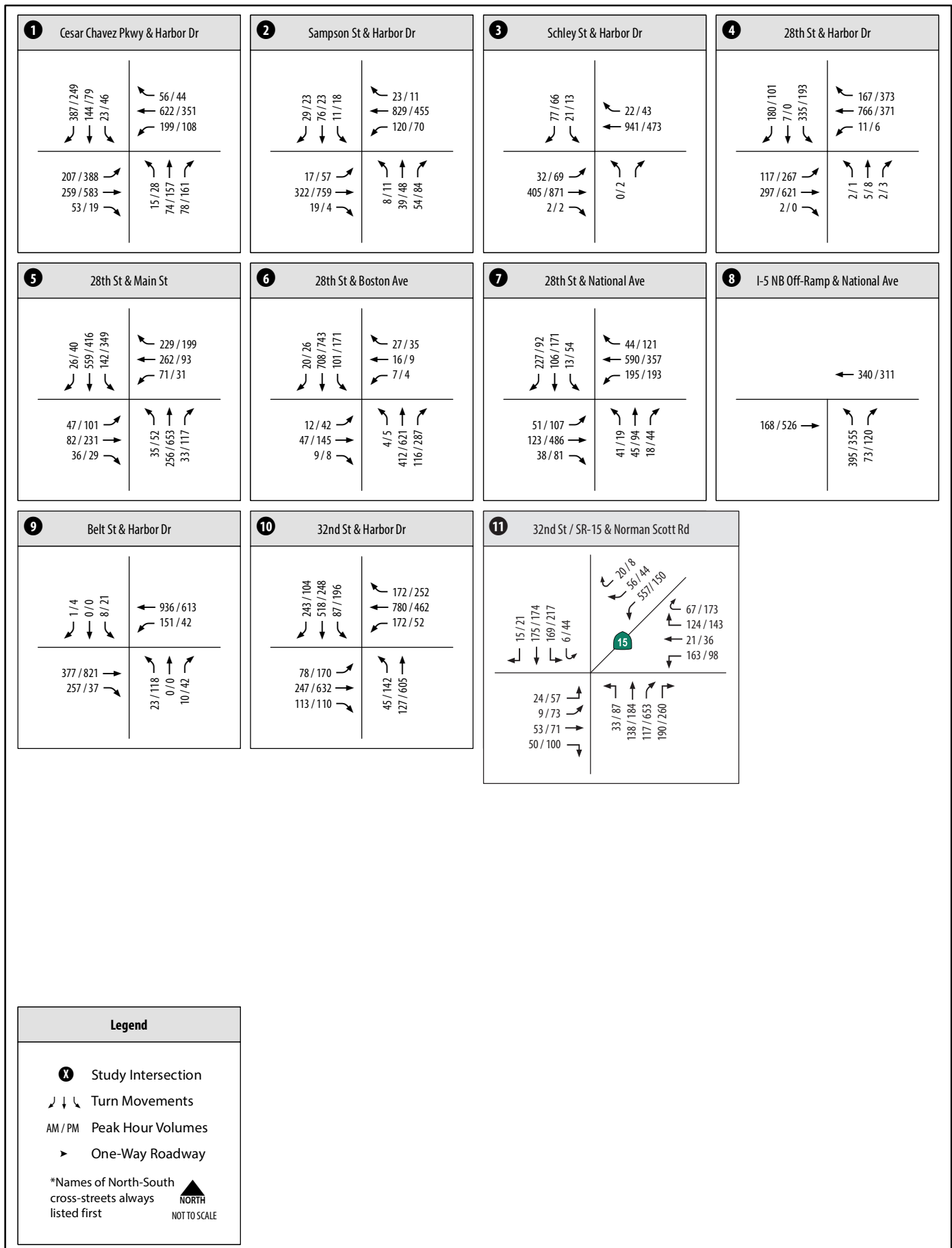


Table 8.5 Daily Roadway Segment LOS Results – Near-Term Year 2021 Base Plus Project Construction Conditions

Roadway Segment	Segment	Cross-section	Threshold (LOS E)	Project Construction			Near-Term Year 2021 Base			Change in V/C	S?
				ADT	V/C	LOS	ADT	V/C	LOS		
Harbor Drive	Between Beardsley Street and Cesar Chavez Parkway	4-Lanes w/ RM	40,000	24,496	0.612	C	24,460	0.612	C	0.000	No
	Between Cesar Chavez Parkway and Sampson Street	4-Lanes w/ RM	40,000	16,296	0.407	B	15,744	0.394	B	0.013	No
	Between Sampson Street and Schley Street	4-Lanes w/ RM	40,000	17,844	0.446	B	17,292	0.432	B	0.014	No
	Between Schley Street and 28 th Street	4-Lanes w/ RM	40,000	17,420	0.436	B	16,868	0.422	B	0.014	No
	Between 28 th Street and Belt Street	4-Lanes w/ RM	40,000	22,797	0.570	C	22,496	0.562	C	0.008	No
	Between Belt Street and 32 nd Street	4-Lanes w/ RM	40,000	21,349	0.534	C	21,048	0.526	C	0.008	No
28 th Street	Between Harbor Drive and Main Street	4-Lanes w/ RM	40,000	17,435	0.436	B	17,184	0.430	B	0.006	No
	Between Main Street and Boston Avenue	4-Lanes w/TWLT	30,000	20,864	0.695	D	20,613	0.687	D	0.008	No
	Between Boston Avenue and National Avenue	3-Lanes w/TWLT	22,500 ¹	23,228	1.032	F	23,076	1.026	F	0.006	No
32 nd Street	Between Harbor Drive and Norman Scott Road	6-lanes w/ RM	50,000	24,911	0.498	B	24,610	0.492	B	0.006	No

Source: NDS, Chen Ryan Associates; June 2016

Notes:

¹ Capacity is 75% of a 4-Lane Collector w/TWLT.

V/C = Volume to Capacity Ratio.

Bold letter indicates LOS E or F.

S?: Significant impact

As shown in Table 8.5, all study area roadway segments are projected to operate at LOS D or better during the peak of project construction, with the exception of 28th Street, between Boston Avenue and National Avenue which is projected to operate at LOS F. However, the project's construction traffic is not anticipated to change the V/C ratio for this segment by more than 0.01; therefore, the construction traffic associated with the proposed project would not result in a significant impact.

Table 8.6 displays the intersection LOS and average vehicle delay results for both Near-Term Year 2021 Base and Near-Term Year 2021 Base Plus Construction conditions. LOS calculation worksheets are provided in **Appendix N**.

As shown in Table 8.6, all study area intersections are projected to operate at LOS D or better during the peak of project construction, with the exception of Norman Scott Road / 32nd Street / Wabash Boulevard which is projected to operate at LOS F. The project's construction traffic is anticipated to add more than 1 second of delay to the intersection; therefore, the construction traffic associated with the proposed project would result in a significant impact.

Table 8.6 Peak Hour Intersection LOS Results – Near-Term Year 2021 Base Plus Project Construction Conditions

#	Intersection	AM Peak Hour				PM Peak Hour				Change in Delay			
		Project Construction		Near-Term Year 2021 Base		Project Construction		Near-Term Year 2021 Base		AM Peak Hour		PM Peak Hour	
		Delay (Sec)	LOS	Delay (Sec)	LOS	Delay (Sec)	LOS	Delay (Sec)	LOS	Change	S?	Change	S?
1	Harbor Drive / Cesar Chavez Parkway	41.6	D	41.0	D	42.5	D	38.0	D	0.6	No	4.5	No
2	Harbor Drive / Sampson Street	44.2	D	43.8	D	46.0	D	44.9	D	0.4	No	1.0	No
3	Harbor Drive / Schley Street	16.4	B	16.3	B	15.7	B	15.7	B	0.1	No	0.0	No
4	Harbor Drive / 28 th Street	29.4	C	28.2	C	27.4	C	26.6	C	1.2	No	0.8	No
5	Main Street / 28 th Street	22.3	C	22.2	C	39.4	D	38.8	D	0.2	No	0.5	No
6	Boston Avenue / 28 th Street	19.1	B	19.1	B	24.1	C	23.9	C	0.0	No	0.1	No
7	National Avenue / 28 th Street	42.6	D	42.6	D	31.8	C	31.5	C	0.0	No	0.3	No
8	National Avenue / I-5 NB Off-Ramp	18.0	B	17.4	B	16.7	B	14.8	B	0.6	No	1.8	No
9	Harbor Drive / Belt Street	18.8	B	18.8	B	17.3	B	17.0	B	0.0	No	0.3	No
10	Harbor Drive / 32 nd Street	30.4	C	29.3	C	46.1	D	43.3	D	1.1	No	2.8	No
11	Norman Scott Road / 32 nd Street / Wabash Boulevard	110.5	F	103.2	F	72.2	E	69.6	E	7.3	Yes	2.6	Yes

Source: Chen Ryan Associates, June 2016

Notes:

Bold letter indicates LOS E or F.

S?: Significant impact

Ramp Intersection Capacity Analysis

Consistent with Caltrans requirements, the signalized ramp intersections of National Avenue / I-5 NB off-ramp and Norman Scott Road / 32nd Street / Wabash Boulevard were analyzed using ILV procedures, as described in Section 2.4. ILV analysis results are displayed in **Table 8.7** and analysis worksheets for Near-Term Year 2021 Base Plus Project Construction conditions are provided in Appendix N.

Table 8.7 Ramp Intersection Capacity Analysis – Near-Term Year 2021 Base Plus Construction Conditions

#	Intersection	Project Construction Conditions			Near-Term Year 2021 Base Conditions		
		Peak Hour	ILV/Hour	Description	Peak Hour	ILV/Hour	Description
8	National Avenue / I-5 NB Off-Ramp	AM	735	Under Capacity	AM	722	Under Capacity
		PM	881	Under Capacity	PM	869	Under Capacity
11	Norman Scott Road / 32nd Street / Wabash Boulevard	AM	1,044	Under Capacity	AM	995	Under Capacity
		PM	1,097	Under Capacity	PM	1,061	Under Capacity

Source: Chen Ryan Associates; June 2016

As shown, the key study signalized ramp intersections are projected to operate at “Under Capacity” during both the AM and PM peak hour, under Near-Term Year 2021 Base Plus Project Construction conditions.

8.4 Impact Significance and Mitigation

Roadway Segments

Existing Plus Project Construction Conditions

- None

Near-Term Year 2021 Base Plus Construction Conditions

- None

Intersections

Existing Plus Project Construction Conditions

- Norman Scott Road / 32nd Street / Wabash Boulevard

Near-Term Year 2021 Base Plus Construction Conditions

- Norman Scott Road / 32nd Street / Wabash Boulevard

Since project construction conditions are temporary, no physical mitigation measures are recommended. Instead, it is recommended that a Transportation Demand Management Plan is developed to limit the number of construction worker trips that travel through the impacted intersection during peak periods. The following lists a series of TDM strategies that would be appropriate during project construction.

-
- Implementation of a ride-sharing program to encourage carpooling amongst workers.
 - Adjusting work schedules so workers do not access the site during the peak hours.
 - Provide off-site parking locations for workers outside of the area with shuttle services to bring them on-site.
 - Provide subsidized transit passes for construction workers

In order to help reduce the temporary transportation and parking related impacts associated with project construction, it is recommended that the project applicant develop a TDM plan utilizing one or multiple of the strategies listed above during the construction of the proposed project.

9.0 Site Access and Parking

This chapter addresses access to the project site and assess the projected parking demand of the proposed project.

9.1 Site Access

Current Configuration

Employees will access the site (both enter and exit) from the main Tenth Avenue Marine Terminal gate located south of the Harbor Drive / Cesar Chavez Parkway intersection. Truck traffic will enter and exit through the Tenth Avenue Marine Terminal through the main gate; however, Refrigerated Truck traffic will exit the terminal via another gate located on Switzer Street, to the north of the Harbor Drive and Cesar Chavez Parkway intersection.

Access to the TAMT does not impact the operations of the external street network. There are currently no proposed changes to the existing project access points including location and traffic control; therefore, no additional sight distance analysis should be required with this study.

Alternative Gate Scenario

The Tenth Avenue Marine Terminal Plan also identifies an alternative gate concept that would serve as the primary entry and exit location for the Refrigerated Container node and the Multi-Purpose General Cargo node. The alternative gate would be located in the north-east corner of the terminal and provide access directly onto Harbor Drive. According to the Plan, the Dry Bulk and Liquid Bulk Nodes would continue to utilize the existing gate off Cesar Chavez Parkway, particularly for domestic bulk shipments.

The alternative gate should be designed to take into account project sight distance and traffic queueing at all approaches. It is assumed that the alternative access point will create new signalized intersection along Harbor Drive. The alternative gate was identified as operated at LOS D or better under all scenarios that were analyzed. Therefore, the alternative gate is not projected to be associated with any additional transportation related impacts.

9.2 Parking

As of the time this report was drafted, the project applicant has not submitted any plans that identify where or how the additional parking demand associated with the proposed project will be addressed. Therefore, this report can only address what additional parking demand could potentially be associated with the proposed project, and not if the proposed project can/will meet this demand.

Parking should be provided on-site for all anticipated new employees that are associated with the proposed project. Similar to trip generation, as a worst case scenario, it is assumed that all new employees associated with the proposed project will drive to the project site alone. Since

new employees associated with the proposed project will be split into 3 separate shifts, the proposed project will need to provide or account for additional parking spaces for the maximum number of new employees will be on the site at any given time, as well as an allowance for turn-over.

It should be noted that parking associated with the proposed project can be reduced with the development of a parking management plan which would be enforced by the project applicant. The parking management plan would consist of site specific measures and strategies that are designed to reduce single occupancy trips to and from the project site. Measures and strategies could include the following:

- Employee Vanpool Program
- Preferential Parking for Carpools / Vanpools
- Employee shuttles to/from the Union Hall at Shift Changes
- Employer Coordination with SANDAG's iCommute Program

Project specific parking space reductions can be negotiated with the District after the submittal of a parking management plan.

Because of space constraints and their size (nearly 2,000 pages), the appendices to the *Transportation Impact Analysis*, prepared by Chen Ryan, dated June 22, 2016, have been removed from Volume II. These appendices are on the District's website and available for download. In addition, upon request, the appendices will be provided within 2 business days of the request.

Appendices to the Transportation Impact Analysis, which are available on the District website or can be provided upon request, include:

Appendix A	Count Data and Signal Timing Plans
Appendix B	Trip Distribution Worksheets
Appendix C	Peak Hour Intersection LOS Worksheets & ILV Worksheets –Existing Conditions
Appendix D	Freeway Information
Appendix E	Peak Hour Intersection LOS Worksheets & ILV Worksheets – Existing Plus Project Conditions
Appendix F	Peak Hour Intersection LOS Worksheets & ILV Worksheets – Existing Plus Interim Project Conditions
Appendix G	Cumulative Project Information
Appendix H	Peak Hour Intersection LOS Worksheets & ILV Worksheets – Near-Term Year 2021 Base Conditions
Appendix I	Peak Hour Intersection LOS Worksheets & ILV Worksheets – Near-Term Year 2021 Base Plus Interim Project Conditions
Appendix J	City of San Diego – Southeastern San Diego and Barrio Logan Community Plan Update Excerpts
Appendix K	Peak Hour Intersection LOS Worksheets & ILV Worksheets –Future Year 2035 Base Conditions
Appendix L	Peak Hour Intersection LOS Worksheets & ILV Worksheets –Future Year 2035 Base Plus Project Conditions
Appendix M	Peak Hour Intersection LOS Worksheets & ILV Worksheets –Existing Plus Project Construction Conditions
Appendix N	Peak Hour Intersection LOS Worksheets & ILV Worksheets – Near-Term Year 2021 Base Plus Project Construction Conditions

Appendix H

Cultural Study

CULTURAL RESOURCES INVENTORY AND EVALUATION REPORT FOR THE TENTH AVENUE MARINE TERMINAL REDEVELOPMENT PLAN AND DEMOLITION AND INITIAL RAIL COMPONENT, SAN DIEGO, CALIFORNIA

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June 2016



ICF International. 2016. Cultural Resources Inventory and Evaluation Report for the Tenth Avenue Marine Terminal Redevelopment Plan and Demolition and Initial Rail Component, San Diego, California. April. (ICF 00165.14) San Diego, CA. Prepared for the San Diego Unified Port District, San Diego, CA.

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Acronyms and Abbreviations

BNSF	Burlington Northern Santa Fe
BP	before present
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
cimuL	consanguineal kin group
CRHR	California Register of Historical Resources
DPR	Department of Parks and Recreation
ICF	ICF International
MT	metric ton
NAHC	Native American Heritage Commission
NRHP	National Register of Historic Places
Port District	San Diego Unified Port District
PRC	Public Resources Code
Santa Fe	Atchison, Topeka, and Santa Fe Railroad
SCIC	South Coastal Information Center
SD&A	San Diego and Arizona
SD&AE	San Diego and Arizona Eastern
TAMT	Tenth Avenue Marine Terminal
TAMT Plan	Tenth Avenue Marine Terminal Redevelopment Plan

Executive Summary

ICF International (ICF) was retained by the San Diego Unified Port District (Port District) to conduct a cultural resources inventory and evaluation study for the Tenth Avenue Marine Terminal Redevelopment Plan (TAMT Plan) and Demolition and Initial Rail Component. The study has been prepared to support the Port District, the lead agency under the California Environmental Quality Act (CEQA), in preparation of an Environmental Impact Report for the proposed TAMT Plan. The purpose of the study is to identify cultural resources within the project study area, evaluate any identified cultural resources that have not been evaluated previously, and provide management recommendations regarding any significant or potentially significant cultural resources within the TAMT Plan area.

During a site visit to the terminal on April 21, 2014, an ICF archaeologist determined that the site had been too thoroughly developed with paving, buildings, structures, and railroad lines to necessitate systematic archaeological surveying. Therefore, no intensive archaeological survey was conducted. On May 14, 2014, an ICF historian/architectural historian performed an intensive level survey of the historic-period built environment. Prior to the current study, two cultural resources had previously and erroneously been recorded within the project area: CA-SDI-13073H, the historic-period alignment of the Coronado Railroad, and CA-SDI-16385H, the historic-period alignment of the Atchison, Topeka, and Santa Fe Railway, both constructed in the 1880s. CA-SDI-16385H has been evaluated for National Register of Historic Places eligibility. The evaluation found that the railroad alignment lacked sufficient historical integrity to relate to its period of significance. Research for this study shows that both CA-SDI-16385H and CA-SDI-13073H were actually aligned to the east and north of the project study area.

ICF identified 10 intact or partially intact built-environment resources 45 years of age or older within the project study area. These 10 historic-era resources include Transit Sheds #1 and #2, the bunker fuel tank complex, a molasses tank complex, a truck scale building, the terminal's bulk loader system, Warehouses B and C, numerous railroad tracks that run throughout the terminal, and the terminal's dry-bulk silo complex. ICF has evaluated the 10 resources for individual California Register of Historical Resources (CRHR) eligibility and found that none of them appear to meet any of the CRHR significance criteria. None of the resources, therefore, appear to qualify as historical resources for the purposes of CEQA. Nine of the resources (all but the silo complex) were determined to compose a potential historic district. ICF has evaluated this potential district and found that it does not appear to meet any of the CRHR significance criteria, and therefore does not appear to qualify as a historical resource for the purposes of CEQA. Consequently, the proposed project does not appear to have the potential to result in any impacts on historical resources.

No prehistoric archaeological resources were identified with the study area. However, CA-SDI-5931, an extensive prehistoric artifact scatter containing Native American burials, is within 200 feet east-northeast of the study area. Due to the presence of CA-SDI-5931, the resource's unknown southern boundary, and its high sensitivity, archaeological monitoring is recommended for all ground-disturbing activities occurring in areas east of Warehouse C, southeast of the rail car unloading building, and both north and east of the terminal entrance at Crosby Road. The area of sensitivity includes the molasses tanks, the rail tracks north, east, and southeast of the molasses tanks, and the paved and unpaved parking areas east of the Crosby Road entrance.

Project Description

The Tenth Avenue Marine Terminal (TAMT) is a 96-acre marine-related industrial shipping facility located along the northeast shoreline of San Diego Harbor opposite Coronado at the western edge of Barrio Logan, south of downtown San Diego and northwest of the Coronado Bridge (Figures 1 and 2). Terminal infrastructure consists of concrete bulkheads at ship berths, two transit sheds (Transit Sheds #1 and #2), two warehouses (Warehouses B and C), two bulk liquid storage facilities, a silo complex and conveyer system (bulk loader), on-dock rail tracks, and an entrance gate into the terminal with a security guard structure at the end of Crosby Road. The remaining areas within the site are dedicated to grounded refrigerated container storage, limited stacked containers, and open space for the handling and staging of import and export general, breakbulk, and roll-on or roll-off cargos.

The Tenth Avenue Marine Terminal Redevelopment Plan (TAMT Plan) would replace the existing 2008 Maritime Business Plan to provide greater flexibility and meet current and future market conditions at the terminal. Substantial flexibility has been built into the TAMT Plan. This technical study supports assessment of the TAMT Plan's "worst-case" effect on the environment, and thereby assumes that the terminal would operate at maximum capacity during the long-term planning horizon and that all potential structures identified in the TAMT Plan would be developed. Although terminal operation would not result in impacts on cultural resources, the potential exists for developmental components of the TAMT Plan to result in impacts on cultural resources.

The Demolition and Initial Rail Component is an initial project-level component of the TAMT Plan. Under this component, Transit Sheds #1 and #2 would be demolished to allow the San Diego Unified Port District (Port District) to use contemporary technologies and handling techniques to serve the needs of specialized and refrigerated cargos in an open area. Following demolition, subsurface conduit and other electrical improvements would be installed to allow future electrification of the terminal, including shore power capabilities at Berths 10-5/10-6. The transit shed sites would then be re-graded and paved to create an open lay-down area linking cargo from vessels to a multi-modal regional transportation system that includes industrial cross-docking facilities, cold storage facilities, rail facilities, and highways without the operational impediments under existing conditions.

To replace the demolished Transit Shed #2 headhouse, an approximately 3,600-square-foot modular building with marine operation offices, a conference room, a work area, and a break room for up to 15 employees would be constructed in the southeastern portion of the terminal, south of the existing molasses tanks and north of the main gate at Crosby Road. Underground water, sewer, and electrical utilities would be installed to support the proposed modular structure. Additional buildings and facilities would be developed to the west, where Transit Sheds #1 and #2 are currently located. An electrical gear room (276 square feet), restroom facility (368 square feet), and information technology room (138 square feet) would be developed within the current footprint of Transit Shed #1. An outdoor storage area (850 square feet) with chain link fencing would also be developed in this area.

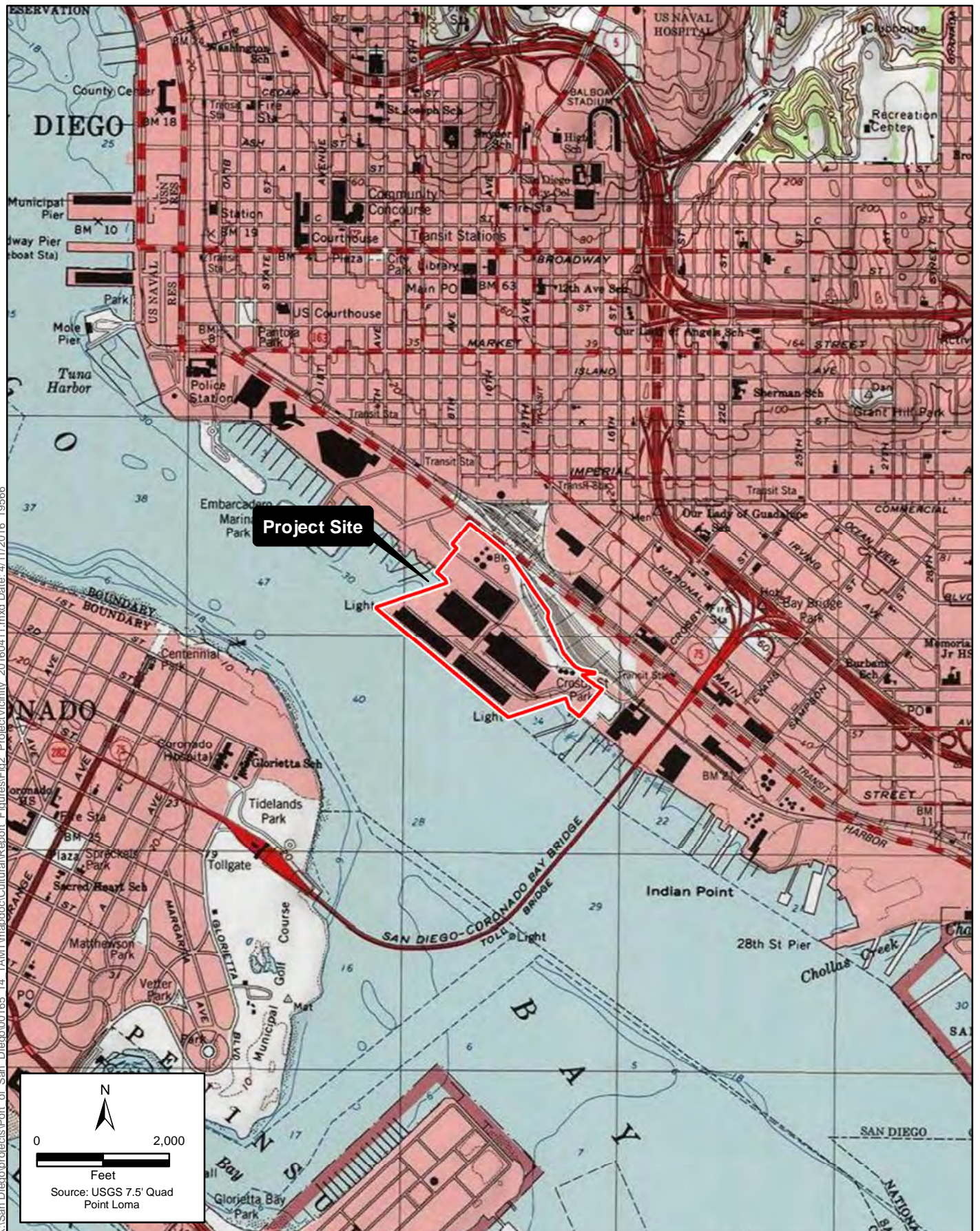


Figure 2
Project Vicinity
Tenth Avenue Marine Terminal Redevelopment Plan and Demolition and Initial Rail Component

Rail improvements would include an automatic rail lubricator system installed in the southeastern portion of the terminal, just southeast of the molasses tanks, which would replace an existing manual process. Installation of air brake testing equipment, including a 100-square-foot structure and subsurface piping (approximately 15 feet), in the northeastern portion of the terminal would allow safety inspections to take place on the terminal, replacing the need for an additional stop at the adjacent railyard facility. Elimination of this additional stop, without compromising safety, would contribute directly to improved safety, efficiency, and emissions reductions. An additional generator and associated subsurface piping would also be installed in the northwestern portion of the current Transit Shed #1 footprint.

Other terminal improvements would involve the TAMT Plan's Dry Bulk, Refrigerated Container, and Multi-Purpose General Cargo nodes, and the central gate facilities. The Dry Bulk node would be located in a 15-acre area at the southeastern portion of the terminal that would be served primarily by Berths 10-7/10-8 and secondarily by Berths 10-5/10-6. The existing conveyor system (bulk loader) would be upgraded to handle multiple bulk commodities such as cement, bauxite, or soda ash. The Dry Bulk node would also maintain 5 acres of existing open storage space between Water Street and Terminal Street, and would add a consolidated bulk discharge unloader using a 2,000-metric-ton (MT) per hour vacuum for cementitious materials at Berths 10-7/10-8 (either a Kovaco, Siwertell, or equivalent system). The existing molasses tanks and Warehouse C would be demolished in association with the Dry Bulk and Multi-Purpose General Cargo nodes. The TAMT Plan's Dry Bulk node would also construct a multi-purpose dry bulk facility with two cement terminals and a new semi-permanent storage facility (up to a 100,000-square-foot horizontal structure and/or an equivalent vertical storage facility) to store dry bulk products. Various combinations of the following options could be developed: a new semi-permanent Rubb style of building up to 100,000 square feet for the storage of dry bulk products; six 9,000 MT silos to store up to 54,000 MT of bulk cement at each terminal; two domes that would each store up to 54,000 MT of bulk cement at each terminal; and any combination of buildings, silos, and domes to allow up to 108,000 MT of bulk cement storage capacity.

The Refrigerated Container node would be on approximately 40 acres within the northern portion of the terminal served by Berths 10-1/10-2 and 10-3/10-4, with overflow handled at Berths 10-5/10-6. The boundaries between the Refrigerated Container and Multi-Purpose General Cargo nodes would be flexible to allow the terminal to be used for the handling of diverse cargos as market conditions and vessel schedules permit. The Refrigerated Container node would maintain approximately 16 acres of existing outside storage space for refrigerated containers as well as the existing 294,000 square feet of cold storage facility (Warehouse B) and would add rail-mounted gauge electrical gantry cranes up to 100 feet tall at Berths 10-1/10-2 (two cranes) and Berths 10-3/10-4 (two cranes).

The Multi-Purpose General Cargo node would comprise approximately 30 acres in the central portion of the terminal and would be primarily served by Berths 10-5/10-6, with overflow handled at Berths 10-3/10-4. The boundary would be flexible to accommodate market needs and facilitate the handling of diverse cargos as market conditions and vessel schedules permit. Proposed improvements associated with this node would include the following: installation of up to two rail-mounted gauge electrical gantry cranes up to 100 feet tall at Berths 10-5/10-6; demolition of Warehouse C to create up to 20 acres of open storage space; and other improvements that would require separate environmental analysis.

Finally, the central gate facility in the southeastern corner of the terminal would also be altered. A new truck weigh station would be installed, after which the existing station would be sold for reuse or disposed of in a landfill. The TAMT Plan also identifies an alternative gate concept for the Refrigerated Container node and the Multi-Purpose General Cargo node. The alternative gate would be sited in the northeast corner of the terminal and provide access directly onto Harbor Drive. It would serve as the primary entry and exit location for “freight only” movements for the Refrigerated Container node and Multi-Purpose General Cargo node. According to the TAMT Plan, however, the Dry Bulk node would continue to utilize the existing gate off Caesar Chavez Parkway, particularly for domestic bulk shipments.

Cultural Resources Study Area

The cultural resources study area encompasses the Port District’s entire 96-acre TAMT property (Figure 3). Although separated from other terminal facilities by fencing and a slope, four rail lines at the central far eastern side of the study area are within the terminal property. Those four rail lines are at a lower grade than the portion of the terminal property to the immediate west, and at the same grade as nearby rail lines in the Burlington Northern Santa Fe (BNSF) railyard immediately east of the terminal site. However, those four lines are integral to the terminal’s operations, and they are not part BNSF railroad yard. The majority of the study area is underlain with dredged fill and has been developed with buildings, structures, and rail lines. The entire surface of the terminal site has been disturbed and most areas between buildings and structures are paved. Parking areas near the terminal entrance at Crosby Road are covered with gravel. Small strips or patches of unpaved surface or deteriorated pavement are covered with gravel or weed growth in the area north of Crosby Road and east of Warehouse C. Prior to filling of the site in the late 1950s, most of the eastern portions of the study area consisted of tideland shoreline. A variety of industrial uses took place along that shoreline prior to development of the terminal. Some of these industrial uses took place at the far northeastern corner and the southeastern portion of the cultural resources study area.

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Figure 3
Project Area
Tenth Avenue Marine Terminal Redevelopment Plan and Demolition and Initial Rail Component

California Environmental Quality Act and Cultural Resources

The California Environmental Quality Act (CEQA) requires public agencies to evaluate the implications of their project(s) on the environment and includes significant historic resources as part of the environment. Public agencies must treat any cultural resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant (California Code of Regulations [CCR] Title 14 §15064.5). A historic resource is considered significant if it meets the definition of *historical resource* or *unique archaeological resource*, as defined below.

Historical Resources

The term *historical resource* includes, but is not limited to any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of the California Public Resources Code (PRC) (PRC §5020.1(j)). Historical resources may be designated as such through three different processes:

1. Official designation or recognition by a local government pursuant to local ordinance or resolution (PRC §5020.1(k))
2. A local survey conducted pursuant to PRC §5024.1(g)
3. The property is listed in or eligible for listing in the National Register of Historic Places (NRHP) (PRC §5024.1(d)(1))

The process for identifying historical resources is typically accomplished by applying the criteria for listing in the California Register of Historical Resources (CRHR) (CCR Title 14 §4852), which states that a historical resource must be significant at the local, state, or national level under one or more of the following four criteria.

1. It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
2. It is associated with the lives of persons important in our past.
3. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values.
4. It has yielded, or may be likely to yield, information important in prehistory or history.

To be considered a *historical resource* for the purpose of CEQA, the resource must also have integrity, which is the authenticity of a resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance.

Resources, therefore, must retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association. It must also be judged with reference to the particular criteria under which a resource is eligible for listing in the CRHR (CCR Title 14 §4852(c)).

Unique Archaeological Resources

A *unique archaeological resource* is defined in section 21083.2 of the PRC as an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria.

- Contains information needed to answer important scientific research questions and for which there is a demonstrable public interest
- Has a special and particular quality such as being the oldest of its type or the best available example of its type
- Is directly associated with a scientifically recognized important prehistoric or historic event or person

In most situations, resources that meet the definition of a unique archaeological resource also meet the definition of *historical resource*. As a result, it is current professional practice to evaluate cultural resources for significance based on their eligibility for listing in the CRHR. For the purposes of this CEQA cultural resources study, a resource is considered significant if it meets the CRHR eligibility (significance and integrity) criteria. Individual resource assessments of eligibility are provided in this report.

Even without a formal determination of significance and nomination for listing in the CRHR, the lead agency can determine that a resource is potentially eligible for such listing, to aid in determining whether a significant impact would occur. The fact that a resource is not listed in the CRHR, or has not been determined eligible for such listing, and is not included in a local register of historic resources, does not preclude an agency from determining that a resource may be a historical resource for the purposes of CEQA.

Discovery of Human Remains

With respect to the potential discovery of human remains, Section 7050.5 of the California Health and Human Safety Code states the following.

- a. Every person who knowingly mutilates or disinters, wantonly disturbs, or willfully removes any human remains in or from any location other than a dedicated cemetery without authority of law is guilty of a misdemeanor, except as provided in Section 5097.99 of the Public Resources Code. The provisions of this subdivision shall not apply to any person carrying out an agreement developed pursuant to subdivision (l) of Section 5097.94 of the Public Resources Code or to any person authorized to implement Section 5097.98 of the Public Resources Code.
- b. In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby

area reasonably suspected to overlies adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27491 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of any death, and the recommendations concerning the treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code. The coroner shall make his or her determination within two working days from the time the person responsible for the excavation, or his or her authorized representative, notifies the coroner of the discovery or recognition of the human remains.

- c. If the coroner determines that the remains are not subject to his or her authority and if the coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission.

Of particular note to cultural resources is subsection (c), requiring the coroner to contact the Native American Heritage Commission (NAHC) within 24 hours if discovered human remains are thought to potentially be those of Native American origin. After notification, NAHC will follow the procedures outlined in PRC Section 5097.98, which include notification of most likely descendants, if possible, and recommendations for treatment of the remains. Also, knowing or willful possession of Native American human remains or artifacts taken from a grave or cairn is a felony under State law (PRC §5097.99).

Thresholds of Significance

According to CEQA, a project that causes a *substantial adverse change* in the significance of a *historical resource* or a *unique archaeological resource* has a significant effect on the environment (CCR Title 14 §15064.5; PRC §21083.2). CEQA defines a *substantial adverse change* as (CCR Title 14 §15064.5(b)):

- Physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired; or
- Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register of Historical Resources; or
- Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to section 5020.1(k) of the Public Resources Code or its identification in an historical resource survey meeting the requirements of section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or
- Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register of Historical Resources as determined by the lead agency.

City of San Diego

The TAMT is not within the jurisdiction of the City of San Diego. The Historical Resource provisions in the City's Land Development Code do not apply to the TAMT. For this reason, the evaluations of historic-period resources in this cultural resources study do not apply City of San Diego Historical Resources Register significance criteria.

Environmental Setting

The TAMT is a developed marine-related industrial area situated south of downtown San Diego and northwest of the Coronado Bridge. The 96-acre terminal site is a paved landfill with concrete bulkheads and rubber or timber finders along each berth face. The terminal currently serves as an omni breakbulk, bulk, project cargo, and niche container facility. Buildings and structures at the site include transit sheds and warehouses, silos, a dry-bulk conveyor system, rail tracks, and an entrance gate with a security guard structure at the end of Crosby Road. The remaining areas within the terminal site are dedicated to grounded refrigerated container storage, limited stacked containers, and open space for the handling and staging of import and export cargo. The terminal does not include any formally dedicated streets or roads. However, three distinct paved areas essentially function as roads; these are referred to by terminal users as Terminal Street, Switzer Street, and Water Street. The site does not contain any vegetation, and is underlain with fill placed to create it in the 1950s. The majority of the site is covered by asphalt, although there is a small 1-acre portion of the site at the entrance that is unpaved.

Three water-dependent shipyards are located immediately south of the terminal. Other industrial uses in the vicinity include a BNSF rail facility, located between the terminal and Harbor Drive, and a Metropolitan Transit System yard, located north and east of the terminal, which serves the San Diego Trolley system. The nearby shipyards, BNSF rail facility, and Restaurant Depot (a wholesale distribution warehouse located off tidelands, just east of the terminal) are all industrial uses in the immediate area. The Barrio Logan neighborhood, immediately east of the terminal, includes a mix of light industrial, commercial, residential, school, and park uses. Other areas near the terminal include a baseball stadium (i.e., Petco Park), several hotels, and the San Diego Convention Center.

Cultural Setting

Prehistoric Context

The following culture history outlines and briefly describes the known prehistoric cultural traditions of the region. The approximately 10,000 years of documented prehistory of the San Diego region has often been divided into three periods: Early Period (San Dieguito tradition/complex), Archaic Period (Milling Stone Horizon, Encinitas tradition, La Jolla and Pauma complexes), and Late Prehistoric Period (Cuyamaca and San Luis Rey complexes).

Early Period Complexes

The Early Period encompasses the earliest documented human habitation in the region. The “San Dieguito complex” is the earliest reliably dated occupation of the area. The assemblage of artifacts associated with the San Dieguito complex has been studied and elaborated upon extensively (Rogers 1939, 1945, 1966; Warren and True 1961; Warren 1967; Moriarty 1969, 1987). The complex correlates with Wallace’s (1955) “Early Man Horizon,” and Warren subsequently defined a broader San Dieguito tradition (1968). The earliest component of the Harris Site (CA-SDI-149/316/4935B) is located along the San Dieguito River and is characteristic of the San Dieguito complex (Warren 1966, 1967; Warren and True 1961). Artifacts from the lower levels of the site include leaf-shaped knives, ovoid bifaces, flake tools, choppers, core and pebble hammerstones; several types of

scrapers, crescents, and short-bladed shouldered points (Warren and True 1961; Warren 1966). Little evidence for the San Dieguito Complex/Early Man Horizon has been discovered north of San Diego County.

Some researchers interpret the San Dieguito complex as having a primarily, but not exclusively, hunting subsistence orientation (Warren 1967, 1968, 1987; Warren et al. 1998). Others see a more diversified San Dieguito subsistence system as possibly ancestral to, or as a developmental stage for, the subsequent, predominantly gathering oriented complex denoted as the “La Jolla/Pauma complex” (cf. Bull 1983; Ezell 1987; Gallegos 1985, 1987, 1991; Koerper et al. 1991).

Archaic Period Complexes

In the southern coastal region of California, the Archaic Period dates from circa 8,600 years before present (BP) to circa 1300 BP (Warren et al. 1998). During the Archaic Period, the La Jolla/Pauma complexes have been identified from the content of archaeological site assemblages dating to this period. These assemblages occur at a range of coastal and inland sites, and appear to indicate that a relatively stable and sedentary hunting and gathering complex, possibly associated with one people, was present in the coastal and immediately inland areas of San Diego County for more than 7,000 years. La Jolla/Pauma complex sites are considered to be part of Warren’s (1968) “Encinitas tradition” and Wallace’s (1955) “Milling Stone Horizon.” The inland or “Pauma complex” aspect of this culture lacks shellfish remains, but is otherwise similar to the La Jolla complex and may, therefore, simply represent a non-coastal expression of the La Jolla complex (True 1958, 1980; True and Beemer 1982). The content of these site assemblages is characterized by manos and metates, shell middens, terrestrial and marine mammal remains, burials, rock features, cobble-based tools at coastal sites and increased hunting equipment and quarry-based tools at inland sites. Artifact assemblages can also include bone tools, doughnut stones, discoidals, stone balls, plummets, biface points/knives, Elko-eared dart points, and beads made of stone, bone, and shell. Beginning approximately 5500 BP, and continuing during the latter half of the Archaic Period, evidence of hunting and the gathering and processing of acorns gradually increases through time. The evidence in the archaeological record consists of artifacts such as dart points and the mortar and pestle, which are essentially absent during the early Archaic Period. The initial and subsequent increasing use of these technologies during the middle and late Archaic constitutes a major transition in how the prehistoric populations interacted with their environment in the southern coastal region. The period of this shift, from ca. 4000 to 1300 BP, has been designated as the Final Archaic Period (Warren et al. 1998).

Late Prehistoric Period Complexes

In the San Diego area, the Late Prehistoric Period has been described as a time characterized by an increased number of sites, and “many technological innovations, and new patterns in material culture and belief systems” (McDonald and Eighmey 1998). This description, in fact, aptly describes the period for the entire San Diego County area. Changes in tool and ornament types, burial practices, and site location choices, from those documented for the earlier periods, are well documented in the archaeological record and are described below.

As with the earlier periods, archaeologists have defined distinctive complexes for the Late Prehistoric Period prehistoric cultures of the area. Two complexes have been defined for the protohistoric occupants of the area. One, designated as “San Luis Rey,” is identified in the southern Orange, western Riverside, and northern San Diego counties areas; the other, “Cuyamaca,” is

identified in southern San Diego County (Meighan 1954; True 1966, 1970; True et al. 1974). The San Luis Rey complex is believed to be the progenitor of the Shoshonean-speaking peoples (Luiseño/Juaneño culture) living in the area at the time of historic contact in northern San Diego County (referred to as San Luis Rey of Shoshonean origin) (cf. Koerper 1979). Those of southern San Diego County (Cuyamaca, Yuman), are believed to be the ancestors of the Hokan-speaking Diegueño or Kumeyaay (Ipai/Tipai) occupying southern San Diego County at contact. The demarcation line between the San Luis Rey complex and the Cuyamaca complex is believed to be near the historic separation of the tribal territories of the Luiseño/Juaneño and Diegueño. It is highly unlikely, however, that the boundary remained static over time. During Late Prehistoric times, the project area would have been within the area commonly associated with the archaeologically defined Diegueño or Kumeyaay (Ipai/Tipai) complex.

Hearths documented at southern San Diego County sites are often clay-lined, yet this type of hearth is not found in the northern county sites. The Luiseño/Juaneño of southern Orange and northern San Diego counties appear to have primarily practiced cremation (Kroeber 1925), but may also have occasionally buried the dead by inhumation. The use of special burial urns for cremations, however, was apparently not commonly practiced.

Ethnographic Context

The project site is situated within the traditional territory of the people known to the Spaniards as the Diegueño, a term derived from the San Diego Mission Alcalá, with which these people came to be associated. This term was later adopted by anthropologists (Kroeber 1925) and further divided into the southern and northern Diegueño. Shippek (1982) later initiated use of a Yuman language term “Kumeyaay” for the people formerly designated as the Diegueño. The Kumeyaay are traditionally considered to be a hunter-gatherer society characterized by central-based nomadism.

The linguistic and language boundaries as seen by Shippek (1982) subsume the Yuman speakers into a single nomenclature, the Kumeyaay, a name applied previously to the mountain Tipai or Southern Diegueño by Lee (1937), while Almstedt (1974) noted that ‘Ipai applied to the Northern Diegueño with Tipai and Kumeyaay for the Southern Diegueño. However, Luomala (1978) has suggested that while these groups consisted of over 30 patrilineal clans, no singular tribal name was used and she referred to the Yuman-speaking people as lipai/Tipai (Carrico 1998).

As with most hunting-gathering societies (Service 1966), Kumeyaay social organization was formed around culturally defined kinship ties. More specifically, the Kumeyaay possessed a patrilocal type of band organization with band exogamy (marriage outside of one’s band) and virilocal marital residence (the married couple integrates into the male’s band). The band is often considered synonymous with a village or rancheria, which is a political entity. Following White (1963), Almstedt (1980) has suggested that the term rancheria be applied to both a social and geographical unit, as well as to the particular population and territory held in common by a native group or band. She also stressed that the territory for a rancheria might comprise a 30-square-mile area. Many households would constitute a village or rancheria and several villages were part of a much larger social system usually referred to as a consanguineal kin group (cimuL). The cimul is typically an exogamous, multilocal, patrilineal, consanguineal descent unit, often widely dispersed in local lineage. The members of the cimul do not intermarry because of their presumed common ancestry, but they maintain close relations and often share territory and resources (Sahlins 1968; Service 1971; Luomala 1963).

Other researchers have designated the San Diego River as a natural feature dividing the Kumeyaay with those people living north of it being the 'Iipai (Northern Diegueño), and those south of the River and into Baja California being the Tipai (Southern Diegueño) (Langdon 1975; Hedges 1975). With a history stretching back at least 2,000 years, the Kumeyaay at the point of contact were, as described by Carrico, settled in permanent villages or rancherias with strong alliances. Carrico has indicated the possible locations for a number of these villages in the San Diego County area (Carrico 1998).

While the Kumeyaay exploited a large variety of terrestrial and marine food sources, emphasis was placed on acorn procurement and processing, as well as the capture of rabbit and deer. Shippek (1989) has strongly suggested that the Kumeyaay, or at least some bands of the Kumeyaay, were practicing proto-agriculture at the time of Spanish contact. While the evidence is problematic, the Kumeyaay were certainly adept land and resource managers with a history of intensive plant husbandry.

The Kumeyaay practiced many forms of spiritualism with the assistance of shamans (kuessay) and cimul leaders. Spiritual leaders were neither elected nor inherited their position, but achieved status because they knew all the songs involved in ceremonies (Shippek 1991) and had an inclination toward the supernatural. Important Kumeyaay ceremonies included male and female puberty rites, the fire ceremony, the whirling dance, the eclipse ceremony, the eagle dance and the cremation ceremony, as well as the yearly mourning ceremony (Spier 1923). The primary ceremonial direction among the Kumeyaay is east, with rock art and entrances to ceremonial enclosures usually facing this direction (Kroeber 1925). The Kumeyaay are the only California tribe known to possess a color-direction system where white represents the east, green-blue the south, black the west, and red the north (Kroeber 1925).

Historic Context

San Diego, the Harbor, and the Tidelands in the Nineteenth Century

During the Spanish and Mexican periods of California history, and the first years of the American period, San Diego's population and development remained centered in Old Town, approximately 4 miles northwest of the terminal site. During these periods, Native Americans made use of the marshy tidelands south of Old Town, in the vicinity of today's downtown San Diego and areas farther south, but European colonists and Hispanic settlers did not frequent these areas (Brian F. Smith and Associates 2011:18, 20).

William Heath Davis made the first attempt to promote settlement and development beyond Old Town. In 1850 Davis acquired land near Punta de los Muertos, the original Spanish harbor-landing point, and constructed a wharf and a cluster of homes on several nearby lots. Davis's "New Town San Diego" ultimately failed and became known as Davis's folly. During the Civil War, the population of Old Town declined from 731 people to a mere 200 by 1865. In 1867, Alonzo Horton purchased 800 acres of land around New Town. Horton succeeded where Davis had failed. By 1870 Horton's Addition—the second New Town San Diego—had 2,300 residents and a growing number of hotels, warehouses, and industrial and residential buildings that formed an increasingly urbanized built environment. The terminal study area is south of Horton's Addition. It appears that a small portion of the southeastern study area may have been situated within the southwestern corner of a subdivision acquired and laid out by Joseph Mannasse and Marcus Schiller in 1870. City leaders set aside the area east of Mannasse and Schiller's Addition, known as the East End, for the planned

terminus of a transcontinental railroad line into San Diego, which failed to be developed during the 1870s (Brian F. Smith and Associates 2011:22; Pourade 1964:22–29).

Near the end of that decade, National City's Frank Kimball persuaded the Atchison, Topeka, and Santa Fe Railroad (Santa Fe) to support construction of a transcontinental connection from San Bernardino south to San Diego and National City. This line, the California Southern Railroad, was completed during the early 1880s and eventually acquired by the Santa Fe. Washouts plagued the Temecula Canyon portion of the line approximately 45 miles north of San Diego, which the Santa Fe ultimately abandoned. San Diego became dependent on a coastal branch line north to the main Santa Fe line at Fullerton. The Santa Fe never fulfilled an earlier agreement to locate its shops at National City. Although the railroad helped swell San Diego's population with newcomers and raised property values, the land boom of the 1880s created a speculative bubble that eventually burst. With the rising tide of incoming migration during the boom, San Diego's population reached 40,000 in 1888. But after the bust, the ebb of outmigration left the city with 16,000 residents in 1890. Despite the bust, the Mannasse and Schiller subdivision and the East End benefited from their proximity to downtown San Diego and the bay. They continued to grow, albeit slowly (Brian F. Smith and Associates 2011:24, 27–28; Irwin 1970:8–11).

San Diego's main nineteenth-century commercial port facilities consisted of a wharf built in 1850 near the south end of today's Kettner Boulevard, and the wharf constructed in 1868 by Alonzo Horton. The City of San Diego constructed no other major wharfs until the twentieth century. In 1891 the War Department improved the navigation channel north of Ballast Point. At that time San Diego had almost no industrial activity. Its maritime exports remained limited to sand and rocks extracted at Ballast Point and hinterland agricultural products. Commercial trade through the harbor averaged only \$70,000 per year throughout the 1890s. At the end of the decade, the Zuniga Jetty was built south from the west end of North Island at the harbor entrance (Harbor Department 1948: 65; Irwin 1970:11–12; Port District ca. 1974:1).

San Diego Harbor during the First Half of the Twentieth Century

San Diego was fortunate to have an ideal natural harbor, and much of its citizenry supported industrial tideland development and expanded port commerce, but in terms of waterborne shipping, the city and harbor would remain challenged by geography and regional patterns of transportation development. Separated from San Diego by an extensive mountain range, the agriculturally productive Imperial Valley formed its own county in 1905. Imperial Valley growers made use of the Southern Pacific Railroad's main line from Arizona to Los Angeles, where convenient railroad connections, increasing agricultural output, and booming petroleum production helped support increasing trade through that city's engineered port. Regardless of San Diego's demand for imports, it lacked the export commodity production necessary to fill the hulls of outgoing ships and thereby support expanded trade through its harbor. Although John D. Spreckels' San Diego and Arizona (SD&A) Railroad completed a line east to Imperial Valley in 1919, E.H. Harriman of the Southern Pacific—with its competing interests in the Port of Los Angeles—was a silent partner in that project. During the pre-World War II decades, the SD&A Railroad, which was renamed the San Diego and Arizona Eastern (SD&AE) would never carry more than a small freight volume, and never generate any consequential increase in maritime trade through San Diego Harbor (Hennessey 1993:129–30; Irwin 1970:12–17).

Still, San Diegans remained eager to reap the economic benefits that could be gained through harbor and waterfront development. In 1911 the State of California handed control of tidelands to local

governments that agreed to invest at least \$1,000,000 in tideland improvements. San Diego voters approved \$1,000,000 and \$400,000 bond issues for harbor improvements in 1912 and 1914 respectively. In 1912, in anticipation of new municipal wharf development, the City arranged for dredging of a 30-foot-wide channel from the shoreline near the west end of D Street (today's Broadway Street) to the harbor's entry channel (Irwin 1970:30–31, 44; Port District ca. 1974:2).

This initial phase of twentieth-century harbor development occurred as part of the planning for the Panama-California Exposition of 1915, one of the most formative events in San Diego history. Although San Diegans across the political spectrum would come to embrace the exposition, municipal plans for commercial pier development in advance of the exposition generated significant disagreement, and revealed emerging tensions that would shape San Diego politics and public debates over waterfront development into the latter twentieth century.

Opposing the new pier was a progressive reform-oriented coalition that advocated park development, nature conservation, and the kind of comprehensive city planning and aesthetic improvement associated with the City Beautiful Movement, the latter of which had been inspired in large part by the Chicago's 1893 Columbia Exposition. Committed to promoting tourism, these San Diegans also viewed the City's pier development plans as a violation of John Nolan's 1908 plan for San Diego. Embodying City Beautiful ideals, Nolan's plan had put significant emphasis on the waterfront and attempted to balance commercial development with aesthetically pleasing civic and recreational space. Nolan had envisioned a public plaza and transportation terminals at the end of D Street, with the waterfront to the north reserved for recreation and the waterfront south of E Street reserved for commercial and industrial development. Nolan had been recruited by George Marston, the influential moderate-progressive department store owner, City Beautiful advocate, and nature conservationist whose land donations would eventually provide for the creation of Torrey Pines and Anza Borrego State Parks (Polos 1984; Pourade 1965:99–105). Acting on behalf of Marston and other influential progressive-minded defenders of the Nolan Plan, San Diego's Civic Improvement Association attempted to postpone decision on the bonds for development of the pier's bulkhead until after the upcoming 1913 election, in which Marston which ran for mayor as the progressive candidate.

Business interests committed to commercial and industrial development supported the new pier over strict adherence to the Nolan Plan. Representing those interests, Frederick J. Lea, manager of a building materials company and chair of the Exposition Executive Committee, responded to the Civic Improvement Association by declaring that no "reputable taxpayer or citizen or businessman in San Diego has the nerve to help openly defeat these bonds," and warning that if any influential citizens "secretly oppose the bonds, we will find it out and their names will be published." Shortly thereafter, the Civic Improvement Association announced its support of the bonds, and the City proceeded with construction of 2,675 feet of downtown harbor bulkhead and the abutting commercial pier. Marston ran for mayor in 1913 and 1917. During the latter election, his younger opponent, Louis Wilde, represented business interests seeking more aggressive industrial development and cast the elder Marston as an effete elitist. Wilde would eventually win the election with a campaign centered on the slogan: "Smokestacks versus Geraniums" (Polos 1984; Pourade 1965:99–105, 135–36 [135 quoted]). The Nolan Plan, and the political divide over it, would shape the course of San Diego Harbor development throughout the twentieth century.



Figure 4. Broadway and B Street Piers (also known as the Embarcadero Piers), circa 1928 (San Diego History Center Photograph Collection, Sensor 52-46)

The completed D Street (Broadway) Pier included a building with architectural elements in keeping with designs of the buildings constructed for the Panama-California Exposition grounds in Balboa Park, which reflected and helped shape an emerging regional revivalist architecture commemorating California's Spanish colonial past. The pier's warehouse office front, or "headhouse," was designed in the Mission Revival style. It featured a shaped parapet over a large arched main warehouse entry, on each side of which rose pilasters incorporating narrow niche-like arches crowned by finials (Irwin 1970:44; Pourade 1965:135, 165, 193, 216; San Diego History Center 1925). In 1926 the City completed construction of the B Street Pier to the north of the D Street (Broadway) pier. The two piers would also become known as the Embarcadero Piers. The architecture of the office headhouse fronting the B Street Pier's transit shed reflected the rise of Art Deco during the 1920s and incorporated Jacobean elements (Irwin 1970:44; Port District ca. 1974:2; San Diego History Center 1929).

According to historian Richard Pourade, completion of the B Street Pier and associated industrial development "brought a realization...that with rapid growth of the city there had to be some plan if there was to be any orderly development at all" (Pourade 1967:29). During the 1920s, the Marston contingent of progressive City Beautiful advocates found a receptive mayor in John Bacon and a city council willing to have Nolan update his plan for San Diego. Nolan proposed a waterfront civic center along the lines of the County Administration Center that would eventually be developed north of the municipal piers, and a scenic waterfront drive that would follow the northerly curve of the bay toward Point Loma. He recommended no more commercial piers north of the B Street Pier, consigned commercial-industrial development to the area south of Market Street, and envisioned development of an airport adjacent to the drive on the north side of the harbor. Nolan's second plan also incorporated military facilities that had been developed west and northwest of the airport site. In 1926, the city council adopted Nolan's new plan as a development guide, but not as an official plan

(Pourade 1967:36–45). By then, federal military investment had come to dominate harbor development and the local San Diego economy generally.

San Diego began courting the military in 1912, when Congressman William Kettner and local Chamber of Commerce Secretary Rufus Choate lobbied the federal government for appropriations to widen and deepen the harbor entrance, ostensibly for commercial purposes. In the subsequent competition among Pacific coastal cities for federal military appropriations, Kettner spearheaded ongoing lobbying efforts on behalf of his hometown, while Navy Admiral George Dewey helped sway congress in favor of investment in San Diego harbor, and the city's citizens voted to lease or deed extensive tideland acreage for naval development. During the years 1916–17, the first West Coast Marine Corps Advance Base, the Naval Hospital, and Rockwell Field (later the North Island Naval Air Station) were established in San Diego. After World War I, Navy planners became convinced that Japan posed the greatest immediate threat to U.S. interests and committed to moving half of the nation's fleet to the West Coast. San Diego became the home of the Pacific Destroyer Force. By the mid-1920s, the federal government had completed or begun developing the Destroyer Base (today's Naval Base San Diego), the Naval Training Station, the Marine Corps Recruit Base, the Naval Radio Station, the Fleet Fuel Depot, the U.S. Coast Guard Base, and Fort Rosecrans (Hennessey 1993:130–133; 143; Shragge 1994:338–39).

During the 1920s, federal investment in naval facility development and operation became the largest factor in the local economy, generating an economic boom that in turn led to increased non-military infrastructural development. The military payroll in San Diego reached \$15 million during that decade, and the local population nearly doubled to 147,995. New housing subdivisions spread east, the central business district expanded, and manufacturing activity increased. In conjunction with the Navy's plans for increased harbor dredging to accommodate aircraft carriers, San Diego voters approved a \$650,000 bond in 1928 to develop the first phase of the airport that would become Lindbergh Field on reclaimed land north of the Embarcadero Piers and east of the Marine Corps Recruit Base (Hennessey 1993:138–43; Shragge 1994:340–355).

Ever since the days of the first Nolan Plan, many influential San Diegans had wanted to reserve as much harbor space as possible for recreation, which had the economic benefit of attracting tourism. But others had hoped that military investment would help transform the city's harbor into a thriving shipping hub. The latter group believed shipping and industrial production along the harbor's tidelands would nurture one another and boost overall economic growth (Emblen 1949:15; Hennessey 1993:136–37). In 1920, 557,224 tons of material valued at \$19,370,400 was shipped commercially through San Diego harbor. By 1927, shipping volume had increased to 942,476 tons valued at \$46,803,000. However, there remained a striking imbalance in favor of imports. Of the total material handled, inbound cargo made up 93% (522,696 tons) in 1920 and 95% (900,781 tons) in 1927. Shipping volumes declined during the Great Depression of the 1930s, and by the end of that decade, San Diego's commercial shipping volume ranked it 23rd of 24 West Coast ports (Klaus 1928:24–25; Hennessey 1993:137; Irwin 1970: 22–23).

By the onset of World War II, ports in other West Coast cities had developed commercial shipping facilities that dwarfed San Diego's modest Embarcadero Piers in terms of size and capacity. Portland, for example, had four marine terminals (including one incorporating three major piers) that featured warehouses, transit sheds, and facilities for efficiently conveying dry bulk commodities such as rock, ores, coal, sulfur, and grain from rail cars to ships. As early as 1922, these dry bulk facilities included a rail car unloader that tipped and tilted cars to empty their contents out of opened doors, as well as extensive conveyor-belt systems that transported bulk commodities to

traveling dockside loading towers and with spouts that deposited such commodities directly into ship hulls (Figures 5 and 6). These kinds of dry bulk rail-car unloading and dockside ship-loading facilities would not be developed in San Diego until the 1960s (Port of Portland 1922; Portland City Club 1944:135).

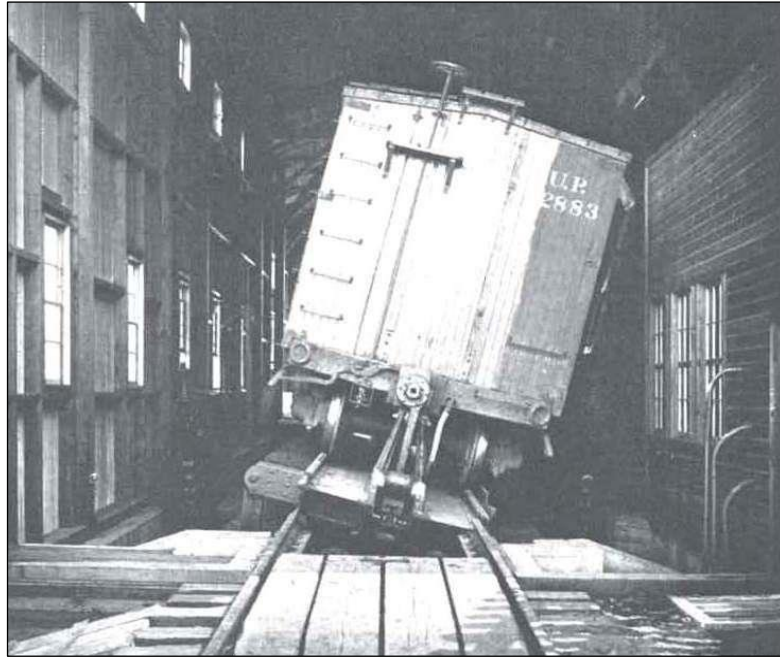


Figure 5. Tilted boxcar at early-twentieth-century rail car unloading facility, Terminal 4, Pier 5, Port of Portland (from Port of Portland 1922)

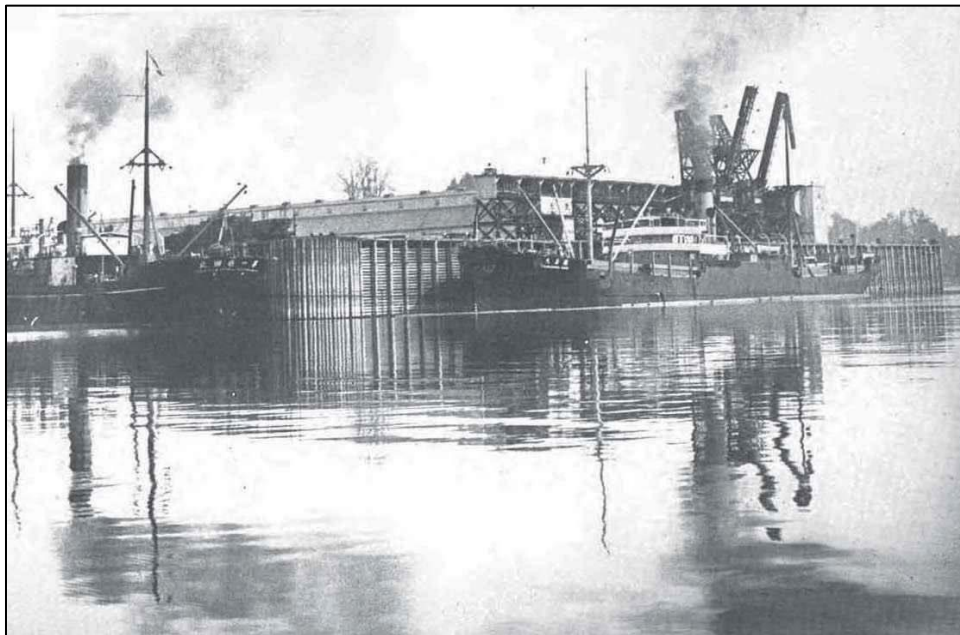


Figure 6. Early-twentieth-century bulk commodity plant, including loading conveyor belt and traveling ship-loading towers (upper right) at Terminal 4, Pier 5, Port of Portland (from Port of Portland 1922)

Commercial Port Development and the Post-World War II San Diego Harbor

During the post-World War II decades of the historic period, the City of San Diego undertook to make its harbor a competitive commercial shipping port. Although San Diego harbor had become a major center of non-military economic activity prior to World War II, it continued to falter as a waterborne shipping hub immediately following the war. The longstanding tuna fishing industry continued to flourish, and construction of the G Street Mole Pier added to the harbor's approximately 15,000 feet of berthing space at commercial fishing piers across the harbor. Shipbuilding and repair facilities operated by the Martinolich Ship Building Company, the Lynch Shipbuilding Company, the National Steel and Shipbuilding Corporation, the Campbell Shipbuilding Company, and the San Diego Marine Construction Company all thrived. San Diego's population exploded during the war and continued to grow afterward. New construction helped support tideland lumber yards and joined with the shipbuilding industry and the growing aircraft and defense industries to increase demand for steel products fabricated at tideland plants. Compared to other California and West Coast harbor cities, however, San Diego's shipping activity languished on the heels of the war. Cargo ships supplied San Diego with petroleum, copra, newsprint, fish, fruits and vegetables, coffee, and livestock, then left the harbor carrying export products such as beer, juice, cans, iron and steel, machinery, salt, gypsum, chemicals, feeds, grain, and airplane parts. In 1948, 2.6 million pounds of material with a shipping value of \$300,000 moved through the harbor. This gave San Diego a ranking of last among 13 California shipping ports and 24th among 25 West Coast shipping ports (Harbor Department 1948:11–12, 20-41; U.S. Department of Commerce 1950).

Beginning in the late 1940s, John Bate, the Port Director of the City's Harbor Department, endeavored to secure a greater share of West Coast shipping business for San Diego. No individual had more influence in shaping San Diego port development and governance during the post-war era. Implementing steps recommended in a study commissioned by previous Port Director Joe Brennan, Bate acted to market the harbor more aggressively and solve the problem of securing export commodities. He initiated and marshaled through plans to create facilities that could accommodate greater numbers of cargo ships. He traveled widely and lobbied aggressively to attract foreign interest, secure improved railroad freight rates, and overcome commercial shipping associations' dismissal of San Diego as a harbor that lacked viable export commodities and remained dominated by the U.S. Navy. Over the longer term, Bate was also instrumental in creating an independent port authority to manage the tidelands across San Diego harbor. Assessing Bate's efforts in 1957, *San Diego Magazine* reporter Ruth Nuttall described him as a "dragon-slayer even in a business suit," and quoted a Bate ally who characterized the Port Director as a man who "no longer knows where the legend ends and Bate begins," whose "key words are 'challenge' and 'impossible'" (Emblen 1949:15, 37–38; Irwin 1970:38–39; Nuttall 1957:41, 76–79 [78-79 quoted]; Nuttall 1958:92; Pourade 1977:111–13). An engineer by training who resided on a houseboat, Bate would be memorialized in a 1983 obituary as a "farsighted leader," the man who "led—and sometimes dragged—the port into the twentieth century," and ultimately "turned the harbor around" (Gross 1983:A1, A14).

As historian Richard Pourade explains, in terms of long-range planning, Bate's post-war Harbor Department "made a concession to the Nolan Plan, and to the lure of recreational attractions, by dividing the waterfront for three uses," and assigning the lands south of Market Street to National City for industrial purposes. "Lands from there north to a point just beyond the City-County Administration building were assigned to commerce, with commercial piers extending out from in front of the Administration building...Between the commercial piers and the Coast Guard Station,

was to be a small protected harbor for the commercial fishing fleet. Recreation was to be assigned to the lee side of Point Loma, behind the two sheltering arms of a narrow island-like area which had been built up with sand from dredging operations and connected to the mainland by a causeway” (Pourade 1977:80–81 [quoted], 82, 111–12). Initially opposed by many Point Loma residents and dismissed as “Bate’s Folly,” the latter feature would become Shelter Island. It would accommodate boat slips, restaurants, hotels, and a shipping pier that San Diegans would come to cherish (Gross 1983:A-14).

A favorable global market for cotton, coupled with increased cotton production from the Imperial Valley and the Mexicali Valley south of the border, provided Bate with a potential initial solution to San Diego’s export commodity problem. Transported from the Imperial Valley on the underused SD&AE Railroad, the ostensible “white gold” of cotton promised to increase shipping traffic through the harbor by providing the so-called “bottom cargo” that would fill ship hulls emptied of import goods and commodities. Indeed by 1955 San Diego had surpassed the Port of Los Angeles in cotton shipments, which overwhelmed the existing municipal port facilities at the Broadway and B Street Piers. Shipping revenues stood at \$31,000 in 1948 but ballooned to \$215,000 by 1956. Amid the cotton boom, San Diegans voted in November 1955 at a ratio of 3-to-1 in favor of a \$9,699,000 bond issue to fund development of the TAMT. As *San Diego Union* reporter Joe Brooks explained several years later, cotton and a new marine terminal promised to empower San Diego with the means to “shake off the shackles of a top-heavy Navy-aircraft industry economy, to broaden its economic base with electronic plants, scientific centers and world commerce that are not dependent on hot and cold wars” (Brooks 1958:C-1 [quoted], C-4; Irwin 1970:181–82; Pourade 1977:111–113).

The TAMT was not developed without controversy, especially after San Diegans learned that Mexican cotton growers planned to ship more of that nation’s supply to Japan via Ensenada port facilities undergoing expansion. As early as 1953, San Diegan Charles D. Wood had published an article in *Businessweek* mocking Bate’s effort to expand commercial shipping. Wood had argued that San Diego lacked the highway connections, railroad lines, and hinterland economy necessary to support a viable shipping port. By 1958, Wood and other critics were characterizing the TAMT as a “white elephant” of wasteful public infrastructure development. Some accused Bate of grandstanding by allowing cotton bales to accumulate at the Embarcadero Piers as San Diegans prepared to vote on the bond issue for the terminal (Brooks 1958:C-1, C-4; Nuttall 1958:41, 92).

Bate countered by arguing that San Diego harbor officials were turning away hundreds of thousands of cotton bales and thereby giving business away to other regional ports. He also predicted that the new terminal would quickly reach 100% capacity. Implying that additional port facilities would need to be developed, Bate argued that the new terminal would soon be “completely inadequate to handle the cargos that will be forced through it.” Arnold Mueller, president of the Mueller Trucking Company committed to investing in a new truck freight facility adjacent to the new marine terminal, which he considered “the greatest investment San Diego has ever made.” An unnamed businessman quoted in a 1958 *San Diego Magazine* article on the terminal’s development captured the sentiments of supporters, declaring that with the new facility, San Diego would attain “terminal status” and enter “the big league of waterborne commerce. Asking if this facility is a white elephant is like asking if the seed is really necessary to agriculture” (Brooks 1958:C-1, C-4; Nuttall 1958:92 [quoted]).

Development of the new TAMT site began in 1956, when the City started dredging channels and placing fill west of the Benson Lumber Company and American Processing Company facilities at the foot of Sigsbee and Beardsley Streets, and south of the recently constructed Harbor Department warehouse on Gull Street (Warehouse A). By fall 1958, two 200,000-square-foot transit sheds began

housing cargo from ships docked at the terminal's nine 500-foot berths. By 1963 the terminal also included a substantial bulk loader modeled after similar dry bulk commodity conveying facilities at other ports, including a rail car unloader, an extensive conveyor, and a modern traveling ship-loading tower. The site also had several large tanks for storage of imported molasses, a Harbor Department office building/union hall, and several truck repair buildings. In 1962 and 1964, respectively, Warehouses B and C would each add 290,646 square feet of storage space. Whereas the transit sheds and warehouses at the B Street and Broadway Piers had 240,190 and 90,980 square feet of storage, respectively, the TAMT provided approximately 1,000,000 square feet of covered storage. The history of the terminal site's development is discussed in more detail below (Brooks 1958; Irwin 1970:46–48; Ninyo & Moore 1999: Appendix A; Port District ca. 1974:4; U.S. Army Corps of Engineers 1956:43–45).

The TAMT and Bate's efforts on behalf of bringing San Diego into the big league of commercial ports succeeded in generating a substantial increase in shipping activity and improving San Diego Harbor's ranking as a shipping port. But San Diego would not rival the larger and longer-established port facilities at Los Angeles, Long Beach, San Francisco Bay, Portland, and Puget Sound. In 1948, San Diego had ranked last among California ports and second to last among West Coast ports. In 1957, prior to opening of the TAMT, San Diego had an outgoing shipping volume of 146.2 million pounds with a value of \$36.7 million, giving it a volume ranking of 12th and a value ranking of 8th among 14 California ports. Among 26 West Coast ports, it ranked 19th for outgoing volume and 13th for value of those shipments in 1957. By comparison, Los Angeles handled 5,696.9 million pounds of outgoing material for a value of \$279 million. In 1965, the year after initial development plans for the TAMT were completed, San Diego port facilities handled 1,037 million pounds of outgoing material with a value of \$52.4 million, giving it an export volume ranking of 7th and a value ranking of 6th among 14 active California ports, as well as a volume ranking of 11th and a value ranking of 10th among 28 active West Coast ports. By comparison, in 1965 Los Angeles handled 4,893 million pounds of outgoing cargo for a value of \$319.4 million; Long Beach handled 9,329.2 million pounds for a value of \$307 million; and Portland handled 7,233 million pounds for a value of \$267.3 million. In the competition among West Coast port facilities, San Diego did not pose a significant threat to larger and longer established West Coast commercial facilities. However, by 1965 the TAMT's outgoing shipments had increased San Diego's share of West Coast shipping revenues compared to its share during previous decades (U.S. Department of Commerce 1958, 1966).

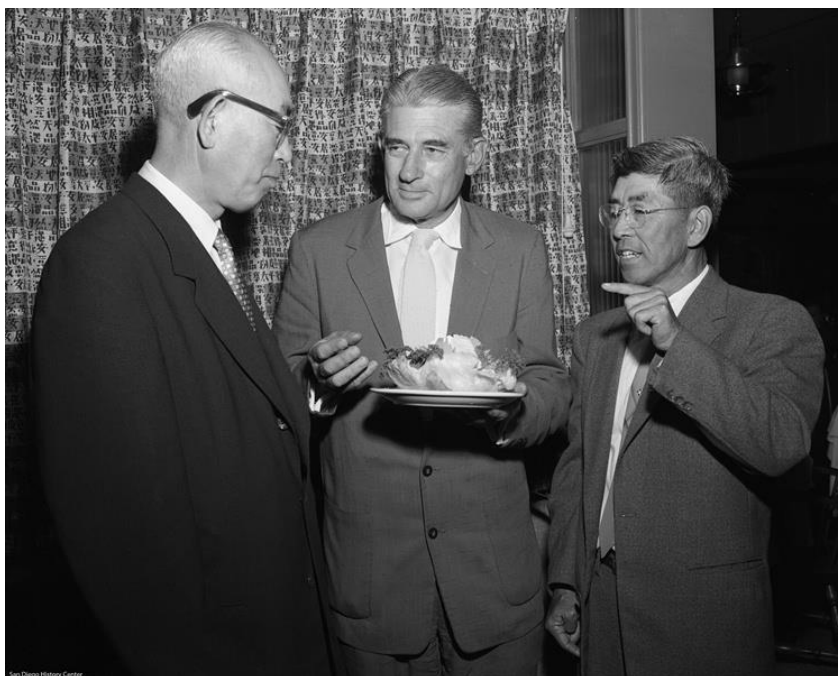


Figure 7. Harbor Department/Port District Director John Bate (center) meeting with officials from Yokohama, Japan in 1957 (from San Diego History Center Photograph Collection, UT-85.D338, No. 8)

Bate ultimately won the struggle for commercial shipping in San Diego Harbor and marshaled through the creation or improvement of additional municipal transportation and recreational facilities. During the first half of the 1960s, San Diego voters approved multiple bonds for continued development of the TAMT. In 1962, the \$2.4 million bond for construction of Warehouses B and C at the TAMT won more votes than the other four City propositions for ongoing Mission Bay development, parks and community centers, development of Harbor Island, and changes in the tidelands revenue charter to create the San Diego Unified Port District (Pourade 1977:200; *San Diego Union* 1960:A-12; 1962A:A-14; 1962B:A20). Bate oversaw the creation of Harbor Island from material dredged to deepen the channel between the outer bay and the aircraft carrier docks at North Island. This recreational destination would front Lindbergh Field, which would receive new facilities enabling it to accommodate an annual increase from 390,427 travelers in 1952, to 1,900,000 in 1965–66, and 4,441,619 in 1974 (Pourade 1977:200, 216; Port District ca. 1974:4–5).

The concept of a San Diego Unified Port District encompassing all the harbor-fronting municipalities had been suggested in 1956 by California Attorney General Edmund G. “Pat” Brown. Bate embraced and promoted the concept. For harbor-front municipalities outside the City of San Diego, unification offered a way to benefit from tideland development without excessive taxation. Although Coronado initially resisted, unification eventually became a reality in 1963. The Port District’s management structure included a port director, the director’s staff, and seven commissioners appointed by municipalities with tideland assets along the bay. The City of San Diego received three commission seats, and the cities of Imperial Beach, Coronado, National City, and Chula Vista each received one seat each. As historian Richard Pourade explains, with creation of the Port District, “Bate now seemed to be lord of all he surveyed” (Irwin 1970:38; Pourade 1977:156, 199–200, 201 quoted).

San Diego's second modern shipping terminal would be developed at the tidelands of National City. Anticipating that the TAMT would reach capacity and that San Diego would need additional cargo facilities, Bate called for development of a new terminal at Fifth Avenue as early as 1961. However, creation of the Port District provided him with a newly expanded planning area. In 1964 the Port District announced plans for development of the Twenty-Fourth Street Marine Terminal at tidelands south of San Diego in National City subject to voter approval of Proposition J. Voters would approve the new terminal, which would eventually become known as the National City Marine Terminal, and would eventually be expanded into a modern container-handling facility (Martin 1961:A-15; Port District 2012:77, 2014a, 2014b; Pourade 1977:216; Shepard 1964A:A-15).

Initially developed for the Panama-California Exposition, San Diego's original municipal piers became obsolete for shipping purposes. In 1972, the Port District completed renovation of the Broadway Street Pier with construction of a passenger platform, customs building, parking spaces, light fixtures, and landscaping that converted the historic cargo facility into bayside park and cruise ship facility. This was the product of a plan created under Port Director Bate. His TAMT, coupled with the new access to southern harbor tidelands for commercial-industrial development, allowed the Port District to begin redeveloping the old municipal shipping piers for recreation and tourism, the original uses envisioned for the downtown waterfront in the 1908 Nolan Plan (Irwin 1970:45, 51; Port District ca. 1974:5-7; Pourade 1977:201).

Illness was the official reason for Bate leaving the Port Directorship in 1966, though rumors of forced retirement abounded. A workaholic, Bate had a reputation for remaining on the job in excess of 16 hours a day and taking few vacations. Despite backing recreational development that nurtured tourism, his role as figurehead of harbor shipping and industrial development became problematic as powerful interests sought to put renewed emphasis on waterfront recreation and tourism. Aspects of Bate's ultimate vision for the harbor were never realized, including a second deep-water channel through the Silver Strand between Coronado and Imperial Beach, outlawing high-rise buildings at Harbor Island, and his most grandiose plan of all, a shipping channel at the Tijuana River south of Imperial Beach. But Bate helped San Diego move beyond dependence on federal naval operations, fishing, and shipbuilding. His planning diversified the economy of San Diego's treasured natural harbor to include new recreational facilities in conjunction with modern shipping facilities. Bate died on April 28, 1983 (Gross 1983:A-1; Pourade 1977:230-231).

Although Bate played the most important role of any individual in the non-military planning and development of San Diego harbor during the post-World War II decades, his TAMT had mixed results during the 1960s and early 1970s. The terminal helped San Diego improve its share of the west-coast maritime shipping economy, but it did not equip San Diego to rival larger, earlier-developed and expanding shipping ports at Los Angeles, Long Beach, and farther north. Federal military operations, defense contracting, the aircraft industry, the shipbuilding industry, and tourism would continue to be far more important to San Diego's economy than waterborne shipping. Moreover, the rise of container cargo shipping would require the development of another terminal—the National City Marine Terminal—to ensure that the Port of San Diego could continue to compete for a share of the West Coast shipping market (Irwin 1970:51, 64-67; Pourade 1977: 194-96, 222-223).

Rising revenues allowed the Port District to become self-supporting and go off the tax rolls at the end of the 1960s, but the Port District's Marine Operations division (which managed the marine terminals) was far less profitable than its other two divisions: the Properties Operations division, which leased property for industrial, recreational, and other land uses, and the Airport Operations

division, which managed Lindbergh Field. In 1968–69, for example, the Marine Operations division earned the Port District approximately \$1.1 million, whereas the Properties Operations division earned \$2.2 million, and the Airport Operations division earned \$2.5 million. As historian Richard Pourade explained during the latter 1970s, in the last of his six-volume history of San Diego, by the late 1960s the Port District was “faced with the prospect that it could be cheaper to unload a ship at the port of Los Angeles [or Long Beach], and truck goods to San Diego, than to make a separate call at San Diego” (Irwin 1970:40–43; Pourade 1977:232).

While maritime trade increased overall during the 1960s, from 1965—the year after the TAMT was completed as originally planned—to 1971, the Port of San Diego did not improve its overall ranking among West Coast shipping ports. In 1965, San Diego port facilities handled 1,037 million pounds of outgoing material with a value of \$52.4 million, giving it a ranking of 7th for outgoing volume and a ranking of 6th for the value of that volume among 14 active California ports. San Diego’s total outgoing material handled, and the value of that material, fluctuated from 993 million pounds (\$43 million) in 1966, to 1,119 million pounds in 1969 (\$39 million), to 976 million pounds (\$54 million) in 1971. San Diego’s ranking among active California ports handling outgoing dry cargo stood at 6th among 15 in 1966, declined to 9th among 13 in 1969, and remained 9th among 17 in 1971. San Diego’s ranking among West Coast ports handling outgoing dry cargo stood at 10th among 30 in 1966, declined to 18th among 31 in 1969, but improved to 11th among 34 in 1971. The earlier trend of San Diego steadily improving its ranking among active West Coast and California ports reversed between 1966 and 1969. While San Diego improved its position between 1969 and 1971, its ranking declined slightly overall during this period (Pourade 1977:231; U.S. Department of Commerce 1967, 1970, 1972).

History of the Tenth Avenue Marine Terminal Property

Early History

During the late nineteenth century, the TAMT site was within the waters of San Diego Bay. By the early twentieth century, industrial development had occurred within the tidelands at the northeastern edge of the TAMT Plan study area and areas further east. During the first part of the century, a railroad bridge carried the Santa Fe line across the former tidal zone at the northeastern edge of the terminal, most of which remained within the waters of the bay at that time. Beginning in 1907, the Benson Lumber Company made use of the far southeastern portion of the site at the foot of Sigsbee Street. The western end of the Benson Lumber Company’s mill building stood at the edge of the study area. Within the site to the north, west, and south the Benson facility included a wharf, several sheds, and numerous mill refuse areas in the tidal zone. By the mid-1920s several buildings and wharves had been established by the West Coast Crab & Lobster Company and the Southern Reduction Company to the southeast of the lumber facility. Fill gradually extended the shoreline west and south of the Benson Lumber Company property within the study area. At the expanded shoreline in the far southeastern portion of the study area, the American Processing Company established facilities and constructed several tanks for fish tallow and oil at the shoreline by the 1950s. Also by the 1950s, an auto repair shop had been constructed adjacent to the tanks, and the Benson Lumber Company facilities had expanded southwestward to include a larger mill building, a refuse burner, a lumber shed, and multiple smaller buildings (Ninyo & Moore 1999:3–10, Appendix A).

Industrial development also occurred at the northeast edge of the terminal site. In 1913 the City of San Diego built an incinerator facility just north of the study area boundary near the south end of Eighth Street, an area long used as a refuse dump. This and a subsequent incineration facility built at roughly the same location in the 1930s could not keep pace with the accumulation of garbage in the area, which became a public nuisance. The far northeast corner of the site was occupied by a structure identified in Sanborn maps as a “Gas Works Refuse Settling Tank” as early as the 1920s. Aligned immediately north of the settling tank was saltwater tunnel associated with San Diego Gas & Electric facilities located at Ninth Street and Imperial Avenue. By the mid-1930s, fill had extended the shoreline to the west in the northeastern study area, and a channel had been created along the northwestern edge of the terminal site. Near the shoreline south of the channel, immediately north of the study area boundary, General Petroleum Corporation of California constructed several gas and oil tanks circa 1936. Around the same time, several small buildings and a structure identified in aerial photographs as a “ramp/garbage harper” were built at the dump area in the northeast portion of the study area. During the early 1950s, additional fill expanded the shoreline in this area. Gull and Water Streets, as well as a large building that housed an automobile and truck sales and service center, were constructed at the former dump site. Farther south along Gull Street, the City of San Diego Harbor Department also constructed a warehouse by 1955. Eventually designated Warehouse A, this building was the first public harbor facility to be constructed within the boundaries of the site that would become the TAMT (Ninyo & Moore 1999:3–10, Appendix A).

The Tenth Avenue Marine Terminal

Development of the TAMT site (Figure 8) began in 1956. The City of San Diego’s Harbor Department contracted for spoil from channel dredging to fill the shoreline westward at the terminal site. Harbor Department engineers chose a “mole” or “marginal wharf” design rather than finger piers such as the Embarcadero Piers. The mole design had several advantages. Solid fill would support more weight than pier pilings. A wide mole terminal would provide more space for storage structures and railroad and truck access. Ships could also berth more conveniently along bulkheads than along finger piers. Adjacent to channels dredged to depths of 37 feet, a bulkhead or quay resembling a gravity dam was constructed of rock and concrete. Tubular rubber fenders lined the three sides of the bulkheads, which provided for nine ship berths and had lengths of 1,118 feet at the north, 2,580 feet along the harbor-facing southwest side of the terminal, and 920 feet at the southeast side. The terminal’s berths and mole arrangement were designed by the Harbor Department’s Engineering Division, headed by J. E. Liebmann. Standard Dredging Company performed the dredge work, and M.H. Golden Construction Company built the bulkhead (Liebmann and Ferver 1958:40; Morin 1957A:A-8, 1957B:A-26; Ninyo & Moore 1999: Appendix A; Port District 1992:8; *San Diego Union* 1958A:C-5).

The first two major buildings on the property were Transit Sheds #1 and #2, designed by San Diego structural engineer E. L. Freeland. The job of building the transit sheds was awarded to the F. E. Young Construction Company, which began work on the northerly Transit Shed #1 in 1957. These storage buildings were constructed of tilt-up fireproof concrete walls with steel roof trusses. In addition to the elevation walls, three interior, transversely positioned walls divided the approximately 200,000-square-foot rectilinear plans of each building into four interior storage spaces. Some of the wall slabs featured modest decorative scoring in the form of fluted panels and Moderne-style signage identifying berth numbers or the Port of San Diego and the year 1957. An extensive interior sprinkler system coupled with the fireproof construction provided for the facility to receive preferred insurance rates for cargo storage and attract shipping companies to lease entire

compartments for exclusive use. The major engineering challenge posed by construction of the transit sheds was their weight and location atop dredged fill in an earthquake prone region. For each transit shed, 370 concrete piles with steel shells were driven to minimum depths of 40 feet or to a resistance of 35 tons. Steel wall columns were installed above each pile. At the base of the longitudinal walls, the tops of the piles were connected to a continuous concrete beam that functioned like a strut (Freeland 1957; Liebmann and Ferver 1958:40, 43; Ninyo & Moore 1999:10, Appendix A; Morin 1957C; Port District 1992:8; *San Diego Union* 1958B:C-6).

Transit Sheds #1 and #2 also incorporated mutually facing two-story headhouses accommodating office space at the southeast elevation of the northerly Transit Shed #1 and the northwest elevation of the southerly Transit Shed #2. The two headhouses were designed by local architect Louis Bodmer. The headhouses' flat roofs, overhanging cantilevered second stories, and horizontal bands of flush steel-frame windows registered the influence of the more current International Style. The headhouses included several circular second-story windows and other elements that evoked nautical associations as well. Between the headhouses, the Harbor Department constructed an oval traffic control island with a concrete pillar featuring signage identifying the terminal and transit sheds. This was flanked by tenant directories for the transit sheds. When the terminal was formally dedicated to "Commerce for the people of the West" on November 21, 1958, a variety of civic and business leaders addressed the assembled crowd from a platform adjacent to the traffic island and pillar, and a band played intermittently from the opposite side of the island (Figure 9). The traffic island and pillar, as well as the southeastern portion of Transit Shed #1, including the headhouse, have been demolished (Figure 9) (Bodmer 1957A, 1957B; *San Diego Union* 1958C:A-19).



Figure 8. Tenth Avenue Marine Terminal Site Map (note that the southeastern portion of Transit Shed #1 visible in this map has been demolished)

By the time the terminal was dedicated, Union Oil had begun construction of the facility's four large bunker fuel tanks. Bate announced that ship fuel stored in the tanks would be sold at the same prices offered at Los Angeles and Long Beach port facilities, where barges and tugboats provided for ship refueling. At San Diego, pipes connected to tanks at the north end of the terminal site conveyed the fuel directly to docked ships, while other pipes running from each berth provided for docked ships to empty the ballast water in their fuel tanks. Although their development did not require

major engineering innovation for the period, the bunker fuel facilities offered convenience and efficiency, which provided a crucial element of the Harbor Department's marketing efforts to attract ships to San Diego (Bate 1958:C-3; Brooks 1958:C-1; Liebmann 1960:69-72; Ninyo & Moore 1999:11, Appendix A; Irwin 1970:57-58).



Figure 9. Dedication of the Tenth Avenue Marine Terminal, November 1958; note that the traffic island, pillar, and signage at left have been demolished along with the Transit Shed #1 headhouse visible in the right background (from San Diego History Center Photograph Collection, S-4868-2).

By 1963 two smaller tanks had been constructed immediately east of the larger Union Oil tanks. Several buildings had also been constructed by that time. One of these was a building located immediately south of the Union Oil tanks that served as Harbor Department offices and a union hall. Two truck repair buildings were also constructed south of the office/union hall building and north of an area then used as a scrap metal yard. The automobile and truck sales building at the far northern portion of the site appears to have been converted to a maintenance shop by 1963. These four buildings are no longer present at the site (Ninyo & Moore 1999:12, Appendix A).

Southeast of the scrap metal yard, the San Francisco-based Pacific Molasses Company constructed a \$150,000 distribution plant consisting of three large tanks and several smaller tanks. In late 1961 the *San Diego Union* reported that, due to construction delays, the plant would not be completed until February 1962. Imported molasses stored in the tanks was trucked to the Imperial Valley and processed into cattle feed. A large molasses tank was later built north of the Union Oil tanks by a different company than Pacific Molasses. The Pacific Molasses facility remains intact; the other molasses tank near the Union Oil Tanks has been demolished. A small truck scale building that remains present today was also constructed south of the three Pacific Molasses tanks by 1963 (Irwin 1970:50-51; Morin 1961A:A-27; Morin 1961B:A-13; Ninyo & Moore 1999:12, Appendix A).

The bulk loader system, one of the terminal's most promoted and expensive facilities, was completed by 1963. Planning for the bulk loader began years earlier, when City Harbor Department officials inspected bulk loading systems on the east coast, at Houston, and at Stockton. Aware of

growing demand for raw materials in Asia, Bate and other officials sought a bulk loader for speedy automated transfer of raw materials from railcars and storage facilities to ship hulls. In California, only the Port of Stockton had bulk loading facilities comparable to the one planned for the TAMT. The Harbor Department contracted the Diversified Builders Inc. of Los Angeles and the McDowell Company of Cleveland to build the system, which would have a maximum conveyance capacity of 2,000 tons of dry bulk material per hour. The system would include a rail car unloader, a junction house, a conveyor, and a traveling ship loader. Such systems were first developed in the early twentieth century. The Port of Portland had a dry-bulk loader system by the 1920s that included a rail car unloader that tipped cars to the side to empty their contents, a conveyor, and two early dockside traveling ship-loader towers. The Port of Stockton appears to have had the most advanced bulk loader in California by the 1950s. The Port of Long Beach developed an up-to-date bulk loader at the same time as the TAMT's was developed (Irwin 1970:48–49; Morin 1961C:A-20; Morin 1962A:B-16; Port of Long Beach 1963:6–11; Port of Portland 1922; Shepard 1962:A-45).

To create the system, rail spurs were constructed from the rail lines east of the terminal to the site of the rail car unloading building, approximately 100 yards north of the Pacific Molasses tanks. Rail cars were unloaded in one of the utilitarian unloading building's two dumping facilities. The westerly one collected materials dumped through doors in the bottom of rail cars. The easterly bay accommodated a 100-ton car dumper. Once clamped into place, the dumper rotated open-top rail cars more than 90 degrees to empty their contents (Figures 10 and 11). Underground conveyor belts transferred the unloaded material west to the system's junction house. From there, 3,600 feet of conveyor belts transferred the material to the traveling ship loader, located along the berths at the south side of the terminal. Reminiscent of a crane, the traveling ship loader was designed as a steel boom that could move parallel to the conveyor in order to be positioned optimally above ship compartments, into which a telescoping chute would convey dry bulk commodities. According to Bate, the system provided for a 10,000 ton freighter to be loaded in five hours, a job that took 40 hours prior to installation of the bulk loader. The bulk loader was created to handle mainly potash from New Mexico, but also flaxseed and alfalfa pellets from Arizona and the Imperial Valley. Over the course of the 1960s, soda ash, borax, phosphates, copper or concentrates, and gypsum would also be conveyed to ships for export by the bulk loader (Irwin 1970:48–49; Morin 1961C:A-20; Morin 1962A:B-16; Shepard 1962:A-45).

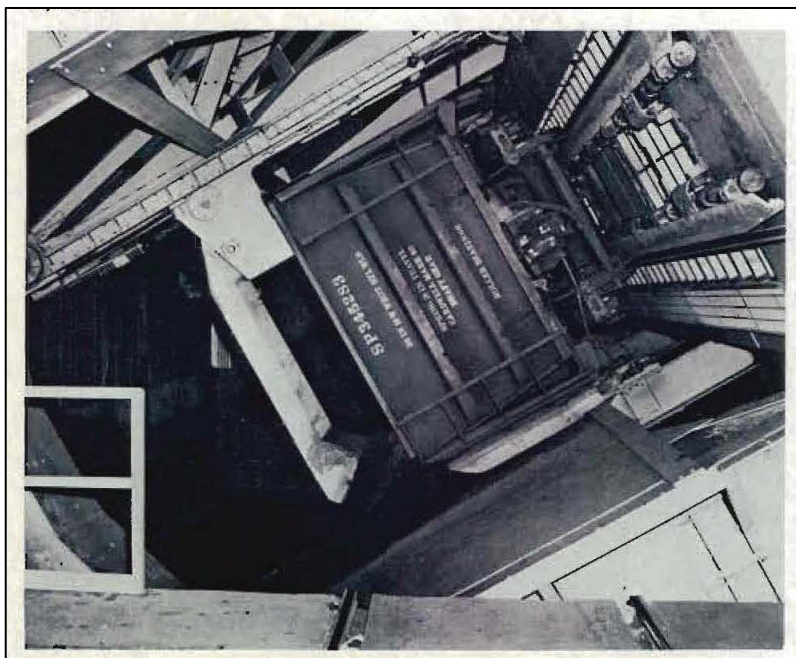


Figure 10. Rail car unloader at Port of the Long Beach's Bulk Loading Terminal, 1963 (from Port of Long Beach 1963:10).



Figure 11. Demonstration of rail car unloader during 1963 dedication of the Tenth Avenue Marine Terminal's bulk loader system; Port Director John Bate at far right (from San Diego History Center Photograph Collection, UT-85.D338, No. 8)

As the bulk loader was constructed, the Harbor Department initiated development of buildings that would add significantly to the covered storage space provided by Warehouse A and Transit Sheds #1 and #2. The Harbor Department (later the Port District) contracted I.C. Curry, Inc. to construct

Warehouses B and C, each of which would expand the terminal's storage space by 300,000 square feet. The warehouses appear to have part of the Harbor Department's original plans for the terminal's development. Warehouse B was completed in 1962 and Warehouse C was completed in 1964. Both warehouses were constructed of tilt-up fireproof concrete walls. The two utilitarian buildings lacked the architectural elements of the transit sheds. The new warehouses did not feature exterior fluted panels or Modern-style headhouses, although wall slabs at the corners of the buildings identified them as "Warehouse B" and "Warehouse C" in Moderne lettering. In contrast to the two transit sheds, the two warehouses had wider rectilinear plans, and they each incorporated a central longitudinal interior wall and two transverse interior walls to form six interior storage spaces (Magee 1961:B-16; Ninyo & Moore 1999:12, Appendix A; *San Diego Union* 1962C:A-24; Morin 1964:A-29; Port District 1992:8).



Figure 12. Aerial photograph of Tenth Avenue Marine Terminal in 1965, showing the facility's originally planned elements developed during its 1957–1964 period of potential significance, looking northwest (from San Diego History Center Photograph Collection, Kazikowski 4-17-65 No. 81)

By the end of 1964, the TAMT site included Transit Sheds #1 and #2, Warehouses A, B, and C, the Union Oil bunker fuel tanks and smaller associated tanks, a maintenance shop building, an office/union hall building, two truck repair buildings, the bulk loader, the Pacific Molasses Company tanks, and the truck scale building. South of the molasses tanks, in the vicinity of today's main entrance to the site, was a collection of steel fish oil and tallow tanks (Ninyo & Moore 1999:12, Appendix A). The completion of the two warehouse buildings marks the end of the TAMT's 1957–1964 period of potential significance, during which the terminal's originally planned historic-period features were developed.

As of 1964, the TAMT offered better centralized onsite cargo handling, warehousing space, onsite distribution services, and bunker fueling capability than the Ports of Los Angeles and Long Beach. However, the Port of Long Beach had developed bulk loading facilities that would compete with the terminal's and cut into San Diego's potential share of the market for shipping dry bulk commodities produced in the American southwest. The TAMT had facilities that provided for ships to be unloaded, serviced with fuel and ballast-water removal, and loaded with export material more quickly than at most other West Coast ports. However, the terminal's bulk loader would have a variety of problems, and although the terminal improved San Diego's share of commercial-port shipping business on the West Coast, it would never allow for the Port of San Diego to compete at the level of earlier-established and larger commercial-shipping port facilities to the north. Moreover, in order to maintain its mid-level position in the west-coast maritime shipping economy, the Port of San Diego would be forced to alter the TAMT from its original design and development during the 1957–1964 period of potential significance.

The bulk loader became the most problematic and controversial element of the TAMT. According to the *San Diego Union's* Howard Morin, the McDowell-Wellman Company had declared that the terminal's bulk loader would "be one of the fastest ship-loaders on the Pacific Coast even though the conveyor system extends half a mile" (Morin 1962B:A-29). One Port District official quoted in the *Union* had stated that the system's "advanced concepts" would "assure costs so low they can absorb rate disadvantages on rail hauls to San Diego." In the same article, the *Union* reported that the system "features dust containment [at] all transfer points minimizing air contamination" (*San Diego Union* 1963:H-11). However, the bulk loader broke down repeatedly during its first several years of operation due in part to potash dust short-circuiting the electrical system. Additionally, the bulk loader lost an estimated \$100,000 annually during its first 2 years of operation. According to Port District officials, the \$2.8 million system needed to handle 500,000 tons of cargo to break even on annual amortization costs. Through the year 1968, however, the bulk loader handled no more than 340,000 tons in a single year. The TAMT continued to suffer from competition at Long Beach, while competition from cheap potash producers in Canada slowed output in New Mexico, the source of San Diego's potash exports. At the same time, larger dry-bulk cargo ships began to be developed that could not pass through San Diego's harbor channels. Finally, dry bulk shipments from the TAMT were dependent on stockpiling enough commodity-filled railroad cars to fill an outgoing ship hull (*San Diego Union* 1965:A-22; Shepard 1964B:A-15, 1968:A-13, 1969A:B-1).

Hoping to increase the volume of commodities handled by the bulk loader, the Port District joined with a private organization, San Diego Bulk Terminal, to develop 12 silos for onsite storage of livestock feed and other grain products. The Port District devoted \$100,000 to preparing the site and San Diego Bulk Terminal built the silo complex for \$1 million. With a storage capacity of 15,000 tons, the silo complex was completed in early 1970 (Morin 1969:A-23; Ninyo & Moore 1999: Appendix A; Port District 1973:5; Shepard 1969B:B-1).

Problems continued to arise. In 1971, as a result of complaints about dust clouds from residents downwind of the terminal, the Air Pollution Control Board threatened to force suspension of bulk loader operations, which prompted the Port District to invest nearly \$300,000 in additional dust control technology. Referring to the bulk loader and its history of problems, one frustrated stevedore told the *San Diego Union* that "there ought to be some Chinese proverb to describe this thing" (Shepard 1971:B-1). Port District officials readily admitted that the bulk loader had lost money and that market fluctuations had frustrated their efforts to secure the dry bulk exports necessary to pay for the facility. However, the Port District also insisted that the TAMT's bulk loader

represented a “loss leader” that brought cargo ships to the harbor that would not do business in San Diego if the terminal had no bulk loader (Shepard 1971:B-5). As the global economic recession of the early 1970s cut into San Diego’s share of West Coast shipping, the Port District worked with the Garnac Grain Company and Koppel Inc. to stockpile wheat at the terminal’s silos and thereby increase shipments out of San Diego. But in 1976, damage to the railroad line between Imperial Valley and San Diego threatened to cut heavily into wheat shipments (*San Diego Union* 1973:D-5; Hudson 1976:B-1). From the bulk loader’s 1963 debut into the 1970s, the facility never reached the annual 500,000 ton mark necessary to pay for its outlay and maintenance costs. The TAMT had helped give San Diego a share of the West Coast shipping business, but the bulk loader’s “loss leader,” or opportunity costs, had proved high.

Prior to the 1970 construction of the silo facility, the terminal had been altered in several other ways. In 1967 the Port Authority installed a bulk commodity bagging plant to bag material that could not be shipped to underdeveloped ports lacking facilities for unloading the free-flowing material conveyed by the bulk loader. In 1969 a number of structures were constructed at the terminal that have since been removed, including the molasses tank near the bunker fuel tanks, an addition to the northwest elevation of Warehouse C, and two rectangular structures (likely covered storage) between Transit Shed #1 and Warehouse B (Irwin 1970:49–50; Ninyo & Moore 1999:12, Appendix A).

The development of the TAMT advanced San Diego from the bottom to the middle ranks of West Coast shipping ports, created jobs and stimulated economic activity locally. However, it did not transform the San Diego economy or become an essential element of the city’s economy during the 1960s and 1970s. During those decades, the Navy continued to maintain its historic role as the most important infrastructural and economic presence in San Diego Harbor. Federal spending on naval facilities in the harbor and elsewhere in the county, defense contracting, the aircraft industry, shipbuilding, and the growing tourism industry would all prove to be larger factors in San Diego’s economy than the Port District’s commercial shipping activities. The Ports of Los Angeles and Long Beach would continue to benefit from better connections both to national railroad networks and to an earlier developed highway network that provided for cargo shipment in trucks. After 1964, the TAMT would have to be altered substantially in order to make it an economically worthwhile public investment. Moreover, the advent of container cargo shipping would require the Port of San Diego to develop a second major terminal—the National City Marine Terminal—to ensure that it could continue to compete for a share of the West Coast shipping market. San Diego would have survived economically and grown during the 1960s and early 1970s without the TAMT, though the facility certainly qualified as a local economic asset, and continues to do so today (Irwin 1970:53–57, 64–66, 177, 183).

Since 1970, the TAMT has undergone substantial alteration (compare Figure 12 above to Figure 13 below). After 1970, Warehouse C received an addition at its northwest elevation that was later demolished, and the large addition at its southeast end that remains present today. In 1975 a large building, the Van Camp Tuna Cannery, was constructed immediately northeast of Warehouse B. The cannery facility operated for several decades. The northern portion of Warehouse C was converted to a cold storage facility in the 1990s, and the building received a small addition and refrigeration machinery at its northwest elevation at that time. The northern portion of the cannery building was demolished by 1998, and the remainder of the building was demolished several years later. Also by 1998, the truck repair buildings north of the silos had been demolished, smaller buildings and fish oil and tallow tanks had been removed from the area southeast of the Pacific Molasses Company

tanks, and several new piers extended into the bay from this area. By 1998 the south portion of Transit Shed #2 had been fitted with large cement unloading and conveyance machinery. Over the next decade, Warehouse A was demolished along with the molasses tank north of the bunker fuel tanks. The maintenance shop farther north was also demolished along with the Harbor Department office/union hall building. The 1970 silo complex was altered in the mid-1980s when two new silos, both much larger than the original ones, were added to the north side of the facility. A rectangular, multi-story corrugated metal element with steel stairs on the southeast side of the original silos appears to have been built in the mid-1980s. A large non-original conduit that extends southeast from the top of the southeast silos, a new junction structure, and a conveyor connecting the new junction house to the original bulk loader junction house were installed by 2006. The traffic island, pillar, and signage between the transit sheds—which formed the focal point of the terminal’s 1958 dedication ceremonies—were demolished at an unknown date. Finally, the headhouse at the south side of Transit Shed #1 and the southernmost of that transit shed’s storage spaces were demolished after 2000 (Ninyo & Moore 1999: Appendix A; *San Diego Union* 1976:B-3).

Background research and field studies were conducted in compliance with CEQA as amended (PRC §21000 et seq.), pursuant to the *Guidelines for Implementation of the California Environmental Quality Act* (CCR Title 14 §15000 et seq.), and in accordance with industry standards for similar projects in San Diego County. The effort to identify cultural resources in the TAMT Plan study area included records searches of previous cultural resource investigations and recorded sites; background research and a review of literature relevant to the prehistory, ethnography, and history of the terminal site and TAMT Plan vicinity; consultation with NAHC and Native Americans; and site visits.

Research

Records Search

ICF International (ICF) obtained a cultural resources record search form the South Coastal Information Center (SCIC), which is located at San Diego State University and is part of the California Historical Resources Information System. The records search and literature review provides for identification of previously documented archaeological, historic, and architectural resources within and near the cultural resources study area, and is useful for developing a context to frame assessments of resource significance. The SCIC reported results of the record search on June 15, 2014. The following is a summary of the records search used in this study.

The records searches revealed that a total of 136 cultural resources surveys have been conducted within a half-mile radius of the project area (Table 1). Of these, 10 have covered at least some portion of the TAMT Plan study area. Within a half-mile radius of the TAMT Plan study area, the record search revealed the presence of 54 previously recorded cultural resources (Table 2). Of these, one is a prehistoric resource and 53 are historic period resources.

Historic maps and aerial photographs indicate that one previously recorded cultural resource, CA-SDI-16385H, the historic-period Santa Fe Railway (constructed in 1882–83), was close to the eastern boundary of the study area. That segment of the Santa Fe Railway line was part of a larger 5.9-mile segment surveyed and evaluated for NRHP eligibility in 2002, and found to have insufficient historical integrity to convey any significance attributable to it. The 2002 survey results indicated that most of the 5.9-mile segment consisted of modern tracks and associated railroad features, not track or associated features dating to the late nineteenth or early twentieth centuries (Ballester and Woodard 2002). During the built environment survey conducted for this study, no railroad tracks or associated features pre-dating the development of the terminal in the late 1950s and early 1960s were identified in the easternmost portion of the study area adjacent to the BNSF railyard.

The record search yielded a site record for an additional historic-period railroad resource, CA-SDI-13073H, the historic Coronado Railroad alignment. That site record, which does not make reference to Sanborn fire insurance maps, incorrectly places this resource along the alignment of the Santa Fe Railway (Laylander 1993). Sanborn maps dating to 1906 indicate that the Coronado Railroad and segments of several other early San Diego railroad alignments were farther east and north of the project study area. The Coronado Railroad segment nearest to the project study area was

approximately 100 yards north of the study area's northeastern corner (Sanborn Map Company 1906A, 1906B, 1906C, 1906D, 1906E). A brief update to CA-SDI-13073H accurately indicating its historic-period alignment in the vicinity of the study area is included with the existing site record for the resource in Appendix B.

The study area does not include any resources listed on the City of San Diego's Register of Historical Resources or the County of San Diego's Historic Property Listing (City of San Diego 2014; County of San Diego 2012).

Table 1. Previous Studies in the Project Vicinity

NADB #*	Year	Author	Title	Within Project Area
1120260	1989	Cardenas, Sean D.	Cultural Resources Check for Pump Station No. 5 (DEP No. 89-0696), City of San Diego, Planning Department	No
1120304	1978	Carrico, Richard, and Lesley C. Eckhardt	Cultural Resources Reconnaissance of the San Diego Fixed Guideway Project Centre City to San Ysidro, San Diego Metropolitan Transit Development Board	No
1121022	1986	Gallegos, Dennis, Dayle Cheever, and Richard Carrico	Cultural Resources Survey for the MTDB Bayside LRT Extension, Metropolitan Transit Development Board	No
1121100	1981	Lloyd, Deborah T.	Archaeological/Historical Study of Two Alternate Project Locations for the San Diego Energy Recovery (Sander) Project, San Diego County Department of Public Works	No
1122060	1979	City of San Diego	Environmental Impact Statement marina/Columbia Residential Development, City of San Diego	No
1122596	1990	Solheid, Vicki, and Roger D. Mason	Cultural Resources Records Search for the Barrio Logan Project Area within City of San Diego	No
1122631	1991	Carrico, Richard and et al.	Archaeological Survey, Monitoring and Testing Report for the AT&SF Railway Company Crosby Street TOFC Yard, CA-SDI-5931, San Diego County	Yes
1122708	1993	Bergin, Kathleen	Archaeological Monitoring Phase 2 Remediation Activities San Diego Railyard, San Diego	No
1122794	1994	Robbins-Wade, Mary and Stephen Van Wormer, Richard Schultz	Archaeological Monitoring for the Logan Heights Family Center, San Diego County	No
1122812	1993	Smith, Brian	A Cultural Resources Study for the Sewer Pump Station No. 5 Project, San Diego	No
1123382	1998	Case, Robert P., and Richard Carrico	Cultural Resources Survey for Sewer Group Job 619, Three Pipeline Segments in the Mission Hills District, San Diego	No

NADB #*	Year	Author	Title	Within Project Area
1123457	1998	Brown, Joan	Archaeological Monitoring of Excavation During Construction for the Sewer and Water Group 55 Project	No
1123496	1999	Gilmer, Jo Anne, and Dayle M. Cheever	Results of Archaeological Monitoring of the San Diego Convention Center Expansion Construction Grading, San Diego	No
1123863	2000	Jones & Stokes	Cultural Resources Investigation for the Nextlink Fiber Optic Project, San Diego County	No
1123934	2001	Various	Julian Produce Company Warehouse Building	No
1123976	2001	Various	Savage Tire Company/Aztec Brewery/Aztec Brewery Artwork	No
1124058	2001	Various	Southern California Baking Company	No
1124309	1990	Carrico, Richard and Steven Briggs	Draft Archaeological Survey, Monitoring & Testing Report for the AT&SF Railway Company Crosby Street TOFC Yard CA-SDI-5931	Yes
1124354	1995	Carrico, Richard L.	Draft Archaeological Survey, Monitoring & Testing Report for the AT&SF Railway Company Crosby Street TOFC Yard CA-SDI-12,093 & CA-SDI-5931, San Diego	Yes
1124358	1991	Carrico, Richard L.	Archaeological Survey, Monitoring & Testing Report for the AT&SF Railway Company Crosby Street TOFC Yard CA-SDI-5931, San Diego	Yes
1124391	1996	Rosen, Martin	Negative Archaeological Survey Report – Retrofit of San Diego Coronado Bay Bridge	No
1124420	1996	Fisher, Jim	Historical Resource Evaluation Report for the San Diego-Coronado Bay Bridge [#57-857], Chicano Park and the Chicano Park Murals, San Diego County	No
1124599	1991	City of San Diego	Public Notice of Proposed Mitigated Negative Declaration Santa Fe TOFC Yard, City of San Diego	Yes
1124713	1999	Schaefer, Jerry	San Diego Ballpark Archaeology Management Plan	No
1124737	1997	Caltrans	Historic Property Survey Reports for the San Diego-Coronado Bay Bridge Seismic Retrofit Projects 1, 2, and 3.	No
1124756	1997	Caltrans and Martin Rosen	Historic Property Survey Report San Diego-Coronado Bay Bridge, Seismic Retrofit Project, 11-SD-75, PMR21.9-R22.3	No
1124761	1998	Rosen, Martin	Historical Resources Compliance Report – San Diego-Coronado Bay Bridge Seismic Retrofit Project 4.	No
1125150	2001	Project Design Consultants	Environmental Secondary Study for 5 th and “K” Condos – Gaslamp Quarter	No

NADB #*	Year	Author	Title	Within Project Area
1125303	1998	Van Wormer, Stephen R. and Ruth Alter	At Home on Gold Mountain, An Historic and Archaeological Study of Chinese Americans in San Diego, California	No
1125462	2000	Smith, Brian E.	An Archaeological/Historical Survey and Evaluation Report for the Mercado Report	No
1125654	1994	City of San Diego	Mitigated Negative Declaration of the Sewer Pump Station No. 5, City of San Diego	No
1125681	1985	Sturm, Bradley	Cultural Resources Appendix San Diego Milcon Project P-283	No
1125915	1996	City of San Diego	Mitigated Negative Declaration for Sewer and Water Group Job No. 639, City of San Diego	No
1125924	1997	City of San Diego	Mitigated Negative Declaration for Addition to Sewer Pump Station No. 22, City of San Diego	Yes
1126071	2001	City of San Diego	Environmental Secondary Study for Rosario Hall Relocation, City of San Diego	No
1126074	2000	Phillips, Roxanna	Historical Archaeological Evaluation of the Noto Property at 637 19 th Street, San Diego, California	No
1126355	2000	Smith, Brian	An Archaeological Historical Survey and Evaluation Report for the Mercado Project	No
1126541	1995	McNeil, Paul	Memorandum: 630 Market Street Demolition, Centre City Development Corporation	No
1127147	1999	City of San Diego	Historical Site Board Agenda of May 27, 1999, Action Item #10 – Ballpark Site Buildings – Bayside/East Village	No
1127517	2002	N/A	Cultural Resource Monitoring for the Villa Harvey Mandel Project, City of San Diego	No
1127549	2002	Duke, Curt	Cultural Resource Assessment Cingular Wireless Facility No. SD 804-01 San Diego County, California	No
1127630	1999	Burke Lia, Marie	1995 Warehouse District Proposal for Centre City East	No
1127693	2000	Pierson, Larry	An Archaeological Report for the Mitigation, Monitoring, and Reporting Program at the Water and Sewer Group Job 464A, City of San Diego	No
1127697	2000	Pierson, Larry	An Archaeological Report for the Mitigation, Monitoring, and Reporting Program at Sewer and Water Group 636, City of San Diego	No
1127749	1997	City of San Diego	EIR for Bridgeworks, City of San Diego	No
1127766	2001	Pierson, Larry J.	Results for Archaeological Monitoring at the Parkloft Project, San Diego	No
1127770	2001	Pierson, Larry J.	Results of the Archaeological Mitigation, Monitoring, and Reporting Program at the Westin Park Place Hotel Project	No
1127819	2002	Duke, Curt	Cingular Wireless Facility No. SD 804-04	No

NADB #*	Year	Author	Title	Within Project Area
1127998	2002	May, Ronald V.	Historical Nomination of the South Park Commercial Transit Historic District	Yes
1128450	1981	Brandes, Ray	Historic Resources Inventory for Uptown Area, San Diego, California	No
1128451	1981	Brandes, Ray	Historic Resources Inventory for Middletown Area, San Diego, California	No
1128468	2003	Gilmer, Joh Anne	Results of the Cultural Resource Monitoring for the Park Avenue East Project at 12 and Island Avenue, San Diego	No
1128552	2004	Smith, Brian F. and Kyle Guerrero	An Archaeological Report for the Mitigation, Monitoring, and Reporting Program at the Diamond Terrace Project	No
1128634	2003	Carrico, Richard L.	Historical and Architectural Assessment of 1401 J Street, San Diego, California	No
1128848	2003	Carrico, Richard L.	Historical and Architectural Assessment of 1401 J Street, San Diego, California	No
1128988	2004	Zepeda-Herman, Carmen	Results of Archaeological Monitoring for the M2I Project, San Diego, California	No
1129016	2003	Dolan, Christy, and Stephanie Rose Fitzsimons	Archaeological Monitoring Report for San Diego Gas and Electric Station A (SDI-8723H) Sanborn Block 157, San Diego, California	No
1129024	2004	Zapeda-Herman, Carmen	Results of Archaeological Monitoring for the M2I Project, San Diego, California	No
1129191	2004	Brown, Joan C., Robert Hermann, Jason Miller, and Gian Villareal	Archaeological Monitoring and Historic Era Trash Recovery During Excavations for the Construction of the Sewer Replacement Group 623B Project, LDR No. 41-0170, City of San Diego	No
1129262	2004	Buyse, Johnna L.	Mitigation Monitoring Report for the Trellis Project at 5 th and K Street, Center City Development Corporation, Gaslamp Quarter Special Permit #41-0546	No
1129389	2005	Moomjian, Scott	Modified Historic American Buildings Survey of the Manos Produce Company Building and the Greenbaum Market Building	No
1129445	2004	Ni Ghabhlain, Sinead	Cultural Resources Survey Report for the Centre City Pedestrian Bridge Project, San Diego, California	No
1129604	2005	Rosen, Martin	Completion of Section 106 Responsibilities for Filing of Historic Property Survey Report	No
1129679	2005	Buyse, Johnna L.	Mitigation Monitoring Report for the Park Terrace Project	No
1129897	2006	Crawford, Kathleen	Historical Assessment of the 536 Seventh Avenue Building, San Diego, California	No
1129966	2006	Crawford, Kathleen	Historical Assessment of the 502-522 Seventh Avenue Building, San Diego, California	No

NADB #*	Year	Author	Title	Within Project Area
1130089	2005	Ni Ghabhlain, Sinead	Historic Property Survey Report for the Harbor Drive Pedestrian Overcrossing Bridge Project, City of San Diego, California	No
1130179	2005	Crawford, Kathleen	Historical Assessment of the Properties Located at 1721-1795 Logan Avenue, San Diego, California	No
1130182	2006	Sherwood, Allison, and Robert J. Manis	Public Notice of a Draft Mitigation Negative Declaration of Barrio Logan Community Planning Area: La Entrada Apartments, City of San Diego	No
1130210	2004	Rosen, Martin	Historical Property Survey Report for the California Department of Transportation Enhancement Activities Grant to Perform Restoration of Murals in Chicano Park, Barrio Logan, City of San Diego, California	No
1130534	2006	Moomjian, Scott A.	Historical Assessment of the 1701-1715 National Avenue Commercial Buildings San Diego, California	No
1130541	2006	Crawford, Kathleen	Historical Assessment of the Building Located at 1629 National Avenue San Diego, California	No
1130546	2004	Carrico, Richard L., and Stacy Jordan	Centre City Development Corporation Downtown San Diego African-American Heritage Study	No
1130642	N/A	Various	Miscellaneous File Folder with Multiple Reports for the Asian Pacific Thematic Historical District	No
1130654	2006	Pierson, Larry J.	An Archaeological Report for the Mitigation Monitoring and Reporting Program at the Hilton San Diego Convention Center Hotel, Port of San Diego/Centre City Development Corporation	Yes
1130667	2005	Pierson, Larry J.	A Historical Significance Evaluation of the Workman Hotel, San Diego, California	No
1130671	2006	Pierson, Larry J.	Mitigation Monitoring of the Central Police Garage Demolition Project, W. O. No. 350821, LDR No. 41-0980	No
1130711	N/A	Various	Multiple Reports for the Barrio Logan District	No
1130722	2006	Pierson, Larry J.	Archaeological Monitoring at the Legend, San Diego, California	No
1130723	2005	Buyse, Johnna L.	Mitigation Monitoring Report for the Alta Project	No
1130724	2007	Buyse, Johnna L., and Larry J. Pierson	Mitigation Monitoring Report for the Icon Project	No
1130726	2006	Buyse, Johnna L.	Mitigation Monitoring and Reporting for the Mark Project	No
1130746	1993	Robbins-Wade, Mary, Stephen R. Van Wormer, and Richard Schultz	Archaeological Monitoring Report for the Logan Heights Family Health Center, San Diego, California	No

NADB #*	Year	Author	Title	Within Project Area
1130756	1996	Smith, Brian F.	Report on Archeological Monitoring at the Sewer Pump Station 5 Project	No
1130778	2007	Burke Lia, Marie	Joseph Ireland Building and Rood Rental	No
1130809	N/A	Various	Fire Station #4, 400 8 th Avenue, San Diego, California	No
1130854	N/A	Various	Bay Bridge Park (Chicano Peoples Park)	No
1130859	N/A	Various	Gaslamp Quarter Historic District	No
1130870	N/A	Various	Miscellaneous Papers on Coronado	No
1130876	N/A	Various	Survey of the Davis Horton House	No
1130917	N/A	Various	Report for the Simon Levi Company Building	No
1130918	N/A	Donaldson, Wayne Milford, and Ray Brandes	Report for the Levi Wholesale Grocery Building	No
1130973	N/A	Various	Klauber-Wagenheim Company, 611 Island Avenue, San Diego, California	No
1131126	2002	Berryman, Judy A.	Cultural Resource Survey of the Silver Gate Power Plant, San Diego, California	No
1131210	2007	McGinnis, Patrick	Archaeological Monitoring for the City of Coronado Transbay Sanitary Sewer Force Main Project	No
1131242	N/A	Various	Queen Anne Cottages, 21 16 th Street (APN 535-623-06), 22 16 th Street (APN 535-623-05), 53 16 th Street (APN 535-623-03), 10 17 th Avenue (APN 535-623-09), San Diego, California	No
1131260	N/A	Various	San Diego Gas & Electric Power Plant, 75 9 th Avenue, San Diego, California	No
1131263	N/A	Various	San Diego Ice and Cold Storage Company, 808-822, 825 Imperial Avenue, San Diego, California	No
1131264	N/A	Various	San Diego Rowing Club / Excelsior Rowing & Swimming Club, 525 E. Harbor Drive, San Diego, California	No
1131283	N/A	Various	Showley Brothers Candy Factory, 305-308 Eighth Avenue, San Diego, California	No
1131342	N/A	Various	Western metal Supply Company, 215 Seventh Avenue, San Diego, California	No
1131383	2007	Case, Robert P., Andrea M. Craft, and Carol J. Serr	Cultural Resources Mitigation Monitoring Report for the Central Police Garage Remediation Project (LDF No. 41-0980A), East Village Community, City of San Diego, California	No

NADB #*	Year	Author	Title	Within Project Area
1131463	2007	Case, Robert P.	Final Cultural Resources mitigation Monitoring Report for the Graybill Terminal Remediation Project (W.O. 426597; PTS 105988; CCD Permit No. 2006-55), east Village Community, City of San Diego, California	No
1131532	2007	Pierson, Larry J.	Archaeological Resource Report Form: Mitigation Monitoring of the Logan Heights Family Health Center Project	No
1131681	2007	Burke Lia, Marie	1220 J Street/406 12 th Street, San Diego, California	No
1131721	2008	Burke Lia, Marie	416 13 th Street, San Diego, California	No
1131826	2008	Robbins-Wade, Mary	Archaeological Resources Analysis for the Master Stormwater System Maintenance Program, San Diego, California	No
1131920	2005	Schaefer, Jerry, Sinead Ni Ghabhlain, and Drew Pallette	Archaeological Investigations on Block 138 (CA-SDI-16, 822): Location of the Heerandner Planning Mill and Residence, the Eureka Hotel/Ocean House Hotel, and a Lodgings House, Downtown San Diego	No
1132092	2009	Robbins-Wade, Mary	Thomas Jefferson School of Law Archaeological Monitoring	No
1132200	2009	Herrmann, Myra	Draft Environmental Impact Report for the Master Storm Water System Maintenance Program, City of San Diego Development Services Department	Yes
1132366	2009	Pierson, Larry J.	Archaeological Mitigation Monitoring Report for the Los Vientos Project	No
1132371	2009	Clowery-Moreno, Sara and Brian F. Smith	Mitigation Monitoring Report for the Parkside Terrace Project	No
1132392	2008	Pierson, Larry J.	5 th Avenue Landing Hotel: Mitigation Monitoring and Reporting Program	No
1132416	2008	Clowery-Moreno, Sara, and Brian F. Smith	Mitigation Monitoring Report for the Hotel Indigo Project	No
1132420	2009	Schaefer, Jerry, Sinead Ni Ghabhlain, and Walter Enterprises	Labor and Life-Styles Among San Diego's Working Class: Historical Archaeology on Block 112 (CA-SDI-19, 435)	No
1132517	2010	Moomjian, Scott A.	Historical Assessment Addendum for the Isaac Lyon Building, 1479 J Street, San Diego (East Village)	No
1132709	2009	White, Laura S., and Robert S. White	An Archaeological Assessment of the 5.17-Acre Restaurant Depot Project Located Immediately South of the Intersection of E. Harbor Drive and Cesar E. Chavez Parkway, City of San Diego, California	No

NADB #*	Year	Author	Title	Within Project Area
1132710	2010	Van Horn, David, Laura S. White, and Robert S. White	An Archaeological Assessment of the 5.17-Acre Restaurant Depot Project Located Immediately South of the Intersection of E. Harbor Drive and Cesar E. Chavez Parkway, City of San Diego, California	No
1132778	2010	Van Wormer, Stephen R., Susan D. Walter, and Jerry Schaefer	From Painted Porcelain to Pumpkinseed Flasks: Historic Patterns of Daily Life on Block 108 (CA-SDI-19, 606) in Downtown, San Diego, California	No
1132811	2010	Bowden-Renna, Cheryl	Cultural Resources Monitoring for Relocation of Underground Facilities for the New San Diego Main Library, Park Avenue and J Street, San Diego, California	No
1133201	2011	Rosen, Martin D.	San Diego Convention Center Expansion and Expansion Hotel Project	No
1133271	2012	Burke Lia, Marie	Addendum to the Historical Resources Research Report for 1310 K Street, Downtown San Diego	No
1133351	2012	Price, Harry J., and Carmen Zepeda-Herman	Results of the Archaeological Monitoring Program for the Restaurant Depot Project, Project No. 180219/I. O. No. 23432387/Sch No. N/A	No
1133799	2011	City of San Diego	Addendum to Mitigated Negative Declaration No. 255100, Sewer and Water Group 957, City of San Diego	No
1133902	2012	Bonner, Wayne	Cultural Resource Records Search and Site Visit Results for T-Mobile USA Candidate SD06811-U (Sprint Tower), 1402 K Street, San Diego	No
1133914	2009	Ninyo and Moore	Phase I Environmental Site Assessment 1901 Main Street, San Diego	No
1133974	2012	Stropes, Tracy A., and Brian F. Smith	Mitigation Monitoring Report for the Mercado Del Barrio Project	No
1134021	2012	Ni Ghabhlain, Sinead	Archaeological Monitoring and Testing Plan for the Monarch School Project, San Diego, California	No
1134036	2011	Ni Ghabhlain, Sinead	Archaeological Resource Initial Evaluation and Testing Plan for the Tenth Avenue Apartments Project, Downtown San Diego	No
1134070	2010	Potter, Elizabeth, and Sinead Ni Ghabhlain	Results of Archaeological Monitoring of the Seventh and Market Street Soil Remediation and Construction Project	No
1134161	2012	Stropes, Tracy A., and Brian F. Smith	A Phase I Cultural Resources Study for the 7 th and Islands Project, San Diego	No
1134225	2012	Crawford, Kathleen	372 Fourth Avenue, San Diego	No

NADB #*	Year	Author	Title	Within Project Area
1134538	2013	Wilson, Stacie	Letter Report: ETS 25341 – Cultural Resources Monitoring Report for Replacement Activities for Pole P1942472392, Chula Vista	No
1134595	2007	McGinnis, Patrick	Re: Archaeological Monitoring for the City of Coronado Transbay Sanitary Sewer Force Main Project	No
1134718	2013	Heritage Architecture & Planning	Historical Resource Research Report Bay View Hotel 509 Park Boulevard, San Diego	No
1134730	2013	Davison, Kristina, and Mary Robbins-Wade	Lake Morena's Oak Shores Mutual Water Company Water System Improvements Project Phase 2 Archaeological Monitoring	Yes

* NADB: National Archaeological Database

Table 2. Previously Recorded Resources in the Project Vicinity

Site #	Recorded By	Year	Description	Within Project Area
CA-SDI-05931	Ballester; Clevenger and Briggs; Eckhardt	2002; 1993; 1978	Prehistoric human remains hammerstone-pounder, blade fragment, mano fragments, metate fragments, groundstone fragments, flakes, flaking fragments, shell beads, midden	No
CA-SDI-08723H	Lloyd	1981	Historic generating station complex	Demolished
CA-SDI-13073H	Pignolo; Laylander	2000; 1999, 1993,	Historic Coronado Railroad line	No
CA-SDI-13123	Shultz, Van Wormer, and Robbins-Wade	1992	Historic trash pit	No
CA-SDI-14792; P-37-016300	Alter	1998	Historic building foundation, trash pits, privy vaults	No
CA-SDI-15118; P-37-017104	Pierson	2006	Tidelands city dump	No
CA-SDI-15688; P-37-018822	May	2000	Historic privy	No
CA-SDI-15930; P-37-023708	Benjamin	2001	Historic artifact deposit	No
CA-SDI-15978; P-37-023865	Pierson	2001	Historic trash deposit	No
CA-SDI-16285; P037-024552	Pierson	2002	Historic trash and building debris deposit	No
CA-SDI-16385H; P-37-024739	Stiefel and Gunderman; Ballester and Woodward	2009, 2007; 2002	Atchison, Topeka, and Santa Fe Railway	No

Site #	Recorded By	Year	Description	Within Project Area
CA-SDI-16424; P-37-024791	Brian F. Smith & Associates	2002	Historic trash deposit [“trench spoil pile”]	No
CA-SDI-16633; P-37-025103	James	2001	Historic trash deposits, privy	No
CA-SDI-16782; P-37-025304	Brian F. Smith & Associates	2000	Historic trash deposits and pits, catchment basin, trenches, building debris	No
CA-SDI-16783; P-37-025305	Brian F. Smith & Associates	2000	Historic trash pit and pit feature	No
CA-SDI-16784; P-37-025306	Brian F. Smith & Associates	2000	Historic trash pit, privy, building debris, brick feature	No
CA-SDI-16822; P-37-025359	Pallette	2003	Historic privies, trash pit , brick foundation	No
CA-SDI-16848; P-37-025401	Brian F. Smith & Associates	2000	Historic cistern	No
CA-SDI-16888; P-37-025443	Brian F. Smith & Associates	2004	Historic structural foundation, privy, well, trash deposits, artifact concentrations	No
CA-SDI-16915; P-37-025477	Zepeda-Herman	2004	Historic cisterns, well	No
CA-SDI-17546; P-37-026838	Brian F. Smith & Associates	2005	Historic cistern, trash deposits, isolated artifacts, surface scatters	No
CA-SDI-17590; P-37-026908	Brian F. Smith & Associates	2005	Historic privies, trash pits, wells, cisterns	No
CA-SDI-18106; P-37-027847	Craft	2006	Historic concrete boxes, foundation, shafts, platform, ramped pit with drain, wood planks	No
CA-SDI-18107; P-37-027848	Craft	2006	Historic refuse deposits	No
CA-SDI-18140; P-37-027308	Ghabhlain	2006	Historic privies, trash pits, dipping furnace, industrial waste deposit	No
CA-SDI-18349; P-37-028388	Pierson	2007	Historic artifact scatter	No
CA-SDI-18360; P-37-028472	Case	2007	Historic cistern and artifact scatter, site of former Graybill Fuel Terminal	No
CA-SDI-18378; P-37-028565	Briggs, Jams	2007	Historic household refuse and building debris deposit	No
CA-SDI-18583; P-37-028978	Murphy	2007	Historic trash dump	No
CA-SDI-18588; P-37-029022	Case	2007	Historic trash deposits and brick cistern	No
CA-SDI-18593; P-37-029027	Pigniolo, Davidson, Roy	2007	Historic trash deposits and brick well, prehistoric rock concentration and artifacts	No
CA-SDI-18997; P-37-029702	Cowery-Moreno	2008	Historic trash deposit, well feature, and isolate	No

Site #	Recorded By	Year	Description	Within Project Area
CA-SDI-19240; P-37-030198	Pierson	2008	Historic domestic refuse deposit	No
CA-SDI-19262; P-37-030243	Clowery-Moreno	2008	Historic cistern and trash scatter	No
CA-SDI-19465; P-37-030639	Schaefer	2001	Historic sell, privies, and trash pits	No
CA-SDI-19606; P-37-030891	Schaefer	2009	Historic trash and privy pits	No
CA-SDI-20232; P-37-031961	Price	2010	Historic trash deposits, brick cisterns, trench filled with construction debris, and spur rail line	No
CA-SDI-20719; P-37-032774	Stropes	2012	Historic refuse deposits and well deposit	No
CA-SDI-20750; P-37-032825	Dietler	2004	Historic domestic refuse deposit	No
CA-SDI-20764; P-37-032850	May	2004	Historic building materials deposit and domestic refuse	No
CA-SDI-21117; P-37-033605	Stropes	2014	Historic building materials deposit and domestic refuse	No
P-37-016030	Alter	1997	Historic trash scatter	No
P-37-016280	Fisher; Barley and Pearlman	1996; 1979	Chicano Park mural art on highway bridge columns	No
P-37-016282	Fisher	1996	San Diego-Coronado Bay Bridge	No
P-37-025680	Daniels, Jale, Comeau, Giacinto; Williams; Wee, Ferrell	2013; 2009; 2000	San Diego & Arizona Railway	No
P-37-028387	Olmos	1980	La Tierra Mia-Chicano Park	No
P-37-028475	N/A	N/A	Historic Simon Levy Company building	No
P-37-028476	N/A	N/A	Historic Simon Levy Company building	No
P-37-028495	N/A	N/A	Gaslamp Quarter Historic District	No
P-37-030420	Gilietti	2008	Historic concrete slab and foundation wall remains	No
P-37-033175	Kraft	2013	Isolate building debris	No

Historical Research

Historical research for this study was conducted at multiple repositories in the San Diego area. These included the Main Branch of the San Diego Public Library and the historical collection housed in its California Room, the San Diego History Center, and Geisel Library, the central library at the University of California, San Diego. Extensive use was made of the Newsbank database at Geisel Library, which provides digital, full-text searchable access to the historical *San Diego Evening Tribune* and *San Diego Union*. Sources were also gathered through online searches of Google, the full-text searchable JSTOR database of academic journals, and the Internet Archive. The Port District provided ICF staff with several useful sources, including the original plans for the terminal's two

1958 transit sheds, and an extensive site history of the terminal prepared by Ninyo & Moore that includes numerous historic aerial and bird's-eye views of the terminal site from the early twentieth to the early twenty-first century.

Outreach to Interested Parties

On June 16, 2014, ICF archaeologist Karolina Chmiel contacted NAHC requesting a review of its Sacred Lands Files. NAHC responded on June 30, 2014, stating that the sacred lands file failed to indicate the presence of Native American cultural resources in the study area. NAHC also provided a list of 19 Native American individuals and organizations that may have knowledge of cultural resources in the study area. On May 14, 2015, ICF sent outreach letters to all 19 individuals and organizations identified by NAHC. On May 26, 2015, a letter was received from the Viejas Band of Kumeyaay Indians stating that the study area has cultural significance or ties to Viejas. The letter requests the presence of a Kumeyaay Cultural Monitor on site for all ground-disturbing activities (Appendix A).

Archaeological Inventory

On April 21, 2014, ICF archaeologist Karolina Chmiel assessed the potential for archaeological surface deposits in the TAMT Plan area during a site visit and tour of the facility attended by ICF environmental staff. Most of the terminal is underlain by fill material placed there in the late 1950s. An overwhelming majority of the 96-acre site is developed with buildings, structures, pavement, and railroad lines, some with ballast. A small 1-acre area at the southeastern portion of the terminal remains unpaved, along with several much smaller areas. These unpaved areas have been graded, driven over or used for vehicle parking, or otherwise disturbed. The potential for archaeological deposits within the TAMT Plan study area is limited to subsurface deposits. For these reasons, the cultural resources study area was not subjected to a formal archaeological survey.

Built Environment Inventory

On May 14, 2014, ICF historian/architectural historian Tim Yates, PhD, surveyed the TAMT Plan study area for intact built-environment resources 45 years of age or older. Yates determined that the terminal represents a potential historic district, and identified 10 individual resources 45 years of age or older during the site visit. These 10 historic-period built environment resources include: Transit Sheds #1 and #2; the bunker fuel complex of tanks and buildings at the northeastern portion of the site; the molasses tanks and truck scale building at the southeastern portion of the site; the bulk loader system at the eastern and southern portions of the terminal; Warehouses B and C; numerous railroad tracks that run throughout the terminal; and the terminal's dry-bulk silo complex. California Department of Parks and Recreation (DPR) forms for these resources are included in Appendix B of this report.

Archaeological Resources

A record search performed by the SCIC failed to identify archaeological resources within the TAMT Plan study area. A formal archaeological survey was not performed due to the fact that majority of the project area is fully paved, built over, or covered in fill. The study area conditions were confirmed during a site visit by archaeologist Karolina Chmiel on April 21, 2014.

Built Environment Resources

Potential Tenth Avenue Marine Terminal Historic District

Description

The TAMT occupies a 96-acre site located along the northeast shoreline of San Diego Harbor, south of downtown San Diego and north of the Coronado Bridge. The terminal's remaining original elements dating to the 1957–64 period of its initial development include Transit Sheds #1 and #2, Warehouses B and C, the bunker fuel complex at the northeast corner of the site, the truck scale building and Pacific Molasses Company tanks at the southeast corner of the site, the bulk loader, and rail lines that run throughout the site (Figure 8). These features are described briefly here, and more detailed descriptions of each individual resource are provided below.

The TAMT is a mole wharf (also known as marginal wharf) formed of dredged fill and rock-and-concrete bulkhead walls (or quay walls) adjacent to ship channels. The terminal provides nine ship-berthing spaces.

The two transit sheds and two warehouse buildings are formed of tilt-up concrete walls and steel roof trusses (Figures 14 through 18). These buildings have numerous warehouse entries secured by roll-up metal doors. Some of the transit shed wall slabs are scored with decorative fluted panels and Moderne-style signage identifying the Port of San Diego or individual ship berths (Figures 15, 17). At the northwest elevation of Transit Shed #2 is a Modern-style two-story headhouse with circular windows and other elements intended to evoke nautical associations (Figure 16). Transit Shed #1's headhouse and its southeastern storage space have been demolished (Figure 15). The original traffic island, pillar, and signage located between the two transit sheds have also been demolished. Warehouses B and C are more utilitarian than the transit sheds, with decorative features limited to modest-sized scored concrete signage with Moderne-style lettering identifying the buildings at their corners (Figures 15, 17). A small addition and refrigeration machinery have been added to the northwest elevation of Warehouse B in recent decades (Figure 26), and Warehouse C has a large 1970s addition the southeastern portion of the plan (Figure 28). Transit Shed #2 has non-original concrete unloading and conveyance machinery at the southeastern portion of the plan.

Two smaller buildings are associated with and located on the southeast side of the bunker fuel complex's five sizeable steel tanks, which are situated at the northeast corner of the terminal site (Figure 19). The complex originally had four larger tanks and multiple smaller acid and oil tanks.

Located at the southeast corner of the site near the terminal's main entrance are the predominantly utilitarian truck scale building (Figure 21), which features a Modern-style flat overhanging roof, and the three sizeable steel Pacific Molasses Company tanks (Figure 20).

The bulk loader consists of a rail car unloading building, an underground conveyor that transmits dry bulk material to a junction house west of the rail car unloading building and northeast of Warehouse C, an elevated conveyor system that stretches from the junction house to the terminal's southern berths, and an elevated conveyor connected to traveling ship loader that extends across the southern berths (Figures 22 through 24). The rail car unloading building and the junction house are utilitarian structures with corrugated-metal roofs and cladding. The bulk loader's original junction house is connected to a non-original junction house by a non-original conveyor segment. The non-original junction house is connected by a non-original cylindrical conduit to the tops of a non-original silo complex constructed west of the rail car unloading building east of Warehouse C's north corner in the 1970, and subsequently expanded with additional silos and utilitarian buildings (Figures 31 and 32).



Figure 13. Recent aerial photograph of Tenth Avenue Marine Terminal; compare to the 1965 Figure 12 aerial photograph: at the upper right a high-rise hotel stands where Warehouse A stood in 1965; refrigerated truck containers occupy areas where the truck repair buildings and office/union hall building stood in 1965; silos, conduits, and a junction house developed in 1970 and later are located east of Warehouse C, which has a large 1970s addition at its southeast end; the headhouse and southeastern storage space of Transit Shed #1 have been demolished along with the original traffic island and sign between the two transit sheds (from San Diego Unified Port District)

Evaluation

The TAMT does not appear to be eligible for listing on the CRHR as a historic district. Consequently, the terminal does not appear to compose a district qualifying as a historical resource for the purposes of CEQA.

The development of the TAMT does not appear to qualify as an event meriting the site for listing on the CRHR as a historic district. The Embarcadero Piers were San Diego's first municipally developed commercial maritime shipping facility, not the TAMT. Although the terminal's development was associated with overall post-World War II economic growth in San Diego, such association is too commonplace to qualify the terminal for CRHR listing. All infrastructure is developed to spur growth or accommodate existing or anticipated growth. It is undeniable that the TAMT increased San Diego's share of the California and west-coast commercial-port shipping business, and that the terminal represented an economic asset to the city that made use of the advantages afforded by the city's natural harbor. However, the TAMT did not equip San Diego to move up beyond a middle-range status among West Coast ports and seriously rival larger, more established commercial shipping facilities at the Ports of Los Angeles and Long Beach and at major West Coast ports farther north. In fact, the Port of San Diego's position relative to California and other West Coast ports actually weakened slightly overall following the 1957–64 period of potential significance, during the latter 1960s and early 1970s. With the advent of container shipping, the National City Marine Terminal would need to be developed into a container facility to maintain the Port of San Diego's position as a middle-level player in the commercial port-shipping business on the West Coast.

Other economic factors were far more important to San Diego's post-World War II economic growth than the TAMT. San Diego had become a military town by the 1920s. World War II increased the U.S. Navy's longstanding and leading in role the local economy, as well as its physical presence in San Diego Harbor. After World War II, federal military spending would continue to be far more important to the San Diego economy than the terminal's commercial shipping activities, as would local economic factors such as defense contracting, the aircraft industry, shipbuilding, and tourism. After 1965, problems with the bulk loader and changing economic conditions would require the terminal to be altered from its original design and initial 1957–1964 development. The Port District's airport and property management revenues would dramatically exceed revenues from terminal operations during the latter 1960s. The TAMT did not, in itself, transform San Diego's economy. San Diego's economic prospects during the latter 1960s and early 1970s were enhanced by the terminal and numerous other factors, but it does not appear that the city's economic prospects depended on the terminal from the late 1950s to the early 1970s. For these reasons, the TAMT does not appear to meet CRHR Criterion 1.

Development of the TAMT was one of multiple major harbor projects and initiatives completed or planned under City Harbor Department/Port District Director John Bate, who is a significant figure in post-World War II San Diego history. In addition to the terminal, harbor-related projects and initiatives completed under Bate's leadership from the late 1940s to 1966 included the creation of Shelter Island, the expansion and modernization of Lindbergh Field, the creation of Harbor Island, planning for conversion of the Embarcadero Piers to recreation and tourism uses, and planning for development of the National City Marine Terminal. Bate was also the organizational and political architect of the Port District. Although Bate was an engineer by training, his role in shaping the non-military features of San Diego's evolving post-World War II Harbor was primarily as a manager and planner. The engineering team that worked under Harbor Department/Port District Director Bate

designed the TAMT. As a *San Diego Evening Tribune* editorial explained soon after Bate's death in 1983,

If one person were to be picked out of the beautiful crowd as most responsible for San Diego's beautiful harbor, it would have to be John Bate...Most of his dreams became realities. He helped to develop the bay into a playground and seaport any city in the world would envy. If he could never make it the major terminus for commercial shipping that he envisioned, it was not for lack of trying (*San Diego Evening Tribune* 1983).

The TAMT was part of Bate's evolving efforts to diversify San Diego Harbor uses beyond military facilities, ship building, and the tuna industry by creating new commercial-shipping and tourist-oriented facilities.

The TAMT does not, however, appear to have sufficiently direct association with Bate under Criterion 2 to qualify for listing on the CRHR as a historic district. Bate did not reside at the terminal. Although the TAMT had onsite Harbor Department/Port District offices (which have been demolished), it was not Bate's primary workplace as Harbor Department/Port District Director. The Harbor Department's headquarters were over a mile northwest of the terminal in a building at Harbor Drive and Ash Street that has been demolished. Several years after the creation of the Port District, and a year before Bate's retirement, the Port District's headquarters were relocated farther north to the current Port District headquarters building on Pacific Coast Highway (Port District ca. 1974:5). For these reasons, the TAMT does not appear eligible for CRHR listing as a historic district under Criterion 2. Moreover, even if the terminal did have significance under Criterion 2, it does not retain sufficient historical integrity to convey significance attributable to it under any of the CRHR criteria. The terminal's substantially diminished historical integrity is addressed in more detail below.

The TAMT does not appear to be significant for its overall design and engineering, or for the limited architectural elements of its larger 1957–64 period buildings. The terminal's mole (or marginal) design and construction does not appear to have represented a major milestone in harbor engineering. Harbor Department Chief Engineer J. E. Liebmann and engineer Greer W. Ferver likened its concrete and rock bulkhead walls to the well-established technology of the gravity dam (Liebmann and Ferver 1958:40). In terms of engineering, the creation of large, seismically safe, fireproof transit sheds and warehouse buildings with concrete walls atop fill appears to have been the most challenging element of the terminal's design and construction. For the transit sheds, which were designed by E. L. Freeland, this was achieved through the use of established technology, by driving 370 foundation piles of an existing type (Raymond step-taper piles), and attaching the tops of the piles below longitudinal walls to a concrete grade beam that functioned as a strut. While this solution to the threat of subsidence was described in a 1958 article authored by Liebmann and Ferver in *Civil Engineering*, it does not appear to represent a major milestone in design and construction of port facilities, and the article appears to have served in part as a means to promote the new terminal (Liebmann and Ferver 1958:43).

The terminal's bunker fuel facilities represented its most innovative feature, and Liebmann touted the terminal's ship fueling and ballast water removal facilities in a second *Civil Engineering* article on the terminal in 1960. While this element of the terminal made it a more attractive shipping facility by providing for ships to be conveniently serviced on site with refueling at competitive prices during cargo unloading and loading activities, the creation of these facilities did not involve historic engineering milestones. The bunker fuel and ballast water removal facilities provided a notable service that helped the terminal compete for several years after it opened for business in 1958.

However, this initially successful feature was undermined fairly quickly during the 1960s as ports in Japan began selling ship fuel at substantially lower prices than other Pacific ports (Irwin 1970:57; Liebmann 1960:69–72).

Other elements of the TAMT—the surviving architectural features of the transit sheds, the extensive bulk loader system—do not appear to have sufficient historical significance to qualify the terminal for CRHR listing as a historic district for design or engineering attributes. The terminal’s bulk loader was an example of technology developed beginning in the early twentieth century that evolved over the course of the century. The Port of Long Beach developed comparable bulk loader facilities at the same time that the TAMT developed its bulk loader facilities. Most of the surviving buildings at the terminal are primarily utilitarian in design. Non-utilitarian architectural features include the decorative fluted panels on some transit-shed wall slabs, the overall Modern architecture and nautically oriented design elements of the surviving transit shed headhouse, and the somewhat retrograde (for the late 1950s) Moderne lettering of scored signage on limited portions of the transit sheds’ and warehouses’ concrete wall slabs. These features do not appear to have sufficient importance to qualify the terminal for CRHR listing as a historic district. For these reasons, the TAMT does not appear to meet Criterion 3 for listing on the CRHR.

Alterations have substantially diminished the TAMT’s historical integrity since its 1957–64 period of significance, the years during which the terminal’s originally planned elements were constructed. Arguably the most noteworthy diminishment of historical integrity has occurred in the area where the terminal’s dedication ceremonies took place in November 1958, between the transit shed headhouses. There, the original traffic island, pillar, and signage formed the symbolic focal point of the dedication ceremonies, and throughout the 1957–64 period of potential significance these elements were integral to the heavily traveled space between the transit sheds (Figure 9). Sometime after the period of significance, the traffic island, pillar, and signage were demolished. Transit Shed #1’s headhouse and the southeastern quarter of its storage space were demolished more recently. The demolition of these elements has substantially altered the terminal’s original design, and notably diminished the historic feeling and setting in this area of the terminal. Extensive concrete unloading and conveyance machinery was also added to the southeast of portion of Transit Shed #2 after the 1970s, which has diminished integrity of design and feeling at this portion of the building.

Numerous buildings present at the terminal to the northeast and east of Warehouse B during the 1957–64 period of potential significance have been demolished, including Warehouse A, the Harbor Department office building/union hall, and two truck repair buildings. The silos constructed by 1970 east of Warehouse C were created to enhance the terminal’s disappointing dry-bulk export output. Rising much higher than other structures at the site, the silos significantly altered terminal viewsheds. Two larger silos and multiple utilitarian buildings were added to the silo complex in subsequent decades. A major, inharmonious addition to the southeast elevation of Warehouse C that does not have concrete walls was constructed during the 1970s. This has reduced the warehouse’s integrity of design and materials, the terminal’s design, and the setting and feeling in that area of the terminal. The bunker fuel complex now has five larger tanks when it originally had four, and its original smaller oil and acid tanks have been removed. The original rotary unloading machinery in the rail car unloader building has been removed. Altering viewsheds further, by 2006 a large non-original conduit had been installed that extends from the tops of the southeastern 1970s silos to a new junction structure connected to the bulk loader conveyor. A new conveyor segment also connected the new junction structure to the bulk loader’s original junction house. Collectively, these changes have diminished the terminal’s integrity of design, setting, and feeling.

In summary, the TAMT does not appear to be eligible for CRHR listing as a historic district. Consequently, the terminal does not appear to compose a district qualifying as a historical resource for the purposes of CEQA.

Transit Shed #1

Description

Located at the northwest portion of the terminal site, Transit Shed #1 has a long rectilinear plan and is constructed of tilt-up fireproof concrete walls and steel roof trusses. Two transverse concrete walls divide the approximately 145,000-square-foot building into three interior storage spaces. Square-shaped concrete wall slabs at each end of the interior transverse walls, and rectangular-shaped wall slabs at the ends of the northwest and southeast elevations rise higher than adjacent wall slabs to form parapets. These parapet-topped concrete wall slabs are scored with decorative Moderne-style fluted panels and signage identifying berth numbers, or the Port of San Diego and the year 1957—the year construction began on the terminal’s transit sheds. The roofs of the building’s three interior spaces slope downward to the southwest and northeast from central ridges. Each of the building’s three interior spaces has five large loading entries with roll-up metal warehouse doors along the southwest and northeast elevations. Concrete truck-loading platforms extend along most of the building’s northeast elevation. The southeast and northwest elevations each have a single centered entry large enough to allow trucks to enter the building. These are also secured by metal roll-up warehouse doors. Industrial-grade pedestrian doors provide access to the building at various locations. The southwest elevation features windows at two locations, including a pair of original steel-frame windows that appear to incorporate awning or hopper sashes.

Transit Shed #1 has undergone several notable alterations. A corrugated-metal shed addition was constructed at the northwest elevation sometime after 1970. Originally, the building had four rather than three interior storage spaces, and its southern end consisted of Modern style headhouse offices. Both have been demolished. Now the southeast elevation consists of a concrete wall with two buttresses. Historic photographs indicate that the Transit Shed #1 headhouse was identical to the intact Modern-style headhouse at the northwest end of Transit Shed #2. Originally, an oval traffic control island with a concrete pillar was situated between Transit Sheds #1 and #2. The pillar featured signage identifying the terminal and transit sheds, and was flanked by tenant directories for the transit sheds. The traffic island, pillar, and associated directories have been removed from the site.



Figure 14. Former interior concrete wall that now forms the southwest elevation of Transit Shed #1, which faces Transit Shed #2's surviving headhouse; note partially remaining "Berth 4" signage (upper right) indicating extent of demolition at southern end of building, looking west



Figure 15. Transit Shed #1 wall slab with Moderne signage and decorative fluting, looking south

Evaluation

As discussed above, the terminal site does not appear to be eligible for CRHR listing as a historic district; therefore, the transit shed does not appear to contribute to a historic district. The following discussion addresses the potential for Transit Shed #1 to qualify as an individual historical resource.

Aerial photographs indicate that the construction of Transit Shed #1 began in 1957. Plans on file at the Unified Port of San Diego indicate that the portion of the building devoted to storage was designed by E. L. Freeland, Structural Engineer of San Diego. Freeland appears to have worked with Harbor Department engineering team headed by J. E. Liebmann in the design of the terminal's two transit sheds. Local architect Louis Bodmer designed Transit Shed #1's original Modern-style headhouse (no longer present). Bodmer also designed the traffic island, pillar, and flanking transit shed tenant directories originally situated between Transit Sheds #1 and #2 (no longer present). The F. E. Young construction company won the contract to build Transit Shed #1 and completed the building by 1958 (Bodmer 1957A, 1957B; Freeland 1957; Liebmann and Ferver 1958:43; Ninyo & Moore 1999: Appendix A; Morin 1957C; San Diego Union 1958A:C-6).

Transit Shed #1 does not appear to be individually eligible for the CRHR. Research efforts have yielded no evidence that Transit Shed #1 is associated with important historical events or patterns of events. Nor has research revealed evidence that a noteworthy individual performed historically important work at the transit shed building. The building does not have a direct enough association with Harbor Department/Port Director John Bate to confer significance upon it. Consequently, the building does not appear to meet or Criteria 1 or 2 for listing in the CRHR.

Research yielded no evidence that E. L. Freeland distinguished himself as an engineer in a manner that would confer historical significance upon Transit Shed #1. The building has limited decorative elements—concrete wall slabs scored with Moderne-style fluting and signage in some places—and does not appear to reach the threshold of significance necessary for CRHR listing as an important example of port architecture. As explained above, although the building's development involved the challenge of potential subsidence because of its weight and location on fill, the measures employed to make it structurally sound—370 concrete Raymond step-taper piles and a concrete grade beam below longitudinal walls that acted like a strut—do not appear to have represented major milestones in port engineering. The building has also been substantially altered. Its original Modern-style headhouse, southeastern-most storage space, and the associated traffic island originally situated near the building's headhouse have all been demolished. A shed-roofed corrugated-metal addition has also been constructed at the building's northwest elevation. These alterations have diminished its integrity of design, materials, workmanship, and feeling. For these reasons, Transit Shed #1 does not appear to meet Criterion 3 for individual CRHR listing.

Transit Shed #2

Description

Occupying the southwest portion of the terminal site, Transit Shed #2 is a cargo storage building that incorporates headhouse offices at the northwest elevation. The 194,000-square-foot building has a long rectilinear plan. Most of the building consists of tilt-up fireproof concrete walls and steel roof trusses that enclose large interior storage spaces southeast of the headhouse. The two-story Modern-style headhouse has a centered cargo-loading bay large enough to accommodate trucks, and pedestrian entries at the façade's first-floor offices, and atop stairways leading to the second story.

One stairway is located at the northwest elevation, and the other two are located within the central bay. Clad mostly in stucco, the headhouse has a slightly pitched shed roof that overhangs broadly at the northwest and northeast (front) elevations to shelter the northwest stairway and the first-floor entries. The second story is slightly cantilevered. Fenestration consists mainly of rectangular banks of multi-pane aluminum-frame windows. On each side of the central bay, the façade's second-story windows are framed by long rectangular surrounds incorporating mullion-like fluted panels. Aluminum-frame glass doors with transoms are integrated into the window banks along the first floor.

The walls at the ends of the headhouse and on each side of the central bay feature circular windows. Six steel poles extend from the sides of each stairway to the overhanging roof. The circular windows, the steel poles lining the stairways, and the headhouse's overall resemblance to a ship's navigation bridge are reminiscent of Streamline Moderne architecture's references to transportation technology. However, the headhouse's horizontal emphasis, window bands, sharp corners, and overhanging projections make it a Modern building registering the post-World War II influence of the International Style.

The remainder of the transit shed to the southwest of the headhouse is formed of tilt-up concrete elevation walls and three tilt-up, concrete, interior transverse walls. These create four interior storage spaces. Square shaped concrete wall slabs at each end of the interior transverse walls, and rectangular-shaped wall slabs at the ends of the northwest and southeast elevations, rise higher than adjacent wall slabs to form parapets. These parapet-topped concrete wall slabs are scored with decorative Moderne-style fluted panels and signage identifying berth numbers, or the Port of San Diego and the year 1957—the year construction began on the terminal's transit sheds.

The roofs of the four interior spaces slope downward to the southwest and northeast from central ridges. Each of the building's four interior spaces has five large loading entries with roll-up metal warehouse doors along the southwest and northeast elevations. Concrete truck-loading platforms extend along most of the building's northeast elevation. Industrial-grade pedestrian doors provide access to the building's storage spaces at various locations. The southwest elevation features windows at two locations, including a pair of original steel-frame windows that appear to incorporate awning or hopper sashes. The southeastern portion of the building incorporates multiple non-original structures, including a ship unloader and associated conveyance machinery at the southwest and northeast elevations, and across the building's roof. The original construction of Transit Sheds #1 and #2 included an oval traffic control island with a concrete pillar situated between the two buildings' headhouses. The pillar featured signage identifying the terminal and transit sheds, and was flanked by tenant directories for the two buildings. The traffic island, pillar, and associated directories have been removed from the site.



Figure 16. Transit Shed #2's surviving headhouse, looking south-southwest



Figure 17. Harbor-facing southwest elevation near non-original cement unloading and conveyance facilities; note Moderne lettering and decorative fluted-concrete wall, looking east



Figure 18. Non original cement unloading and conveyance facilities at south end of southeast elevation, looking north-northwest

Evaluation

As discussed above, the terminal site does not appear to be eligible for CRHR listing as a historic district; therefore, the transit shed does not appear to contribute to a historic district. The following discussion addresses the potential for Transit Shed #2 to qualify as an individual historical resource.

Transit Shed #2 has the same development history as Transit Shed #1. Aerial photographs indicate that the construction of Transit Shed #2 began in 1957. Plans on file at the Unified Port of San Diego show that the portion of the building devoted to storage was designed by E. L. Freeland, Structural Engineer of San Diego, in consultation with the Harbor Department engineering team lead by J. E. Liebmann. Local architect Louis Bodmer designed Transit Shed #2's Modern-style headhouse. Bodmer also designed the traffic island, pillar, and flanking transit shed directories originally situated between Transit Sheds #1 and #2. The F. E. Young construction company won the contract to build Transit Sheds #1 and #2 and completed the buildings by 1958 (Bodmer 1957A, 1957B; Freeland 1957; Liebmann and Ferver 1958; Ninyo & Moore 1999:Appendix A; Morin 1957C; San Diego Union 1958A:C-6).

Transit Shed #2 does not appear to be individually eligible for the CRHR. Research revealed no evidence that the building has direct individual associations with an important event or pattern of events, nor has research revealed any evidence that a noteworthy individual performed historically important work that was strongly associated with Transit Shed #2. The building does not have sufficiently direct association with Harbor Department/Port Director John Bate to confer significance upon it. Consequently, the building does not appear to meet Criteria 1 or 2 for listing in the CRHR.

Research yielded no evidence that either E. L. Freeland or Harbor Department chief engineer J.E. Liebmann distinguished themselves as engineers in a manner that would confer historical

significance upon Transit Shed #2. As explained above, although the development of the building's extensive storage spaces involved the challenge of potential subsidence because of the structure's weight and location on fill, the measures employed to make it structurally sound—370 concrete Raymond step-taper piles and a concrete grade beam below longitudinal walls that acted like a strut—do not appear to have represented major milestones in port engineering. Sources on master architects and architectural Modernism in San Diego offer no evidence that Louis Bodmer distinguished himself as an important designer of post-World War II buildings (City of San Diego 2007; Freeley et al. 2011; Modern San Diego Real Estate 2014). The building's storage portion incorporates limited ornamental features at some concrete wall slabs in the form of scored Moderne-style fluting and signage. The headhouse is a commonplace example of Modern architecture that incorporates limited design elements evoking nautical associations—some circular windows, steel poles lining stairways, and an overall resemblance to a ship's navigation bridge. These elements gave the 1958 headhouse qualities reminiscent of older Streamline Moderne design at a moment when Modernism evolving out of the International Style was ascendant in San Diego and across the United States. In contrast to architecturally significant port buildings designed in Modernist idioms, such as the International-style Los Angeles Cruise Terminal at the Port of Los Angeles (1963) (Applied Earth Works, Inc. 2013:19–21, 24), Transit Shed #2 does not achieve high artistic values and does not exhibit innovative architectural design. Overall, Transit Shed #2 does not appear to meet the threshold of architectural or engineering significance appropriate for CRHR listing. For these reasons, Transit Shed #2 does not appear to be eligible for individual CRHR listing under Criterion 3.

Bunker Fuel Complex

Description

Located at the northeastern portion of the TAMT site, the above-ground portion of the bunker fuel complex consists of five large steel tanks and two buildings secured by chain-link fences topped with barbed wire. The two steel tanks closest to the buildings at the southeast side of the complex appear to be equivalent in size and have diameters of approximately 100 feet. Immediately northwest of those tanks are two additional tanks. The southern one has a diameter of approximately 80 feet and the one to the northeast has a diameter of approximately 55 feet. An additional tank at the northernmost portion of the complex was constructed within the last decade. The buildings on the site appear to function as a utility building (eastern) and a small office (western). Both are utilitarian in design with concrete-block walls and flat roofs with broadly overhanging eaves. The western building has several window openings. Access restrictions during the field visit prohibited clear observation of the contents of the window openings.



Figure 19. Bunker Fuel Complex tanks, looking west-northwest

Evaluation

As discussed above, the terminal site does not appear to be eligible for CRHR listing as a historic district; therefore, the bunker fuel complex does not appear to contribute to a historic district. The following discussion addresses the potential for the bunker fuel complex to qualify as an individual historical resource.

The terminal's bunker fuel complex was completed in 1959. An in-depth history of the terminal site's development has identified the owner of the tank complex from 1959 through 1971 as Union Oil of California. Several smaller original tanks have been removed from the complex. The purpose of the tanks was to store ship fuel and provide refueling services to ships docked at the terminal. Pipes from the tanks conveyed fuel directly to terminal berths so that ships could refuel during cargo loading or unloading. The same pipes provided for removal of ballast water from arriving ships' fuel tanks. At most earlier-developed West Coast ports during the 1950s and 1960s, cargo ships were refueled from barges or tugboats. Harbor Department officials heavily promoted the terminal's bunker fuel facilities. Although their development does not appear to have required major engineering innovation for the period, the bunker fuel facilities offered convenience and promoted efficiency, and provided a crucial element of the Harbor Department's marketing efforts to attract ships to San Diego. While the bunker fuel facilities helped make the Port of San Diego more competitive in the West Coast shipping market for a time, this initially successful feature was undermined fairly quickly during the 1960s as ports in Japan began selling ship fuel at substantially lower prices than other Pacific ports (Bate 1958:C-3; Brooks 1958:C-1; Liebmann 1960:69-72; Ninyo & Moore 1999:11, Appendix A; Irwin 1970:57-58).

The TAMT's bunker fuel complex does not appear to be individually eligible for the CRHR. As part of the terminal's bunker fuel facilities, the bunker fuel complex does not appear to have direct individual associations with important events or patterns of events. As explained above, although the terminal's bunker fuel capabilities were an important element of the Harbor Department

officials' efforts to create a terminal that offered superior maintenance services to ships, the competitiveness provided by the facility was undermined fairly quickly in the 1960s by cheaper fuel prices at Japanese ports. Research has revealed no evidence that a noteworthy individual performed historically important work that was strongly associated with the bunker fuel complex. The building does not have sufficiently direct association with Harbor Department/Port Director John Bate to confer significance upon it. Consequently, the complex does not appear to meet Criteria 1 or 2 for listing in the CRHR.

Research efforts did not reveal any evidence that the bunker fuel complex is significant as the work of a master engineer or builder. Neither the tank complex nor the underground pipeline system for conveying fuel and ballast water appear to qualify as engineering masterworks. The system appears to be the product of technology that was well established by the late 1950s. Tanks comparable in size, with equivalent steel construction, are commonplace elements of the historic-period industrial built environment at numerous ports and other industrial complexes in California and across the West Coast. The two small buildings associated with the tanks are also commonplace examples of utilitarian 1950s buildings. For these reasons, the bunker fuel complex does not appear to meet Criterion 3 for listing individual listing in the CRHR.

Molasses Tanks

Description

The terminal's remaining tanks for molasses storage are approximately 170 feet east of Warehouse C's southeastern corner. The three steel molasses tanks appear to be the same size and have diameters of approximately 70 feet. The tops are connected by steel catwalks. The lower circumference of the eastern tank and the entire circumference of the central tank have been covered with non-original insulating material. Various associated pipes and valves are located on the south side of the tanks.



Figure 20. Molasses Tanks, looking north

Evaluation

As discussed above, the terminal site does not appear to be eligible for CRHR listing as a historic district; therefore, the molasses tanks do not appear to contribute to a historic district. The following discussion addresses the potential for the molasses tanks to qualify as an individual historical resource.

The San Francisco-based Pacific Molasses Company arranged for construction of the three large tanks for \$150,000 as a distribution plant. A newspaper report in December 1961 noted that, due to construction delays, the plant would not be completed until the following February. It appears that the plant was completed in 1962; it is present in a 1963 aerial photograph. Imported molasses stored in the tanks was trucked to the Imperial Valley and processed into cattle feed. The Pacific Molasses Company tanks remain intact; an additional molasses tank constructed near the bunker fuel tank complex by a different company than Pacific Molasses was later demolished. Several smaller tanks constructed at the same time as the Pacific Molasses tanks and located immediately north of them have been removed from the site (Irwin 1970:50–51; Morin 1961A:A-27; Morin 1961B; Ninyo & Moore 1999:12, Appendix A).

The molasses tanks developed by the Pacific Molasses Company at the TAMT do not appear to be individually eligible for the CRHR. The molasses tanks do not appear to have significance for direct individual association with a historically important event or pattern of events. Research has revealed no evidence that a noteworthy individual performed historically important work that was strongly associated with the molasses tanks. The tank complex does not have sufficiently direct association with Harbor Department/Port Director John Bate to confer significance upon it. Consequently, the tanks do not appear to meet Criteria 1 or 2 for listing in the CRHR.

Research efforts did not reveal any evidence that the molasses tanks are significant as the work of a master engineer or builder. The tanks do not appear to be an engineering masterwork. Tanks

comparable in size, with equivalent steel construction, are commonplace elements of the industrial built environment in numerous cities in California and across the West Coast. For these reasons, the molasses tanks do not appear to meet Criterion 3 for listing in the CRHR. Additionally, two of the tanks have been entirely or partially covered with non-original insulating material, which has diminished their historical integrity of design, materials, and feeling. The integrity of the site as whole has also been compromised by the removal of the smaller tanks originally installed immediately north of the existing three larger tanks.

Truck Scale Building

Description

The Truck Scale Building faces southwest and is immediately south of the terminal's molasses tanks. The predominantly utilitarian building has a rectangular plan with a small projecting square element at the southwest elevation that accommodates the main drive-up window. The building's concrete block walls support a flat roof outlined by low parapets atop the square element, and a flat-roof Modern-style roof with broadly projecting eave overhangs and angled fascia boards across the main rectangular mass. Most windows are inset, horizontally sliding aluminum-frame units above wood sills. Two non-original horizontally sliding vinyl windows are located at the northwest portion of the southwest elevation. Wood doors with upper glazing provide access at the northwest and southeast sides of the drive-up window projection, as well as the southwest elevation of the main rectangular element. The northwest elevation of the main rectangular element has a metal door that slides horizontally on a mounted track.



Figure 21. Northwest and southwest elevations of truck scale building, looking north

Evaluation

As discussed above, the terminal site does not appear to be eligible for CRHR listing as a historic district; therefore, the truck scale building does not appear to contribute to a historic district. The

following discussion addresses the potential for truck scale building to qualify as an individual historical resource.

The truck scale building was constructed by 1963. It is unclear whether the Pacific Molasses Company constructed the building or whether the building was developed by Westside Metals/Scrap Metals, which operated a scrap metal yard during the early 1960s at the terminal near the northeast side of Warehouse C (Ninyo & Moore 1999:12, Appendix A).

The truck scale building does not appear to be individually eligible for the CRHR. As discussed in detail above, the larger terminal does not appear to qualify for CRHR listing under Criterion 1 as a historic district for association with a historically important event or pattern of events. Research efforts have revealed no evidence that a noteworthy individual performed historically important work that was strongly associated with the building, which does not have sufficiently direct association with Harbor Department/Port Director John Bate to confer significance upon it. Individually, therefore, the building does not appear to meet Criteria 1 or 2 for listing in the CRHR.

Research efforts did not reveal any evidence that the truck scale building was designed by a master architect or builder. The building does not have high artistic value and does not appear to be a distinctive example of any architectural style or building technique. The building registers the influence of Modern architecture in its flat roof and broadly overhanging eaves. But such elements are commonplace among buildings constructed at industrial sites throughout California during the 1950s and 1960s. For these reasons, the truck scale building does not appear to meet Criterion 3 for listing in the CRHR.

Bulk Loader System

Description

The TAMT's bulk loader is a multicomponent system for conveying dry bulk commodities from railroad cars and onsite storage structures to the two terminal's two southernmost berths. Its original elements consist of a rail car unloading building, an underground conveyor from the rail car unloading building to a junction house to the west, a much longer conveyor extending from south of the junction house south to the southernmost berths, and a conveyor and traveling loader that provided for bulk commodities to be dumped directly into ship hulls. Original portions of the system total approximately 1,600 feet in length. The commodities delivered to ships through the system included potash, soda ash, grain, alfalfa pellets, and chemical fertilizers. The bulk loader's capacity was originally 2,000 tons per hour. In more recent decades, its capacity has been rated from 1,200 to 1,800 tons per hour (Irwin 1970:49–50; World Port Source 2014; Port District 1992:13).

The historic-era portion of the system begins at the rail car unloading building, which is north of the molasses tanks, east of Warehouse C, and southeast of the silo complex, along spur tracks connected to the railroad lines that run east of the site. The building's corrugated-metal rectangular western portion has a low-pitched gable roof and two large openings at the northwest and southeast elevations. This portion of the building contains facilities for receiving materials dumped from the bottoms of cars through steel grills to a conveyor system underneath the building. A corrugated metal shelter projects from the building's northeast elevation and is supported at the northeast side by several steel posts. Under the shelter along the northeast wall of the building is an elevated operations room accessed at a steel stairway. A rotary car dumper was originally located in this part of the building.

Commodity materials received at the rail car unloading building are conveyed underground and within a corrugated metal conveyance structure to the corrugated metal junction house approximately 200 feet to the west. Originally, the system's 42-inch-wide conveyor belt extended from the junction house south to the terminal's southern berthing area. Within the past decade, however, the system has been altered in the vicinity of the original junction house. A second, taller junction structure was built south of the original structure. This new structure incorporates a four-sided conduit with a conveyor that extends to the original junction house, as well as a long cylindrical conduit with three sets of support legs. This conduit connects to the top of the grain silo complex. Steel conveyance structures located between the aforementioned features and the concrete ramp to the south have been introduced to the system since 1970 (Ninyo & Moore 1999: Appendix A).

The elevated steel frame of the 42-inch conveyor belt extends from the newer junction structure (rather than the original junction structure) approximately 600 feet south to an additional rectangular corrugated metal junction structure in the vicinity of Berth 8. Comparison of historic and current aerial imagery indicates that the junction structure near Berth 8 has been altered, and that it originally incorporated several windows (Ninyo & Moore 1999: Appendix A).



Figure 22. Railcar unloader building, looking northwest



Figure 23. Bulk loader system from non-original junction structure (monolithic darker gray structure center right) to east end of southern berthing area, looking north



Figure 24. Southern segment of bulk loader system, including elevated conveyor, corrugated metal conveyor shelter, and traveling loader with telescoping chute (center-right background), looking east-southeast

The remainder of the system consists of an elevated steel structure incorporating a conveyor belt, a corrugated metal shelter, and an affixed track along which the system's steel traveling ship loader (or boom conveyor) is connected. The loader moves parallel to the elevated conveyor structure to allow for optimal positioning relative to berthed ships. Once positioned, the traveling loader conveys

material to a vertical telescoping chute with a dust suppressor, which transmits the material directly into ship compartments.

Evaluation

As discussed above, the terminal site does not appear to be eligible for CRHR listing as a historic district; therefore, the bulk loader does not appear to contribute to a historic district. The following discussion addresses the potential for the terminal's bulk loader system to qualify as an individual historical resource.

The bulk loader system, one of the terminal's most heavily promoted features, was put into service in early 1963. Planning for the bulk loader began years earlier, when Harbor Department officials inspected bulk loading systems on the east coast, the gulf coast, and the West Coast. Aware of growing demand for raw materials in Asia, Harbor Department officials sought bulk-loading facilities for speedier, automated transfer of raw materials from railcars and storage facilities to ship hulls. It appears that in California prior to the 1960s, only the Port of Stockton had bulk-loading facilities comparable to the one planned for the TAMT. The Port of Portland had industrial bulk loading facilities as early as the 1920s. The Port of Long Beach developed up-to-date bulk loading facilities, including a rotary rail car unloader, at the same time that TAMT's bulk loader was developed. San Diego's Harbor Department contracted the Diversified Builders Inc. of Los Angeles and the McDowell Company of Cleveland (later the McDowell-Wellman Company) to build the system, which would have a capacity to load 2,000 tons per hour. Initially the loader handled exports such as potash from New Mexico and flaxseed and alfalfa pellets from Arizona and the Imperial Valley. During the first decade of its existence, soda ash, borax, phosphates, copper concentrates, and gypsum would subsequently be conveyed to ships for export by the bulk loader (Irwin 1970:48-49; Morin 1961C:A-20; Morin 1962A:B-16; Port of Long Beach 1963:6-1; Port of Portland 1922; Shepard 1962:A-45).

As explained in detail above in the historic context for the TAMT, the bulk loader proved to be the most problematic and controversial element of the terminal after the system was completed in 1964. It broke down repeatedly and never handled enough material to break even on its amortization costs during the 1960s and early 1970s. It was developed to handle mainly potash, but during the 1960s, new cheap sources of potash from Canada undermined output from New Mexico, the source of San Diego's potash exports. The disappointing economic performance of the terminal's bulk loader forced the Port District joined with a private organization to develop the silo complex for onsite storage of livestock feed and other grain products to increase dry bulk exports (Morin 1969:A-23; San Diego Union 1963:H-11; San Diego Union 1965:A-22; Shepard 1964B:A-15; Shepard 1968:A-13; Shepard 1969A:B-1).

The TAMT's bulk loader system does not appear to be eligible for the CRHR. The bulk loader does not appear to have significance for direct association with a historically important event or pattern of events. Research has revealed no evidence that a noteworthy individual performed historically important work that was strongly associated the bulk loader. The bulk loader does not have sufficiently direct association with Harbor Department/Port Director John Bate to confer significance upon it. Consequently, the bulk loader does not appear to meet Criteria 1 or 2 for individual listing in the CRHR.

As an engineering structure, the bulk loader has impressive size and capacity both in terms of its conveyance speed and the rate at which its rail car unloading machinery could intake railroad cargo.

However, it does not appear that the TAMT's bulk loader has historic engineering or technological significance qualifying it for CRHR listing. As explained above, Portland had bulk loading facilities in the early twentieth century. Bulk-loading technology advanced over the course of the twentieth century. San Diego's bulk loader was developed on the basis of similar existing facilities on the East Coast, in Houston, and in Stockton. City Harbor Department officials planned and developed the bulk loader at the same time that the Port of Long Beach developed its modern bulk loader. It does not appear that San Diego's bulk loader was particularly unique, or that its development represented a milestone in port engineering history. For these reasons, the bulk loader does not appear to meet Criterion 3 for individual listing in the CRHR.

Warehouse B

Description

Warehouse B has a rectangular plan and provides approximately 300,000 square feet of storage space. It is constructed of tilt-up fireproof concrete walls and steel roof trusses. One interior longitudinal concrete wall and two interior transverse concrete walls divide the building into six interior storage spaces. Along the southwest and northeast elevations, rectangular- and square-shaped wall slabs rise higher than adjacent wall slabs to form parapets. The walls across the northwest and southeast elevations are as high as the parapet-topped wall slabs along the southwest and northeast elevations. The roof is slightly angled downward to the northeast and southwest from the top of the central interior longitudinal wall.

Numerous cargo loading bays secured by metal roll-up doors are distributed across the exterior walls. These open to concrete loading platforms along the southwest and northeast elevations. The platforms have steel railing and concrete stairs in some places. Warehouse B does not have any of the decorative fluting visible on Transit Sheds #1 and #2, but at several places the building is identified by concrete-scored Moderne lettering similar to the signage lettering of the transit sheds. Pedestrian entries and windows are concentrated at the building's west and south corners, and at the southern portion of the northeast elevation. Solid industrial-grade doors secure the pedestrian entries. The windows have steel frames and appear to be original awning or hopper units. They include single-pane, three-pane, and 12-pane windows.

The building has been altered in several places. The loading bays at the northwest portion of the northeast elevation are covered by a non-original metal shelter. Non-original refrigeration machinery is concentrated at the center of the northwest elevation. In recent decades, an addition with a curving roof has been constructed at the northeast portion of the northwest elevation.



Figure 25. Southwest and partial northwest elevations of Warehouse B, looking southeast



Figure 26. Northwest elevation of Warehouse B; note non-original refrigeration machinery and recent addition with curved roof, looking east

Evaluation

As discussed above, the terminal site does not appear to be eligible for CRHR listing as a historic district; therefore, Warehouse B does not appear to contribute to a historic district. The following discussion addresses the potential for Warehouse B to qualify as an individual historical resource.

The Harbor Department contracted I.C. Curry, Inc. to construct Warehouse B, which added 300,000 square feet of covered storage protected by fireproof concrete walls and steel roof trusses to the TAMT. Warehouse B was completed in 1962 (Magee 1961:B-16; Ninyo & Moore 1999:12, Appendix A; San Diego Union 1962C:A-24; Port District 1992:8).

Warehouse B does not appear to be individually eligible for the CRHR. The building does not appear to be associated with an important event or pattern of events that would confer individual significance upon it. Research efforts have revealed no evidence that a noteworthy individual performed historically important work that was strongly associated with Warehouse B. The building does not have sufficiently direct association with Harbor Department/Port Director John Bate to confer significance upon it. Individually, therefore, the building does not appear to meet Criteria 1 or 2 for listing in the CRHR.

Research efforts did not reveal who designed Warehouse B. However, its utilitarian design essentially repeats the arrangement and materials of the concrete walls and steel roof trusses that compose the majority of the terminal's earlier-built transit shed buildings. Limited concrete-scored Moderne signage identifies the warehouse at several corners of the building. Apart from this decorative element, the warehouse lacks the kinds of architectural elements observable on the earlier transit sheds. The warehouse is not an architectural masterwork, does not embody high artistic value, and is not the product of an important milestone in engineering or building techniques. For these reasons, the Warehouse B does not appear to meet Criterion 3 for individual listing in the CRHR.

Warehouse C

Description

Warehouse C was designed similarly to Warehouse B, but has been altered with a large addition at the southeast end of the building. The building has a rectangular plan and its original portion is constructed of tilt-up fireproof concrete walls and steel roof trusses. One interior longitudinal concrete wall and two interior transverse concrete walls divide the original portion of the building into six interior storage spaces. Along original portions of the southwest and northeast elevations, rectangular- and square-shaped wall slabs rise higher than adjacent wall slabs to form parapets. The northwest elevation wall and the original interior transverse walls are as high as the parapet-topped wall slabs along the southwest and northeast elevations. The roof of the original portion of the building is slightly angled downward to the northeast and southwest from the top of the central interior longitudinal wall.



Figure 27. Warehouse C, northeast and northwest elevation, looking south



Figure 28. Southwest and southeast elevations of addition at southeast side of Warehouse C, looking north

Numerous cargo loading bays secured by metal roll-up doors are distributed across the exterior walls. These open to concrete loading platforms along the southwest and northeast elevations. The platforms have steel railing and concrete stairs in some places. Like Warehouse B, Warehouse C does not have any of the decorative fluting visible on Transit Sheds #1 and #2, but at several places the building is identified by concrete-scored Moderne signage with lettering similar to the signage

on the transit sheds. Pedestrian entries and windows are concentrated near the center of the building's northeast elevation, and the center and southeast end of the original portion of the building's southwest elevation. Solid industrial-grade doors secure the pedestrian entries. The windows appear to be original steel frame units with an upper two-pane awning sash and a lower single-pane fixed sash.

The exterior of the large addition forming the southeast end of Warehouse C is concrete at the wall bases and sheathed in metal cladding at the upper portions. The addition has multiple loading bays with role-up metal doors. The far southeast portion of the building does not form a corner. Instead, the addition is shaped so as not to interfere with immediately adjacent bulk-loader conveyor.

Evaluation

As discussed above, the terminal site does not appear to be eligible for CRHR listing as a historic district; therefore, Warehouse C does not appear to contribute to a historic district. The following discussion addresses the potential for Warehouse C to qualify as an individual historical resource.

The Harbor Department contracted I.C. Curry, Inc. to construct Warehouse C, which essentially repeated the design of Warehouse B. Warehouse C added another 300,000 square feet of covered storage protected by fireproof concrete walls and steel roof trusses to the TAMT. I.C. Curry, Inc. completed Warehouse C in 1964 for a price of \$1.4 million. The building received a major addition at its southeast end during the 1970s (Morin 1964:A-29; Ninyo & Moore 1999: Appendix A; Port District 1992:8).

Warehouse C does not appear to be individually eligible for the CRHR. The building does not appear to be associated with an important event or pattern of events that would confer individual significance upon it. Research efforts have revealed no evidence that a noteworthy individual performed historically important work that was strongly associated with Warehouse C. The building does not have sufficiently direct association with Harbor Department/Port Director John Bate to confer significance upon it. Individually, therefore, Warehouse C does not appear to meet Criteria 1 or 2 for listing in the CRHR.

Research efforts did not reveal who designed Warehouse C. However, its utilitarian design essentially repeats Warehouse B, built 2 years earlier. Moreover, Warehouses B and C repeated the arrangement and materials of the concrete walls and steel roof trusses that composed the majority of the terminal's earlier-built transit shed buildings. Limited Moderne signage identifies the warehouse at several corners of the building, which lacks the kinds of other architectural elements observable on the earlier transit sheds. The warehouse is not an architectural masterwork, does not exhibit high artistic value, and does not embody an important milestone in engineering or building techniques. For these reasons, Warehouse C does not appear to meet Criterion 3 for individual listing in the CRHR.

Rail Tracks

Description

Numerous historic-era railroad tracks are located within the TAMT property. The rail lines within the terminal were installed as part of the facility's initial development in the late 1950s and early 1960s. They represent standard railroad construction. They consist of steel rails affixed to cross-ties

across a layer of ballast, or tracks imbedded in asphalt pavement or in concrete. The track within the terminal property totals over 50,000 linear feet. Four tracks within the eastern portion of the terminal property east of the silo complex are aligned adjacent to the BNSF (former Santa Fe) railyard. The four tracks adjacent to the yard are at the same grade as the yard tracks, and are demarcated from other terminal facilities by a fence and a slope (Figure 29). Trains access the terminal site proper via a spur from the BNSF railyard that enters the terminal at the southeast corner of the site, east of the molasses tanks and north of the main gate.

Just east of the molasses tanks, the spur splits into multiple lines running to the southwest and northwest. The line to the northwest splits into multiple tracks to provide for railcars to be conveyed to the bulk loader's rail car unloading building. An additional connecting track extends between the track leading to the rail car unloading building and tracks running south of the molasses tanks. Northwest of the rail car unloading building, these lines converge into a single track in the vicinity of the bunker fuel complex. That single track continues to the northwest beyond the terminal site.

Multiple tracks run parallel to one another south of the molasses tanks toward the traveling ship loader at Berths 7 and 8. These split near Berth 8 into multiple tracks extending southwest and west. The line running southwest wraps around the south end of the bulk loader system and Transit Shed #2, and then splits into two lines that extend to the northwest along the southwest sides of the both transit sheds. The line running west from the vicinity of Berth 8 splits into multiple tracks that extend along the northeast sides of the transit sheds and the southwest sides of Warehouses B and C. Several tracks extend across the paved space between the transit sheds and warehouses.

The railroad tracks have undergone periodic alteration in the form of repair, replacement, and even realignment over the decades. Tracks that formerly provided for rail cars to be conveyed northwest from the north side of the molasses tanks to the northeast sides of Warehouses B and C have been removed or abandoned.

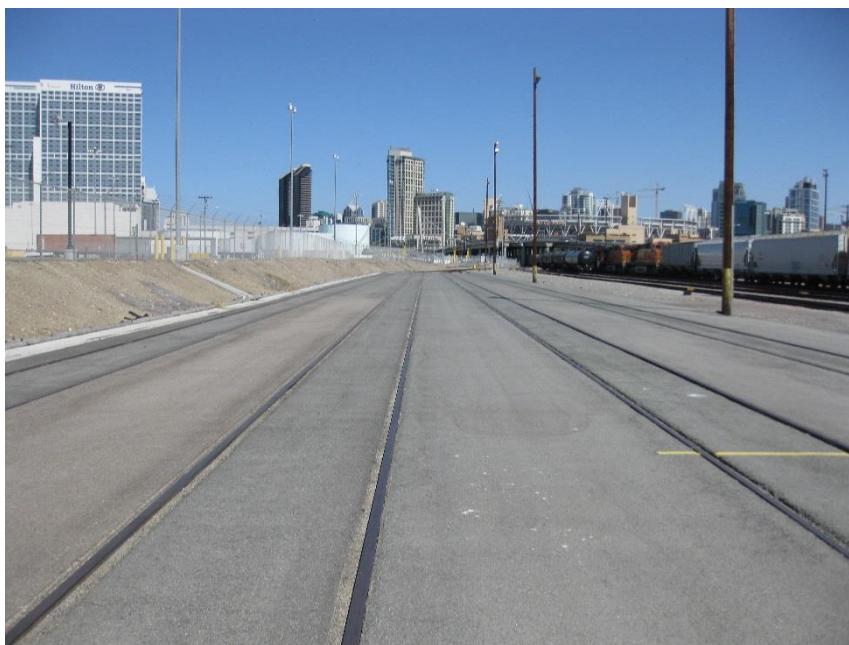


Figure 29. Marine Terminal tracks within central-northeast study area boundary, immediately west of BNSF yard, looking northwest

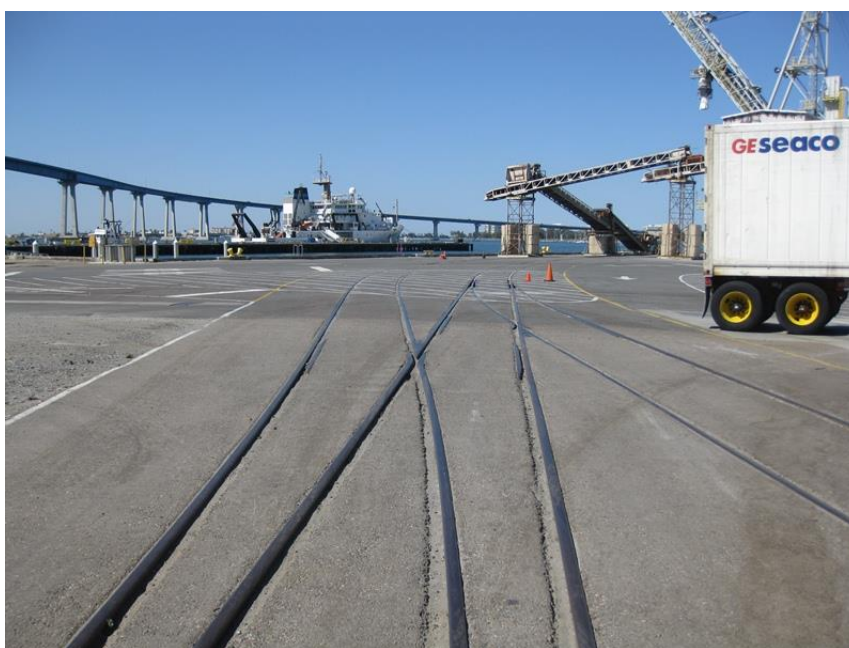


Figure 30. Spur from BNSF track extending into Tenth Avenue Marine Terminal east of molasses tanks, looking east

Evaluation

As discussed above, the terminal site does not appear to be eligible for CRHR listing as a historic district; therefore, the terminal's rail tracks do not appear to contribute to a historic district. The

following discussion addresses the potential for the terminal's rail tracks to qualify as a historical resource individually.

None of the rail lines within the study area were part of the original Santa Fe Railway line constructed during the early 1880s, which was aligned nearby and to the east of the eastern study area boundary, nor were any of the tracks within the terminal part of sidings associated with the Santa Fe Line. The Santa Fe Railway alignment's proximity to the eastern boundary of the study area circa 1928–29, prior to development of the TAMT, is illustrated in Figure 31 below. The original spur line into the terminal property and various tracks within the site were constructed during the terminal's initial development in the late 1950s and early 1960s. A maintenance evaluation of the terminal's rail system conducted in the 1990s states that some of the track alignments within the site were added in the 1970s and 1980s, and that tracks along some of the original rail alignments within the terminal were replaced prior to the 1990s. The evaluation recommended replacing much of the track present at that time. Therefore, like most historic-period rail lines generally, the terminal's tracks have been subject to repeated maintenance and replacement (Frederick R. Harris, Inc. 1994:IV).

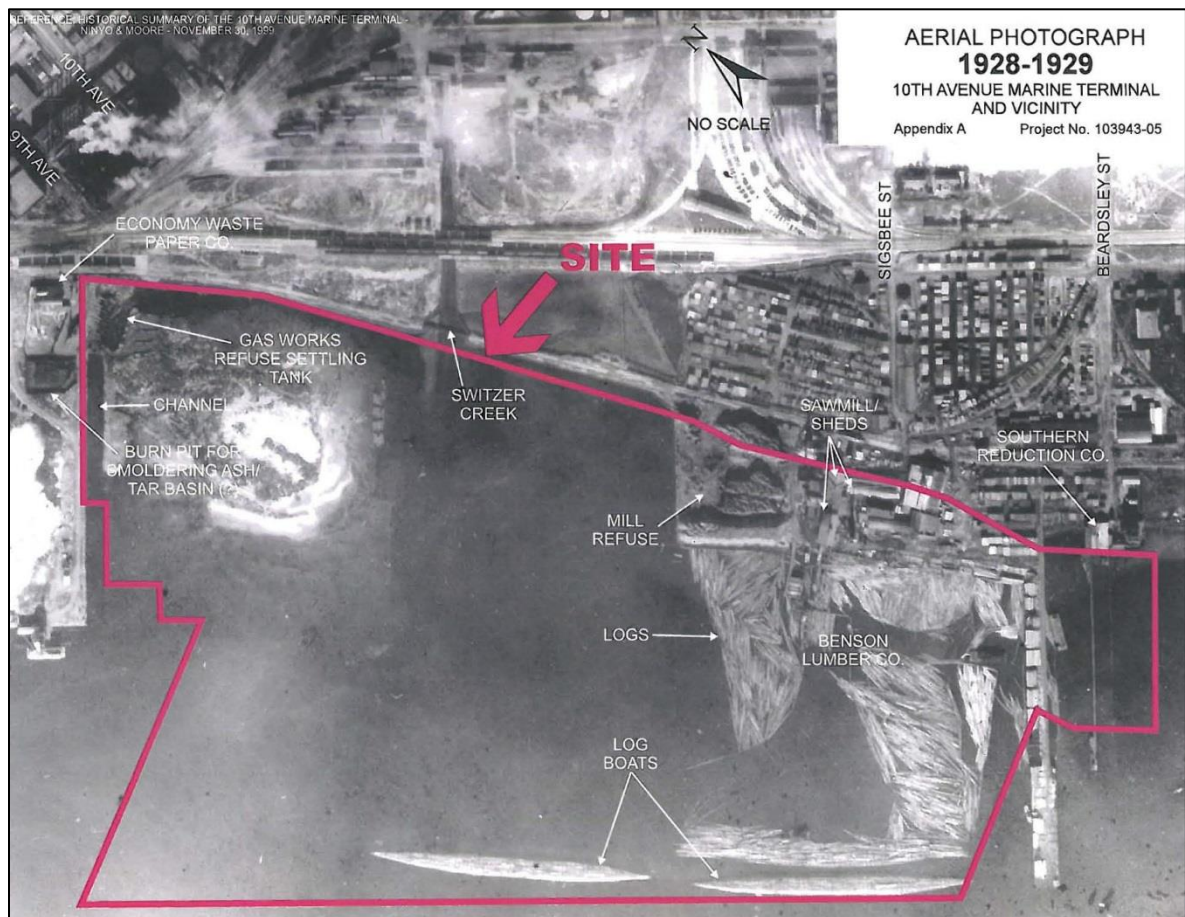


Figure 31. Aerial view of shoreline with overlay of Tenth Avenue Marine Terminal site. The Santa Fe Railway line is visible near the eastern boundary of the terminal. The arrow with the identifier “Switzer Creek” points to a bridge that carried the Santa Fe Railway line over the creek. South of the bridge, a causeway carried the line through the tidal zone (Ninyo & Moore 1999, Historical Study, Tenth Avenue Marine Terminal, Appendix B).

The system of railroad tracks at the TAMT does not appear to be eligible for the CRHR. The terminal's tracks do not appear to be associated with an important event or pattern of events that would confer individual significance upon them. Research efforts have revealed no evidence that a noteworthy individual performed historically important work with the terminal's internal rail lines. This rail track system does not have sufficiently direct association with Harbor Department/Port Director John Bate to confer significance upon it. Individually, therefore, the terminal's rail tracks do not appear to meet Criteria 1 or 2 for listing in the CRHR.

Railroad tracks represent a ubiquitous, commonplace form of infrastructure. Research has revealed no evidence that the terminal's rail tracks have significance for any association with a master engineer or builder, and they do not represent an engineering masterwork. They are entirely commonplace features of the industrial built environment that can be observed at shipping facilities throughout California and the nation. For these reasons, the terminal's railroad tracks do not appear to meet Criterion 3 for listing in the CRHR. As stated above, the railroad tracks have been subject to repair, replacement, and even realignment for decades, and little if any of the tracks' current materials are original to the terminal site.

Silo Complex

Description

Twelve silos originally constructed for storage of food grains are located immediately northeast of the northwest half of Warehouse C and west of the bulk loader rail-car unloading building. The 12 original silos have flat roofs and are constructed of concrete. They rise approximately 75 feet in height. The utilitarian corrugated metal building on the southwest side of the northwestern silos appears to have been constructed along with the original 12 silos. Numerous associated features have been added to the silo complex since the 1970s. Two much bulkier silo structures and associated steel conduits and catwalks were added to the northeast side of the original 12 silos. The rectangular, multi-story corrugated metal element with steel stairs on the southeast side of the original silos, which is not present in a 1976 bird's eye aerial photograph of the site, appears to have been built along with the two larger non-original silos. Two manufactured buildings and an open-sided shelter have also been introduced to the site since that time. The large elevated cylindrical conduit that connects to the square element above the southernmost original silos was introduced to the site during alterations to the bulk loader system within the last decade.



Figure 32. Silos looking east-northeast

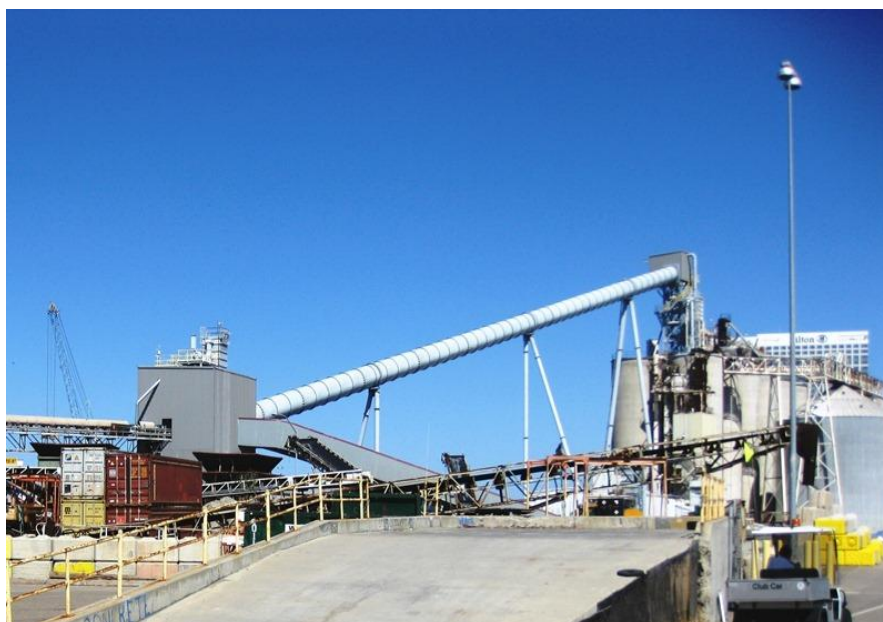


Figure 33. View showing relationship between silo cluster (right) and recently added conduit and junction structure; note later-constructed silo at lower far right, looking west-northwest

Evaluation

The silo complex at the TAMT is not considered a resource that can contribute to a potential TAMT historic district because its original structures were completed in 1970, well after the terminal's 1957–64 period of potential significance as a historic district.

The 12 silos at the TAMT were constructed to store new kinds of bulk dry commodities at the terminal in order to boost exports and help the \$2.8 million bulk loader break even on amortization costs. Port officials had anticipated that the bulk loader would be conveying 900,000 tons annually, or 400,000 more than it needed to break even, but by the late 1960s, it had yet to reach the 400,000 ton mark. Hoping to increase exports of feed products and grain, the Port District joined with a private organization, San Diego Bulk Terminal, to develop the silos. The Port District devoted \$100,000 to preparing the site and San Diego Bulk Terminal built the silo complex for \$1 million. With a storage capacity of 15,000 tons, the silo complex was completed in early 1970. The complex was altered in the mid-1980s when two new silos, both much larger than the original ones, were added to the north side of the facility. The rectangular, multi-story corrugated metal element with steel stairs on the southeast side of the original silos appears to have been built in the mid-1980s as well. The large conduit that currently extends from the top of the southeast silos to the bulk loader was installed within the past decade (Morin 1969:A-23; Ninyo & Moore 1999: Appendix A; Port District 1973:5; Shepard 1969A:B-1, 1969B: B-1).

The silo complex at the TAMT does not appear to be individually eligible for the CRHR. The complex does not appear to have significance for direct individual associations with a historically important event or pattern of events. Research has revealed no evidence that a noteworthy individual performed historically important work that was strongly associated the silo complex. Consequently, the complex does not appear to meet Criteria 1 or 2 for CRHR listing. Research efforts did not reveal any evidence that the silo complex is significant as the work of a master engineer or builder, and the original silos do not appear to be an engineering masterwork. Silo structures comparable in size, with equivalent reinforced-concrete construction, can be encountered throughout California and across the West Coast. The same can be said for the complex's original and entirely commonplace utilitarian corrugated-metal building. For these reasons, the silo complex does not appear to meet Criterion 3 for listing in the CRHR.

Archaeological Resources

While the record search failed to indicate the presence of archaeological resources within the study area, there exists potential for subsurface resources in the southeastern section of the study area due to the presence of an extensive prehistoric resource nearby. CA-SDI-5931 is approximately 200 feet northeast of the study area boundary and consists of an extensive artifact scatter and included one Native American burial found during grading activities within the BNSF railyard. The site was tested in 1993 within the railyard and yielded multiple artifacts. The record suggests the possibility of intact buried deposits and possible other human burials within the railyard beyond the areas tested in 1993 (Treganza, Gross, and Bull n.d.). Because the exact site boundary of CA-SDI-5931 is not known, and due to the proximity of the railyard to the study area, it is possible that the site extends within the TAMT Plan study area.

Built Environment Resources

The records search and research identified no built resources within the study area that have been determined or recommended eligible for the CRHR or the NRHP, or that have been previously designated by the City of San Diego or the County of San Diego as locally significant resources. ICF's historical resource evaluation of the potential TAMT historic district finds that the terminal does not appear to be eligible for the CRHR as a historic district. ICF's evaluations of surviving individual historic-period resources find that no resource within the TAMT Plan study area appears to be eligible for individual listing on the CRHR. Consequently, none of the historic-period built environment resources identified within the study area appear to qualify as a historical resource for the purposes of CEQA.

Recommendation 1. Provide Archaeological Monitor in Areas of Sensitivity

While no resources were identified within the study area, the possibility of subsurface archaeological deposits within the southeastern portion of the study area exists due to the presence of CA-SDI-5931 near the study area boundary. Archaeological monitoring is recommended because the exact southern boundary of CA-SDI-5931 is not known and the resource is extremely sensitive due to previously discovered Native American burials. Based on the currently known extent of CA-SDI-5931 and a review of maps to determine historic shorelines, monitoring is recommended for all ground-disturbing activities occurring within the area of archaeological sensitivity. The monitoring will be conducted by a qualified archaeologist(s), who meets the Secretary of the Interior's Professional Qualifications Standards as promulgated in 36 CFR 61, and a Native American cultural monitor, the latter of which has been requested by the Viejas Band of Kumeyaay Indians (Appendix A). The sensitive portion of the project area, where it is possible that artifacts associated with CA-SDI-5931 could be buried, is immediately east of Warehouse C and south and east of the silo complex and the rail car unloading building. The sensitive area includes the molasses tanks, truck scale building, spur lines north, east, and south of the molasses tanks, and paved and unpaved parking areas near the Crosby Road entrance.

The qualified archaeologist shall participate in a preconstruction meeting to inform all personnel of the potential for historical archaeological materials to be encountered during ground-disturbing activities.

If an isolated artifact or historic-period deposit is discovered that requires salvaging, the qualified archaeologist shall have the authority to temporarily halt construction activities within 100 feet of the find and shall be given sufficient time to recover the item(s) and map its location with a global positioning system device.

If buried cultural resources are discovered inadvertently during ground-disturbing activities, work should be temporarily halted in the area and within 100 feet of the find until a qualified archaeologist can assess the significance of the find and, if necessary, develop appropriate treatment measures in consultation with the Port District, the Viejas Band of Kumeyaay Indians, who have expressed interest and concern regarding the TAMT Plan study area, and any other appropriate agencies.

The qualified archaeologist shall treat recovered items in accordance with current professional standards by properly provenancing, cleaning, analyzing, researching, reporting, and curating them in a collection facility meeting the Secretary of the Interior's Standards as promulgated in 36 CFR 79, such as the San Diego Archaeological Center.

Within 60 days after completion of the ground-disturbing activity, the qualified archaeologist shall prepare and submit a final report to the Port District for review and approval, which shall discuss the monitoring program and its results, and provide interpretations about the recovered materials, noting to the extent feasible each item's class, material, function, and origin.

Impacts on discovered cultural resources would be reduced to a less-than-significant level because the recommended monitoring of any ground-disturbing activities in the area near CA-SDI-5931, and treatment of any discoveries, would minimize the potential of damage or loss of unknown subsurface archaeological resources.

Recommendation 2. Contact Authorities if Human Remains Are Encountered

No human remains are known to be located in the project area. However, there is the possibility that unmarked burials could be present within the study area, particularly at the southeastern portion of the study area in the vicinity of site CA-SDI-5931. Section 7050.5 of the California Health and Safety Code requires that construction or excavation be stopped in the vicinity of discovered human remains and that no further disturbance can occur until the county coroner has made a determination of origin and disposition pursuant to PRC Section 5097.98. If the remains are determined to be Native American, the coroner must contact NAHC, who will assign a most likely descendant to participate in determining the disposition of the remains. In addition, according to the California Health and Safety Code, six or more human burials at one location constitute a cemetery (Section 8100), and disturbance of Native American cemeteries is a felony (Section 7052). Given the highly unlikely chance that human remains would be encountered and the presence of regulations that would avoid any significant impacts on human remains, the project would result in no impact related to the disturbance of human remains.

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- . 1906C. San Diego, California. Sheet 13. Sanborn Map Company, New York, New York.
- . 1906D. San Diego, California. Sheet 15. Sanborn Map Company, New York, New York.
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Appendix A

Correspondence



June 16, 2014

Mr. Dave Singleton
Native American Heritage Commission
915 Capitol Mall, Room 364
Sacramento, California 95814

Re: Tenth Avenue Marine Terminal Optimization Project and Business Plan Update Initial Study

Dear Mr. Singleton:

This letter is a request for review of the Sacred Lands File for the Tenth Avenue Marine Terminal Optimization Project and Business Plan Update Initial Study (Project). Any information you are able to provide would be appreciated. Appropriate and other knowledgeable tribal members whose names and addresses you provide will be contacted.

ICF International is preparing an initial study for the Port of San Diego. The Project involves terminal upgrades and the adoption of a business plan to serve as a guide for future operations over the next 30 years. The terminal improvements would involve the demolition of two transit sheds, upgrades to on-terminal rail infrastructure, and the construction of modular office and restroom facilities. The terminal consists of 96 acres.

The project site is located along the San Diego Bay just west of Harbor Drive, near downtown San Diego. Specifically, the project site is located within La Nacion Land Grant as mapped on the United States Geological Survey (USGS) 7.5 minute Series National City, California quadrangle.

A record search conducted at the South Coastal Information Center on June 16, 2014 reported no previously identified prehistoric resources within the project area.

If you have any questions please feel free to contact me by telephone at 858-444-3936 or e-mail at Karolina.Chmiel@icfi.com. Our fax number is 858-578-0573.

Thank you,

A handwritten signature in blue ink, appearing to read "K. Chmiel".

Karolina Chmiel

Encl. Figure 1 – Project Location

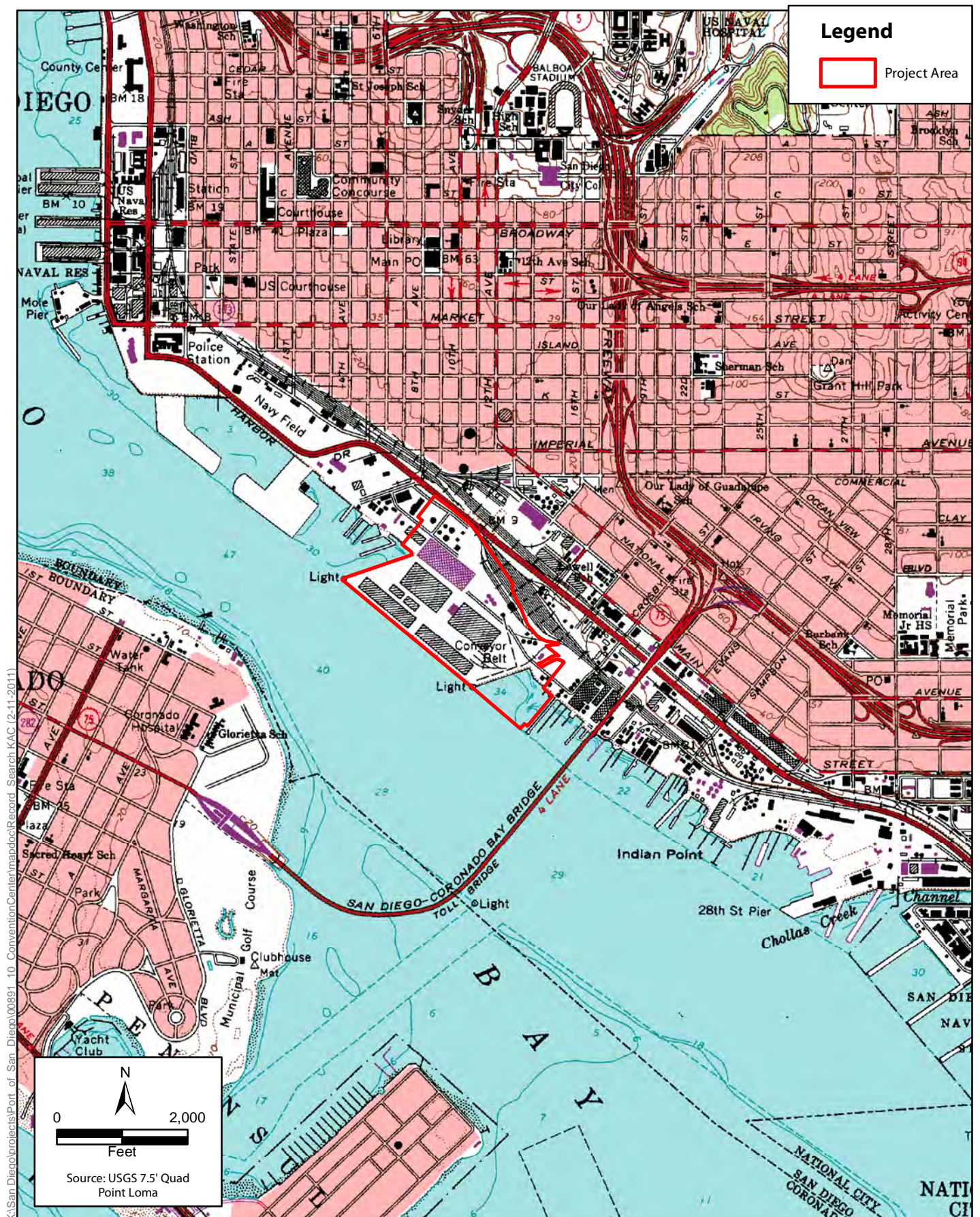


Figure 1
Project Location
Tenth Avenue Marine Terminal

STATE OF CALIFORNIAEdmund G. Brown, Jr., Governor**NATIVE AMERICAN HERITAGE COMMISSION**

1550 Harbor Boulevard, Suite 100
West Sacramento, CA 95691
(916) 372-3715
Fax (916) 373-5471
Web Site www.nahc.ca.gov
E-mail De_nahc@pacbell.net



June 30, 2014

Ms. Karolina Chmiel, M.A., Archaeologist

ICF INTERNATIONAL

9775 Businesspark Avenue, Suite 200
San Diego, CA 92131

Sent by FAX to: 858-578-0573
No. of Pages: 5

RE: Sacred Lands File Search and Native American Contacts list for the **"Tenth Avenue Marine Terminal Project and Business Plan Update Initial Study (for the Port of San Diego)"** located along Harbor Drive near Downtown San Diego; San Diego County, California

Dear Ms. Chmiel:

A record search of the NAHC Sacred Lands Inventory failed to indicate the presence of Native American traditional sites/places of the Project site(s) or 'areas of Potential effect' (APEs), submitted to this office. Note also that the absence of archaeological features, Native American cultural resources does not preclude their existence at the subsurface level.

In the 1985 Appellate Court decision (170 Cal App 3rd 604), the Court held that the NAHC has jurisdiction and special expertise, as a state agency, over affected Native American resources impacted by proposed projects, including archaeological places of religious significance to Native Americans, and to Native American burial sites.

When the project becomes public, please inform the Native American contacts as to the nature of the project (e.g. residential, renewable energy, infrastructure or other appropriate type). Attached is a list of Native American tribes, Native American individuals or organizations that may have knowledge of cultural resources in or near the proposed project area (APE). As part of the consultation process, the NAHC recommends that local government and project developers contact the tribal governments and Native American individuals on the list in order to determine if the proposed action might impact any cultural places or sacred sites. If a response from those listed on the attachment is not received in two weeks of notification, the NAHC recommends that a follow-up telephone call be made to ensure the project information has been received.

California Government Code Sections 65040.12(e) defines 'environmental justice' to provide "fair treatment of people...with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations and policies." Also, Executive Order B-10-11 requires that state agencies "consult with Native American tribes, their elected officials and other representatives of tribal governments in order to provide meaningful input into...the development of legislation, regulations, rules and policies on matter that may affect tribal communities."

If you have any questions or need additional information, please contact me at (916) 373-3715.

Sincerely,


Dave Singleton
Program Analyst

Attachments

**Native American Contacts
San Diego County California
June 27, 2014**

Barona Group of the Capitan Grande
Clifford LaChappa, Chairperson
1095 Barona Road Diegueno
Lakeside , CA 92040
sue@barona-nsn.gov
(619) 443-6612
(619) 443-0681

Sycuan Band of the Kumeyaay Nation
Daniel Tucker, Chairperson
5459 Sycuan Road Diegueno/Kumeyaay
El Cajon , CA 92019
ssilva@sycuan-nsn.gov
(619) 445-2613
(619) 445-1927 Fax

La Posta Band of Mission Indians
Gwendolyn Parada, Chairperson
8 Crestwood Road Diegueno/Kumeyaay
Boulevard , CA 91905
gparada@lapostacasino.
(619) 478-2113
(619) 478-2125

Viejas Band of Kumeyaay Indians
Anthony R. Pico, Chairperson
P.O. Box 908 Diegueno/Kumeyaay
Alpine , CA 91903
jhagen@viejas-nsn.gov
(619) 445-3810
(619) 445-5337 Fax

Manzanita Band of Kumeyaay Nation
Leroy J. Elliott, Chairperson
P.O. Box 1302 Diegueno/Kumeyaay
Boulevard , CA 91905
ljbirdsinger@aol.com
(619) 766-4930
(619) 766-4957 Fax

Kumeyaay Cultural Historic Committee
Ron Christman
56 Viejas Grade Road Diegueno/Kumeyaay
Alpine , CA 92001
(619) 445-0385

San Pasqual Band of Mission Indians
Allen E. Lawson, Chairperson
P.O. Box 365 Diegueno
Valley Center, CA 92082
allenl@sanpasqualband.com
(760) 749-3200
(760) 749-3876 Fax

Campo Band of Mission Indians
Ralph Goff, Chairperson
36190 Church Road, Suite 1 Diegueno/Kumeyaay
Campo , CA 91906
chairgoff@aol.com
(619) 478-9046
(619) 478-5818 Fax

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.6 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting locative Americans with regard to cultural resources for the proposed Tenth Avenue Marine Terminal Optimization Project and Business Plan/Initial Study; located along Harbor Drive near Downtown San Diego; San Diego County, California for which a Sacred Lands File search and Native American Contacts list were requested.

**Native American Contacts
San Diego County California
June 27, 2014**

Jamul Indian Village
Raymond Hunter, Chairperson
P.O. Box 612
Jamul, CA 91935
jamulrez@sctdv.net
(619) 669-4785

Diegueno/Kumeyaay

Kumeyaay Cultural Repatriation Committee
Steve Banegas, Spokesperson
1095 Barona Road
Lakeside, CA 92040
sbenegas50@gmail.com
(619) 742-5587
(619) 443-0681 Fax

Diegueno/Kumeyaay

Mesa Grande Band of Mission Indians
Mark Romero, Chairperson
P.O. Box 270
Santa Ysabel, CA 92070
mesagrandeband@msn.com
(760) 782-3818
(760) 782-9092 Fax

Diegueno

Viejas Band of Kumeyaay Indians
ATTN: Julie Hagen, Cultural Resources
P.O. Box 908
Alpine, CA 91903
jhagen@viejas-nsn.gov
(619) 445-3810
(619) 445-5337

Diegueno/Kumeyaay

Kwaaymii Laguna Band of Mission Indians
Carmen Lucas
P.O. Box 775
Pine Valley, CA 91962
(619) 709-4207

Diegueno-Kwaaymii

Ewiiapaayp Tribal Office
Will Micklin, Executive Director
4054 Willows Road
Alpine, CA 91901
wmicklin@leaningrock.net
(619) 445-6315
(619) 445-9126 Fax

Diegueno/Kumeyaay

Inaja Band of Mission Indians
Rebecca Osuna, Chairman
2005 S. Escondido Blvd.
Escondido, CA 92025
(760) 737-7628
(760) 747-8568 Fax

Diegueno

Ipay Nation of Santa Ysabel
Clint Linton, Director of Cultural Resources
P.O. Box 507
Santa Ysabel, CA 92070
cjlinton73@aol.com
(760) 803-5694

Diegueno/Kumeyaay

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Tenth Avenue Marine Terminal Optimization Project and Business Plan/Initial Study; located along Harbor Drive near Downtown San Diego; San Diego County, California for which a Sacred Lands File search and Native American Contacts list were requested.

**Native American Contacts
San Diego County California
June 27, 2014**

Kumeyaay Diegueno Land Conservancy
Mr. Kim Bactad, Executive Director
2 Kwaaypaay Court Diegueno/Kumeyaay
El Cajon , CA 91919
kimbactad@gmail.com
(619) 659-1008 Office
(619) 445-0238 Fax

Inter-Tribal Cultural Resource Protection Council
Frank Brown, Coordinator
240 Brown Road Diegueno/Kumeyaay
Alpine , CA 91901
frbrown@viejas-nsn.gov
(619) 884-6437

Kumeyaay Cultural Repatriation Committee
Bernice Paipa, Vice Spokesperson
P.O. 937 Diegueno/Kumeyaay
Boulevard , CA 91905
bernicepaipa@gmail.com

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Tenth Avenue Marine Terminal Optimization Project and Business Plan/Initial Study; located along Harbor Drive near Downtown San Diego; San Diego County, California for which a Sacred Lands File search and Native American Contacts list were requested.



May 11, 2015

[NAME]
[ADDRESS]
[ADDRESS]
[ADDRESS]

Subject: Cultural Resources Documentation for the Tenth Avenue Marine Terminal Near-Term Optimization Improvements Project and Maritime Cargo Redevelopment Plan, San Diego, California.

Dear [NAME]:

I'm writing to inform you that ICF International is preparing cultural resources documentation in support of an environmental impact report (EIR) for the Tenth Avenue Marine Terminal (TAMT) Near-term Optimization Improvements Project (Near-term Project) and the TAMT Maritime Cargo Redevelopment Plan (Plan) Project. The project is located at 623 Switzer Street, San Diego, CA 92101, just south of Downtown San Diego. The project is located in Pueblo Lands of San Diego, on the Point Loma California USGS 7.5-minute series topographic maps (Figure 1).

The proposed Near-term Project would include demolition of two obsolete and underutilized transit sheds, installation of a rail lubricator and compressed air system on the existing track to improve rail operations, installation of additional refrigerated plugs and a racking system to accommodate additional near-term throughput for container cargo, and construction of a modular office with restroom facilities. These proposed changes are anticipated to begin in approximately 2016 and be completed within 29 weeks.

The proposed Plan would replace an existing 2008 plan to provide greater flexibility and meet current and future market conditions at the terminal. Depending on market opportunities, some improvements identified in the Plan may occur within a 5- to 10-year (Year 2025) planning horizon, whereas others may not occur until the 10- to 20-year (Year 2035) planning horizon. The proposed Plan includes a variety of infrastructure investments that may be undertaken over the long-term to accommodate a need to increase the terminal's capabilities and capacity. These include gantry cranes, additional dry bulk storage capacity, enhancements to the existing conveyor system, demolition of the molasses tanks and Warehouse C, additional open storage space, and on-dock intermodal rail facilities.

ICF International has been retained to conduct cultural resources documentation in support of the EIR. A site visit conducted by ICF archaeologist noted that the whole project area is currently paved over or covered in buildings. A record search conducted by the South Coastal Information Center (SCIC) revealed the presence of two resources (historic era railroads) in the project area and

[NAME]
May 11, 2015
Page 2 of 2

multiple resources within a half-mile buffer including one prehistoric artifact scatter located 160 feet northeast of the project boundary.

The Native American Heritage Commission (NAHC) completed a search of the Sacred Lands File which failed to indicate the presence of Native American cultural resources in the area. The NAHC also identify you as a person who may have concerns or knowledge of cultural resources in the project area. Any information you might be able to share about the Project Area would greatly enhance the study and would be most appreciated.

If you have any concerns or recommendations regarding the Project, please respond to this letter so that they can be incorporate them into our draft report. As required by State law, all site data and other culturally sensitive information will not be released to the general public and will be kept strictly confidential.

I may be reached by letter, email (Karolina.chmiel@icfi.com) or phone (858-444-3936). Thank you for your time.

Sincerely,

A handwritten signature in blue ink, appearing to read 'K. Chmiel'.

Karolina Chmiel, MA
Archaeologist

Encl. Figure 1

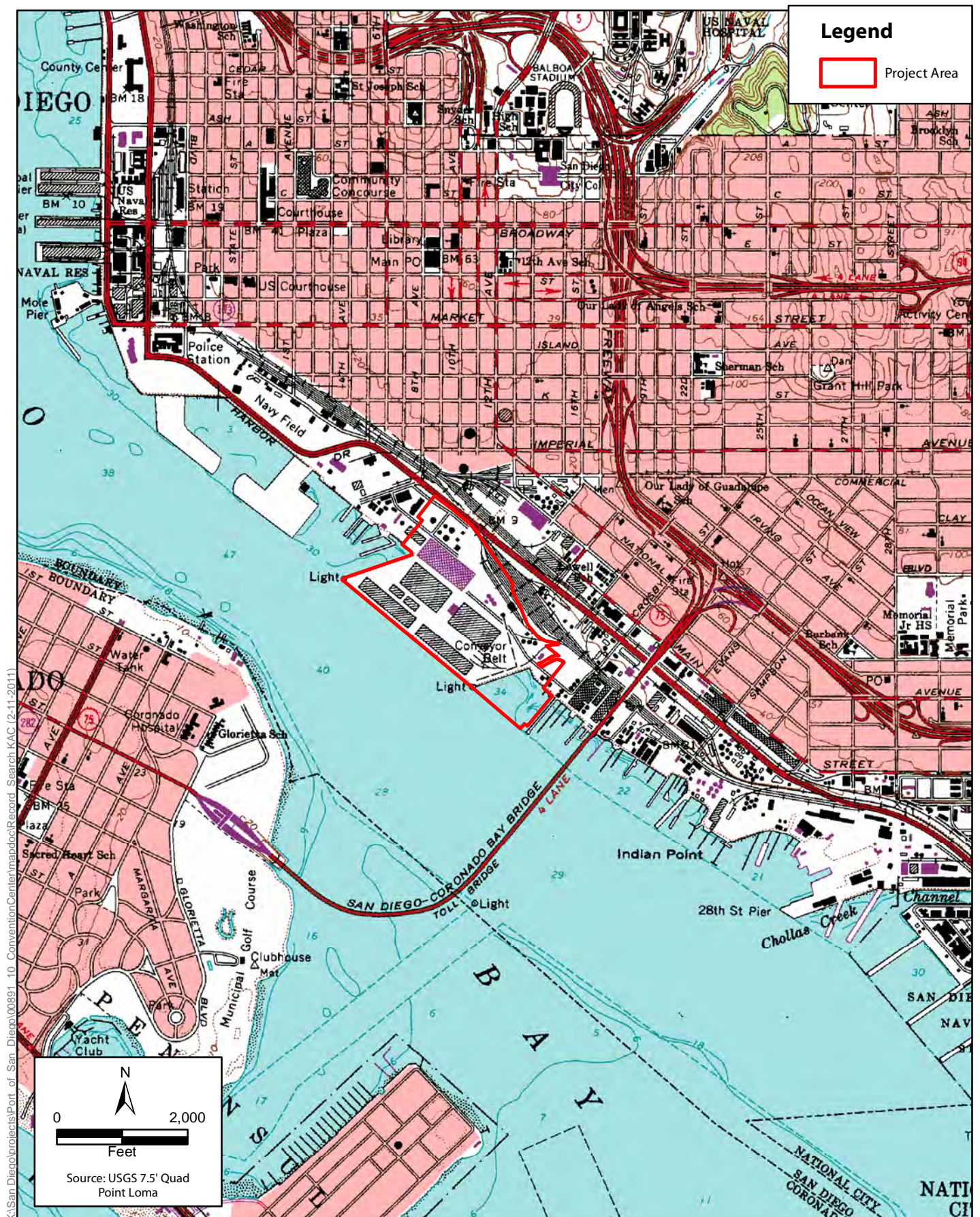


Figure 1
Project Location
Tenth Avenue Marine Terminal

VIEJAS

TRIBAL GOVERNMENT

P.O. Box 908
Alpine, CA 91903
#1 Viejas Grade Road
Alpine, CA 91901

Phone: 6194453810
Fax: 6194455337
viejas.com

May 26, 2015

Karolina Chmiel
9775 Businesspark Ave., Suite 200
San Diego, CA 92131

RE: Tenth Avenue Marine Terminal

Dear Ms. Chmiel,

The Viejas Band of Kumeyaay Indians ("Viejas") has reviewed the proposed project and at this time we have determined that the project site is has cultural significance or ties to Viejas. Viejas Band request that a Kumeyaay Cultural Monitor be on site for all ground disturbing activities to inform us of any new developments such as inadvertent discovery of cultural artifacts, cremation sites, or human remains. Please call Julie Hagen for scheduling at 619-659-2339 or email jhagen@viejas-nsn.gov. Thank you

Sincerely,

VIEJAS BAND OF KUMEYAAY INDIANS

Appendix B
CA DPR 523 Forms

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code(s) 6Z

Other Listings
Review Code

Reviewer

Date

Page 1 of 61

*Resource Name or #: Tenth Avenue Marine Terminal

P1. Other Identifier:

*P2. Location: ☐ Not for Publication ☒ Unrestricted

*a. County: San Diego

*b. USGS 7.5' Quad: Point Loma Date: 1967 (PR 1975) T17S R3W; ¼ of Sec N/A (Pueblo Lands of San Diego Land Grant); San Bernardino B.M.

c. Address: 623 Switzer Street

City: San Diego

Zip: 92101

d. UTM: See accompanying forms for individual resources

Elevation:

e. Other Locational Data:

*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The Tenth Avenue Marine Terminal occupies a 96-acre site located along the northeast shoreline of San Diego Harbor, south of downtown San Diego and north of the Coronado Bridge. The terminal is a mole wharf (also known as marginal wharf) formed of dredged fill and rock-and-concrete bulkhead walls (or quay walls) adjacent to ship channels. The terminal provides nine ship-berthing spaces. The terminal's remaining original elements dating the 1957-64 period of its initial development include Transit Sheds 1 and 2, Warehouses B and C, the bunker fuel complex at the northeast corner of the site, the truck scale building and Pacific Molasses Company tanks at the southeast corner of the site, the bulk loader, and rail lines that run throughout the site. The terminal includes a silo complex and associated conveyance conduits and features, as well as other structures and ancillary buildings developed after 1964.

*P3b. Resource Attributes: (List attributes and codes) HP11.Engineering structure; HP8. Industrial building

*P4. Resources Present: ☐ Building ☐ Structure ☐ Object ☐ Site ☒ District ☐ Element of District ☐ Other (Isolates, etc.)



P5b. Description of Photo:

(View, date, accession #) Tenth Avenue Marine Terminal from Coronado Bridge, looking northwest

*P6. Date Constructed/Age and Sources: ☒ Historic ☐ Prehistoric ☐ Both
1957-64 (see 523D Form and page 8 Continuation Sheet)

***P7. Owner and Address:**

Unified Port of San Diego
3165 Pacific Highway
San Diego, CA 92101

*P8. Recorded by: (Name, affiliation, and address):
Tim Yates, ICF International
575 B Street, Ste. 1700
San Diego, CA 92101

*P9. Date Recorded: May 14, 2014

*P10. Survey Type: Intensive

*P11. Report Citation: (Cite survey report and other sources, or enter "none.") ICF International. 2016. Cultural Resources Inventory and Evaluation Report for the Tenth Avenue Marine Terminal Redevelopment Plan and Demolition and Initial Rail Component (ICF 00165.14). San Diego, CA. Prepared for the San Diego Unified Port District

*Attachments: ☐ NONE ☒ Location Map ☒ Sketch Map ☒ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☒ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List):

D1. Historic Name: Tenth Avenue Marine Terminal

D2. Common Name: Tenth Avenue Marine Terminal

***D3. Detailed Description** (discuss overall coherence of the district, its setting, visual characteristics, and minor features. List all elements of the district):

The Tenth Avenue Marine Terminal occupies a 96-acre site located along the northeast shoreline of San Diego Harbor, south of downtown San Diego and north of the Coronado Bridge. The terminal is a mole wharf (also known as marginal wharf) formed of dredged fill and rock-and-concrete bulkhead walls (or quay walls) adjacent to ship channels. The terminal provides nine ship-berthing spaces. The terminal's surviving original elements dating to the 1957-64 period of its initial development include Transit Sheds 1 and 2 (portions of Transit Shed 1 have been demolished), Warehouses B and C, the bunker fuel complex at the northeast corner of the site, the truck scale building and molasses tanks at the southeast corner of the site, the bulk loader system, and rail lines that run throughout the site. The terminal also includes a silo complex and associated conveyance conduits and features, as well as other structures and ancillary buildings developed after 1964 (see Continuation Sheet).

***D4. Boundary Description** (describe limits of district and attach map showing boundary and district elements):

The limits of the potential Tenth Avenue Marine Terminal historic district are the terminal's 96-acre property boundary. See page 4 Sketch Map.

***D5. Boundary Justification:**

The boundary of this potential district corresponds roughly to the Tenth Avenue Marine Terminal's boundaries during the 1957-64 period of potential significance, and encompasses all surviving elements of the Tenth Avenue Marine Terminal dating to that period.

***D6. Significance: Theme:** N/A

Area: N/A

Period of Significance: N/A

Applicable Criteria: N/A

(Discuss district's importance in terms of its historical context as defined by theme, period of significance, and geographic scope. Also address the integrity of the district as a whole)

The Tenth Avenue Marine Terminal does not appear to be eligible for listing on the CRHR as a historic district. Consequently, the terminal does not appear to comprise a district qualifying as a historical resource for the purposes of CEQA. This evaluation is based on the extensive historical context included in the cultural resources technical study to which this District DPR form set has been appended. Evaluations of individual resources addressed in this district evaluation are included below (see Continuation Sheet).

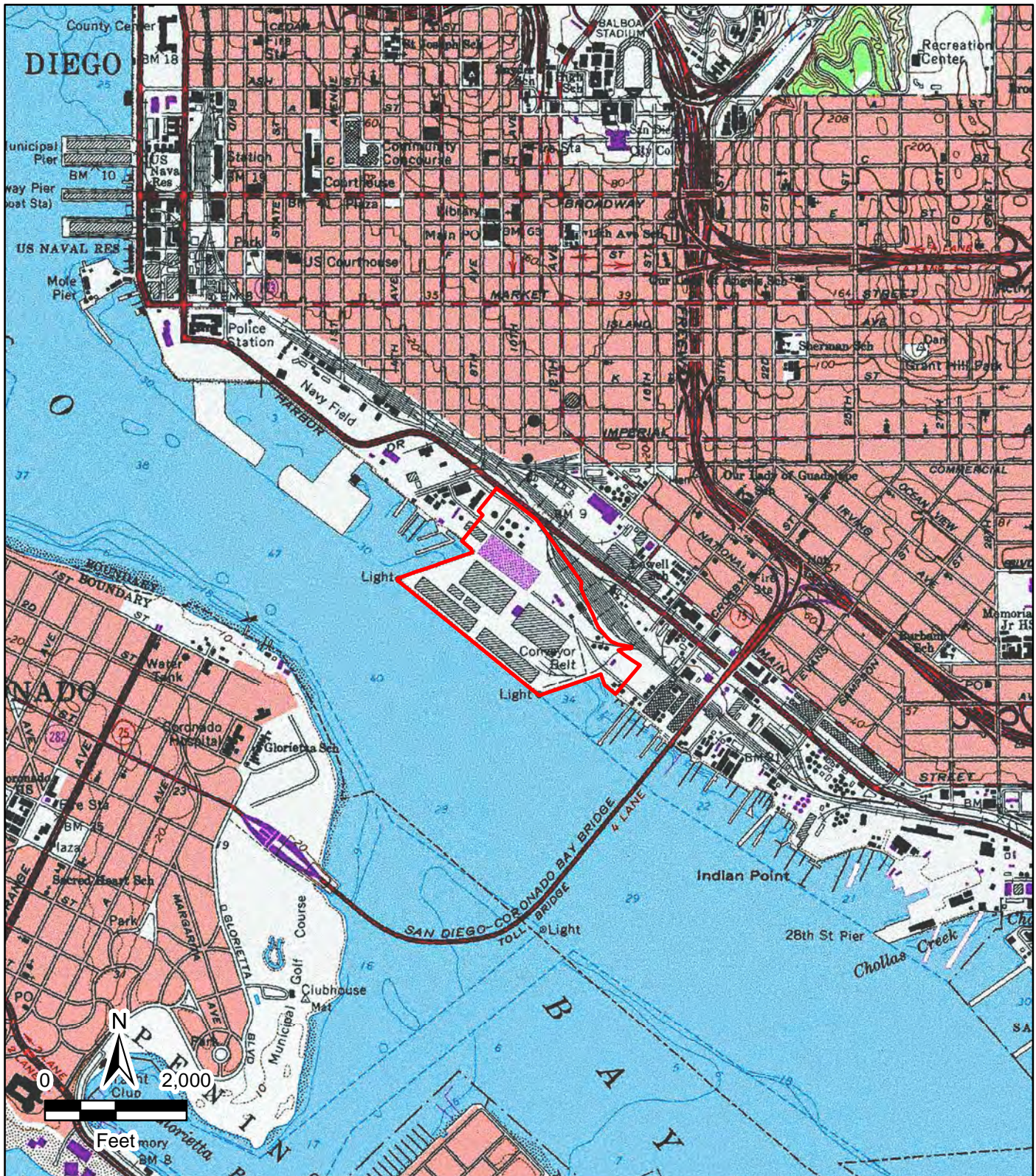
***D7. References** (Give full citations including the names and addresses of any informants, where possible):

This district evaluation makes limited reference to historical sources, which are listed below on the page 8 Continuation Sheet. To review the historical context that has framed this district evaluation and the full range historical sources referenced in the historical context, the reader is invited to consult the technical study: ICF International. 2016. Cultural Resources Inventory and Evaluation Report for the Tenth Avenue Marine Terminal Redevelopment Plan and Demolition and Initial Rail Component (ICF 00165.14). San Diego, CA. Prepared for the San Diego Unified Port District.

***D8. Evaluator:** Timothy Yates, Ph.D.

Date: May 15, 2015

Affiliation and Address: ICF International, 575 B Street, Ste. 1700, San Diego, CA 92101





Page 5 of 61

*Resource Name or # (Assigned by recorder) Tenth Avenue Marine Terminal

*Recorded by T. Yates, ICF International

*Date May 14, 2014

☒ Continuation ☐ Update

***D3. Detailed Description** (continued):

The two transit sheds and two warehouse buildings are formed of tilt-up concrete walls and steel roof trusses. These buildings have numerous warehouse entries secured by roll-up metal doors. Some of the transit-shed wall slabs are scored with decorative fluted panels and Moderne-style signage identifying the Port of San Diego or individual ship berths. At the northwest elevation of Transit Shed 2 is a Modern-style two-story headhouse with circular windows and other elements intended to evoke nautical associations. Transit Shed 1's headhouse and its southeastern storage space have been demolished. The original traffic island, pillar, and signage located between the two transit sheds have also been demolished. Warehouses B and C are more utilitarian than the Transit Sheds, with decorative features limited to modest-sized scored concrete signage with Moderne-style lettering identifying the buildings at their corners. A small addition and refrigeration machinery have been added to the northwest elevation of Warehouse B in recent decades, and Warehouse C has a large 1970s addition the southeastern portion of the plan. Transit Shed 2 has non-original concrete unloading and conveyance machinery at the southeastern portion of the plan.

Two smaller buildings are associated with and located on the southeast side of the bunker fuel complex's five sizeable steel tanks, which are situated at the northeast corner of the terminal site. The complex originally had four larger tanks and multiple smaller acid and oil tanks. Located at the southeast corner of the site near the terminal's main entrance are the predominantly utilitarian truck scale building, which features a Modern-style flat overhanging roof, and the three sizeable steel Pacific Molasses Company tanks.

The bulk loader consists of a rail car unloading building, an underground conveyor that transmits dry bulk material to a junction house west of the rail car unloading building and northeast of Warehouse C, an elevated conveyor system that stretches from the junction house to the terminal's southern berths, and an elevated conveyor connected to traveling ship loader that extends across the southern berths. The rail car unloading building and the junction house are utilitarian structures with corrugated-metal roofs and cladding. The bulk loader's original junction house is connected to a non-original junction house by a non-original conveyor segment. The non-original junction house is connected by a non-original cylindrical conduit to the tops of a non-original silo complex constructed west of the rail car unloading building east of Warehouse C's north corner in the 1970, and subsequently expanded with additional silos and utilitarian buildings. Because it was constructed over five years after the potential period of district significance, the silo complex is not considered a potential contributor. Individual DPR 523A and 523B forms for the resources comprising the potential district's individual potential contributors are included below.

***D6. Significance** (continued):

The development of the Tenth Avenue Marine Terminal does not appear to qualify as an event meriting the site for listing on the CRHR as a historic district. The Embarcadero Piers were San Diego's first municipally developed commercial maritime shipping facility, not the Tenth Avenue Marine Terminal. Although the terminal's development was associated with overall post-World War II economic growth in San Diego, such association is too commonplace to qualify the terminal for CRHR listing. All infrastructure is developed to spur growth or accommodate existing or anticipated growth. It is undeniable that the Tenth Avenue Marine Terminal increased San Diego's share of the California and west-coast commercial-port shipping business, and that the terminal represented an economic asset to the city that made use of the advantages afforded by the city's natural harbor. However, the Tenth Avenue Marine Terminal did not equip San Diego to move up beyond a middle-range status among west coast ports and seriously rival larger, more established commercial shipping facilities at the Ports of Los Angeles and Long Beach and at major west coast ports farther north. In fact, the Port of San Diego's position relative to California and other west coast ports actually weakened slightly overall following the 1957-64 period of potential significance, during the latter 1960s and early 1970s. With the advent of container shipping, the National City Marine Terminal would need to be developed into a container facility to maintain the Port of San Diego's position as a middle-level player in the commercial port-shipping business on the west coast.

Other economic factors were far more important to San Diego's post-World War II economic growth than the Tenth Avenue Marine Terminal. San Diego had become a military town by the 1920s. World War II increased the U.S. Navy's longstanding and leading role in the local economy, as well as its physical presence in San Diego Harbor. After World War II, federal military spending would continue to be far more important to the San Diego economy than the terminal's commercial shipping activities, as would local economic factors such as defense contracting, the aircraft industry, shipbuilding, and tourism. After 1965, problems with the bulk loader and changing economic conditions would require the terminal to be altered from its original design and initial 1957-1964 development. The Port District's airport and property management revenues would dramatically exceed revenues from terminal operations during the latter 1960s. The Tenth Avenue Marine Terminal did not, in itself, transform San Diego's economy. San Diego's economic prospects during the latter 1960s and early 1970s were enhanced by the terminal and numerous other factors, but it does not appear that the city's economic prospects depended on the terminal from the late 1950s to the early 1970s. For these reasons, the Tenth Avenue Marine Terminal does not appear to meet CRHR Criterion 1.

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*Resource Name or # (Assigned by recorder) Tenth Avenue Marine Terminal

*Recorded by T. Yates, ICF International

*Date May 14, 2014

☒ Continuation ☐ Update

Development of the Tenth Avenue Marine Terminal was one of multiple major harbor projects and initiatives completed or planned under City Harbor Department/Port District Director John Bate, who is a significant figure in post-World War II San Diego history. In addition to the Tenth Avenue Marine Terminal, included the creation of Shelter Island, the expansion and modernization of Lindbergh Field, the creation of Harbor Island, planning for conversion of the Embarcadero Piers to recreation and tourism uses, and planning for development of the National City Marine Terminal. Bate was also the organizational and political architect of San Diego's Unified Port District. Although Bate was an engineer by training, his role in shaping the non-military features of San Diego's evolving post-World War II Harbor was primarily as a manager and planner. The engineering team that worked under Harbor Department/Port District Director Bate designed the Tenth Avenue Marine Terminal. As a *San Diego Evening Tribune* editorial explained soon after Bate's death in 1983, "if one person were to be picked out of the beautiful crowd as most responsible for San Diego's beautiful harbor, it would have to be John Bate . . . Most of his dreams became realities. He helped to develop the bay into a playground and seaport any city in the world would envy. If he could never make it the major terminus for commercial shipping that he envisioned, it was not for lack of trying (*San Diego Evening Tribune* 1983). The Tenth Avenue Marine Terminal was part of Bate's evolving efforts to diversify San Diego Harbor uses beyond military facilities, ship building, and the tuna industry by creating new commercial-shipping and tourist-oriented facilities.

The Tenth Avenue Marine Terminal does not, however, appear to have sufficiently direct association with Bate under Criterion 2 to qualify for listing on the CRHR as a historic district. Bate did not reside at the terminal. Although the Tenth Avenue Marine Terminal had on-site Harbor Department/Port District offices (which have been demolished), it was not Bate's primary workplace as Harbor Department/Port District Director. The City Harbor Department's headquarters were located over a mile northwest of the terminal in a building at Harbor Drive and Ash Street that has been demolished. Several years after the creation of the Unified Port District, and a year before Bate's retirement, the Port District's headquarters were relocated farther north to the current Port District headquarters building on Pacific Coast Highway (Port District ca. 1974:5). For these reasons, the Tenth Avenue Marine Terminal does not appear eligible for CRHR listing as a historic district under Criterion 2. Moreover, even if the terminal did have significance under Criterion 2, it does not retain sufficient historical integrity to convey significance attributable to it under any of the CRHR Criteria. The terminal's substantially diminished historical integrity is addressed in more detail below.



Aerial photograph of Tenth Avenue Marine Terminal in 1965, showing the facility's originally planned elements developed during its 1957-1964 period of potential significance, looking northwest (from San Diego History Center Photograph Collection, Kazikowski 4-17-65 No. 81)

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*Recorded by T. Yates, ICF International

*Resource Name or # (Assigned by recorder) Tenth Avenue Marine Terminal
*Date May 14, 2014 ☒ Continuation ☐ Update



Recent aerial photograph of Tenth Avenue Marine Terminal, compare to the 1965 aerial photograph above: at the upper right a high-rise hotel stands where Warehouse A stood in 1965; refrigerated truck containers occupy areas where the truck repair buildings and union hall/office building offices stood in 1965; silos, conduits, and a junction house developed in 1970 and later are located east of Warehouse C, which has a large 1970s addition at its southeast end; the headhouse and southeastern storage space of Transit Shed 1 have been demolished along with the original traffic island and sign between the two transit sheds (From San Diego Unified Port District)

The Tenth Avenue Marine Terminal does not appear to be significant for its overall design and engineering, or for the limited architectural elements of its larger 1957-64 period buildings. The terminal's mole (or marginal) design and construction does not appear to have represented a major milestone in harbor engineering. Harbor Department Chief Engineer J. E. Liebmann and engineer Greer W. Ferver likened its concrete and rock bulkhead walls to the well-established technology of the gravity dam (Liebmann and Greer 1958:40). In terms of engineering, the creation of large, seismically safe, fire-proof transit sheds and warehouse buildings with concrete walls atop fill appears to have been the most challenging element of the terminal's design and construction. For the transit sheds, this was achieved through the use of established technology, by driving 370 foundation piles of an existing type (Raymond step-taper piles), and attaching the tops of the piles below longitudinal walls to a concrete grade beam that functioned as a strut. While this solution to the threat of subsidence was described in a 1958 article authored by Liebmann and Greer in *Civil Engineering*, it does not appear to represent a major milestone in design and construction of port facilities, and the article appears to have served in part as a means to promote the new terminal (Liebmann and Greer 1958: 43).

The terminal's bunker fuel facilities represented its most innovative feature, and Liebmann touted the terminal's ship fueling and ballast water removal facilities in a second *Civil Engineering* article on the terminal in 1960. While this element of the terminal made it a more attractive shipping facility by providing for ships to be conveniently serviced on site with refueling at competitive prices during cargo unloading and loading activities, it does not appear that creation of these facilities involved historic engineering milestones. The bunker fuel and ballast water removal facilities provided a notable service that helped the terminal compete for several years after it opened for business in 1958. However, this initially successful feature was undermined fairly quickly during the 1960s as ports in Japan began selling ship fuel at substantially lower prices than other Pacific ports (Irwin 1970:57; Liebmann 1960:69-72).

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*Resource Name or # (Assigned by recorder) Tenth Avenue Marine Terminal

*Recorded by T. Yates, ICF International

*Date May 14, 2014

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Other elements of the Tenth Avenue Marine Terminal—the surviving architectural features of the transit sheds, the extensive bulk loader system—do not appear to have sufficient historical significance to qualify the terminal for CRHR listing as a historic district for design or engineering attributes. The terminal's bulkloader was an example of technology developed beginning in the early twentieth century that evolved over the course of the century. The Port of Long Beach developed comparable bulk loader facilities at the same time that the Tenth Avenue Marine Terminal developed its bulk loader facilities. Most of the surviving buildings at the terminal are primarily utilitarian in design. Non-utilitarian architectural features include the decorative fluted panels on some transit-shed wall slabs, the overall Modern architecture and nautically oriented design elements of the surviving transit shed headhouse, and the somewhat retrograde (for the late 1950s) Moderne lettering of scored signage on limited portions of the transit sheds' and warehouses' concrete wall slabs. These features do not appear to have sufficient importance to qualify the terminal for CRHR listing as a historic district. For these reasons, the Tenth Avenue Marine Terminal does not appear to meet Criterion 3 for listing on the CRHR.

Alterations have substantially diminished the Tenth Avenue Marine Terminal's historical integrity since its 1957-64 period of significance, the years during which the terminal's originally planned elements were constructed. Arguably the most noteworthy diminishment of historical integrity has occurred in the area where the terminal's dedication ceremonies took place in November 1958, between the transit shed headhouses. There, the original traffic island, pillar, and signage formed the symbolic focal point of the dedication ceremonies, and throughout the 1957-64 period of potential significance these elements were integral to the heavily trafficked space between the transit sheds. Sometime after the period of significance, the traffic island, pillar, and signage were demolished. Transit Shed 1's headhouse and the southeastern quarter of its storage space were demolished more recently. Demolition of these elements has substantially altered the terminal's original design, and notably diminished the historic feeling and setting in this area of the terminal. Extensive concrete unloading and conveyance machinery was also added to the southeast of portion of Transit Shed 2 after the 1970s, which has diminished integrity of design and feeling at this portion of the building.

Numerous buildings present at the terminal to the northeast and east of Warehouse B during the 1957-64 period of potential significance have been demolished, including Warehouse A, the Harbor Department office building/union hall, and two truck repair buildings. The silos constructed by 1970 east of Warehouse C were created to enhance the terminal's disappointing dry-bulk export output. Rising much higher than other structures at the site, the silos significantly altered terminal viewsheds. Two larger silos and multiple utilitarian buildings were added to the silo complex in subsequent decades. A major, inharmonious addition to the southeast elevation of Warehouse C that does not have concrete walls was constructed during the 1970s. This has reduced the warehouse's integrity of design and materials, the terminal's design, and the setting and feeling in that area of the terminal. The bunker fuel complex now has five larger tanks when it originally had four, and its original smaller oil and acid tanks have been removed. The original rotary unloading machinery in the rail car unloader building has been removed. Altering viewsheds further, by 2006 a large non-original conduit had been installed that extends from the tops of the southeastern 1970s silos to a new junction structure connected to the bulk loader conveyor. A new conveyor segment also connected the new junction structure to the bulk loader's original junction house. Collectively, these changes have diminished the terminal's integrity of design, setting, and feeling.

In summary, the Tenth Avenue Marine Terminal does not appear to be eligible for CRHR listing as a historic district. Consequently, the terminal does not appear to comprise a district qualifying as a historical resource for the purposes of CEQA.

***D7. References** (continued):

Irwin, Wayne Ray. 1970. The Port of San Diego: An Economic Geography of Waterborne Trade. Master's Thesis in Geography, San Diego State College, San Diego, California.

Liebmann, Joachim E (J.E.). Ship Bunkering Facilities for a Cargo Pier. *Civil Engineering*. 30 (March): 69-72.

Liebmann, Joachim E. (J.E.), and Greer W. Ferver. Twin Dock-Side Transit Sheds for San Diego. *Civil Engineering*. 28 (November): 40-43.

San Diego Evening Tribune. 1983. John Bate Brought Sparkle to Our Bay. April 30. Un-paginated newspaper clipping from Biographic Files, Burr-Baz. San Diego History Center, San Diego, California.

San Diego Unified Port District (Port District). Ca. 1974. History and Development of the Port of San Diego. Unpublished Pamphlet on File at the San Diego Public Library, Ninth Floor San Diego Heritage Room.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code(s) 6Z

Other Listings
Review Code

Reviewer

Date

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*Resource Name or #: Transit Shed 1, Tenth Avenue Marine Terminal

P1. Other Identifier:

*P2. Location: ☐ Not for Publication ☒ Unrestricted

*a. County: San Diego

*b. USGS 7.5' Quad: Point Loma Date: 1967 (PR 1975) T17S R3W; ¼ of Sec N/A (Pueblo Lands of San Diego Land Grant); San Bernardino B.M.

c. Address: 623 Switzer Street

City: San Diego

Zip: 92101

d. UTM: Zone: 11 (NAD 83); 485059 mE/ 3618050 mN (G.P.S.) (approximate center of building footprint)

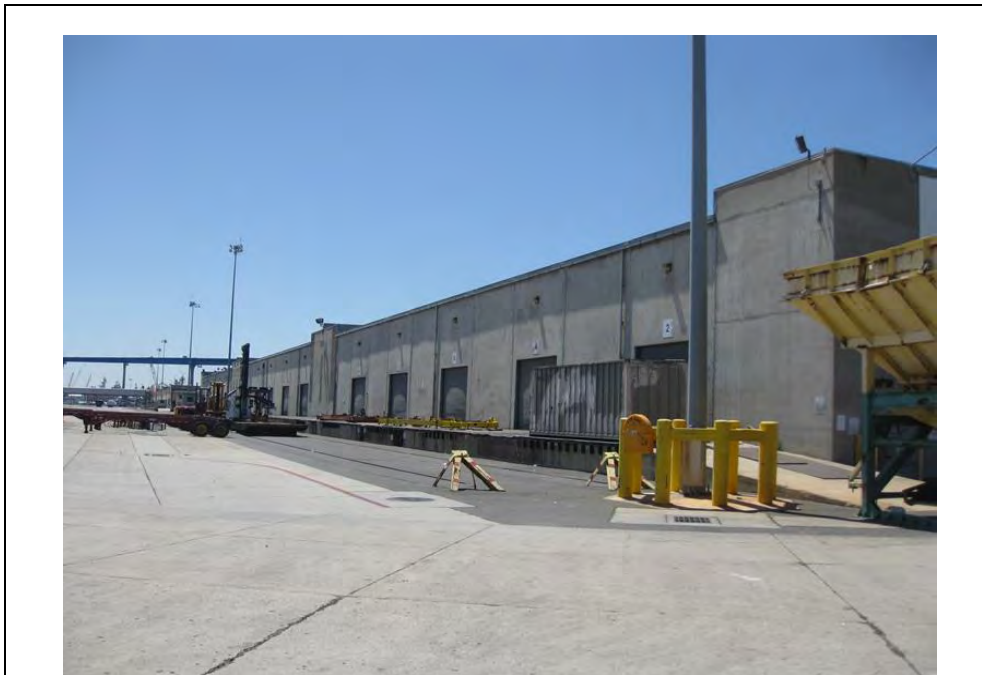
e. Other Locational Data:

Elevation:

*P3a. **Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
Located at the northwest portion of the terminal site, Transit Shed 1 has a long rectilinear plan and is constructed of tilt-up fireproof concrete walls and steel roof trusses. Two transverse concrete walls divide the approximately 145,000 square-foot building into three interior storage spaces. Square shaped concrete wall slabs at each end of the interior transverse walls, and rectangular-shaped wall slabs at the ends of the northwest and southeast elevations rise higher than adjacent wall slabs to form parapets. These parapet-topped concrete wall slabs are scored with decorative Moderne-style fluted panels and signage identifying berth numbers, or the Port of San Diego and the year 1957—the year construction began on the terminal's transit sheds. The roofs of the building's three interior spaces slope downward to the southwest and northeast from central ridges. Each of the building's three interior spaces has five large loading entries with roll-up metal warehouse doors along the southwest and northeast elevations. Concrete truck-loading platforms extend along most of the building's northeast elevation. The southeast and northwest elevations each have a single centered entry large enough to allow trucks to enter the building. These are also secured by metal roll-up warehouse doors. Industrial-grade pedestrian doors provide access to the building at various locations. The southwest elevation features windows at two locations, including a pair of original steel-frame windows that appear to incorporate awning or hopper sashes (see Continuation Sheet).

*P3b. **Resource Attributes:** (List attributes and codes) HP8. Industrial building

*P4. **Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)



P5b. Description of Photo:

(View, date, accession #)
Northeast elevation, looking southeast

*P6. **Date Constructed/Age and Sources:** ☒ Historic
☐ Prehistoric ☐ Both
1957-58 (see references on page 14 Continuation Sheet)

*P7. **Owner and Address:**
Unified Port of San Diego
3165 Pacific Highway
San Diego, CA 92101

*P8. **Recorded by:** (Name, affiliation, and address):
Tim Yates, ICF International
575 B Street, Ste. 1700
San Diego, CA 92101

*P9. **Date Recorded:** May 14, 2014

*P10. **Survey Type:** Intensive

*P11. **Report Citation:** (Cite survey report and other sources, or enter "none.") ICF International. 2016. Cultural Resources Inventory and Evaluation Report for the Tenth Avenue Marine Terminal Redevelopment Plan and Demolition and Initial Rail Component (ICF 00165.14). San Diego, CA. Prepared for the San Diego Unified Port District

*Attachments: ☐ NONE ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☐ Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

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*NRHP Status Code 6Z

*Resource Name or #: Transit Shed 1, Tenth Avenue Marine Terminal

B1. Historic Name: Transit Shed 1

B2. Common Name: Transit Shed 1

B3. Original Use: Cargo storage

B4. Present Use: Cargo storage

***B5. Architectural Style:**

***B6. Construction History:** (Construction date, alterations, and date of alterations) The building was constructed in 1957-58. Portions of it were demolished within the past decade.

***B7. Moved?** ☒No ☐Yes ☐Unknown **Date:**

Original Location:

***B8. Related Features:** Transit Shed 2

B9a. Architect: Louis Bodmer (headhouse); E. L. Freeland (storage portion of building) **b. Builder:** F.E. Young Construction Company

***B10. Significance: Theme:** N/A

Area: N/A

Period of Significance: N/A

Property Type: N/A

Applicable Criteria: N/A

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

As discussed above, the terminal site does not appear to be eligible for CRHR listing as a historic district. Therefore the transit shed does not appear to contribute to a historic district. The following evaluation addresses the potential for Transit Shed 1 to qualify as an individual historical resource.

Aerial photographs indicate that the construction of Transit Shed 1 began in 1957. Plans on file at the Unified Port of San Diego indicate that the portion of the building devoted to storage was designed by E. L. Freeland, Structural Engineer of San Diego. Freeland appears to have worked with Harbor Department engineering team headed by J. E. Liebmman in the design of the terminal's two transit sheds. Local architect Louis Bodmer designed Transit Shed 1's original Modern-style headhouse (no longer present). Bodmer also designed the traffic island, pillar, and flanking transit shed tenant directories originally situated between Transit Sheds 1 and 2 (no longer present). The F. E. Young construction company won the contract to build Transit Shed 1 and completed the building by 1958. (Bodmer 1957A, 1957B; Freeland 1957; Liebmman and Greer 1958: 43; Ninio & Moore 1999: Appendix A; Morin 1957; *San Diego Union* 1958:C-6).

Transit Shed 1 does not appear to be individually eligible for the CRHR. Research efforts have yielded no evidence that Transit Shed 1 is associated with important historical events or patterns of events. Nor has research revealed evidence that a noteworthy individual performed historically important work at the transit shed building. The building does not have a direct enough association with Harbor Department/Port Director John Bate to confer significance upon it. Consequently, the building does not appear to meet or Criteria 1 or 2 for listing in the CRHR (see Continuation Sheet).

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**

See page 14 Continuation Sheet

B13. Remarks:

***B14. Evaluator:**

Tim Yates, Ph.D., ICF International

***Date of Evaluation:** May 15, 2015

(This space reserved for official comments.)

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

***P3a. Description** (continued):

Transit Shed 1 has undergone several notable alterations. A corrugated-metal shed addition was constructed at the northwest elevation sometime after 1970. Originally the building had four rather than three interior storage spaces, and its southern end consisted of Modern-style headhouse offices. Both have been demolished. Now the southeast elevation consists of a concrete wall with two buttresses. Historic photographs indicate that the Transit Shed 1 headhouse was identical to the intact Modern-style headhouse at the northwest end of Transit Shed 2. Originally, an oval traffic control island with a concrete pillar was situated between Transit Sheds 1 and 2. The pillar featured signage identifying the terminal and transit sheds, and was flanked by tenant directories for the transit sheds. The traffic island, pillar, and associated directories have been removed from the site (Ninyo & Moore 1999: 10, Appendix A; Morin 1957; San Diego History Center 1958; *San Diego Union* 1958:C-6).

***B10. Significance** (continued):

Research yielded no evidence that E. L. Freeland distinguished himself as an engineer in a manner that would confer historical significance upon Transit Shed 1. The building has limited decorative elements—concrete wall slabs scored with Moderne-style fluting and signage in some places—and does not appear to reach the threshold of significance necessary for CRHR listing as an important example of port architecture. As explained above, although the building's development involved the challenge of potential subsidence because of its weight and location on fill, the measures employed to make it structurally sound—370 concrete Raymond step-taper piles and a concrete grade beam below longitudinal walls that acted like a strut—do not appear to have represented major milestones in port engineering. The building has also been substantially altered. Its original Modern-style headhouse, southeastern-most storage space, and the associated traffic island originally situated near the building's headhouse have all been demolished. A shed-roofed corrugated-metal addition has also been constructed at the building's northwest elevation. These alterations have diminished its integrity of design, materials, workmanship, and feeling. For these reasons, Transit Shed 1 does not appear to meet Criterion 3 for individual CRHR listing.

***P5a. Photographs** (continued):



Photograph 2: Wall slab with decorative fluting and signage at northeast elevation, looking south

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*Resource Name or # (Assigned by recorder) Transit Shed 1, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

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Photograph 3: Southeast elevation, note partially remaining “Berth 4” signage indicating extent of demolition at building’s southern end, including the headhouse, looking west



Photograph 4: Harbor-facing southwest elevation (left) and west end of southeast elevation, looking north

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*Resource Name or # (Assigned by recorder) Transit Shed 1, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

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*P5a. Photographs (continued):



Photograph 4: Harbor-facing southwest elevation (left) and west end of southeast elevation, looking north



Photograph 5: Southwest elevation, looking north

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*Resource Name or # (Assigned by recorder) Transit Shed 1, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

*P5a. Photographs (continued):



Photograph 6: Northwest elevation, looking east

*B12. References (continued):

Bodmer, Louis. 1957A. Tenth Avenue Marine Terminal Headhouses, Nos. 1 & 2, Front Elevation, Details. Sheet 4 of 12. November. On file at the Unified Port of San Diego, San Diego, California.

_____. 1957B. Tenth Avenue Marine Terminal Headhouses 1 & 2, Traffic Control Island, Reflected Ceiling Plan, Details. Sheet 6 of 12. November. On file at the Unified Port of San Diego, San Diego, California.

City of San Diego. 2007. San Diego Modernism Historic Context Statement. Prepared by the Historical Resources Board, City of San Diego Planning and Community Investment Department, and Heritage Architecture and Planning, for submission to the State of California, Office of Historic Preservation. San Diego, California. Available: <<http://ohp.parks.ca.gov/pages/1054/files/san%20diego%20modernism%20context.pdf>>. Downloaded June, 2012.

Freeland, E. L. 1957. Tenth Avenue Marine Terminal Transit Sheds No. 1 & 2, Plot Plan. Sheet 1 of 30. City of San Diego, Harbor Department. March 28. On file at the Unified Port of San Diego, San Diego, California.

Freeley, Jennifer, Tricia Olsen, Ricki Siegel, Ginger Weatherford, and Historic Resources Board Staff. 2011. Biographies of Established Masters. San Diego Historic Resources Board. Available: <<http://www.sandiego.gov/planning/programs/historical/pdf/201109biographies.pdf>>. Downloaded July, 2012.

Liebmann, Joachim E. (J.E.), and Greer W. Ferver. Twin Dock-Side Transit Sheds for San Diego. *Civil Engineering*. 28 (November): 40-43.

Modern San Diego Real Estate. 2014. Modern San Diego Real Estate—Architects. Internet Website Available: <<http://www.modernsandiego.com/>>. Accessed August 12, 2014.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary #
HRI #
Trinomial

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*Resource Name or # (Assigned by recorder) Transit Shed 1, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

***B12. References** (continued):

Morin, Howard. 1957. Contract of \$1,460,501 Awarded for Tenth Avenue Pier Transit Sheds. *San Diego Union*. [no date or page number]. Newspaper clipping on file at the San Diego History Center: Subject Files—Harbors—Harbor Department.

Ninyo & Moore Geotechnical and Environmental Sciences Consultants (Ninyo and Moore). 1999. Historical Study, 10th Avenue Marine Terminal, San Diego, California. Prepared for the San Diego Unified Port District. November 30, Project No. 103943-05 [the Appendix of this report features over 50 aerial photographs of the terminal site dating from late 1920s through the 2000s].

San Diego History Center. 1958. Photograph of Tenth Avenue Marine Terminal Dedication. # S-4868. November 21. Booth Historical Photo Archive: San Diego Harbor: 1952-79, Book 10 of 12.

San Diego Union. 1958. Terminal: Shipping Facilitated. November 23:C-6.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code(s) 6Z

Other Listings
Review Code

Reviewer

Date

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*Resource Name or #: Transit Shed 2, Tenth Avenue Marine Terminal

P1. Other Identifier:

*P2. Location: ☐ Not for Publication ☒ Unrestricted

*a. County: San Diego

*b. USGS 7.5' Quad: Point Loma Date: 1967 (PR 1975) T17S R3W; ¼ of Sec N/A (Pueblo Lands of San Diego Land Grant); San Bernardino B.M.

c. Address: 623 Switzer Street

City: San Diego

Zip: 92101

d. UTM: Zone: 11 (NAD 83); 485366 mE/ 3617803 mN (G.P.S.) (approximate center of building footprint)

e. Other Locational Data: APN

Elevation:

*P3a. **Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
Occupying the southwest portion of the terminal site, Transit Shed 2 is a cargo storage building that incorporates headhouse offices at the northwest elevation. The approximately 194,000 square-foot building has a long rectilinear plan. Most of the building consists of tilt-up fireproof concrete walls and steel roof trusses that enclose large interior storage spaces southeast of the headhouse. The two-story Modern-style headhouse has a centered cargo-loading bay large enough to accommodate trucks, and pedestrian entries at the façade's first-floor offices, and atop stairways leading to the second story. One stairway is located at the northwest elevation, and the other two are located within the central bay. Clad mostly in stucco, the headhouse has a slightly pitched shed roof that overhangs broadly at the northwest and northeast (front) elevations to shelter the northwest stairway and the first-floor entries. The second story is slightly cantilevered. Fenestration consists mainly of rectangular banks of multi-pane aluminum-frame windows. On each side of the central bay, the façade's second-story windows are framed by long rectangular surrounds incorporating mullion-like fluted panels. Aluminum-frame glass doors with transoms are integrated into the window banks along the first floor (see Continuation Sheet).

*P3b. **Resource Attributes:** (List attributes and codes) HP8. Industrial building; HP6. 1-3 story commercial building

*P4. **Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)



P5b. Description of Photo:

(View, date, accession #) Transit Shed 2 headhouse, northwest and partial ,.northeast elevations, looking south

P6. Date Constructed/Age and Sources: ☒ Historic

☐ Prehistoric ☐ Both
1957-58 (see references on page 22 Continuation Sheet)

P7. Owner and Address:

Unified Port of San Diego
3165 Pacific Highway
San Diego, CA 92101

P8. Recorded by: (Name, affiliation, and address):

Tim Yates, ICF International
575 B Street, Ste. 1700
San Diego, CA 92101

*P9. **Date Recorded:** May 14, 2014

*P10. **Survey Type:** Intensive

*P11. **Report Citation:** (Cite survey report and other sources, or enter "none.") ICF International. 2016. Cultural Resources Inventory and Evaluation Report for the Tenth Avenue Marine Terminal Redevelopment Plan and Demolition and Initial Rail Component (ICF 00165.14). San Diego, CA. Prepared for the San Diego Unified Port District

*Attachments: ☐ NONE ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☐ Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

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*NRHP Status Code 6Z

*Resource Name or #: Transit Shed 2, Tenth Avenue Marine Terminal

B1. Historic Name: Transit Shed 2

B2. Common Name: Transit Shed 2

B3. Original Use: Cargo storage; offices

B4. Present Use: Cargo storage; offices

***B5. Architectural Style:**

***B6. Construction History:** (Construction date, alterations, and date of alterations)

***B7. Moved?** ☒No ☐Yes ☐Unknown **Date:**

Original Location:

***B8. Related Features:** Transit Shed 2

B9a. Architect: Louis Bodmer (headhouse); E. L. Freeland (storage portion of building) **b. Builder:** F.E. Young Construction Company

***B10. Significance: Theme:** N/A

Area: N/A

Period of Significance: N/A

Property Type: N/A

Applicable Criteria: N/A

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

As discussed above, the terminal site does not appear to be eligible for CRHR listing as a historic district. Therefore the transit shed does not appear to contribute to a historic district. The following evaluation addresses the potential for Transit Shed 2 to qualify as an individual historical resource.

Transit Shed 2 has the same development history as Transit Shed 1. Aerial photographs indicate that the construction of Transit Shed 2 began in 1957. Plans on file at the Unified Port of San Diego show that the portion of the building devoted to storage was designed by E. L. Freeland, Structural Engineer of San Diego, on consultation with the Harbor Department engineering team lead by J. E. Liebmann. Local architect Louis Bodmer designed Transit Shed 2's Modern-style headhouse. Bodmer also designed the traffic island, pillar, and flanking transit shed directories originally situated between Transit Sheds 1 and 2. The F. E. Young construction company won the contract to build Transit Sheds 1 and 2 and completed the buildings by 1958 (Bodmer 1957A, 1957B; Freeland 1957; Liebmann and Greer 1958; Ninyo & Moore 1999:Appendix A; Morin 1957; *San Diego Union* 1958:C-6).

Transit Shed 2 does not appear to be individually eligible for the CRHR. Research revealed no evidence that the building has direct individual associations with an important event or pattern of events. Nor has research revealed any evidence that a noteworthy individual performed historically important work that was strongly associated with Transit Shed 2. The building does not have sufficiently direct association with Harbor Department/Port Director John Bate to confer significance upon it. Consequently, the building does not appear to meet Criteria 1 or 2 for listing in the CRHR (see Continuation Sheet).

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**

See page 22 Continuation Sheet

B13. Remarks:

***B14. Evaluator:**

Tim Yates, Ph.D., ICF International

***Date of Evaluation:** May 15, 2015

(This space reserved for official comments.)

***P3a. Description** (continued):

The walls at the ends of the headhouse and on each side of the central bay feature circular windows. Six steel poles extend from the sides of each stairway to the overhanging roof. The circular windows, the steel poles lining the stairways, and the headhouse's overall resemblance to a ship's navigation bridge are reminiscent of Streamline Moderne architecture's references to transportation technology. However, the headhouse's horizontal emphasis, window bands, sharp corners, and overhanging projections make it a Modern building registering the post-World War II influence of the International Style.

The remainder of the transit shed to the southwest of the headhouse is formed of tilt-up concrete elevation walls and three tilt-up, concrete, interior transverse walls. These create four interior storage spaces. Square shaped concrete wall slabs at each end of the interior transverse walls, and rectangular-shaped wall slabs at the ends of the northwest and southeast elevations, rise higher than adjacent wall slabs to form parapets. These parapet-topped concrete wall slabs are scored with decorative Moderne-style fluted panels and signage identifying berth numbers, or the Port of San Diego and the year 1957—the year construction began on the terminal's transit sheds.

The roofs of the four interior spaces slope downward to the southwest and northeast from central ridges. Each of the buildings four interior spaces has five large loading entries with roll-up metal warehouse doors along the southwest and northeast elevations. Concrete truck-loading platforms extend along most of the building's northeast elevation. Industrial-grade pedestrian doors provide access to the building's storage spaces at various locations. The southwest elevation features windows at two locations, including a pair of original steel-frame windows that appear to incorporate awning or hopper sashes. The southeastern portion of the building incorporates multiple non-original structures, including a ship unloader and associated conveyance machinery at the southwest and northeast elevations, and across the building's roof. The original construction of Transit Sheds 1 and 2 included an oval traffic control island with a concrete pillar situated between the two buildings' headhouses. The pillar featured signage identifying the terminal and transit sheds, and was flanked by tenant directories for the two buildings. The traffic island, pillar, and associated directories have been removed from the site (Ninyo & Moore 1999: 10, Appendix A; Morin 1957; San Diego History Center 1958; *San Diego Union* 1958: C-6)

***B10. Significance** (continued):

Research yielded no evidence that either E. L. Freeland or Harbor Department chief engineer J.E. Liebmann distinguished themselves as engineers in a manner that would confer historical significance upon Transit Shed 2. As explained above, although the development of the building's extensive storage spaces involved the challenge of potential subsidence because of the structure's weight and location on fill, the measures employed to make it structurally sound—370 concrete Raymond step-taper piles and a concrete grade beam below longitudinal walls that acted like a strut—do not appear to have represented major milestones in port engineering. Sources on master architects and architectural Modernism in San Diego offer no evidence that Louis Bodmer distinguished himself as an important designer of post-World War II buildings (City of San Diego 2007; Freeley et al. 2001; Modern San Diego Real Estate 2014). The building's storage portion incorporates limited ornamental features at some concrete wall slabs in the form of scored Moderne-style fluting and signage. The headhouse is a commonplace example of Modern architecture that incorporates limited design elements evoking nautical associations—some circular windows, steel poles lining stairways, and an overall resemblance to a ship's navigation bridge. These elements gave the 1958 headhouse qualities reminiscent of older Streamline Moderne design at a moment when Modernist evolving out of the International Style was ascendant in San Diego and across the United States. In contrast to architecturally significant port buildings designed in Modernism idioms, such as the International-style Los Angeles Cruise Terminal at the Port of Los Angeles (1963) for example (Applied Earth Works, Inc.: 2013:19-21, 24), the Tenth Avenue Marine Terminal's Transit Shed 2 does not achieve high artistic values and does not exhibit innovative architectural design. Overall, Transit Shed 2 does not appear to meet the threshold of architectural or engineering significance appropriate for CRHR listing. For these reasons, Transit Shed 2 does not appear to be eligible for individual CRHR listing under Criterion 3.

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***Resource Name or #** (Assigned by recorder) Transit Shed 2, Tenth Avenue Marine Terminal

***Recorded by:** T. Yates, ICF International

***Date:** May 14, 2014

☒ **Continuation** ☐ **Update**

***P5a. Photographs** (continued):



Photograph 2: Transit shed headhouse, northwest and southwest elevations, looking east



Photograph 3: Northeast elevation, note non-original cement company conduits and machinery at roof and elevation wall, looking south-southeast

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*Resource Name or # (Assigned by recorder) Transit Shed 2, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

*P5a. Photographs (continued):



Photograph 4: Harbor-facing southwest elevation at Berth 5, looking east



Photograph 5: Northeast elevation, looking south

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*Resource Name or # (Assigned by recorder) Transit Shed 2, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

*P5a. Photographs (continued):



Photograph 6: Harbor-facing southwest elevation near non-original cement unloading and conveyance machinery, looking east



Photograph 7: Non-original cement unloading and conveyor machinery at south end of southeast elevation, looking north-northwest.

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*Resource Name or # (Assigned by recorder) Transit Shed 2, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

*P5a. Photographs (continued):



Photograph 8: Southeast elevation, note bagging plant dating to after 1970 at right, looking north

*B12. References (continued):

Applied Earth Works, Inc. 2013. Historic Resources Evaluation Report for the Port of Los Angeles Master Plan Update. February. Prepared for Science Applications International Corporation and the Port of Los Angeles.

Bodmer, Louis. 1957A. Tenth Avenue Marine Terminal Headhouses, Nos. 1 & 2, Front Elevation, Details. Sheet 4 of 12. November. On file at the Unified Port of San Diego, San Diego, California.

_____. 1957B. Tenth Avenue Marine Terminal Headhouses 1 & 2, Traffic Control Island, Reflected Ceiling Plan, Details. Sheet 6 of 12. November. On file at the Unified Port of San Diego, San Diego, California.

City of San Diego. 2007. San Diego Modernism Historic Context Statement. Prepared by the Historical Resources Board, City of San Diego Planning and Community Investment Department, and Heritage Architecture and Planning, for submission to the State of California, Office of Historic Preservation. San Diego, California. Available: <<http://ohp.parks.ca.gov/pages/1054/files/san%20diego%20modernism%20context.pdf>>. Downloaded June, 2012.

Freeland, E. L. 1957. Tenth Avenue Marine Terminal Transit Sheds No. 1 & 2, Plot Plan. Sheet 1 of 30. City of San Diego, Harbor Department. March 28. On file at the Unified Port of San Diego, San Diego, California.

Freeley, Jennifer, Tricia Olsen, Ricki Siegel, Ginger Weatherford, and Historic Resources Board Staff. 2011. Biographies of Established Masters. San Diego Historic Resources Board. Available: <<http://www.sandiego.gov/planning/programs/historical/pdf/201109biographies.pdf>>. Downloaded July, 2012.

Modern San Diego Real Estate. 2014. Modern San Diego Real Estate—Architects. Internet Website Available: <<http://www.modernsandiego.com/>>. Accessed August 12, 2014.

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*Resource Name or # (Assigned by recorder) Transit Shed 2, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

***B12. References** (continued):

Morin, Howard. 1957. Contract of \$1,460,501 Awarded for Tenth Avenue Pier Transit Sheds. San Diego Union. [no date or page number]. Newspaper clipping on file at the San Diego History Center: Subject Files—Harbors—Harbor Department.

Ninyo & Moore Geotechnical and Environmental Sciences Consultants (Ninyo and Moore). 1999. Historical Study, 10th Avenue Marine Terminal, San Diego, California. Prepared for the San Diego Unified Port District. November 30, Project No. 103943-05 [the Appendix of this report features over 50 aerial photographs of the terminal site dating from late 1920s through the 2000s].

San Diego History Center. 1958. Photograph of Tenth Avenue Marine Terminal Dedication. # S-4868. November 21. Booth Historical Photo Archive: San Diego Harbor: 1952-79, Book 10 of 12.

San Diego Union. 1958. Terminal: Shipping Facilitated. November 23: C-6.

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NRHP Status Code(s) 6Z

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*Resource Name or #: Bunker Fuel Complex, Tenth Avenue Marine Terminal

P1. Other Identifier:

*P2. Location: ☐ Not for Publication ☒ Unrestricted

*a. County: San Diego

*b. USGS 7.5' Quad: Point Loma Date: 1967 (PR 1975) T17S R3W; ¼ of Sec N/A (Pueblo Lands of San Diego Land Grant); San Bernardino B.M.

c. Address: 623 Switzer Street

City: San Diego

Zip: 92101

d. UTM: See page 26 Continuation Sheet

Elevation:

e. Other Locational Data: APN

*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

Located at the northeastern portion of the Tenth Avenue Marine Terminal site, the above ground portion of the bunker fuel complex consists of five large steel tanks and two buildings secured by chain-link fences topped with barbed wire. The two steel tanks closest to the buildings at the southeast side of the complex appear to be equivalent in size and have diameters of approximately 100 feet. Immediately northwest of those tanks are two additional tanks. The southern one has a diameter of approximately 80 feet and the one to the northeast has a diameter of approximately 55 feet. An additional tank at the northernmost portion of the complex was constructed within the last decade. The buildings on the site appear to function as a utility building (eastern) and a small office (western). Both are utilitarian in design with concrete-block walls and flat roofs with broadly overhanging eaves. The western building has several window openings. Access restrictions during the field visit prohibited clear observation of the contents of the window openings.

*P3b. Resource Attributes: (List attributes and codes) HP11.Engineering structure; HP8. Industrial building

*P4. Resources Present: ☒ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)2

P5a. Photograph 20.



P5b. Description of Photo:

(View, date, accession #) Tanks at bunker fuel complex, looking west-northwest

*P6. Date Constructed/Age and Sources: ☒ Historic

☐ Prehistoric ☐ Both
1959 (see references on page 26 Continuation Sheet)

***P7. Owner and Address:**

Unified Port of San Diego
3165 Pacific Highway
San Diego, CA 92101

***P8. Recorded by:** (Name, affiliation, and address):

Tim Yates, ICF International
575 B Street, Ste. 1700
San Diego, CA 92101

*P9. Date Recorded: May 14, 2014

*P10. Survey Type: Intensive

*P11. Report Citation: (Cite survey report and other sources, or enter "none.") ICF International. 2016. Cultural Resources Inventory and Evaluation Report for the Tenth Avenue Marine Terminal Redevelopment Plan and Demolition and Initial Rail Component (ICF 00165.14). San Diego, CA. Prepared for the San Diego Unified Port District

*Attachments: ☐ NONE ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☐ Photograph Record ☐ Other (List):

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*NRHP Status Code 6Z

*Resource Name or #: Bunker Fuel Complex, Tenth Avenue Marine Terminal

B1. Historic Name: Bunker Fuel Complex

B2. Common Name: Bunker Fuel Complex

B3. Original Use: Fuel storage and conveyance

B4. Present Use: Fuel storage and conveyance

***B5. Architectural Style:** Utilitarian

***B6. Construction History:** (Construction date, alterations, and date of alterations). The original portions of the facility were completed in 1959. Several smaller tanks originally located northeast of the larger original tanks have been demolished. The complex's northern-most tank was constructed within the past decade.

***B7. Moved?** ☒No ☐Yes ☐Unknown **Date:**

Original Location:

***B8. Related Features:**

B9a. Architect: J. E. Liebmann and Harbor Department engineering staff

b. Builder: Unknown

***B10. Significance: Theme:** N/A

Area: N/A

Period of Significance: N/A

Property Type: Marine terminal **Applicable Criteria:** N/A

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

As discussed above, the terminal site does not appear to be eligible for CRHR listing as a historic district. Therefore, the bunker fuel complex does not appear to contribute to a historic district. The following evaluation addresses the potential for the bunker fuel complex to qualify as an individual historical resource.

The terminal's bunker fuel complex was completed in 1959. An in-depth history of the terminal site's development has identified the owner of the tank complex from 1959 through 1971 as Union Oil of California. Several smaller original tanks have been removed from the complex. The purpose of the tanks was to store ship fuel and provide refueling services to ships docked at the terminal. Pipes from the tanks conveyed fuel directly to terminal berths so that ships could refuel during cargo loading or unloading. The same pipes provided for removal of ballast water from arriving ships' fuel tanks. At most earlier developed west coast ports during the 1950s and 60s, cargo ships were refueled from barges or tugboats. Harbor Department officials heavily promoted the terminal's bunker fuel facilities. Although their development does not appear to have required major engineering innovation for the period, the bunker fuel facilities offered convenience and promoted efficiency, and provided a crucial element of the Harbor Department's marketing efforts to attract ships to San Diego. While the bunker fuel facilities helped make the Port of San Diego more competitive in the west coast shipping market for a time, this initially successful feature was undermined fairly quickly during the 1960s as ports in Japan began selling ship fuel at substantially lower prices than other Pacific ports (Bate 1958: C-3; Brooks 1958: C-1; Liebmann 1960:69-72; Ninoy & Moore 1999:11, Appendix A; Irwin 1970:57-58) (see Continuation Sheet).

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**

See page 28 Continuation Sheet

B13. Remarks:

***B14. Evaluator:**

Tim Yates, Ph.D., ICF International

***Date of Evaluation:** May 15, 2015

(This space reserved for official comments.)

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*Resource Name or # (Assigned by recorder) Bunker Fuel Tank Complex, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

***P2. Location** (continued)

d. UTM: Zone: 11 (NAD 83); 485357 mE/ 3618350 mN (G.P.S.) (center of northern original tank)
Zone: 11 (NAD 83); 485334 mE/ 3618350 mN (G.P.S.) (center of western original tank)
Zone: 11 (NAD 83); 485392 mE/ 3618359 mN (G.P.S.) (center of eastern original tank)
Zone: 11 (NAD 83); 485392 mE/ 3618359 mN (G.P.S.) (center of southern original tank)
Zone: 11 (NAD 83); 485441 mE/ 3618346 mN (G.P.S.) (center of eastern building)
Zone: 11 (NAD 83); 485417 mE/ 3618317 mN (G.P.S.) (center of western building)

***B10. Significance** (continued):

The Tenth Avenue Marine Terminal's bunker fuel complex does not appear to be individually eligible for the CRHR. As part of the terminal's bunker fuel facilities, the bunker fuel complex does not appear to have direct individual associations with important events or patterns of events. As explained above, although the terminal's bunker fuel capabilities were an important element of the Harbor Department officials' efforts to create a terminal that offered superior maintenance services to ships, the competitiveness provided by the facility was undermined fairly quickly in the 1960s by cheaper fuel prices at Japanese ports. Research has revealed no evidence that a noteworthy individual performed historically important work that was strongly associated with bunker fuel complex. The building does not have sufficiently direct association with Harbor Department/Port Director John Bate to confer significance upon it. Consequently, the complex does not appear to meet Criteria 1 or 2 for listing in the CRHR.

Research efforts did not reveal any evidence that the bunker fuel complex is significant as the work of a master engineer or builder. Neither the tank complex nor the underground pipeline system for conveying fuel and ballast water appear to qualify as engineering masterworks. The system appears to be the product of technology that was well-established by the late 1950s. Tanks comparable in size, with equivalent steel construction, are commonplace elements of the historic-period industrial built environment at numerous ports and other industrial complexes in California and across the west coast. The two small buildings associated with the tanks are also commonplace examples of utilitarian 1950s buildings. For these reasons, the bunker fuel complex does not appear to meet Criterion 3 for listing individual listing in the CRHR.

***P5a. Photographs** (continued):



Photograph 2: Eastern building at bunker fuel complex, looking west-southwest

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*Resource Name or # (Assigned by recorder) Bunker Fuel Complex, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

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*P5a. Photographs (continued):



Photograph 3: Eastern building at bunker fuel complex, looking west-southwest



Photograph 4: Western building at bunker fuel complex, looking southwest

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*Resource Name or # (Assigned by recorder) Bunker Fuel Complex, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

*B12. References: (continued):

Bate, John. 1958. On The Move: Terminal One Big Step Toward Port Potential, Director Says. *San Diego Union*. November 23: C-3.

Brooks, Joe. 1958. New Terminal Makes San Diego Hub of Export-Import Trade: Facility's Value to City, Southwest Unlimited. *San Diego Union*. November 23: C-1, C-4.

Irwin, Wayne Ray. 1970. The Port of San Diego: An Economic Geography of Waterborne Trade. Master's Thesis in Geography, San Diego State College.

Liebmann, Joachim E. (J.E.), and Greer W. Ferver. Twin Dock-Side Transit Sheds for San Diego. *Civil Engineering*. 28 (November): 40-43.

Ninyo & Moore Geotechnical and Environmental Sciences Consultants (Ninyo and Moore). 1999. Historical Study, 10th Avenue Marine Terminal, San Diego, California. Prepared for the San Diego Unified Port District. November 30, Project No. 103943-05 [the Appendix of this report features over 50 aerial photographs of the terminal site dating from late 1920s through the 2000s].

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NRHP Status Code(s) 6Z

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*Resource Name or #: Molasses Tanks, Tenth Avenue Marine Terminal

P1. Other Identifier:

*P2. Location: ☐ Not for Publication ☒ Unrestricted

*a. County: San Diego

*b. USGS 7.5' Quad: Point Loma Date: 1967 (PR 1975) T17S R3W; ¼ of Sec N/A (Pueblo Lands of San Diego Land Grant); San Bernardino B.M.

c. Address: 623 Switzer Street

City: San Diego

Zip: 92101

d. UTM: See page 31 Continuation Sheet

e. Other Locational Data: APN

Elevation:

*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The terminal's remaining tanks for molasses storage are located approximately 170 feet east of Warehouse C's southeastern corner. The three steel molasses tanks appear to be the same size and have diameters of approximately 70 feet. The tops are connected by steel catwalks. The lower circumference of the eastern tank and the entire circumference of the central tank have been covered with non-original insulating material. Various associated pipes and valves are located on the south side of the tanks.

*P3b. Resource Attributes: (List attributes and codes) HP11. Engineering structure

*P4. Resources Present: ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5a. Photograph 23.



P5b. Description of Photo:

(View, date, accession #) Molasses Tanks, looking north

*P6. Date Constructed/Age and Sources: ☒ Historic
☐ Prehistoric ☐ Both
1963 (see references on page 32 Continuation Sheet)

*P7. Owner and Address:
Unified Port of San Diego
3165 Pacific Highway
San Diego, CA 92101

*P8. Recorded by: (Name, affiliation, and address):
Tim Yates, ICF International
575 B Street, Ste. 1700
San Diego, CA 92101

*P9. Date Recorded: May 14, 2014

*P10. Survey Type: Intensive

*P11. Report Citation: (Cite survey report and other sources, or enter "none.") ICF International. 2016. Cultural Resources Inventory and Evaluation Report for the Tenth Avenue Marine Terminal Redevelopment Plan and Demolition and Initial Rail Component (ICF 00165.14). San Diego, CA. Prepared for the San Diego Unified Port District

*Attachments: ☐ NONE ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☐ Photograph Record ☐ Other (List):

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*NRHP Status Code 6Z

*Resource Name or #: Molasses Tanks, Tenth Avenue Marine Terminal

B1. Historic Name: Molasses Tanks

B2. Common Name: Molasses Tanks

B3. Original Use: Molasses storage

B4. Present Use: Unknown

***B5. Architectural Style:**

***B6. Construction History:** (Construction date, alterations, and date of alterations): The Molasses Tanks built by Pacific Molasses Company at the Tenth Avenue Marine Terminal were completed by 1963.

***B7. Moved?** ☐No ☐Yes ☐Unknown **Date:**

Original Location:

***B8. Related Features:**

B9a. Architect: Unknown

b. Builder: Unknown

***B10. Significance: Theme:** N/A

Area: N/A

Period of Significance: N/A

Property Type: N/A

Applicable Criteria: N/A

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

As discussed above, the terminal site does not appear to be eligible for CRHR listing as a historic district. Therefore, the molasses tanks do not appear to contribute to a historic district. The following evaluation addresses the potential for the molasses tanks to qualify as an individual historical resource.

The San Francisco-based Pacific Molasses Company arranged for construction of the three large tanks for \$150,000 as a distribution plant. A newspaper report in December 1961 noted that, due to construction delays, the plant would not be completed until the following February. It appears that the plant was completed in 1962; it is present in a 1963 aerial photograph. Imported Molasses stored in the tanks was trucked to the Imperial Valley and processed into cattle feed. The Pacific Molasses Company tanks remain intact; an additional molasses tank constructed near the bunker fuel tank complex by a different company than Pacific Molasses was later demolished. Several smaller tanks constructed at the same time as the Pacific Molasses tanks and located immediately north of them have been removed from the site (Irwin 1970:50-51; Morin 1961A:A-27; Morin 1961B; Ninyo & Moore 1999: 12, Appendix A) (see Continuation Sheet).

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**

See page 32 Continuation Sheet

B13. Remarks:

***B14. Evaluator:**

Tim Yates, Ph.D., ICF International

***Date of Evaluation:** May 15, 2015

(This space reserved for official comments.)

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*Resource Name or # (Assigned by recorder) Molasses Tanks, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

***P2. Location** (continued):

d. UTM: Zone: 11 (NAD 83); 485727 mE/ 3617841 mN (G.P.S.) (approximate center of west tank)
Zone: 11 (NAD 83); 485754 mE/ 3617837 mN (G.P.S.) (approximate center of central tank)
Zone: 11 (NAD 83); 485781 mE/ 3617834 mN (G.P.S.) (Approximate center of east tank)

***B10. Significance** (continued):

The Molasses Tanks developed by the Pacific Molasses Company at the Tenth Avenue Marine Terminal do not appear to be individually eligible for the CRHR. The Molasses Tanks do not appear to have significance for direct individual association with a historically important event or pattern of events. Research has revealed no evidence that a noteworthy individual performed historically important work that was strongly associated with the Molasses Tanks. The tank complex does not have sufficiently direct association with Harbor Department/Port Director John Bate to confer significance upon it. Consequently, the tanks do not appear to meet Criteria 1 or 2 for listing in the CRHR (see Continuation Sheet).

Research efforts did not reveal any evidence that the Molasses Tanks are significant as the work of a master engineer or builder. The tanks do not appear to be an engineering masterwork. Tanks comparable in size, with equivalent steel construction, are commonplace elements of the industrial built environment in numerous cities in California and across the west coast. For these reasons, the Molasses Tanks do not appear to meet Criterion 3 for listing in the CRHR. Additionally, two of the tanks have been entirely or partially covered with non-original insulating material, which has diminished their historical integrity of design, materials, and feeling. The integrity of the site as whole has also been compromised by the removal of the smaller tanks originally installed immediately north of the existing three larger tanks.

***P5a. Photographs** (continued):



Photograph 24: Looking west

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*Resource Name or # (Assigned by recorder) Molasses Tanks, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

***B12. References** (continued):

Irwin, Wayne Ray. 1970. The Port of San Diego: An Economic Geography of Waterborne Trade. Master's Thesis in Geography, San Diego State College.

Morin, Howard. 1961A. Multimillion Port Plan Outline Set. *San Diego Union*. October 29: A-27.

_____. 1961B. Molasses Plans Bog Down. *San Diego Union*. December 12: A-13.

Ninyo & Moore Geotechnical and Environmental Sciences Consultants (Ninyo and Moore). 1999. Historical Study, 10th Avenue Marine Terminal, San Diego, California. Prepared for the San Diego Unified Port District. November 30, Project No. 103943-05 [the Appendix of this report features over 50 aerial photographs of the terminal site dating from late 1920s through the 2000s].

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NRHP Status Code(s) 6Z

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*Resource Name or #: Truck Scale Building, Tenth Avenue Marine Terminal

P1. Other Identifier:

*P2. Location: ☐ Not for Publication ☒ Unrestricted

*a. County: San Diego

*b. USGS 7.5' Quad: Point Loma Date: 1967 (PR 1975) T17S R3W; ¼ of Sec N/A (Pueblo Lands of San Diego Land Grant); San Bernardino B.M.

c. Address: 623 Switzer Street

City: San Diego

Zip: 92101

d. UTM: Zone: 11 (NAD 83); 485752 mE/ 3617805 mN (G.P.S.) (approximate center of building footprint)

e. Other Locational Data: APN

Elevation:

*P3a. **Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
The Track Scale Building faces southwest and is located immediately south of the terminal's molasses tanks. The predominantly utilitarian building has a rectangular plan with a small projecting square element at the southwest elevation that accommodates the main drive-up window. The building's concrete block walls support a flat roof outlined by low parapets atop the square element, and a flat-roof Modern-style roof with broadly projecting eave overhangs and angled fascia boards across the main rectangular mass. Most windows are inset, horizontally sliding aluminum-frame units above wood sills. Two non-original horizontally sliding vinyl windows are located at the northwest portion of the southwest elevation. Wood doors with upper glazing provide access at the northwest and southeast sides of the drive-up window projection, as well as the southwest elevation of the main rectangular element. The northwest elevation of the main rectangular element has a metal door that slides horizontally on a mounted track.

*P3b. **Resource Attributes:** (List attributes and codes) HP8. Industrial building

*P4. **Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)



P5b. Description of Photo:

(View, date, accession #)
Northwest and southwest
elevations, looking facing north

*P6. **Date Constructed/Age and Sources:** ☒ Historic
☐ Prehistoric ☐ Both
1963 (see references on 523B Form)

*P7. **Owner and Address:**
Unified Port of San Diego
3165 Pacific Highway
San Diego, CA 92101

*P8. **Recorded by:** (Name, affiliation, and address):
Tim Yates, ICF International
575 B Street, Ste. 1700
San Diego, CA 92101

*P9. **Date Recorded:** May 14, 2014

*P10. **Survey Type:** Intensive

*P11. **Report Citation:** (Cite survey report and other sources, or enter "none.") ICF International. 2016. Cultural Resources Inventory and Evaluation Report for the Tenth Avenue Marine Terminal Redevelopment Plan and Demolition and Initial Rail Component (ICF 00165.14). San Diego, CA. Prepared for the San Diego Unified Port District

*Attachments: ☐ NONE ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☐ Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

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*NRHP Status Code 6Z

*Resource Name or #: Truck Scale Building, Tenth Avenue Marine Terminal

B1. Historic Name: Unknown

B2. Common Name: Truck Scale Building

B3. Original Use: Truck Scale Building

B4. Present Use: Truck Scale Building

***B5. Architectural Style:** Predominantly utilitarian with Modern-style roof

***B6. Construction History:** (Construction date, alterations, and date of alterations) The Truck Scale Building was constructed by 1963.

***B7. Moved?** ☒No ☐Yes ☐Unknown **Date:**

Original Location:

***B8. Related Features:**

B9a. Architect: Unknown

b. Builder: Unknown

***B10. Significance: Theme:** N/A

Area: N/A

Period of Significance: N/A

Property Type: N/A

Applicable Criteria: N/A

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

As discussed above, the terminal site does not appear to be eligible for CRHR listing as a historic district. Therefore, the truck scale building does not appear to contribute to a historic district. The following evaluation addresses the potential for truck scale building to qualify as an individual historical resource.

The Tenth Avenue Marine Terminal's Truck Scale Building was constructed by 1963. It is unclear whether the Pacific Molasses Company constructed the building or whether the building was developed by Westside Metals/Scrap Metals, which operated a scrap metal yard during the early 1960s at the terminal near the northeast side of Warehouse C (Ninyo & Moore 1999: 12, Appendix A).

The Truck Scale Building does not appear to be individually eligible for the CRHR. The Truck Scale Building does not appear to have significance for direct individual association with a historically important event or pattern of events. Research efforts have revealed no evidence that a noteworthy individual performed historically important work that was strongly associated with the building, which does not have sufficiently direct association with Harbor Department/Port Director John Bate to confer significance upon it. Individually, therefore, the building does not appear to meet Criteria 1 or 2 for listing in the CRHR (see Continuation Sheet).

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**

Ninyo & Moore Geotechnical and Environmental Sciences Consultants (Ninyo and Moore). 1999. Historical Study, 10th Avenue Marine Terminal, San Diego, California. Prepared for the San Diego Unified Port District. November 30, Project No. 103943-05 [the Appendix of this report features over 50 aerial photographs of the terminal site dating from late 1920s through the 2000s].

B13. Remarks:

***B14. Evaluator:**

Tim Yates, Ph.D., ICF International

***Date of Evaluation:** May 15, 2015

(This space reserved for official comments.)

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*Resource Name or # (Assigned by recorder) Truck Scale Building, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

***B10. Significance** (continued):

Research efforts did not reveal any evidence that the Truck Scale Building was designed by a master architect or builder. The building does not have high artistic value and does not appear to be a distinctive example of any architectural style or building technique. The building registers the influence of Modern architecture in its flat roof and broadly overhanging eaves. But such elements are entirely commonplace among buildings constructed at industrial sites throughout California during the 1950s and 1960s. For these reasons, the Truck Scale Building does not appear to meet Criterion 3 for listing in the CRHR.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code(s) 6Z

Other Listings
Review Code

Reviewer

Date

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*Resource Name or #: Bulk Loader, Tenth Avenue Marine Terminal

P1. Other Identifier:

*P2. Location: ☐ Not for Publication ☒ Unrestricted

*a. County: San Diego

*b. USGS 7.5' Quad: Point Loma Date: 1967 (PR 1975) T17S R3W; ¼ of Sec N/A (Pueblo Lands of San Diego Land Grant); San Bernardino B.M.

c. Address: 623 Switzer Street

City: San Diego

Zip: 92101

d. UTM: See page 38 Continuation Sheet

Elevation:

e. Other Locational Data: APN

*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The Tenth Avenue Marine Terminal's bulk loader is a multicomponent system for conveying dry bulk commodities from railroad cars and on-site storage structures to Berths 7 and 8 at the terminal's southern edge. Its original elements consist of a rail car unloading building, an underground conveyor from the rail car unloading building to a junction house to the west, a much longer conveyor extending from south of the junction house south to Berths 7 and 8, and a conveyor and traveling loader at Berths 7 and 8 that provided for bulk commodities to be dumped directly into ship hulls. Original portions of the system total approximately 1600 feet in length. The Commodities delivered to ships through the system included potash, soda ash, grain, alfalfa pellets, and chemical fertilizers. The bulk loader's capacity was originally 2,000 tons per hour. In more recent decades its capacity has been rated from 1,200 to 1,800 tons per hour (Irwin 1970:49-50; World Port Source 2012; Unified Port of San Diego 1992:13) (see Continuation Sheet).

*P3b. Resource Attributes: (List attributes and codes) HP11. Engineering structure; HP8. Industrial building

*P4. Resources Present: ☒ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)



P5b. Description of Photo:

(View, date, accession #) Camera facing north, note traveling loader (booms conveyor) positioned near east end of southern berthing area, looking northwest

*P6. Date Constructed/Age and Sources: ☒ Historic ☐ Prehistoric ☐ Both
1962 (see references on page 43 Continuation Sheet)

***P7. Owner and Address:**

Unified Port of San Diego
3165 Pacific Highway
San Diego, CA 92101

***P8. Recorded by:** (Name, affiliation, and address):

Tim Yates, ICF International
575 B Street, Ste. 1700
San Diego, CA 92101

*P9. Date Recorded: May 14, 2014

*P10. Survey Type: Intensive

*P11. Report Citation: (Cite survey report and other sources, or enter "none.") ICF International. 2016. Cultural Resources Inventory and Evaluation Report for the Tenth Avenue Marine Terminal Redevelopment Plan and Demolition and Initial Rail Component (ICF 00165.14). San Diego, CA. Prepared for the San Diego Unified Port District

*Attachments: ☐ NONE ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

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*NRHP Status Code 6Z

*Resource Name or #: Bulk Loader, Tenth Avenue Marine Terminal

B1. Historic Name: Bulk Loader

B2. Common Name: Bulk Loader

B3. Original Use: Dry bulk commodity conveyance

B4. Present Use: Dry bulk export commodity conveyance

***B5. Architectural Style:**

***B6. Construction History:** (Construction date, alterations, and date of alterations): Construction of the bulk loader was completed in 1963. It has been altered in recent years with a new junction house and a large conduit that connects to the top of the terminal's Silo Complex.

***B7. Moved?** ☒No ☐Yes ☐Unknown **Date:**

Original Location:

***B8. Related Features:**

B9a. Architect: Unknown
Company); Diversified Builders Inc.

b. Builder: McDowell Company (McDowell Wellman

***B10. Significance: Theme:** N/A

Area: N/A

Period of Significance: N/A

Property Type: N/A

Applicable Criteria: N/A

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

As discussed above, the terminal site does not appear to be eligible for CRHR listing as a historic district. Therefore the bulk loader does not appear to contribute to a historic district. The following evaluation addresses the potential for the terminal's bulk loader system to qualify as an individual historical resource.

The bulk loader system, one of the terminal's most heavily promoted features, was completed and put into service in 1963. Planning for the bulk loader began years earlier, when City Harbor Department officials inspected bulk loading systems on the east coast, the gulf coast, and the west coast. Aware of growing demand for raw materials in Asia, Harbor Department officials sought bulk-loading facilities for speedier, automated transfer of raw materials from railcars and storage facilities to ship hulls. It appears that prior to the 1960s, only the port of Stockton had bulk-loading facilities comparable to the one planned for the Tenth Avenue Marine Terminal, although such facilities existed, for example, at the Port of Portland, and were developed in the early 1960s for both San Diego and the Port of Long Beach. By 1963, both San Diego and Long Beach would have bulk-loading systems with similar rail-car unloading facilities, including rotary rail-car dumpers. The Harbor Department contracted the Diversified Builders Inc. of Los Angeles and the McDowell Company of Cleveland (later the McDowell-Wellman Company) to build the system, which would have a capacity to load 2,000 tons per hour. Initially the loader handled exports such as potash from New Mexico and flaxseed and alfalfa pellets from Arizona and the Imperial Valley. During the first decade of its existence, it also handled soda ash, borax, phosphates, copper concentrates, and gypsum would subsequently be conveyed to ships for export by the bulk loader (Irwin 1970: 48-49; Morin 1961:A-20; Morin 1962A:B-16; Port of Long Beach 1963: 6-1; Port of Portland 1922; Shepard 1962:A-45) (see Continuation Sheet).

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**

See page 43 Continuation Sheet

B13. Remarks:

***B14. Evaluator:**

Tim Yates, Ph.D., ICF International

***Date of Evaluation:** May 15, 2015

(This space reserved for official comments.)

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

***P2. Location** (continued)

- d. UTM: Zone: 11 (NAD 83); 485670 mE/ 3618012 mN (G.P.S.) (approximate center of rail car unloading building).
Zone: 11 (NAD 83); 485630 mE/ 3617970 mN (G.P.S.) (approximate center of original junction house)
Zone: 11 (NAD 83); 485635 mE/ 3617960 mN (G.P.S.) (approximate north end of conveyor)
Zone: 11 (NAD 83); 485698 mE/ 3617731 mN (G.P.S.) (approximate south end of conveyor and east end of ship-loading track)
Zone: 11 (NAD 83); 485514 mE/ 3617661 mN (G.P.S.) (approximate west end of ship-loading track).

***P3a. Description** (continued):

The historic-era portion of the system begins at the rail car unloading building, which is located north of the molasses tanks, east of Warehouse C, and southeast of the grain silos, along spur tracks connected to the railroad lines that run east of the site. The building's corrugated-metal rectangular western portion has a low-pitched gable roof and two large openings at the northwest and southeast elevations. This portion of the building contains facilities for receiving materials dumped from the bottoms of cars through steel grills to a conveyor system underneath the building. A corrugated metal shelter projects from the building's northeast elevation and is supported at the northeast side by several steel posts. Under the shelter along the northeast wall of the building is an elevated operations room accessed at a steel stairway. A rotary car dumper was originally located in this part of the building.

Commodity materials received at the rail car unloading building are conveyed underground and within a corrugated metal conveyance structure to the corrugated metal junction house approximately 200 feet to the west. Originally, the system's 42-inch wide conveyor belt extended from the junction house south to the terminal's southern berthing area. Within the past decade, however, the system has been altered in the vicinity of the original junction house. A second, taller junction structure was built south of the original structure. This new structure incorporates a four-sided conduit with a conveyor that extends to the original junction house, as well as a long cylindrical conduit with three sets of support legs. This conduit connects to the top of the grain silo complex. Steel conveyance structures located between the aforementioned features and the concrete ramp to the south have been introduced to the system since 1970 (Ninyo & Moore 1999: Appendix A).

The elevated steel frame of the 42-inch conveyor belt extends from the newer junction structure (rather than the original junction structure) approximately 600 feet south to an additional rectangular corrugated metal junction structure in the vicinity of Berth 8. Comparison of historic and current aerial imagery indicates that the junction structure near Berth 8 has been altered, and that it originally incorporated several windows (Ninyo & Moore 1999: Appendix A).

The remainder of the system consists of an elevated steel structure incorporating a conveyor belt, a corrugated metal shelter, and an affixed track along which the system's steel traveling ship loader (or boom conveyor) is connected. The loader moves parallel to the elevated conveyor structure to allow for optimal positioning relative to berthed ships. Once positioned, the traveling loader conveys material to a vertical telescoping chute with a dust suppressor, which transmits the material directly into ship compartments.

***B10. Significance** (continued):

The bulk loader proved to be the most problematic and controversial element of the terminal after the system was completed in 1964. It broke down repeatedly and never handled enough material to break even on its amortization costs during the 1960s and early 1970s. It was developed to handle mainly potash, but during the 1960s, new cheap sources of potash in Canada undermined output from New Mexico the source of San Diego's potash exports. Its disappointing economic performance forced the Port District joined with a private organization to develop the silo complex for on-site storage of livestock feed and other grain products to increase dry bulk exports (Morin 1969:A-23; San Diego Union 1963:H-11; San Diego Union 1965:A-22; Shepard 1964B:A-15; Shepard 1968:A-13; Shepard 1969A:B-1).

The Tenth Avenue Marine Terminal's bulk loader system does not appear to be individually eligible for the CRHR. The bulk loader does not appear to have significance for direct individual association with a historically important event or pattern of events. Research has revealed no evidence that a noteworthy individual performed historically important work that was strongly associated the bulk loader. The bulk loader does not have sufficiently direct association with Harbor Department/Port Director John Bate to confer significance upon it. Consequently, the bulk loader does not appear to meet Criteria 1 or 2 for individual listing in the CRHR.

As an engineering structure, the bulk loader has impressive size and capacity both in terms of its conveyance speed and the rate at which its rail car unloading machinery could intake railroad cargo. However, it does not appear that the Tenth Avenue Marine Terminal's bulk loader has historic engineering or technological significance qualifying it for CRHR listing. Portland had bulk loading facilities in the early twentieth century. Bulk-loading technology advanced over the course of the twentieth century. San Diego's bulk loader was developed on the basis of similar existing facilities on the east coast, in Houston, and in Stockton. City Harbor Department officials planned and developed the bulk loader at the same time that the Port of Long Beach developed its modern bulk loader. It does not appear that San Diego's bulk loader was particularly unique, or that its development represented a milestone in port engineering history. For these reasons, the bulk loader does not appear to meet Criterion 3 for individual listing in the CRHR.

***P5a. Photographs** (continued):



Photograph 1: Rail car Unloader Building, looking northwest

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*Resource Name or # (Assigned by recorder) Bulk Loader, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

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Photograph 2: Rail car Unloader Building, looking southeast



Photograph 3: Steel grills for dumping of commodities underneath rail cars within westerly enclosed portion of rail car Unloading Building, looking southeast

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*Resource Name or # (Assigned by recorder) Bulk Loader, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

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Photograph 4: Rotary car unloading facility underneath projecting shelter on northeast side of rail car unloader building, looking southeast



Photograph 5: Original bulk loader junction house west of rail car unloading building. Note elements constructed within the past decade, including four-sided conduit (dark gray) extending south from original junction house to recently constructed junction house, and conduit from recently constructed junction house to top of silos looking west-northwest



Photograph 6: View highlighting elements of bulk loader system added within the past decade, including recent junction structure and conduit four-sided conduit connecting to original junction house (dark gray, left), and elevated cylindrical conduit extending from the top of the silo complex to the recently constructed junction structure. The steel conveyor apparatuses between the aforementioned features and the concrete ramp at the right are also elements of the system introduced after 1970, looking north-northwest.



Photograph 7: Bulk loader from recent junction structure (dark gray, center right) to east end of southern berthing area, looking north

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*Resource Name or # (Assigned by recorder) Bulk Loader, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

*P5a. Photographs (continued):



Photograph 8: Southern end of bulk loader system, including elevated conveyor, corrugated metal conveyor shelter, and traveling loader with telescoping chute (center-right background), looking east-southeast

*B12. References (continued):

Hudson, Ken. 1976. Storm Damage May Affect Grain Shipments Here. *San Diego Union*. September 28: B-1.

Irwin, Wayne Ray. 1970. The Port of San Diego: An Economic Geography of Waterborne Trade. Master's Thesis in Geography, San Diego State College.

Morin, Howard. 1961. Bids to be Asked on Bulk Loader at Port Terminal. *San Diego Union*. June 2: A-20.

_____. 1962A. Commission Told of Bulk Loader Plans. *San Diego Union*. April 25: B-16.

_____. 1962B. Bulk Loader Harbor Unit's Last Big Task. *San Diego Union*. November 11, 1962: A-29.

_____. 1969. Grain Silos Being Built at Terminal. May 8: A-23.

Ninyo & Moore Geotechnical and Environmental Sciences Consultants (Ninyo and Moore). 1999. Historical Study, 10th Avenue Marine Terminal, San Diego, California. Prepared for the San Diego Unified Port District. November 30, Project No. 103943-05 [the Appendix of this report features over 50 aerial photographs of the terminal site dating from late 1920s through the 2000s].

Port of Long Beach. 1961. The Port's First 50 Years. *Port Highlights*, 7 (Winter): 1-18.

_____. 1963. New Bulk-Loading Terminal Opens: Mountains of Ore and Other Bulk Cargoes now Move at a Record Pace through the Port of Long Beach. *Port Highlights*, 9 (First Edition): 6-11.

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DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

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HRI #
Trinomial

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*Resource Name or # (Assigned by recorder) Bulk Loader, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

Port of Portland (and Commission of Public Docks). 1922. *The World's Sea Lanes Lead to the Port of Portland, Portland, Oregon, U.S.A: Development Progress and Facilities of the Port*. Port of Portland and Commission of Public Docks. Portland, Oregon.

Shepard, Tim. 1962. Automated Loader to Speed Ship Handling at Terminal. *San Diego Union*. October 14: A-45.

_____. 1968. Port Plans to Attract Cargo from Competitors. *San Diego Union*. June 3: A-13.

_____. 1969A. Record Year Forecast for Bulk Loader. *San Diego Union*. February 1: B-1.

_____. 1969B. New Bulk Facility to Boost Port. *San Diego Union*. September 4: B-1.

_____. 1971. Bulk Loader Pacts a Cargo of Woes. *San Diego Union*. November 9: B-1; B-5.

San Diego Union. 1961. Weston to Tour Cotton Shipping. August 13: A-20.

_____. 1963. Bulk Loader Expected to Boost Port Outflow. January 6: H-11.

_____. 1965. Port Bulk Loader Loses \$100,000. December 1: A-22.

_____. 1973. Grain Shipments to Help Lagging Port Business. December 25: 1973.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code(s) 6Z

Other Listings
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*Resource Name or #: Warehouse B, Tenth Avenue Marine Terminal

P1. Other Identifier:

*P2. Location: ☐ Not for Publication ☒ Unrestricted

*a. County: San Diego

*b. USGS 7.5' Quad: Point Loma Date: 1967 (PR 1975) T17S R3W; ¼ of Sec N/A (Pueblo Lands of San Diego Land Grant); San Bernardino B.M.

c. Address: 623 Switzer Street

City: San Diego

Zip: 92101

d. UTM: Zone: 11 (NAD 83); 485273 mE/ 3618094 mN (G.P.S.) (approximate center of building footprint)

e. Other Locational Data: APN

Elevation:

*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

Warehouse B has a rectangular plan and provides approximately 300,000 square feet of storage space. It is constructed of tilt-up fire-proof concrete walls and steel roof trusses. One interior longitudinal concrete wall and two interior transverse concrete walls divide the building into six interior storage spaces. Along the southwest and northeast elevations, rectangular and square shaped wall slabs rise higher than adjacent wall slabs to form parapets. The walls across the northwest and southeast elevations are as high as the parapet-topped wall slabs along the southwest and northeast elevations. The roof is slightly angled downward to the northeast and southwest from the top of the central interior longitudinal wall (see Continuation Sheet).

*P3b. Resource Attributes: (List attributes and codes) HP8. Industrial building

*P4. Resources Present: ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)



P5b. Description of Photo:

(View, date, accession #)

Southwest and partial northwest elevations, looking southeast

***P6. Date Constructed/Age and Sources:** ☒ Historic

☐ Prehistoric ☐ Both

1962 (see references on page 49 Continuation Sheet)

***P7. Owner and Address:**

Unified Port of San Diego
3165 Pacific Highway
San Diego, CA 92101

***P8. Recorded by:** (Name, affiliation, and address):

Tim Yates, ICF International
575 B Street, Ste. 1700
San Diego, CA 92101

*P9. Date Recorded: May 14, 2014

*P10. Survey Type: Intensive

*P11. Report Citation: (Cite survey report and other sources, or enter "none.") ICF International. 2016. Cultural Resources Inventory and Evaluation Report for the Tenth Avenue Marine Terminal Redevelopment Plan and Demolition and Initial Rail Component (ICF 00165.14). San Diego, CA. Prepared for the San Diego Unified Port District

*Attachments: ☐ NONE ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☐ Photograph Record ☐ Other (List):

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*NRHP Status Code 6Z

*Resource Name or #: Warehouse B, Tenth Avenue Marine Terminal

B1. Historic Name: Warehouse B

B2. Common Name: Warehouse B

B3. Original Use: Cargo storage

B4. Present Use: Cold storage

***B5. Architectural Style:** N/A (utilitarian)

***B6. Construction History:** (Construction date, alterations, and date of alterations): Warehouse B was completed in 1962. It received several additions decades later when it was converted into a cold storage facility.

***B7. Moved?** ☒No ☐Yes ☐Unknown **Date:**

Original Location:

***B8. Related Features:**

B9a. Architect: Unknown

b. Builder: I. C. Curry Construction Company.

***B10. Significance: Theme:** N/A

Area: N/A

Period of Significance: N/A

Property Type: N/A

Applicable Criteria: N/A

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

As discussed above, the terminal site does not appear to be eligible for CRHR listing as a historic district. Therefore Warehouse B does not appear to contribute to a historic district. The following evaluation addresses the potential for Warehouse B to qualify as an individual historical resource.

The Harbor Department contracted I.C. Curry, Inc. to construct Warehouse B, which added 300,000 square feet of covered storage protected by fire-proof concrete walls and steel roof trusses to the Tenth Avenue Marine Terminal. Warehouse B was completed in 1962. The building was dedicated along with the bulk loader on February 9 of that year (Magee 1961:B-16; Ninyo & Moore 1999: 12, Appendix A; *San Diego Union* 1962:A-24; Port District 1992: 8).

Warehouse B does not appear to be individually eligible for the CRHR. The building does not appear to be associated with an important event or pattern of events that would confer individual significance upon it. Research efforts have revealed no evidence that a noteworthy individual performed historically important work that was strongly associated with the Warehouse B. The building does not have sufficiently direct association with Harbor Department/Port Director John Bate to confer significance upon it. Individually, therefore, the building does not appear to meet Criteria 1 or 2 for listing in the CRHR (see Continuation Sheet).

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**

See page 49 Continuation Sheet

B13. Remarks:

***B14. Evaluator:**

Tim Yates, Ph.D., ICF International

***Date of Evaluation:** May 15, 2015

(This space reserved for official comments.)

***P3a. Description** (continued):

Numerous cargo loading bays secured by metal-roll up doors are distributed across the exterior walls. These open to concrete loading platforms along the southwest and northeast elevations. The platforms have steel railing and concrete stairs in some places. Warehouse B does not have any of the decorative fluting visible on Transit Sheds 1 and 2, but at several places the building is identified by concrete-scored Moderne lettering similar to the signage lettering of the transit sheds. Pedestrian entries and windows are concentrated at the building's west and south corners, and at the southern portion of the northeast elevation. Solid Industrial-grade doors secure the pedestrian entries. The windows have steel frames and appear to be original awning or hopper units. They include single-pane, three-pane, and 12-pane windows.

The building has been altered in several places. The loading bays at the northwest portion of the northeast elevation are covered by a non-original metal shelter. Non-original refrigeration machinery is concentrated at the center of the northwest elevation. In recent decades, an addition with a curving roof has been constructed at the northeast portion of the northwest elevation.

***B10. Significance** (continued):

Research efforts did not reveal who designed Warehouse B. However, its utilitarian design essentially repeats the arrangement and materials of the concrete walls and steel roof trusses that comprise the majority of the terminal's earlier-built transit shed buildings. Limited concrete-scored Moderne signage identifies the warehouse at several corners of the building. Apart from this decorative element, the warehouse lacks the kinds of architectural elements observable on the earlier transit sheds. The warehouse is not an architectural masterwork, does not embody high artistic value, and is not the product of an important milestone in engineering or building techniques. For these reasons, the Warehouse B does not appear to meet Criterion 3 for individual listing in the CRHR.

***P5a. Photographs** (continued):



Photograph 2: Southwest and southeast elevations, looking north-northwest



Photograph 3: Detail view of original windows at south corner of Warehouse B, looking north-northwest



Photograph 4: Detail view of signage and windows at north corner of Warehouse B, looking southeast

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*Resource Name or # (Assigned by recorder) Warehouse B, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

*P5a. Photographs (continued):



Photograph 5: Northwest elevation, note non-original refrigeration machinery and recent addition with curved roof, looking east

*B12. References (continued):

Magee, Jack. 1961. Two Warehouse Units Due By September. *San Diego Union*. June 18: B-16.

Ninyo & Moore Geotechnical and Environmental Sciences Consultants (Ninyo and Moore). 1999. Historical Study, 10th Avenue Marine Terminal, San Diego, California. Prepared for the San Diego Unified Port District. November 30, Project No. 103943-05 [the Appendix of this report features over 50 aerial photographs of the terminal site dating from late 1920s through the 2000s].

San Diego Unified Port District (Port District). 1992. A Complete Guide to the Port of San Diego. Port of San Diego, Trade Development Department. San Diego, California.

San Diego Union. 1962. Port Warehouse Opened. February 10: A-24.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code(s) 6Z

Other Listings
Review Code

Reviewer

Date

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*Resource Name or #: Warehouse C, Tenth Avenue Marine Terminal

P1. Other Identifier:

*P2. Location: ☐ Not for Publication ☒ Unrestricted

*a. County: San Diego

*b. USGS 7.5' Quad: Point Loma Date: 1967 (PR 1975) T17S R3W; ¼ of Sec N/A (Pueblo Lands of San Diego Land Grant); San Bernardino B.M.

c. Address: 623 Switzer Street

City: San Diego

Zip: 92101

d. UTM: Zone: 11 (NAD 83); 485501 mE/ 3617908 mN (G.P.S.) (approximate center of original building footprint)

e. Other Locational Data: APN

Elevation:

*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

Warehouse C was designed similarly to Warehouse B, but has been altered with a large addition at the southeast end of the building. The building has a rectangular plan and its original portion is constructed of tilt-up fire-proof concrete walls and steel roof trusses. One interior longitudinal concrete wall and two interior transverse concrete walls divide the original portion of the building into six interior storage spaces. Along original portions of the southwest and northeast elevations, rectangular and square shaped wall slabs rise higher than adjacent wall slabs to form parapets. The northwest elevation wall and the original interior transverse walls are as high as the parapet-topped wall slabs along the southwest and northeast elevations. The roof of the original portion of the building is slightly angled downward to the northeast and southwest from the top of the central interior longitudinal wall (see Continuation Sheet).

*P3b. Resource Attributes: (List attributes and codes)

*P4. Resources Present: ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5a. Photograph 41.



P5b. Description of Photo:

(View, date, accession #)
Northwest elevation, northwest end of southwest elevation, looking east. Note that the crane is mobile

***P6. Date Constructed/Age and Sources:**

☒ Historic
☐ Prehistoric ☐ Both
1964 (see references on page 55 Continuation Sheet)

***P7. Owner and Address:**

Unified Port of San Diego
3165 Pacific Highway
San Diego, CA 92101

***P8. Recorded by:** (Name,

affiliation, and address):
Tim Yates, ICF International
575 B Street, Ste. 1700
San Diego, CA 92101

***P9. Date Recorded:** May 14, 2014

*P10. Survey Type: Intensive

*P11. Report Citation: (Cite survey report and other sources, or enter "none.") ICF International. 2016. Cultural Resources Inventory and Evaluation Report for the Tenth Avenue Marine Terminal Redevelopment Plan and Demolition and Initial Rail Component (ICF 00165.14). San Diego, CA. Prepared for the San Diego Unified Port District

*Attachments: ☐ NONE ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☐ Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

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*NRHP Status Code 6Z

*Resource Name or #: Warehouse C, Tenth Avenue Marine Terminal

B1. Historic Name: Warehouse C

B2. Common Name: Warehouse C

B3. Original Use: Cargo storage

B4. Present Use: Cargo storage

***B5. Architectural Style:**

***B6. Construction History:** (Construction date, alterations, and date of alterations) Warehouse C was constructed in 1964 and received a major addition in the 1970s.

***B7. Moved?** ☒No ☐Yes ☐Unknown **Date:**

Original Location:

***B8. Related Features:**

B9a. Architect: Unknown

b. Builder: I.C. Curry, Inc.

***B10. Significance: Theme:** N/A

Area: N/A

Period of Significance: N/A

Property Type: N/A

Applicable Criteria: N/A

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

As discussed above, the terminal site does not appear to be eligible for CRHR listing as a historic district. Therefore Warehouse C does not appear to contribute to a historic district. The following evaluation addresses the potential for Warehouse C to qualify as an individual historical resource.

The Harbor Department contracted I.C. Curry, Inc. to construct Warehouse C, which essentially repeated the design of Warehouse B. Warehouse C added another 300,000 square feet of covered storage protected by fire-proof concrete walls and steel roof trusses to the Tenth Avenue Marine Terminal. I.C. Curry, Inc. completed Warehouse C in 1962 for a price of \$1.4 million. The building received a major addition at its southeast end during the 1970s (Morin 1964:A-29; Ninyo & Moore 1999: Appendix A; Port District 1992: 8).

Warehouse C does not appear to be individually eligible for the CRHR. Nor does the building appear to be associated with an important event or pattern of events that would confer individual significance upon it. Research efforts have revealed no evidence that a noteworthy individual performed historically important work that was strongly associated with the Warehouse C. The building does not have sufficiently direct association with Harbor Department/Port Director John Bate to confer significance upon it. Individually, therefore, Warehouse C does not appear to meet Criteria 1 or 2 for listing in the CRHR (see Continuation Sheet).

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**

See page 55 Continuation Sheet

B13. Remarks:

***B14. Evaluator:**

Tim Yates, Ph.D., ICF International

***Date of Evaluation:** May 15, 2015

(This space reserved for official comments.)

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary #
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*Resource Name or # (Assigned by recorder) Warehouse C, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

*P3a. Description (continued):

Numerous cargo loading bays secured by metal-roll up doors are distributed across the exterior walls. These open to concrete loading platforms along the southwest and northeast elevations. The platforms have steel railing and concrete stairs in some places. Like Warehouse B, Warehouse C does not have any of the decorative fluting visible on Transit Sheds 1 and 2, but at several places the building is identified by concrete-scored Moderne signage with lettering similar to the signage on the transit sheds. Pedestrian entries and windows are concentrated near the center of the building's northeast elevation, and the center and southeast end of the original portion of the building's southwest elevation. Solid Industrial-grade doors secure the pedestrian entries. The windows appear to be original steel frame units with an upper two-pane awning sash and a lower single-pane fixed sash.

The exterior of the large addition forming the southeast end of Warehouse C is concrete at the wall bases and metal at the upper portions. The addition has multiple loading bays with role-up metal doors. The far southeast portion of the building does not form a corner. Instead, the addition is shaped so as not to interfere with immediately adjacent bulk-loader conveyor.

*B10. Significance (continued):

Research efforts did not reveal who designed Warehouse C. However, its utilitarian design essentially repeats Warehouse B, built two years earlier. Moreover, Warehouse B and C repeated the arrangement and materials of the concrete walls and steel roof trusses that comprised the majority of the terminal's earlier-built transit shed buildings. Limited Moderne signage identifies the warehouse at several corners of the building, which lacks the kinds of other architectural elements observable on the earlier transit sheds. The warehouse is not an architectural masterwork, does not exhibit high artistic value, and does not embody an important milestone in engineering or building techniques. For these reasons, Warehouse C does not appear to meet Criterion 3 for individual listing in the CRHR.

*P5a. Photographs (continued):



Photograph 2: Northeast and northwest elevation, looking south



Photograph 3: Southwest elevation, looking southeast



Photograph 4: Detail of original windows and signage at southwest elevation, looking northeast

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*Resource Name or # (Assigned by recorder) Warehouse C, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

*P5a. Photographs (continued):



Photograph 5: Southwest and southeast elevations of addition to southeast side of building, looking north



Photograph 6: View of addition from pier south of bulk loader and Berths 7 and 8, camera facing north

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CONTINUATION SHEET

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*Resource Name or # (Assigned by recorder) Warehouse C, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

***B12. References** (continued):

Morin, Howard. 1964. \$1.4 Million Warehouse Completed. *San Diego Union*. April 26: A-29.

Ninyo & Moore Geotechnical and Environmental Sciences Consultants (Ninyo and Moore). 1999. Historical Study, 10th Avenue Marine Terminal, San Diego, California. Prepared for the San Diego Unified Port District. November 30, Project No. 103943-05 [the Appendix of this report features over 50 aerial photographs of the terminal site dating from late 1920s through the 2000s].

San Diego Unified Port District (Port District). 1992. A Complete Guide to the Port of San Diego. Port of San Diego, Trade Development Department. San Diego, California.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code(s) 6Z

Other Listings
Review Code

Reviewer

Date

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*Resource Name or #: Railroad Tracks, Tenth Avenue Marine Terminal

P1. Other Identifier:

*P2. Location: ☐ Not for Publication ☒ Unrestricted

*a. County: San Diego

*b. USGS 7.5' Quad: Point Loma Date: 1967 (PR 1975) T17S R3W; ¼ of Sec N/A (Pueblo Lands of San Diego Land Grant); San Bernardino B.M.

c. Address: 623 Switzer Street

City: San Diego

Zip: 92101

d. UTM:

e. Other Locational Data: APN

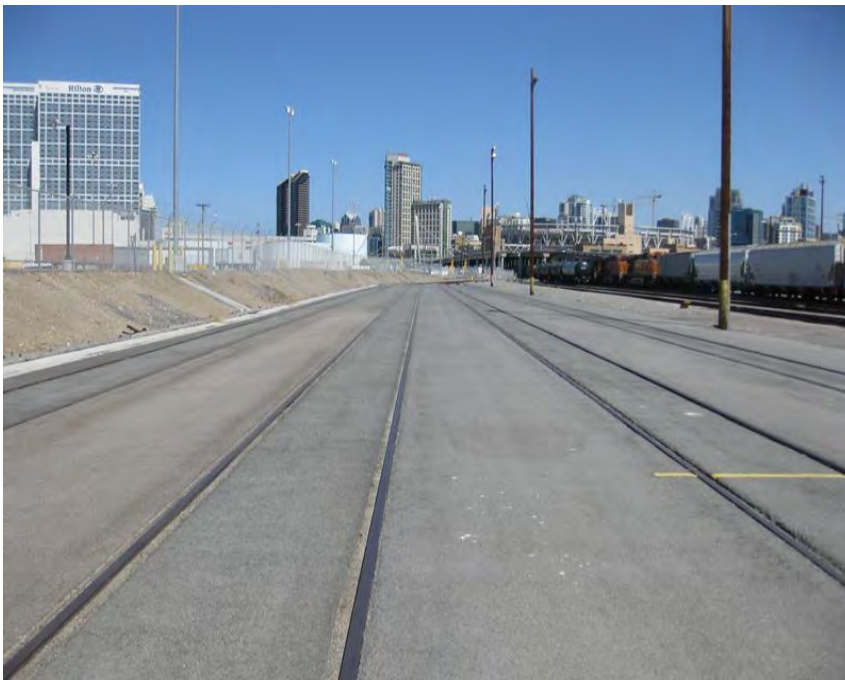
Elevation:

*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

Numerous historic-era railroad tracks are located within the Tenth Avenue Marine Terminal property. The rail lines within terminal were installed as part of the facility's initial development in the late 1950s and early 1960s. They represent standard railroad construction. They consist of steel rails affixed to cross-ties across a layer of ballast, or tracks imbedded in asphalt pavement or in concrete. The track within the terminal property totals over 50,000 linear feet. Four tracks within the eastern portion of the terminal property east of the silo complex are aligned adjacent to the BNSF (former Santa Fe) railroad yard. The four tracks adjacent to the yard are at the same grade as the yard tracks, and are demarcated from other terminal facilities by a fence and a slope (Photograph 1). Trains access the terminal site proper via a spur from the BNSF rail yard that enters the terminal at the southeast corner of the site, east of the molasses tanks and north of the main gate (see Continuation Sheet).

*P3b. Resource Attributes: (List attributes and codes): HP39. Other

*P4. Resources Present: ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)



P5b. Description of Photo:

(View, date, accession #)
Photograph 1. Marine terminal tracks immediately west of BNSF railroad yard, looking northwest

***P6. Date Constructed/Age and Sources:**

☒ Historic
☐ Prehistoric ☐ Both
1958-1964 (see 523B form)

***P7. Owner and Address:**

Unified Port of San Diego
3165 Pacific Highway
San Diego, CA 92101

***P8. Recorded by:** (Name, affiliation, and address):

Tim Yates, ICF International
575 B Street, Ste. 1700
San Diego, CA 92101

***P9. Date Recorded:** May 14, 2014

***P10. Survey Type:** Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") ICF International. 2016. Cultural Resources Inventory and Evaluation Report for the Tenth Avenue Marine Terminal Redevelopment Plan and Demolition and Initial Rail Component (ICF 00165.14). San Diego, CA. Prepared for the San Diego Unified Port District

***Attachments:** ☐ NONE ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☐ Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

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*NRHP Status Code 6Z

*Resource Name or #: Railroad Tracks, Tenth Avenue Marine Terminal

B1. Historic Name: Rail spurs, tracks

B2. Common Name: Rail spurs, tracks

B3. Original Use: Cargo transport

B4. Present Use: Cargo transport

***B5. Architectural Style:** N/A

***B6. Construction History:** (Construction date, alterations, and date of alterations)

***B7. Moved?** ☐No ☐Yes ☐Unknown **Date:**

Original Location:

***B8. Related Features:**

B9a. Architect: Unknown

b. Builder: Unknown

***B10. Significance: Theme:** N/A

Area: N/A

Period of Significance: N/A

Property Type: N/A

Applicable Criteria: N/A

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

As discussed above, the terminal site does not appear to be eligible for CRHR listing as a historic district. Therefore, the terminal's rail tracks do not appear to contribute to a historic district. The following text addresses the potential for the terminal's rail tracks to qualify as a historical resource individually.

None of the rail lines within the terminal were part of the original Santa Fe Railway line constructed during the early 1880s, which was aligned nearby and to the east of the eastern terminal boundary. Nor were any of the tracks within the terminal part of sidings associated with the Santa Fe Line. The Santa Fe Railway alignment's proximity to the eastern boundary of the terminal circa 1928-29, prior to the terminal's development, is illustrated in Photograph 2 below. The original spur line into the terminal property and various tracks within the site were constructed during the terminal's initial development in the late 1950s and early 1960s. A maintenance evaluation of the terminal's rail system conducted in the 1990s states that some of the track alignments within the site were added in the 1970s and 1980s, and that tracks along some of the original rail alignments within the terminal were replaced prior to the 1990s. The evaluation recommended replacing much of the track present at that time. Hence, like most historic-period rail lines generally, the terminal's tracks have been subject to repeated maintenance and replacement (Frederick R. Harris, Inc. 1994:IV).

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**

Frederick R. Harris, Inc. 1994. Evaluate Conditions of Railroad Tracks at Tenth Avenue Marine Terminal, San Diego, and National City Marine Terminal, National City, California. Report prepared for the San Diego Unified Port District. On file at the San Diego Unified Port District; Ninyo & Moore. 1999. Historical Study, 10th Avenue Marine Terminal, San Diego, California. Prepared for the San Diego Unified Port District. November 30, Project No. 103943-05. Unified Port of San Diego, San Diego, California.

B13. Remarks:

***B14. Evaluator:**

Tim Yates, Ph.D., ICF International

***Date of Evaluation:** May 15, 2015

(This space reserved for official comments.)

Sketch Map

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*Resource Name or # (Assigned by recorder) Railroad Tracks, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

***P3a. Description** (continued):

Just east of the molasses tanks, the spur splits into multiple lines running to the southwest and northwest. The line to the northwest splits into multiple tracks to provide for railcars to be conveyed to the bulk loader's rail car unloading building. An additional connecting track extends between the track leading to the rail car unloading building and tracks running south of the molasses tanks. Northwest of the rail car unloading building, these lines converge into a single track in the vicinity of the bunker fuel complex. That single track continues to the northwest beyond the terminal site.

Multiple tracks run parallel to one another south of the molasses tanks toward the traveling ship loader at Berths 7 and 8. These split near Berth 8 into multiple tracks extending southwest and west. The line running southwest wraps around the south end of the bulk loader system and Transit Shed 2, and then splits into two lines that extend to the northwest along the southwest sides of the both transit sheds. The line running west from the vicinity of Berth 8 splits into multiple tracks that extend along the northeast sides of the transit sheds and the southwest sides of Warehouses B and C. Several tracks extend across the paved space between the transit sheds and warehouses.

The railroad tracks have undergone periodic alteration in the form of repair, replacement, and even realignment over the decades. Tracks that formerly provided for rail cars to be conveyed northwest from the north side of the molasses tanks to the northeast sides of Warehouses B and C have been removed or abandoned.

***B10. Significance** (continued):

The system of railroad tracks at the Tenth Avenue Marine Terminal do not appear to be eligible for the CRHR. The terminal's tracks do not appear to be associated with an important event or pattern of events that would confer individual significance upon them. Research efforts have revealed no evidence that a noteworthy individual performed historically important work with the terminal's internal rail lines. These rail track system does not have sufficiently direct association with Harbor Department/Port Director John Bate to confer significance upon it. Individually, therefore, the terminal's rail tracks do not appear to meet Criteria 1 or 2 for listing in the CRHR.

Railroad tracks represent a ubiquitous, commonplace form of infrastructure. Research has revealed no evidence that the terminal's rail tracks have significance for any association with a master engineer or builder, and they do not represent an engineering masterwork. They are entirely commonplace features of the industrial built environment that can be observed at shipping facilities throughout California and the nation. For these reasons, the terminal's railroad tracks do not appear to meet Criterion 3 for listing in the CRHR. As stated above, the railroad tracks have been subject to repair, replacement, and even realignment for decades, and little if any of the tracks' current materials are original to the terminal site.

Railroad tracks represent a ubiquitous, commonplace form of infrastructure. Research has revealed no evidence that the terminal's internal tracks have significance for any association with a master engineer or builder, and they do not represent an engineering masterwork. They are entirely commonplace features of the industrial built environment that can be observed at shipping facilities throughout California and the nation. For these reasons, the terminal's railroad tracks do not appear to meet Criterion 3 for listing in the CRHR. As stated above, the railroad tracks have been subject to repair, replacement, and even realignment for decades, and little if any of the tracks' current constituent materials are original to the terminal site.

***P5a. Photographs** (continued below):



Photograph 2: Aerial view of shoreline with overlay of Tenth Avenue Marine Terminal site. The Santa Fe Railway line is visible near the east boundary of the terminal. The arrow with the identifier "Switzer Creek," for example, points to a bridge that carried the Santa Fe Railway line over the creek (Ninyo and Moore, 1999)

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*Resource Name or # (Assigned by recorder) Railroad Tracks, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

*P5a. Photographs (continued):



Photograph 3: Spur from BNSF track extending into Tenth Avenue Marine Terminal east of molasses tanks, looking east



Photograph 4: Rail tracks extending toward the bulk loader's rail car unloading building, view from just east of molasses tanks, looking northwest

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*Resource Name or # (Assigned by recorder) Railroad Tracks, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update



Photograph 5: Intersecting tracks extending toward bulk loader's traveling ship loader at Berths 7 and 8, view from south of molasses tanks, looking southwest



Photograph 6: Rail tracks along northeast side of Transit Shed 1, looking northwest

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PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code(s) 6Z

Other Listings
Review Code

Reviewer

Date

Page 1 of 6

*Resource Name or #: Silo Complex, Tenth Avenue Marine Terminal

P1. Other Identifier:

*P2. Location: ☐ Not for Publication ☒ Unrestricted

*a. County: San Diego

*b. USGS 7.5' Quad: Point Loma Date: 1967 (PR 1975) T17S R3W; ¼ of Sec N/A (Pueblo Lands of San Diego Land Grant); San Bernardino B.M.

c. Address: 623 Switzer Street

City: San Diego

Zip: 92101

d. UTM: Zone: 11 (NAD 83); 485577 mE/ 3618034 mN (G.P.S.) (center of original silos)

e. Other Locational Data: APN

Elevation:

*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

Twelve silos originally constructed for storage of food grains are located immediately northeast of the northwest half of Warehouse C and west of the bulk loader rail-car unloading building. The twelve original silos have flat roofs and are constructed of concrete. They rise approximately 75 feet in height. The utilitarian corrugated metal building on the southwest side of the northwestern silos appears to have been constructed along with the original 12 silos. Numerous associated features have been added to the silo complex since the 1970s. Two much bulkier silo structures and associated steel conduits and catwalks were added to the northeast side of the original twelve silos. The rectangular, multi-story corrugated metal element with steel stairs on the southeast side of the original silos, which is not present in a 1976 bird's eye aerial photograph of the site, appears to have been built along with the two larger non-original silos. Two manufactured buildings and an open-sided shelter have also been introduced to the site since that time. The large elevated cylindrical conduit that connects to the square element above the southern-most original silos was introduced to the site during alterations to the bulk loader system within the last decade (NETR 2009; Ninyo & Moore 1999: Appendix A).

*P3b. Resource Attributes: (List attributes and codes) HP11. Engineering structure

*P4. Resources Present: ☒ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)



P5b. Description of Photo:
(View, date, accession #) Silos looking east-northeast

*P6. Date Constructed/Age and Sources: ☒ Historic
☐ Prehistoric ☐ Both
1970 (see references on page 6 Continuation Sheet)

*P7. Owner and Address:
Unified Port of San Diego
3165 Pacific Highway
San Diego, CA 92101

*P8. Recorded by: (Name, affiliation, and address):
Tim Yates, ICF International
575 B Street, Ste. 1700
San Diego, CA 92101

*P9. Date Recorded: May 14, 2014

*P10. Survey Type: Intensive

*P11. Report Citation: (Cite survey report and other sources, or enter "none.") ICF International. 2016. Cultural Resources Inventory and Evaluation Report for the Tenth Avenue Marine Terminal Redevelopment Plan and Demolition and Initial Rail Component (ICF 00165.14). San Diego, CA. Prepared for the San Diego Unified Port District

*Attachments: ☐ NONE ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☐ Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

Page 2 of 6

*NRHP Status Code 6Z

*Resource Name or #: Silos, Tenth Avenue Marine Terminal

B1. Historic Name: Grain Silos

B2. Common Name: Silos

B3. Original Use: Storage of food grains

B4. Present Use: Storage of food grains and minerals

***B5. Architectural Style:**

***B6. Construction History:** (Construction date, alterations, and date of alterations) The silo complex was constructed in 1970.

Numerous alterations to the site have occurred since the 1970s and are discussed in more detail below.

***B7. Moved?** ☒No ☐Yes ☐Unknown **Date:**

Original Location:

***B8. Related Features:**

B9a. Architect: N/A

b. Builder: San Diego Bulk Terminal

Area: N/A

***B10. Significance: Theme:** N/A

Property Type: N/A

Applicable Criteria: N/A

Period of Significance: N/A

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The silo complex at the Tenth Avenue Marine Terminal is not considered a resource that can contribute to a potential Tenth Avenue Marine Terminal District because its original structures were completed in 1970, well after the terminal's 1957-64 period of potential significance as a historic district.

The twelve Silos at the Tenth Avenue Marine Terminal were constructed to store new kinds of bulk dry commodities at the terminal in order to boost exports and help the \$2.8 million bulk loader break even on amortization costs. Port officials had anticipated that the bulk loader would be conveying 900,000 tons annually, or 400,000 more than it needed to break even, but by the late 1960s, it had yet to reach the 400,000 ton mark. Hoping to increase exports of feed products and grain, the Port District joined with a private organization, San Diego Bulk Terminal, to develop the silos. The Port District devoted \$100,000 to preparing the site and San Diego Bulk Terminal built the silo complex for \$1 million. With a storage capacity of 15,000 tons, the silo complex was completed in early 1970. The complex was altered in the mid-1980s when two new silos, both much larger than the original ones, were added to the north side of the facility. The rectangular, multi-story corrugated metal element with steel stairs on the southeast side of the original silos appears to have been built in the mid-1980s as well. The large conduit that currently extends from the top of the southeast silos to the bulk loader was installed within the past decade (Morin 1969:A-23; Ninyo & Moore 1999: Appendix A San Diego Unified Port District 1973: 5; Shepard 1969: B-1) (see Continuation Sheet).

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**

See page 6 Continuation Sheet

B13. Remarks:

***B14. Evaluator:**

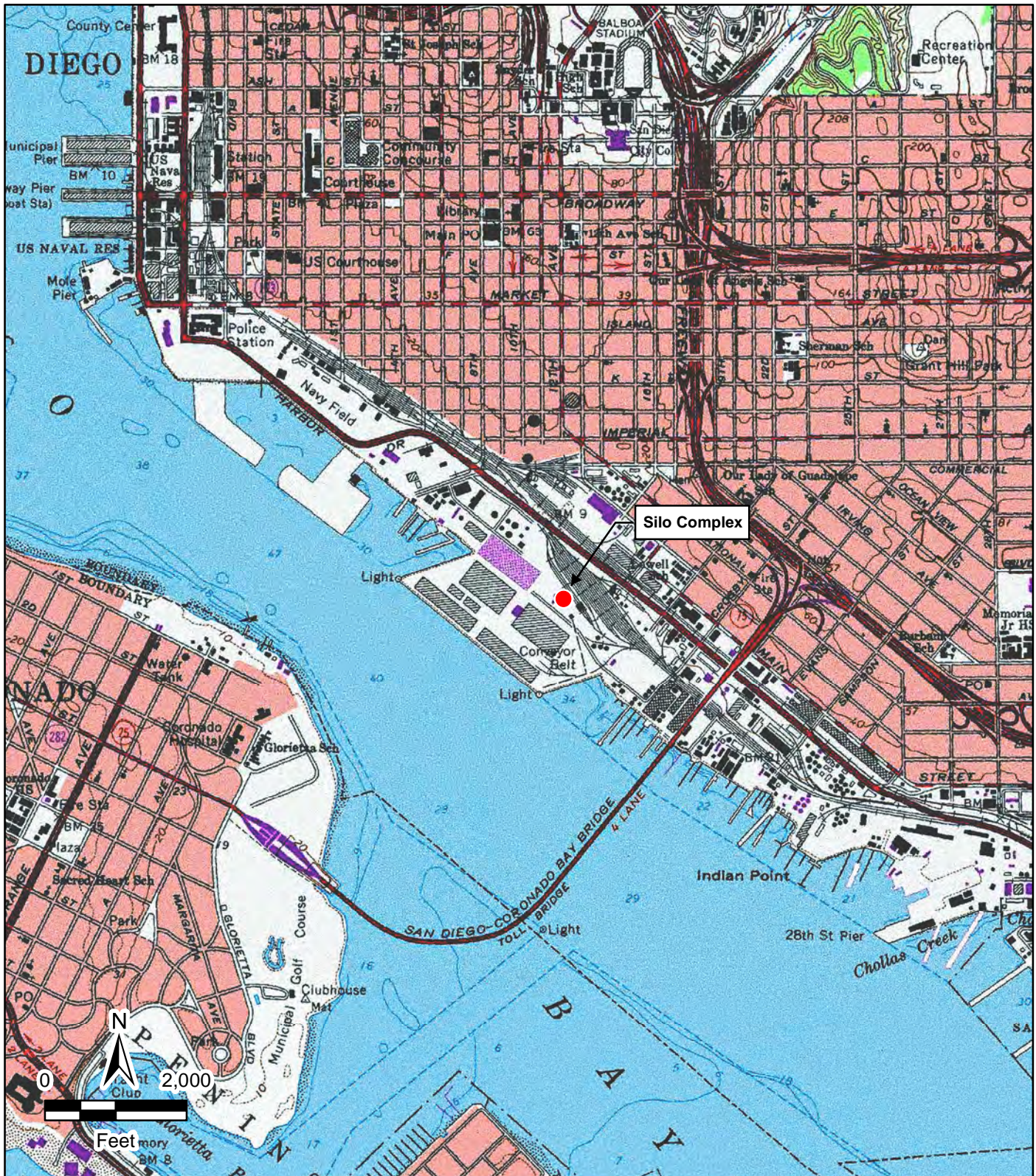
Tim Yates, Ph.D., ICF International

***Date of Evaluation:** May 15, 2015

(This space reserved for official comments.)

Sketch Map

See DPR page 4 Sketch Map





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*Resource Name or # (Assigned by recorder) Silos, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update

***B10. Significance** (continued):

The silo complex at the Tenth Avenue Marine Terminal does not appear to be individually eligible for the CRHR. The complex was constructed in 1970, well after the 1957-64 period of potential significance for the rest of the terminal's features, and well after John Bate retired as Port District Director. The complex does not appear to have significance for direct individual associations with a historically important event or pattern of events. Research has revealed no evidence that a noteworthy individual performed historically important work that was strongly associated with the silo complex. Consequently, the complex does not appear to meet Criteria 1 or 2 for CRHR listing.

Research efforts did not reveal any evidence that the silo complex is significant as the work of a master engineer or builder, and the original silos do not appear to be an engineering masterwork. Silo structures comparable in size, with equivalent reinforced-concrete construction, can be encountered throughout California and across the west coast. The same can be said for the complex's original and entirely commonplace utilitarian corrugated-metal building. For these reasons, the silo complex does not appear to meet Criterion 3 for listing in the CRHR.

***P5a. Photographs** (continued):



Photograph 2: Northeast side of silo cluster, note two larger silos constructed since the 1970s, and multistory corrugated-metal structure (far left) that appears to have been built with the larger silos. Also note elevated conduit and square element constructed within the past decade (upper left). Looking west-southwest

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*Resource Name or # (Assigned by recorder) Silos, Tenth Avenue Marine Terminal

*Recorded by: T. Yates, ICF International

*Date: May 14, 2014

☒ Continuation ☐ Update



Photograph 3: View showing relationship between silo cluster (right) and recently added conduit and junction structure, looking west-northwest

***B12. References** (continued):

Morin, Howard. 1969. Grain Silos Being Built at Terminal. *San Diego Union*, May 8: A-23.

Ninyo & Moore Geotechnical and Environmental Sciences Consultants (Ninyo and Moore). 1999. Historical Study, 10th Avenue Marine Terminal, San Diego, California. Prepared for the San Diego Unified Port District. November 30, Project No. 103943-05 [the Appendix of this report features over 50 aerial photographs of the terminal site dating from late 1920s through the 2000s].

San Diego Unified Port District (Port District). 1973. Port of San Diego. Pamphlet advertising Port of San Diego services, on file at the San Diego Public Library.

Shepard, Tim. 1969. New Bulk Facility to Boost Port. *San Diego Union*. September 4: B-1.

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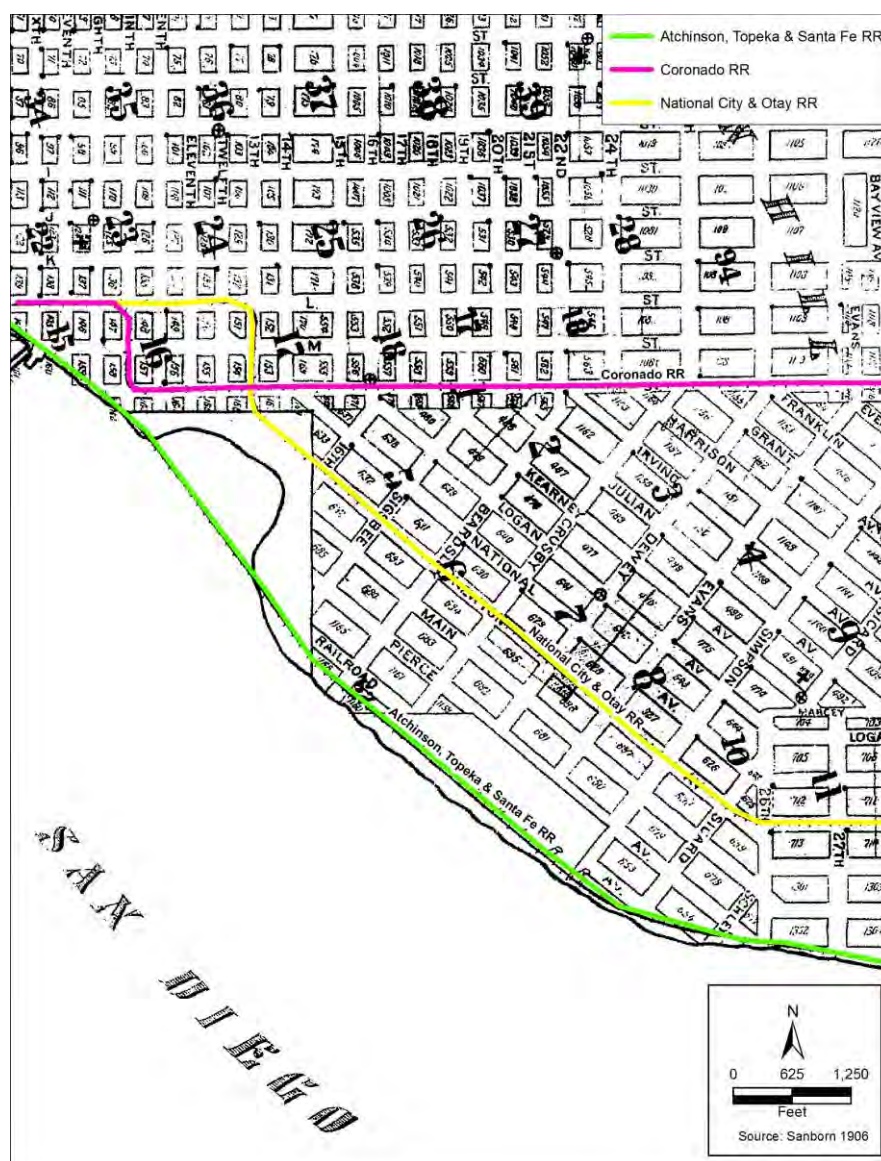
*Resource Name or # (Assigned by recorder) CA-SDI-13073 (Coronado Railroad)

*Recorded by: T. Yates, ICF International

*Date: April 7, 2016

☒ Continuation ☐ Update

Location maps in the CA-SDI-13073 site record appended to this update form incorrectly indicate that, in the vicinity of today's Coronado Bridge and the Tenth Avenue Marine Terminal, the historic Coronado Railroad was aligned parallel to the Atchison, Topeka and Santa Fe Railway (Santa Fe) line, both of which were built in the 1880s. Sanborn fire insurance maps dating to 1906 show that the Coronado Railroad in the vicinity of today's Coronado Bridge and the Tenth Avenue Marine Terminal was actually aligned to the east of the Santa Fe line. The National City and Otay Railroad (which in 1906 leased, later acquired, and then in 1908 sold the Coronado Railroad to the San Diego Southern Railway Company) was also aligned east of the Santa Fe line. Indeed in the area bordered today at the southeast by the Coronado Bridge and at the northwest by the San Diego Convention Center, the historic Coronado Railroad segment nearest to the Santa Fe line was situated approximately 100 yards north of the Tenth Avenue Marine Terminal's northeast corner (Robertson 1998:115; Sanborn Map Company 1906A, 1906B, 1906C, 1906D, 1906E). An approximately 1.5 segment of the original Coronado Railroad alignment located approximately seven miles southeast of the Coronado Bridge has been designated as a City of San Diego Historical Landmark (City of San Diego 2014; Coons 2005)



1906 Sanborn index map showing railroad alignments in southern San Diego near today's Coronado Bridge, Tenth Avenue Marine Terminal, and Convention Center.

Page 2 of 3

*Resource Name or # (Assigned by recorder) CA-SDI-13073 (Coronado Railroad)

*Recorded by: T. Yates, ICF International

*Date: April 7, 2016

☒ Continuation ☐ Update



Railroad lines as represented in 1906 Sanborn maps overlaid on current aerial view

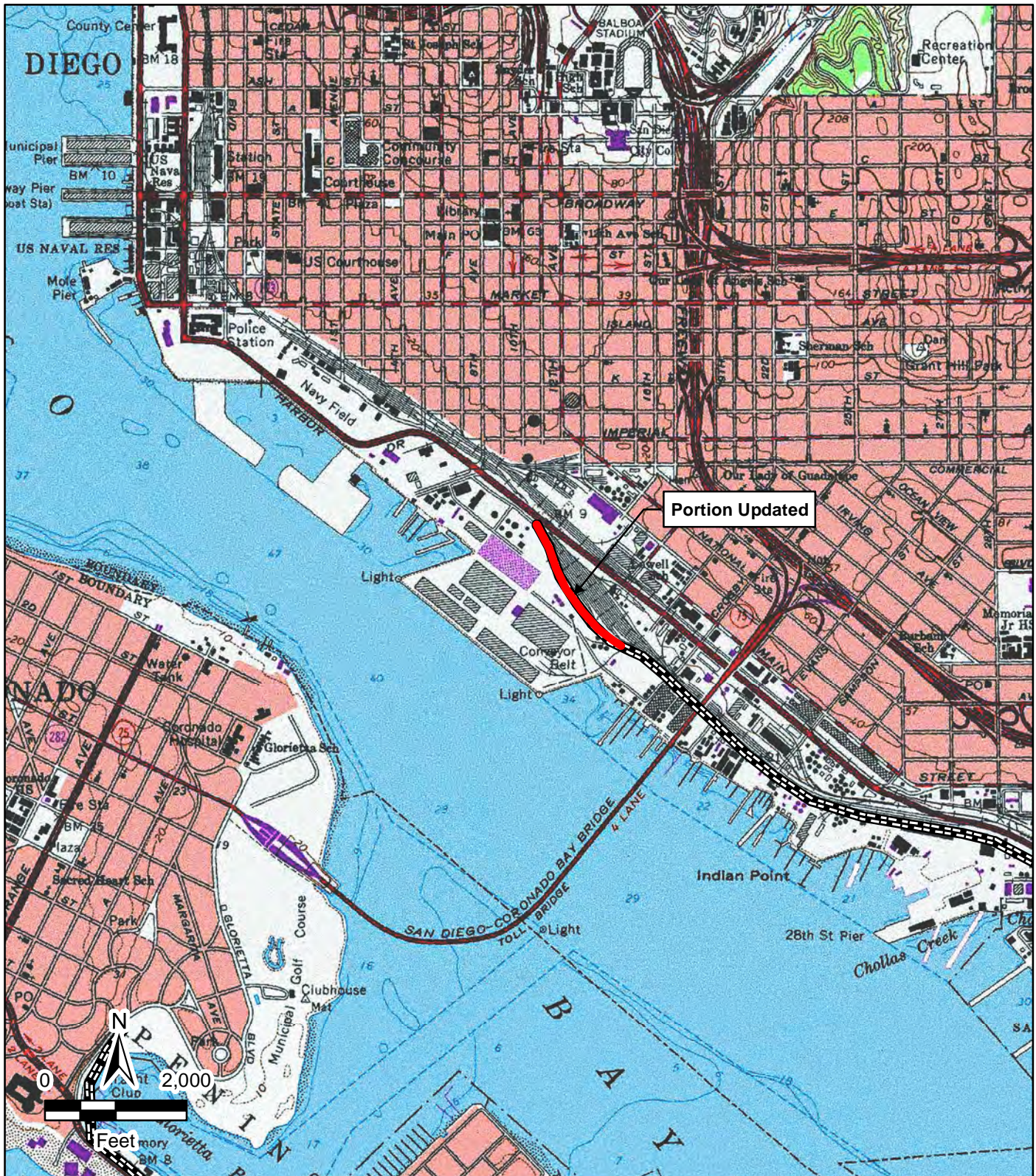
References:

Coons, Bruce. 2005. Historic Designation of Coronado Railroad Upheld By City Council. Save Our Heritage Organization Website. Available: <<http://www.sohosandiego.org/reflections/2005-4/execmess.htm>>. Accessed May 27, 2015.

City of San Diego. 2014. San Diego Register of Historic Resources. July, 24. Maintained by the City of San Diego Historical Resources Board. Available: <<http://www.sandiego.gov/planning/programs/historical/pdf/2014/register140724.pdf>>. Accessed May 14, 2015.

Robertson, Donald B. 1998. *Encyclopedia of Western Railroad History, Volume IV, California*. Caxton Printers, Ltd., Caldwell, Idaho.

Sanborn Map Company. 1906A. San Diego, California. Sheet 0d. Sanborn Map Company, New York, New York.
_____. 1906B. San Diego, California. Sheet 1. Sanborn Map Company, New York, New York.
_____. 1906C. San Diego, California. Sheet 13. Sanborn Map Company, New York, New York.
_____. 1906D. San Diego, California. Sheet 15. Sanborn Map Company, New York, New York.
_____. 1906E. San Diego, California. Sheet 16. Sanborn Map Company, New York, New York.



State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #: _____
HRI #: _____
Trinomial: CA-SDI-13.073H (update)
NRHP Status Code: _____

Other Listings: _____
Review Code: _____ Reviewer: _____ Date: _____

Page 1 of 2

Resource Name or #: (Assigned by recorder): CA-SDI-13,073H

UPDATE

P1. Other Identifier: None

P2. Location: ☒ Not for Publication ☐ Unrestricted

a. County: San Diego

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

b. USGS 7.5' Quad: Imperial Beach, CA Date: 1967 (Photorevised 1975) T18 S ; R 2 W; south half of section 16, northwest corner of Section 21 and the eastern half of Section 20; S.B.M.

c. Address: None City: _____ Zip: _____

d. UTM: Zone 17 ; NAD 1927 ; A: 491370 mE/ 3606900 mN; B: 490160mE/ 3605440mN

e. Other Locational Data (e.g., parcel #, directions to resource, elevation, etc., as appropriate): Site is located along the southeastern margins of the San Diego Bay.

P3a. Description (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries): This site consists of a portion of the historic Coronado Railroad within the project APE. The railroad alignment is not in use and has been fenced off near the Western Salt Plant. Several portions of the track have been undermined by erosion while others have been partially covered by erosion from the nearby berm. The track south of the APE has been removed. The two tressels within the APE are both in poor condition. A portion of the southern tressels has been removed to limit access across the channel. The remainder has seriously deteriorated and has been tagged by graffiti. The northern tressel is also heavily deteriorated and a portion has been burned. The overall integrity of CA-SDI-13,073H within the APE is poor.

P3b. Resource Attributes (List attributes and codes): AH7. Railroad grades.

P4. Resources Present: ☐ Building ☐ Structure ☐ Object ☒ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5a. Photograph or Drawing (Photo required for buildings, structures, and objects)

P5b. Description of Photo (View, date, accession #):

P6. Age and Sources: ☒ Historic
☐ Prehistoric ☐ Both

P7. Owner and Address:

Western Salt Co.
1470 Bav Blvd.
Chula Vista, CA 91910

P8. Recorded by (Name, affiliation, and address):

Andrew R. Pignuolo
Tierra Environmental Services
9903-E Businesspark Avenue
San Diego, CA 92131

P9. Date Recorded:

November 3, 1999

P10. Survey Type (Describe):

Intensive Surface Inventory

P11. Report Citation (Cite survey report and other sources, or enter "none"): Pignuolo, Andrew R. and Michael Baksh 2000 Draft Archaeological Survey Report for the Bayshore Bikeway Project, City of San Diego, California.

Attachments: ☐ NONE ☒ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☐ Photograph Record ☐ Other (List):

LOCATION MAP

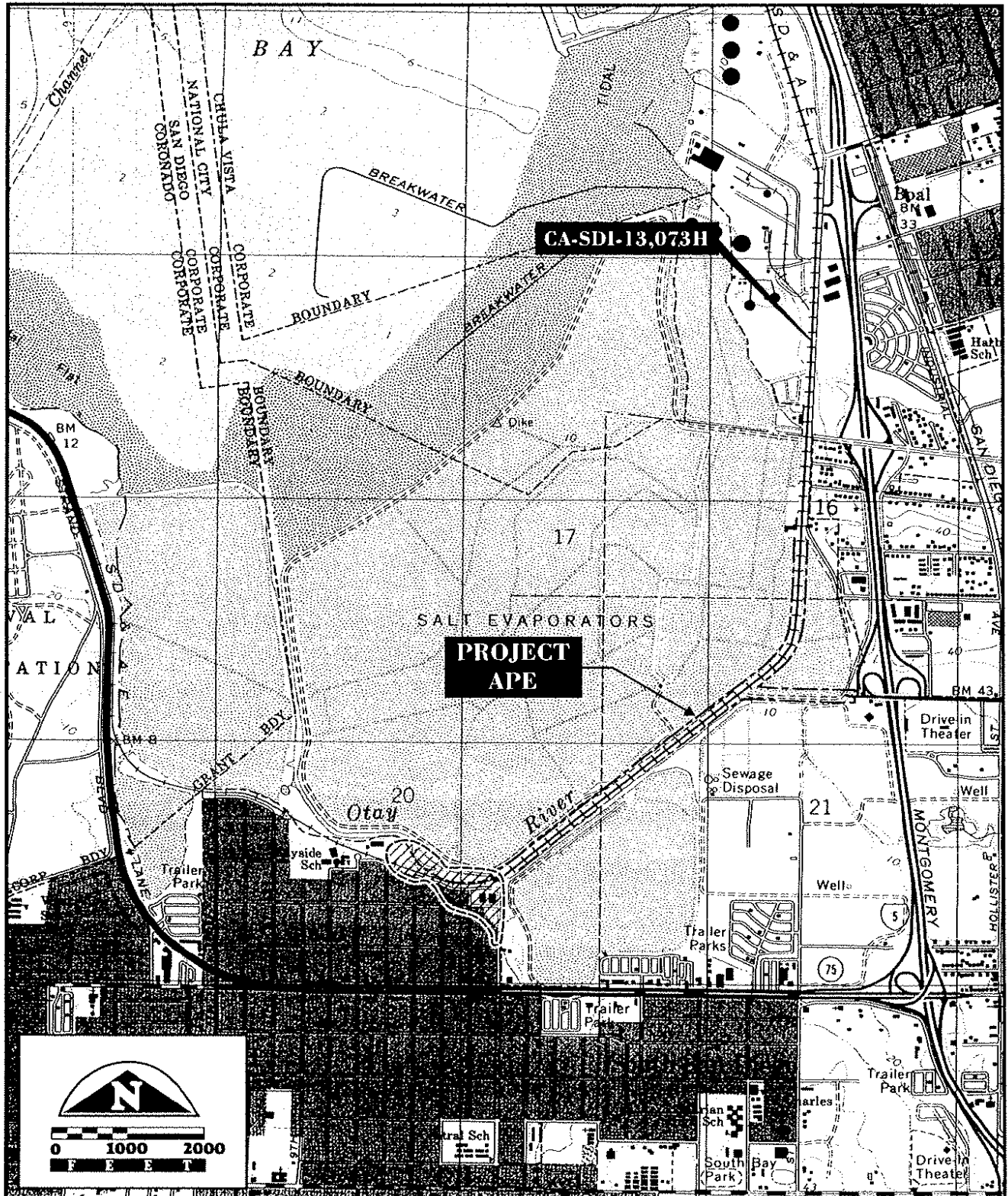
Page 2 of 2

Resource Name or #: (Assigned by recorder):

Map Name: USGS Quad Map (Imperial Beach)

Scale: 1:24,000

Date of Map: 1967 (photorevised 1975)



State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #: P-37-013073H

HRI #:

Trinomial: CA-SDI-13.073H

NRHP Status Code:

Other Listings:

Review Code:

Reviewer:

Date:

Page 1 of 2

Resource Name or #: (Assigned by recorder): CA-SDI-13,073H

UPDATE

P1. Other Identifier: None

P2. Location: ☒ Not for Publication ☐ Unrestricted

a. County: San Diego

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

b. USGS 7.5' Quad: Imperial Beach, CA Date:1967 (Photorevised 1975) T18 S ; R 2 W; south half of section 16, northwest corner of Section 21 and the eastern half of Section 20; S.B.M.

c. Address: None

City:

Zip:

d. UTM: Zone 17 ; NAD 1927 ; A: 491370 mE/ 3606900 mN

B: 490160mE/ 3605440mN

e. Other Locational Data (e.g., parcel #, directions to resource, elevation, etc., as appropriate):Site is located along the southeastern margins of the San Diego Bay.

P3a. **Description** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries): This site consists of a portion of the historic Coronado Railroad within the project APE. The railroad alignment The alignment is not in use and has been fenced off near the Western Salt Plant. Several portions of the track have been undermined by erosion while others have been partially covered by erosion from the nearby berm. The track south of the APE has been removed. The two tressels withing the APE are both in poor condition. A portion of the southern tressels has been removed to limit access across the channel. The remainder has seriously deteriorated and has been tagged by graffiti. The northern tressel is also heavily deteriorated and a portion has been burned. The overall integrity of CA-SDI-13,073H within the APE is poor.

P3b. **Resource Attributes** (List attributes and codes): AH7. Railroad grades.

P4. **Resources Present:** ☐ Building ☐ Structure ☐ Object ☒ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5a. Photograph or Drawing (Photo required for buildings, structures, and objects)

P5b. Description of Photo
(View, date, accession #):

P6. **Age and Sources:**

☒ Historic ☐ Prehistoric
☐ Both

P7. **Owner and Address:**

Western Salt Co.
1470 Bay Blvd.
Chula Vista, CA 91910

P8. **Recorded by** (Name,
affiliation, and address):

Andrew R. Pignoli
Tierra Environmental Services
9903-E Businesspark Avenue
San Diego, CA 92131

P9. **Date Recorded:**

November 3, 1999

P10. **Survey Type** (Describe):

Intensive Surface Inventory

P11. **Report Citation** (Cite survey report and other sources, or enter "none"):Pignoli, Andrew R. and Michael Baksh 2000 Draft Archaeological Survey Report for the Bayshore Bikeway Project, City of San Diego, California.

Attachments: ☐ NONE ☒ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☐ Photograph Record ☐ Other (List):

LOCATION MAP

UPDATE

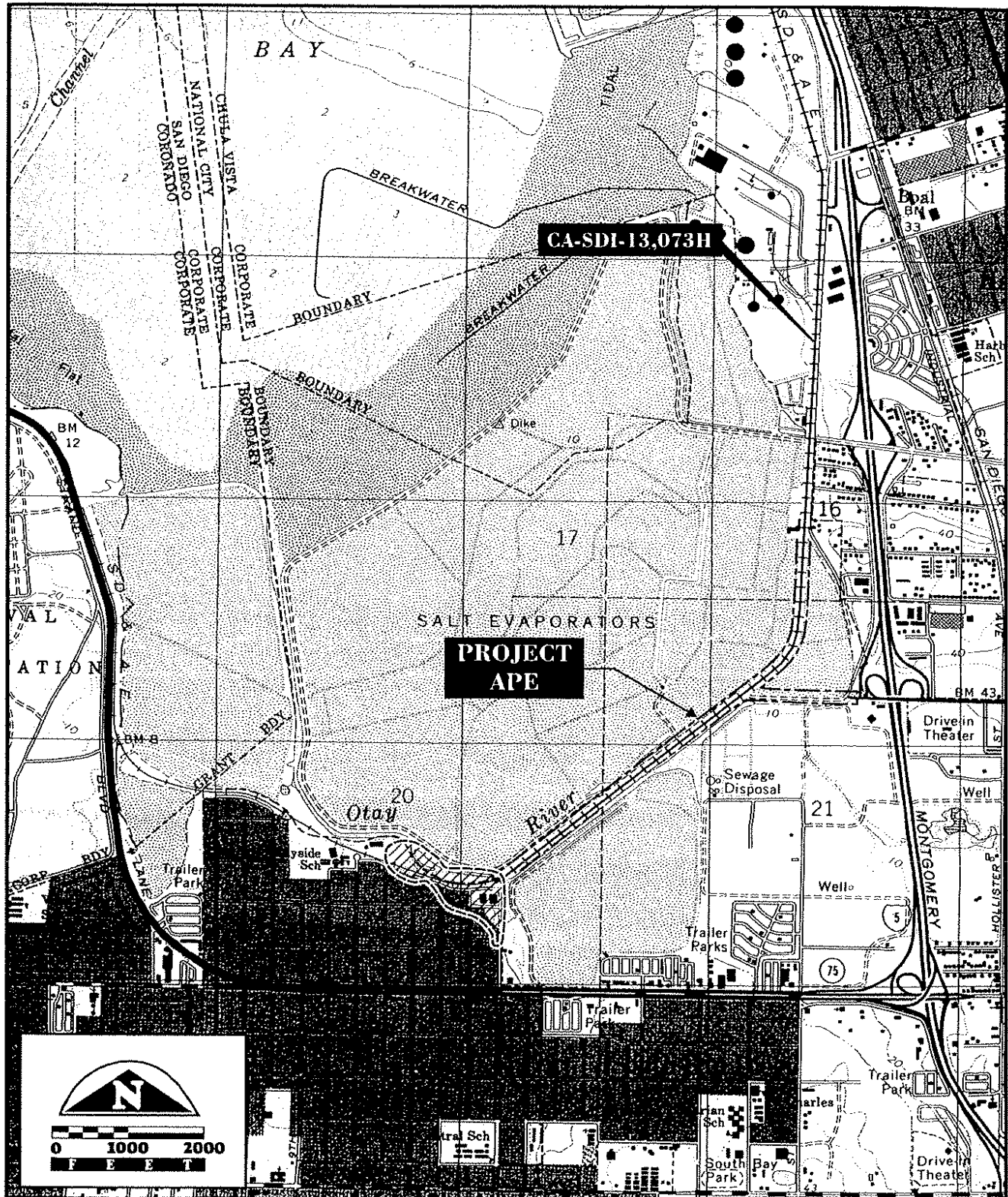
Page 2 of 2

Resource Name or #: (Assigned by recorder):

Map Name: USGS Quad Map (Imperial Beach)

Scale: 1:24,000

Date of Map: 1967 (photorevised 1975)



PRIMARY RECORD

Primary #: **P-37-013073H**

HRI #:

Trinomial: **CA-SDI-13073H**

NRHP Status Code:

Other Listings:

Review Code:

Reviewer:

Date:

Page 1 of 1

Resource Name or #: (Assigned by recorder):

UPDATE

P1. Other Identifier: None

P2. Location: ☒ Not for Publication ☐ Unrestricted

a. County: San Diego

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

b. USGS 7.5' Quad: Imperial Beach, National City, Point Loma Date: 1967, photorevised 1975 T 17S,18S ; R 2W,3w
Unsectioned; SBM

c. Address: None

d. UTM: Zone 11 ; NAD 1927 ; A:485580mE/ 3618150N B:491250mE /3606400N C: 488500mE/ 3605950mN
D: 483800mE /3616000mN

e. Other Locational Data (e.g., parcel #, directions to resource, elevation, etc., as appropriate): This site is located along the southern margins of San Diego Bay, from San Diego to Coronado.

P3a. Description (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries): This site includes the railroad grade, track ties and bridges of which the tracks and ties have been removed. Only the bed of the railroad remains. It has been heavily impacted by construction of the Bayshore Bikeway and parking facilities. The vegetation community includes salt marsh.

P3b. Resource Attributes (List attributes and codes): AH7:Railroad grades

P4. Resources Present: ☐ Building ☐ Structure ☐ Object ☒ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5a. Photograph or Drawing (Photo required for buildings, structures, and objects)

P5b. Description of Photo
(View, date, accession #):

P6. Age and Sources:

☒ Historic ☐ Prehistoric
☐ Both

P7. Owner and Address:
unknown

P8. Recorded by (Name,
affiliation, and address):
Andrew R. Pignolo
Tierra Environmental Services
9903-E Businesspark Avenue
San Diego, CA 92131

P9. Date Recorded:
October 5, 2000

P10. Survey Type (Describe):
Intensive Surface Inventory

P11. Report Citation (Cite survey report and other sources, or enter "none"): Pignolo, Andrew R. Archaeological Survey Report for the Coronado Underground Project, City of Coronado, California.

Attachments: ☐ NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☐ Photograph Record ☐ Other (List):

State of California - The Resources Agency
Department of Parks and Recreation

Permanent Trinomial: CA-SDI-

Supplement:

ARCHAEOLOGICAL SITE RECORD

Other Designations: Coronado Railroad

Page 1 of 8

1. County: San Diego
2. USGS Quads: Imperial Beach, National City, Point Loma (7.5') 1967 (15')
Photorevised: 1975
3. UTM Coordinates: Zone 11, 485⁵⁸⁰650 m Easting 3618150 m Northing
491250 m 3606400 m
488500 m 3605950 m
483800 m 3616050 m
4. Townships 17 & 18 South, Ranges 2 & 3 West, SBM
5. Map Coordinates: N/A
6. Elevation: about 5 to 25 feet above sea level
7. Location: Along the southern margins of San Diego Bay, from San Diego to Coronado
8. Prehistoric Historic X Protohistoric
9. Site Description: Historic railroad grade
10. Area: 18 linear miles (30,000 m) x 3 ± m = 90,000 m²
Method of Determination: U.S.G.S. mapping
11. Depth: N/A Method of Determination: N/A
12. Features: Railroad grade, tracks, ties, bridges
13. Artifacts: None observed
14. Non-artifactual Constituents and Faunal Remains: N/A
15. Date Recorded: 3/93
16. Recorded by: D. Laylander
17. Affiliation and Address: Caltrans District 11, 2829 Juan Street, San Diego, CA 92186-5406
18. Human Remains: None observed
19. Site Disturbance: Probable periodic repair and replacement of original features
20. Nearest Water (type, distance and direction): Adjacent to San Diego Bay; crosses Sweetwater River, Otay River, etc.

State of California - The Resources Agency
Department of Parks and Recreation

Permanent Trinomial: CA-SDI-

Month/Year: 3/93

ARCHAEOLOGICAL SITE RECORD

Other Designations: Coronado Railroad

Page 2 of 8

21. **Vegetation Community (site vicinity):** Salt marsh and various others
22. **Vegetation (on site):** Same as vicinity
23. **Site Soil:** Urban land, made land, tidal flats, coastal beaches, Marine loamy coarse sand, Huerhuero loam, Salinas clay loam
24. **Surrounding Soil:** Same as site
25. **Geology:** Quaternary alluvium, dune sand, Pleistocene marine and marine terrace deposits
26. **Landform:** Bay margin 27. **Slope:** 0-1% 28. **Exposure:** Open
29. **Landowner(s) (and/or tenants) and Address:** Unknown
30. **Remarks:** The Coronado Railroad was constructed in the late 1880s. The route has been variously labelled on maps and in publications the Coronado Belt Line, Coronado Railroad, San Diego Southern, San Diego & Southeastern, San Diego and Arizona - Southern Pacific Lines, A. T. & S. F. - San Diego and Arizona Eastern.
31. **References:** Richard F. Pourade, 1964, "The History of San Diego: The Glory Years"; Philip R. Pryde (ed.), 1984, "San Diego: An Introduction to the Region", pp. 171-188; Robert M. Hanft, 1984, "San Diego & Arizona: The Impossible Railroad"; Don Laylander, 1993, "An Archaeological Survey for the Bay Route Bikeway, Chula Vista and National City, California"
32. **Name of Project:** Bay Route Bikeway 33. **Type of Investigation:** Survey
34. **Site Accession Number:** N/A Curated At: N/A 35. **Photos:** None
-

Page 3 of 8

Permanent Trinomial: CA-SDI / 13073 H
mo. yr.

Temporary Number: _____

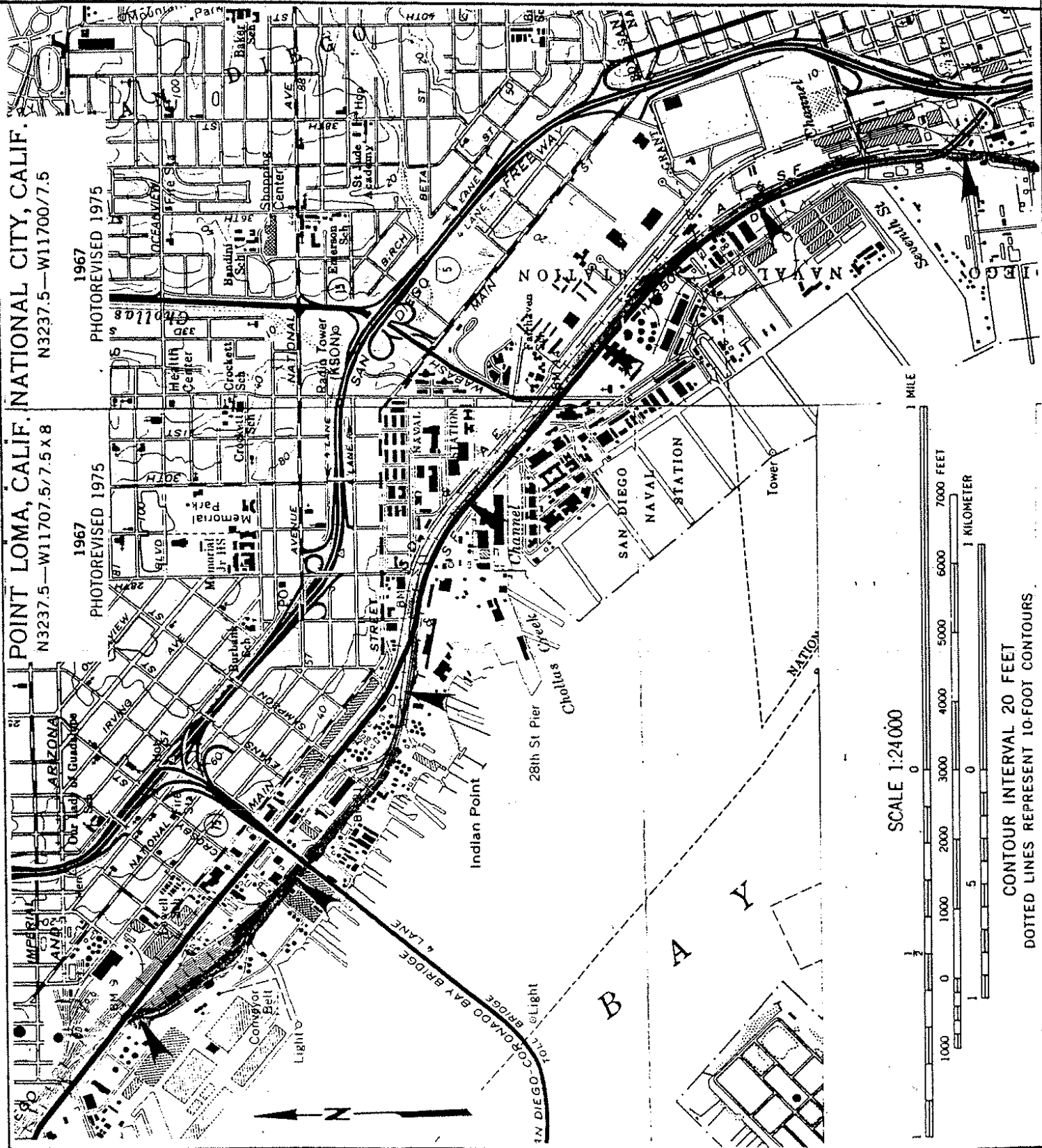
Agency Designation: _____



State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
ARCHEOLOGICAL SITE LOCATION
MAP

Permanent Trinomial: CA-SDI / 13073
Temporary Number: _____
Agency Designation: _____

Page 4 of 8



State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
ARCHEOLOGICAL SITE LOCATION
MAP

Page 5 of 8

Permanent Trinomial:

CA-SDI / 13072 H
mo. yr.

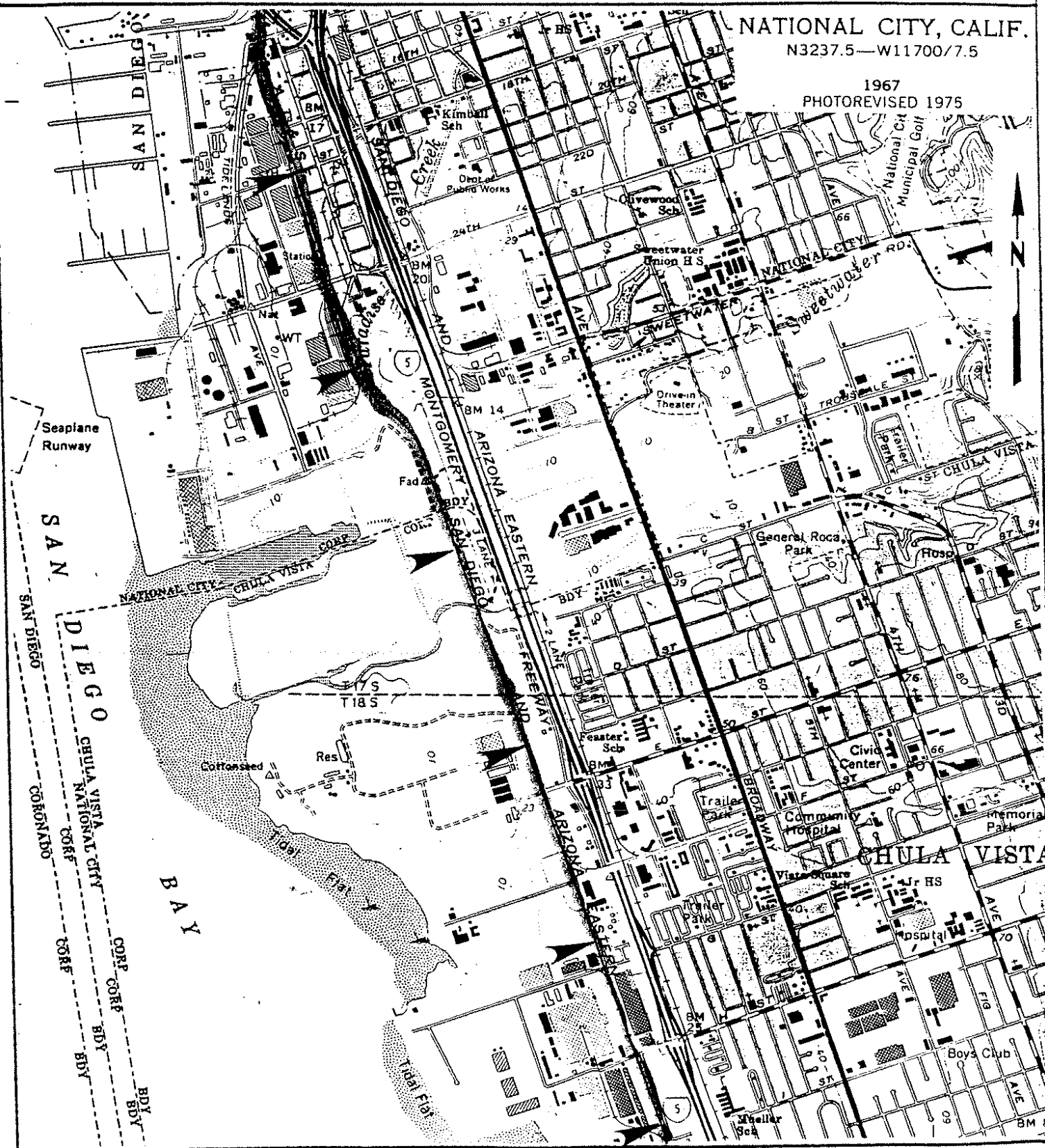
Temporary Number:

Agency Designation:

NATIONAL CITY, CALIF.

N3237.5—W11700/7.5

1967
PHOTOREVISED 1975



State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
ARCHEOLOGICAL SITE LOCATION
MAP

Permanent Trinomial: CA-SDI / 1 3 07 2

Temporary Number: _____

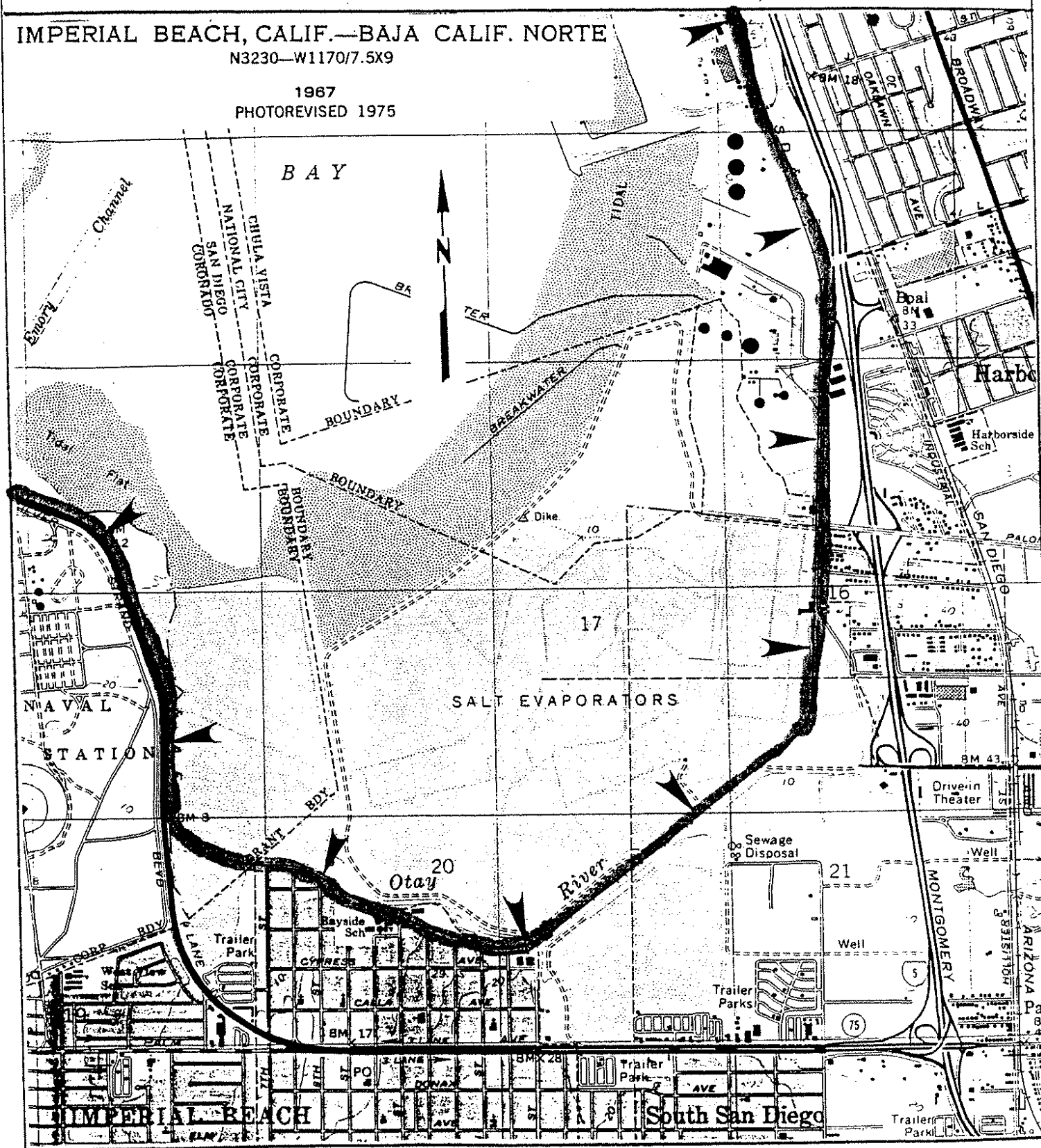
Agency Designation: _____

Page 6 of 8

IMPERIAL BEACH, CALIF.—BAJA CALIF. NORTE

N3230—W1170/7.5X9

1967
PHOTOREVISED 1975



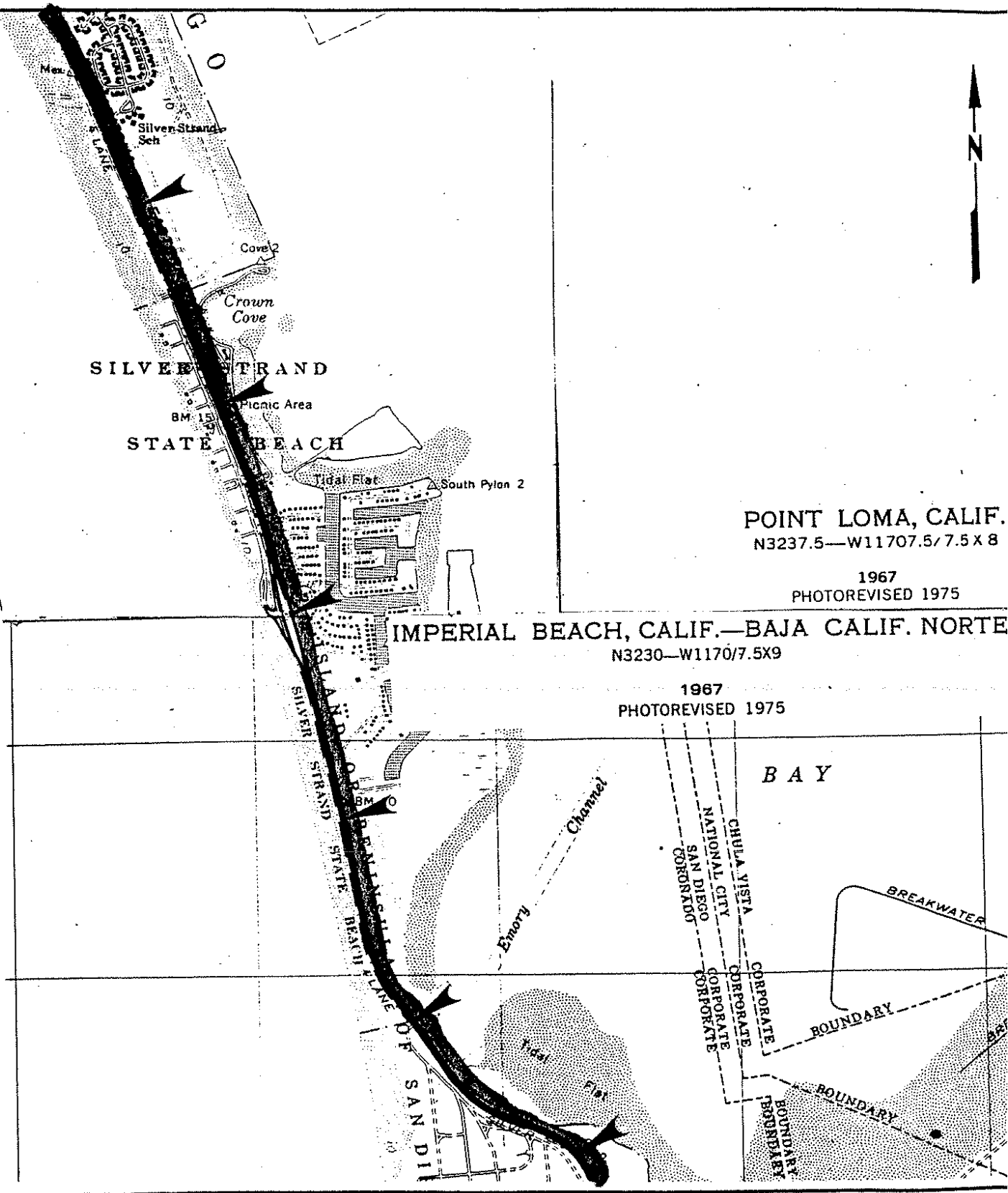
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
ARCHEOLOGICAL SITE LOCATION
MAP

Page 7 of 8

Permanent Triennial: _____ / _____ mo. _____ yr.

Temporary Number: _____

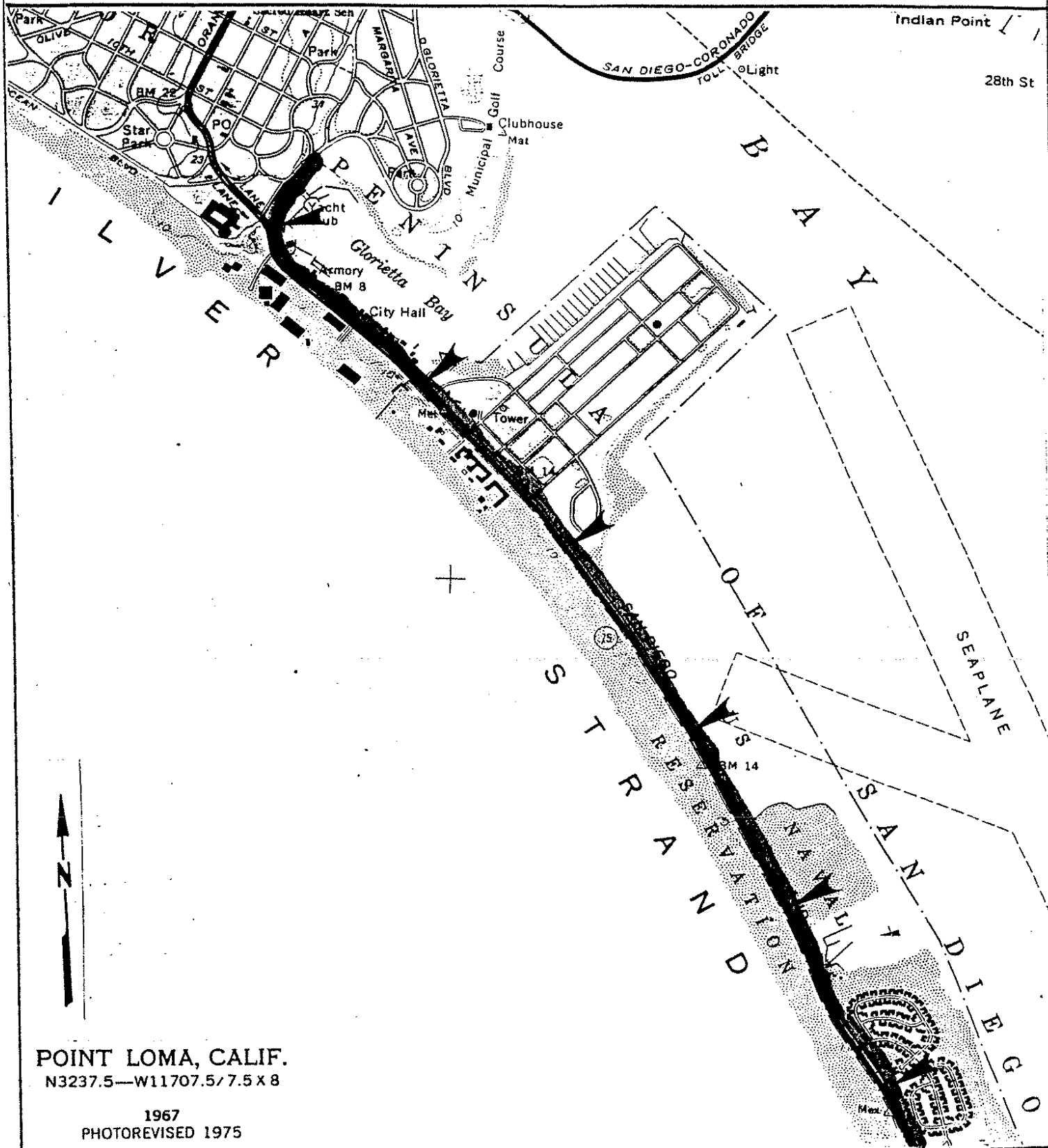
Agency Designation: _____



State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
ARCHEOLOGICAL SITE LOCATION
MAP

Page 8 of 8.

Permanent Trinomial: _____ / _____ mo. _____ yr.
Temporary Number: _____
Agency Designation: _____



Appendix I

Geology Studies

**GEOTECHNICAL EVALUATION
PROPOSED LIGHT POLES
BAY D AND HEADHOUSE 1 OF TRANSIT SHED 1
10TH AVENUE MARINE TERMINAL
SAN DIEGO, CALIFORNIA**

PREPARED FOR:

Jacobs
1455 Frazee Road, Suite 300
San Diego, California 92108

PREPARED BY:

Ninyo & Moore
Geotechnical and Environmental Sciences Consultants
5710 Ruffin Road
San Diego, California 92123

December 16, 2011
Project No. 107049004

December 16, 2011
Project No. 107049004

Mr. Bill Zondorak
Jacobs
1455 Frazee Road, Suite 300
San Diego, California 92108

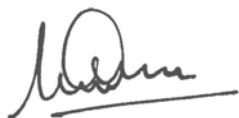
Subject: Geotechnical Evaluation
Proposed Light Poles
Bay D and Headhouse 1 of Transit Shed 1
10th Avenue Marine Terminal
San Diego, California

Dear Mr. Zondorak:

In accordance with your request and authorization, we have performed a geotechnical evaluation for the proposed light poles at Bay D and Head House 1 of Transit Shed 1 at the 10th Avenue Marine Terminal in San Diego. This report presents our geotechnical findings, conclusions, and recommendations regarding the proposed project. Our report was prepared in accordance with our revised September 29, 2011 proposal.

We appreciate the opportunity to be of service on this project.

Sincerely,
NINYO & MOORE



Madan Chirumalla, PE
Project Engineer

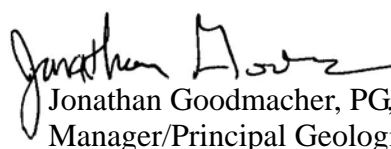


Soumitra Guha, PhD, GE
Principal Engineer



MAC/JG/SG/mmd

Distribution: (1) Addressee (via e-mail)



Jonathan Goodmacher, PG, CEG
Manager/Principal Geologist



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Appendices

Appendix A – Boring Logs
Appendix B – Laboratory Testing
Appendix C – Pile Capacity Calculations

1. INTRODUCTION

In accordance with your request, we have performed a limited geotechnical evaluation for the proposed light poles at Bay D and Head House 1 of Transit Shed 1 at the 10th Avenue Marine Terminal in San Diego, California (Figure 1). This report presents the results of our field exploration and laboratory testing, our conclusions regarding the geotechnical conditions at the subject site, and our recommendations for the design and construction of this project. Ninyo & Moore previously submitted a geotechnical report (dated August 1, 2011) for the proposed pavement at the project site.

2. SCOPE OF SERVICES

The scope of services for this study included the following:

- Reviewing background data listed in the References section of this report. The data reviewed included geotechnical reports, topographic maps, geologic data, stereoscopic aerial photographs, fault maps, and a site plan of the site.
- Obtaining a boring permit from the County of San Diego Department of Environmental Health.
- Performing a field reconnaissance to observe site conditions and to locate and mark proposed exploratory borings.
- Coordinating with Underground Service Alert to mark underground utilities near the proposed borings.
- Coordinating and mobilizing for the subsurface exploration.
- Performing a subsurface evaluation consisting of the drilling, logging, and sampling of two exploratory borings with a truck-mounted drill rig to a depth of approximately 56.5 feet. Samples were obtained at selected intervals from the borings.
- Performing geotechnical laboratory testing on selected soil samples obtained from our borings.
- Compiling and analyzing the engineering data obtained from our background, laboratory, and field evaluations.
- Preparing this report presenting our findings, conclusions, and recommendations regarding the geotechnical design and construction of the project.

3. SITE AND PROJECT DESCRIPTION

The 10th Avenue Marine Terminal is located along the eastern shore of San Diego Bay (Figure 1), approximately 0.5 miles south of downtown San Diego. The project area is located northwest of Crosby Road and south of Water Street. The site is currently occupied by Transit Sheds Nos. 1 and 2 and Warehouses B and C (San Diego Unified Port District [SDUPD], 2011). The site is traversed by existing utilities including water lines, storm drains, sewer pipes, electric lines, and other utilities. The marine terminal is at an elevation of approximately 9 to 15 feet above mean sea level.

It is our understanding that the project will include the demolition of Bay D, Headroom Nos. 1 and 2, and the transformer room within Transit Shed No. 2. The project will also include removal of the existing asphalt concrete floor from Bay D, re-grading, and re-paving of the project area, the recommendations for which were presented in our previous geotechnical report (referenced). Based on the review of site plans by SDUPD (dated April 18, 2011) and Lopez Engineering (dated September 20, 2011), four light pole structures are planned for the current project. We understand that the light poles will be approximately 90 feet high. We further understand that deep foundations are planned for the proposed light poles.

4. SUBSURFACE EXPLORATION AND LABORATORY TESTING

Our subsurface exploration was conducted on November 10, 2011 and consisted of drilling, logging, and sampling two borings. The borings were drilled to a depth of approximately 56.5 feet below existing grades with a truck-mounted, continuous flight auger drill rig. Bag and relatively undisturbed soil samples were obtained from the borings. The samples were then transported to our in-house geotechnical laboratory for testing. The approximate locations of the exploratory borings are shown on Figure 2. Logs of the borings are included in Appendix A.

Laboratory testing of representative soil samples included in-situ moisture content and dry density, gradation, direct shear strength, and soil corrosivity. The results of the in-situ moisture content and dry density tests are presented on the boring logs in Appendix A. The results of the other laboratory tests are presented in Appendix B.

5. GEOLOGY AND SUBSURFACE CONDITIONS

Our findings regarding regional and local geology, liquefaction, and groundwater conditions at the subject site are provided in the following sections.

5.1. Regional Geologic Setting

The project area is situated in the western San Diego County section of the Peninsular Ranges Geomorphic Province. This geomorphic province encompasses an area that extends approximately 1,450 km (900 miles) from the Transverse Ranges and the Los Angeles Basin south to the southern tip of Baja California (Norris and Webb, 1990). The province varies in width from approximately 48 to 160 km (30 to 100 miles). In general, the province consists of rugged mountains underlain by Jurassic metavolcanic and metasedimentary rocks, and Cretaceous igneous rocks of the southern California batholith. The portion of the province in San Diego County that includes the project area consists generally of uplifted Tertiary sedimentary rock, Jurassic metamorphic rock, and Cretaceous granitic rock. Figure 3 is a map of the local geology (see discussion below).

The Peninsular Ranges Province is traversed by a group of sub-parallel faults and fault zones trending roughly northwest. Several of these faults, which are shown on Figure 4, are considered active faults. The Elsinore, San Jacinto, San Andreas and Rose Canyon faults are active fault systems located northeast of the project area and the Coronado Bank, San Diego Trough, and San Clemente faults are active faults located west of the project area. The Rose Canyon Fault Zone, the nearest active fault system, has been mapped approximately 0.2 miles east of the project site. Major tectonic activity associated with these and other faults within this regional tectonic framework consists primarily of right-lateral, strike-slip movement. Further discussion of faulting relative to the site is provided in the Faulting and Seismicity section of this report.

5.2. Site Geology

Geologic units encountered during our subsurface evaluation included fill and bay deposits. Generalized descriptions of the earth units encountered are provided in the subsequent sections. Additional descriptions of the subsurface units are provided on the boring logs in Appendix A.

5.2.1. Fill

Fill was encountered in our borings from the surface to depths of up to approximately 39 feet. As encountered, the fill generally consisted of damp to saturated, very loose to medium dense, silty sand, clayey sand, sand with silt, sand, and gravel, and firm, sandy clay.

5.2.2. Bay Deposits

Bay deposits were encountered in our borings below the fill. Bay deposits extended to the explored depth of 56.5 feet. The bay deposits generally consisted of saturated, very loose to very dense, silty sand, clayey sand, and sand, and very stiff to hard, sandy clay.

5.3. Groundwater

Groundwater was encountered in our exploratory borings at a depth of approximately 8.5 feet below the ground surface. In addition, from research on GeoTracker (2011), groundwater is present at depths of approximately 5 to 10 feet below the ground surface. Fluctuations in the groundwater level and perched conditions may occur due to variations in ground surface topography, subsurface geologic conditions and structure, rainfall, irrigation, tides, and other factors.

5.4. Faulting and Seismicity

The project area is considered to be seismically active. Based on our review of the referenced geologic maps and stereoscopic aerial photographs, as well as on our geologic field mapping, the site is not underlain by known active or potentially active faults (i.e., faults that exhibit evidence of ground displacement in the last 11,000 years and 2,000,000 years, respectively). However, the site is located in a seismically active area and the potential for strong ground motion is considered significant during the design life of the proposed struc-

ture. As noted earlier, the nearest known active fault system is the Rose Canyon fault zone, located approximately 0.2 miles east of the project site.

In general, hazards associated with seismic activity include strong ground motion, ground surface rupture, liquefaction and seismically induced settlement, and tsunamis. These hazards are discussed in the following sections.

5.4.1. Strong Ground Motion and Ground Surface Rupture

The 2010 California Building Code (CBC) recommends that the design of structures be based on the horizontal peak ground acceleration (PGA) having a 2 percent probability of exceedance in 50 years, which is defined as the Maximum Considered Earthquake (MCE). The statistical return period for PGA_{MCE} is approximately 2,475 years. Based on our review of subsurface data, the project site corresponds to a Site Class D. The site modified PGA_{MCE} was estimated to be 0.64g using the United States Geological Survey (USGS) (USGS, 2011) ground motion calculator (web-based). The site modified design PGA was estimated to be 0.42g. These estimates of ground motion do not include near-source factors that may be applicable to the design of structures on site.

5.4.2. Ground Rupture

Based on our review of the referenced literature and our site reconnaissance, no active faults are known to cross the project site. Therefore, the potential for ground rupture due to faulting at the site is not a design consideration. However, lurching or cracking of the ground surface as a result of nearby seismic events is possible.

5.4.3. Liquefaction

Liquefaction is the phenomenon in which loosely deposited granular soils with silt and clay contents of less than approximately 35 percent and non-plastic silts located below the water table undergo rapid loss of shear strength when subjected to strong earthquake-induced ground shaking. Ground shaking of sufficient duration results in the loss of grain-to-grain contact due to a rapid rise in pore water pressure, and causes the soil to behave as a fluid for a short period of time. Liquefaction is known generally to occur in

saturated or near-saturated cohesionless soils at depths shallower than 50 feet below the ground surface. Factors known to influence liquefaction potential include composition and thickness of soil layers, grain size, relative density, groundwater level, degree of saturation, and both intensity and duration of ground shaking.

The liquefaction potential of subsurface soils at the project site was evaluated using the soil sampler blow counts recorded at various depths in the exploratory borings B-1 and B-2. The liquefaction analysis was based on the National Center for Earthquake Engineering Research (NCEER) procedure (Youd, et al., 2001) developed from the methods originally recommended by Seed and Idriss (1982) using the computer program LiquefyPro (CivilTech Software, 2007a). A groundwater table depth of 5 feet below the existing ground surface was used in our liquefaction evaluation. Our liquefaction analysis indicates that loose to medium dense fill soils and very loose bay deposits occurring below the assumed groundwater level of 5 feet and up to a depth of 42 feet below the surface are generally susceptible to liquefaction during the design seismic event. Further, as mapped by the City of San Diego (2008), the site is within an area with a high potential for liquefaction.

5.4.4. Dynamic Settlement of Saturated Soils

As a result of liquefaction, the proposed structures may be subject to several hazards, including liquefaction-induced settlement. In order to estimate the amount of post-earthquake settlement, the method proposed by Tokimatsu and Seed (1987) was used in which the seismically induced cyclic stress ratios and corrected N-values are related to the volumetric strain of the soil. The amount of soil settlement during a strong seismic event depends on the thickness of the liquefiable layers and the density and/or consistency of the soils.

Under the current conditions, post-earthquake total settlement of up to approximately 15 inches was calculated for the project site. Based on the guidelines presented in California Geological Survey (CGS) Special Publication 117 (2008) and assuming relatively continuous subsurface stratigraphy across the site, we estimate differential settlement on the order of 7.5 inches over a horizontal distance of 40 feet.

5.4.5. Tsunamis

Tsunamis are long wavelength seismic sea waves (long compared to the ocean depth) generated by sudden movements of the ocean bottom during submarine earthquakes, landslides, or volcanic activity. Based on our review of the tsunami hazards map prepared by the CGS (2009) the site is not located in an area subject to tsunami inundation. Therefore, tsunami inundation is not a design consideration.

5.5. Landsliding

Landslides may be induced by strong vibratory motion produced by earthquakes. Research and historical data indicate that seismically induced landslides tend to occur in weak soil and rock on sloping terrain. The process for zoning earthquake-induced landslides incorporates expected future earthquake shaking, existing landslide features, slope gradient and strength of earth materials on the slope. Based on our review of published geologic literature and our geotechnical evaluation, no landslides or related features underlie the site.

6. CONCLUSIONS

Based on our review of the referenced background data, subsurface evaluation, and laboratory testing, it is our opinion that construction of the project is feasible from a geotechnical standpoint provided the recommendations presented in this report are incorporated into the design and construction of the project. In general, the following conclusions were made:

- Based on our site reconnaissance and observations during the subsurface evaluation, the project site is underlain by fill and bay deposits.
- Groundwater was encountered in our borings at a depth of 8.5 feet and is a design and construction consideration. Our measurements during drilling and evaluation of the moisture contents obtained from the borings indicate that groundwater will likely be encountered in the excavations for deep foundation (i.e., drilled piers). The high groundwater levels and granular soils with little cohesion will likely cause caving in drilled holes. The contractor should anticipate the need to mitigate caving during construction.
- Excavations in the fill should generally be feasible with standard earth working equipment in good working order. The bay deposits may present difficult drilling and excavating conditions. Cobbles were not encountered in our borings. However, the contractor should anticipate difficult drilling conditions if gravel and cobbles are encountered during construction.

- We anticipate that the earth materials generated from the excavations in the fill should be generally suitable for use as compacted fill, if needed. Fill for use in structural areas should not contain clayey soils.
- The active Rose Canyon fault zone is located approximately 0.2 miles east of the site. Accordingly, the potential for relatively strong seismic ground motions should be considered in the project design.
- The potential for liquefaction and liquefaction induced settlement is high in soils up to a depth of about 42 feet below the surface at the project site.
- We estimated a PGA_{MCE} of 0.64g at the subject site that has a 2 percent probability of exceedance in 50 years. The Design PGA was estimated to be 0.42g.
- Based on the results of our limited soil corrosivity tests during this study and Caltrans corrosion guidelines (2003), the site would be classified as a corrosive site.

7. RECOMMENDATIONS

Based on our understanding of the project, the following recommendations are provided for the design and construction of the project. The proposed site improvements should be constructed in accordance with the requirements of the applicable governing agencies.

7.1. Earthwork

In general, earthwork should be performed in accordance with the recommendations presented in this report. Ninyo & Moore should be contacted for questions regarding the recommendations or guidelines presented herein.

7.1.1. Site Preparation

Site preparation should begin with the removal of vegetation, utility lines, asphalt, concrete, and other deleterious debris from areas to be graded. Tree stumps and roots should be removed to such a depth that organic material is generally not present. Clearing and grubbing should extend to the outside of the proposed excavation and fill areas. The debris and unsuitable material generated during clearing and grubbing should be removed from areas to be graded and disposed of at a legal dumpsite away from the project area.

7.1.2. Excavation and Drilling Characteristics

The results of our field exploration indicate that the project site is underlain by fill soils and bay deposits. The fill soils should be generally excavatable with standard earth working equipment. Difficult drilling should be anticipated in bay deposits or if gravel and cobbles are encountered.

7.1.3. Materials for Fill

On-site granular soils with an organic content of less than approximately 3 percent by volume (or 1 percent by weight) are suitable for use as fill. In general, fill material should not contain rocks or lumps over approximately 3 inches in diameter, and not more than approximately 30 percent larger than $\frac{3}{4}$ inch.

Utility trench backfill material should not contain rocks or lumps over approximately 3 inches in general. Soils classified as silts or clays should not be used for backfill in the pipe zone. Larger chunks, if generated during excavation, may be broken into acceptably sized pieces or disposed of offsite.

Imported fill material, if needed for the project, should generally be granular soils with a low expansion potential (i.e., an expansion index of 50 or less as evaluated by the American Society for Testing and Materials [ASTM] Test Method D 4829). Import material should also be non-corrosive in accordance with the Caltrans (2003) corrosion guidelines. Materials for use as fill should be evaluated by Ninyo & Moore's representative prior to filling or importing.

7.1.4. Compacted Fill

We do not anticipate compacted fill for the proposed light pole structures. However, the following general recommendations should be used if compacted fill is used for the light pole structures. Prior to placement of compacted fill, the contractor should request an evaluation of the exposed ground surface by Ninyo & Moore. The exposed ground surface should then be scarified to a depth of approximately 8 inches and moisture conditioned to near the optimum moisture content. The scarified materials

should then be compacted to 90 percent of their modified Proctor density as evaluated by ASTM D 1557. The evaluation of compaction by Ninyo & Moore should not be considered to preclude any requirements for observation or approval by governing agencies. It is the contractor's responsibility to notify this office and the appropriate governing agency when project areas are ready for observation, and to provide reasonable time for that review.

Fill materials should be moisture-conditioned to near the laboratory optimum moisture content prior to placement. The optimum moisture content will vary with material type and other factors. Moisture-conditioning of fill soils should be generally consistent within the soil mass.

Prior to placement of additional compacted fill material following a delay in the grading operations, the exposed surface of previously compacted fill should be prepared to receive fill. Preparation may include scarification, moisture-conditioning, and recompaction.

Compacted fill should be placed in horizontal lifts of approximately 8 inches in loose thickness. Prior to compaction, each lift should be moisture-conditioned to near the laboratory optimum, mixed, and then compacted by mechanical methods, using sheepfoot rollers, multiple-wheel pneumatic-tired rollers or other appropriate compacting rollers, to 90 percent of its modified Proctor density as evaluated by ASTM D 1557. Successive lifts should be treated in a like manner until the desired finished grades are achieved.

7.1.5. Temporary Excavations, Braced Excavations, and Shoring

For temporary excavations, we recommend that the following Occupational Safety and Health Administration (OSHA) soil classification be used:

Fill and bay deposits

Type C

Upon making the excavations, the soil classifications and excavation performance should be evaluated in the field by the contractor in accordance with the OSHA regulations. Temporary excavations should be constructed in accordance with OSHA recommendations. For trench or other excavations, OSHA requirements regarding personnel safety should be met using appropriate shoring (including trench boxes) or by laying back the slopes to no steeper than 1.5:1 (horizontal:vertical). Temporary excavations that encounter seepage may be shored or stabilized by placing sandbags or gravel along the base of the seepage zone. Excavations encountering seepage should be evaluated on a case-by-case basis. On-site safety of personnel is the responsibility of the contractor.

7.1.6. Underground Utilities

We recommend that utility lines be supported on 6 or more inches of granular bedding material such as sand with a sand equivalent value of 30 or higher. Bedding material should be placed around the pipe and 12 inches or more above the top of the pipe in accordance with specifications of the recent edition of the “Greenbook” (Standard Specifications for Public Works Construction). Special care should be taken not to allow voids beneath the pipe. Bedding material and compaction requirements should be in accordance with the recommendations of this report, the project specifications, and applicable requirements of the appropriate governing agency.

Based on our subsurface evaluation, the on-site earth materials should be generally suitable for re-use as trench backfill above the pipe zone provided they are free of organic material, clay lumps, debris, and rocks greater than approximately 3 inches in diameter. Fill should be moisture-conditioned to near the laboratory optimum. Trench backfill should be compacted to 90 percent of its modified Proctor density as evaluated by ASTM D 1557. Lift thickness for backfill will depend on the type of compaction equipment utilized, but fill should generally be placed in lifts not exceeding 8 inches in loose thickness. Special care should be exercised to avoid damaging the pipe during compaction of the backfill.

7.1.7. Seismic Design Parameters

Design of the proposed improvements should be in accordance with the requirements of governing jurisdictions and applicable building codes. Table 1 presents the seismic design parameters for the site in accordance with CBC (2010) guidelines and mapped spectral acceleration parameters (USGS, 2011).

Table 1 – 2010 California Building Code Seismic Design Criteria

Seismic Design Factors	Values
Site Class	D
Site Coefficient, F_a	1.0
Site Coefficient, F_v	1.5
Mapped Short Period Spectral Acceleration, S_s	1.591g
Mapped One-Second Period Spectral Acceleration, S_1	0.632g
Short Period Spectral Acceleration Adjusted For Site Class, S_{MS}	1.591g
One-Second Period Spectral Acceleration Adjusted For Site Class, S_{M1}	0.948g
Design Short Period Spectral Acceleration, S_{DS}	1.060g
Design One-Second Period Spectral Acceleration, S_{D1}	0.632g

7.2. Cast-In-Drilled-Hole (CIDH) Pile Foundation

Based on our discussions with the representatives of Jacobs, we understand that the proposed light poles will be supported on cast-in-drilled-hole (CIDH) piles. We further understand that the proposed diameter of CIDH piles is 48 inches. Foundations should be designed in accordance with structural considerations and the following recommendations. In addition, requirements of the appropriate governing jurisdictions and applicable building codes should be considered in the design of the structures.

7.2.1. Axial Capacity

As discussed in the earlier sections, there is a high potential for liquefaction up to a depth of approximately 42 feet below the ground surface. Due to the downdrag loads caused on piles from the liquefaction induced settlement, we recommend that CIDH piles penetrate into bay deposits, and to a depth of 10 feet or more beneath the depth of liquefaction of 42 feet. The allowable loads for the CIDH piles were analyzed using the computer program AllPile (CivilTech, 2007b) based on the assumed pile length of 52 feet.

The calculated pile capacities are based on frictional capacity; end bearing was ignored in our analysis. The results of ultimate axial pile capacity and service load evaluation for a factor of safety of 2.0 are presented in Appendix C and summarized in Table 2.

Table 2 – Axial Pile Capacity Evaluation

CIDH Pile Diameter (inches)	Pile Length (feet)	Ultimate Downward Capacity (kips)	Design (Service) Loads (kips)	
			Compression	Tension
48	52	20	10	10

7.2.2. Lateral Capacity

The lateral pile capacity for the 48-inch diameter CIDH piles was analyzed using the computer program AllPile (CivilTech, 2007b) based on the assumed pile length of 52 feet. Free-head condition was assumed for the pile. The results indicate that an assumed 52 feet long pile will have a deflection of ¼-inch or less at the pile head. Our analyses did not account for dynamic loads due to inertial loads from the structure during the design earthquake. The results of lateral capacity analysis are presented in Appendix C.

7.2.3. Construction Considerations for CIDH piles

Construction of CIDH piles should be observed by the geotechnical consultant during drilling to evaluate if the piles have been extended to the recommended depths. The drilled holes should be cleaned of loose soil and gravel. It is the contractor's responsibility to take the appropriate measures to provide for the integrity of the drilled holes and to see that the holes are cleaned and straight and that sloughed loose soil is removed from the bottom of the hole prior to the placement of concrete. Drilled CIDH piles should be checked for alignment and plumbness during installation. The amount of acceptable misalignment of a pile is approximately 3 inches from the plan location but may be reduced based on design criteria. The center-to-center spacing of piles should be no less than three times the nominal diameter of the pile.

Based on the depth to groundwater encountered in our exploratory borings (approximately 8.5 feet below the ground surface), groundwater should be anticipated within the excavation depth of foundations. We recommended that the contractor consider appropriate measures during construction to reduce the potential for caving of the drilled holes, including the use of steel casing and/or drilling mud. In addition, we recommend placement of concrete by tremie method to see that the aggregate and cement do not segregate during concrete placement.

Contractors with proven records in the installation of CIDH piles should be considered. We recommend that the drilling equipment have a rated torque of 20,000 foot-pounds or more. During construction, a certified deep foundation inspector should document the diameter, depth, vertical alignment, and the nature of the materials encountered at each pile location. Reinforcing steel and concrete placement should be continuously observed by Ninyo & Moore. A quality control report should be submitted for each pile stating, in writing, that the design details have been observed and meet the requirements.

7.3. Corrosion

Laboratory testing was performed on a representative sample of the on-site earth materials to evaluate pH and electrical resistivity, as well as chloride and sulfate contents. The pH and electrical resistivity tests were performed in accordance with California Test (CT) 643 and the sulfate and chloride content tests were performed in accordance with CT 417 and CT 422, respectively. These laboratory test results are presented in Appendix B.

The results of the corrosivity testing indicated an electrical resistivity of 770 ohm-centimeters (cm), soil pH of 7.8, chloride content of 600 parts per million (ppm) and sulfate content of 0.032 percent (i.e., 320 ppm). Based on the Caltrans corrosion (2003) criteria, the on-site soils would be classified as corrosive, which is defined as soils with more than 500 ppm chlorides, more than 0.2 percent sulfates, pH less than 5.5, or an electrical resistivity of 1,000 ohm-cm or less. Therefore, the project site would be classified as corrosive. If corrosion-susceptible improvements are planned on site, we recommend that a corrosion engineer be consulted for further evaluation and recommendations.

7.4. Concrete

Concrete in contact with soil or water that contains high concentrations of water-soluble sulfates can be subject to premature chemical and/or physical deterioration. The soil sample tested in this evaluation indicated water-soluble sulfate content of 0.032 percent by weight (320 ppm). According to American Concrete Institute (ACI) 318-08, the potential for sulfate attack is negligible for water-soluble sulfate contents in soil ranging from 0.00 to 0.10 percent by weight (i.e., 0 to 1,000 ppm). Therefore, the site soils may be considered to have a negligible potential for sulfate attack. Based on ACI (2011) criteria, Type II cement may be used for concrete construction. However, due to the potential variability of site soils, consideration should be given to using Type V cement for concrete structures in contact with soil with a water-cement ratio no higher than 0.45 by weight for normal weight aggregate concrete and a 28-day compressive strength of 4,500 pounds per square inch or more for the project.

7.5. Plan Review and Construction Observation

The conclusions and recommendations presented in this report are based on analysis of observed conditions in widely spaced exploratory borings. If conditions are found to vary from those described in this report, Ninyo & Moore should be notified, and additional recommendations will be provided upon request. Ninyo & Moore should review the final project drawings and specifications prior to the commencement of construction. Ninyo & Moore should perform the needed observation and testing services during construction operations.

The recommendations provided in this report are based on the assumption that Ninyo & Moore will provide geotechnical observation and testing services during construction. In the event that it is decided not to utilize the services of Ninyo & Moore during construction, we request that the selected consultant provide the client with a letter (with a copy to Ninyo & Moore) indicating that they fully understand Ninyo & Moore's recommendations, and that they are in full agreement with the design parameters and recommendations contained in this report. Construction of proposed improvements should be performed by qualified subcontractors utilizing appropriate techniques and construction materials.

8. LIMITATIONS

The field evaluation, laboratory testing, and geotechnical analyses presented in this report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be encountered during construction. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation will be performed upon request. Please also note that our evaluation was limited to assessment of the geotechnical aspects of the project, and did not include evaluation of structural issues, environmental concerns, or the presence of hazardous materials.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

This report is intended for design purposes only. It does not provide sufficient data to prepare an accurate bid by contractors. It is suggested that the bidders and their geotechnical consultant perform an independent evaluation of the subsurface conditions in the project areas. The independent evaluations may include, but not be limited to, review of other geotechnical reports prepared for the adjacent areas, site reconnaissance, and additional exploration and laboratory testing.

Our conclusions, recommendations, and opinions are based on an analysis of the observed site conditions. If geotechnical conditions different from those described in this report are encountered, our office should be notified, and additional recommendations, if warranted, will be provided upon request. It should be understood that the conditions of a site could change with time as a result of natural processes or the activities of man at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

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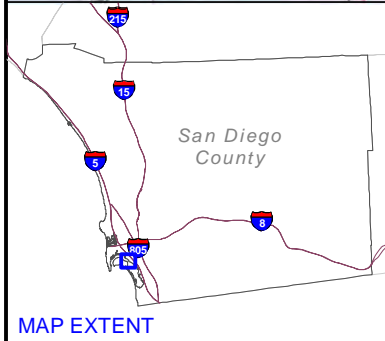
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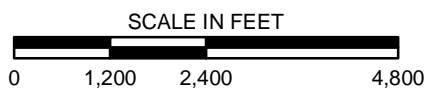
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SOURCE: 2008 Thomas Guide for San Diego County, Street Guide and Directory; Map © Rand McNally, R.L.07-S-129



MAP EXTENT



NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE

Ninyo & Moore

SITE LOCATION

FIGURE

PROJECT NO.

DATE

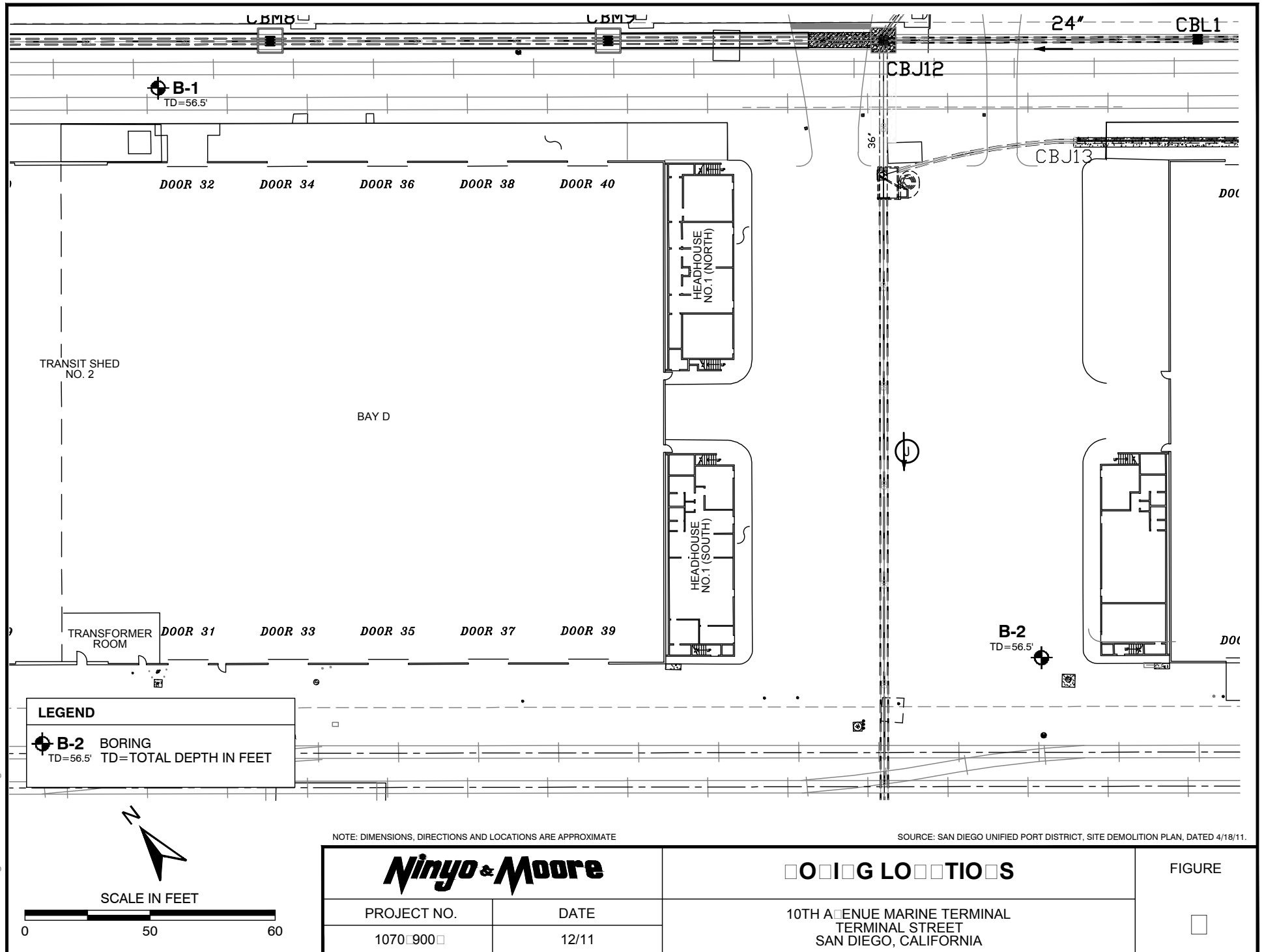
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SAN DIEGO, CALIFORNIA

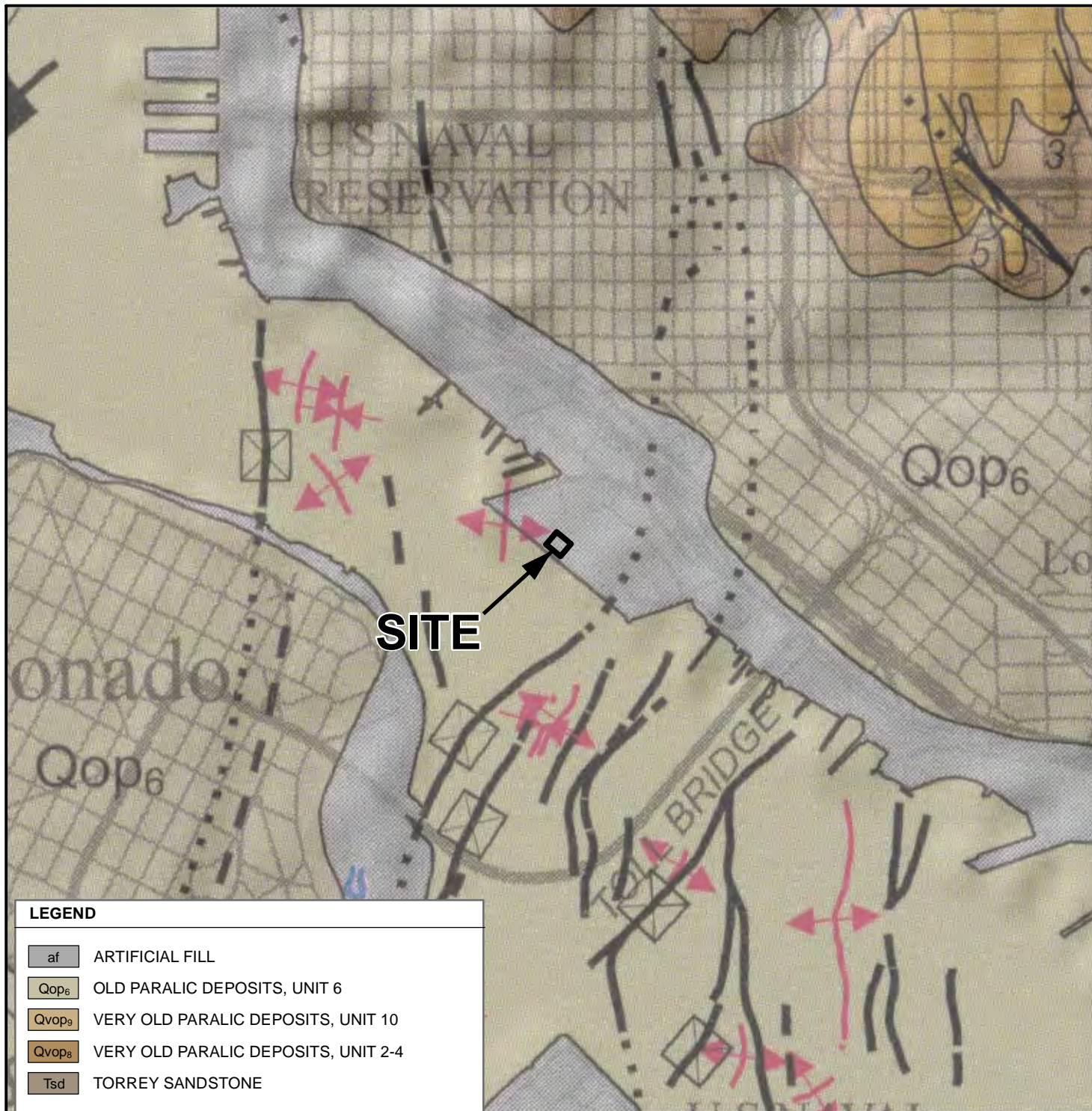
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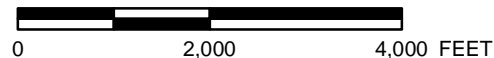
- af ARTIFICIAL FILL
- Qop₆ OLD PARALIC DEPOSITS, UNIT 6
- Qvop₉ VERY OLD PARALIC DEPOSITS, UNIT 10
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- Tsd TORREY SANDSTONE

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D FAULT - SOLID WHERE ACCURATELY
LOCATED, DASHED WHERE APPROXIMATE,
DOTTED WHERE CONCEALED. ARROW
AND NUMBER INDICATE DIRECTION AND
ANGLE OF DIP OF FAULT PLANE
- ↕ ANTICLINE - SOLID WHERE WELL DEFINED;
SHORT DASH WHERE INFERRED
- ↘ SYNCLINE - SOLID WHERE WELL DEFINED;
SHORT DASH WHERE INFERRED

SOURCE: KENNEDY, M.P., AND TAN, S.S., 2008, GEOLOGIC MAP OF THE SAN DIEGO 30' X 60' QUADRANGLE, CALIFORNIA



APPROXIMATE SCALE



NOTES: ALL DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE

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GEOLOGY

FIGURE

PROJECT NO.

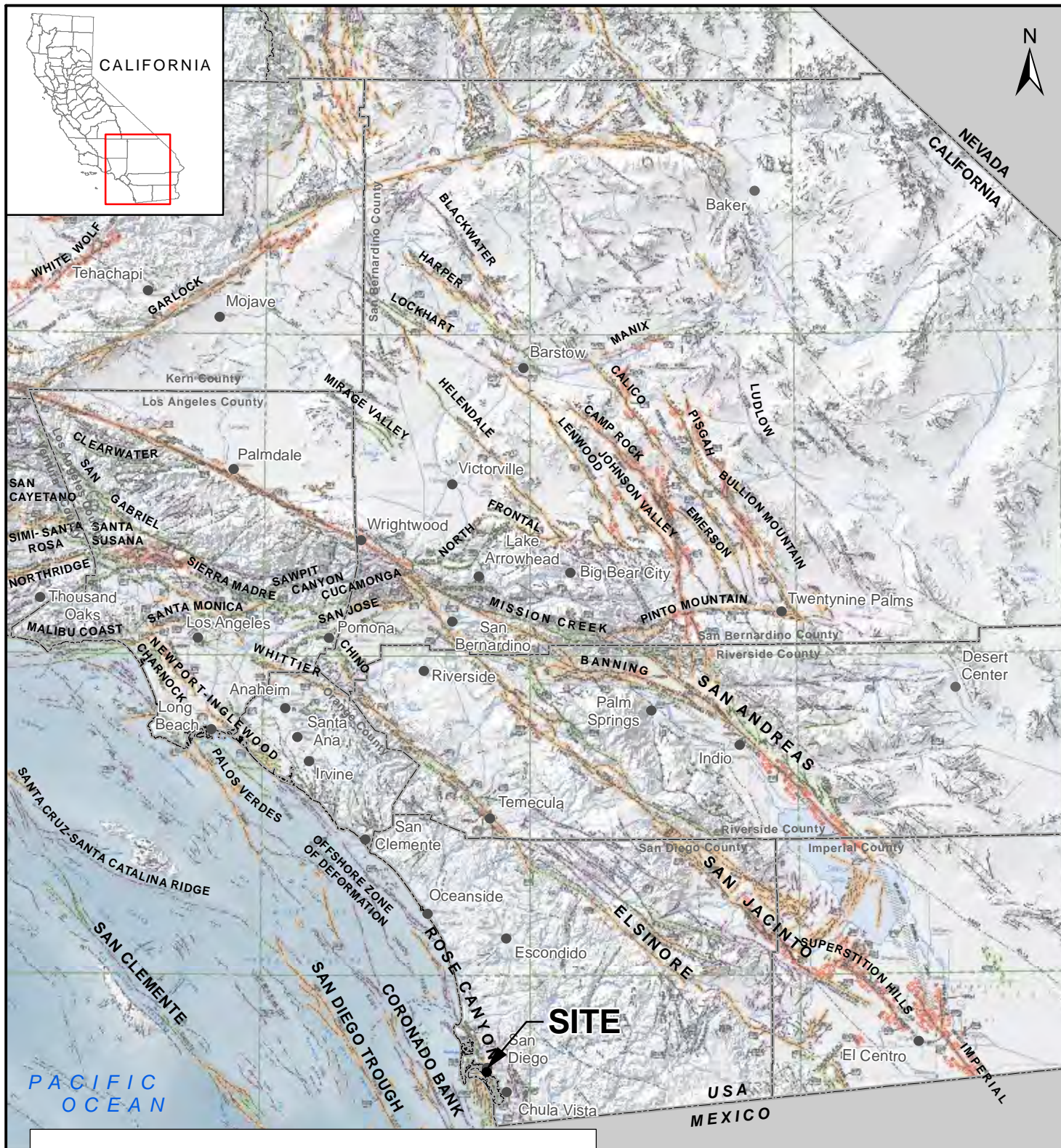
DATE

10TH AVENUE MARINE TERMINAL
TERMINAL STREET
SAN DIEGO, CALIFORNIA

107049004

12/11

3



SOURCE: Jennings, C.W., and Bryant, W.A., 2010. Fault Activity Map of California, California Geological Survey.

APPROXIMATE SCALE

0 30 60 MILES

NOTES: ALL DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE

Ningo & Moore

FAULT LOCATIONS

FIGURE

PROJECT NO.

DATE

10TH AVENUE MARINE TERMINAL
TERMINAL STREET
SAN DIEGO, CALIFORNIA

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4

fig4_107049004_fault.mxd AOB

APPENDIX A
BORING LOGS

Field Procedure for the Collection of Disturbed Samples

Disturbed soil samples were obtained in the field using a Standard Penetration Test sampler.

The Standard Penetration Test (SPT) Sampler

Disturbed drive samples of earth materials were obtained by means of a Standard Penetration Test sampler. The sampler is composed of a split barrel with an external diameter of 2 inches and an unlined internal diameter of 1-3/8 inches. The sampler was driven into the ground 12 to 18 inches with a 140-pound hammer falling freely from a height of 30 inches in general accordance with ASTM D 1586. The blow counts were recorded for every 6 inches of penetration; the blow counts reported on the logs are those for the last 12 inches of penetration. Soil samples were observed and removed from the sampler, bagged, sealed and transported to the laboratory for testing.

Field Procedure for the Collection of Relatively Undisturbed Samples

Relatively undisturbed soil samples were obtained in the field using a Modified Split-Barrel Drive sampler.

The Modified Split-Barrel Drive Sampler

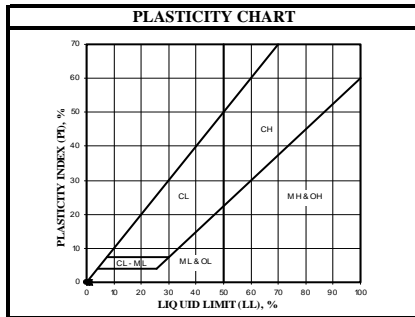
The sampler, with an external diameter of 3.0 inches, was lined with 1-inch long, thin brass rings with inside diameters of approximately 2.4 inches. The sample barrel was driven into the ground with the weight of a hammer in general accordance with ASTM D 3550. The driving weight was permitted to fall freely. The approximate length of the fall, the weight of the hammer, and the number of blows per foot of driving are presented on the boring logs as an index to the relative resistance of the materials sampled. The samples were removed from the sample barrel in the brass rings, sealed, and transported to the laboratory for testing.

DEPTH (feet)	Bulk Driven SAMPLES	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.C.S.	BORING LOG EXPLANATION SHEET
0							Bulk sample.
							Modified split-barrel drive sampler.
							No recovery with modified split-barrel drive sampler.
							Sample retained by others.
							Standard Penetration Test (SPT).
5							No recovery with a SPT.
		XX/XX					Shelby tube sample. Distance pushed in inches/length of sample recovered in inches.
							No recovery with Shelby tube sampler.
							Continuous Push Sample.
10							Seepage.
							Groundwater encountered during drilling.
							Groundwater measured after drilling.
						SM	MAJOR MATERIAL TYPE (SOIL):
							Solid line denotes unit change.
						CL	Dashed line denotes material change.
							Attitudes: Strike/Dip
							b: Bedding
							c: Contact
							j: Joint
							f: Fracture
							F: Fault
							cs: Clay Seam
							s: Shear
							bss: Basal Slide Surface
							sf: Shear Fracture
							sz: Shear Zone
							sbs: Shear Bedding Surface
							The total depth line is a solid line that is drawn at the bottom of the boring.
20							

Ninyo & Moore			BORING LOG		
			Explanation of Boring Log Symbols		
PROJECT NO.	DATE	FIGURE			
	Rev. 11/11				

U.S.C.S. METHOD OF SOIL CLASSIFICATION				
MAJOR DIVISIONS		SYMBOL		TYPICAL NAMES
COARSE-GRAINED SOILS (More than 1/2 of soil > No. 200 Sieve Size)	GRAVELS (More than 1/2 of coarse fraction > No. 4 sieve size)		GW	Well graded gravels or gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
			GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS (More than 1/2 of coarse fraction < No. 4 sieve size)		SW	Well graded sands or gravelly sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
			SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (More than 1/2 of soil < No. 200 sieve size)	SILTS & CLAYS Liquid Limit <50		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS Liquid Limit >50		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils

GRAIN SIZE CHART		
CLASSIFICATION	RANGE OF GRAIN	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDERS	Above 12"	Above 305
COBBLES	12" to 3"	306 to 76.2
GRAVEL	3" to No. 4	76.2 to 4.76
	Coarse 3" to 3/4"	76.2 to 19.1
	Fine 3/4" to No. 4	19.1 to 4.76
SAND	No. 4 to No. 200	4.76 to 0.075
	Coarse No. 4 to No. 10	4.76 to 2.00
	Medium No. 10 to No. 40	2.00 to 0.420
	Fine No. 40 to No. 200	0.420 to 0.075
SILT & CLAY	Below No. 200	Below 0.075




Ninyo & Moore	U.S.C.S. METHOD OF SOIL CLASSIFICATION
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Updated Nov. 2011

DEPTH (feet)	Bulk Samples	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED 11/10/11 BORING NO. B-1
							GROUND ELEVATION 9' ± (MSL) SHEET 1 OF 2
							METHOD OF DRILLING 8" Diameter Hollow Stem Auger (Scott's Drilling)
							DRIVE WEIGHT 140 lbs. (Auto-Trip) DROP 30"
							SAMPLED BY CER LOGGED BY CER REVIEWED BY SG
DESCRIPTION/INTERPRETATION							
0					GP	ASPHALT CONCRETE: Approximately 8.5 inches thick.	
					SP-SM	FILL: Gray, damp, medium dense, poorly graded GRAVEL; ballast rock.	
9							
					SM	Brown, moist, medium dense, poorly graded SAND; few silt and shells.	
10				17.6	110.5		
6						Loose; no recovery.	
20				24.9	93.1	SP	Brownish gray, saturated, medium dense, poorly graded fine SAND; trace silt.
5						Loose.	
30				17.9	110.5	CL	Brown, saturated, firm, sandy CLAY; few shells.
0						SM	Gray, saturated, very loose, silty fine SAND.
						CL	BAY DEPOSITS: Grayish brown, saturated, very stiff, sandy CLAY; fine SAND; few shells.
40							

BORING LOG		
10TH AVENUE MARINE TERMINAL TERMINAL STREET, SAN DIEGO, CALIFORNIA		
PROJECT NO. 107049004	DATE 12/11	FIGURE A-1


DEPTH (feet)	BULK SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED 11/10/11 BORING NO. B-1	
							GROUND ELEVATION 9' ± (MSL) SHEET 2 OF 2	
METHOD OF DRILLING 8" Diameter Hollow Stem Auger (Scott's Drilling)							DRIVE WEIGHT 140 lbs. (Auto-Trip) DROP 30"	
SAMPLED BY CER LOGGED BY CER REVIEWED BY SG							DESCRIPTION/INTERPRETATION	
40		18	28.6	98.5	CL	BAY DEPOSITS: (Continued) Grayish brown, saturated, very stiff, sandy CLAY; fine SAND; few shells.		
					SP	Brown, saturated, very dense, poorly graded fine to coarse SAND.		
76								
98/9"		23.6	100.9					
82						Fine to medium sand.		
Total Depth = 56.5 feet. Groundwater encountered at approximately 8.5 feet during drilling. Backfilled with approximately 19.9 cubic feet of bentonite grout and capped with black dyed concrete shortly after drilling on 11/10/11.								
<u>Note:</u> Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.								



BORING LOG
 10TH AVENUE MARINE TERMINAL
 TERMINAL STREET, SAN DIEGO, CALIFORNIA

PROJECT NO. 107049004	DATE 12/11	FIGURE A-2
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DEPTH (feet)	BULK SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED 11/10/11 BORING NO. B-2	
							GROUND ELEVATION 9' ± (MSL) SHEET 1 OF 2	
METHOD OF DRILLING 8" Diameter Hollow Stem Auger (Scott's Drilling)							DRIVE WEIGHT 140 lbs. (Auto-Trip) DROP 30"	
SAMPLED BY CER LOGGED BY CER REVIEWED BY SG							DESCRIPTION/INTERPRETATION	
0					SM	ASPHALT CONCRETE: Approximately 4 inches thick.		
					SC	FILL: Brown, damp, medium dense, silty SAND; some gravel. Brown, moist, medium dense, clayey fine SAND.		
35		4.2	109.2		SP-SM	Brown, damp, medium dense, poorly graded medium SAND; few silt and shells.		
						Saturated. (Groundwater measured during drilling)		
7					SP	Gray, saturated, loose, poorly graded fine to coarse SAND; few shells.		
8		25.3	102.6					
6					SP-SM	Gray, saturated, loose, poorly graded fine to coarse SAND with silt; trace gravel.		
14		16.0	106.7		SP	Gray, saturated, loose, poorly graded fine to medium SAND; trace silt.		
17					SP-SM	Brown, saturated, medium dense, poorly graded SAND; few silt and shells.		
5					SC	BAY DEPOSITS: Dark brown, saturated, very loose, clayey fine SAND.		



BORING LOG
 10TH AVENUE MARINE TERMINAL
 TERMINAL STREET, SAN DIEGO, CALIFORNIA

PROJECT NO. 107049004	DATE 12/11	FIGURE A-3
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DEPTH (feet)	SAMPLES Bulk Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>11/10/11</u> BORING NO. <u>B-2</u>	
							GROUND ELEVATION <u>9' ± (MSL)</u> SHEET <u>2</u> OF <u>2</u>	
METHOD OF DRILLING <u>8" Diameter Hollow Stem Auger (Scott's Drilling)</u>							DRIVE WEIGHT <u>140 lbs. (Auto-Trip)</u> DROP <u>30"</u>	
SAMPLED BY <u>CER</u> LOGGED BY <u>CER</u> REVIEWED BY <u>SG</u>							DESCRIPTION/INTERPRETATION	
40		10				SM	<u>BAY DEPOSITS: (Continued)</u> Brown, saturated, medium dense, silty fine SAND.	
		50/6"	15.5	110.6			Very dense; some gravel.	
50		21				CL	Reddish brown, saturated, hard, sandy CLAY; fine sand.	
		43	18.5	112.8		SC	Reddish brown, saturated, dense, clayey fine SAND.	
60							Total Depth = 56.5 feet. Groundwater encountered at approximately 8.5 feet during drilling. Backfilled with approximately 19.9 cubic feet of bentonite grout and capped with black dyed concrete shortly after drilling on 11/10/11.	
							<u>Note:</u> Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.	
70								
80								



BORING LOG		
10TH AVENUE MARINE TERMINAL TERMINAL STREET, SAN DIEGO, CALIFORNIA		
PROJECT NO. 107049004	DATE 12/11	FIGURE A-4

10th Avenue Marine Terminal
San Diego, California

December 16, 2011
Project No. 107049004

APPENDIX B LABORATORY TESTING

Classification

Soils were visually and texturally classified in accordance with the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488. Soil classifications are indicated on the logs of the exploratory borings in Appendix A.

In-Place Moisture and Density Tests

The moisture content and dry density of relatively undisturbed samples obtained from the exploratory borings were evaluated in general accordance with ASTM D 2937. The test results are presented on the logs of the exploratory borings in Appendix A.

Gradation Analysis

Gradation analysis tests were performed on selected representative soil samples in general accordance with ASTM D 422. The grain-size distribution curves are shown on Figures B-1 through B-5. These test results were utilized in evaluating the soil classifications in accordance with the USCS.

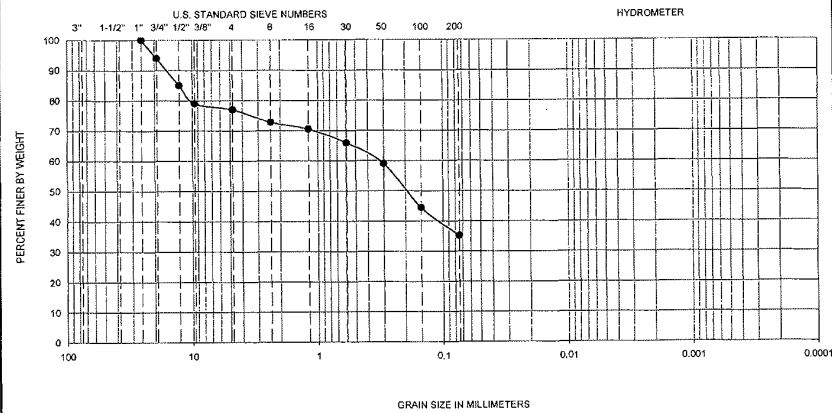
Direct Shear Tests

Direct shear tests were performed on relatively undisturbed samples in general accordance with ASTM D 3080 to evaluate the shear strength characteristics of the selected material. The sample was inundated during shearing to represent adverse field conditions. The results are shown on Figures B-6 and B-7.

Soil Corrosivity Tests

Soil pH, and resistivity tests were performed on a representative sample in general accordance with CT 643. The soluble sulfate and chloride content of the selected samples were evaluated in general accordance with CT 417 and CT 422, respectively. The test results are presented on Figure B-8.

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay



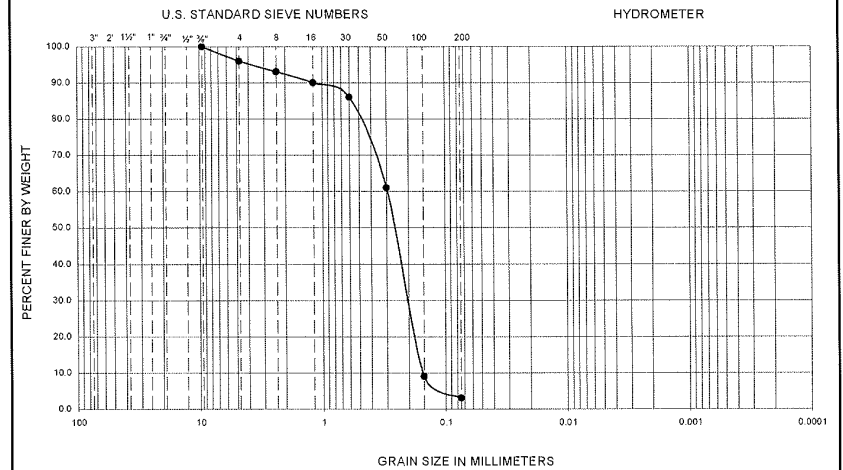
Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	U.S.C.S
●	B-1	10.0-11.5	--	--	--	--	--	--	--	--	35	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ninyo & Moore		GRADATION TEST RESULTS		FIGURE B-1
PROJECT NO.	DATE	10TH AVENUE MARINE TERMINAL TERMINAL STREET SAN DIEGO, CALIFORNIA		
107049004	12/11			

107049004 SIEVE B-1 @ 10.0-11.5.xls

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



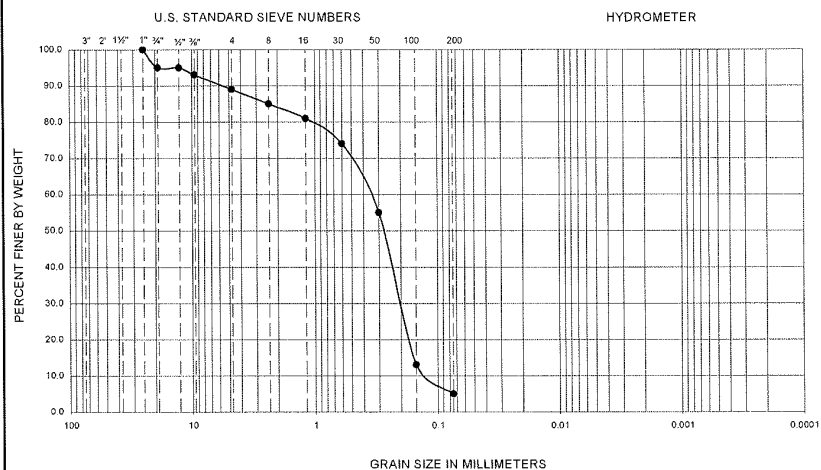
Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	B-2	10.0-11.5	--	--	--	0.15	0.20	0.30	2.0	0.9	3	SP

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ninyo & Moore		GRADATION TEST RESULTS		FIGURE B-2
PROJECT NO.	DATE	10TH AVENUE MARINE TERMINAL TERMINAL STREET SAN DIEGO, CALIFORNIA		
107049004	12/11			

107049004 SIEVE B-2 @ 10.0-11.5.xls

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	B-2	20.0-21.5	--	--	--	0.13	0.20	0.34	2.6	0.9	5	SP-SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ninyo & Moore

GRADATION TEST RESULTS

FIGURE

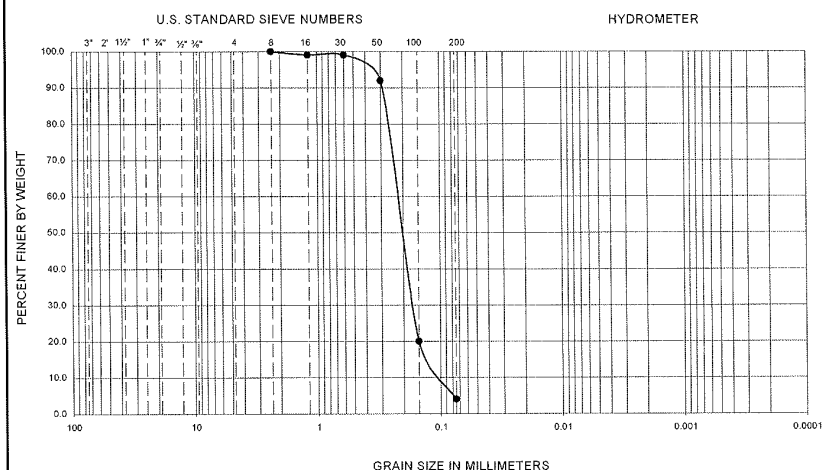
PROJECT NO. 107049004
DATE 12/11

10TH AVENUE MARINE TERMINAL
TERMINAL STREET
SAN DIEGO, CALIFORNIA

B-3

107049004 SIEVE B-2 @ 20.0-21.5.xls

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	B-2	25.0-26.5	--	--	--	0.11	0.17	0.21	1.9	1.3	4	SP

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ninyo & Moore

GRADATION TEST RESULTS

FIGURE

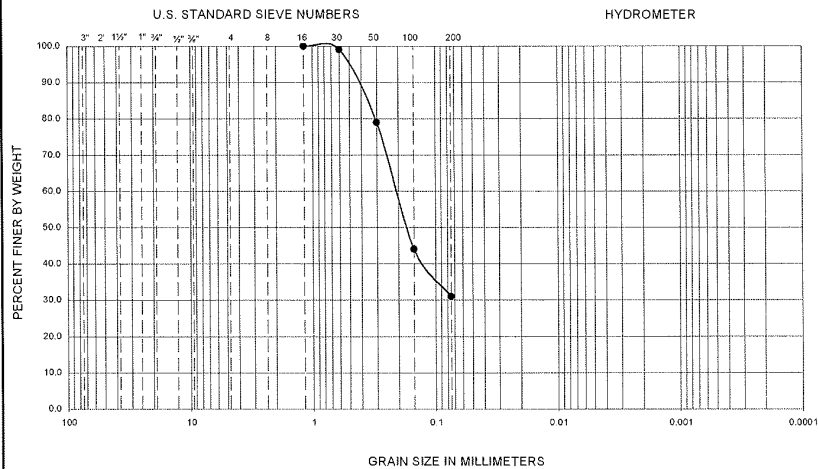
PROJECT NO. 107049004
DATE 12/11

10TH AVENUE MARINE TERMINAL
TERMINAL STREET
SAN DIEGO, CALIFORNIA

B-4

107049004 SIEVE B-2 @ 25.0-26.5.xls

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	B-2	40.0-41.5	--	--	--	--	--	--	--	--	31	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ningo & Moore

GRADATION TEST RESULTS

FIGURE

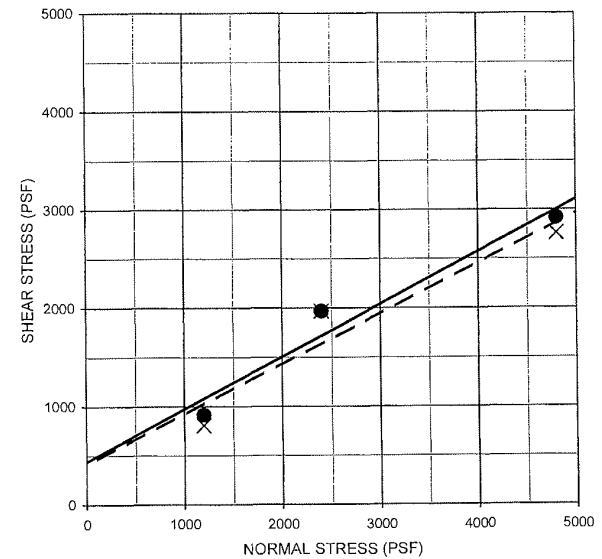
PROJECT NO.
107049004

DATE
12/11

10TH AVENUE MARINE TERMINAL
TERMINAL STREET
SAN DIEGO, CALIFORNIA

B-5

107049004 SIEVE B-2 @ 40.0-41.5.xls



Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion, c (psf)	Friction Angle, ϕ (degrees)	Soil Type
Sandy CLAY	—●—	B-1	30.0-31.5	Peak	440	28	CL
Sandy CLAY	- - X - -	B-1	30.0-31.5	Ultimate	410	27	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080

Ningo & Moore

DIRECT SHEAR TEST RESULTS

FIGURE

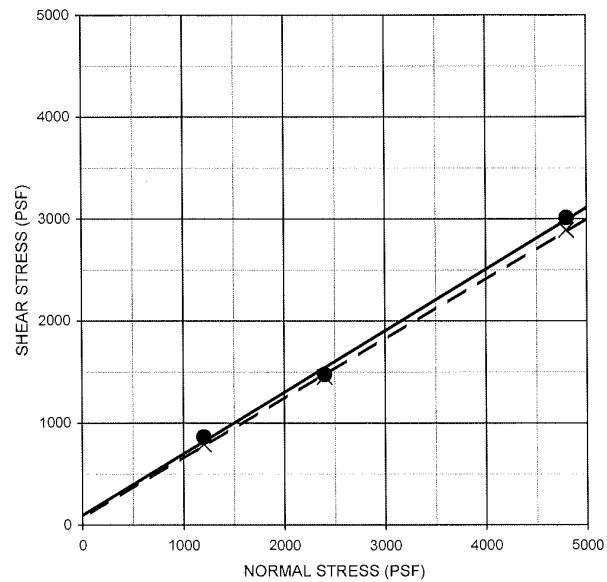
PROJECT NO.
107049004

DATE
12/11

10TH AVENUE MARINE TERMINAL
TERMINAL STREET
SAN DIEGO, CALIFORNIA

B-6

107049004 SHEAR B-1 @ 30.0-31.5.xls



Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion, c (psf)	Friction Angle, ϕ (degrees)	Soil Type
Clayey SAND	—●—	B-2	35.0-36.5	Peak	100	31	SC
Clayey SAND	- - X - -	B-2	35.0-36.5	Ultimate	70	30	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080

Ninyo & Moore		DIRECT SHEAR TEST RESULTS		FIGURE B-7
PROJECT NO.	DATE	10TH AVENUE MARINE TERMINAL TERMINAL STREET SAN DIEGO, CALIFORNIA		
107049004	12/11			

SAMPLE LOCATION	SAMPLE DEPTH (FT)	pH ¹	RESISTIVITY ¹ (Ohm-cm)	SULFATE CONTENT ²		CHLORIDE CONTENT ³ (ppm)
				(ppm)	(%)	
B-2	15.0-16.5	7.8	770	320	0.032	600

¹ PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 643

² PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 417

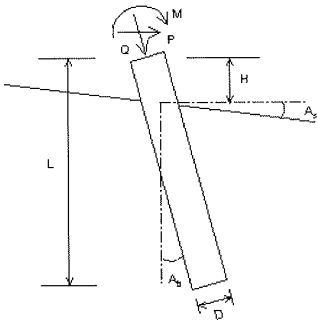
³ PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 422

Ninyo & Moore		CORROSIVITY TEST RESULTS		FIGURE B-8
PROJECT NO.	DATE	10TH AVENUE MARINE TERMINAL TERMINAL STREET SAN DIEGO, CALIFORNIA		
107049004	12/11			

APPENDIX C

PILE CAPACITY CALCULATIONS

VERTICAL ANALYSIS



Loads:
Load Factor for Vertical Loads= 1.0
Load Factor for Lateral Loads= 1.0
Loads Supported by Pile Cap= 0 %
Shear Condition: Static

Vertical Load, Q= 4.7 -kp
Shear Load, P= 1.6 -kp
Moment, M= 98.2 -kp-f

Profile:
Pile Length, L= 52.0 -ft
Top Height, H= 0 -ft
Slope Angle, A_s= 0
Batter Angle, A_b= 0

* Zero Friction *
Zero Friction Start: 0 -ft End: 1 -ft
* Negative Friction *
Negative Friction Start: 5 -ft End: 42 -ft with Factor: 0.6

Drilled Shaft (dia >24 in. or 61 cm)

Soil Data:							Pile Data:						
Depth	Gamma	Phi	C	K	e50 or Dr	Nspt	Depth	Width	Area	Per.	I	E	Weight
-ft	-lb/f3		-kp/f2	-lb/f3	%		-ft	-in	-in2	-in	-in4	-kp/2	-kp/f
0	115	30	0.00	25	50	10	0.0	48	1809.6	150.8	260576.3	3000	1.885
5	53	30	0.00	20	25	7	52.0						
30	58	32	0.00	60	50	17							
35	53	30	0.00	20	15	3							
42	63	34	0.00	125	90	60							
50	63	0.0	2.0	500	0.5	21							
55	63	34	0.00	125	65	30							

Vertical capacity:
Weight above Ground= 0.00 Total Weight= 61.17-kp *Soil Weight is not included
Side Resistance (Down)= 21.634-kp Side Resistance (Up)= 215.609-kp
Tip Resistance (Down)= 330.512-kp Tip Resistance (Up)= 0.000-kp
Total Ultimate Capacity (Down)= 352.146-kp Total Ultimate Capacity (Up)= 276.775-kp
Total Allowable Capacity (Down)= 176.073-kp Total Allowable Capacity (Up)= 138.388-kp
OK! Qallow > Q

Settlement Calculation:
At Q= 4.70-kp Settlement= 0.01701-in
At Xallow= 1.00-in Qallow= 191.74738-kp

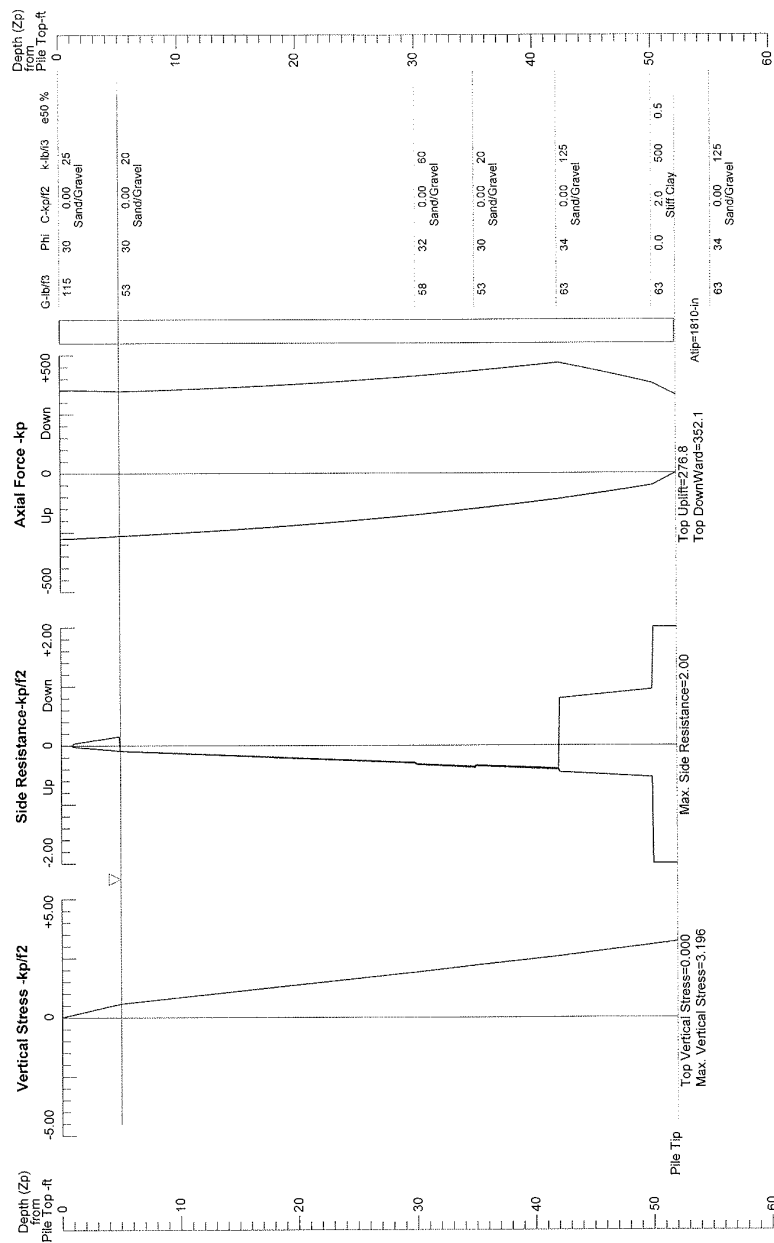
Note: If the program cannot find a result or the result exceeds the upper limit. The result will be displayed as 99999.



CivilTech
Software

10th Ave Marine Terminal; Light Poles
48" dia CIDH

SOIL STRESS, SIDE RESISTANCE, & AXIAL FORCE vs DEPTH Based on Ultimate Load Condition

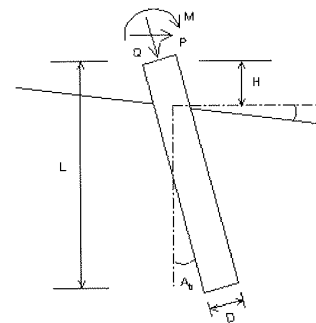


10th Ave Marine Terminal; Light Poles
48" dia CIDH



LATERAL ANALYSIS

Figure 2



Drilled Shaft (dia >24 in. or 61 cm)

Loads:

Load Factor for Vertical Loads= 1.0
Load Factor for Lateral Loads= 1.0
Loads Supported by Pile Cap= 0 %
Shear Condition: Static

Vertical Load, Q= 4.7 -kp
Shear Load, P= 1.6 -kp
Moment, M= 98.2 -kp-f

Profile:

Pile Length, L= 52.0 -ft
Top Height, H= 0 -ft
Slope Angle, As= 0
Batter Angle, Ab= 0

* Zero Friction *

Zero Friction Start: 0 -ft End: 1 -ft

* Negative Friction *

Negative Friction Start: 5 -ft End: 42 -ft with Factor: 0.6

Soil Data:

Depth -ft	Gamma -lb/f3	Phi -lb/f3	C -kp/f2	K -lb/f3	e50 or Dr %	Nspt
0	115	30	0.00	25	50	10
5	53	30	0.00	20	25	7
30	58	32	0.00	60	50	17
35	53	30	0.00	20	15	3
42	63	34	0.00	125	90	60
50	63	0.0	2.0	500	0.5	21
55	63	34	0.00	125	65	30

Pile Data:

Depth -ft	Width -in	Area -in2	Per. -in	I -in4	E -kp/f2	Weight -kp/f
0.0	48	1809.6	150.8	260576.3	3000	1.885
52.0						

Single Pile Lateral Analysis:

Top Deflection, yt= 0.05110-in

Max. Moment, M= 103.33-kp-f

Top Deflection Slope, St= -0.00039

OK! Top Deflection, 0.0511-in is less than the Allowable Deflection= 0.25-in

Note: If the program cannot find a result or the result exceeds the upper limit. The result will be displayed as 99999.

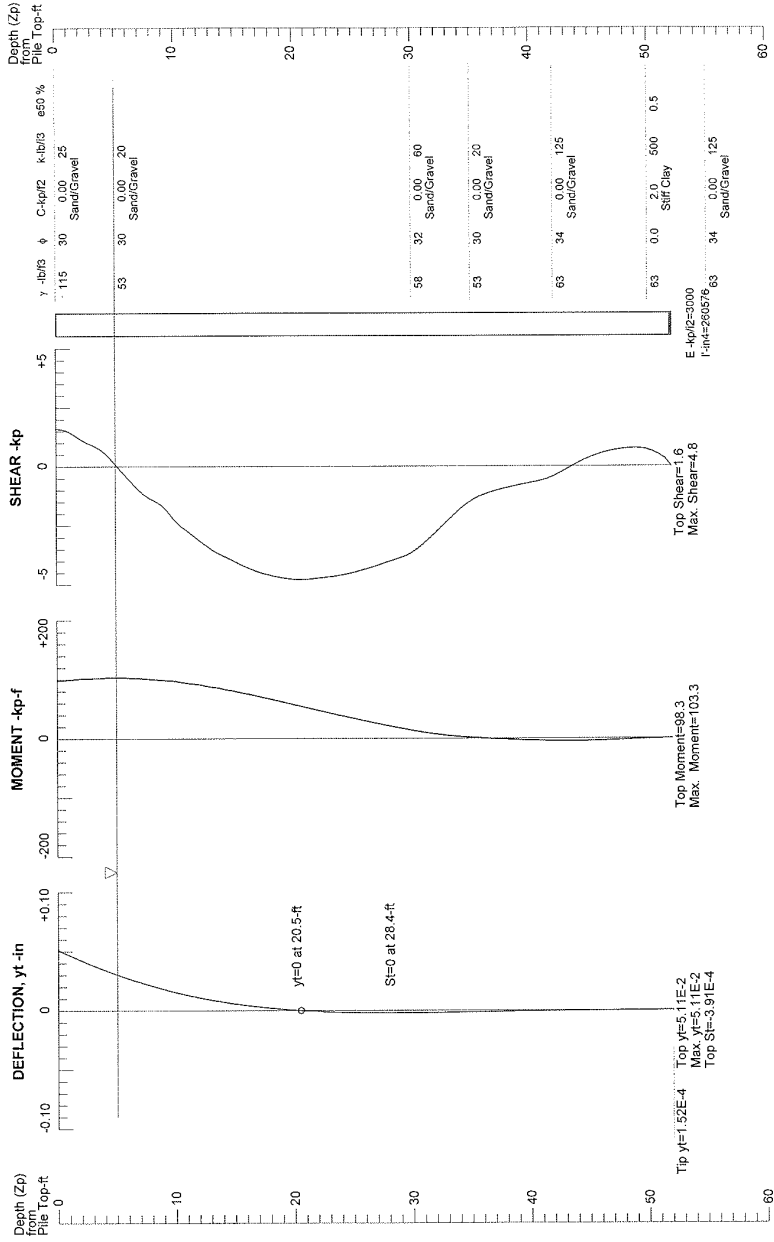
The Max. Moment calculated by program is an internal force from the applied load conditions. Structural engineer has to check whether the pile has enough capacity to resist the moment with adequate factor of safety. If not, the pile may fail under the load conditions.



CivilTech
Software

10th Ave Marine Terminal; Light Poles
48" dia CIDH

PILE DEFLECTION & FORCE vs DEPTH
Single Pile, Khead=1, Kbc=1



10th Ave Marine Terminal; Light Poles
48" dia CIDH

Figure 2

**UPDATED GEOTECHNICAL AND
FAULT HAZARD EVALUATION
COMMERCIAL BERTHING PIER AND TAMT
SAN DIEGO, CALIFORNIA**

PREPARED FOR:

Port of San Diego
3165 Pacific Highway
San Diego, California 92101

PREPARED BY:

Ninyo & Moore
Geotechnical and Environmental Sciences Consultants
5710 Ruffin Road
San Diego, California 92123

December 13, 2012
Project No. 107319001

December 13, 2012
Project No. 107319001

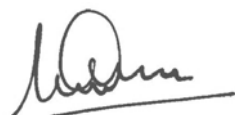
Mr. Ernesto Medina
Port of San Diego
3165 Pacific Highway
San Diego, California 92101

Subject: Updated Geotechnical and Fault Hazard Evaluation
Commercial Berthing Pier and TAMT
San Diego, California

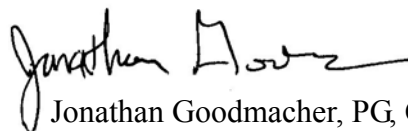
Dear Mr. Medina:

In accordance with Agreement No. 37-2012, Tasks 3.1 through 3.4, and 3.7 of Attachment A of the agreement, we have prepared this geotechnical and fault hazard evaluation report for the construction of the proposed site improvements at the vacant parcel along Water Street at the Tenth Avenue Marine Terminal (TAMT), in the City of San Diego, California. This report presents our geotechnical findings, conclusions, and recommendations regarding the proposed project. This report supersedes our previous report dated July 24, 2012 (referenced) for this project as some aspects of the project have changed since issuance of that report. This report also incorporates our responses to City of San Diego review comments on our earlier report. We appreciate the opportunity to be of service on this project.

Respectfully submitted,
NINYO & MOORE



Madan Chirumalla, PE
Project Engineer



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Principal Geologist



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MAC/JG/SG/kh

Distribution: (6) Addressee

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1. INTRODUCTION

The updated report presents the results of our geotechnical and fault hazard evaluation for the proposed site improvements at the vacant parcel along Water Street at the Tenth Avenue Marine Terminal (TAMT), in the City of San Diego, California (Figure 1). This report presents the results of our background review, subsurface evaluations, laboratory testing, geotechnical analyses, conclusions regarding the geologic and geotechnical conditions at the project site, and recommendations for design and construction of the proposed project. This report supersedes our previous report dated July 24, 2012 (referenced), and it incorporates our responses to City of San Diego review comments on our earlier report. The comments and responses are provided in Appendix F.

2. SCOPE OF SERVICES

Our scope of services included the following:

- Reviewing background information including available geotechnical evaluation reports, geologic and fault maps, stereoscopic aerial photographs, and in-house data.
- Performing geologic reconnaissance of the site to observe existing conditions and to mark out Cone Penetration Test (CPT) sounding and exploratory boring locations prior to contacting Underground Service Alert (USA).
- Notifying USA to clear CPT/boring locations for conflicts with public utilities.
- Coordinating with the Port personnel to clear CPT/boring locations for conflicts with private utilities.
- Obtaining County of San Diego Department of Environmental Health (DEH) boring permits. Work was conducted under DEH boring permit #LMON108504 and #LMON108786.
- Performing a subsurface exploration consisting of the advancement of 21 CPT soundings with a truck-mounted rig to depths of up to approximately 50½ feet below ground surface (bgs). In addition, one small diameter boring was drilled with a truck-mounted hollow-stem auger drill rig equipment to a depth of approximately 51½ feet bgs. The purpose of the CPTs and boring was to observe the subsurface conditions at the site and to collect soil samples for geotechnical testing and analysis in our in-house geotechnical laboratory. The boring was sampled continuously from a depth of approximately 10 feet bgs to its termination.
- Compiling and analyzing the data obtained from our research, subsurface exploration, and geotechnical laboratory testing.

- Preparing this update report presenting our findings, conclusions, and recommendations regarding the presence of faulting on the subject site and geotechnical design and construction aspects of the project.
- Evaluating the flood hazard potential at the site. This was performed by our sub-consultant, Alyson Consulting, and was presented as a separate transmittal (Alyson Consulting, 2012).

3. SITE AND PROJECT DESCRIPTION

The project is located near the intersection of Crosby Road and Water Street at TAMT in San Diego, California (Figure 1). Site coordinates are approximately 32.6967° Latitude and -117.1517° Longitude. Currently, the project site is vacant land and a parking lot. We understand that previous structures at the site were demolished. Concrete bulkheads were observed at the western end of the property during our site reconnaissance. The project site has an elevation of approximately 8 feet above mean sea level (MSL) (National Geodetic Vertical Datum of 1929 [NGVD 29]) and slopes gently to the east. We understand that the proposed project improvements will include the construction of a single-story, steel-framed, butler warehouse building, a pre-fabricated, modular office building, and an at-grade parking lot.

4. BACKGROUND INFORMATION

Various documents were reviewed in preparation for our subsurface explorations, including aerial photographs, geologic maps, and geotechnical evaluations performed by GeoLogic Associates (GLA, 2006). The State of California and the City of San Diego have designated the site as being within a fault-rupture hazard zone (Alquist-Priolo zone, Point Loma Quadrangle R03, Official Map of Earthquake Fault Zones delineated by the California Geological Survey (CGS) under the Alquist-Priolo Earthquake Fault Zoning Act) requiring a site-specific evaluation for the potential presence of active faults.

5. SUBSURFACE EXPLORATION AND LABORATORY TESTING

Our subsurface explorations were conducted on May 24 and May 25, and October 26, 2012, and consisted of the advancement of 21 CPT soundings (CPT-1 through CPT-21), and the drilling, log-

ging, and sampling of one small diameter boring (B-1) using a truck-mounted hollow-stem auger drill rig. The CPT soundings were performed to an approximate depth of 50½ feet bgs. The exploratory boring was drilled to a depth of approximately 51½ feet bgs. Figure 2 shows the approximate locations of our explorations.

The primary purpose of the CPT soundings and boring was to provide information regarding subsurface conditions and to collect soil samples for geotechnical laboratory testing. The CPTs and boring were backfilled with bentonite grout. Boring and CPT logs are presented in Appendix A.

Bulk and standard penetration test (SPT) samples were collected at selected depths from the boring and were transported to our in-house laboratory for geotechnical testing. Laboratory testing included in-situ moisture content, sieve (gradation) analysis, and R-value. The result of the in-situ moisture content test is shown at the corresponding sample depth on the boring log in Appendix A. The results of the other laboratory tests performed are presented in Appendix B.

6. GEOLOGY AND SUBSURFACE CONDITIONS

Our findings regarding regional and site geology, including groundwater conditions are provided in the following sections.

6.1. Regional Geologic Setting

The project area is situated in the western San Diego County section of the Peninsular Ranges Geomorphic Province. This geomorphic province encompasses an area that extends approximately 1,450 km (900 miles) from the Transverse Ranges and the Los Angeles Basin south to the southern tip of Baja California (Norris and Webb, 1990). The province varies in width from approximately 48 to 160 km (30 to 100 miles). In general, the province consists of rugged mountains underlain by Jurassic metavolcanic and metasedimentary rocks, and Cretaceous igneous rocks of the southern California batholith. The portion of the province in San Diego County that includes the project area consists generally of uplifted Tertiary sedi-

mentary rock, Jurassic metamorphic rock, and Cretaceous granitic rock. Figure 3 is a map of the regional geology (see discussion below).

The Peninsular Ranges Province is traversed by a group of sub-parallel faults and fault zones trending roughly northwest. Several of these faults, which are shown on Figure 4, are considered active faults. The Elsinore, San Jacinto, and San Andreas are active fault systems located northeast of the project area and the Coronado Bank, San Diego Trough, and San Clemente faults are active faults located west of the project area. Elements of the Rose Canyon Fault Zone, the nearest active fault system, have been mapped within several hundred feet of the project. Major tectonic activity associated with these and other faults within this regional tectonic framework consists primarily of right-lateral, strike-slip movement. Further discussion of faulting relative to the site is provided in the Faulting and Seismicity section of this report.

6.2. Subsurface Conditions

Based on our literature review of published geologic maps and reports, our site reconnaissance, and subsurface exploration, the geologic units underlying the project site include fill, bay deposits, and old paralic deposits. Generalized descriptions of the earth units are provided in the subsequent sections. Additional descriptions are provided on the CPT and boring logs in Appendix A. Figure 5 is our interpretation of the geology of the site. Figure 6 presents interpreted geologic cross-sections of sub-surface conditions.

6.2.1. Fill

Fill materials were encountered in our boring from the ground surface to a depth of approximately 9 feet. As encountered in our boring, the fill material generally consisted of light brown to brown, damp to moist, loose to medium dense, silty sand with gravel, and poorly-graded sand with silt and scattered shell debris. Documentation regarding placement of these fills was requested but was not made available.

6.2.2. Bay Deposits

Bay deposits were encountered below the fill. Bay deposits extended to a depth of approximately 15½ feet bgs. The bay deposits generally consisted of dark gray, saturated, very loose to medium dense, poorly-graded sand and silty sand, with scattered shell debris. The bay deposits are considered to be less than 6,500 years old (Kennedy & Clarke, 1999 a & b).

6.2.3. Old Paralic Deposits (Qop6)

Materials correlating to mapped old paralic deposits (Kennedy and Tan, 2008; formerly designated Bay Point Formation) were encountered underlying the bay deposits to the total exploration depth of approximately 51½ feet bgs. These materials generally consisted of brown to yellowish brown or grayish brown, saturated, loose to very dense, poorly-graded sand, clayey sand, silty sand, and sandy silt, and hard, clay and clayey silt.

The old paralic deposits generally consisted of two zones. An upper zone of dominantly poorly graded sand or silty or clayey sand. Contained within the upper zone was a paleosol (as evidenced by carbonate nodules). The lower zone consisting of interlayered units of the materials above but with clay and clayey silt layers. These units appear to be generally stratigraphically consistent with those observed in the upper 300 feet of the sediments in studies of faulting in San Diego Bay (Kennedy & Clarke, 1999 a & b). Per Kennedy & Clarke (1999 a & b) the upper 300 feet of sediments within San Diego Bay are interpreted to be Quaternary in age.

6.3. Groundwater

Groundwater was encountered in our boring at a depth of approximately 8 feet bgs. Groundwater was also encountered at a similar depth in the referenced geotechnical report by others (GLA, 2006). Fluctuations in the groundwater level may occur due to variations in tidal fluctuations, ground surface topography, subsurface geologic conditions and structure, rainfall, irrigation, and other factors not evident at the time of our subsurface evaluation.

7. GEOLOGIC HAZARDS

The following sections describe potential geologic hazards at the site, including faulting and seismicity, liquefaction, lateral spreading, and tsunamis.

7.1. Faulting and Seismicity

As shown on Figures 5 and 7, projections of the active Rose Canyon Fault trend in the direction of the site. As discussed below, there are indications of active or potentially active faults (i.e., faults that exhibit evidence of ground displacement in the last 11,000 years and 2,000,000 years, respectively) underlying the site.

In general, hazards associated with seismic activity include strong ground motion, ground surface rupture, liquefaction, and seismically-induced settlement. Discussion of these considerations is included in the following sections.

7.1.1. Strong Ground Motion

The 2010 California Building Code (CBC) recommends that the design of structures be based on the peak horizontal ground acceleration (PGA) having a 2 percent probability of exceedance in 50 years which is defined as the Maximum Considered Earthquake (MCE). The statistical return period for PGA_{MCE} is approximately 2,475 years. In evaluating the seismic hazards associated with the project site, we have used a Site Class D (average shear wave velocity ranging from approximately 600 to 1,200 feet per second) based on the review of our boring and CPT data, and in accordance with CBC. The United States Geological Survey (USGS) (USGS, 2011) ground motion calculator (web-based) calculates both the site modified PGA_{MCE} and the design PGA. The site modified PGA_{MCE} and the design PGA are estimated to be 0.64g and 0.43g, respectively, using the USGS ground motion calculator. The calculations are provided in Appendix C. These estimates of ground motion do not include near-source factors that may be applicable to the design of structures on site.

7.1.2. Ground Surface Rupture and Site-Specific Fault Evaluation

Due to the site being located within an Alquist-Priolo zone and the City of San Diego designated “Downtown Special Fault Zone”, a site-specific fault evaluation was performed to evaluate the presence or absence of active or potentially active faulting on the subject site. The site-specific evaluation generally followed the State of California, City of San Diego technical guidelines for fault-rupture hazard reports (City of San Diego, 2011; CGS, 2007). An active fault is defined as a fault which has had surface displacement within the Holocene time (about the last 11,000 years) and a potentially active fault is considered to have been active during the Quaternary time (last 1.6 million years). The evaluation consisted of drilling a boring and advancing CPT soundings.

The location of the evaluation was selected to intersect mapped faults in the vicinity of the site. The project is in a complex area of subsidiary fault splays associated with the Rose Canyon Fault Zone.

Our evaluation found evidence of a subsurface anomaly that is interpreted as an active or potentially active fault at the site. An offset of traceable beds was observed between CPT-4 and CPT-5 (Figure 6). Considering the close proximity to the active Rose Canyon Fault, and the amount of offset that is observed between the traceable beds near the existing ground surface, we interpret the fault to be active. The interpreted fault is located somewhere between CPT-4 and CPT-5, with an unknown exact location. We have conservatively located the fault as being adjacent to CPT-5. We note that beds to the north of the inferred fault are “warped” or tilted. This tilt is ascribed to deformation or dragging associated with movement on the fault. The interpreted location of the suspected fault is also depicted on Figure 5.

Based on our subsurface evaluation and review of background data, it is our opinion that active or potentially active faults cross the project site, and therefore, the potential for ground surface rupture due to active faulting is considered high. In accordance with the Alquist-Priolo Act, the proposed building structures for human occupancy should be

offset 50 feet from the closest suspected fault location. A 'structure for human occupancy' is defined in CGS Special Publication 42 (2007) as any structure used or intended for supporting or sheltering any use or occupancy, which is expected to have a human occupancy rate of more than 2,000 person-hours per year. The extent of this offset is shown on Figure 5. Lurching or cracking of the ground surface as a result of nearby seismic events is also possible.

7.1.3. Liquefaction

Liquefaction is the phenomenon in which loosely deposited granular soils (with silt and clay contents of less than approximately 35 percent) and non-plastic silts located below the water table undergo rapid loss of shear strength when subjected to strong earthquake-induced ground shaking. Ground shaking of sufficient duration results in the loss of grain-to-grain contact due to a rapid rise in pore water pressure, and causes the soil to behave as a fluid for a short period of time. Liquefaction is known generally to occur in saturated or near-saturated cohesionless soils at depths shallower than 50 feet below the ground surface. Factors known to influence liquefaction potential include composition and thickness of soil layers, grain size, relative density, groundwater level, degree of saturation, and both intensity and duration of ground shaking.

An evaluation of the liquefaction potential of subsurface soils was performed using the computer program LiquefyPro (CivilTech Software, 2007a), using the data from CPT soundings. The liquefaction analysis was based on the National Center for Earthquake Engineering Research (NCEER) procedure (Youd, et al., 2001) developed from the methods originally recommended by Seed and Idriss (1982). A groundwater table depth of 5 feet below the existing ground surface was used in our liquefaction evaluation. A moment magnitude of 7.2 associated with the Rose Canyon Fault, and a design PGA of 0.43 was used in liquefaction analyses. Our analyses indicate that there is a high potential for liquefaction at the site and significant liquefiable layers occur to a depth of approximately 25 feet. Further, as mapped by the City of San Diego (2008), the site is within an area with a high potential for liquefaction, shallow groundwater, major drainages, and hydraulic fill

(Figure 8). The liquefaction analyses results are presented in Appendix D. The mitigation recommendations for liquefaction are provided in the following sections.

7.1.4. Dynamic Settlement of Saturated Soils

As a result of liquefaction, the proposed structures may be subject to several hazards, including liquefaction-induced settlement. In order to estimate the amount of post-earthquake settlement, the method proposed by Ishihara and Yoshimine (1992) was chosen for the evaluation of dynamic settlement. The amount of soil settlement during a strong seismic event depends on the thickness of the liquefiable layers and the density and/or consistency of the soils.

Under the current conditions, post-earthquake total settlement of up to approximately 5 inches was calculated for the project site using the computer program LiquefyPro (CivilTech Software, 2007a). Based on the depth of the liquefiable zone and assuming relatively continuous subsurface stratigraphy across the site, we estimate differential settlement on the order of 2.5 inches over a horizontal distance of approximately 25 feet.

7.1.5. Lateral Spreading

Lateral spreading of ground surface during an earthquake usually takes place along weak shear zones that have formed within a liquefiable soil layer. Lateral spread has generally been observed to take place in the direction of a free-face (i.e., retaining wall, slope, channel) but has also been observed to a lesser extent on ground surfaces with very gentle slopes. An empirical model developed by Youd and Bartlett (2002) is typically used to predict the amount of horizontal ground displacement within a site. For a site located in proximity to a free-face, the amount of lateral ground displacement is strongly correlated with the distance of the site from the free-face. Other factors such as earthquake magnitude, distance from the earthquake epicenter, thickness of the liquefiable layers, and the fines content and particle sizes of the liquefiable layers also affect the amount of lateral ground displacement. Based on the thickness of potentially liquefiable soil layers underlying the site, the depth of free-face, and corrected sampler blow counts (i.e., $[N1]_{60-CS}$) within the liquefiable layers that are not in excess of 15,

there is a high potential for lateral spread to a depth of approximately 13 feet bgs. The mitigation recommendations for lateral spreading are provided in the following sections.

7.2. Tsunamis

Tsunamis are long wavelength seismic sea waves (long compared to the ocean depth) generated by sudden movements of the ocean bottom during submarine earthquakes, landslides, or volcanic activity. Based on our review of the tsunami hazards map prepared by the CGS (2009) the site is not located in an area subject to tsunami inundation. Therefore, tsunami inundation is not a design consideration for the proposed structures.

8. CONCLUSIONS

Based on the results of our subsurface evaluation, laboratory testing, and data analysis, construction of the proposed improvements is feasible from a geotechnical standpoint, provided the recommendations of this report are incorporated in the design and construction of the project. Geotechnical considerations include the following:

- Based on the subsurface data presented herein, it is our opinion that an active or potentially active fault crosses the project site. This fault is interpreted to be between CPT-4 and CPT-5. The proposed structures should be offset from the closest possible location of the suspected fault trace (Figure 5) for human occupancy.
- The potential for relatively strong seismic accelerations will need to be considered in the design of the proposed improvements.
- The project site is underlain by fill materials, bay deposits, and old paralic deposits. Fill materials were encountered to a depth of approximately 9 feet bgs in our boring. Surficial fill materials are not considered suitable in their current condition for support of structures. However, it is not anticipated that removal of fills to their total depth will be required given the nature of the proposed construction specifics. Recommendations for the depth of fill material removal are provided in Remedial Grading Section of this report.
- Groundwater was encountered in our boring at a depth of approximately 8 feet bgs. However, due to tidal fluctuations the groundwater may be encountered at a shallower depth.
- Based on our analyses, there is a high potential for liquefaction and lateral spreading at the site. Further, as mapped by the City of San Diego (2008), the site is within an area with a

high potential for liquefaction, shallow groundwater, major drainages, and hydraulic fill. Ground improvement or deep foundations are recommended in the following sections to mitigate liquefaction and lateral spreading.

- In our opinion, the on-site materials should be generally excavatable with heavy-duty earthmoving equipment in good working condition. Excavations in or close to the groundwater will encounter wet and loose or soft ground conditions. Caving should be anticipated. Wet soils may be subject to pumping under heavy equipment loads.
- Soils derived from on-site excavations are generally considered suitable for reuse as fill material provided they meet the recommendations presented in the Materials for Fill and Compacted Fill sections of this report.
- Based on our review of the referenced report (GLA, 2006) and due to the proximity of the site to a marine environment, the project site should be considered corrosive.

9. RECOMMENDATIONS

The following sections present our geotechnical recommendations for the design and construction of the proposed improvements. We recommend that the site earthwork and construction be performed in accordance with the following recommendations and the requirements of the applicable governing agencies. We also recommend that the contractor consider appropriate measures to avoid damage to the existing bulkhead anchors during earthwork operations and building construction.

9.1. Earthwork

In general, earthwork should be performed in accordance with the recommendations presented in this report. Ninyo & Moore should be contacted for questions regarding the recommendations or guidelines presented herein.

9.1.1. Site Preparation

Site preparation should begin with the removal of vegetation, utility lines, asphalt, concrete, and other deleterious debris from areas to be graded. Tree stumps and roots should be removed to such a depth that organic material is not present. Clearing and grubbing should extend to the outside of the proposed excavation and fill areas. The debris and unsuitable material generated during clearing and grubbing should be removed from areas to be graded and disposed of at a legal dumpsite away from the project area.

9.1.2. Excavatability

Our evaluation of the excavation characteristics of the on-site materials at the subject site is based on the results of our subsurface exploration and our experience with similar materials. In our opinion, the on-site soil materials should be generally excavatable with heavy-duty earthmoving equipment in good working condition. Excavations in or close to the groundwater will encounter wet and loose or soft ground conditions. Caving should be anticipated. Wet soils may be subject to pumping under heavy equipment loads.

9.1.3. Remedial Grading

The existing surficial fill materials are considered compressible and not suitable for structural support in their present condition. To reduce the potential for settlement and provide the foundations with an engineered subgrade, we recommend that the existing undocumented fill materials be removed to a depth of approximately 5 feet below existing grade or 3 feet below the footing, whichever is greater, within the building pad and replaced with compacted fill. For the purposes of this report, the building pad is defined as the structural footprint plus a horizontal distance of 5 feet or the depth of the excavation below pad grade, whichever is greater. The extent and depths of removals should be evaluated by Ninyo & Moore's representative in the field based on the materials exposed. The resulting removal surface should be scarified approximately 8 inches, moisture-conditioned to near optimum moisture content, and recompacted to a relative compaction of 90 percent as evaluated by ASTM International (ASTM) Test Method D 1557.

9.1.4. Materials for Fill

On-site soils are generally suitable for reuse as fill. The fill material should exhibit an expansion index (EI) of 50 or less (i.e., low expansion potential) as evaluated by ASTM D 4829 and are free of trash, debris, roots, vegetation, or other deleterious materials. Fill should generally be free of rocks or lumps of material in excess of 3 inches in diameter and not more than approximately 30 percent larger than $\frac{3}{4}$ inch. Rocks or hard lumps larger than approximately 3 inches in diameter should be broken into smaller pieces or should be removed from the site. Contaminated materials should not be used as fill. Moisture-conditioning (including drying) of existing on-site materials is anticipated if reused as fill.

Imported fill material, if required, should consist of clean, granular material that generally meets Standard Specifications for Public Works Construction (Greenbook) criteria for structure backfill. Import material should consist of clean, granular soils with an EI of 50 or less. Soil should also be tested for corrosive properties prior to importing. We recommend that the imported materials satisfy the Caltrans (2003) and American Concrete Institute (ACI) 318 criteria for non-corrosive soils (i.e., soils having a chloride concentration of 500 parts per million [ppm] or less, a soluble sulfate content of approximately 0.10 percent [1,000 ppm] or less, a pH value of 5.5 or higher, or an electrical resistivity of 1,000 ohm-cm or higher). Materials for use as fill should be evaluated by Ninyo & Moore prior to importing. The contractor should be responsible for the uniformity of import material brought to the site.

To reduce the potential of importing contaminated materials to the site, prior to delivery, soil materials obtained from off-site sources should be sampled and tested in accordance with standard practice (Department of Toxic Substances Control). Soils that exhibit a known risk to human health, the environment, or both, should not be imported to the site.

9.1.5. Compacted Fill

Prior to placement of compacted fill, the contractor should request an evaluation of the exposed ground surface by Ninyo & Moore. Unless otherwise recommended, the exposed ground surface should then be scarified to a depth of approximately 8 inches and watered or dried, as needed, to achieve generally consistent moisture contents at or near the optimum moisture content. The scarified materials should then be compacted to 90 percent relative compaction as evaluated by ASTM D 1557. The evaluation of compaction by Ninyo & Moore should not be considered to preclude any requirements for observation or approval by governing agencies. It is the contractor's responsibility to notify Ninyo & Moore and the appropriate governing agency when project areas are ready for observation, and to provide reasonable time for that review.

Fill materials should be moisture-conditioned to near optimum moisture content prior to placement. The optimum moisture content will vary with material type and other factors. Moisture-conditioning of fill soils should be generally consistent within the soil mass.

Prior to placement of additional compacted fill material following a delay in the grading operations, the exposed surface of previously compacted fill should be prepared to receive fill. Preparation may include scarification, moisture-conditioning, and recompaction.

Compacted fill should be placed in horizontal lifts of approximately 8 inches in loose thickness. Prior to compaction, each lift should be watered or dried as needed to achieve near optimum moisture condition, mixed, and then compacted by mechanical methods, using sheepsfoot rollers, multiple-wheel pneumatic-tired rollers, or other appropriate compacting rollers, to a relative compaction of 90 percent as evaluated by ASTM D 1557. Successive lifts should be treated in a like manner until the desired finished grades are achieved.

9.1.6. Excavation and Shoring

We recommend that excavations be designed and constructed in accordance with California Occupational Safety and Health Administration (Cal/OSHA) regulations. These regulations provide trench sloping and shoring design parameters for excavations up to 20 feet deep based on the soil types encountered. For planning purposes, we recommend that the following Cal/OSHA soil classification be used for temporary excavations and other purposes:

Fill, Bay Deposits, and Old Paralic Deposits *Type C*

Upon making the excavations, the soil classifications and excavation performance should be evaluated in the field by the geotechnical consultant in accordance with the Cal/OSHA regulations. Temporary excavations should be constructed in accordance with Cal/OSHA recommendations. For trench or other excavations, Cal/OSHA requirements regarding personnel safety should be met using appropriate shoring (including trench boxes) or by laying back the slopes to a slope ratio no steeper than 1.5:1 (horizontal:vertical). Temporary excavations that encounter seepage may be shored or stabilized by placing sandbags or gravel along the base of the seepage zone. Excavations encountering seepage should be evaluated on a case-by-case basis. On-site safety of personnel is the responsibility of the contractor.

9.1.7. Utility Trench Backfill

Based on our subsurface exploration, the on-site earth materials should be generally suitable for re-use as trench backfill provided they are free of organic material, clay lumps, debris, and rocks greater than approximately 3 inches in diameter. We recommend that trench backfill materials be in conformance with the “Greenbook” (Standard Specifications for Public Works) specifications for structure backfill. Fill should be moisture-conditioned to generally above the laboratory optimum. Trench backfill should be compacted to a relative compaction of 90 percent except for the upper 12 inches of the backfill that should be compacted to a relative compaction of 95 percent as evaluated by ASTM D 1557. Lift thickness for backfill will depend on

the type of compaction equipment utilized, but fill should generally be placed in lifts not exceeding 8 inches in loose thickness. Special care should be exercised to avoid damaging the pipe during compaction of the backfill.

9.1.8. Drainage

Roof, pad, and slope drainage should be diverted away from slopes and structures to suitable discharge areas by nonerrodible devices (e.g., gutters, downspouts, concrete swales, etc.). Positive drainage adjacent to structures should be established and maintained. Positive drainage may be accomplished by providing drainage away from the foundations of the structure at a gradient of 2 percent or steeper for a distance of 5 feet outside the building perimeter, and further maintained by a graded swale leading to an appropriate outlet, in accordance with the recommendations of the project civil engineer and/or landscape architect.

Surface drainage on the site should be provided so that water is not permitted to pond. A gradient of 2 percent or steeper should be maintained over the pad area and drainage patterns should be established to divert and remove water from the site to appropriate outlets.

Care should be taken by the contractor during grading to preserve any berms, drainage terraces, interceptor swales or other drainage devices on or adjacent to the property. Drainage patterns established at the time of grading should be maintained for the life of the project. The property operators should be made aware that altering drainage patterns might be detrimental to slope stability and foundation performance.

9.2. Seismic Design Considerations

The proposed improvements should be designed in accordance with the requirements of governing jurisdictions and applicable building codes. Table 1 presents the seismic design parameters for the site in accordance with CBC (2010) guidelines and mapped spectral acceleration parameters (USGS, 2012). The calculations are provided in Appendix C.

Table 1 – 2010 California Building Code Seismic Design Criteria

Seismic Design Factors	Values
Site Class	D
Site Coefficient, F_a	1.0
Site Coefficient, F_v	1.5
Mapped Short Period Spectral Acceleration, S_s	1.60 g
Mapped One-Second Period Spectral Acceleration, S_1	0.64 g
Short Period Spectral Acceleration Adjusted For Site Class, S_{MS}	1.60 g
One-Second Period Spectral Acceleration Adjusted For Site Class, S_{M1}	0.96 g
Design Short Period Spectral Acceleration, S_{DS}	1.07 g
Design One-Second Period Spectral Acceleration, S_{D1}	0.64 g

9.3. Ground Improvement

Due to the high potential for liquefaction-induced dynamic settlement and lateral spreading, we recommend that ground improvement be performed at the site if buildings are planned to be supported on shallow or mat foundations. Ground improvement is not necessary if pile foundations are selected for the project. The primary objectives of ground improvement at the site would be to provide improved support for structures during and immediately after an earthquake, and to reduce the potential for unacceptable damage due to liquefaction of soils. Based on the results of our liquefaction and lateral spreading analyses, we are of the opinion that ground improvement should extend from depths of approximately 5 feet to 25 feet below the existing ground surface. Remedial grading was recommended in this report to a depth of approximately 5 feet from ground surface. Ground improvement methods typically include dynamic compaction, vibro-compaction, grouting, and stone columns. However, since dynamic compaction and vibro-compaction methods generate significant noise and vibration, these methods are not considered suitable for the site. Grouting is generally more expensive. Accordingly, stone columns are considered suitable for this site. A specialty contractor should design the actual size, spacing, depth, and layout of the stone columns.

9.4. Foundations

The following foundation recommendations were provided based on the geotechnical considerations and our discussions with the structural engineer for the project. The proposed warehouse and office building structures may be supported on shallow, spread or continuous footings bearing on compacted fill if ground improvements are performed as recommended; otherwise, pile foundations may be considered without ground improvement. Foundations should be designed in accordance with structural considerations and the following recommendations. In addition, requirements of the appropriate governing jurisdictions and applicable building codes should be considered in the design of the structures.

9.4.1. Shallow Footings

Shallow, spread or continuous footings founded in compacted fill, may be designed using an allowable bearing capacity of 2,500 pounds per square foot (psf). These allowable bearing capacities may be increased by $\frac{1}{3}$ when considering loads of short duration such as wind or seismic forces. These allowable bearing capacities are based on a factor of safety of three.

Spread footings should be founded 24 inches below the lowest adjacent grade. Continuous footings should have a width of 15 inches and isolated footings should be 24 inches in width. The spread footings should be reinforced in accordance with the recommendations of the project structural engineer.

9.4.1.1. Lateral Resistance

For resistance of footings founded in compacted fill to lateral loads, we recommend that a passive pressure of 350 psf of depth be used with a value of up to 3,500 psf. This value assumes that the ground is horizontal for a distance of 10 feet, or three times the height generating the passive pressure, whichever is greater. We recommend that the upper 1 foot of soil not protected by pavement or a concrete slab be neglected when calculating passive resistance.

For frictional resistance to lateral loads, we recommend a coefficient of friction of 0.40 between soil and concrete. The allowable lateral resistance can be taken as the sum of the frictional resistance and passive resistance provided the passive resistance does not exceed $\frac{1}{2}$ of the total allowable resistance. The passive resistance values may be increased by $\frac{1}{3}$ when considering loads of short duration such as wind or seismic forces.

Trenches should not be excavated adjacent to spread footings. If trenches are to be excavated near a continuous footing, the bottom of the trench should be located above a 1:1 plane projected downward from the bottom of the footing. Utility lines that cross beneath footings should be encased in concrete below the footing.

9.4.1.2. Static Settlement

We estimate that the proposed structures, designed and constructed as recommended herein, will undergo total settlement on the order of 1 inch. Differential settlement on the order of $\frac{1}{2}$ inch over a horizontal span of 40 feet should be expected.

9.4.2. Pile Foundation

If pile foundations are selected for the project, we recommend that the pile dimensions and spacing be evaluated by the project structural engineer using the recommendations presented herein. Based on our discussions with the structural engineer, the capacity of a 14-inch-square driven precast/prestressed (PC/PS) pile and a 24-inch-diameter cast-in-drilled-hole (CIDH) pile was evaluated using Allpile V.7.11A computer program (CivilTech Software, 2007b). The axial capacities (compression and uplift) of these piles were evaluated using the recommended soil parameters presented in Appendix E. Pile capacity calculations are also provided in Appendix E. Compression capacity was evaluated using frictional resistance and end bearing. Tension (uplift) capacity was evaluated using frictional resistance and weight of the pile. In evaluating pile capacity for seismic condition, downdrag was considered to a depth of 25 feet bgs (significant liquefiable zone). The results of axial pile capacity evaluation are summarized in Table 2.

Table 2 – Summary of Single Pile Axial Capacity Evaluation

Pile Type	Pile Length (feet)	Ultimate Capacity (kips)		Allowable Capacity (kips)
		Static Condition	Seismic Condition	
14-inch Square Driven PC/PS Concrete	35	167 (Compression) 57 (Uplift)	112 (Compression) 33 (Uplift)	80 (Compression) 26 (Uplift)
24-inch Diameter CIDH	35	200 (Compression) 50 (Uplift)	160 (Compression) 33 (Uplift)	100 (Compression) 26 (Uplift)

9.4.2.1. Lateral Pile Analysis

Lateral loads are not available at this time. Based on our discussions with the structural engineer, we understand that the static lateral loads are expected to be relatively small, and the pile head will be fixed. We have evaluated the lateral capacity of the piles shown in Table 2 based on assumed loading that includes the lateral load on pile from possible dynamically induced lateral spreading. Based on our analysis, the deflection of the fixed pile head will be ¼-inch or less for static condition and 1-inch or less for seismic condition. Lateral pile capacity analyses are presented in Appendix E.

For lateral loading, piles in a group may be considered to act individually when the center-to-center spacing is greater than 3D (where, D is the diameter of the pile) in the direction normal to loading and greater than 5D in the direction parallel to loading. The following table presents the lateral load reduction factors to be applied for various pile spacing for in-line loading.

Table 3 – Lateral Load Group Reduction Factors

Center-to-Center Pile Spacing for In-Line Loading	Reduction Factor*		
	Row 1	Row 2	Row 3 and higher
3D	0.8	0.40	0.3
5D	1.0	0.85	0.7
Note: * Based on AASHTO LRFD Bridge Design Specifications, 5 th Edition, 2010 Interim Revision			

9.4.2.2. *Construction Considerations for Driven Piles*

The project site is located in a developed area. Therefore, the noise and vibrations from pile driving should be considered in project design. Driven concrete piles should be constructed and driven in accordance with the applicable project specifications and the following recommendations. Piles should be checked for alignment and plumbness. The amount of acceptable misalignment of a pile is approximately 2 to 3 inches from the plan location and it is usually acceptable for a pile to be out of plumb by one percent of the depth of the pile. Piles should be spaced no closer than three times the nominal diameter or dimension (center-to-center).

Difficult driving conditions should be anticipated if hard clays or gravel layers are encountered. For driven concrete piles, the pile hammer should be an approved steam, air or hydraulic hammer that develops sufficient energy to drive the piles at a penetration rate of not less than 1 inch per blow to the recommended tip elevation. For preliminary purposes, we recommend that a pile hammer having a rated energy of 40,000 foot-pounds or more be used. We also recommend that during the pile hammer selection Ninyo & Moore be retained to evaluate the appropriateness of the pile hammer chosen for use on the project and to evaluate capacity and refusal criteria.

9.4.2.3. *Construction Considerations for Cast-In-Drilled-Hole Piles*

Construction of CIDH piles should be observed by Ninyo & Moore during drilling to evaluate if the piles have been extended to the recommended depths. The drilled holes should be cleaned of loose soil and gravel. It is the contractor's responsibility to take the appropriate measures to provide for the integrity of the drilled holes and to see that the holes are cleaned and straight and that sloughed loose soil is removed from the bottom of the hole prior to the placement of concrete. Drilled CIDH piles should be checked for alignment and plumbness during installation. The amount of acceptable misalignment of a pile is approximately 3 inches from the plan location

but may be reduced based on design criteria. The center-to-center spacing of piles should be no less than three times the nominal diameter of the pile.

Groundwater was encountered in our boring at a depth of approximately 8 feet bgs. As a result, we anticipate that groundwater would be encountered within the excavation depth of foundations. We recommended that the contractor consider appropriate measures during construction to reduce the potential for caving of the drilled holes, including the use of steel casing and/or drilling mud. In addition, we recommend placement of concrete by tremie method to see that the aggregate and cement do not segregate during concrete placement.

We recommend that acoustic testing of the piles, if considered, be performed in accordance with ASTM D 6760 "Integrity Testing of Concrete Deep Foundations by Ultrasonic Crosshole Testing" within a few days of casting the piles. It is recommended that acoustic-testing access tubes be included as part of the reinforcing cage prior to the placement of concrete. The acoustic-testing access tubes should consist of 2-inch internal diameter or larger, plastic (Schedule 40 PVC) pipes placed longitudinally in the drilled shaft by attachment to the reinforcing cage. The lower ends of the access tubes should be plugged to keep out concrete. The tubes should be filled with water to stabilize the temperature of the tubes to keep them from de-bonding from the concrete.

Contractors with proven records in the installation of CIDH piles should be considered. During construction, a certified deep foundation inspector should document the diameter, depth, vertical alignment, and the nature of the materials encountered at each pile location. Reinforcing steel and concrete placement should be continuously observed by Ninyo & Moore. A quality control report should be submitted for each pile stating, in writing, that the design details have been observed and meet the requirements.

9.5. Slabs-on-Grade

We recommend that conventional, slab-on-grade floors, where required, be underlain by compacted fill materials of generally very low to low expansion potential, be 5 inches in thickness and be reinforced with No. 4 reinforcing bars spaced 18 inches on center each way. The reinforcing bars should be placed near the middle of the slab. As a means to help reduce shrinkage cracks, we recommend that the slabs be provided with expansion joints at intervals of approximately 12 feet each way. The slab reinforcement and expansion joint spacing should be designed by the project structural engineer.

If moisture-sensitive floor coverings are to be used, we recommend that slabs be underlain by a vapor retarder and capillary break system consisting of a 10-mil polyethylene (or equivalent) membrane placed over 4 inches of medium to coarse, clean sand or pea gravel and overlain by an additional 2 inches of sand to help protect the membrane from puncture during placement and to aid in concrete curing. The exposed subgrade should be moistened just prior to the placement of concrete.

9.6. Concrete Flatwork

Exterior concrete flatwork should be 4 inches in thickness and should be reinforced with No. 3 reinforcing bars placed at 24 inches on-center both ways. No vapor retarder is needed for exterior flatwork. To reduce the potential manifestation of distress to exterior concrete flatwork due to movement of the underlying soil, we recommend that such flatwork be installed with crack-control joints at appropriate spacing as designed by the structural engineer. Exterior slabs should be underlain by 4 inches of clean sand. The subgrade soils should be scarified to a depth of 8 inches, moisture-conditioned to generally above the laboratory optimum moisture content, and compacted to a relative compaction of 90 percent as evaluated by ASTM D 1557. Positive drainage should be established and maintained adjacent to flatwork.

9.7. Corrosion

Corrosion testing was not in our scope of study. However, we reviewed the corrosion test data in the referenced report (GLA, 2006). It was noted in the report that the soils at the site have a moderate potential for sulfate attack on concrete and a heavy potential for corrosion to uncoated metal conduits.

9.8. Concrete

Concrete in contact with soil or water that contains high concentrations of soluble sulfates can be subject to chemical deterioration. As noted in the referenced report (GLA, 2006), the soils at the site have a moderate potential for sulfate attack on concrete. Due to the potential for variability of site soils and the proximity of the site to a marine environment, we recommend using Type V cement for concrete with a water-cement ratio no higher than 0.45 by weight with normal weight aggregate concrete and a 28-day compressive strength of 4,500 pounds per square inch (psi) or more.

9.9. Preliminary Pavement Design

The on-site fill material was evaluated to have an R-value of 57. However, due to the variability of on-site soils we assumed an R-value of 40 for flexible pavement design. We recommend that the import fill materials, if used, should have an R-value of 40 or greater. Actual pavement recommendations should be based on R-value tests performed on bulk samples of the soils that are exposed at the finished subgrade elevations across the site at the completion of the mass grading operations.

We understand that traffic will consist primarily of automobiles and trucks. For design we have assumed Traffic Indices (TI) of 6.0, 7.0, 8.0, and 9.0 for site pavements. The preliminary recommended pavement sections are presented in Table 4. However, we recommend that we re-evaluate the pavement design, based on the R-value of the subgrade material exposed at the time of construction.

Table 4 – Recommended Preliminary Pavement Sections

Traffic Index	R-Value	Asphalt Concrete (AC) (in)	Class 2 Aggregate Base (AB) (in)
6.0	40	3.5	5.5
7.0	40	4.0	7.0
8.0	40	5.0	8.0
9.0	40	5.5	9.5

We recommend that the upper 12 inches of the subgrade and base materials be compacted to a relative compaction of 95 percent as evaluated by ASTM D 1557. If TI values are different from those assumed, the pavement design should be re-evaluated.

We suggest that consideration be given to using Portland cement concrete pavements in areas where dumpsters will be stored and where refuse trucks will stop and load. Experience indicates that refuse truck traffic can significantly shorten the useful life of AC sections. We recommend that in these areas, 6 inches of 600 pounds psi flexural strength Portland cement concrete reinforced with No. 3 bars, 18 inches on center, be placed over 6 inches or more of crushed aggregate base compacted to a relative compaction of 95 percent, placed over 1 or more feet of very low to low expansive fill materials compacted to the recommendations presented herein.

9.10. Pre-Construction Meeting

We recommend that a pre-construction meeting be held prior to commencement of grading. The owner or his representative, the agency representatives, the architect, the civil engineer, Ninyo & Moore, and the contractor should be in attendance to discuss the plans, the project, and the proposed construction schedule.

9.11. Plan Review and Construction Observation

The conclusions and recommendations presented in this report are based on analysis of observed conditions in our boring and CPTs. If conditions are found to vary from those described in this report, Ninyo & Moore should be notified, and additional recommendations will be provided upon request. Ninyo & Moore should review the final project drawings and specifications prior to the commencement of construction. Ninyo & Moore should perform the needed observation and testing services during construction operations.

The recommendations provided in this report are based on the assumption that Ninyo & Moore will provide geotechnical observation and testing services during construction. In the event that it is decided not to utilize the services of Ninyo & Moore during construction, we request that the selected consultant provide the client with a letter (with a copy to Ninyo & Moore) indicating that they fully understand Ninyo & Moore's recommendations, and that they are in full agreement with the design parameters and recommendations contained in this report. Construction of proposed improvements should be performed by qualified subcontractors utilizing appropriate techniques and construction materials.

10. LIMITATIONS

The field evaluation, laboratory testing, and geotechnical analyses presented in this report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be encountered during construction. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation will be performed upon request. Please also note that our evaluation was limited to assessment of the geotechnical aspects of the project, and did not include evaluation of structural issues, environmental concerns, or the presence of hazardous materials.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

This report is intended for design purposes only. It does not provide sufficient data to prepare an accurate bid by contractors. It is suggested that the bidders and their geotechnical consultant perform an independent evaluation of the subsurface conditions in the project areas. The independent evaluations may include, but not be limited to, review of other geotechnical reports prepared for the adjacent areas, site reconnaissance, and additional exploration and laboratory testing.

Our conclusions, recommendations, and opinions are based on an analysis of the observed site conditions. If geotechnical conditions different from those described in this report are encountered, our office should be notified, and additional recommendations, if warranted, will be provided upon request. It should be understood that the conditions of a site could change with time as a result of natural processes or the activities of man at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

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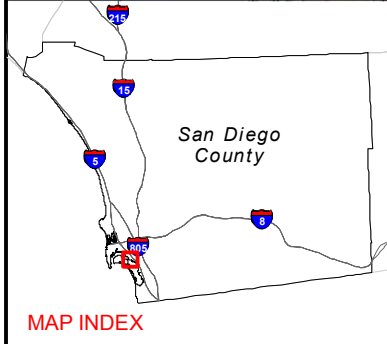
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AERIAL PHOTOGRAPHS				
Source	Date	Flight	Numbers	Scale
USDA	3-31-53	AXN-3M	196 and 198	1:20,000



SOURCE: 2008 THOMAS GUIDE FOR SAN DIEGO COUNTY, STREET GUIDE AND DIRECTORY; MAP © RAND MCNALLY, R.L.07-S-129



MAP INDEX

SCALE IN FEET

0 1,200 2,400 4,800

NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE

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SITE LOCATION

FIGURE

PROJECT NO.

DATE

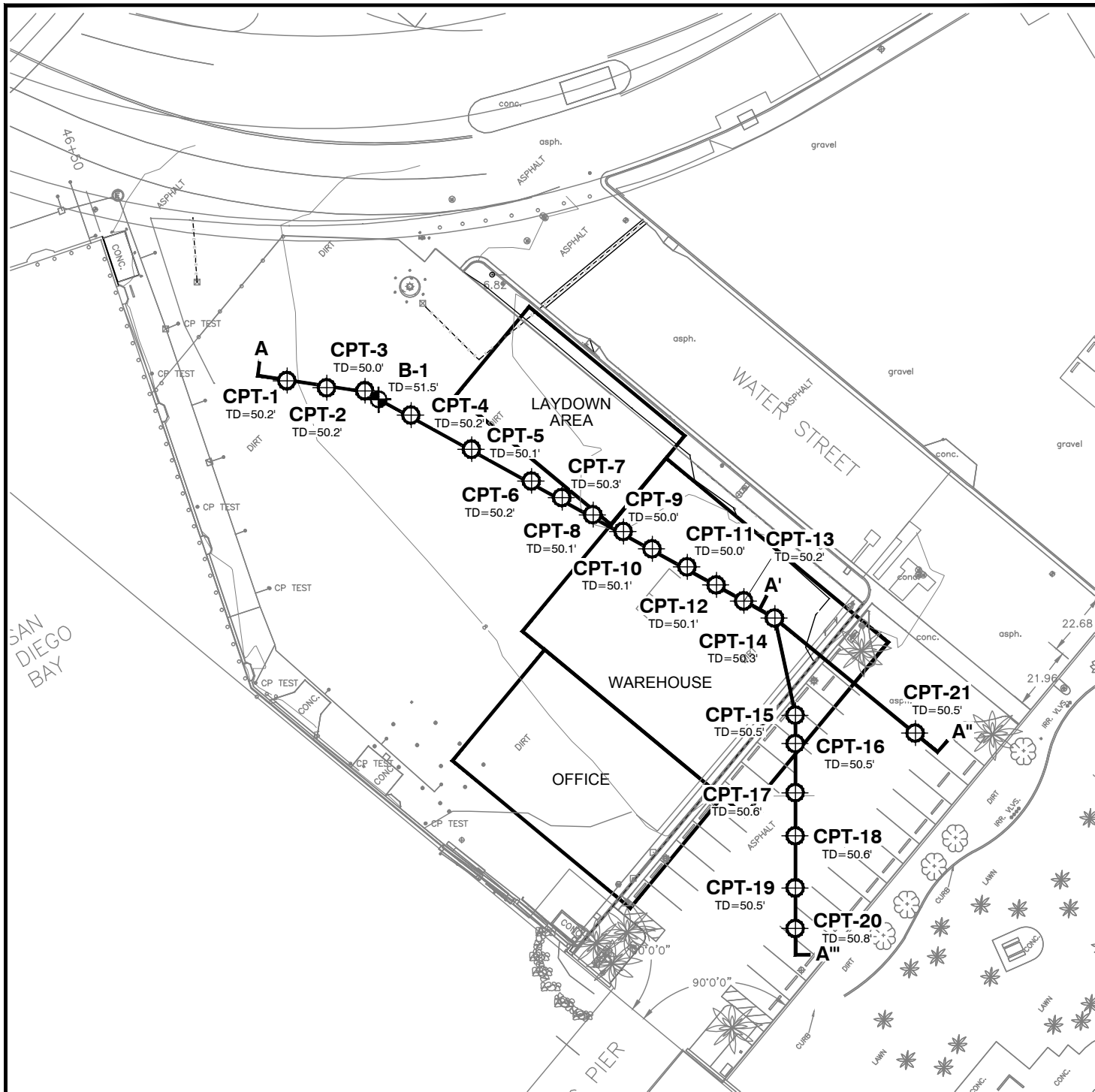
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SAN DIEGO, CALIFORNIA

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SCALE IN FEET

0 50 100

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE

LEGEND

- CPT-21** TD=50.5' CONE PENETRATION TEST TD=TOTAL DEPTH IN FEET
- B-1** TD=51.5' BORING TD=TOTAL DEPTH IN FEET
- A A'** INTERPRETED CROSS SECTION

SOURCE: SAN DIEGO UNIFIED PORT DISTRICT (SDUPD), 2011; ALYSON CONSULTING, 2012.

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0010G 0000 00T LO 00TIO 0S

FIGURE

PROJECT NO.

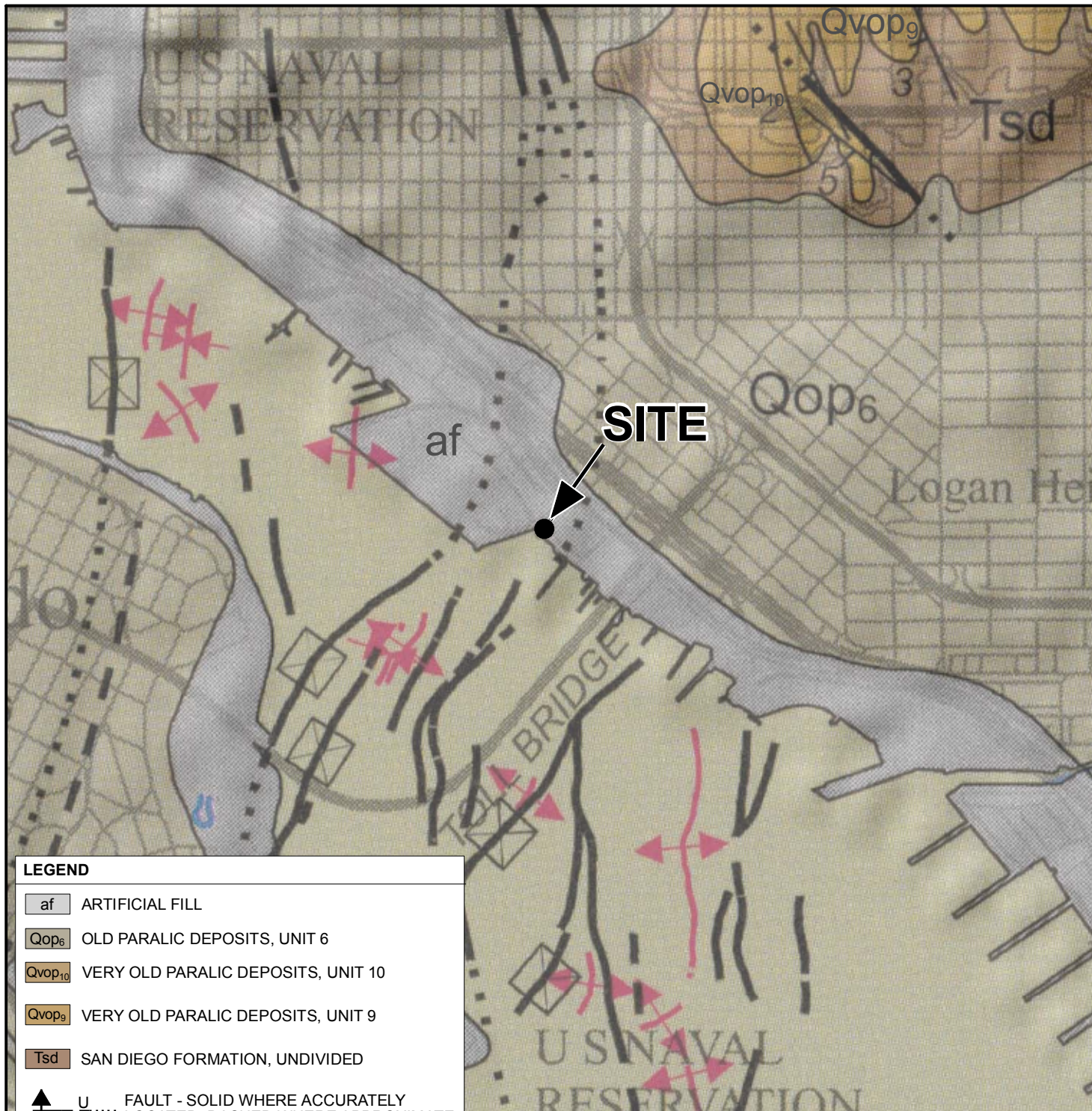
DATE

COMMERCIAL BERTHING PIER AND TAMT
SAN DIEGO, CALIFORNIA

107319001

12/12





SOURCE: KENNEDY, M.P., AND TAN, S.S., 2008, GEOLOGIC MAP OF THE SAN DIEGO 30' X 60' QUADRANGLE, CALIFORNIA

LEGEND

- af ARTIFICIAL FILL
- Qop₆ OLD PARALIC DEPOSITS, UNIT 6
- Qvop₁₀ VERY OLD PARALIC DEPOSITS, UNIT 10
- Qvop₉ VERY OLD PARALIC DEPOSITS, UNIT 9
- Tsd SAN DIEGO FORMATION, UNDIVIDED

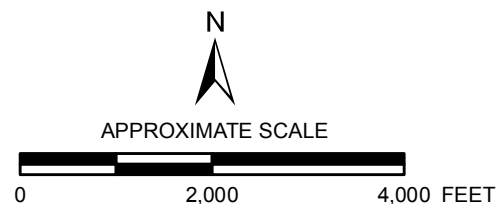
U FAULT - SOLID WHERE ACCURATELY LOCATED, DASHED WHERE APPROXIMATE, DOTTED WHERE CONCEALED. ARROW AND NUMBER INDICATE DIRECTION AND ANGLE OF DIP OF FAULT PLANE

5 INCLINED

ANTICLINE

SYNCLINE

NOTES: ALL DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE



Ninyo & Moore

REGIONAL GEOLOGY

FIGURE

PROJECT NO.

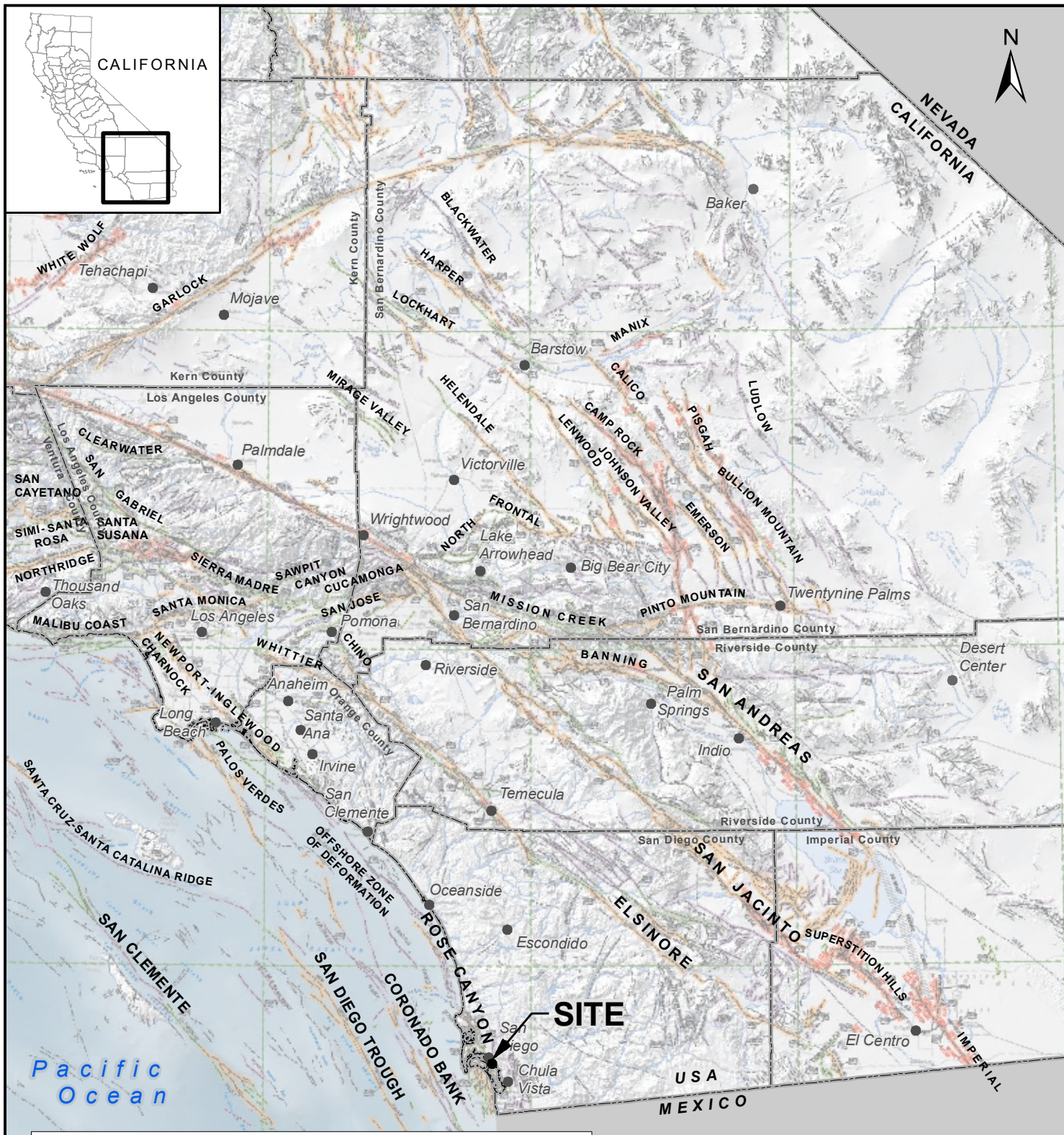
DATE

COMMERCIAL BERTHING PIER AND TAMT
SAN DIEGO, CALIFORNIA

107319001

12/12

3



LEGEND

CALIFORNIA FAULT ACTIVITY

- | | |
|--------------------------------------|---------------------------------|
| HISTORICALLY ACTIVE | QUATERNARY (POTENTIALLY ACTIVE) |
| HOLOCENE ACTIVE | STATE/COUNTY BOUNDARY |
| LATE QUATERNARY (POTENTIALLY ACTIVE) | |

SOURCE: JENNINGS, C.W., AND BRYANT, W.A., 2010. FAULT ACTIVITY MAP OF CALIFORNIA.

SCALE IN MILES



NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE.

Ninyo & Moore

FAULT LOCATIONS

FIGURE

PROJECT NO.

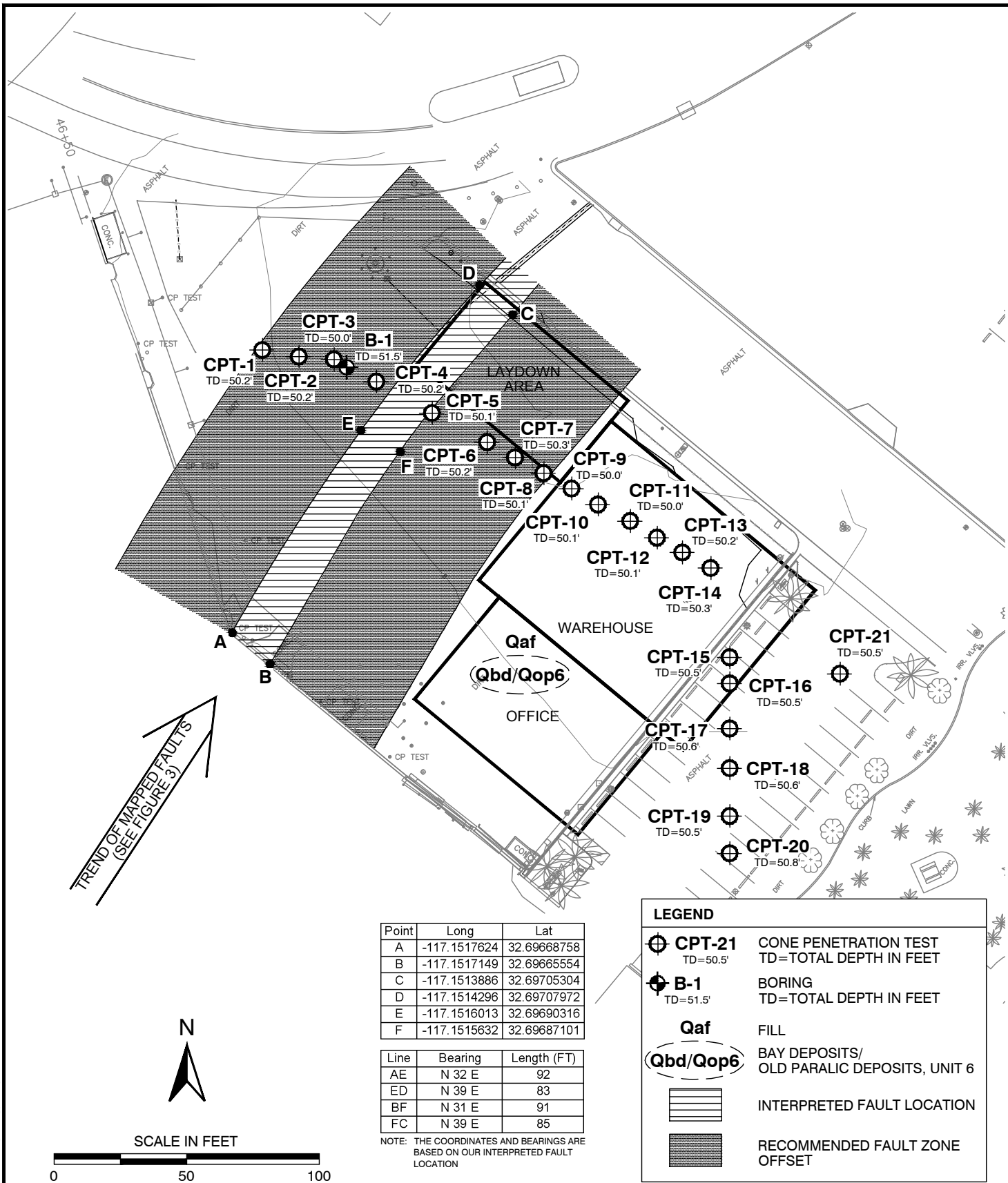
DATE

COMMERCIAL BERTHING PIER AND TAMT
SAN DIEGO, CALIFORNIA

107319001

12/12

4



SOURCE: SAN DIEGO UNIFIED PORT DISTRICT (SDUPD), 2011; ALYSON CONSULTING, 2012.

Ninyo & Moore

SITE GEOLOGY

FIGURE

PROJECT NO.

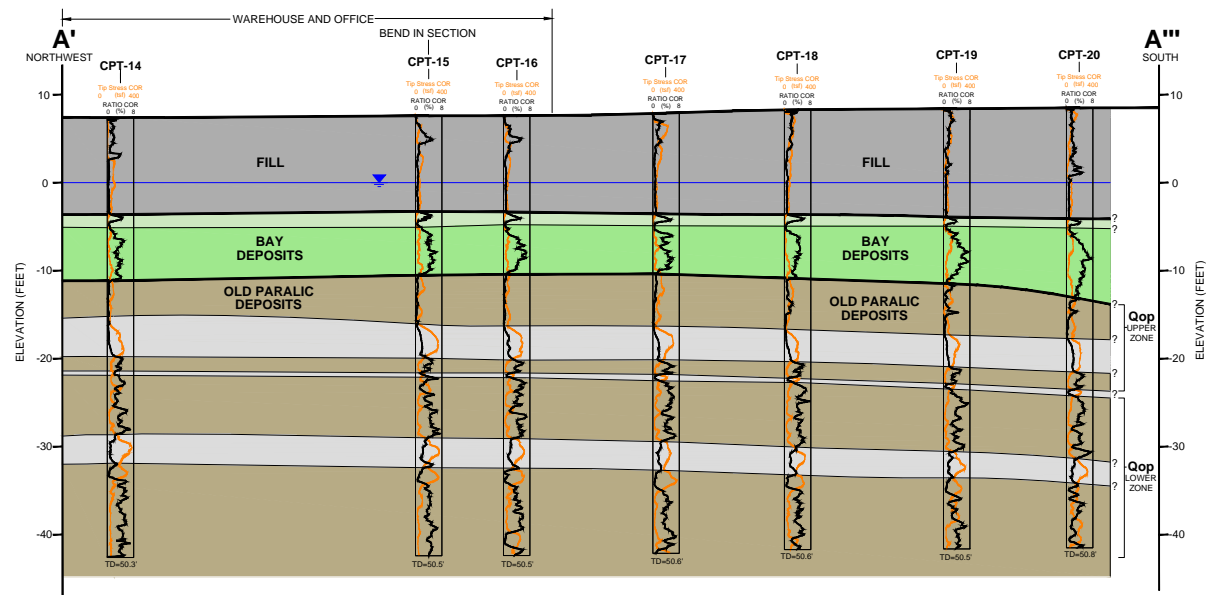
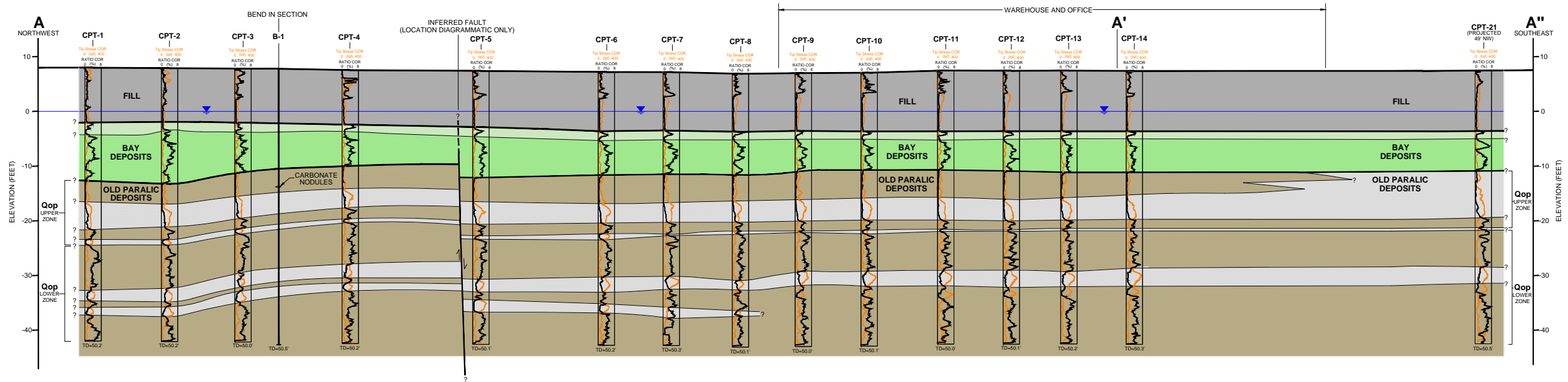
DATE

COMMERCIAL BERTHING PIER AND TAMT
SAN DIEGO, CALIFORNIA

5

107319001

12/12



LEGEND

B-1
BORING
TD=TOTAL DEPTH IN FEET
TD=50.9

CPT-21
CONE PENETRATION TEST
TD=TOTAL DEPTH IN FEET
TD=50.9

GROUNDWATER ELEVATION

GEOLOGIC CONTACT, QUERIED WHERE QUESTIONABLE

FILL: HETEROGENEOUS MATERIALS, DOMINANTLY BROWN OR LIGHT BROWN, DAMP TO MOIST, MEDIUM DENSE, SILTY FINE SAND OR POORLY GRADED FINE SAND WITH SILT; SOME SHELL DEBRIS.

BAY DEPOSITS: DARK GRAY, SATURATED, VERY LOOSE TO MEDIUM DENSE, POORLY GRADED FINE SAND OR SILTY FINE SAND; SOME SHELL DEBRIS.

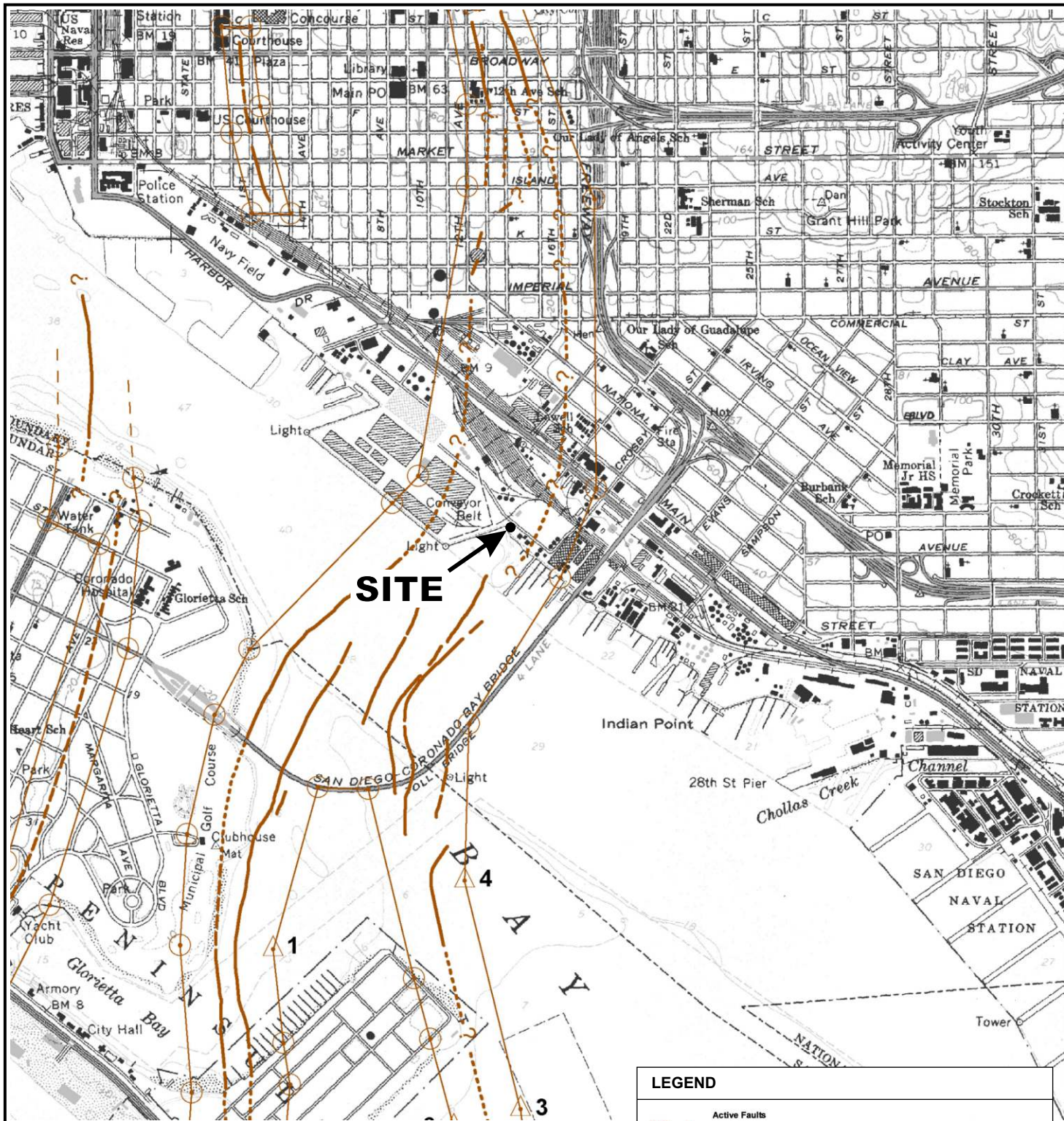
OLD PARALIC DEPOSITS (Qop) - UPPER ZONE: DOMINANTLY BROWN OR GRAYISH BROWN, SATURATED, LOOSE TO VERY DENSE, POORLY GRADED FINE SAND OR CLAYEY OR SILTY SAND, PALEOSOL PRESENT AT LOCATION OF CARBONATE NODULES (SEE TEXT FOR DISCUSSION).

OLD PARALIC DEPOSITS (Qop) - LOWER ZONE: AS ABOVE MIXED WITH LAYERS OF HARD CLAY AND CLAYEY SILT.

NOTE: SHADING IS ADDED TO FIGURES TO EMPHASIZE STRATIGRAPHIC LAYERS AND AID IN CORRELATING DEPOSITS.

SCALE IN FEET
0 10 20
NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE

Ninjo & Moore		INTERPRETED CROSS SECTIONS	FIGURE 6
PROJECT NO.	DATE	COMMERCIAL BERTHING PIER AND TAMT SAN DIEGO, CALIFORNIA	
107319001	12/12		



LEGEND

Active Faults

1906 C

Faults considered to have been active during Holocene time and have potential for surface rupture; solid line where accurately located, long dash where approximately located, short dash where inferred, dotted where concealed; query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by fault creep.

Earthquake Fault Zone Boundaries

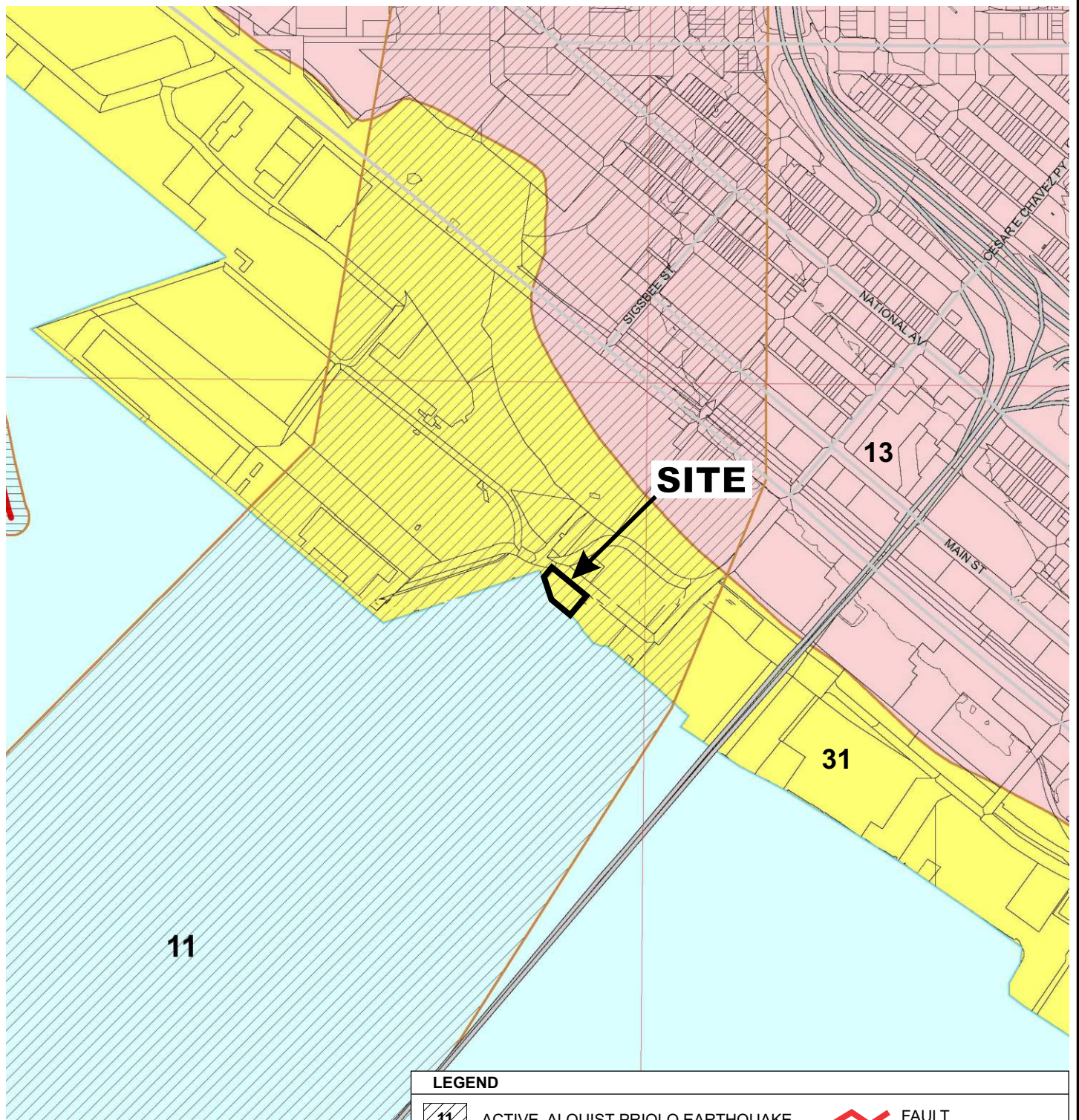
These are delineated as straight-line segments that connect encircled turning points so as to define Earthquake Fault Zone segments.

NOTE: ALL DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

REFERENCE: STATE OF CALIFORNIA EARTHQUAKE FAULT ZONES, 2003 POINT LOMA QUADRANGLE.

		EARTHQUAKE FAULT ZONES	FIGURE 7
PROJECT NO.	DATE		
107319001	12/12		
		COMMERCIAL BERTHING PIER AND TAMT SAN DIEGO, CALIFORNIA	

fig7 107319001 earthquake.cdr AOB



LEGEND



11 ACTIVE, ALQUIST-PRIOLO EARTHQUAKE FAULT ZONE



13 DOWNTOWN SPECIAL FAULT ZONE



31 HIGH POTENTIAL FOR LIQUEFACTION - SHALLOW GROUNDWATER MAJOR DRAINAGES, HYDRAULIC FILLS



FAULT



INFERRED FAULT



CONCEALED FAULT



SHEAR ZONE

NOTE: ALL DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE.

REFERENCE: CITY OF SAN DIEGO SEISMIC SAFETY STUDY, 2008.

Ninyo & Moore

GEOLOGIC HAZARDS

FIGURE

PROJECT NO.

DATE

107319001

12/12

COMMERCIAL BERTHING PIER AND TAMT
SAN DIEGO, CALIFORNIA

8

APPENDIX A

BORING LOG AND CONE PENETRATION TEST SOUNDING

Field Procedure for the Collection of Disturbed Samples

Disturbed soil samples were obtained in the field using the following methods.

Bulk Samples

A bulk sample of representative earth materials was obtained from the exploratory boring. The sample was bagged and transported to the laboratory for testing.


The Standard Penetration Test (SPT) Sampler

Disturbed drive samples of earth materials were obtained by means of a SPT sampler. The sampler is composed of a split barrel with an external diameter of 2 inches and an unlined internal diameter of 1½ inches. The sampler was driven into the ground 12 to 18 inches with a 140-pound hammer falling freely from a height of 30 inches in general accordance with ASTM D 1586. The blow counts were recorded for every 6 inches of penetration; the blow counts reported on the logs are those for the last 12 inches of penetration. Soil samples were observed and removed from the sampler, bagged, sealed and transported to the laboratory for testing.

Field Procedure for CPT

The CPT described in this report was conducted by Kehoe Testing Inc. of Huntington Beach, California, in general accordance with ASTM D 5778. The cone penetrometer assembly used for this project consisted of a conical tip and a cylindrical friction sleeve. The conical tip had an apex angle of 60 degrees and a diameter of approximately 1.7 inches resulting in a projected cross-sectional area of approximately 2.3 square inches. The cylindrical friction sleeve was approximately 6.33 inches long and had an outside diameter of approximately 1.7 inches, resulting in a surface area of approximately 34 square inches. The interior of the CPT probe was instrumented with strain gauges that allowed simultaneous measurement of cone tip and friction sleeve resistance during penetration. The cone was hydraulically pushed into the soil using the reaction mass of a specially designed 30-ton truck at a constant rate of approximately 4 feet per minute while the cone tip resistance and sleeve friction resistance were recorded at an approximately 1-inch interval and stored in digital form. The computer-generated logs presented in the following pages include cone resistance, friction resistance, friction ratio, equivalent SPT blow counts, and interpreted soil types. The soil type interpretations were based on the method proposed by Robertson and Campanella (1990).

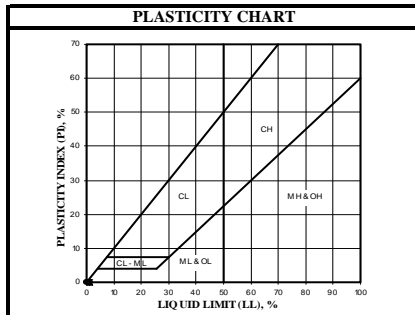
DEPTH (feet)	Bulk Driven SAMPLES	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.C.S.	BORING LOG EXPLANATION SHEET
0							Bulk sample.
							Modified split-barrel drive sampler.
							No recovery with modified split-barrel drive sampler.
							Sample retained by others.
							Standard Penetration Test (SPT).
5							No recovery with a SPT.
		XX/XX					Shelby tube sample. Distance pushed in inches/length of sample recovered in inches.
							No recovery with Shelby tube sampler.
							Continuous Push Sample.
10							Seepage.
							Groundwater encountered during drilling.
							Groundwater measured after drilling.
						SM	MAJOR MATERIAL TYPE (SOIL):
							Solid line denotes unit change.
						CL	Dashed line denotes material change.
15							Attitudes: Strike/Dip b: Bedding c: Contact j: Joint f: Fracture F: Fault cs: Clay Seam s: Shear bss: Basal Slide Surface sf: Shear Fracture sz: Shear Zone sbs: Shear Bedding Surface
							The total depth line is a solid line that is drawn at the bottom of the boring.
20							



BORING LOG		
Explanation of Boring Log Symbols		
PROJECT NO.	DATE	FIGURE
	Rev. 11/11	

U.S.C.S. METHOD OF SOIL CLASSIFICATION				
MAJOR DIVISIONS		SYMBOL		TYPICAL NAMES
COARSE-GRAINED SOILS (More than 1/2 of soil > No. 200 Sieve Size)	GRAVELS (More than 1/2 of coarse fraction > No. 4 sieve size)		GW	Well graded gravels or gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
			GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS (More than 1/2 of coarse fraction < No. 4 sieve size)		SW	Well graded sands or gravelly sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
			SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (More than 1/2 of soil < No. 200 sieve size)	SILTS & CLAYS Liquid Limit <50		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS Liquid Limit >50		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils

GRAIN SIZE CHART		
CLASSIFICATION	RANGE OF GRAIN	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDERS	Above 12"	Above 305
COBBLES	12" to 3"	306 to 76.2
GRAVEL	3" to No. 4	76.2 to 4.76
	Coarse 3" to 3/4"	76.2 to 19.1
	Fine 3/4" to No. 4	19.1 to 4.76
SAND	No. 4 to No. 200	4.76 to 0.075
	Coarse No. 4 to No. 10	4.76 to 2.00
	Medium No. 10 to No. 40	2.00 to 0.420
	Fine No. 40 to No. 200	0.420 to 0.075
SILT & CLAY	Below No. 200	Below 0.075



Ninyo & Moore	U.S.C.S. METHOD OF SOIL CLASSIFICATION
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Updated Nov. 2011

DEPTH (feet)	BULK SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>5/24/12</u> BORING NO. <u>B-1</u>
							GROUND ELEVATION <u>7.80' ± (MSL)</u> SHEET <u>1</u> OF <u>3</u>
METHOD OF DRILLING <u>8" Diameter Hollow Stem Auger (Scott's Drilling)</u>							
DRIVE WEIGHT <u>140 lbs. (Auto-Trip)</u> DROP <u>30"</u>							
SAMPLED BY <u>CER</u> LOGGED BY <u>CER</u> REVIEWED BY <u>JG</u>							
DESCRIPTION/INTERPRETATION							
0					SM		FILL: Brown, damp to moist, loose to medium dense, silty SAND with gravel.
5					SP-SM		Light brown, moist, loose to medium dense, poorly graded SAND with silt; scattered shells.
10		4	24.7		SP		BAY DEPOSITS: Dark gray, saturated, loose, poorly graded, fine SAND.
15		2			SM		Dark gray, saturated, very loose, silty fine SAND; some shell debris.
20		15					Medium dense.
25		20			SC		OLD PARALIC DEPOSITS: Brown, saturated, medium dense, clayey fine SAND.
30		18					Dense.
35		21					Light brown clay; medium dense; little carbonate nodules.
40		12					

Ninyo & Moore			BORING LOG		
			COMMERCIAL BERTHING PIER AND TAMT SAN DIEGO, CALIFORNIA		
PROJECT NO. 107319001		DATE 12/12		FIGURE A-1	

DEPTH (feet)	SAMPLES Bulk Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>5/24/12</u> BORING NO. <u>B-1</u>	
							GROUND ELEVATION <u>7.80' ± (MSL)</u> SHEET <u>2</u> OF <u>3</u>	
METHOD OF DRILLING <u>8" Diameter Hollow Stem Auger (Scott's Drilling)</u>							DRIVE WEIGHT <u>140 lbs. (Auto-Trip)</u> DROP <u>30"</u>	
SAMPLED BY <u>CER</u> LOGGED BY <u>CER</u> REVIEWED BY <u>JG</u>							DESCRIPTION/INTERPRETATION	
20						SC	OLD PARALIC DEPOSITS: (Continued)	
		4				SM	Brown, saturated, medium dense, clayey fine SAND. Brown, saturated, loose, silty SAND; some shells.	
		7					Loose to medium dense.	
		14				SP	Brown, saturated, medium dense, poorly graded coarse SAND; trace silt.	
25		11						
		33				SP	Grayish brown, saturated, dense to very dense, poorly graded fine SAND.	
		25					Dense.	
30		25				SM	Brown, saturated, dense, silty fine SAND.	
		27				ML	Brown, saturated, dense, sandy SILT; fine sand.	
		28				SC	Brown, saturated, dense, clayey SAND; trace shells.	
		39				CL	Brown, saturated, hard, CLAY.	
35		25						
		18				ML	Brown to yellowish red, saturated, medium dense, sandy SILT; fine sand.	
		20					Brown to yellowish brown.	
40								

Ninyo & Moore

BORING LOG
 COMMERCIAL BERTHING PIER AND TAMT
 SAN DIEGO, CALIFORNIA

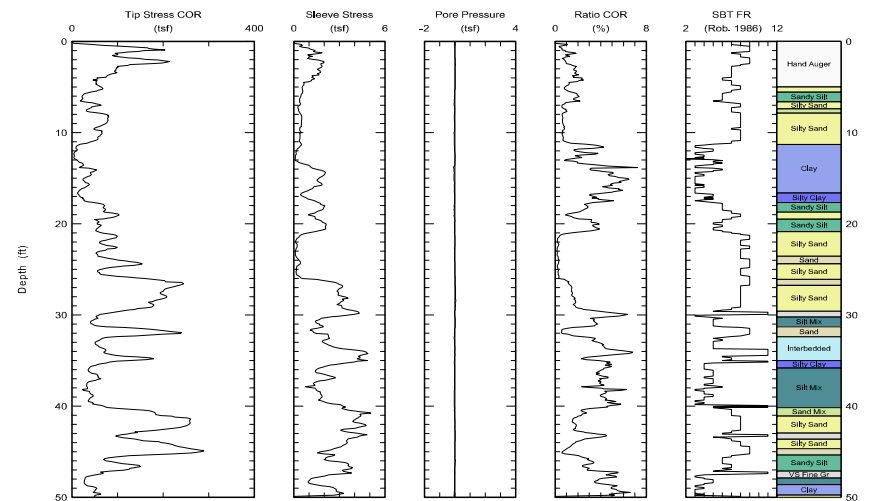
PROJECT NO. 107319001	DATE 12/12	FIGURE A-2
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DEPTH (feet)	SAMPLES Bulk Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>5/24/12</u> BORING NO. <u>B-1</u>	
							GROUND ELEVATION <u>7.80' ± (MSL)</u> SHEET <u>3</u> OF <u>3</u>	
METHOD OF DRILLING <u>8" Diameter Hollow Stem Auger (Scott's Drilling)</u>							DRIVE WEIGHT <u>140 lbs. (Auto-Trip)</u> DROP <u>30"</u>	
SAMPLED BY <u>CER</u> LOGGED BY <u>CER</u> REVIEWED BY <u>JG</u>							DESCRIPTION/INTERPRETATION	
40						ML	OLD PARALIC DEPOSITS: (Continued)	
		25					Brown to yellowish brown, saturated, dense, sandy SILT; fine sand.	
		52					Dense.	
		28					Medium dense.	
		43				SP-SM	Grayish brown, saturated, dense to very dense, poorly graded medium SAND with silt.	
45		23				SM	Brown, saturated, very dense, silty fine SAND.	
		24				ML	Dense.	
		24					Brown, saturated, hard, clayey SILT; some fine sand.	
50		24				CL	Brown, saturated, hard, sandy CLAY; fine sand.	
							Total Depth = 51.5 feet. Groundwater encountered at 8 feet during drilling. Backfilled with approximately 17 cubic feet of bentonite grout shortly after drilling on 5/24/12.	
							<u>Note:</u> Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.	
55								
60								

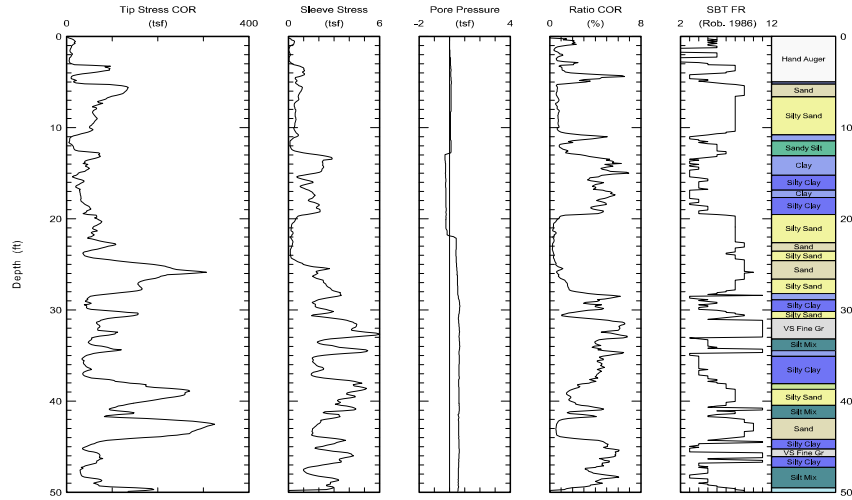
Ninyo & Moore

BORING LOG
 COMMERCIAL BERTHING PIER AND TAMT
 SAN DIEGO, CALIFORNIA

PROJECT NO. 107319001	DATE 12/12	FIGURE A-3
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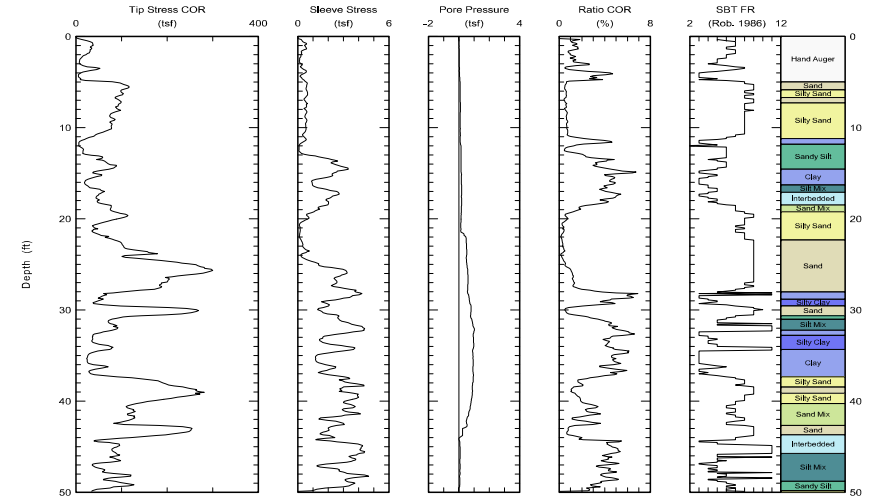
	Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 25/May/2012 Test ID: C-5 Project: San Diego
		Customer: Ninyo & Moore Job Site: 10th Avenue Marine Terminal	



Maximum depth: 50.12 (ft)
Page 1 of 2


Test ID: C-5
File: Z371235C.CPT

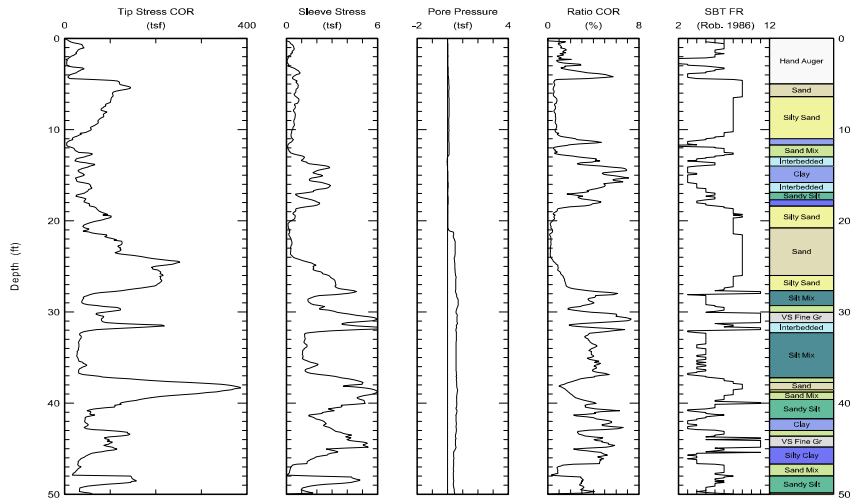
	Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 24/May/2012 Test ID: C-6 Project: San Diego
		Customer: Ninyo & Moore Job Site: 10th Avenue Marine Terminal	




Maximum depth: 50.22 (ft)
Page 1 of 2

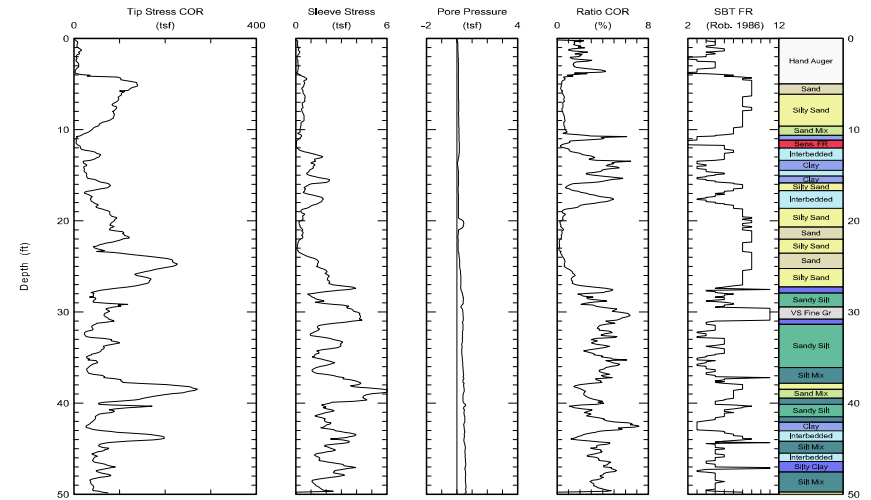
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	Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 24/May/2012 Test ID: C-7 Project: San Diego
		Customer: Ninyo & Moore Job Site: 10th Avenue Marine Terminal	




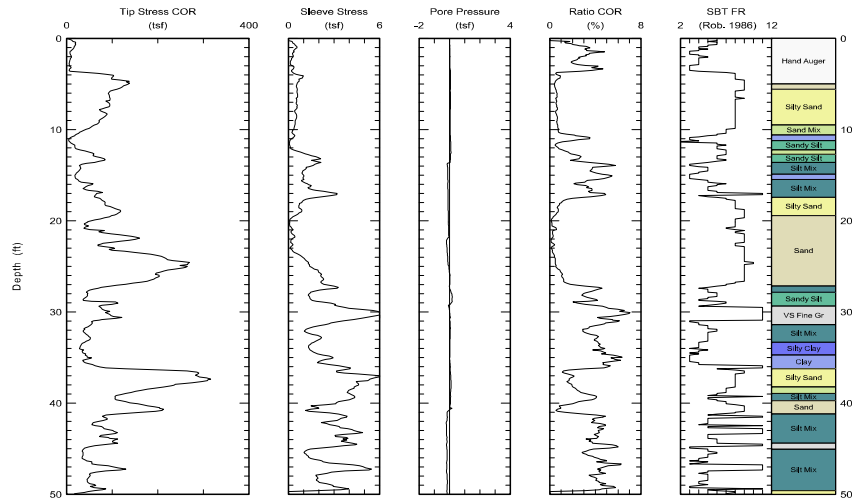
Maximum depth: 50.26 (ft)
Page 1 of 2

	Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 24/May/2012 Test ID: C-8 Project: San Diego
		Customer: Ninyo & Moore Job Site: 10th Avenue Marine Terminal	




Maximum depth: 50.08 (ft)
Page 1 of 2

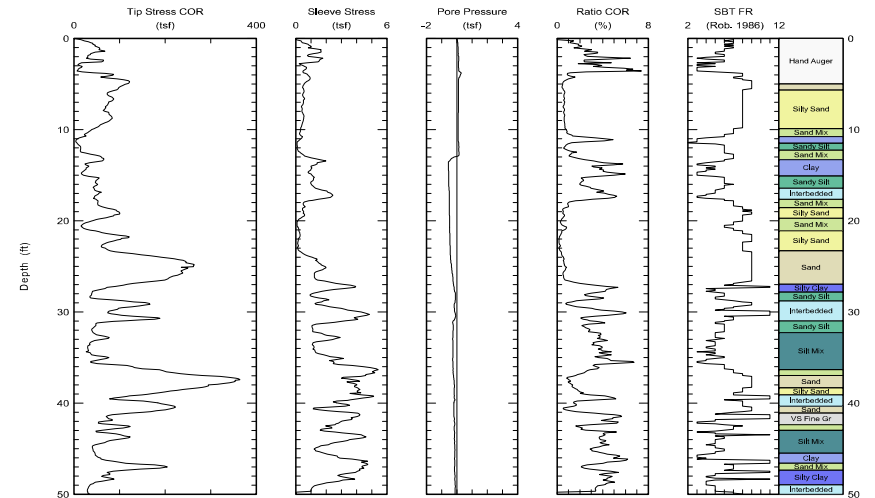
	Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 24/May/2012 Test ID: C-9 Project: San Diego
	Customer: Ninyo & Moore		
	Job Site: 10th Avenue Marine Terminal		



Maximum depth: 50.03 (ft)
Page 1 of 2

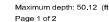
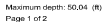
Test ID: C-9
File: ZSM728C6CP


	Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 24/May/2012 Test ID: C-10 Project: San Diego
	Customer: Ninyo & Moore		
	Job Site: 10th Avenue Marine Terminal		

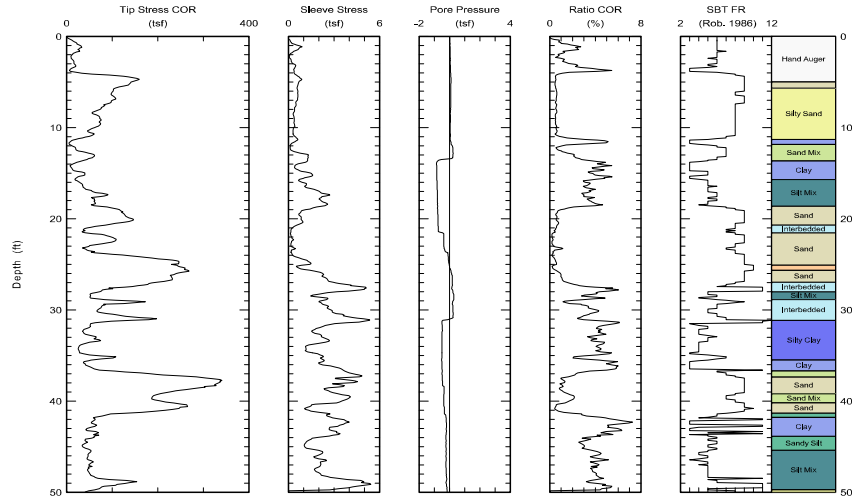


Maximum depth: 50.10 (ft)
Page 1 of 2

Test ID: C-10
File: ZSM728C6CP




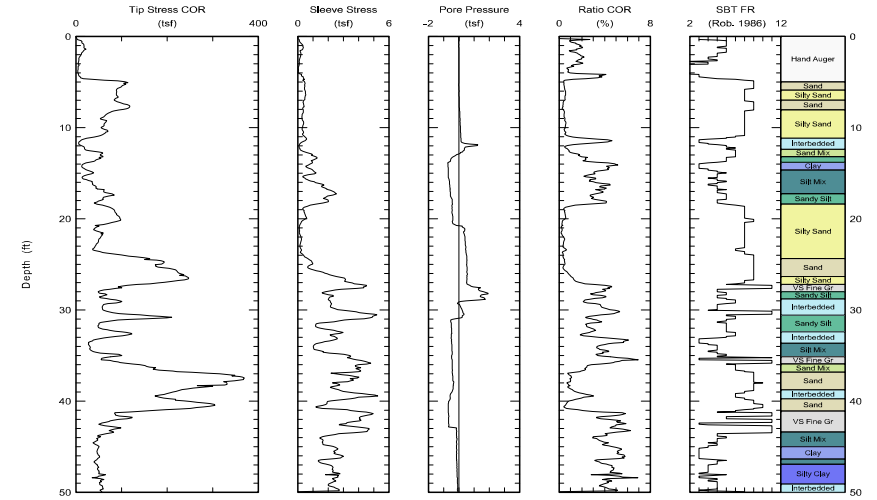
	Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 24/May/2012 Test ID: C-13 Project: San Diego
		Customer: Ninyo & Moore Job Site: 10th Avenue Marine Terminal	



Maximum depth: 50.19 (ft)
Page 1 of 2


Test ID: C-13
File: ZM1205C6P

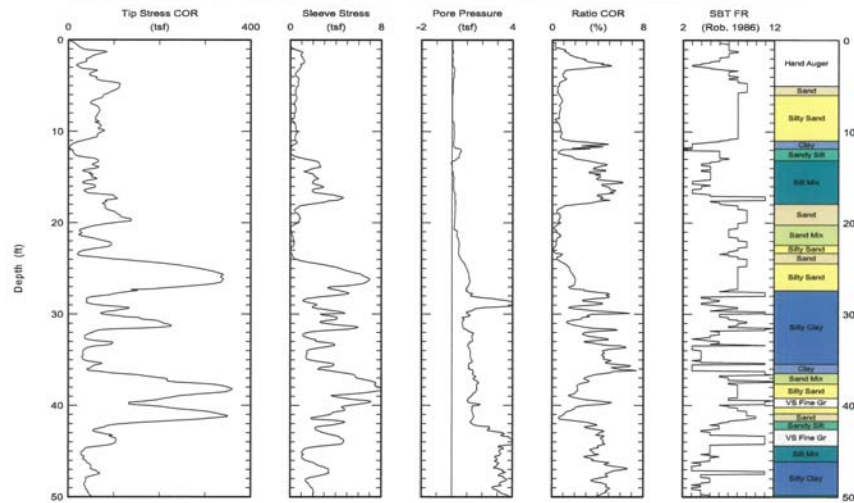
	Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 24/May/2012 Test ID: C-14 Project: San Diego
		Customer: Ninyo & Moore Job Site: 10th Avenue Marine Terminal	



Maximum depth: 50.26 (ft)
Page 1 of 2


Test ID: C-14
File: ZM1205C6P

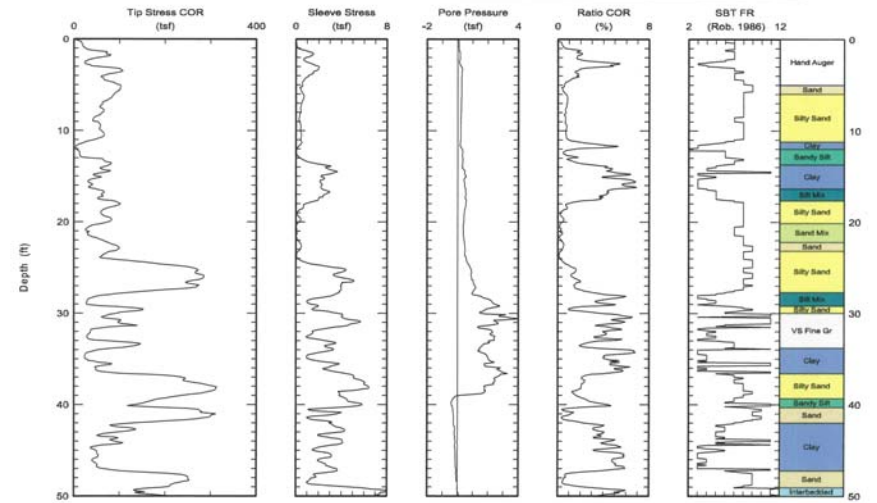
 Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/Oct/2012 Test ID: CPT-15 Project: San Diego
	Customer: Ninyo & Moore Job Site: 10th Avenue Marine Terminal	



Maximum depth: 50.53 (ft)
Page 1 of 2


Test ID: CPT-15

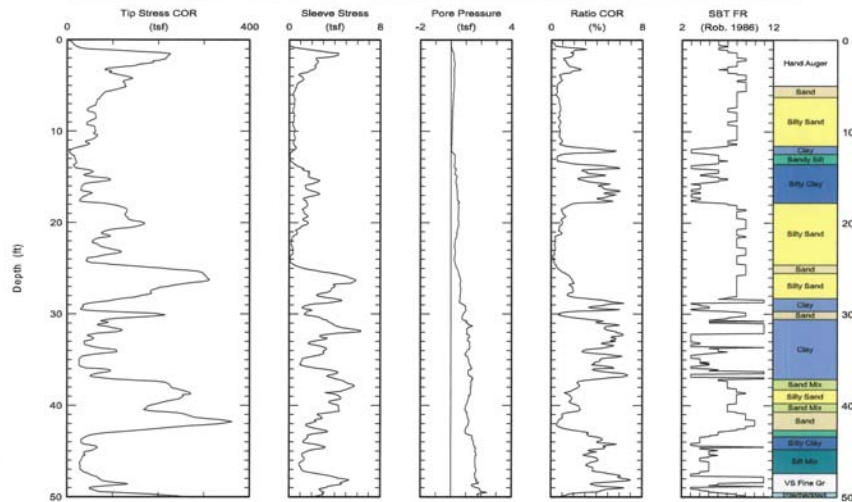
 Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/Oct/2012 Test ID: CPT-16 Project: San Diego
	Customer: Ninyo & Moore Job Site: 10th Avenue Marine Terminal	




Maximum depth: 50.53 (ft)
Page 1 of 2

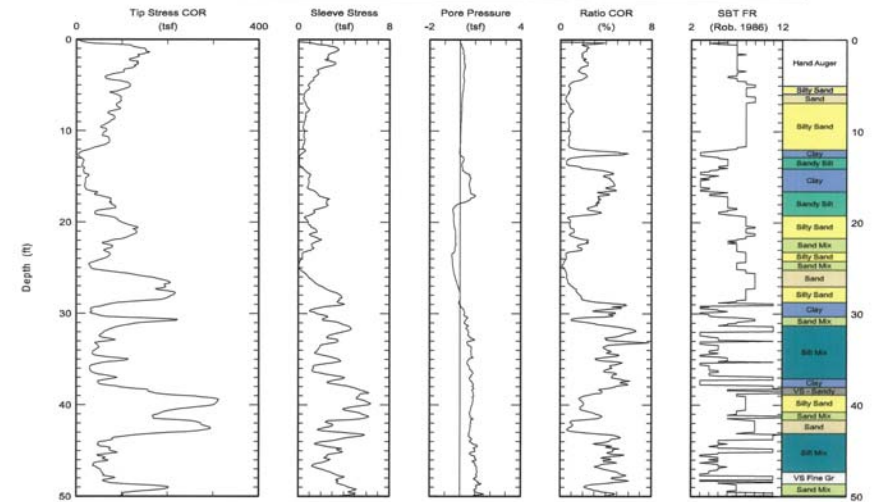
Test ID: CPT-16

	Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/Oct/2012 Test ID: CPT-17 Project: San Diego
		Customer: Ninyo & Moore Job Site: 10th Avenue Marine Terminal	




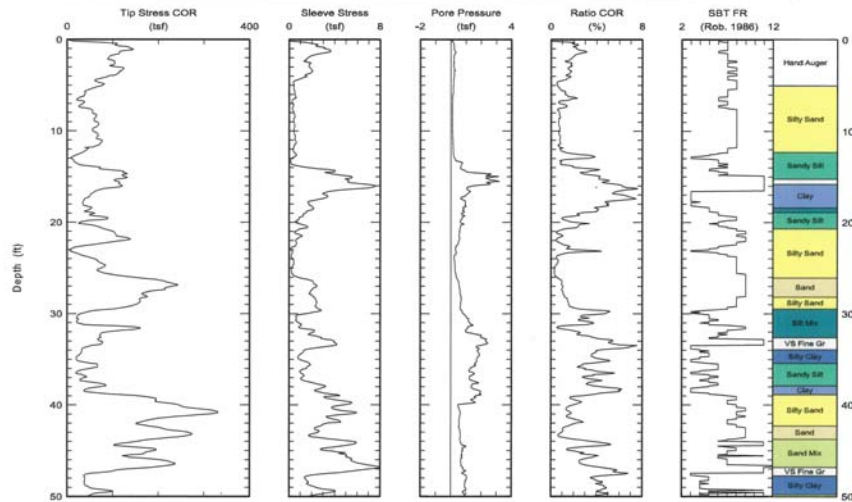
Maximum depth: 50.58 (ft)
Page 1 of 2

	Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/Oct/2012 Test ID: CPT-18 Project: San Diego
		Customer: Ninyo & Moore Job Site: 10th Avenue Marine Terminal	




Maximum depth: 50.57 (ft)
Page 1 of 2

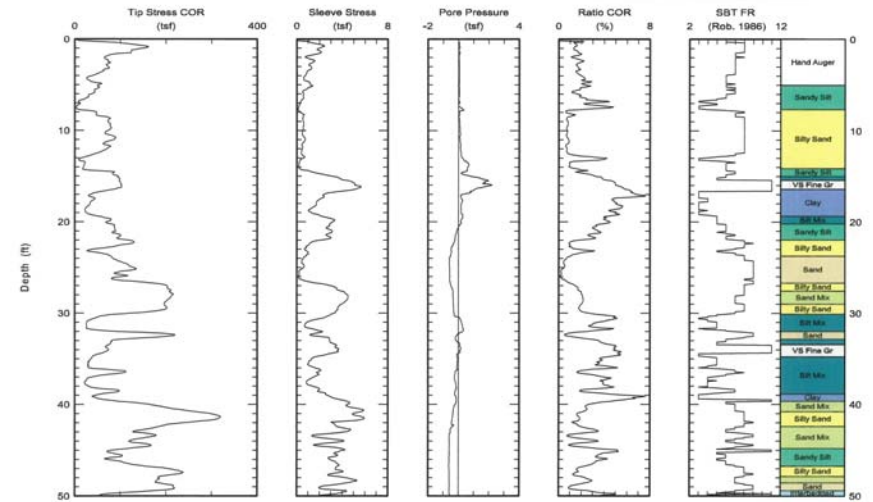
	Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/Oct/2012 Test ID: CPT-19 Project: San Diego
	Customer: Ninyo & Moore		
	Job Site: 10th Avenue Marine Terminal		



Maximum depth: 50.52 (ft)
Page 1 of 2

Test ID: CPT-19

	Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 26/Oct/2012 Test ID: CPT-20 Project: San Diego
	Customer: Ninyo & Moore		
	Job Site: 10th Avenue Marine Terminal		



Maximum depth: 50.77 (ft)
Page 1 of 2

Test ID: CPT-20

APPENDIX B

LABORATORY TESTING

Soils were visually and texturally classified in accordance with the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488. Soil classifications are indicated on the boring log in Appendix A.

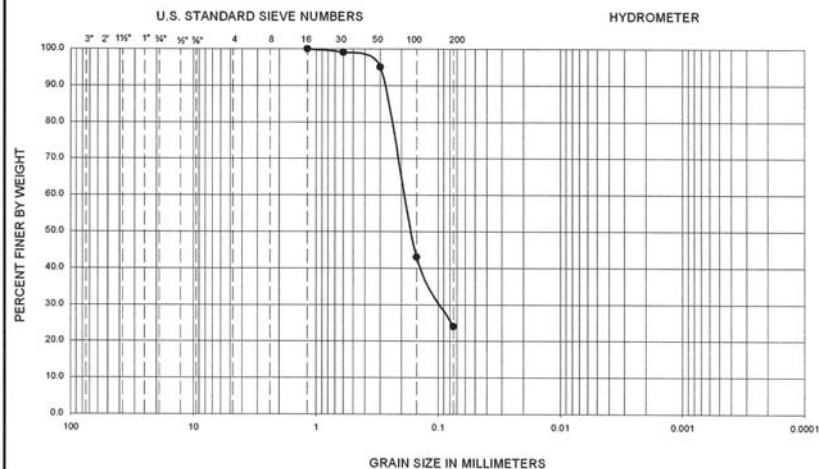
The moisture content of a soil sample obtained from the exploratory boring was evaluated in general accordance with ASTM D 2937. The test result is presented in Appendix A.

Gradation analysis tests were performed on selected representative soil samples in general accordance with ASTM D 422. The grain-size distribution curves are shown on Figures B-1 through B-3. These test results were utilized in evaluating the soil classifications in accordance with USCS.

The resistance value, or R-value, for site soils was evaluated in general accordance with California Test (CT) 301. Samples were prepared and evaluated for exudation pressure and expansion pressure. The equilibrium R-value is reported as the lesser or more conservative of the two calculated results. The test results are shown on Figure B-4.



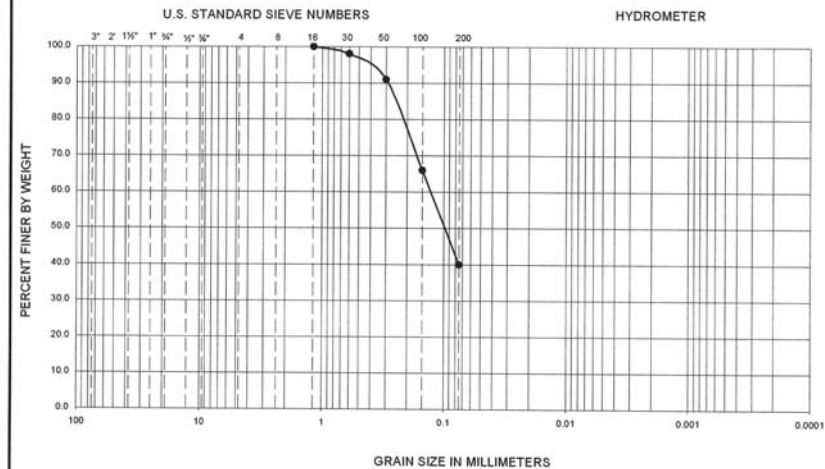
GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₅₀	C _u	C _c	Passing No. 200 (%)	USCS
●	B-1	11.5-13.0	--	--	--	--	--	--	--	--	24	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₅₀	C _u	C _c	Passing No. 200 (%)	USCS
●	B-1	16.0-17.5	--	--	--	--	--	--	--	--	40	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

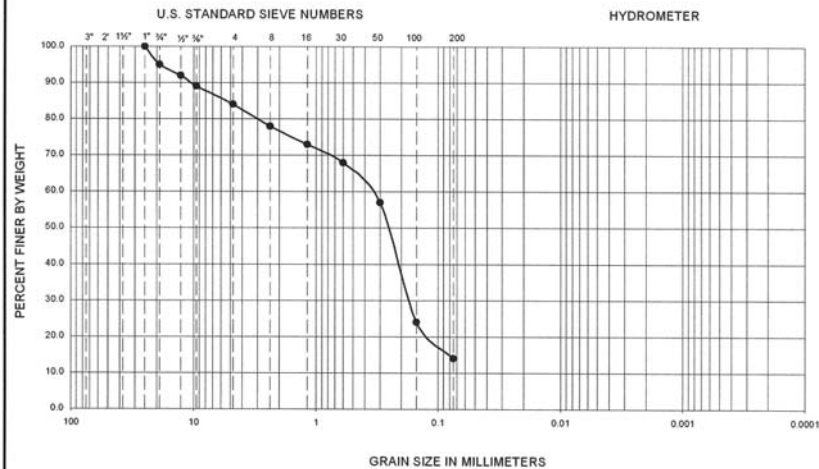
Ninyo & Moore		GRADATION TEST RESULTS		FIGURE B-1
PROJECT NO.	DATE	COMMERCIAL BERTHING PIER AND TAMT SAN DIEGO, CALIFORNIA		
107319001	12/12			

107319001_SIEVE B-1 @ 11.5-13.0.dwg

Ningo & Moore		GRADATION TEST RESULTS		FIGURE B-2
PROJECT NO.	DATE	COMMERCIAL BERTHING PIER AND TAMT SAN DIEGO, CALIFORNIA		
107319001	12/12			

107319001_SIEVE B-1 @ 16.0-17.5.dwg

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₅₀	C _u	C _c	Passing No. 200 (%)	USCS
●	B-1	20.5-22.0	--	--	--	--	--	--	--	--	14	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ninyo & Moore		GRADATION TEST RESULTS		FIGURE
PROJECT NO.	DATE	COMMERCIAL BERTHING PIER AND TAMT SAN DIEGO, CALIFORNIA		B-3
107319001	12/12			

107319001_SIEVE B-1 @ 20.5-22.0.xls

SAMPLE LOCATION	SAMPLE DEPTH (FT)	SOIL TYPE	R-VALUE
B-1	2.5- 5.0	SAND with Silt (SP-SM)	57

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2844/CT 301

Ninyo & Moore		R-VALUE TEST RESULTS		FIGURE
PROJECT NO.	DATE	COMMERCIAL BERTHING PIER AND TAMT SAN DIEGO, CALIFORNIA		B-4
107319001	12/12			

107319001_R-Value TABLE page 1.xls

APPENDIX C
SEISMIC DESIGN PARAMETERS

Project 107319001; Commercial Berthing Pier and TAMT

Conterminous 48 States
2005 ASCE 7 Standard
Latitude = 32.6967
Longitude = -117.1517
Spectral Response Accelerations S_s and S_1
 S_s and S_1 = Mapped Spectral Acceleration Values
Site Class B - $F_a = 1.0$, $F_v = 1.0$
Data are based on a 0.01 deg grid spacing
Period S_a
(sec) (g)
0.2 1.601 (S_s , Site Class B)
1.0 0.638 (S_1 , Site Class B)

Conterminous 48 States
2005 ASCE 7 Standard
Latitude = 32.6967
Longitude = -117.15169999999999
Spectral Response Accelerations S_M s and S_{M1}
 S_M s = $F_a \times S_s$ and $S_{M1} = F_v \times S_1$
Site Class D - $F_a = 1.0$, $F_v = 1.5$

Period S_a
(sec) (g)
0.2 1.601 (S_M s, Site Class D)
1.0 0.957 (S_{M1} , Site Class D)

Conterminous 48 States
2005 ASCE 7 Standard
Latitude = 32.6967
Longitude = -117.15169999999999
Design Spectral Response Accelerations S_D s and S_{D1}
 S_D s = $2/3 \times S_M$ s and $S_{D1} = 2/3 \times S_{M1}$
Site Class D - $F_a = 1.0$, $F_v = 1.5$

Period S_a
(sec) (g)
0.2 1.067 (S_D s, Site Class D)
1.0 0.638 (S_{D1} , Site Class D)

Conterminous 48 States
2005 ASCE 7 Standard
Latitude = 32.6967
Longitude = -117.15169999999999
MCE Response Spectrum for Site Class B
 S_s and S_1 = Mapped Spectral Acceleration Values

Site Class B - $F_a = 1.0$, $F_v = 1.0$

Period (sec)	S_a (g)	S_d (inches)
0.000	0.640	0.000
0.080	1.601	0.099
0.200	1.601	0.626
0.399	1.601	2.485
0.400	1.595	2.493
0.500	1.276	3.117
0.600	1.063	3.740
0.700	0.911	4.363
0.800	0.797	4.987
0.900	0.709	5.610
1.000	0.638	6.233
1.100	0.580	6.857
1.200	0.532	7.480
1.300	0.491	8.103
1.400	0.456	8.726
1.500	0.425	9.350
1.600	0.399	9.973
1.700	0.375	10.596
1.800	0.354	11.220
1.900	0.336	11.843
2.000	0.319	12.466

Conterminous 48 States
 2005 ASCE 7 Standard
 Latitude = 32.6967
 Longitude = -117.15169999999999
 Site Modified Response Spectrum for Site Class D
 $S_Ms = F_a S_s$ and $S_{M1} = F_v S_1$
 Site Class D - $F_a = 1.0$, $F_v = 1.5$

Period (sec)	S_a (g)	S_d (inches)
0.000	0.640	0.000
0.120	1.601	0.224
0.200	1.601	0.626
0.598	1.601	5.590
0.600	1.595	5.610
0.700	1.367	6.545
0.800	1.196	7.480
0.900	1.063	8.415
1.000	0.957	9.350
1.100	0.870	10.285
1.200	0.797	11.220
1.300	0.736	12.155

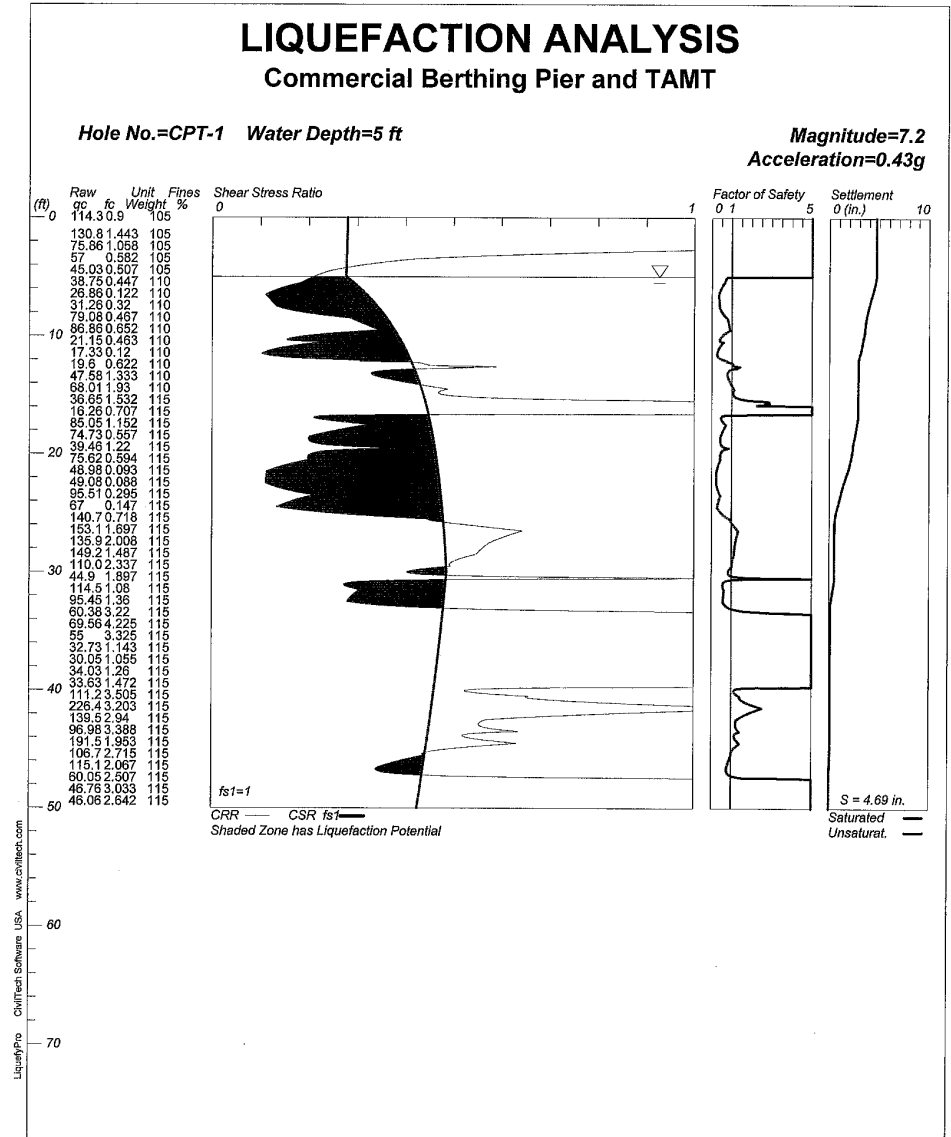
1.400	0.684	13.090
1.500	0.638	14.025
1.600	0.598	14.960
1.700	0.563	15.895
1.800	0.532	16.830
1.900	0.504	17.765
2.000	0.478	18.700

Conterminous 48 States
 2005 ASCE 7 Standard
 Latitude = 32.6967
 Longitude = -117.15169999999999
 Design Response Spectrum for Site Class D
 $S_Ds = 2/3 \times S_Ms$ and $S_{D1} = 2/3 \times S_{M1}$
 Site Class D - $F_a = 1.0$, $F_v = 1.5$

Period (sec)	S_a (g)	S_d (inches)
0.000	0.427	0.000
0.120	1.067	0.149
0.200	1.067	0.417
0.598	1.067	3.727
0.600	1.063	3.740
0.700	0.911	4.363
0.800	0.797	4.987
0.900	0.709	5.610
1.000	0.638	6.233
1.100	0.580	6.857
1.200	0.532	7.480
1.300	0.491	8.103
1.400	0.456	8.726
1.500	0.425	9.350
1.600	0.399	9.973
1.700	0.375	10.596
1.800	0.354	11.220
1.900	0.336	11.843
2.000	0.319	12.466

APPENDIX D

LIQUEFACTION ANALYSES

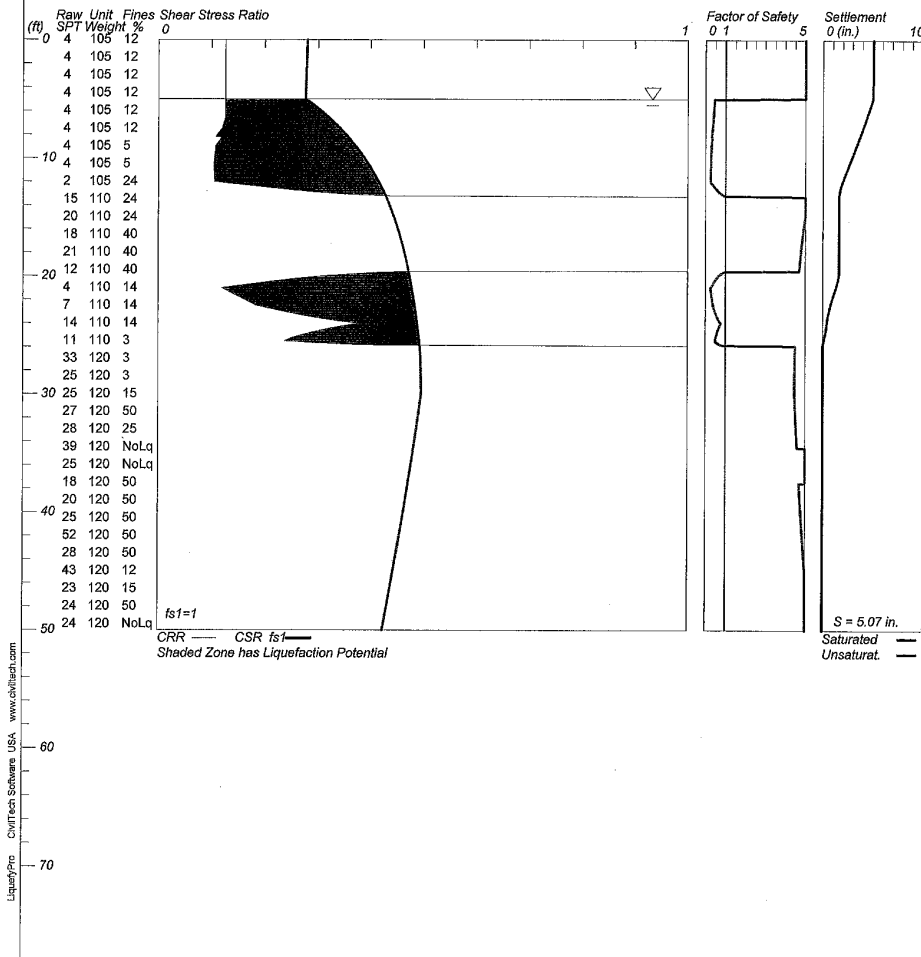


LIQUEFACTION ANALYSIS

Commercial Berthing Pier and TAMT

Hole No.=B-1 Water Depth=5 ft

Magnitude=7.2
Acceleration=0.43g



CivilTech Corporation

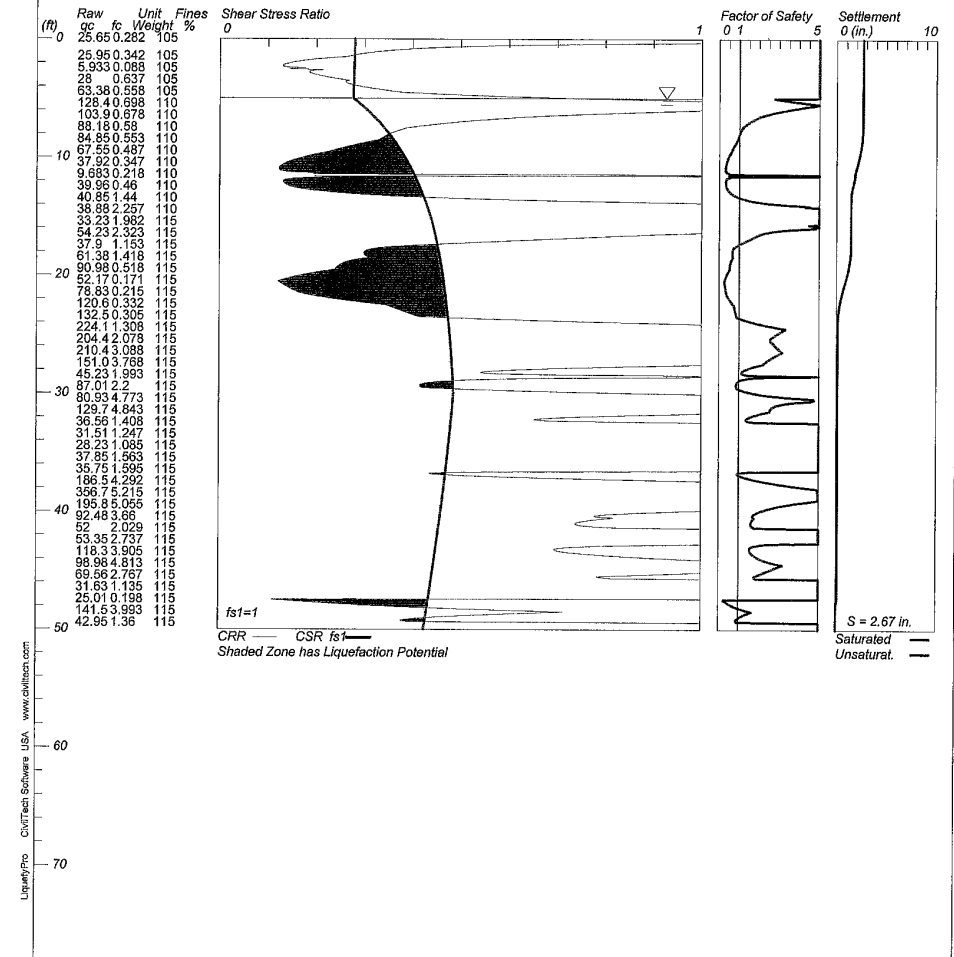
107319001

LIQUEFACTION ANALYSIS

Commercial Berthing Pier and TAMT

Hole No.=CPT-7 Water Depth=5 ft

Magnitude=7.2
Acceleration=0.43g



CivilTech Corporation

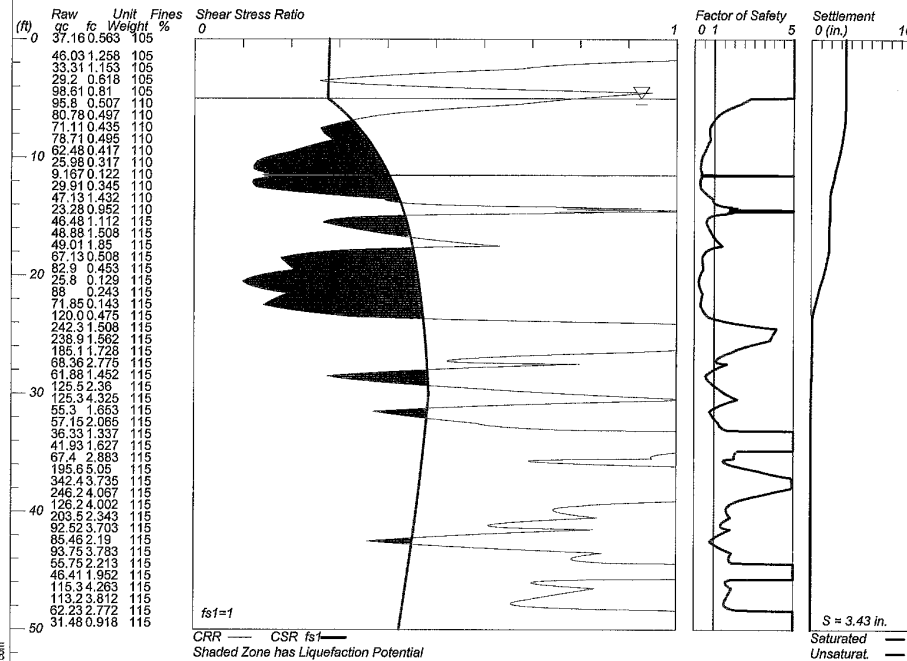
107319001

LIQUEFACTION ANALYSIS

Commercial Berthing Pier and TAMT

Hole No.=CPT-10 Water Depth=5 ft

Magnitude=7.2
Acceleration=0.43g

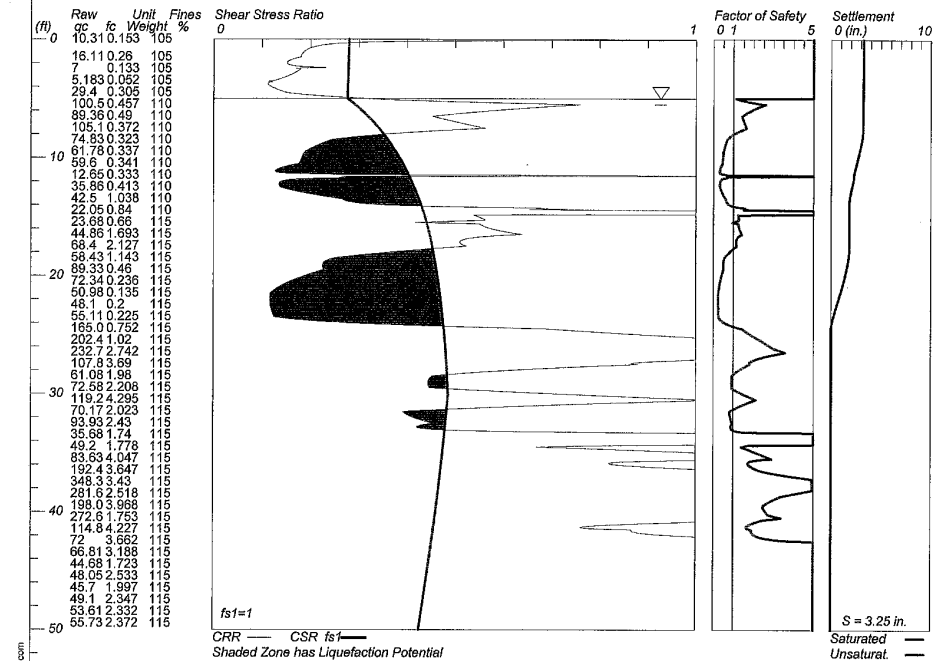


LIQUEFACTION ANALYSIS

Commercial Berthing Pier and TAMT

Hole No.=CPT-14 Water Depth=5 ft

Magnitude=7.2
Acceleration=0.43g

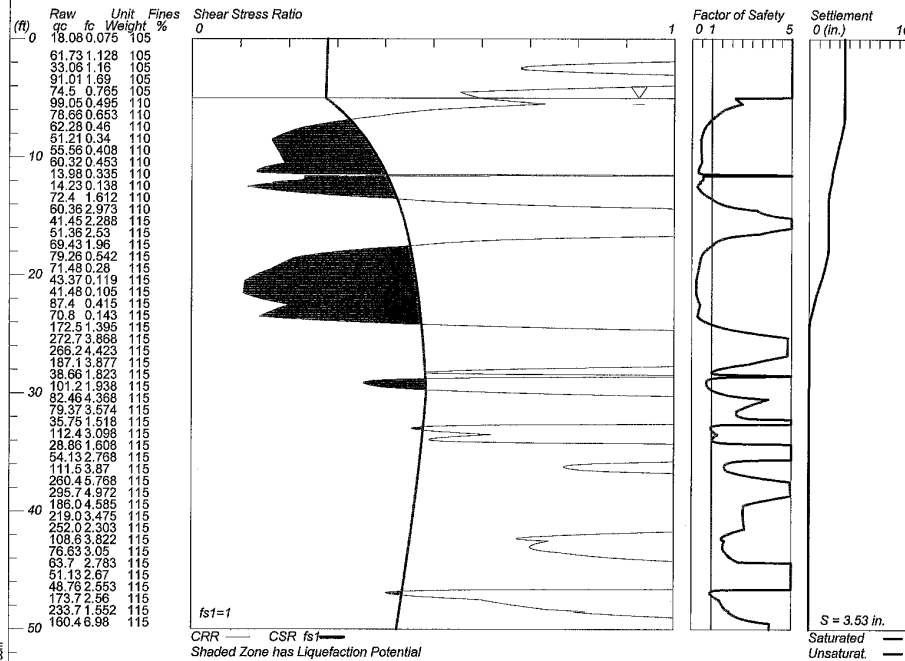


LIQUEFACTION ANALYSIS

Commercial Berthing Pier and TAMT

Hole No.=CPT-16 Water Depth=5 ft

Magnitude=7.2
Acceleration=0.43g

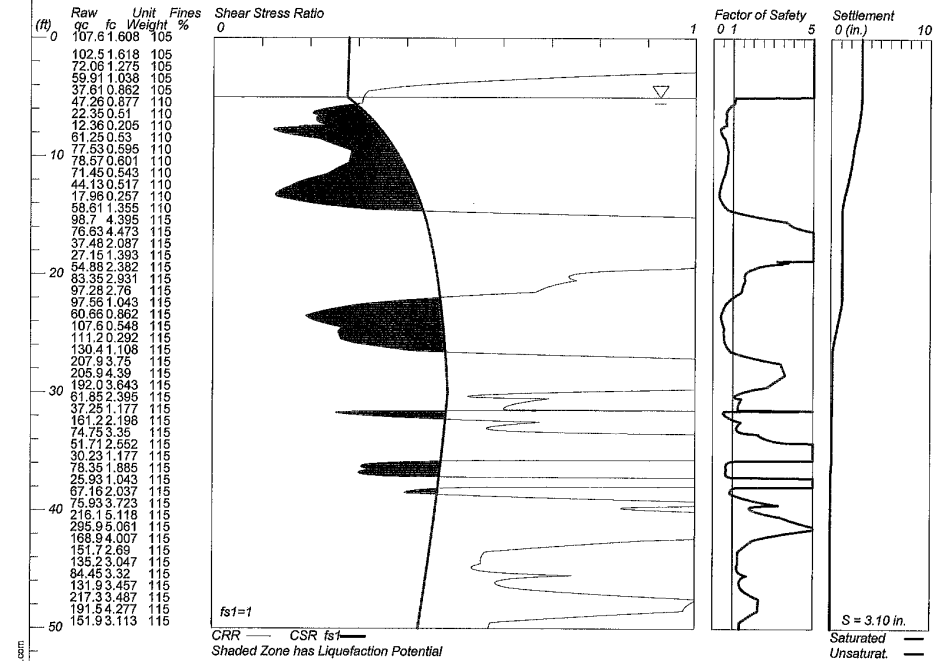


LIQUEFACTION ANALYSIS

Commercial Berthing Pier and TAMT

Hole No.=CPT-20 Water Depth=5 ft

Magnitude=7.2
Acceleration=0.43g



SOIL PARAMETERS FOR PILE CAPACITY ANALYSES

Table E1 – Static Condition

Layer Number	Simplified Soil Layers	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Buoyant Unit Weight (pcf)	Friction Angle (degrees)	Cohesion (ksf)	e ₅₀ (%)	k (pci)
1	Sand	0.0	5.0	105.0	28	0	N/A	25
2	Sand	5.0	14.0	47.6	28	0	N/A	20
3	Sand	14.0	16.0	52.6	30	0	N/A	60
4	Sand	16.0	25.0	52.6	28	0	N/A	60
5	Sand	25.0	50.0	52.6	34	0	N/A	125

Table E2 – Seismic Condition

Layer Number	Simplified Soil Layers	Depth to Top of Layer (ft)	Depth to Bottom of Layer (ft)	Buoyant Unit Weight (pcf)	Friction Angle (degrees)	Cohesion (ksf)	e ₅₀ (%)	k (pci)
1	Sand	0.0	5.0	105.0	28	0	N/A	25
2*	Sand	5.0	14.0	47.6	0.1	0	N/A	5
3	Sand	14.0	16.0	52.6	30	0	N/A	60
4*	Sand	16.0	25.0	52.6	0.1	0	N/A	15
5	Sand	25.0	50.0	52.6	34	0	N/A	125

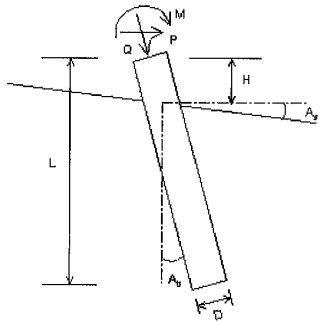
* Liquefiable soil layer.

APPENDIX E

SOIL PARAMETERS AND PILE CAPACITY ANALYSES

VERTICAL ANALYSIS

Figure 1



Driving Concrete Pile

Loads:

Load Factor for Vertical Loads= 1.0
Load Factor for Lateral Loads= 1.0
Loads Supported by Pile Cap= 0 %
Shear Condition: Static

Vertical Load, Q= 80.0 -kp
Shear Load, P= 10.0 -kp
Slope Restrain St= 0.00 -in/-in

Profile:

Pile Length, L= 35.0 -ft
Top Height, H= 0 -ft
Slope Angle, As= 0
Batter Angle, Ab= 0
Fixed Head Condition

Soil Data:

Depth -ft	Gamma -lb/f3	Phi	C -kp/f2	K -lb/f3	e50 or Dr %	Nspt
0	105	28	0.00	25	20	5
5	47.6	28	0.00	20	20	5
14	52.6	30	0.00	60	30	15
16	52.6	28	0.00	60	30	10
25	52.6	34	0.00	125	50	25

Pile Data:

Depth -ft	Width -in	Area -in2	Per. -in	I -in4	E -kp/f2	Weight -kp/f
0.0	14	196.0	56.0	3201.3	3000	0.204
35.0						

Vertical capacity:

Weight above Ground= 0.00 Total Weight= 4.60-kp *Soil Weight is not included
Side Resistance (Down)= 85.850-kp Side Resistance (Up)= 52.831-kp
Tip Resistance (Down)= 81.470-kp Tip Resistance (Up)= 0.000-kp
Total Ultimate Capacity (Down)= 167.320-kp Total Ultimate Capacity (Up)= 57.427-kp
Total Allowable Capacity (Down)= 83.660-kp Total Allowable Capacity (Up)= 31.012-kp
OK! Qallow > Q

Settlement Calculation:

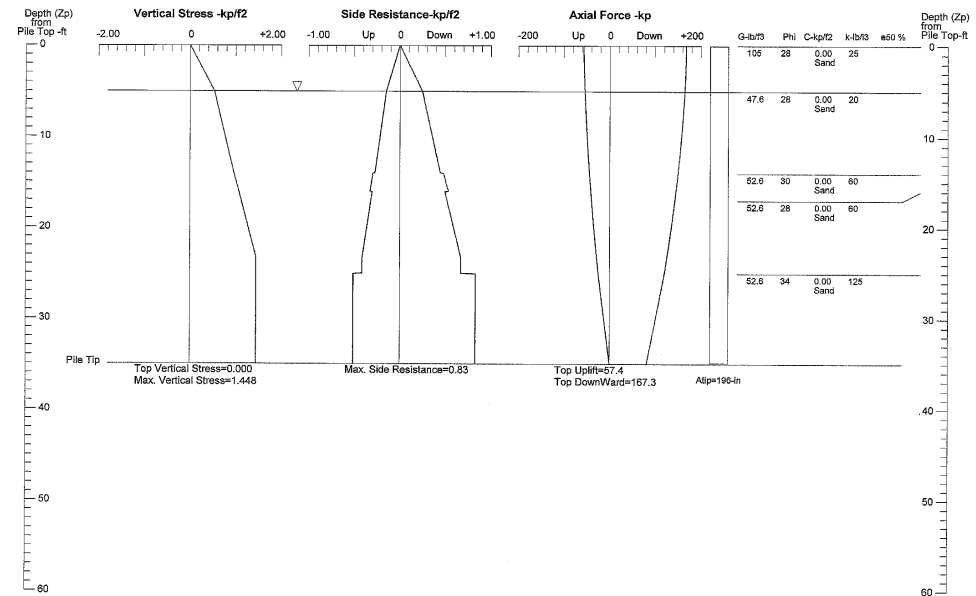
At Q= 80.00-kp Settlement= 0.05021-in
At Qallow= 1.00-in Qallow= 99999.00000-kp

Note: If the program cannot find a result or the result exceeds the upper limit. The result will be displayed as 99999.

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SOIL STRESS, SIDE RESISTANCE, & AXIAL FORCE vs DEPTH

Based on Ultimate Load Condition



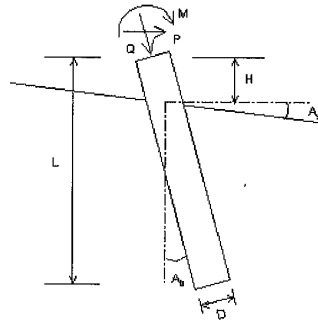
Commercial Berthing Pier and TAMT
14-inch sq driven concrete_Static



Commercial Berthing Pier and TAMT
14-inch sq driven concrete_Static

LATERAL ANALYSIS

Figure 2



Loads:

Load Factor for Vertical Loads= 1.0
Load Factor for Lateral Loads= 1.0
Loads Supported by Pile Cap= 0 %
Shear Condition: Static

Vertical Load, Q= 80.0 -kp
Shear Load, P= 10.0 -kp
Slope Restrain St= 0.00 -in/-in

Profile:

Pile Length, L= 35.0 -ft
Top Height, H= 0 -ft
Slope Angle, As= 0
Batter Angle, Ab= 0
Fixed Head Condition

Driving Concrete Pile

Soil Data:

Depth -ft	Gamma -lb/ft ³	Phi °	C -kp/ft ²	K -lb/ft ³	e50 or Dr %	Nspt	Depth -ft	Width -in	Area -in ²	Per. -in	I -in ⁴	E -kp/ft ²	Weight -kp/ft
0	105	28	0.00	25	20	5	0.0	14	196.0	56.0	3201.3	3000	0.204
5	47.6	28	0.00	20	20	5	35.0						
14	52.6	30	0.00	60	30	15							
16	52.6	28	0.00	60	30	10							
25	52.6	34	0.00	125	50	25							

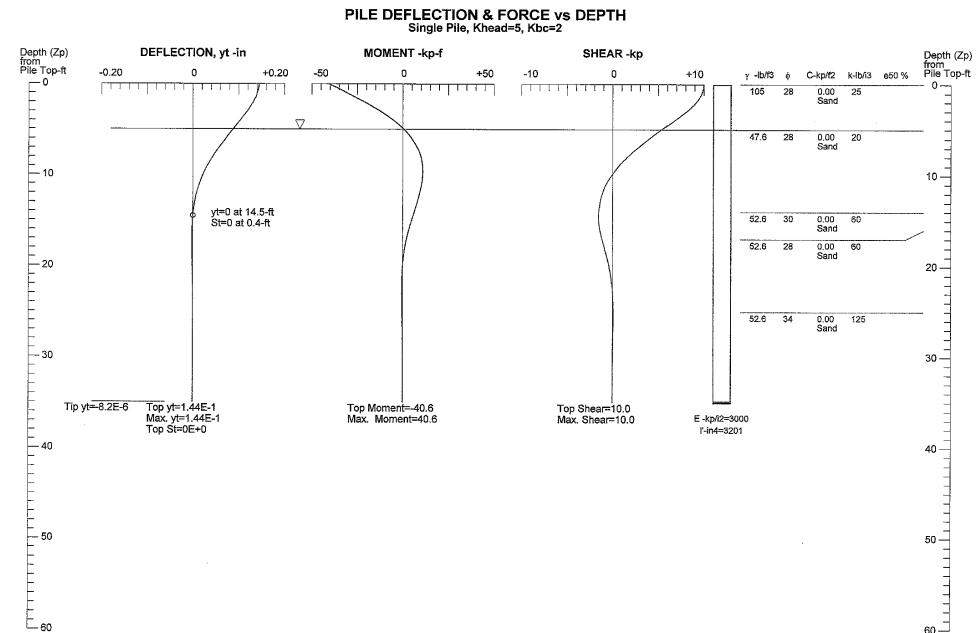
Pile Data:

Single Pile Lateral Analysis:

Top Deflection, yt= 0.14400-in
Max. Moment, M= -40.58-kp-f
Top Deflection Slope, St= 0.00000
OK! Top Deflection, 0.1440-in is less than the Allowable Deflection= 1.00-in

Note: If the program cannot find a result or the result exceeds the upper limit. The result will be displayed as 99999.
The Max. Moment calculated by program is an internal force from the applied load conditions. Structural engineer has to check whether the pile has enough capacity to resist the moment with adequate factor of safety. If not, the pile may fail under the load conditions.

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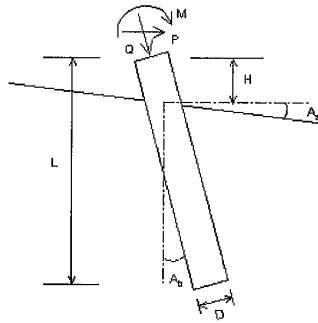
Commercial Berthing Pier and TAMT
14-inch sq driven concrete_Static



Commercial Berthing Pier and TAMT
14-inch sq driven concrete_Static

VERTICAL ANALYSIS

Figure 1



Loads:

Load Factor for Vertical Loads= 1.0
Load Factor for Lateral Loads= 1.0
Loads Supported by Pile Cap= 0 %
Shear Condition: Static

Vertical Load, Q= 80.0 -kp
Shear Load, P= 20.0 -kp
Slope Restrain St= 0.00 -in/in

Profile:

Pile Length, L= 35.0 -ft
Top Height, H= 0 -ft
Slope Angle, As= 0
Batter Angle, Ab= 0

* Negative Friction *

Negative Friction Start: 0 -ft End: 25 -ft with Factor: 1.0 Fixed Head

Driving Concrete Pile

Soil Data:

Depth -ft	Gamma -lb/ft ³	Phi	C -kp/ft ²	K -lb/ft ³	e50 or Dr %	Nspt	Depth -ft	Width -in	Area -in ²	Per. -in	I -in ⁴	E -kp/ft ²	Weight -kp/ft
0	105	28	0.00	25	20	5	0.0	14	196.0	56.0	3201.3	3000	0.204
5	47.6	0.1	0.00	5	20	5	35.0						
14	52.6	30	0.00	60	30	15							
16	52.6	0.1	0.00	15	30	10							
25	52.6	34	0.00	125	50	25							

Pile Data:

Vertical capacity:

Weight above Ground= 0.00 Total Weight= 4.60-kp *Soil Weight is not included
Side Resistance (Down)= 30.771-kp Side Resistance (Up)= 28.568-kp
Tip Resistance (Down)= 81.470-kp Tip Resistance (Up)= 0.000-kp
Total Ultimate Capacity (Down)= 112.240-kp Total Ultimate Capacity (Up)= 33.164-kp
Total Allowable Capacity (Down)= 93.534-kp Total Allowable Capacity (Up)= 28.403-kp
OK! Qallow > Q

Settlement Calculation:

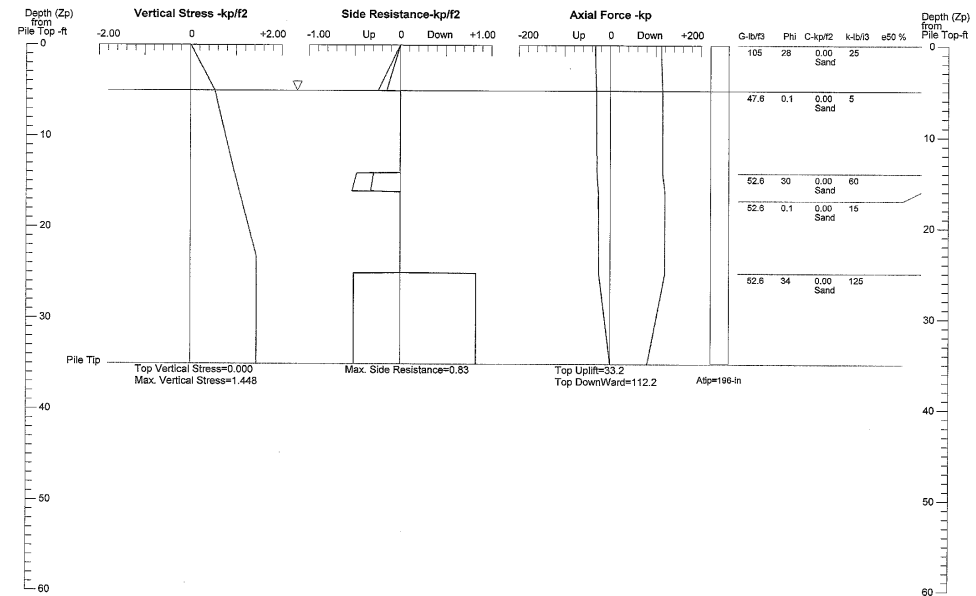
At Q= 80.00-kp Settlement= 0.19644-in
At Qallow= 1.00-in Qallow= 99999.00000-kp

Note: If the program cannot find a result or the result exceeds the upper limit. The result will be displayed as 99999.

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SOIL STRESS, SIDE RESISTANCE, & AXIAL FORCE vs DEPTH

Based on Ultimate Load Condition

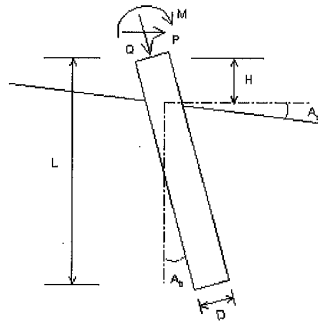


Commercial Berthing Pier and TAMT
14-inch sq driven concrete_Seismic



Commercial Berthing Pier and TAMT
14-inch sq driven concrete_Seismic

LATERAL ANALYSIS



Loads:

Load Factor for Vertical Loads= 1.0
Load Factor for Lateral Loads= 1.0
Loads Supported by Pile Cap= 0 %
Shear Condition: Static

Vertical Load, Q= 80.0 -kp
Shear Load, P= 20.0 -kp
Slope Restrain St= 0.00 -in/in

Profile:

Pile Length, L= 35.0 -ft
Top Height, H= 0 -ft
Slope Angle, As= 0
Batter Angle, Ab= 0

* Negative Friction *

Negative Friction Start: 0 -ft End: 25 -ft with Factor: 1.0 Fixed Head

Driving Concrete Pile

Soil Data:

Depth -ft	Gamma -lb/ft ³	Phi	C -kp/ft ²	K -lb/ft ³	e50 or Dr %	Nspt	Depth -ft	Width -in	Area -in ²	Per. -in	I -in ⁴	E -kp/ft ²	Weight -kp/ft
0	105	28	0.00	25	20	5	0.0	14	196.0	56.0	3201.3	3000	0.204
5	47.6	0.1	0.00	5	20	5	35.0						
14	52.6	30	0.00	60	30	15							
16	52.6	0.1	0.00	15	30	10							
25	52.6	34	0.00	125	50	25							

Pile Data:

Depth -ft	Width -in	Area -in ²	Per. -in	I -in ⁴	E -kp/ft ²	Weight -kp/ft
0.0	14	196.0	56.0	3201.3	3000	0.204
35.0						

Single Pile Lateral Analysis:

Top Deflection, y_t= 0.76700-in

Max. Moment, M= -105.83-kp-ft

Top Deflection Slope, St= 0.00000

OK! Top Deflection, 0.7670-in is less than the Allowable Deflection= 1.00-in

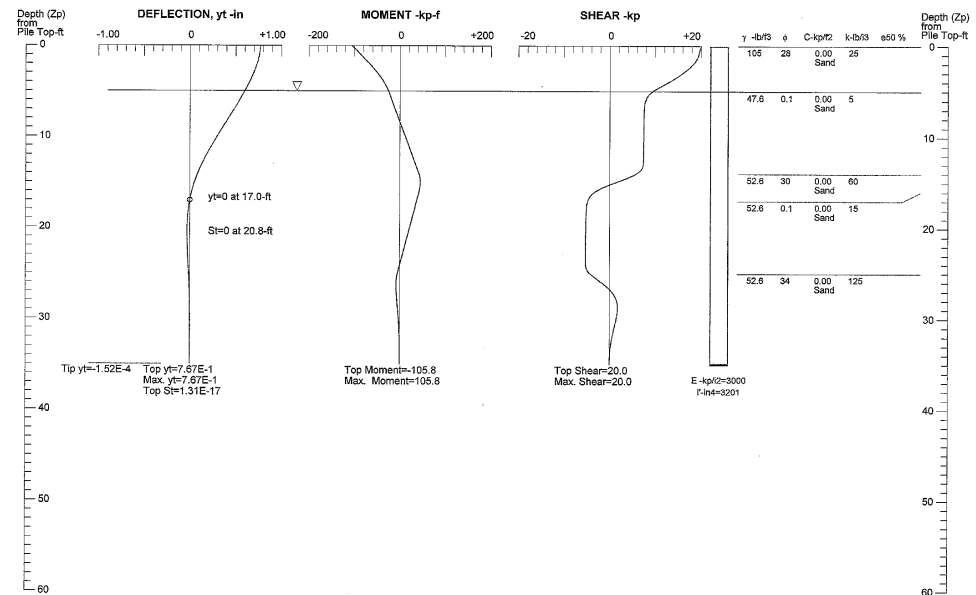
Note: If the program cannot find a result or the result exceeds the upper limit. The result will be displayed as 99999.

The Max. Moment calculated by program is an internal force from the applied load conditions. Structural engineer has to check whether the pile has enough capacity to resist the moment with adequate factor of safety. If not, the pile may fail under the load conditions.

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PILE DEFLECTION & FORCE vs DEPTH

Single Pile, Khead=5, Kbc=2

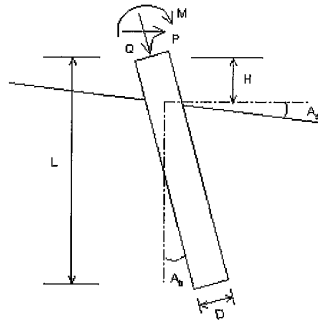


Commercial Berthing Pier and TAMT
14-inch sq driven concrete_Seismic



Commercial Berthing Pier and TAMT
14-inch sq driven concrete_Seismic

VERTICAL ANALYSIS



Loads:

Load Factor for Vertical Loads= 1.0
Load Factor for Lateral Loads= 1.0
Loads Supported by Pile Cap= 0 %
Shear Condition: Static

Vertical Load, Q= 100.0 -kp
Shear Load, P= 10.0 -kp
Slope Restrain St= 0.00 -in/in

Profile:

Pile Length, L= 35.0 -ft
Top Height, H= 0 -ft
Slope Angle, A_s= 0
Batter Angle, A_b= 0
Fixed Head Condition

Drilled Pile (dia <=24 in. or 61 cm)

Soil Data:

Depth -ft	Gamma -lb/ft ³	Phi	C -kp/ft ²	K -lb/ft ³	e50 or Dr %	Nspt	Depth -ft	Width -in	Area -in ²	Per. -in	I -in ⁴	E -kp/ft ²	Weight -kp/ft
0	105	28	0.00	25	20	5	0.0	24	452.4	75.4	16286.0	3000	0.471
5	47.6	28	0.00	20	20	5	35.0						
14	52.6	30	0.00	60	30	15							
16	52.6	28	0.00	60	30	10							
25	52.6	34	0.00	125	60	25							

Pile Data:

Vertical capacity:

Weight above Ground= 0.00 Total Weight= 10.61-kp *Soil Weight is not included
Side Resistance (Down)= 69.171-kp Side Resistance (Up)= 39.526-kp
Tip Resistance (Down)= 131.452-kp Tip Resistance (Up)= 0.000-kp
Total Ultimate Capacity (Down)= 200.623-kp Total Ultimate Capacity (Up)= 50.140-kp
Total Allowable Capacity (Down)= 100.311-kp Total Allowable Capacity (Up)= 30.377-kp
OK! Q_{allow} > Q

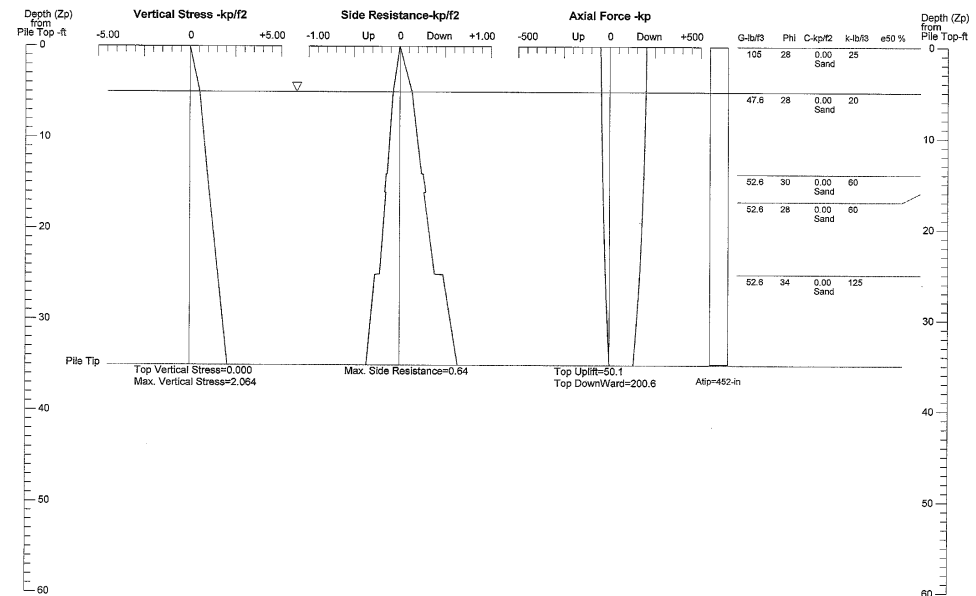
Settlement Calculation:

At Q= 100.00-kp Settlement= 0.26269-in
At Q_{allow}= 100.00-kp Q_{allow}= 164.15179-kp

Note: If the program cannot find a result or the result exceeds the upper limit. The result will be displayed as 99999.

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SOIL STRESS, SIDE RESISTANCE, & AXIAL FORCE vs DEPTH

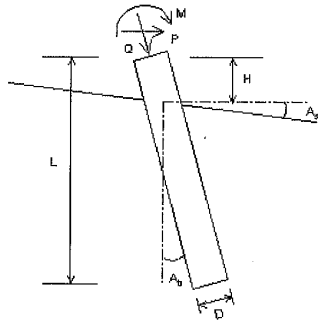


Commercial Berthing Pier and TAMT
24-inch diameter CIDH_Static



Commercial Berthing Pier and TAMT
24-inch diameter CIDH_Static

LATERAL ANALYSIS



Loads:

Load Factor for Vertical Loads= 1.0
Load Factor for Lateral Loads= 1.0
Loads Supported by Pile Cap= 0 %
Shear Condition: Static

Vertical Load, Q= 100.0 -kp
Shear Load, P= 10.0 -kp
Slope Restrain St= 0.00 -in/-in

Profile:

Pile Length, L= 35.0 -ft
Top Height, H= 0 -ft
Slope Angle, As= 0
Batter Angle, Ab= 0
Fixed Head Condition

Drilled Pile (dia <=24 in. or 61 cm)

Soil Data:

Depth -ft	Gamma -lb/ft ³	Phi	C -kp/ft ²	K -lb/ft ³	e50 or Dr %	Nspt	Depth -ft	Width -in	Area -in ²	Per. -in	I -in ⁴	E -kp/ft ²	Weight -kp/ft
0	105	28	0.00	25	20	5	0.0	24	452.4	75.4	16286.0	3000	0.471
5	47.6	28	0.00	20	20	5	35.0						
14	52.6	30	0.00	60	30	15							
16	52.6	28	0.00	60	30	10							
25	52.6	34	0.00	125	50	25							

Pile Data:

Single Pile Lateral Analysis:

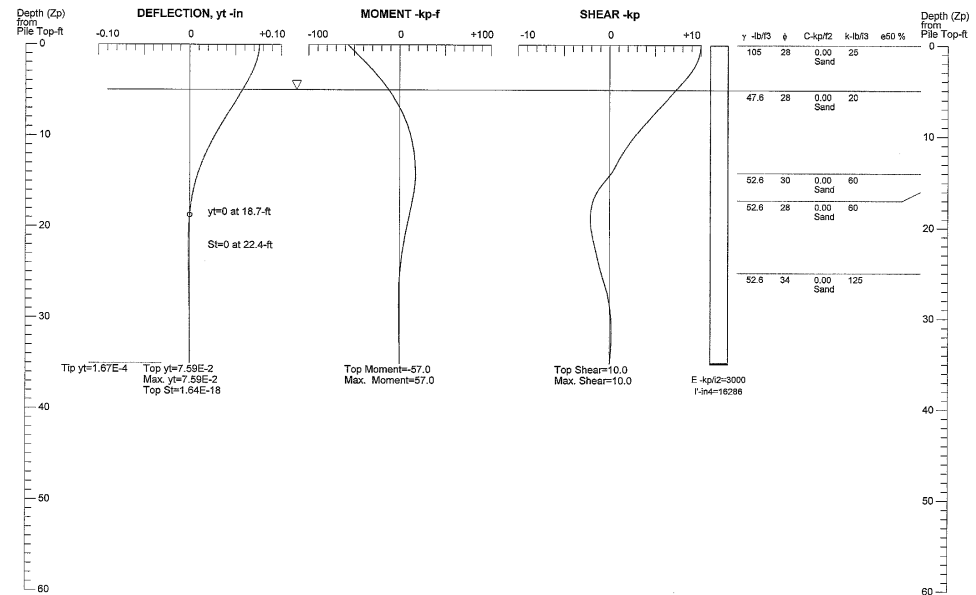
Top Deflection, y_t= 0.07590-in
Max. Moment, M= -57.00-kp-ft
Top Deflection Slope, St= 0.00000
OK! Top Deflection, 0.0759-in is less than the Allowable Deflection= 1.00-in

Note: If the program cannot find a result or the result exceeds the upper limit. The result will be displayed as 99999.
The Max. Moment calculated by program is an internal force from the applied load conditions. Structural engineer has to check whether the pile has enough capacity to resist the moment with adequate factor of safety. If not, the pile may fail under the load conditions.

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PILE DEFLECTION & FORCE vs DEPTH

Single Pile, Khead=5, Kbc=2



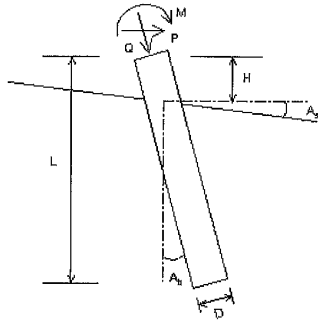
Commercial Berthing Pier and TAMT
24-inch diameter CIDH_Static



Commercial Berthing Pier and TAMT
24-inch diameter CIDH_Static

VERTICAL ANALYSIS

Figure 1



Loads:

Load Factor for Vertical Loads= 1.0
Load Factor for Lateral Loads= 1.0
Loads Supported by Pile Cap= 0 %
Shear Condition: Static

Vertical Load, Q= 100.0 -kp
Shear Load, P= 25.0 -kp
Slope Restrain St= 0.00 -in/-in

Profile:

Pile Length, L= 35.0 -ft
Top Height, H= 0 -ft
Slope Angle, As= 0
Batter Angle, Ab= 0

* Negative Friction *

Negative Friction Start: 0 -ft End: 25 -ft with Factor: 1.0 Fixed Head

Drilled Pile (dia <=24 in. or 61 cm)

Soil Data:

Depth -ft	Gamma -lb/ft ³	Phi	C -kp/ft ²	K -lb/ft ³	e50 or Dr %	Nspt	Depth -ft	Width -in	Area -in ²	Per. -in	I -in ⁴	E -kp/ft ²	Weight -kp/ft
0	105	28	0.00	25	20	5	0.0	24	462.4	75.4	16286.0	3000	0.471
5	47.6	0.1	0.00	5	20	5	35.0						
14	52.6	30	0.00	60	30	15							
16	52.6	0.1	0.00	15	30	10							
25	52.6	34	0.00	125	50	25							

Pile Data:

Vertical capacity:

Weight above Ground= 0.00 Total Weight= 10.61-kp *Soil Weight is not included
Side Resistance (Down)= 29.116-kp Side Resistance (Up)= 23.123-kp
Tip Resistance (Down)= 131.452-kp Tip Resistance (Up)= 0.000-kp
Total Ultimate Capacity (Down)= 160.568-kp Total Ultimate Capacity (Up)= 33.736-kp
Total Allowable Capacity (Down)= 133.807-kp Total Allowable Capacity (Up)= 29.883-kp
OK! Qallow > Q

Settlement Calculation:

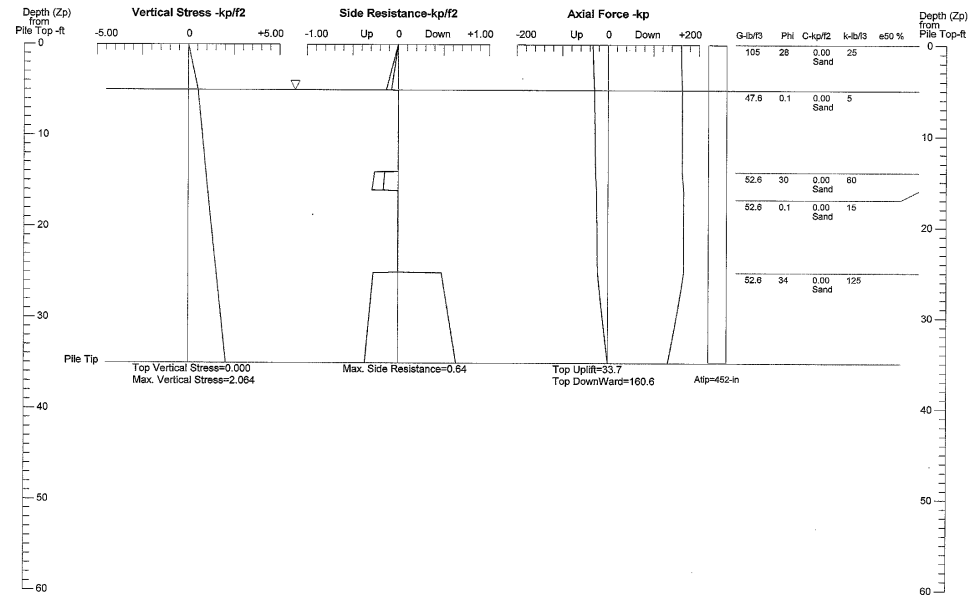
At Q= 100.00-kp Settlement= 0.64377-in
At Xallow= 1.00-in Qallow= 124.83939-kp

Note: If the program cannot find a result or the result exceeds the upper limit. The result will be displayed as 99999.

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SOIL STRESS, SIDE RESISTANCE, & AXIAL FORCE vs DEPTH

Based on Ultimate Load Condition



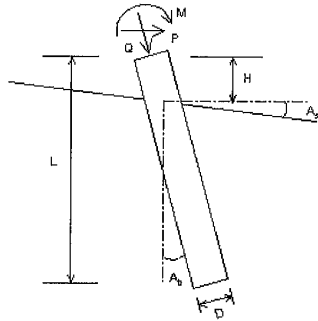
Commercial Berthing Pier and TAMT
24-inch diameter CIDH_Seismic



Commercial Berthing Pier and TAMT
24-inch diameter CIDH_Seismic

LATERAL ANALYSIS

Figure 2



Loads:

Load Factor for Vertical Loads= 1.0
Load Factor for Lateral Loads= 1.0
Loads Supported by Pile Cap= 0 %
Shear Condition: Static

Vertical Load, Q= 100.0 -kp
Shear Load, P= 25.0 -kp
Slope Restrain St= 0.00 -in/-in

Profile:

Pile Length, L= 35.0 -ft
Top Height, H= 0 -ft
Slope Angle, As= 0
Batter Angle, Ab= 0

* Negative Friction *

Negative Friction Start: 0 -ft End: 25 -ft with Factor: 1.0Fixed Head

Drilled Pile (dia <=24 in. or 61 cm)

Soil Data:

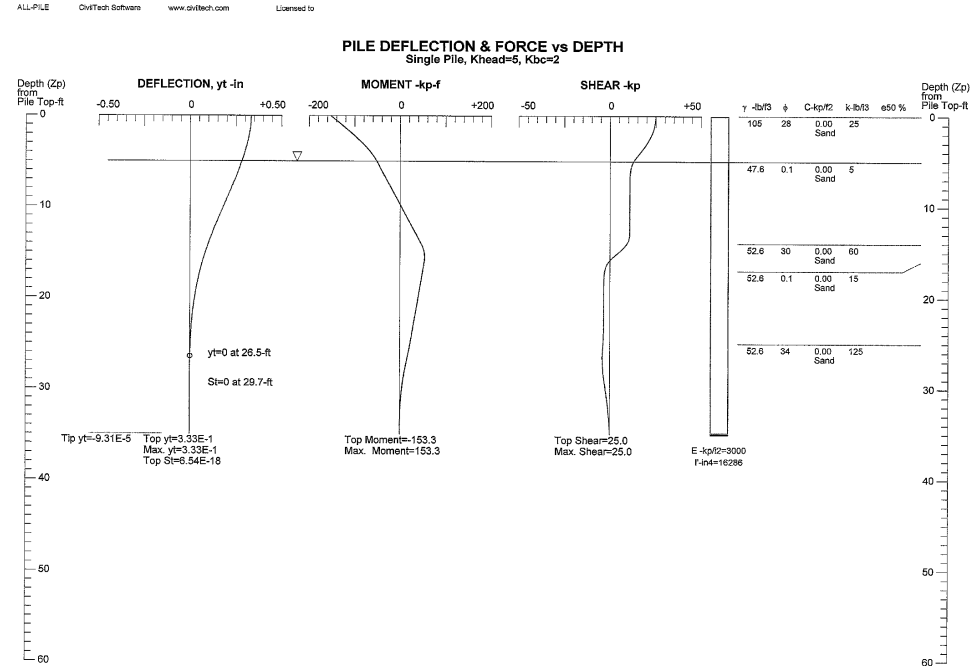
Depth -ft	Gamma -lb/ft ³	Phi	C -kp/ft ²	K -lb/ft ³	e50 or Dr %	Nspt	Depth -ft	Width -in	Area -in ²	Per. -in	I -in ⁴	E -kp/ft ²	Weight -kp/ft
0	105	28	0.00	25	20	5	0.0	24	452.4	75.4	16286.0	3000	0.471
5	47.6	0.1	0.00	5	20	5	35.0						
14	52.6	30	0.00	60	30	15							
16	52.6	0.1	0.00	15	30	10							
25	52.6	34	0.00	125	50	25							

Pile Data:

Single Pile Lateral Analysis:

Top Deflection, yt= 0.33300-in
Max. Moment, M= -153.33-kp-ft
Top Deflection Slope, St= 0.00000
OK! Top Deflection, 0.3330-in is less than the Allowable Deflection= 1.00-in

Note: If the program cannot find a result or the result exceeds the upper limit. The result will be displayed as 99999.
The Max. Moment calculated by program is an internal force from the applied load conditions. Structural engineer has to check whether the pile has enough capacity to resist the moment with adequate factor of safety. If not, the pile may fail under the load conditions.



Commercial Berthing Pier and TAMT
24-inch diameter CIDH_Seismic



Commercial Berthing Pier and TAMT
24-inch diameter CIDH_Seismic

APPENDIX F

RESPONSES TO CITY OF SAN DIEGO REVIEW COMMENTS

Presented below are our responses to the City of San Diego preliminary review comments dated September 5, 2012 (referenced) on our earlier geotechnical and fault hazard evaluation report, dated July 24, 2012 (referenced).

Issue No. 1: Geologic Hazard Category:

As shown or described on the San Diego Seismic Safety Study maps, the subject property is located in Geologic Hazard Categories (GHC) 11, 13, and 31. GHC 11 is the Alquist-Priolo fault-rupture hazard zone is characterized by a high risk of geologic hazards. GHC 13 is the downtown special fault zone. GHC 31 encompasses areas with a high liquefaction potential. (New Issue)

Ninyo & Moore (N&M) Response: No Response Required.

Issue No. 2: References:

Geotechnical and Fault Hazard Evaluation, Commercial Berthing Pier and TAMT, San Diego, California, prepared by Ninyo & Moore, dated July 24, 2012 (their project no. 107319001)

Preliminary Review Questionnaire, Project No. 292259, prepared by Unified Port of San Diego. (New Issue)

N&M Response: No Response Required.

Issue No. 3: Preliminary Review Question:

Review Geotechnical and Fault Hazard Evaluation report and determination by the City Geologist. (New Issue)

N&M Response: No Response Required.

Issue No. 4: *The submitted geotechnical report includes a partial copy of Figure 6. Please provide a complete report with full size figures to facilitate this review. (New Issue)*

N&M Response: The Port of San Diego will receive additional copies with full-size figures for transmittal to the City.

Issue No. 5: *Submit three (3) complete copies of the geotechnical investigation reports addressing the faulting and surface fault-rupture hazards. (New Issue)*

N&M Response: As noted in our response to Issue 4, we are providing additional copies for re-transmittal to the City of San Diego.

Issue No. 6: *The locations of the proposed structures should be shown on the geologic map. (New Issue)*

N&M Response: The proposed structures are shown on Figure 5 of this updated report.

Issue No. 7: *The project's geotechnical consultant should provide additional representative geologic cross-sections that show the relationship of the proposed construction to site stratigraphy and fault(s). Provide geologic cross-sections aligned orthogonal to the bulkhead that extend sufficiently offshore to illustrate the bathymetry of the bay slope. (New Issue)*

N&M Response: Figure 6 of this updated report shows the relationship of the proposed construction to the site stratigraphy. At this time, we are unclear as to how the bathymetry of the bay slope is a concern to the project due to the presence of the bulkhead. We are available to discuss this issue as soon as feasible for the City reviewers. However, we have provided an additional representative geologic cross-section in Figure 6 of the report based on our additional subsurface exploration performed recently (CPT-15 through CPT-21).

Issue No. 8: *Describe the criteria used to define the stratigraphic units. (New Issue)*

N&M Response: Stratigraphic units were defined based on direct observations of the soils in our boring and correlations of the boring and CPT data to other studies and maps in the project area (Kennedy and Clarke, 1999 a and b; Kennedy and Tan, 2008 [please see references in this report]).

Issue No. 9: *Describe the age-dating techniques used to determine the geochronology of the interpreted stratigraphic units and activity of faulting. (New Issue)*

N&M Response: As noted in our response to Issue 8 the stratigraphic units were correlated to well-defined and dated units as described by the California Geological Survey (Kennedy and Clarke, 1999 a and b). This is a conservative position (assuming that the Bay Deposits are Quaternary in age). Please see Section 6 of this report for additional discussion.

Issue No. 10: *The consultant identifies soil layers within the "old paralic deposits" as susceptible to liquefaction during the design seismic event. The consultant should describe implications for the age and environment of deposition of these sediments and the veracity of their identification of these sediments as old paralic deposits. (New Issue)*

N&M Response: As noted in our response to Issue 8 the stratigraphic units were correlated to well-defined and dated units as described by the California Geological Survey. Please see Section 6 of this report for additional discussion.

Issue No. 11: *The site is located in an area of transitional fault trends, based on regional geologic mapping. The trend of faulting at the site does not appear to be constrained by site-specific information. Additional subsurface exploration appears necessary to provide that constraint. (New Issue)*

N&M Response: We are of the opinion that transitional fault trends are not present in the immediate area of the site. As shown on Figures 3 and 7 in this report faults in the immediate area of the site trend to the northeast only. In addition, data from our additional evaluations confirms our opinion regarding the continuity of the units to the south and southeast.

Issue No. 12: *Possible faulting south or east of CPT-14 does not appear to be precluded by the presented information. Within the Alquist-Priolo Earthquake Zone, it is typically presumed that faulting is present beyond the demonstrated geology and an appropriate structural setback is applied. (New Issue)*

N&M Response: Please see our response to Issue 11 above.

Issue No. 13: *Address flow slide potential. (New Issue)*

N&M Response: We assume that the reviewer is referring to lateral spread potential as flow slides typically occur on sloping grounds. Lateral spread is addressed in this updated report. Mitigation recommendations for lateral spreading are also provided (Sections 9.3 and 9.4).

Issue No. 14: *Address global stability of the bulkhead if instability might impact the proposed development. (New Issue)*

N&M Response: To mitigate the instability of the proposed development during seismic event, we have provided mitigation recommendations for liquefaction and lateral spreading in this updated report (Sections 9.3 and 9.4). Furthermore, based on our discussions with the Port representatives, we understand that improvements were performed on the bulkhead recently.

Issue No. 15: *If the proposed structures require a building permit from the City of San Diego, the geotechnical report must address the requirements of the 2010 CBC and local amendments. This includes Chapter 18, Section 1802, which requires an assessment of the consequences of any liquefaction or lateral movement and shall address mitigation measures. (New Issue)*

N&M Response: As noted, mitigation recommendations for liquefaction and lateral spreading are provided in this updated report (Sections 9.3 and 9.4).

Issue No. 16: *Provide the criteria used to determine Site Class in accordance with Table 1613.5.2. For Site Class C, D, or E, provide the criteria used to determine Site Class is accordance with Section 1613.5.5 of the 2010 CBC. (New Issue)*

N&M Response: The criteria used in determining Site Class are provided in Section 7.1.1, "Strong Ground Motion", which were based on Tables 1613.5.2 and 1613.5.5 of 2010 CBC.

**GEOTECHNICAL EVALUATION
PROPOSED CONTAINER STORAGE AREAS
AND LIGHT POLES
10TH AVENUE MARINE TERMINAL
SAN DIEGO, CALIFORNIA**

PREPARED FOR:

Harris & Associates
750 B Street, Suite 1800
San Diego, California 92101

PREPARED BY:

Ninyo & Moore
Geotechnical and Environmental Sciences Consultants
5710 Ruffin Road
San Diego, California 92123

November 11, 2013
Project No. 107589003

November 11, 2013
Project No. 107589003

Mr. Daniel Lee
Harris & Associates
750 B Street, Suite 1800
San Diego, California 92101

Subject: Geotechnical Evaluation
Proposed Container Storage Areas and Light Poles
10th Avenue Marine Terminal
San Diego, California

Dear Mr. Lee:

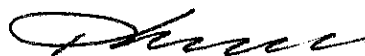
In accordance with your request and authorization, we have performed a geotechnical evaluation for the proposed container storage areas and light poles at Transit Shed 1 and Warehouse C at the 10th Avenue Marine Terminal in San Diego. This report presents our geotechnical findings, conclusions, and recommendations regarding the proposed project. Our report was prepared in accordance with our proposal dated July 30, 2013.

We appreciate the opportunity to be of service on this project.

Sincerely,
NINYO & MOORE



Madan Chirumalla, PE
Project Engineer

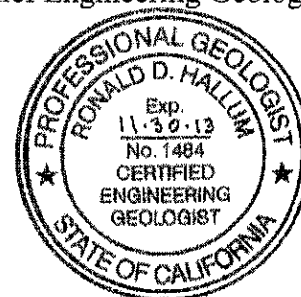


Kenneth H. Mansir, Jr., PE
Principal Engineer

MAC/RDH/KHM/kh



Ronald D. Hallum, PG, CEG
Chief Engineering Geologist



Distribution: (1) Addressee (via e-mail)

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Appendix A – Boring and CPT Logs
Appendix B – Laboratory Testing
Appendix C – Previous Boring Logs and Lab Data (2011)
Appendix D – Lateral Pile Capacity Analyses

1. INTRODUCTION

In accordance with your request, we have performed a geotechnical evaluation for the proposed container storage areas and light poles at Transit Shed 1 and Warehouse C at the 10th Avenue Marine Terminal in San Diego, California (Figure 1). This report presents the results of our field exploration and laboratory testing, our conclusions regarding the geotechnical conditions at the subject site, and our recommendations for the design and construction of this project.

2. SCOPE OF SERVICES

The scope of services for this study included the following:

- Reviewing background data listed in the References section of this report. The data reviewed included geotechnical reports, topographic maps, geologic data, stereoscopic aerial photographs, fault maps, and a site plan of the site.
- Obtaining a boring permit from the County of San Diego, Department of Environmental Health (DEH).
- Performing a field reconnaissance to observe site conditions and to locate and mark proposed exploratory locations.
- Coordinating with Underground Service Alert (USA) and the Port of San Diego personnel to mark underground utilities at the exploration locations.
- Coordinating and mobilizing for the subsurface exploration.
- Performing coring of the existing asphalt concrete slabs to provide access to our borings.
- Performing a subsurface evaluation consisting of the advancement of four Cone Penetration Test (CPT) soundings with a truck-mounted rig to depths up to approximately 55.5 feet below the ground surface (bgs). In addition, three hand auger borings were performed to depths of up to approximately 6 feet bgs. Bulk soil samples were obtained at selected intervals from the borings.
- Performing geotechnical laboratory testing on selected soil samples obtained from our borings.
- Compiling and analyzing the engineering data obtained from our background, laboratory, and field evaluations.
- Preparing this report presenting our findings, conclusions, and recommendations regarding the geotechnical design and construction of the project.

3. SITE AND PROJECT DESCRIPTION

The 10th Avenue Marine Terminal (TAMT) is located along the eastern shore of San Diego Bay (Figure 1), approximately 0.5 mile south of downtown San Diego. The project area is located northwest of Crosby Road and south of Water Street. The site is currently occupied by Transit Sheds Nos. 1 and 2 and Warehouses B and C. The site is traversed by existing utilities including water lines, storm drains, sewer pipes, electric lines, and other utilities. The marine terminal is at an elevation of approximately 9 to 15 feet above mean sea level (MSL).

It is our understanding that the project will include the demolition of three bays of Transit Shed No. 1, the east addition to Warehouse C, and the three bays on the north side of Warehouse C (Figure 2). The purpose of the proposed demolition is to allow for the future expansion and/or renovation of the TAMT for the storage of shipping containers asphalt paved parking areas. Additional improvements will consist of 11 light pole structures, approximately 90 feet tall, for the current project at Transit Shed No. 1. Deep foundations are anticipated for the proposed light poles.

4. SUBSURFACE EXPLORATION AND LABORATORY TESTING

Our subsurface exploration was conducted on September 16, 2013 and October 11, 2013, and consisted of the advancement of four CPT soundings (CPT-1 through CPT-4), and the logging and sampling of three small diameter hand auger borings (B-1 through B-3). The CPT soundings were performed to depths of up to approximately 55.5 feet and the borings were excavated to depths of up to approximately 6 feet bgs. Refusal was encountered in CPT-2 and CPT-3 at a depth of approximately 39.5 feet. Refusal was also encountered in boring B-3 in gravel and cobbles at a depth of approximately 4 feet. Bulk soil samples were obtained from the borings. The samples were then transported to our in-house geotechnical laboratory for testing. The approximate locations of the exploratory borings are shown on Figure 2. Boring and CPT logs are included in Appendix A.

Laboratory testing of representative soil samples included in-situ moisture content, gradation, soil corrosivity, and R-value. The results of the in-situ moisture content tests are presented on the boring logs in Appendix A. The results of the other laboratory tests are presented in Appendix B.

Boring locations from a previous subsurface exploration (Ninyo & Moore, 2011) are also shown on Figure 2. The previous boring logs and laboratory tests are presented in Appendix C.

5. GEOLOGY AND SUBSURFACE CONDITIONS

Our findings regarding regional and local geology, liquefaction, and groundwater conditions at the subject site are provided in the following sections.

5.1. Regional Geologic Setting

The project area is situated in the western San Diego County section of the Peninsular Ranges Geomorphic Province. This geomorphic province encompasses an area that extends approximately 1,450 km (900 miles) from the Transverse Ranges and the Los Angeles Basin south to the southern tip of Baja California (Norris and Webb, 1990). The province varies in width from approximately 48 to 160 km (30 to 100 miles). In general, the province consists of rugged mountains underlain by Jurassic metavolcanic and metasedimentary rocks, and Cretaceous igneous rocks of the southern California batholith. The portion of the province in San Diego County that includes the project area consists generally of uplifted Tertiary sedimentary rock, Jurassic metamorphic rock, and Cretaceous granitic rock. Figure 3 is a map of the local geology.

The Peninsular Ranges Province is traversed by a group of sub-parallel faults and fault zones trending roughly northwest. Several of these faults, which are shown on Figure 4, are considered active faults. The Elsinore, San Jacinto, San Andreas and Rose Canyon faults are active fault systems located northeast of the project area and the Coronado Bank, San Diego Trough, and San Clemente faults are active faults located west of the project area. The Rose Canyon fault zone is the nearest active fault system. Strands of the Rose Canyon fault zone have been mapped as passing under or adjacent to the project site. Major tectonic activity associated with these and other faults within this regional tectonic framework consists primarily of right-lateral, strike-slip movement. Further discussion of faulting relative to the site is provided in the Faulting and Seismicity section of this report.

5.2. Site Geology

Geologic units encountered during our subsurface evaluation included fill and bay deposits. Generalized descriptions of the earth units encountered are provided in the subsequent sections. Additional descriptions of the subsurface units are provided on the boring logs in Appendix A.

5.2.1. Fill

Fill was encountered in our borings from the surface to the depths explored. Based on our CPT soundings and previous boring data (Ninyo & Moore, 2011), fill is anticipated to be encountered to depths of up to approximately 40 feet. The fill generally consisted of damp to saturated, very loose to medium dense, sand, silty sand, and clayey sand, with gravel and cobbles.

5.2.2. Bay Deposits

Based on our CPT soundings and previous boring data (Ninyo & Moore, 2011), Bay deposits are anticipated to be encountered below the fill. Bay deposits extended to the explored depth of approximately 55.5 feet in CPT soundings and 56.5 feet in our previous borings. The bay deposits generally consisted of saturated, very loose to very dense, sand, silty sand, and clayey sand, and very stiff to hard, sandy clay.

5.3. Groundwater

Groundwater was encountered in our previous borings (Ninyo & Moore, 2011) at a depth of approximately 8.5 feet bgs. In addition, from research on GeoTracker (2011), groundwater is present at depths of approximately 5 to 10 feet bgs. Fluctuations in the groundwater level and perched conditions may occur due to variations in ground surface topography, subsurface geologic conditions and structure, rainfall, irrigation, tides, and other factors.

5.4. Faulting and Seismicity

The project area is considered to be seismically active. Based on our review of the referenced geologic maps and stereoscopic aerial photographs, as well as on our geologic field

mapping, a strand of the Rose Canyon fault zone, the silver strand fault has been mapped as crossing the eastern portion of the site (Kennedy and Tan, 2008). The Silver Strand fault is mapped as buried or concealed where it is mapped crossing the site. The eastern portion of the site is also located within the Alquist-Priolo earthquake fault study area (California Geological Survey, 2003; City of San Diego, 2008). In addition, the site is located in a seismically active area and the potential for strong ground motion is considered significant during the design life of the proposed structure.

In general, hazards associated with seismic activity include strong ground motion, ground surface rupture, liquefaction and seismically induced settlement, and tsunamis. These hazards are discussed in the following sections.

5.4.1. Strong Ground Motion and Ground Surface Rupture

The 2010 California Building Code (CBC) recommends that the design of structures be based on the horizontal peak ground acceleration (PGA) having a 2 percent probability of exceedance in 50 years, which is defined as the Maximum Considered Earthquake (MCE). The statistical return period for PGA_{MCE} is approximately 2,475 years. Based on our review of subsurface data, the project site corresponds to a Site Class D. The site modified PGA_{MCE} was estimated to be 0.64g using the United States Geological Survey (USGS) (USGS, 2011) ground motion calculator (web-based). The site modified design PGA was estimated to be 0.42g. These estimates of ground motion do not include near-source factors that may be applicable to the design of structures on site.

5.4.2. Ground Rupture

Based on our review of the referenced literature, a strand of the Rose Canyon fault zone, the Silver Strand fault has been mapped as crossing the eastern portion of the site (Kennedy and Tan, 2008). The Silver Strand fault is mapped as buried or concealed where it is mapped crossing the site. The eastern portion of the site is also located within the Alquist-Priolo earthquake fault study area (California Geological Survey, 2003; City of San Diego, 2008). Therefore, there is a potential for ground rupture due to

faulting at the site. However, based on the nature of the proposed improvements at the site (pavement and light pole standards), the potential for damage due to direct ground rupture is considered low. In addition, lurching or cracking of the ground surface as a result of nearby seismic events is possible.

5.4.3. Liquefaction

Liquefaction is the phenomenon in which loosely deposited granular soils with silt and clay contents of less than approximately 35 percent and non-plastic silts located below the water table undergo rapid loss of shear strength when subjected to strong earthquake-induced ground shaking. Ground shaking of sufficient duration results in the loss of grain-to-grain contact due to a rapid rise in pore water pressure, and causes the soil to behave as a fluid for a short period of time. Liquefaction is known generally to occur in saturated or near-saturated cohesionless soils at depths shallower than 50 feet below the ground surface. Factors known to influence liquefaction potential include composition and thickness of soil layers, grain size, relative density, groundwater level, degree of saturation, and both intensity and duration of ground shaking.

The liquefaction potential of subsurface soils at the project site was evaluated using the CPT data. The liquefaction analysis was based on the National Center for Earthquake Engineering Research (NCEER) procedure (Youd, et al., 2001) developed from the methods originally recommended by Seed and Idriss (1982) using the computer program LiquefyPro (CivilTech Software, 2007a). A groundwater table depth of 5 feet below the existing ground surface was used in our liquefaction evaluation. Our liquefaction analysis indicates that fill soils and loose bay deposits occurring below the assumed groundwater level of 5 feet and up to a depth of 43 feet below the surface are generally susceptible to liquefaction during the design seismic event. Further, as mapped by the City of San Diego (2008), the site is within an area with a high potential for liquefaction.

5.4.4. Dynamic Settlement of Saturated Soils

As a result of liquefaction, the proposed improvements may be subject to several hazards, including liquefaction-induced settlement. In order to estimate the amount of post-earthquake settlement, the method proposed by Tokimatsu and Seed (1987) was used in which the seismically induced cyclic stress ratios and corrected N-values are related to the volumetric strain of the soil. The amount of soil settlement during a strong seismic event depends on the thickness of the liquefiable layers and the density and/or consistency of the soils.

Under the current conditions, post-earthquake total settlement of up to approximately 8 inches was calculated for the project site. Assuming relatively continuous subsurface stratigraphy across the site, we estimate differential settlement on the order of 4 inches over a horizontal distance of 40 feet.

5.4.5. Lateral Spreading

Lateral spreading of ground surface during an earthquake usually takes place along weak shear zones that have formed within a liquefiable soil layer. Lateral spread has generally been observed to take place in the direction of a free-face but has also been observed to a lesser extent on ground surfaces with very gentle slopes. An empirical model developed by Youd and Bartlett (2002) is typically used to predict the amount of horizontal ground displacement within a site. For a site located in proximity to a free-face, the amount of lateral ground displacement is strongly correlated with the distance of the site from the free-face. Other factors such as earthquake magnitude, distance from the earthquake epicenter, thickness of the liquefiable layers, and the fines content and particle sizes of the liquefiable layers also affect the amount of lateral ground displacement.

Although the soils are prone to lateral spread, it is assumed that the existing bulkhead will confine it, but evaluation of bulkhead is not a part of this evaluation.

5.4.6. Tsunamis

Tsunamis are long wavelength seismic sea waves (long compared to the ocean depth) generated by sudden movements of the ocean bottom during submarine earthquakes, landslides, or volcanic activity. Based on our review of the tsunami hazards map prepared by the CGS (2009) the site is not located in an area subject to tsunami inundation. Therefore, tsunami inundation is not a design consideration.

5.5. Landsliding

Landslides may be induced by strong vibratory motion produced by earthquakes. Research and historical data indicate that seismically induced landslides tend to occur in weak soil and rock on sloping terrain. The process for zoning earthquake-induced landslides incorporates expected future earthquake shaking, existing landslide features, slope gradient and strength of earth materials on the slope. Based on our review of published geologic literature and our geotechnical evaluation, no landslides or related features underlie the site.

6. CONCLUSIONS

Based on our review of the referenced background data, subsurface evaluation, and laboratory testing, it is our opinion that construction of the project is feasible from a geotechnical standpoint provided the recommendations presented in this report are incorporated into the design and construction of the project. In general, the following conclusions were made:

- Based on our site reconnaissance and observations during the subsurface evaluation, the project site is underlain by fill and bay deposits.
- Based on our background review and subsurface exploration, groundwater is anticipated to be encountered at 5 to 10 feet bgs. Groundwater should be anticipated in the excavations for deep foundation (i.e., drilled piers). The high groundwater levels and granular soils with little cohesion will likely cause caving in drilled holes. The contractor should anticipate the need to mitigate caving during construction and the use of casing.
- Excavations in the fill should generally be feasible with standard earth working equipment in good working condition. Loose caving conditions are anticipated in fill. Very dense and hard soils were encountered in the bay deposits and may present difficult drilling and excavating conditions. Gravel and cobbles were encountered in the fill material and gravel was

encountered in the bay deposits. The contractor should also anticipate difficult drilling conditions in gravel and cobbles.

- Trench excavations that encounter wet soils or that are close to or below the water table may be unstable. Recommendations for stabilizing the excavation bottoms are provided in the following sections.
- We anticipate that the earth materials generated from the excavations in the fill should be generally suitable for use as compacted fill, if needed. Recommendations for fill are provided in the following sections.
- A strand of the Rose Canyon fault zone, the silver strand fault has been mapped as crossing the eastern portion of the site. The Silver Strand fault is mapped as buried or concealed where it is mapped crossing the site. Accordingly, the potential for relatively strong seismic ground motions should be considered in the project design.
- The potential for liquefaction and liquefaction induced settlement is high in soils up to a depth of about 43 feet below the surface at the project site. Post-earthquake total settlement of up to approximately 8 inches was calculated for the project site.
- Although the soils are prone to lateral spread, it is assumed that the bulkhead will confine it, but evaluation of bulkhead is not a part of this evaluation.
- We estimated a PGA_{MCE} of 0.64g at the subject site that has a 2 percent probability of exceedance in 50 years. The Design PGA was estimated to be 0.42g.
- Based on the results of our limited soil corrosivity tests during this study, previous study, our experience, and Caltrans corrosion guidelines (2012), the site would be classified as a corrosive site.

7. RECOMMENDATIONS

Based on our understanding of the project, the following recommendations are provided for the design and construction of the project. The proposed site improvements should be constructed in accordance with the requirements of the applicable governing agencies.

7.1. Earthwork

In general, earthwork should be performed in accordance with the recommendations presented in this report. Ninyo & Moore should be contacted for questions regarding the recommendations or guidelines presented herein.

7.1.1. Site Preparation

Site preparation should begin with the removal of vegetation, utility lines, asphalt, concrete, and other deleterious debris from areas to be graded. Tree stumps and roots should be removed to such a depth that organic material is generally not present. Clearing and grubbing should extend to the outside of the proposed excavation and fill areas. The debris and unsuitable material generated during clearing and grubbing should be removed from areas to be graded and disposed of at a legal dumpsite away from the project area.

7.1.2. Excavation and Drilling Characteristics

The results of our field exploration indicate that the project site is underlain by fill soils and bay deposits. Excavations in the fill should generally be feasible with standard earth working equipment in good working condition. Loose caving conditions are anticipated in fill. Very dense and hard soils were encountered in the bay deposits and may present difficult drilling and excavating conditions. Gravel and cobbles were encountered in the fill material and gravel was encountered in the bay deposits. The contractor should also anticipate difficult drilling conditions in gravel and cobbles.

7.1.3. Materials for Fill

On-site granular soils with an organic content of less than approximately 3 percent by volume (or 1 percent by weight) are suitable for use as fill. In general, fill material should not contain rocks or lumps over approximately 3 inches in diameter, and not more than approximately 30 percent larger than ¾-inch.

Utility trench backfill material should not contain rocks or lumps over approximately 3 inches in general. Soils classified as silts or clays should not be used for backfill in the pipe zone. Larger chunks, if generated during excavation, may be broken into acceptably sized pieces or disposed of offsite.

Imported fill material, if needed for the project, should generally be granular soils with a low expansion potential (i.e., an expansion index of 50 or less as evaluated by the ASTM International [ASTM] Test Method D 4829). Import material should also be non-corrosive

in accordance with the Caltrans (2012) corrosion guidelines. Materials for use as fill should be evaluated by Ninyo & Moore's representative prior to filling or importing.

7.1.4. Use of Concrete and Asphalt as Fill

Portland cement concrete and asphalt concrete generated by on-site demolition may be reused in new structural fill if processed in accordance with the following recommendations. Concrete and asphalt to be used in structural fills should not have painted, stained, or coated surfaces, contain rebar or other metal reinforcement, vegetation, or other debris. The concrete and asphalt should be crushed to sizes of 3 inches or less. Crushed concrete and asphalt to be used as fill should be stockpiled and blended with soil prior to placement to meet the requirements of Section 7.1.3 and should be placed in accordance with Section 7.1.5.

7.1.5. Compacted Fill

The following general recommendations should be used if compacted fill is used for the project. Prior to placement of compacted fill, the contractor should request an evaluation of the exposed ground surface by Ninyo & Moore. The exposed ground surface should then be scarified to a depth of approximately 8 inches and moisture conditioned to near the optimum moisture content. The scarified materials should then be compacted to 90 percent of their modified Proctor density as evaluated by ASTM D 1557. The evaluation of compaction by Ninyo & Moore should not be considered to preclude any requirements for observation or approval by governing agencies. It is the contractor's responsibility to notify this office and the appropriate governing agency when project areas are ready for observation, and to provide reasonable time for that review.

Fill materials should be moisture-conditioned to near the laboratory optimum moisture content prior to placement. The optimum moisture content will vary with material type and other factors. Moisture-conditioning of fill soils should be generally consistent within the soil mass.

Prior to placement of additional compacted fill material following a delay in the grading operations, the exposed surface of previously compacted fill should be prepared to receive fill. Preparation may include scarification, moisture-conditioning, and recompaction.

Compacted fill should be placed in horizontal lifts of approximately 8 inches in loose thickness. Prior to compaction, each lift should be moisture-conditioned to near the laboratory optimum, mixed, and then compacted by mechanical methods, using sheeps-foot rollers, multiple-wheel pneumatic-tired rollers or other appropriate compacting rollers, to 90 percent of its modified Proctor density as evaluated by ASTM D 1557. Successive lifts should be treated in a like manner until the desired finished grades are achieved. We recommend that the upper 12 inches of the subgrade for pavements be compacted to 95 percent of its Proctor density as evaluated by ASTM D 1557. The Class 2 Aggregate Base should be compacted to 95 percent of its Proctor density as evaluated by ASTM D 1557.

7.1.6. Temporary Excavations, Braced Excavations, and Shoring

For temporary excavations, we recommend that the following Occupational Safety and Health Administration (OSHA) soil classification be used:

Fill and bay deposits

Type C

Upon making the excavations, the soil classifications and excavation performance should be evaluated in the field by the contractor in accordance with the OSHA regulations. Temporary excavations should be constructed in accordance with OSHA recommendations. For trench or other excavations, OSHA requirements regarding personnel safety should be met using appropriate shoring (including trench boxes) or by laying back the slopes to no steeper than 1.5:1 (horizontal:vertical). Temporary excavations that encounter seepage may be shored or stabilized by placing sandbags or gravel along the base of the seepage zone. Excavations encountering seepage should be evaluated on a case-by-case basis. On-site safety of personnel is the responsibility of the contractor.

7.1.7. Trench Bottom Stability

Trench excavations that encounter wet soils or that are close to or below the water table may be unstable. In general, unstable bottom conditions may be mitigated by using a stabilizing geogrid (such as a Tensar BX 1100 or equivalent), overexcavating the excavation bottom to suitable depths and replacing with gravel wrapped in filter fabric, or other suitable method. Recommendations for stabilizing the excavation bottoms should be based on an evaluation in the field by Ninyo & Moore at the time of construction.

7.1.8. Underground Utilities

We recommend that utility lines be supported on 6 or more inches of granular bedding material such as sand with a sand equivalent value of 30 or higher. Bedding material should be placed around the pipe and 12 inches or more above the top of the pipe in accordance with specifications of the recent edition of the “Greenbook” (Standard Specifications for Public Works Construction). Special care should be taken not to allow voids beneath the pipe. Bedding material and compaction requirements should be in accordance with the recommendations of this report, the project specifications, and applicable requirements of the appropriate governing agency.

Based on our subsurface evaluation, the on-site earth materials should be generally suitable for re-use as trench backfill above the pipe zone provided they are free of organic material, clay lumps, debris, and rocks greater than approximately 3 inches in diameter. Fill should be moisture-conditioned to near the laboratory optimum. Trench backfill should be compacted to 90 percent of its modified Proctor density as evaluated by ASTM D 1557. Lift thickness for backfill will depend on the type of compaction equipment utilized, but fill should generally be placed in lifts not exceeding 8 inches in loose thickness. Special care should be exercised to avoid damaging the pipe during compaction of the backfill.

7.1.9. Seismic Design Parameters

Design of the proposed improvements should be in accordance with the requirements of governing jurisdictions and applicable building codes. Table 1 presents the seismic design parameters for the site in accordance with CBC (2010) guidelines and mapped spectral acceleration parameters (USGS, 2011).

Table 1 – 2010 California Building Code Seismic Design Criteria

Seismic Design Factors	Values
Site Class	D
Site Coefficient, F_a	1.0
Site Coefficient, F_v	1.5
Mapped Short Period Spectral Acceleration, S_s	1.595g
Mapped One-Second Period Spectral Acceleration, S_1	0.634g
Short Period Spectral Acceleration Adjusted For Site Class, S_{MS}	1.595g
One-Second Period Spectral Acceleration Adjusted For Site Class, S_{M1}	0.951g
Design Short Period Spectral Acceleration, S_{DS}	1.063g
Design One-Second Period Spectral Acceleration, S_{D1}	0.634g

7.2. Cast-In-Drilled-Hole Pile Foundation

Based on our discussions with Harris & Associates and Kleinfelder Simon Wong (structural engineer), we understand that the proposed light poles will be supported on 30-inch diameter cast-in-drilled-hole (CIDH) piles. The pile capacities were evaluated for static and seismic conditions using the design loads provided by the structural engineer. Foundations should be designed in accordance with structural considerations and the following recommendations. In addition, requirements of the appropriate governing jurisdictions and applicable building codes should be considered in the design of the structures.

7.2.1. Axial Capacity

As discussed in the earlier sections, there is a high potential for liquefaction up to a depth of approximately 43 feet bgs. We understand the proposed light poles will be designed to mitigate liquefaction induced dynamic settlement and downdrag. We recommend that CIDH piles penetrate into bay deposits, and to a depth of 7 feet or more beneath the depth of lique-

faction (43 feet). The allowable loads for the CIDH piles were analyzed using the computer program AllPile (CivilTech, 2007b) based on the assumed pile length of 50 feet. The calculated pile capacities are based on frictional capacity; end bearing was not considered in our analysis. The results are summarized in Table 2.

Table 2 – Axial Pile Capacity Evaluation

CIDH Pile Diameter (inches)	Pile Length (feet)	Loading Condition	Ultimate Downward Capacity (kips)	Allowable Loads (kips)	
				Compression	Tension
30	50	Static	180	12	12
		Seismic	14		

7.2.2. Lateral Capacity

The lateral pile capacity for 30-inch diameter CIDH piles was analyzed using the computer program AllPile (CivilTech, 2007b) based on an assumed pile length of 50 feet and the lateral loads provided by the structural engineer. Free-head conditions were assumed for the piles. The results indicate that an assumed 50 feet long pile would have a deflection of approximately ¼-inch at the pile head. The results of lateral capacity analyses are presented in Appendix D.

7.2.3. Construction Considerations for CIDH piles

Construction of CIDH piles should be observed by the geotechnical consultant during drilling to evaluate if the piles have been extended to the recommended depths. The drilled holes should be cleaned of loose soil and gravel. It is the contractor's responsibility to take the appropriate measures to provide for the integrity of the drilled holes and to see that the holes are cleaned and straight and that sloughed loose soil is removed from the bottom of the hole prior to the placement of concrete. Drilled CIDH piles should be checked for alignment and plumbness during installation. The amount of acceptable misalignment of a pile is approximately 3 inches from the plan location but may be reduced based on design criteria. The center-to-center spacing of piles should be no less than three times the nominal diameter of the pile.

Based on our boring data, groundwater should be anticipated within the excavation depth of foundations. We recommended that the contractor consider appropriate measures during construction to reduce the potential for caving of the drilled holes, including the use of steel casing and/or drilling mud. In addition, we recommend placement of concrete by tremie method to mitigate aggregate and cement segregation during concrete placement.

Contractors with proven records in the installation of CIDH piles should be considered. We recommend that the drilling equipment have a rated torque of 20,000 foot-pounds or more. During construction, a certified deep foundation inspector should document the diameter, depth, vertical alignment, and the nature of the materials encountered at each pile location. Reinforcing steel and concrete placement should be continuously observed by Ninyo & Moore. A quality control report should be submitted for each pile stating, in writing, that the design details have been observed and meet the requirements.

7.3. Corrosion

Laboratory testing was performed on a representative sample of the on-site earth materials to evaluate pH and electrical resistivity, as well as chloride and sulfate contents. The pH and electrical resistivity tests were performed in accordance with California Test (CT) 643 and the sulfate and chloride content tests were performed in accordance with CT 417 and CT 422, respectively. These laboratory test results are presented in Appendix B.

The results of the corrosivity testing indicated an electrical resistivity of 1,700 ohm-centimeters (cm), soil pH of 9.7, chloride content of 85 parts per million (ppm) and sulfate content of 0.020 percent (i.e., 200 ppm). However, the results of previous corrosivity testing on a soil sample (Ninyo & Moore, 2011) indicated an electrical resistivity of 770 ohm-cm, soil pH of 7.8, chloride content of 600 ppm and sulfate content of 0.032 percent (i.e., 320 ppm). Based on the Caltrans corrosion (2012) criteria, our test results, and the marine environment, the on-site soils would be classified as corrosive. Corrosive soils are defined as soils with more than 500 ppm chlorides, more than 0.2 percent sulfates, pH less than 5.5, or an electrical resistivity of 1,000 ohm-cm or

less. If corrosion-susceptible improvements are planned on site, we recommend that a corrosion engineer be consulted for further evaluation and recommendations.

7.4. Concrete

Concrete in contact with soil or water that contains high concentrations of water-soluble sulfates can be subject to premature chemical and/or physical deterioration. The soil sample tested in this evaluation indicated water-soluble sulfate content of 0.020 percent by weight (200 ppm). According to American Concrete Institute (ACI) 318, the potential for sulfate attack is negligible for water-soluble sulfate contents in soil ranging from 0.00 to 0.10 percent by weight (i.e., 0 to 1,000 ppm). Therefore, the site soils may be considered to have a negligible potential for sulfate attack. However, due to the potential variability of site soils and the marine environment, we recommend using Type II/V cement for concrete structures in contact with soil with a water-cement ratio no higher than 0.45 by weight for normal weight aggregate concrete and a 28-day compressive strength of 4,500 pounds per square inch (psi) or more for the project.

7.5. Preliminary Pavement Design

The on-site fill material was evaluated to have an R-value of 43. We assumed an R-value of 40 for flexible pavement design. We recommend that the import fill materials, if used, should have an R-value of 40 or greater. Actual pavement recommendations should be based on R-value tests performed on bulk samples of the soils that are exposed at the finished subgrade elevations across the site at the completion of the mass grading operations.

For the design of pavements, Harris & Associates provided us a Traffic Index (TI) of 12.0 due to the anticipated heavy truck traffic, rubber-tired gantry crane or top loader traffic, and container loading. The recommended preliminary flexible pavement section alternatives are presented in Table 3. However, we recommend that we re-evaluate the pavement design, based on the R-value of the subgrade material exposed at the time of construction.

Table 3 – Recommended Preliminary Flexible Pavement Section Alternatives

Traffic Index	R-Value	Asphalt Concrete (in)	Class 2 Aggregate Base (in)	Cement Treated Base (in)
12.0	40	7.0	15.0	--
12.0	40	4.5	--	13.5

We recommend that the upper 12 inches of the subgrade be compacted to 95 percent of its Proctor density as evaluated by ASTM D 1557. The Class 2 Aggregate Base should be compacted to 95 percent of its Proctor density as evaluated by ASTM D 1557. If TI value is different from that assumed, the pavement design should be re-evaluated.

Alternatively, Portland cement concrete pavements may be used. We recommend that in these areas, 10 inches of 600 pounds per square inch (psi) flexural strength Portland cement concrete be placed over 10 inches of Class 2 Aggregate Base compacted to 95 percent of its Proctor density as evaluated by ASTM D 1557. We recommend that the concrete pavement be reinforced with No. 3 bars spaced 18 inches on center.

7.6. Plan Review and Construction Observation

The conclusions and recommendations presented in this report are based on analysis of observed conditions in widely spaced exploratory borings. If conditions are found to vary from those described in this report, Ninyo & Moore should be notified, and additional recommendations will be provided upon request. Ninyo & Moore should review the final project drawings and specifications prior to the commencement of construction. Ninyo & Moore should perform the needed observation and testing services during construction operations.

The recommendations provided in this report are based on the assumption that Ninyo & Moore will provide geotechnical observation and testing services during construction. In the event that it is decided not to utilize the services of Ninyo & Moore during construction, we request that the selected consultant provide the client with a letter (with a copy to Ninyo & Moore) indicating that they fully understand Ninyo & Moore's recommendations, and that they are in full agreement with the design parameters and recommendations contained in this

report. Construction of proposed improvements should be performed by qualified subcontractors utilizing appropriate techniques and construction materials.

8. LIMITATIONS

The field evaluation, laboratory testing, and geotechnical analyses presented in this report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be encountered during construction. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation will be performed upon request. Please also note that our evaluation was limited to assessment of the geotechnical aspects of the project, and did not include evaluation of structural issues, environmental concerns, or the presence of hazardous materials.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

This report is intended for design purposes only. It does not provide sufficient data to prepare an accurate bid by contractors. It is suggested that the bidders and their geotechnical consultant perform an independent evaluation of the subsurface conditions in the project areas. The independent evaluations may include, but not be limited to, review of other geotechnical reports prepared for the adjacent areas, site reconnaissance, and additional exploration and laboratory testing.

Our conclusions, recommendations, and opinions are based on an analysis of the observed site conditions. If geotechnical conditions different from those described in this report are encountered, our office should be notified, and additional recommendations, if warranted, will be provided upon request. It should be understood that the conditions of a site could change with time as a result of

natural processes or the activities of man at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

9. REFERENCES

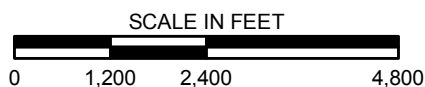
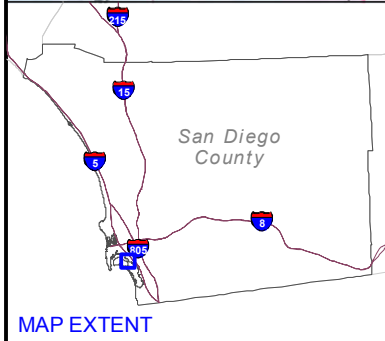
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AERIAL PHOTOGRAPHS				
Source	Date	Flight	Numbers	Scale
USDA	3-31-53	AXN-3M	196 and 198	1:20,000



SOURCE: 2008 Thomas Guide for San Diego County, Street Guide and Directory; Map © Rand McNally, R.L.07-S-129



NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE

Ninyo & Moore

SITE LOCATION

FIGURE

PROJECT NO.

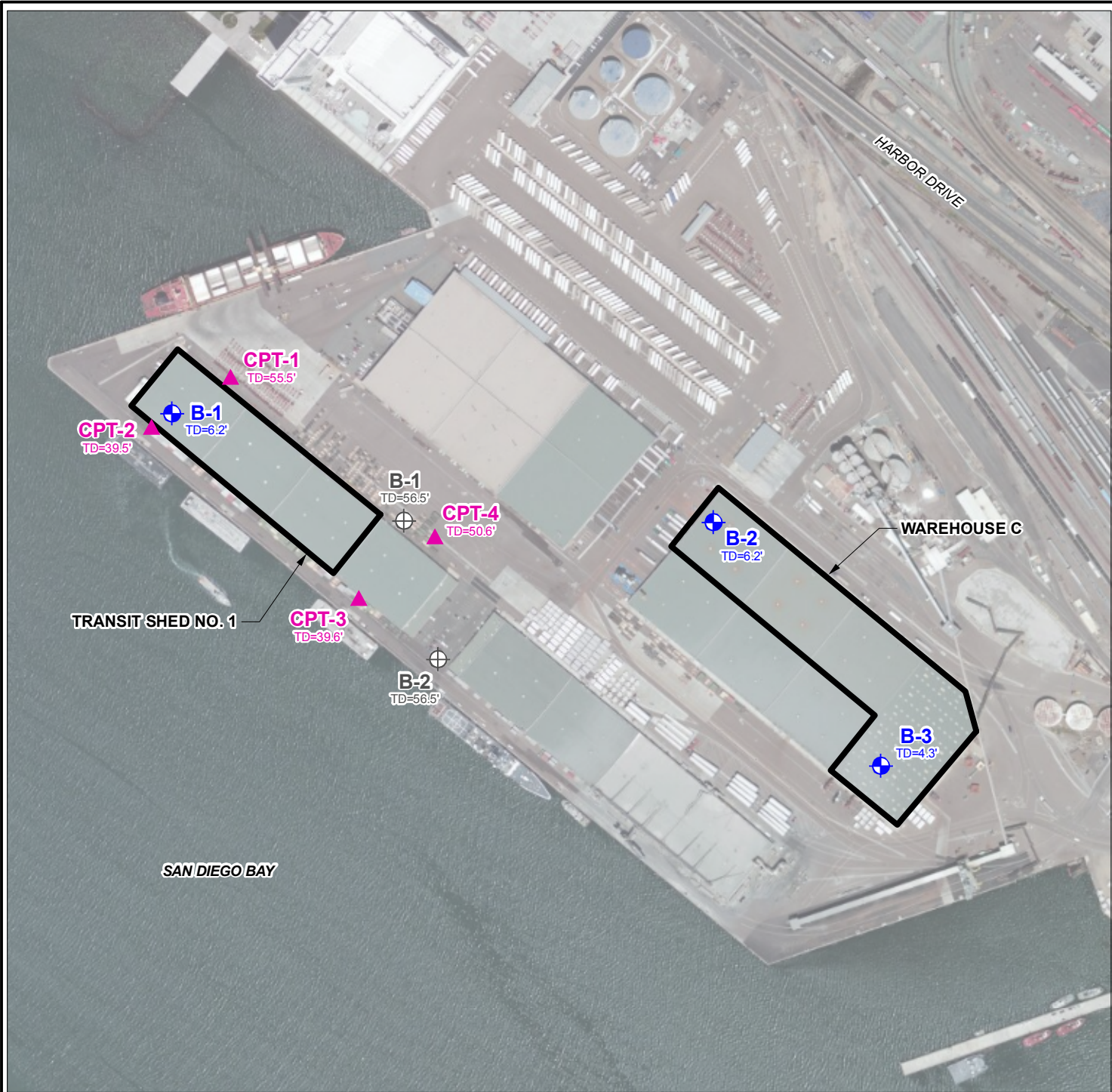
DATE

PROPOSED CONTAINER STORAGE AREAS AND LIGHT POLES
10TH AVENUE MARINE TERMINAL
SAN DIEGO, CALIFORNIA

107589003

11/13

1



SOURCE: Aerial Imagery - Photo Date: Feb 11, 2010, ESRI, icubed, USDA FSA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGP.

LEGEND



B-3
TD=4.3'

BORING
TD=TOTAL DEPTH IN FEET



CPT-4
TD=50.6'

CONE PENETRATION TEST (CPT)
TD=TOTAL DEPTH IN FEET

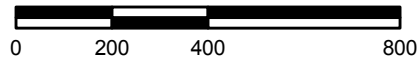


B-2
TD=56.5'

PREVIOUS NINYO & MOORE BORING (2011)
TD=TOTAL DEPTH IN FEET



SCALE IN FEET



NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE

Ninyo & Moore

BORING AND CPT LOCATIONS

FIGURE

PROJECT NO.

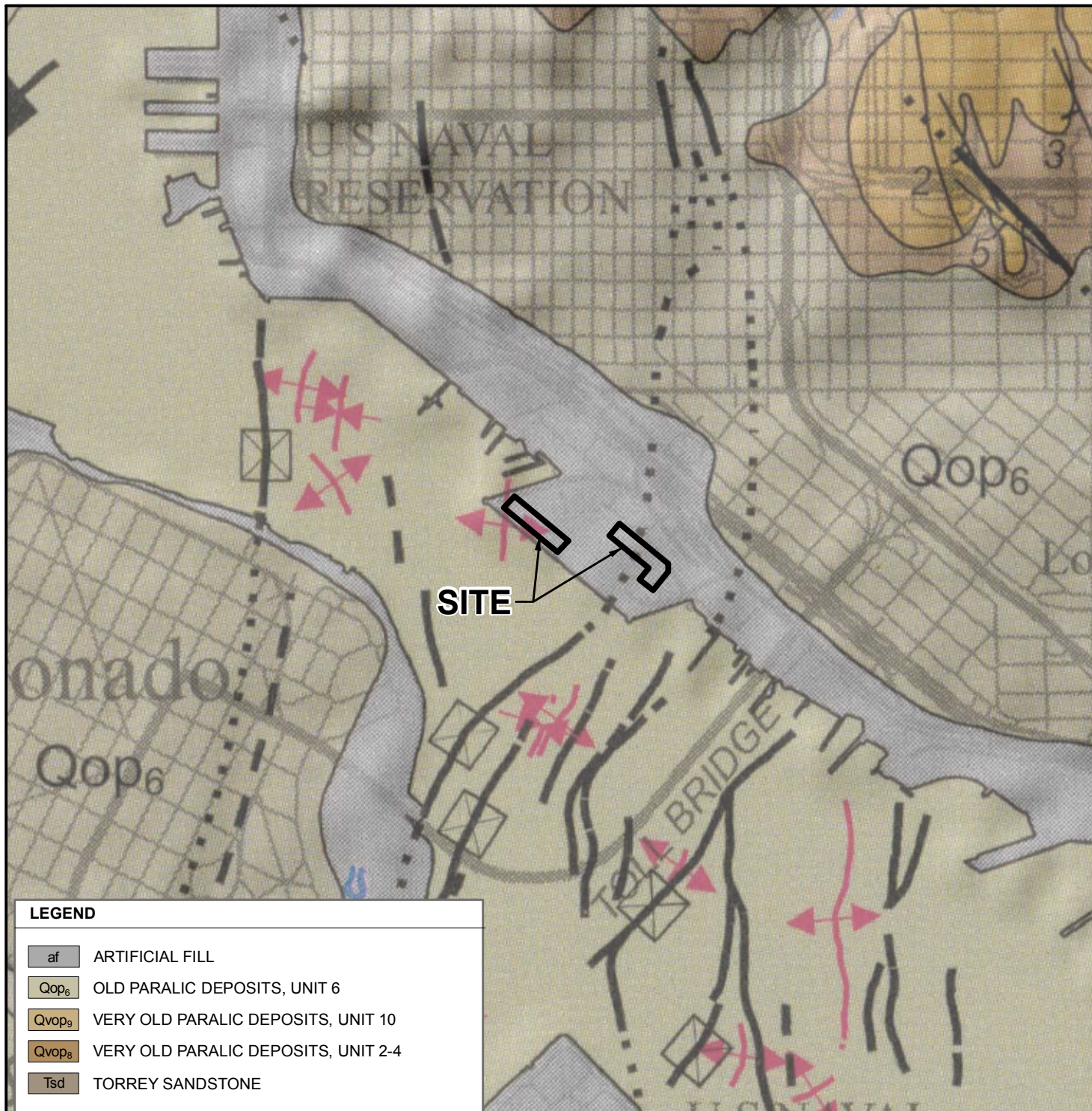
DATE

PROPOSED CONTAINER STORAGE AREAS AND LIGHT POLES
10TH AVENUE MARINE TERMINAL
SAN DIEGO, CALIFORNIA

107589003

11/13

2



LEGEND

- af ARTIFICIAL FILL
- Qop₆ OLD PARALIC DEPOSITS, UNIT 6
- Qvop₉ VERY OLD PARALIC DEPOSITS, UNIT 10
- Qvop₈ VERY OLD PARALIC DEPOSITS, UNIT 2-4
- Tsd TORREY SANDSTONE

65

$\frac{U}{D}$ FAULT - SOLID WHERE ACCURATELY LOCATED, DASHED WHERE APPROXIMATE, DOTTED WHERE CONCEALED. ARROW AND NUMBER INDICATE DIRECTION AND ANGLE OF DIP OF FAULT PLANE

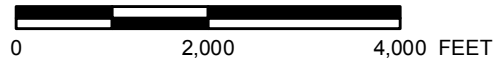
..... ANTICLINE - SOLID WHERE WELL DEFINED; SHORT DASH WHERE INFERRED

..... SYNCLINE - SOLID WHERE WELL DEFINED; SHORT DASH WHERE INFERRED

SOURCE: KENNEDY, M.P., AND TAN, S.S., 2008, GEOLOGIC MAP OF THE SAN DIEGO 30' X 60' QUADRANGLE, CALIFORNIA



APPROXIMATE SCALE



NOTES: ALL DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE

Ninyo & Moore

GEOLOGY

FIGURE

PROJECT NO.

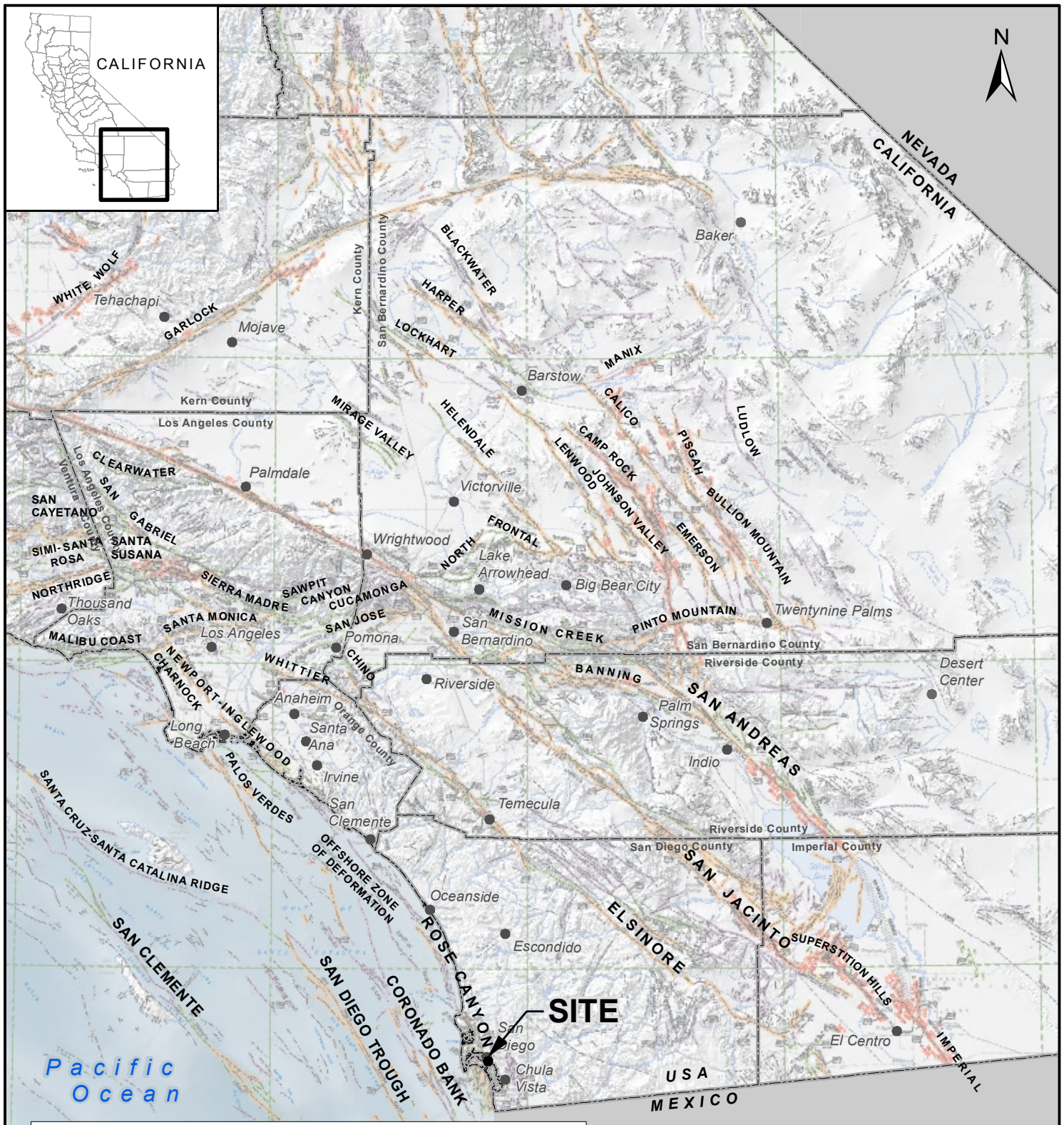
DATE

PROPOSED CONTAINER STORAGE AREAS AND LIGHT POLES
10TH AVENUE MARINE TERMINAL
SAN DIEGO, CALIFORNIA

107589003

11/13

3



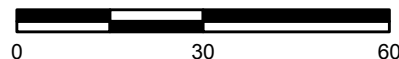
SOURCE: JENNINGS, C.W., AND BRYANT, W.A., 2010, FAULT ACTIVITY MAP OF CALIFORNIA, CALIFORNIA GEOLOGICAL SURVEY.

LEGEND

CALIFORNIA FAULT ACTIVITY

- HISTORICALLY ACTIVE
- HOLOCENE ACTIVE
- LATE QUATERNARY (POTENTIALLY ACTIVE)
- QUATERNARY (POTENTIALLY ACTIVE)
- STATE/COUNTY BOUNDARY

SCALE IN MILES



NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE.

Ninyo & Moore

FAULT LOCATIONS

FIGURE

PROJECT NO.

DATE

PROPOSED CONTAINER STORAGE AREAS AND LIGHT POLES
10TH AVENUE MARINE TERMINAL
SAN DIEGO, CALIFORNIA

107589003

11/13

4

APPENDIX A

BORING AND CPT LOGS

Field Procedure for the Collection of Disturbed Samples

Disturbed soil samples were obtained in the field using the following method.


Bulk Samples

Bulk samples of representative earth materials were obtained from the exploratory borings. The samples were bagged and transported to the laboratory for testing.

Field Procedure for CPT

The CPT described in this report was conducted by Kehoe Testing Inc. of Huntington Beach, California, in general accordance with ASTM D 5778. The cone penetrometer assembly used for this project consisted of a conical tip and a cylindrical friction sleeve. The conical tip had an apex angle of 60 degrees and a diameter of approximately 1.7 inches resulting in a projected cross-sectional area of approximately 2.3 square inches. The cylindrical friction sleeve was approximately 6.33 inches long and had an outside diameter of approximately 1.7 inches, resulting in a surface area of approximately 34 square inches. The interior of the CPT probe was instrumented with strain gauges that allowed simultaneous measurement of cone tip and friction sleeve resistance during penetration. The cone was hydraulically pushed into the soil using the reaction mass of a specially designed 30-ton truck at a constant rate of approximately 4 feet per minute while the cone tip resistance and sleeve friction resistance were recorded at an approximately 1-inch interval and stored in digital form. The computer-generated logs presented in the following pages include cone resistance, friction resistance, friction ratio, equivalent SPT blow counts, and interpreted soil types. The soil type interpretations were based on the method proposed by Robertson and Campanella (1990).

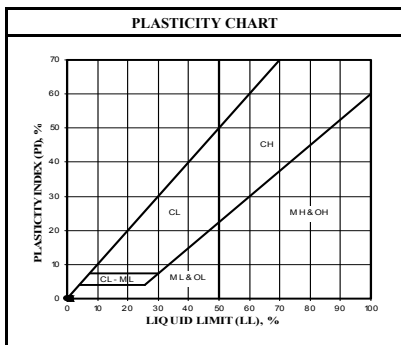
DEPTH (feet)	SAMPLES Bulk Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	BORING LOG EXPLANATION SHEET
0							Bulk sample. Modified split-barrel drive sampler. No recovery with modified split-barrel drive sampler. Sample retained by others. Standard Penetration Test (SPT). No recovery with a SPT. Shelby tube sample. Distance pushed in inches/length of sample recovered in inches. No recovery with Shelby tube sampler. Continuous Push Sample. Seepage. Groundwater encountered during drilling. Groundwater measured after drilling.
5		XX/XX					
10						SM	ALLUVIUM: Solid line denotes unit change. Dashed line denotes material change.
15							Attitudes: Strike/Dip b: Bedding c: Contact j: Joint f: Fracture F: Fault cs: Clay Seam s: Shear bss: Basal Slide Surface sf: Shear Fracture sz: Shear Zone sbs: Sheared Bedding Surface
20							The total depth line is a solid line that is drawn at the bottom of the boring.



BORING LOG		
EXPLANATION OF BORING LOG SYMBOLS		
PROJECT NO.	DATE Rev. 01/03	FIGURE

U.S.C.S. METHOD OF SOIL CLASSIFICATION				
MAJOR DIVISIONS		SYMBOL	TYPICAL NAMES	
COARSE-GRAINED SOILS (More than 1/2 of soil >No. 200 sieve size)	GRAVELS (More than 1/2 of coarse fraction > No. 4 sieve size)		GW	Well graded gravels or gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
			GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS (More than 1/2 of coarse fraction <No. 4 sieve size)		SW	Well graded sands or gravelly sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
			SM	Silty sands, sand-silt mixtures
FINE-GRAINED SOILS (More than 1/2 of soil <No. 200 sieve size)	SILTS & CLAYS Liquid Limit <50		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean
			OL	Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS Liquid Limit >50		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
	HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils

GRAIN SIZE CHART		
CLASSIFICATION	RANGE OF GRAIN SIZE	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDERS	Above 12"	Above 305
COBBLES	12" to 3"	305 to 76.2
GRAVEL Coarse Fine	3" to No. 4	76.2 to 4.76
	3" to 3/4"	76.2 to 19.1
SAND Coarse Medium Fine	3/4" to No. 4	19.1 to 4.76
	No. 4 to No. 200	4.76 to 0.075
	No. 4 to No. 10	4.76 to 2.00
	No. 10 to No. 40	2.00 to 0.420
SILT & CLAY	No. 40 to No. 200	0.420 to 0.075
	Below No. 200	Below 0.075




Ninyo & Moore	U.S.C.S. METHOD OF SOIL CLASSIFICATION
--------------------------	--

DEPTH (feet)	BULK SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED 9/16/13 BORING NO. B-1
							GROUND ELEVATION 10' ± (MSL) SHEET 1 OF 1
							METHOD OF DRILLING Hand Auger
							DRIVE WEIGHT N/A DROP N/A
							SAMPLED BY GS LOGGED BY GS REVIEWED BY RDH
DESCRIPTION/INTERPRETATION							
0						SP-SM	<p>ASPHALT CONCRETE: Approximately 3 inches.</p> <p>AGGREGATE BASE: Approximately 9 inches thick.</p> <p>FILL: Grayish brown, moist, loose, poorly graded SAND with silt; scattered shell fragments; trace gravel (up to 3 inches).</p>
5							
10							
15							
20							<p>Total Depth = 6.2 feet. Groundwater not encountered. Backfilled and capped with concrete on 9/16/13.</p> <p><u>Note:</u> Groundwater, though not encountered at the time of excavation, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.</p>

Ninyo & Moore		BORING LOG	
		PROPOSED CONTAINER STORAGE AREAS AND LIGHT POLES 10TH AVENUE MARINE TERMINAL, SAN DIEGO, CALIFORNIA	
		PROJECT NO. 107589003	DATE 11/13

FIGURE A-1


DEPTH (feet)	Bulk Samples Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	B-2			
							DATE DRILLED	9/16/13	BORING NO.	
GROUND ELEVATION <u>10' ± (MSL)</u> SHEET <u>1</u> OF <u>1</u> METHOD OF DRILLING <u>Hand Auger</u> DRIVE WEIGHT <u>N/A</u> DROP <u>N/A</u> SAMPLED BY <u>GS</u> LOGGED BY <u>GS</u> REVIEWED BY <u>RDH</u>										
DESCRIPTION/INTERPRETATION ASPHALT CONCRETE: Approximately 3-1/2 inches thick. AGGREGATE BASE: Approximately 7-1/2 inches thick. FILL: Light grayish brown, damp, loose, poorly graded fine SAND. SC Light grayish brown, moist, medium dense, clayey fine SAND; scattered shell fragments. SP Light grayish brown, moist to wet, loose to medium dense, poorly graded fine SAND; scattered shell fragments; trace gravel. Total Depth = 6.2 feet. Groundwater not encountered. Backfilled and capped with concrete on 9/16/13. <u>Note:</u> Groundwater, though not encountered at the time of excavation, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.										



BORING LOG
 PROPOSED CONTAINER STORAGE AREAS AND LIGHT POLES
 10TH AVENUE MARINE TERMINAL, SAN DIEGO, CALIFORNIA

PROJECT NO.	DATE	FIGURE
107589003	11/13	A-2

DEPTH (feet)	Bulk Samples Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	B-3			
							DATE DRILLED	9/16/13	BORING NO.	
GROUND ELEVATION <u>10' ± (MSL)</u> SHEET <u>1</u> OF <u>1</u> METHOD OF DRILLING <u>Hand Auger</u> DRIVE WEIGHT <u>N/A</u> DROP <u>N/A</u> SAMPLED BY <u>GS</u> LOGGED BY <u>GS</u> REVIEWED BY <u>RDH</u>										
DESCRIPTION/INTERPRETATION ASPHALT CONCRETE: Approximately 4 inches thick. AGGREGATE BASE: Approximately 7 inches thick. FILL: Yellowish brown, moist, medium dense, silty fine SAND; trace shell fragments; trace cobbles; few gravel. SM Grinding on gravel/cobbles. Total Depth = 4.3 feet. (Refusal on gravel cobbles.) Groundwater not encountered. Backfilled and capped with concrete on 9/16/13. <u>Note:</u> Groundwater, though not encountered at the time of excavation, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.										



BORING LOG
 PROPOSED CONTAINER STORAGE AREAS AND LIGHT POLES
 10TH AVENUE MARINE TERMINAL, SAN DIEGO, CALIFORNIA

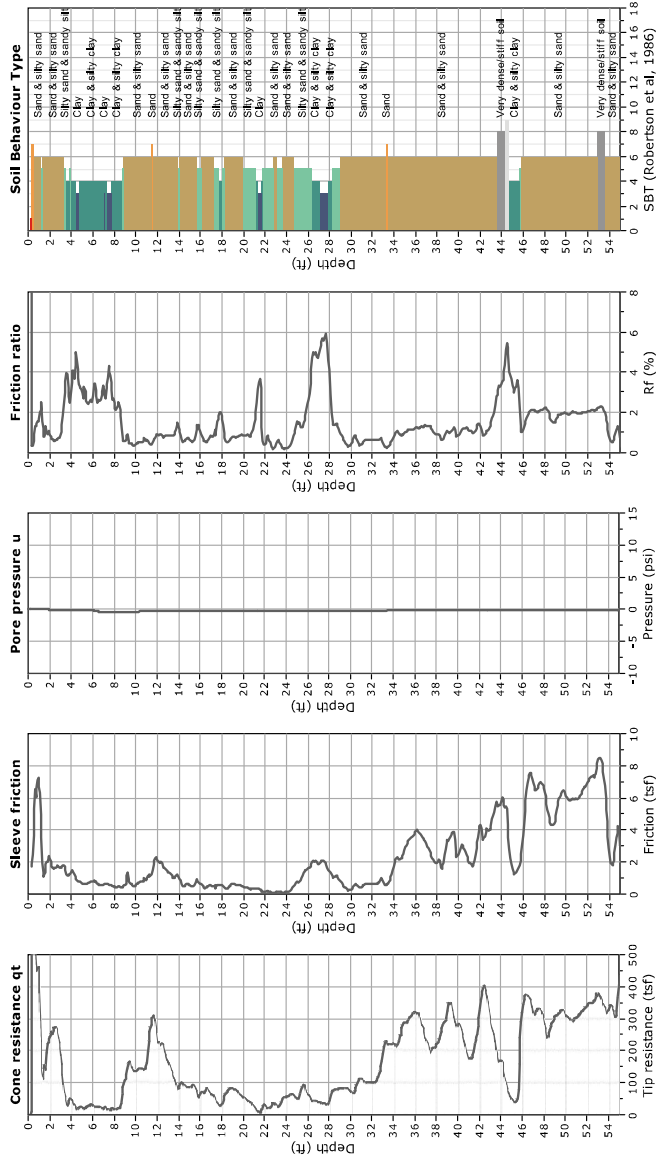
PROJECT NO.	DATE	FIGURE
107589003	11/13	A-3



Kehoe Testing and Engineering
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

Project: Ninyo & Moore/10th Avenue Marine Terminal
Location: Water St. & Crosby Rd. San Diego, CA

CPT: CPT-1
Total depth: 55.45 ft. Date: 10/11/2013
Cone Type: Vertek



CPT-JT v.1.7.6.3 - CPTU data presentation & interpretation software - Report created on: 10/11/2013, 3:39:02 PM
Project file: C:\NinyoSanDiego\10-13\CPT Data\Mat Data\MatScpt

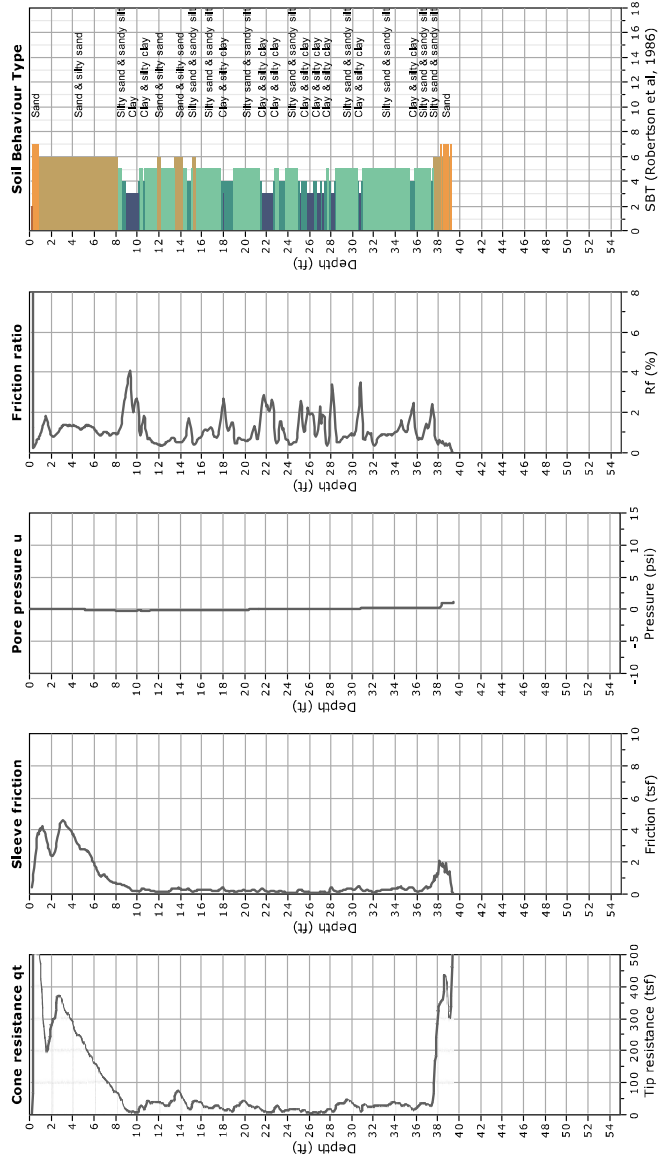
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Kehoe Testing and Engineering
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

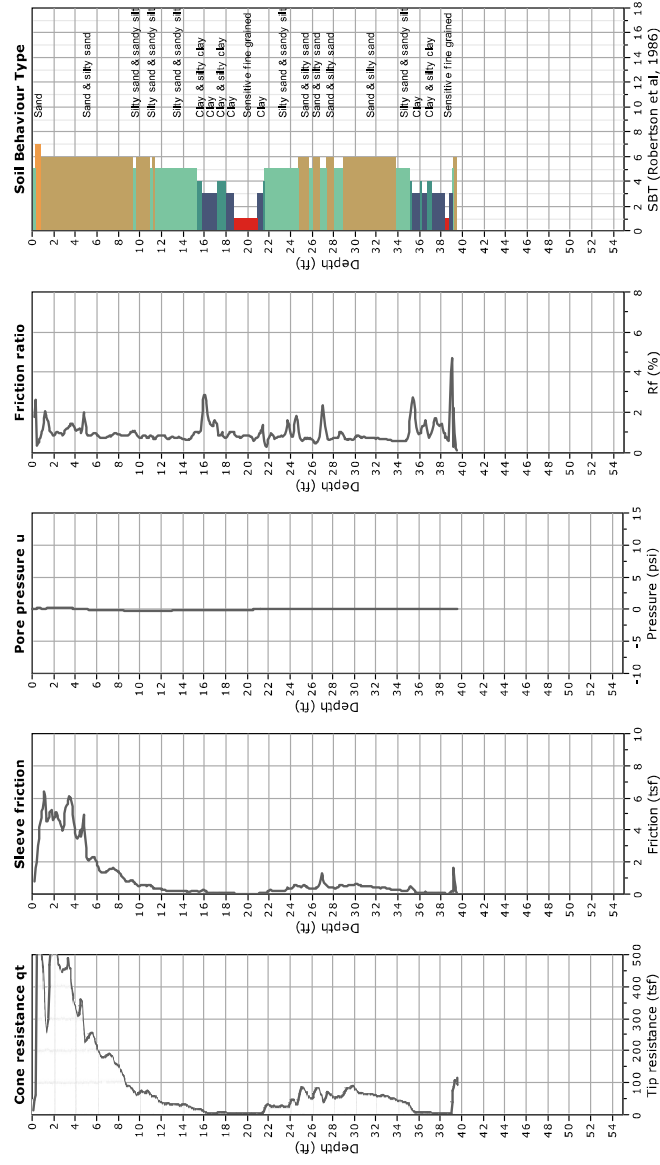
Project: Ninyo & Moore/10th Avenue Marine Terminal
Location: Water St. & Crosby Rd. San Diego, CA

CPT: CPT-2
Total depth: 39.47 ft. Date: 10/11/2013
Cone Type: Vertek



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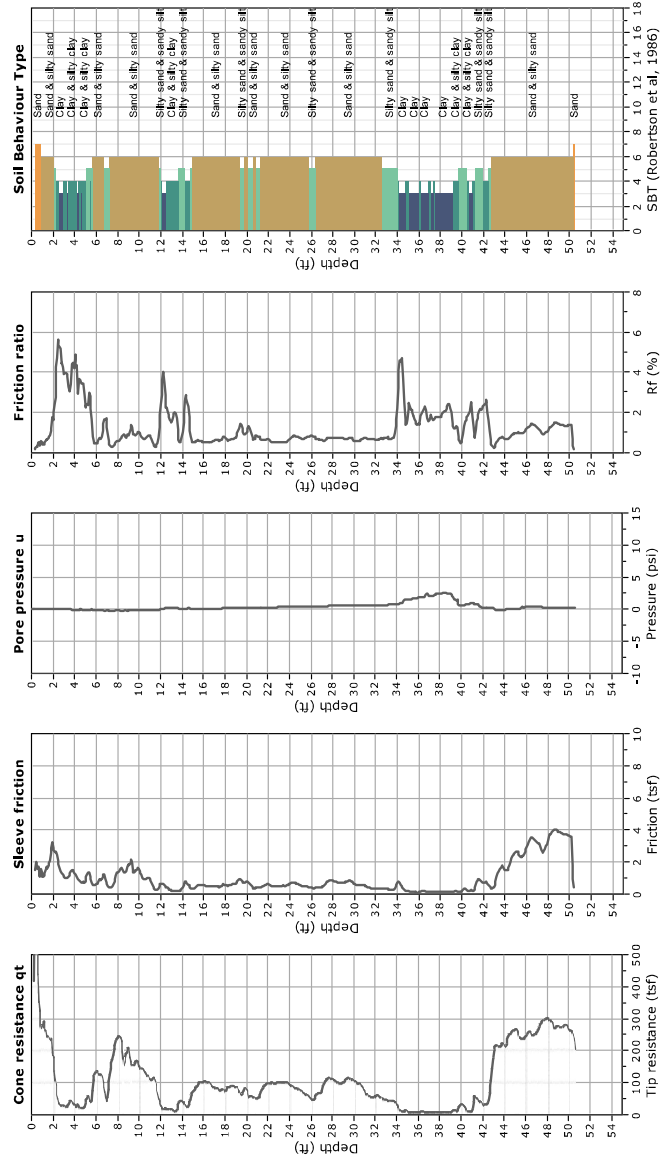
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CPeT-IT v.1.7.6.3 - CPTU data presentation & interpretation software - Report created on: 10/11/2013, 3:41:54 PM
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CPeT-IT v.1.7.6.3 - CPTU data presentation & interpretation
Project file: C:\NinyoSanDiego10-13\CPeT Data\Plot Data\Plots.cpt

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CPeT-IT v.1.7.6.3 - CPTU data presentation & interpretation software - Report created on: 10/11/2013, 3:43:54 PM
Project file: C:\NinyoSanDiego10-13\CPeT Data\Plot Data\Plots.cpt

CPeT-IT v.1.7.6.3 - CPTU data presentation & interpretation
Project file: C:\NinyoSanDiego\10-13\CPeT Data\Plot Data\plots.cpt

0

APPENDIX B

LABORATORY TESTING

Classification

Soils were visually and texturally classified in accordance with the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488. Soil classifications are indicated on the logs of the exploratory borings in Appendix A.

In-Place Moisture and Density Tests

The moisture content and dry density of relatively undisturbed samples obtained from the exploratory borings were evaluated in general accordance with ASTM D 2937. The test results are presented on the logs of the exploratory borings in Appendix A.

Gradation Analysis

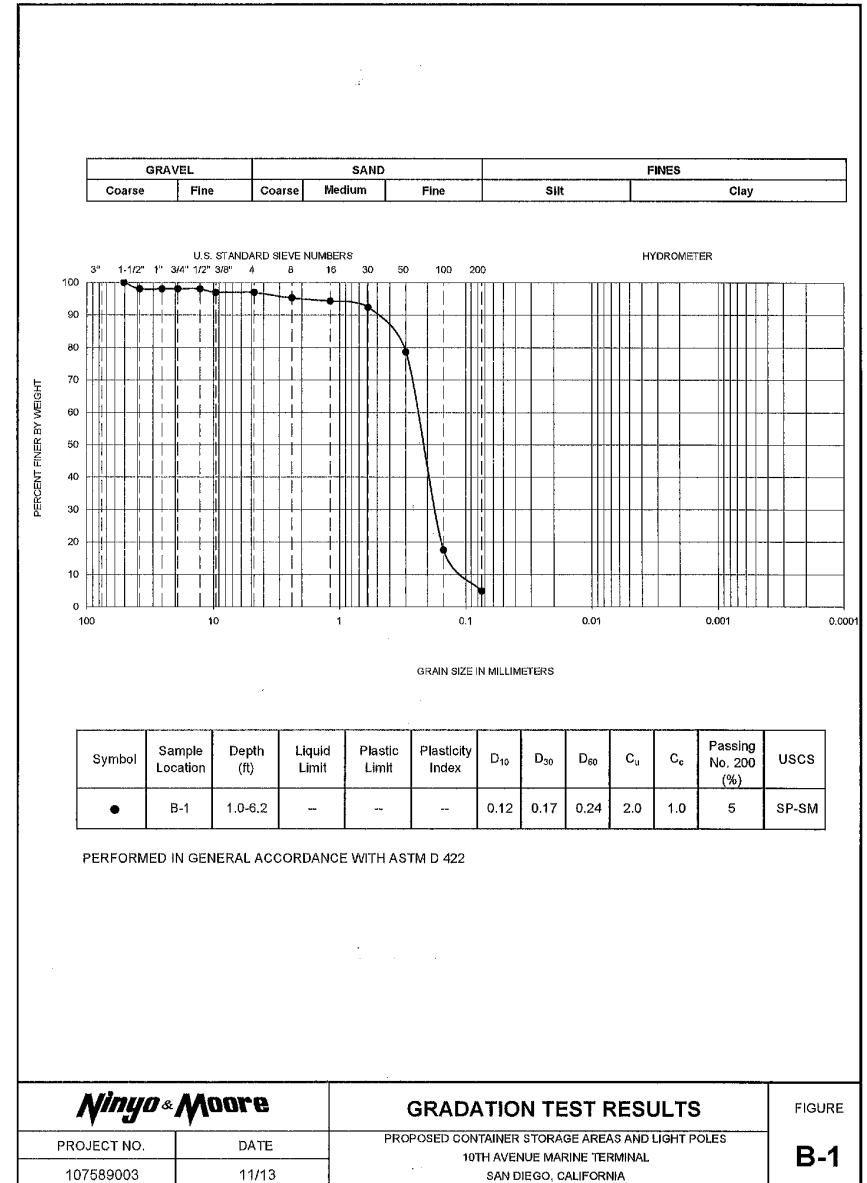
Gradation analysis tests were performed on selected representative soil sample in general accordance with ASTM D 422. The grain-size distribution curve is shown on Figures B-1. The test results were utilized in evaluating the soil classifications in accordance with the USCS.

Soil Corrosivity Tests

Soil pH, and resistivity tests were performed on a representative sample in general accordance with CT 643. The soluble sulfate and chloride content of the selected samples were evaluated in general accordance with CT 417 and CT 422, respectively. The test results are presented on Figure B-2.

R-Value

The resistance value, or R-value, for site soils was evaluated in general accordance with CT 301. Samples were prepared and evaluated for exudation pressure and expansion pressure. The equilibrium R-value is reported as the lesser or more conservative of the two calculated results. The test results are shown on Figure B-3.



SAMPLE LOCATION	SAMPLE DEPTH (FT)	pH ¹	RESISTIVITY ¹ (Ohm-cm)	SULFATE CONTENT ²		CHLORIDE CONTENT ³ (ppm)
				(ppm)	(%)	
B-2	2.5-4.5	9.7	1,700	200	0.020	85

¹ PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 643

² PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 417

³ PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 422

Ninyo & Moore		CORROSIVITY TEST RESULTS	FIGURE B-2
PROJECT NO.	DATE	PROPOSED CONTAINER STORAGE AREAS AND LIGHT POLES 10TH AVENUE MARINE TERMINAL SAN DIEGO, CALIFORNIA	
107589003	11/13		

SAMPLE LOCATION	SAMPLE DEPTH (FT)	SOIL TYPE	R-VALUE
B-2	2.5-4.5	Clayey SAND (SC)	43

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2844/CT 301

Ninyo & Moore		R-VALUE TEST RESULTS	FIGURE B-3
PROJECT NO.	DATE	PROPOSED CONTAINER STORAGE AREAS AND LIGHT POLES 10TH AVENUE MARINE TERMINAL SAN DIEGO, CALIFORNIA	
107589003	11/13		

10th Avenue Marine Terminal
San Diego, California

November 11, 2013
Project No. 107589003

APPENDIX C
PREVIOUS BORING LOGS AND LAB DATA (2011)

107589003 R.doc

DEPTH (feet)	SAMPLES Bulk Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED	BORING NO.				
							11/10/11	B-1				
							GROUND ELEVATION	SHEET	1	OF	2	
							METHOD OF DRILLING 8" Diameter Hollow Stem Auger (Scott's Drilling)					
							DRIVE WEIGHT	140 lbs. (Auto-Trip)	DROP	30"		
							SAMPLED BY	CER	LOGGED BY	CER	REVIEWED BY	SG
							DESCRIPTION/INTERPRETATION					
0						GP	ASPHALT CONCRETE: Approximately 8.5 inches thick.					
						SP-SM	FILL: Gray, damp, medium dense, poorly graded GRAVEL; ballast rock.					
		9					Brown, moist, medium dense, poorly graded SAND; few silt and shells.					
						SM	Brown, wet, medium dense, silty medium SAND; few gravel and shells. Saturated. (Groundwater measured during drilling.)					
10		33	17.6	110.5								
		6					Loose; no recovery.					
20		24	24.9	93.1		SP	Brownish gray, saturated, medium dense, poorly graded fine SAND; trace silt.					
		5					Loose.					
30		7	17.9	110.5		CL	Brown, saturated, firm, sandy CLAY; few shells.					
		0				SM	Gray, saturated, very loose, silty fine SAND.					
40						CL	BAY DEPOSITS:					

Ningo & Moore

BORING LOG


10TH AVENUE MARINE TERMINAL
TERMINAL STREET, SAN DIEGO, CALIFORNIA

PROJECT NO.
107049004

DATE
12/11

FIGURE
A-1


DEPTH (feet)	SAMPLES	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>11/10/11</u> BORING NO. <u>B-1</u>	
							GROUND ELEVATION <u>9' ± (MSL)</u> SHEET <u>2</u> OF <u>2</u>	
METHOD OF DRILLING <u>8" Diameter Hollow Stem Auger (Scott's Drilling)</u>							DRIVE WEIGHT <u>140 lbs. (Auto-Trip)</u> DROP <u>30"</u>	
SAMPLED BY <u>CER</u> LOGGED BY <u>CER</u> REVIEWED BY <u>SG</u>							DESCRIPTION/INTERPRETATION	
40		18	28.6	98.5		CL	Grayish brown, saturated, very stiff, sandy CLAY; fine sand; few shells. BAY DEPOSITS: (Continued) Grayish brown, saturated, very stiff, sandy CLAY; fine sand; few shells.	
						SP	Brown, saturated, very dense, poorly graded fine to coarse SAND.	
		76						
50		98/9"	23.6	100.9				
		82					Fine to medium sand.	
60							Total Depth = 56.5 feet. Groundwater encountered at approximately 8.5 feet during drilling. Backfilled with approximately 19.9 cubic feet of bentonite grout and capped with black dyed concrete shortly after drilling on 11/10/11.	
70							Note: Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.	
80								



BORING LOG
 10TH AVENUE MARINE TERMINAL
 TERMINAL STREET, SAN DIEGO, CALIFORNIA

PROJECT NO. 107049004	DATE 12/11	FIGURE A-2
--------------------------	---------------	---------------

DEPTH (feet)	SAMPLES	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>11/10/11</u> BORING NO. <u>B-2</u>	
							GROUND ELEVATION <u>9' ± (MSL)</u> SHEET <u>1</u> OF <u>2</u>	
METHOD OF DRILLING <u>8" Diameter Hollow Stem Auger (Scott's Drilling)</u>							DRIVE WEIGHT <u>140 lbs. (Auto-Trip)</u> DROP <u>30"</u>	
SAMPLED BY <u>CER</u> LOGGED BY <u>CER</u> REVIEWED BY <u>SG</u>							DESCRIPTION/INTERPRETATION	
0						SM	ASPHALT CONCRETE: Approximately 4 inches thick.	
						SC	FILL: Brown, damp, medium dense, silty SAND; some gravel. Brown, moist, medium dense, clayey fine SAND.	
		35	4.2	109.2		SP-SM	Brown, damp, medium dense, poorly graded medium SAND; few silt and shells.	
							Saturated. (Groundwater measured during drilling)	
10		7				SP	Gray, saturated, loose, poorly graded fine to coarse SAND; few shells.	
		8	25.3	102.6				
20		6				SP-SM	Gray, saturated, loose, poorly graded fine to coarse SAND with silt; trace gravel.	
		14	16.0	106.7		SP	Gray, saturated, loose, poorly graded fine to medium SAND; trace silt.	
30		17				SP-SM	Brown, saturated, medium dense, poorly graded SAND; few silt and shells.	
		5				SC	BAY DEPOSITS: Dark brown, saturated, very loose, clayey fine SAND.	
40								



BORING LOG
 10TH AVENUE MARINE TERMINAL
 TERMINAL STREET, SAN DIEGO, CALIFORNIA

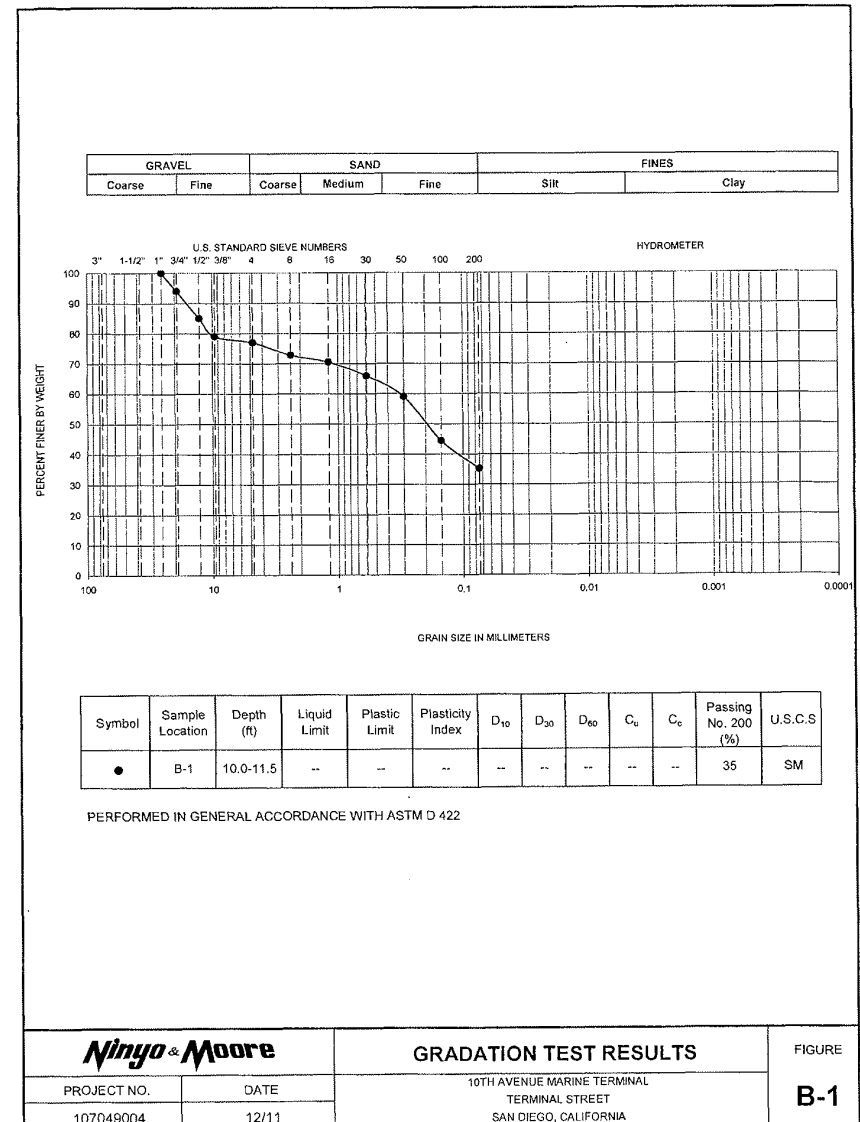
PROJECT NO. 107049004	DATE 12/11	FIGURE A-3
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DEPTH (feet)	SAMPLES Bulk Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED 11/10/11 BORING NO. B-2	
							GROUND ELEVATION 9' ± (MSL) SHEET 2 OF 2	
METHOD OF DRILLING 8" Diameter Hollow Stem Auger (Scott's Drilling)							DRIVE WEIGHT 140 lbs. (Auto-Trip) DROP 30"	
SAMPLED BY CER LOGGED BY CER REVIEWED BY SG							DESCRIPTION/INTERPRETATION	
40	10				SM	BAY DEPOSITS: (Continued) Brown, saturated, medium dense, silty fine SAND.		
	50/6"	15.5	110.6			Very dense; some gravel.		
50	21				CL	Reddish brown, saturated, hard, sandy CLAY; fine sand.		
	43	18.5	112.8		SC	Reddish brown, saturated, dense, clayey fine SAND.		
Total Depth = 56.5 feet. Groundwater encountered at approximately 8.5 feet during drilling. Backfilled with approximately 19.9 cubic feet of bentonite grout and capped with black dyed concrete shortly after drilling on 11/10/11.								
<u>Note:</u> Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.								

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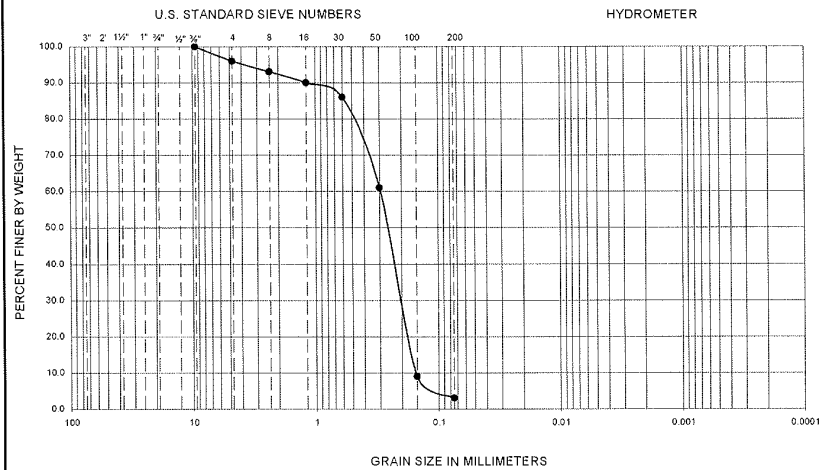
BORING LOG
 10TH AVENUE MARINE TERMINAL
 TERMINAL STREET, SAN DIEGO, CALIFORNIA

PROJECT NO. 107049004	DATE 12/11	FIGURE A-4
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107049004 SIEVE B-1 @ 10.0-11.5 ft

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ninyo & Moore

GRADATION TEST RESULTS

FIGURE

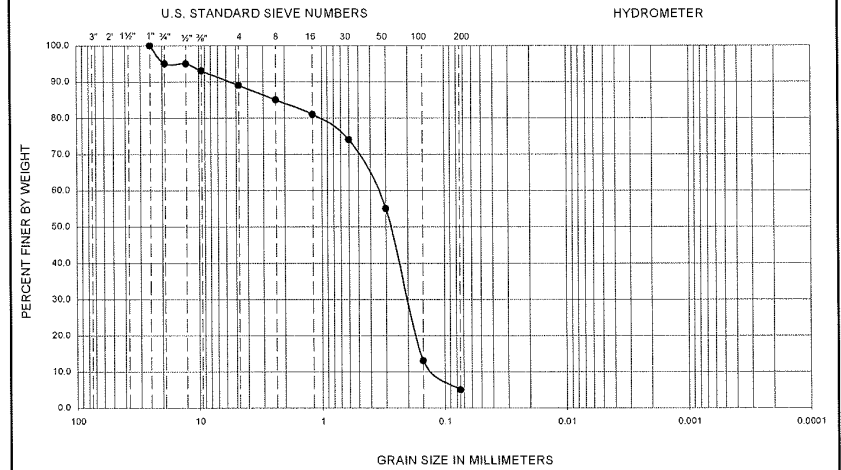
PROJECT NO. 107049004
DATE 12/11

10TH AVENUE MARINE TERMINAL
TERMINAL STREET
SAN DIEGO, CALIFORNIA

B-2

107049004 SIEVE B-2 @ 10.0-11.5.xls

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ninyo & Moore

GRADATION TEST RESULTS

FIGURE

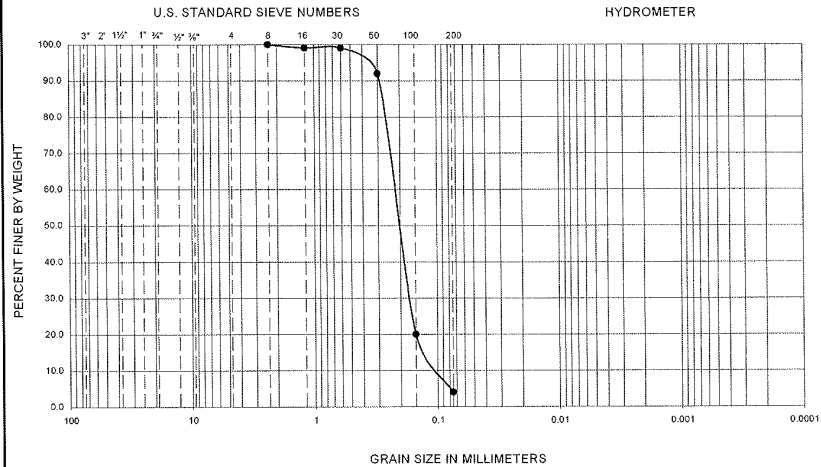
PROJECT NO. 107049004
DATE 12/11

10TH AVENUE MARINE TERMINAL
TERMINAL STREET
SAN DIEGO, CALIFORNIA

B-3

107049004 SIEVE B-2 @ 20.0-21.5.xls

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ninyo & Moore

GRADATION TEST RESULTS

FIGURE

PROJECT NO.
107049004

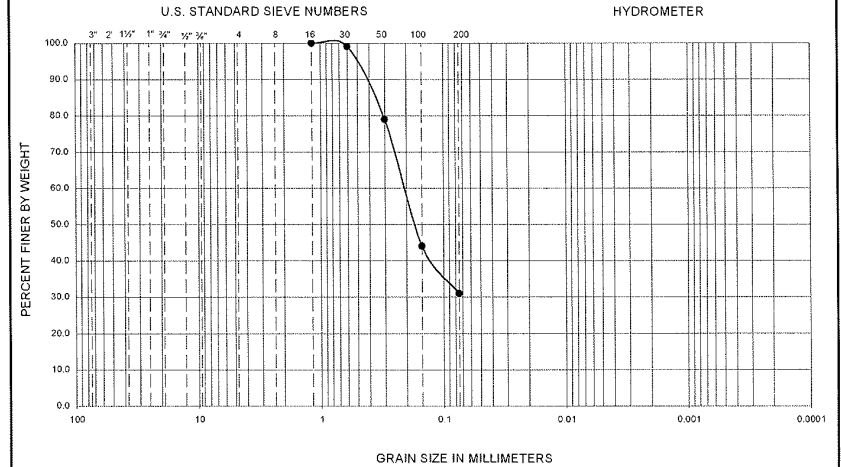
DATE
12/11

10TH AVENUE MARINE TERMINAL
TERMINAL STREET
SAN DIEGO, CALIFORNIA

B-4

107049004 SIEVE B-2 @ 25 @ 35.5 in

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ninyo & Moore

GRADATION TEST RESULTS

FIGURE

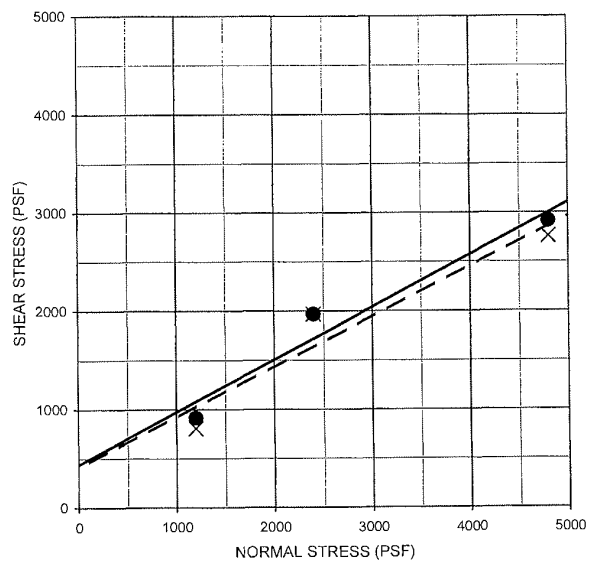
PROJECT NO.
107049004

DATE
12/11

10TH AVENUE MARINE TERMINAL
TERMINAL STREET
SAN DIEGO, CALIFORNIA

B-5

107049004 SIEVE B-2 @ 40 @ 41.5 in

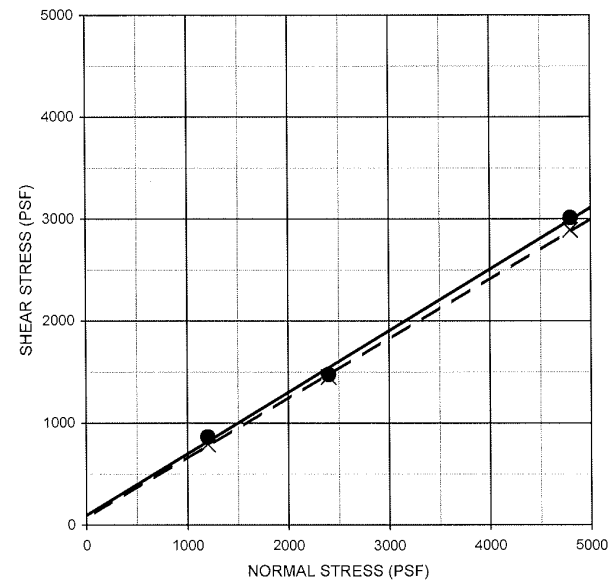


Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion, c (psf)	Friction Angle, ϕ (degrees)	Soil Type
Sandy CLAY	—●—	B-1	30.0-31.5	Peak	440	28	CL
Sandy CLAY	- - X - -	B-1	30.0-31.5	Ultimate	410	27	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080

Ninyo & Moore		DIRECT SHEAR TEST RESULTS		FIGURE B-6
PROJECT NO.	DATE	10TH AVENUE MARINE TERMINAL TERMINAL STREET SAN DIEGO, CALIFORNIA		
107049004	12/11			

107049004 SHEAR B-1 @ 30.0-31.5.xls



Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion, c (psf)	Friction Angle, ϕ (degrees)	Soil Type
Clayey SAND	—●—	B-2	35.0-36.5	Peak	100	31	SC
Clayey SAND	- - X - -	B-2	35.0-36.5	Ultimate	70	30	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080

Ninyo & Moore		DIRECT SHEAR TEST RESULTS	FIGURE B-7
PROJECT NO.	DATE	10TH AVENUE MARINE TERMINAL TERMINAL STREET SAN DIEGO, CALIFORNIA	
107049004	12/11		

107049004 SHEAR B-2 @ 35.0-36.5.xls

SAMPLE LOCATION	SAMPLE DEPTH (FT)	pH ¹	RESISTIVITY ¹ (Ohm-cm)	SULFATE CONTENT ²		CHLORIDE CONTENT ³ (ppm)
				(ppm)	(%)	
B-2	15.0-16.5	7.8	770	320	0.032	600

¹ PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 643

² PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 417

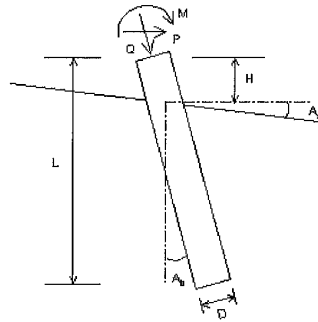
³ PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 422

APPENDIX D

LATERAL PILE CAPACITY ANALYSES

Ninyo & Moore		CORROSIVITY TEST RESULTS	FIGURE
PROJECT NO.	DATE	10TH AVENUE MARINE TERMINAL TERMINAL STREET SAN DIEGO, CALIFORNIA	B-8
107049004	12/11		

LATERAL ANALYSIS



Drilled Shaft (dia >24 in. or 61 cm)

Loads:
Load Factor for Vertical Loads= 1.0
Load Factor for Lateral Loads= 1.0
Loads Supported by Pile Cap= 0 %
Shear Condition: Static

Vertical Load, Q= 10.0 -kp
Shear Load, P= 3.8 -kp
Moment, M= 173.0 -kp-f

Profile:
Pile Length, L= 50.0 -ft
Top Height, H= 0 -ft
Slope Angle, As= 0
Batter Angle, Ab= 0

* Zero Tip Resistance *
The tip resistance is zero

Soil Data:

Depth -ft	Gamma -lb/ft ³	Phi -	C -kp/ft ²	K -lb/ft ³	e50 or Dr %	Nspt
0	115.0	30.0	0.00	25.0		
5	52.6	30.0	0.00	20.0		
37	57.6	32.0	0.00	60.0		
43	62.6	34.0	0.00	125.0		
50	62.6	36.0	0.00	150.0		

Pile Data:

Depth -ft	Width -in	Area -in ²	Per. -in	I -in ⁴	E -kp/ft ²	Weight -kp/f
0.0	30	706.9	94.2	39760.8	3000	0.736
50.0						

Single Pile Lateral Analysis:

Top Deflection, yt= 0.27100-in
Max. Moment, M= 180.83-kp-f
Top Deflection Slope, St= -0.00307
OK! Top Deflection, 0.2710-in is less than the Allowable Deflection= 1.00-in

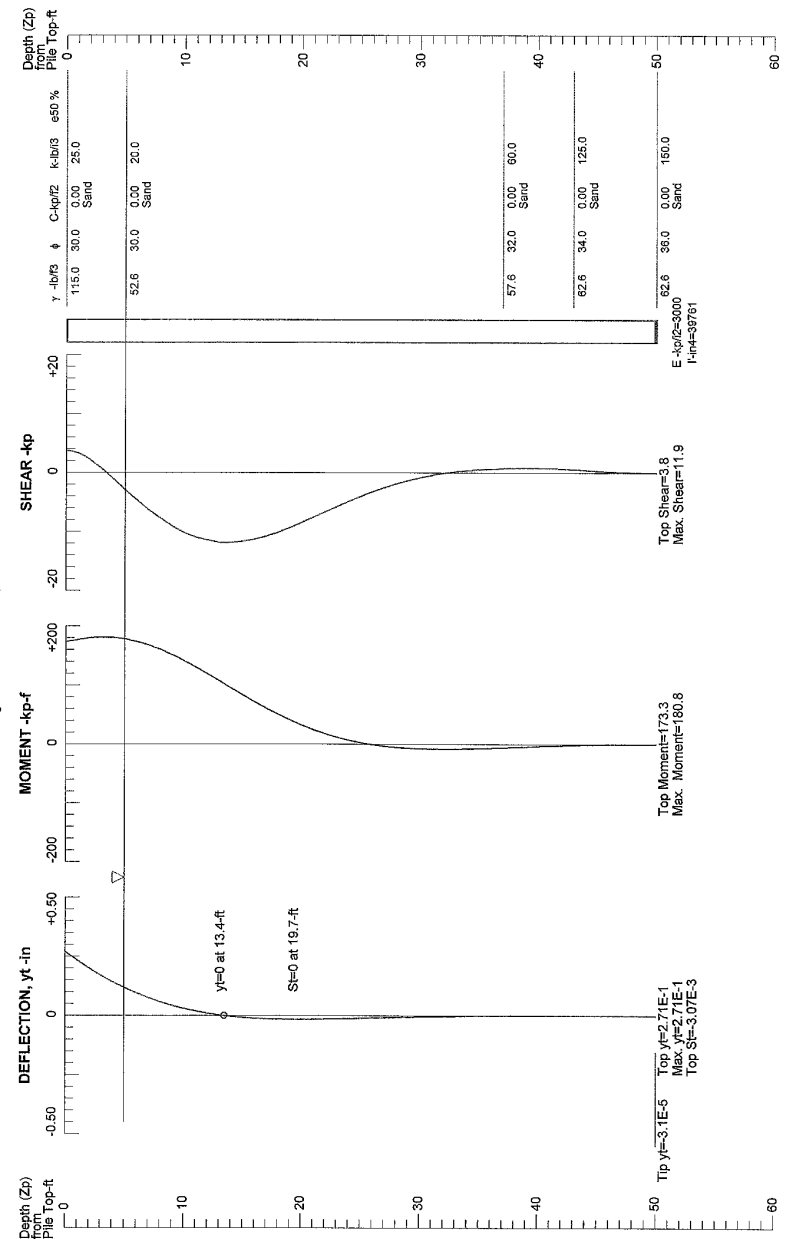
Note: If the program cannot find a result or the result exceeds the upper limit. The result will be displayed as 99999.
The Max. Moment calculated by program is an internal force from the applied load conditions. Structural engineer has to check whether the pile has enough capacity to resist the moment with adequate factor of safety. If not, the pile may fail under the load conditions.

107589003_TAMT Light Poles
2.5 ft dia CIDH_Wind Load_Static

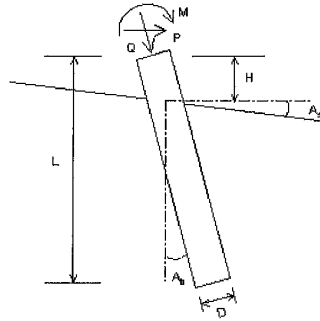
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PILE DEFLECTION & FORCE vs DEPTH

Single Pile, Khead=1, Kbc=1



LATERAL ANALYSIS



Drilled Shaft (dia >24 in. or 61 cm)

Loads:

Load Factor for Vertical Loads= 1.0
Load Factor for Lateral Loads= 1.0
Loads Supported by Pile Cap= 0 %
Shear Condition: Static

Vertical Load, Q= 10.0 -kp
Shear Load, P= 1.9 -kp
Moment, M= 103.0 -kp-f

Profile:

Pile Length, L= 50.0 -ft
Top Height, H= 0 -ft
Slope Angle, As= 0
Batter Angle, Ab= 0

* Zero Tip Resistance *

The tip resistance is zero

* Negative Friction *

Negative Friction Start: 0 -ft End: 43 -ft with Factor: 1

Soil Data:

Depth -ft	Gamma -lb/ft ³	Phi	C -kp/ft ²	K -lb/ft ³	e50 or Dr %	Nspt
0	115.0	30.0	0.00	25.0		
5	52.6	0.1	0.00	5.0		
37	57.6	0.1	0.00	15.0		
43	62.6	34.0	0.00	125.0		
50	62.6	36.0	0.00	150.0		

Pile Data:

Depth -ft	Width -in	Area -in ²	Per. -in	I -in ⁴	E -kp/ft ²	Weight -kp/f
0.0	30	706.9	94.2	39760.8	3000	0.736
50.0						

Single Pile Lateral Analysis:

Top Deflection, yt= 0.20300-in
Max. Moment, M= 106.67-kp-f
Top Deflection Slope, St= -0.00222
OK! Top Deflection, 0.2030-in is less than the Allowable Deflection= 1.00-in

Note: If the program cannot find a result or the result exceeds the upper limit. The result will be displayed as 99999.
The Max. Moment calculated by program is an internal force from the applied load conditions. Structural engineer has to check whether the pile has enough capacity to resist the moment with adequate factor of safety. If not, the pile may fail under the load conditions.

107589003_TAMT Light Poles
2.5 ft dia CIDH_EQ Load_Seismic

PILE DEFLECTION & FORCE vs DEPTH

Single Pile, Khead=1, Kbc=1

