Question Number	Proposer Question	Port of Los Angeles Response
1.	What is the anticipated throughput capacity in Tue of this terminal	Unknown at this time. This would be determined based on the proposer's ultimate terminal design and plan for operations.
2.	We're reaching out regarding the upcoming project and wanted to inquire whether there will be a need for plumbing services as part of the scope of work. If so, we would appreciate the opportunity to review any relevant bid documents and submit a proposal for the plumbing portion of the project	The scope is unknown at this time; it will be determined at a later phase. Proposers are encouraged to register on RAMPLA at https://www.rampla.org to learn about future opportunities in real time (RAMP ID #225498).
3.	If known, when is this project expected to go to bid for contractors and what is the expected start date for construction	No date has been set for the start of construction. This RFP will directly result in a pre-development phase with a team that includes, at a minimum, the entities listed in section 2.1.7 of the RFP. Interested parties who do not join a proposer team in response to this RFP should continue to monitor progress on the project, including any documents posted on RAMPLA. Entities are encouraged to register on RAMPLA at https://www.rampla.org to learn about future opportunities in real time (RAMP ID #225498).
4.	Do you plan to announce the list of firms who have downloaded the RFP?	This information was published on RAMPLA October 28, 2025 (https://www.rampla.org).
5.	Section 2.1.5 of the RFP states "See Exhibit A for a depiction of the Site, an illustrative conceptual layout, and also estimated costs." We have not located the estimated costs. Please provide.	This information was published on RAMPLA October 23, 2025 (https://www.rampla.org).
6.	Will the Harbor Department provide existing geotechnical, bathymetric, hydrographic or subsurface data for the Pier 500 site, or must the Pre-Developer obtain all such studies independently?	The Harbor Department anticipates providing the Pre-Developer with any such existing studies in its possession to the extent the studies are relevant to the concept being pursued.
7.	Has the Harbor Department completed any preliminary engineering / site data for the proposed 200-acre landfill and 3,000-foot wharf, or is full concept development expected under the PDA?	Yes, a full concept development proposal is expected under the Pre-Development Agreement. The Harbor Department anticipates providing the Pre-Developer with any such existing studies in its possession to the extent the studies are relevant to the concept being pursued.
8.	Has the Harbor Department assessed any risk of potential existing soils contamination in the Pier 500 area?	Although there is limited sediment chemistry data available in the area, it is not applicable for these purposes. Additional data will be collected as part of the pre-development phase.
9.	Are there any identified environmental mitigation measures in terms of infrastructure that need to be adopted by the Pre-Developer under the PDA for the definitive design of the terminal?	Unknown at this time, this will be determined as part of the pre-development phase and environmental review process.
10.	Are there preferred design criteria or performance standards (e.g., design vessels, berth depth, crane rail capacity, backland paving standards, intermodal yard standards, customs and other related authorities' requirements) the Pre-Developer should consider in the Initial Project Approach?	Yes, the minimum design depth is –55 MLLW. Design criteria and performance standards should be based on POLA standards. These items include but are not limited to Engineering Design Guidelines, POLA Seismic Code, etc. See the Harbor Department Engineering Design Guidelines and Seismic Design Code.
11.	Will the Harbor Department provide access to existing port utility mapping (water, sewer, power, fiber, etc.), and are there defined utility connection points for Pier 500 project?	Yes, reference drawings will be made available at the pre-development stage. Utilities connections are not defined.
12.	What is the available (current and future) power supply capacity considered for Pier 500 project?	Power availability is being considered. Exact capacity is not available at this time.
13.	What assumptions should proposers make regarding dredging volumes, sediment disposal, and mitigation offsets for the landfill?	This would be determined based on the proposer's conceptual development plan and ultimate terminal design.

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		Unavoidable loss of waters will require mitigation. Proposer will work with the Harbor Department regarding obtaining mitigation credits. The Port of Los Angeles Harbor Habitat Mitigation Bank currently has approximately 84 Enhanced Harbor Habitat credits (Link to POLA Mitigation Bank). Upon approval by the appropriate agencies, some or all of these credits could be applied to this project.
14.	On the seaside boundary, the Pre-Developer shall consider up to the berth pocket as being within their scope and responsibility for the design works under the PDA or it should include any other common area (like rail connectivity) outside the Pier 500 that will be necessary for the proper operation of the terminal?	The Pre-Developer should plan to consider rail, road, and utility connections.
15.	Is the Harbor Department open to considering alternative foundation or reclamation technologies (e.g., caisson, confined disposal cell, hybrid wharf, etc.)?	Yes.
16.	Given the size of the proposed landfill/reclamation footprint, are there anticipated cumulative, indirect or irreversible impacts (e.g., marine disposal, habitat loss, sea-level rise) that the Lead Agency expects to address explicitly?	Unavoidable loss of waters will require mitigation. Proposer will work with the Harbor Department regarding obtaining mitigation credits. The Port of Los Angeles Harbor Habitat Mitigation Bank currently has approximately 84 Enhanced Harbor Habitat credits (Link to POLA Mitigation Bank). Upon approval by the appropriate agencies, some or all of these credits could be applied to this project.
17.	Will the project require both CEQA and National Environmental Policy Act (NEPA) review (for example, if federally-funded or involving federal permits such as United States Army Corps of Engineers dredge/fill permits)? If so, how will the PDA allocate responsibility for coordination?	Yes. The NEPA lead agency is a federal agency with primary responsibility for preparing the environmental review document. If more than one federal agency is involved, a NEPA lead agency is designated to coordinate the process and multiple agencies can act as joint or cooperating agencies to share responsibilities or contribute expertise to the review process.
18.	What are the assumed source materials, volumes and placement methods for the reclamation / landfill operation (e.g., dredged material, clean fill, contaminated sediments), and how will those assumptions be reflected in the environmental studies (e.g., landfill liner design, sediment testing, groundwater monitoring)?	This would be determined based on the proposer's conceptual development plan and ultimate terminal design.
19.	How will hazardous or designated waste (or dredged material with elevated contaminants) be managed under California's solid-waste laws and how will that interplay with the marine/port reclamation environment?	Hazardous or designated waste will be managed in accordance with all federal, state and local laws, regulations and policies.
20.	What is the expected process for integration with Pier 400's breakwater and navigation channels—will the U.S. Army Corps of Engineers be directly involved during pre-development? What is the length of the new breakwater envisaged and what is the max width of vessel that can enter in the navigation channel?	This will be determined at the pre-development phase.

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21.	Should environmental mitigation concepts (habitat creation, carbon reduction, etc.) be included in the initial conceptual plan submission?	Environmental mitigation concepts may be included but are not required during this phase of the procurement process.
22.	What is the required depth of the draft alongside the quay?	The required depth is –55 MLLW minimum.
23.	Are there any air draft limitations for cranes or yard operations?	Unknown at this time, this will be determined as part of the pre-development phase.
24.	Can mooring dolphins be built next to the 3,000 ft quay	This would be determined based on the proposer's conceptual development plan and ultimate terminal design.
25.	What is the Harbor Department's target cargo throughput or ship size for the Pier 500 terminal?	See Section 2 of the RFP.
26.	How will terminal access (road and on-dock rail) be integrated with the existing Pier 400 and Alameda Corridor corridors—are rail connections expected to be within the pre-development scope?	Yes, it is expected for the Pre-Developer to consider rail connections.
27.	Will the Harbor Department retain any control or rights regarding gate operations, security, or truck scheduling systems?	No.
28.	Are zero-emission equipment requirements anticipated to be mandatory or performance-based?	Mandatory.
29.	How should the Pre-Developer address interim uses or phasing options during landfill construction?	Unknown at this time. The Pre-Developer will determine as part of the pre-development phase.
30.	Is there an expectation for integration with Port-wide digital platforms such as the Port Optimizer or Clean Truck Program data systems?	Yes. Tenant must abide by Tariff number 4 Section 23 (Link to Tariff number 4, Section 23).
31.	Is an on-dock chassis pool mandatory for Pier 500 RFP?	No
32.	The RFP indicates that union coordination is required. Given the recent move by Governor Newsom to veto legislation that would restrict automation at ports, how does the Harbor Department foresee the automation level of operations (remote-operated cranes, automatic guided vehicles, etc.) being incorporated at the proposed facility for Pier 500, and how it compares to the current level of automation of the existing container terminals in the Port of LA?	Proposers are referred to the Pacific Maritime Association (www.pmanet.org).
33.	1) Will the Harbor Department require the operator to maintain flexibility to adapt labor models (including potential automation) but also provide labor protection commitments (job security, retraining, transition agreements)? 2) Will such commitments be evaluated in the RFP scoring?	1) The container terminal operations at the Port of Los Angeles are subject to collective bargaining agreements. Proposers are referred to the Pacific Maritime Association (www.pmanet.org) for more information. 2) Proposers are referred to evaluation criteria in Section 3.3 in the RFP.
34.	How will the operator address community labor considerations, such as local hiring, wage levels (including union-scale wage floors), prevailing wage applicability, and apprenticeships — especially where automation may reduce the number of direct jobs on-site?	The container terminal operations at the Port of Los Angeles are subject to collective bargaining agreements. Proposers are referred to the Pacific Maritime Association (www.pmanet.org) for more information. The pre-developer and developer will be required to comply with all applicable law, rules, and regulations regarding wage and labor matters. Please see Section 3.4.3 of regarding the labor harmony elements required in the proposal.
35.	Is membership with the PMA a prerequisite in the RFP scoring?	Please see Sections 2.1.7, 3.4, and Exhibit B of the RFP.
36.	Will the draft Pre-Development Agreement (to be issued by addendum) be open for comments or redlines beyond the written Q&A period?	Please see Section 2.1.8.1 of the RFP.

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37.	What specific weighting factors will apply to the financial proposal in the Evaluation Form (Exhibit B) once finalized (currently "under development")?	This information will be published as an addendum to the RFP.
38.	Are there limitations on the number of proposers who may be interviewed or shortlisted?	This will be decided by the Harbor Department in its sole and absolute discretion.
39.	Will the Harbor Department share the names of proposers or shortlisted teams publicly before final award?	No.
40.	To guarantee full understanding, please confirm the financial definition (formula) of the "maximum profit margin"? Should it include any volume-related fees to the Port of LA?	The Harbor Department expects to address as an addendum to this RFP.
41.	Can proposers include conditional financing or alternative delivery options in their response, or must the proposal conform strictly to the structure implied in the RFP?	This RFP is for the Harbor Department to execute a Pre-Development Agreement with a Pre-Developer. As noted in Section 1.1 of the RFP, "Though the [Pre-Developer] will explore various potential delivery models, the Harbor Department anticipates delivery of the Project through a public-private partnership model." Also, as noted in Section 2.1.4, "The Harbor Department is open to considering various public and private financing approaches, as well as combinations. To the extent public financing approaches are used (e.g. debt issued directly by the Harbor Department or creation of a municipal corporation) the Harbor Department will retain sole discretion regarding whether to issue debt, amount of debt to be issued, and structure of debt obligations."
42.	What is the anticipated timeline for Board and City Council approval of the Pre-Development Agreement following selection?	The effectiveness of the proposed Agreement described in the RFP is contingent upon full completion of all review and approval processes required by the Los Angeles City Charter and Administrative Code, inclusive of approval by the Board of Harbor Commissioners and Los Angeles City Council. Such processes have not yet commenced, and their outcomes are unknown and subject to the full, unfettered discretion of all reviewing bodies. The necessary environmental assessment(s) will be determined by the lead agencies which include the Harbor Department under the California Environmental Quality ACT (CEQA) and any applicable federal lead agency under National Environmental Policy
43.	Will a dataroom be provided during the PDA term? If so, what initial contents will it contain, and will that be the channel for dissemination throughout the process?	The Harbor Department anticipates providing the Pre-Developer with any existing reference documents in its possession to the extent the studies are relevant to the concept being pursued.
44.	Will the PDA define specific deliverables and milestones (e.g., completion of feasibility studies, EIR submission, 30% design package) with payment or reimbursement triggers?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
45.	What is the expected scope of "at-risk" work and the formula for potential separation payments if the Harbor Department terminates the PDA for convenience?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
46.	What site access windows, permits and safety protocols will be provided for site visits during the PDA?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
47.	How will the PDA treat and protect proprietary technological solutions from proponents during the Pre-Development Phase and eventually in a termination event?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
48.	Will the Pre-Developer retain ownership of intellectual property, studies, and models produced during the pre-development phase?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.

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49.	How will cost recovery or cost sharing be handled for environmental documentation and permitting fees?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
50.	Confirm exclusivity over the Pier 500 site will be guaranteed to the Pre-Developer during the five-year PDA term.	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
51.	What level of financial security (bond, letter of credit, parent guarantee) will be required to execute the PDA?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an Addendum to this RFP.
52.	Will the PDA include a defined pathway or right-of-first-offer for the Implementation Agreement, or will a new competitive process be required?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
53.	Can the Pre-Developer propose modifications to the PDA schedule or milestones based on regulatory or technical findings?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
54.	Clarify the need for a Shipping Line to be included in the Proposer Team, considering there is an "expectation that this entity would ultimately provide a guaranty", as per item 2.1.7 – Proposer Structure and Qualifications. If that is the case, what type of guarantee is expected by the shipping line?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
55.	Will the future Implementation Agreement impose binding commitments (on design, final landfill/reclamation plan, monitoring obligations) based on the findings of the environmental studies produced during the PDA? And how will those be reflected in the proposer's financial model (e.g., contingencies for mitigation costs or delay risk)?	See the draft Pre-Development Agreement upon release, noting that the Pre-Development Agreement will address the steps to agreeing upon an Implementation Agreement and completion of required environmental processes.
56.	Does this RFP call only for cost estimates related to the pre-development phase, meaning costs incurred prior to the initiation of physical works? Or does this RFP call for the cost estimates of the physical development phase?	See Addendum 1 regarding cost information available at this time. Proposers may include its estimated project costs in its response to Section 3.4.5.
57.	To what degree of specificity does POLA expect to receive cost estimates as part of this RFP? Is it for the full cost of construction of the facility? If so, is a Class 4 estimate sufficient?	See Addendum 1 regarding cost information available at this time. Proposers may include its estimated project costs in its response to Section 3.4.5.
58.	If POLA wants to see cost estimates for physical development, what elements are meant to be included? Should they include land reclamation or other infrastructure in addition to superstructure, buildings, and equipment?	See Addendum 1 regarding cost information available at this time. Proposers may include its estimated project costs in its response to Section 3.4.5.
59.	What studies has POLA undertaken to analyze the capacity of non-terminal supporting infrastructure (power supply, road access, rail access, etc.)? Will POLA provide the results of that analysis?	The Harbor Department anticipates providing the Pre-Developer with any such existing studies in its possession to the extent the studies are relevant to the concept being pursued. The Harbor Department has completed preliminary analysis and may be provided at a later date.
60.	Are there any US Army Corps of Engineers or government property use restrictions for dredging or filling?	Yes. The successful proposer is expected to be familiar with all applicable regulations and may consult with agencies with jurisdictions over that scope of work.
61.	Who has responsibility for existing Terminal Island Treatment Plan (TITP) outfall relocation or protection in place?	Unknown at this time, this will be determined as part of the pre-development phase.
62.	Can the end section of the TITP outfall be altered or relocated?	It is anticipated that the TITP outfall will need to be relocated. Scope is currently unknown. Extensive coordination would be required.
63.	Does the Port anticipate the relocation or removal of PMA/ILWU training building?	Unknown at this time, this will be determined as part of the pre-development phase.
64.	Please elaborate on the role of Lead Contractor as part of the Proposer team during the pre-development phase.	The Harbor Department anticipates that the Lead Contractor will be integral in many aspects of the pre-development work, including vetting the viability of

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		different development options and related costing and schedule analyses.
65.	Can the requirement to name a Lead Contractor be removed given the fact that this is the Pre-Development Agreement stage? If not, please elaborate on the level of agreement required in order to remain compliant with the RFP?	The Harbor Department does not intend to remove the requirement to name a Lead Contractor. Assuming the Lead Contractor is not the entity entering into the Pre-Development Agreement with the Harbor Department, the Harbor Department does not intend to dictate a particular contractual relationship between the prime and the Lead Contractor.
66.	Section 2.1.5 refers to Exhibit A that refers to estimated costs. Please provide estimated costs	This information was published on RAMPLA October 23, 2025 (https://www.rampla.org).
67.	Does the information requested in the RFP, Item 4 (Financial Capability/Capacity) of Section 3.4, Proposal Content apply to the Lead submitting entity or all members of the submitting team?	The financial capacity of equity members that would provide equity contributions during the terms of the Pre-Development Agreement and Implementation Agreement needs to be provided. Refer to Section 4.C for the financial statements that would be required in order for the Harbor Department to evaluate the financial capacity of these equity members/contributors. Please note that if the Proposer intends to organize as a partnership, LLP, JV or LLC, then the financial information of each general partner, joint-venture member or LLC member must be submitted. Refer to Section 4.C(iv) for additional information which may be required if the Harbor Department requires that a company guarantees the contractual obligations under the Pre-Development and/or Implementation Agreement. The Harbor Department reserves the right to request additional information.
68.	Who is responsible for identifying and permitting a borrow site for reclamation?	The Harbor Department.
69.	When will the draft Pre-Development Agreement be made available?	Please refer to Section 2.1.8.1 of the RFP.
70.	Will the project implementation proposal be subject to a separate competitive process?	Please refer to Section 2.1.3 of the RFP.
71.	When does the Harbor Department intend to seek the adoption of an ordinance by the City Council authorizing the Harbor Department to use the competitive sealed proposal selection process and alternative project delivery methods and establishing criteria relating to such contracts for the Pier 500 Project?	This action is expected to be considered by the Board of Harbor Commissioners and Los Angeles City Council prior to proposal due date.
72.	What biological mitigation credits does the Harbor Department anticipate being available for the project?	Unavoidable loss of waters will require mitigation. Proposer will work with the Harbor Department regarding obtaining mitigation credits. The Port of Los Angeles Harbor Habitat Mitigation Bank currently has approximately 84 Enhanced Harbor Habitat credits (Link to POLA Mitigation Bank). Upon approval by the appropriate agencies, some or all of these credits could be applied to this project.
73.	The RFP provides that the Harbor Department reserves the right to require covenants for the financing/liquidity levels not to fall under a specified level for the term of the Implementation Agreement. What type of financing/liquidity levels does the Harbor Department anticipate?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
74.	The RFP provides that "all parent company guarantees" must be in a form acceptable to the Harbor Department and approved as to form by the Los Angeles City Attorney. Please provide the approved form.	The financial capacity of equity members that would provide equity contributions during the terms of the Pre-Development Agreement and Implementation Agreement needs to be provided. Refer to Section 4.C for the financial statements that would be required in order for the Harbor Department to evaluate the financial capacity of these equity members/contributors. Please note that if the

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		Proposer intends to organize as a partnership, LLP, JV or LLC, then the financial information of each general partner, joint-venture member or LLC member must be submitted. Refer to Section 4.C(iv) for additional information which may be required if the Harbor Department requires that a company guarantees the contractual obligations under the Pre-Development and/or Implementation Agreement. The Harbor Department reserves the right to request additional information and expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
75.	The RFP provides that the Financial Proposal element of the RFP remains "Under Development", please provide the updated guidance and an opportunity to ask questions.	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP. Proposers will have an opportunity to ask questions.
76.	Confirm that the Maximum Profit margin requirements only apply to "design and construction services" and not to marine terminal operations to be performed under the anticipated Implementation Agreement.	The Harbor Department expects to address as an addendum to this RFP.
77.	Does the Harbor Department anticipate any changes to the Port Leasing Policy or Port Master Plan?	The Harbor Department reserves rights to update the Leasing Policy and/or Port Master Plan, subject to all applicable approvals.
78.	What amount of city and state funding is anticipated to be available for the Pier 500 Project?	To be determined during the pre-development phase based on the conceptual plan and developer's plan of finance.
79.	Does the Harbor Department have a preferred target lift capacity for Pier 500?	To be determined by the proposer based on the business and operations plan.
80.	The RFP provides that the bid package should include (i) three years of financial statements and (ii) a statement that there has been no material change in the financial condition of the company subsequent to the financial statements provided in connection with the submission. Recognizing that the RFP response is due by the end of January, which will be ahead of the completion of any prior-year audit can be completed, please confirm that the appropriate standard will be that "there has been no material change in the financial condition of the company that will impact its ability to meet the obligations contained in the Pre-Development Agreement or Proposer's submission.	It is of the utmost importance that the obligations contained in the Pre-Development Agreement and overall submission are met. Therefore, confirming that there has been no material change in the financial condition of the company since the date that the most recent financial statements were issued is appropriate.
81.	Under 1.1, there is a list of items (which we counted to be 16 items) that the Pre-Developer would need to support in Project Definition. Can you explain what "support" refers to? Is the Pre-developer expected to just (a) provide input or (b) will also need to fund and pay for all the studies required to support the Project Definition?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
82.	Please confirm that the concession term for Pier 500 is fixed for 66 years	The maximum allowable term is 66 years per the City Charter.
83.	Can you share the study which indicated that "the long-term cargo forecast states that cargo volume at the Port of Los Angeles will exceed land capacity within the next 10 years, thereby requiring the creation of marine container terminal acreage."? Will be helpful for us to understand the study and forecast.	The Harbor Department is considering whether this information will be released as part of the procurement process for the Pre-Development Agreement.

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84.	Who will be funding and paying for all the items/studies listed in 2.1.3 Delivery of Projects?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
85.	What are needed to "maintain eligibility for federal funds and financing assistance"? Who is eligible for such funds and financing assistance?	The Harbor Department and the project are to remain eligible to receive federal funds and financing assistance.
86.	Is it a must to include a Shipping line? Some of the top Global Container Port operators do not own a shipping line and are qualified to design, build, operate and maintain a terminal like Pier 500 given the relevant experience?	The Harbor Department does not plan to remove the Shipping Line requirement from Section 2.1.7.
87.	We are not a member of Pacific Maritime Association ("PMA") yet because we do not currently have any presence in USA on the Pacific side, but we are a top Global Container Port Operator. We will apply to be a member of PMA if we are the Developer of the concession. The current requirement in the RFP that the Pre-Developer will need to be part of PMA will limit competition and exclude several major Global Container Port Operator in this RFP.	Please see Sections 2.1.7, 3.4, and Exhibit B of the RFP. The container terminal operations at the Port of Los Angeles are subject to collective bargaining agreements. Proposers are referred to the Pacific Maritime Association (www.pmanet.org) for more information. The pre-developer and developer will be required to comply with all applicable law, rules, and regulations regarding wage and labor matters. Please see Section 3.4.3 of regarding the labor harmony elements required in the proposal.
88.	We noted that this payment section is [UNDER DEVELOPMENT]. When would you be able to share and provide the draft Pre-Development Agreement?	Please refer to Section 2.1.8.1 of the RFP.
89.	Will you consider extending the deadline for the Proposal Submission beyond 29 Jan 2026 because there are currently insufficient information for us to assess and evaluate the RFP, including our comments in 2.8.1.3 and 3.4?	See Addendum 2 of the RFP.
90.	It is noted that the Financial Proposal is [UNDER DEVELOPMENT] and yet it is the highest single component of RFP Selection Evaluation. When can we get this confirmed?	The Harbor Department expects to address this item as an addendum to this RFP.
91.	Can you define Proposed Profit Margin? There isn't any information given on revenue and it will be difficult to come out.	The Harbor Department expects to address this item as an addendum to this RFP.
92.	Can you provide a window for mark ups for the Pre-Development Agreement before the deadline of the RFP?	Please see Section 2.1.8.1 of the RFP.
93.	Can you provide the past studies on the site condition?	The Harbor Department anticipates providing the Pre-Developer with any such existing studies in its possession to the extent the studies are relevant to the concept being pursued.
94.	The RFP states that the draft Pre-Development Agreement will be issued as an addendum. Could the Port advise the target publication date and expected review period before the January 29, 2026 deadline?	Please see Section 2.1.8.1 of the RFP.
95.	Section 3.1 mentions the possibility of one-on-one meetings. Could the Port clarify the request process (e.g., submission of agenda or participant list) and the expected timing for such meetings in October or November?	See Section 3.1.
96.	Is it acceptable for foreign entities registered outside the U.S. to register under RAMP using a U.S. subsidiary's Tax ID, or must the main foreign parent entity itself be registered?	RAMP registration is designed to accommodate both domestic and international businesses seeking to do business with the City of Los Angeles. If the foreign parent company wishes to be the official vendor of record, it should register under its own name and provide its own Tax ID, even if it operates through a U.S. subsidiary.

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97.	The RFP outlines that deletion or substitution of team entities identified in the proposal is subject to the Harbor Department's prior written approval at its sole discretion. Could the Port clarify whether additions to the team—such as bringing in new technical advisors or equity participants post-award—would be permitted, provided they do not replace existing Major Participants and are disclosed in advance?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
98.	Section 1.1 and 2.1.5 describe multiple predevelopment tasks (engineering, feasibility, conceptual design, landfill, environmental scoping). Please confirm whether the Port expects: full 30% design drawings and preliminary cost estimates, or conceptual design-level deliverables primarily supporting environmental and entitlement processes.	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
99.	The RFP references biological mitigation credits and off-site mitigation projects. Could the Port identify existing mitigation bank arrangements (e.g., Port Mitigation Bank at Pier 400) that may be applied to Pier 500?	Unavoidable loss of waters will require mitigation. Proposer will work with the Harbor Department regarding obtaining mitigation credits. The Port of Los Angeles Harbor Habitat Mitigation Bank currently has approximately 84 Enhanced Harbor Habitat credits (Link to POLA Mitigation Bank). Upon approval by the appropriate agencies, some or all of these credits could be applied to this project.
100.	Will coordination with state and federal agencies (U.S. Army Corps of Engineers, California Coastal Commission, EPA, etc.) be led by the Harbor Department or delegated to the Pre-Developer?	The public agency is typically the lead. However, see the statement of work that the Harbor Department will issue with the draft Pre-Development Agreement for any further information.
101.	Section 2.1.4 states that the Harbor Department is open to various public and private financing approaches. Could the Port elaborate on whether: •private equity investment under a Design-Build-Finance-Operate-Maintain (DBFOM) structure is preferred; •a lease-to-own or availability-payment model is contemplated; or •the Port anticipates direct bond issuance while retaining ownership of assets.	This RFP is for the Harbor Department to execute a Pre-Development Agreement with a Pre-Developer. As noted in Section 1.1 of the RFP, "Though the [Pre-Developer] will explore various potential delivery models, the Harbor Department anticipates delivery of the Project through a public-private partnership model." Also, as noted in Section 2.1.4, "The Harbor Department is open to considering various public and private financing approaches, as well as combinations. To the extent public financing approaches are used (e.g. debt issued directly by the Harbor Department or creation of a municipal corporation) the Harbor Department will retain sole discretion regarding whether to issue debt, amount of debt to be issued, and structure of debt obligations."
102.	Is any bid bond or performance guarantee required at the time of proposal submission or execution of the Pre-Development Agreement? If so, please specify expected value and acceptable formats (LOC, surety bond, etc.).	No bid bond is required for this RFP at this time. The Harbor Department expects to address the remaining portion of this item in the draft Pre-Development Agreement which will be published as an Addendum to this RFP.
103.	For non-U.S. entities, will the Port accept financial statements prepared under IFRS (with U.S. dollar conversion), or must they be restated under U.S. GAAP?	Financial statements prepared under IFRS with U.S. Dollar conversion or U.S. GAAP are acceptable.
104.	Can a participant's corporate guarantee be provided through a designated subsidiary registered in the U.S. rather than the ultimate parent entity, subject to equivalent credit rating?	The Harbor Department would consider this if the entity demonstrates its financial capacity to undertake such an obligation during the pre-development process.
105.	The RFP mentions a five-year term. If environmental permitting or federal approvals extend beyond that period, will the Port allow time extensions or renewals without re-tendering?	Yes, subject to all processes set forth in the City's administrative code and City Charter.

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106.	Does the execution of the PDA grant the selected Pre-Developer the exclusive right to negotiate the Implementation Agreement, provided good faith performance?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
107.	Given the high level of proprietary financial and technical data involved, would the Port consider a Confidentiality Protocol permitting partial redaction under CPRA to protect trade secrets consistent with Gov. Code §7920.530?	See section 3.5 of the RFP related to confidentiality of proposals. The forthcoming pre-development agreement will address the confidentiality of information provided or produced pursuant to that agreement.
108.	The RFP references 3,000 linear feet of wharf. Please confirm target vessel class (24,000 TEU ULCV vs. smaller post-Panamax) if any, in relation to the future dredging plan.	To be determined by the proposer subject to the Environmental review process.
109.	Please confirm whether the Port intends to provide substation capacity as part of the public infrastructure scope.	No, provision of electrical infrastructure necessary to provide power is not included in the estimate. Scope, cost, and financial responsibility are to be determined.
110.	Will any incentives or environmental credits be offered for achieving near-zero emissions?	Unlikely. Near zero is not in line with CAAP and is, in most cases, already required by law for most equipment types.
111.	Who will be responsible for dredging and disposal operations (Port or Pre-Developer), and will the Port secure federal dredging permits via the U.S. Army Corps of Engineers?	The Harbor Department intends to answer this in the draft scope of work to be added as an addendum to the RFP; otherwise it will be determined during the pre-development phase.
112.	Does the Port foresee shared infrastructure or interface requirements with Pier 400 (APL/Maersk) for utilities, access roads, or rail spurs?	Not foreseen at this time.
113.	Considering the breadth and complexity of the RFP requirements, including the anticipated release of the draft PDA and the need for internal coordination across multiple disciplines, we respectfully request that the Port consider extending the current submission deadline. An extension would allow us to incorporate forthcoming clarifications and submit a more comprehensive and thoughtful proposal.	See Addendum 2 of the RFP.
114.	We recommend that the PDA define "Financial Close" as the date when all required approvals and financing agreements are executed to avoid ambiguity during the transition to the Implementation Agreement.	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
115.	The PDA should explicitly recognize environmental permit delays and acts of government as force majeure events, with corresponding schedule relief.	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
116.	Would the Port consider an expedited dispute resolution mechanism such as mediation followed by binding arbitration to avoid project delays?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
117.	Given the magnitude and long-term nature of the project, we recommend that the Harbor Department confirm whether the Implementation Agreement will be governed under a PPP framework (e.g., DBFOM) consistent with California Government Code §5956.	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
118.	Can the Port of Los Angeles (POLA) clarify whether landfill reclamation, dredging works, breakwater construction, and related marine infrastructure will be procured and funded directly by POLA, or whether these works are expected to be undertaken and financed by the proposer?	The Harbor Department expects proposers to provide initial conceptual project approaches. See Section 3.4.5 in the RFP.

Question Number	Proposer Question	Port of Los Angeles Response
119.	Following completion of any landfill works, how will responsibilities for subsequent soil improvement be allocated between POLA and the proposer, both in terms of execution and funding?	This will be determined during the implementation phase.
120.	Can POLA confirm whether the rail/road access beyond the terminal boundary will be delivered and funded by POLA?	The Harbor Department expects proposers to provide initial conceptual project approaches. See Section 3.4.5 in the RFP. Proposers should plan to include this element in their scope.
121.	We assume that we can propose an automated set-up consistent with the Collective Bargaining Agreement. Please confirm.	Please consult the Pacific Maritime Association.
122.	Is the shape of the area and location of the wharf fixed? Can it be modified? If yes, to what extent?	Yes, however, to what extent is to be determined in the pre-development phase.
123.	Please provide the existing bathymetry survey of the area.	The Harbor Department has completed preliminary analysis and may be provided at a later date.
124.	Please provide available soil reports for the project area.	The Harbor Department has completed preliminary analysis and may be provided at a later date.
125.	Please provide any records and/or information regarding the source and placement of fill material currently placed at the site.	The Harbor Department has completed preliminary analysis and may be provided at a later date.
126.	Please provide all available sediment and biological data for the project area, including any identified potential fill source locations. If available, please include information on the sources of fill and surcharge materials intended for land reclamation, their material characterization, and the designated disposal locations for any excess surcharge material.	The Harbor Department has completed preliminary analysis and may be provided at a later date.
127.	Have short period waves (swells), long period waves (harbor resonance), and ship response to waves analyses been performed for the new basin? If so, please provide the studies.	The Harbor Department has completed preliminary analysis and may be provided at a later date.
128.	Please provide the tie-in location, elevation, size, and details of the existing water and sewer main lines to the new utilities needed in the Pier 500 area.	Water mains in Navy Way. Sewer is Force Main – new system will be required as well as capacity study.
129.	Please provide the invert elevation, size, and location of the existing sewer outlet in the project area.	See NavigateLA - City of Los Angeles
130.	What are the target depths and is there a definition for the extent of the dredging scope at this point?	-55 MLLW minimum.
131.	What exactly does the TITP Outfall extension scope entail? A comment in a document seems to indicate that the existing underwater outfall could be relocated inside the new breakwater, is that correct? Is there a drainage masterplan that has been developed in general?	Unknown at this time.
132.	Have studies been performed related to the future demand and availability of power in POLA area? Who is responsible to have sufficient availability of the same?	Los Angeles Department of Water and Power (in coordination with the Harbor Department and proposer) is responsible to provide sufficient availability. Preliminary has been completed analysis and may be provided at a later date.
133.	Have any traffic, navigation, and/or rail access studies been performed ? If so, please share the studies.	No.
134.	Please define the "profit margin" used in Section 6 (Financial Proposal) and how the proposer should consider it?	The Harbor Department expects to address as an addendum to this RFP.
135.	To what extent can a proposer rely on its internal resources, either now at the proposal stage or in the pre-development phase, instead of including third party equity members, lead contractor, lead	Proposers must meet the composition requirements set forth in Section 2.1.7 of the RFP provided that one entity may be able to satisfy multiple roles.

Question Number	Proposer Question	Port of Los Angeles Response
	engineering firm, and CBA signatory as part of its project team?	
136.	Can POLA be more specific on the guaranty expected from the shipping line in section 2.1.7 (Proposer Structure)?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
137.	When will the draft pre-development agreement be made available to the proposers?	Please refer to Section 2.1.8.1 of the RFP.
138.	Will there be a new session for questions and comments regarding new or modified documents (e.g. Financial Proposal)?	The Harbor Department expects to address this item as an addendum to this RFP.
139.	What is meant by "legal structure" in 3.4.2 (and Exhibit E, Attachment 3 to Transmittal Cover Letter) and "organizational chart" in Section 3.4.F? Does this refer to the proposer's organizational legal entity chart or a Human Resources type chart with roles/titles within the proposer?	Section A of Exhibit E provides details on the meaning of legal structure. An organizational chart is required to understand the individuals and their roles within the respective proposer.
140.	Can POLA clarify the extent of the actual, real, perceived or potential organizational conflict of interest as set out in Section 3.6 and Exhibit D? Is there a time limit for "past… interests that may present an organizational conflict of interest for any Proposer team member" ("past… interest(s) of the Proposer and its team members which may result, or could be viewed as, an actual, perceived, or potential organizational conflict of interest in connection with the RFP"), such as the past 2 years or 5 years or another time limit?	Any actual, real, perceived, or potential Organizational Conflict of Interest should be disclosed regardless of time.
141.	What handback condition will apply at the end of the concession term?	This will be determined with the implementation agreement.
142.	What does "UNDER DEVELOPMENT" in the Section 2.1.8.3 and 3.4.6 titles mean? Does it mean the Harbor Department is contemplating revising or modifying the information requested in these sections? Something else?	The Harbor Department expects to address as an addendum to this RFP.
143.	Will the proposer be responsible for payment into a GHG mitigation fund?	If a payment is required, it is the expectation of the Harbor Department that the costs will be paid by the successful proposer.
144.	Does POLA expect the proposer to participate in habitat enhancement programs? What is the status of identifying and securing sufficient biological mitigations credits for the project?	Unavoidable loss of waters will require mitigation. Proposer will work with the Harbor Department regarding obtaining mitigation credits. The Port of Los Angeles Harbor Habitat Mitigation Bank currently has approximately 84 Enhanced Harbor Habitat credits (Link to POLA Mitigation Bank). Upon approval by the appropriate agencies, some or all of these credits could be applied to this project.
145.	Will contaminated sediments be an issue in creating the landfill and deepening the berth and channel?	Sediment characterization in accordance with federal and state regulations will be required. It is not anticipated that hazardous levels of contaminants are present within the project footprint.
146.	Does POLA anticipate being responsible for obtaining all permits for in-water construction?	Unknown at this time, this will be determined as part of the pre-development phase.
147.	Will the proposer be responsible for obtaining coverage under the Construction General and Industrial General permits?	This has not been determined at this time.
148.	Does POLA have a concept of what the proposer's role will be in the Coastal Commission process?	This has not been determined at this time.
149.	Were there any pre-advertisement events or information provided? If yes, who was invited, attended or expressed interest?	All up to date information concerning this procurement is published on RAMPLA at https://www.rampla.org. RAMP ID #225498

Question Number	Proposer Question	Port of Los Angeles Response
150.	Is there a list of equity, operator, engineers, or contractors who have shown interest in the project?	All up to date information concerning this procurement is published on RAMPLA at https://www.rampla.org. RAMP ID #225498.
151.	Will there be any information meetings about the project prior to the RFP due date?	See Section 3.
152.	Have the environmental permitting processes already been started? Who will be responsible for these?	See Section 2.1.6.
153.	Can the Harbor Department clarify when the Pre-Development Agreement will be published?	Please see Section 2.1.8.1 of the RFP.
154.	Can the Harbor Department clarify that only one Pre-Developer will be selected to advance to an Implementation Agreement?	The Harbor Department intends to select a single pre-developer for this procurement.
155.	Can the Harbor Department clarify if there are any exclusivities for the entities participating in each proposal team?	Proposer team members are not permitted to be on more than one proposer team, which will be clarified in an addendum to the RFP.
156.	The required team of entities for each Proposer includes a Shipping Line with the expectation that it will ultimately provide a guaranty. Is the Proposer required to include a Shipping Line as a team member if the Equity Members are willing to provide a guaranty?	The Harbor Department does not intend to remove the Shipping Line requirement from Section 2.1.7.
157.	There are no page limits, project size requirements, or number of projects specified in Points 3 to 6. Can the Harbor Department provide details on the type and amount of information expected for each section?	The Harbor Department expects to address this item as an addendum to this RFP.
158.	Does experience need to come from corporations/firms or can it come from participant individuals? In other words, can members of the equity partner with significant experience operating marine terminals be included as part of the Proposers experience?	Such experience is relevant but should be called out as attributed to an individual's experience with a prior entity.
159.	Can the Harbor Department provide additional details on what information it considers acceptable form of parent company guarantee?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
160.	How will the profit margin calculation provide differentiation between proposals where the Proposer is contemplating a full DBFOM structure vs those that look to the Harbor Department to retain financing responsibilities?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
161.	Can the Harbor Department clarify when the Financial Proposal Section will be provided?	The Harbor Department expects to address this item as an addendum to this RFP.
162.	Can the Harbor Department clarify what the maximum time limit will be to execute the Pre-Development Agreement, or when this will be established?	The Harbor Department expects to address this item as an addendum to this RFP.
163.	Can the Harbor Department please define the 'design and construction work costs' base to which the profit margin applies, including what categories are included/excluded?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
164.	In conjunction with the term of the Pre-Development Agreement, the RFP states there is potential to enter into a subsequent leasing and development agreement ("Implementation Agreement"). Will there be a subsequent request for proposals to enter into the Implementation Agreement, or will this be awarded to the same entity as the Pre-Development Agreement?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.
165.	Can the Port of LA clarify anticipated road and rail access to the terminal, as contemplated by the design shown in Exhibit A of the RFP? Is access	To be determined and coordinated during the pre-development phase.

Question Number	Proposer Question	Port of Los Angeles Response
	expected to conflict with any existing portion of Pier 400?	
166.	Is there an opportunity to expand this potential terminal's footprint if justified by the planning process?	Yes, however, subject to all required regulatory approvals.
167.	Is the Port of LA able to provide the "estimated costs" that RFP section 2.1.5 indicates are meant to be included in Exhibit A of the RFP? How and when were these "estimated costs" developed?	This information was published on RAMPLA October 23, 2025 (https://www.rampla.org).
168.	Will financial models prepared by proposers as a part of this RFP be made public?	The Harbor Department will remain in compliance with the California Public Records Act.
169.	Does the Port of LA anticipate applying for federal grants to help defray project costs?	The Harbor Department will consider all possible funding opportunities including federal grants.
170.	Is the financial proposal relating to profit margin intended to represent the margin potentially payable by the ultimate terminal operator in exchange for design and construction services? Can you clarify the margin in question?	The Harbor Department expects to address this item in the draft Pre-Development Agreement which will be published as an addendum to this RFP.

THE PORT
OF LOS ANGELES

Engineering Design Guidelines 2009 Edition

Antonio Gioiello
Chief Harbor Engineer

Prepared by:
Engineering Division

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01 INTRODUCTION

01.01 GENERAL INTRODUCTION

01.01.01 Background

The Engineering Division of the Los Angeles Harbor Department (Port of Los Angeles) has completed this third revision of the design guidelines for Port facility projects. The original 1984 edition consisted of a comprehensive set of Engineering Guidelines containing summary design information for use by both Division staff and consultants in the design of Port facilities. A more detailed and comprehensive version was prepared in 1992 (two volume set), that intended to provide direction to the designers of Port facilities by documenting successful design experiences.

01.01.02 Purpose

The purpose of the 2009 Engineering Design Guidelines is to provide a streamlined and user friendly reference manual for general engineering design of Port facilities. It is a supplemented, condensed, and updated version of the 1992 Engineering Design Guidelines.

01.01.03 Companion Manuals

The 2-volume Policy/Procedure Manual, the POLA CADD Manual, and POLA Project Management Manual are companion volumes to the 2009 Engineering Design Guidelines. The Policy/Procedure Manual is focused on documenting Engineering Division operational/management policies and methods of implementing those policies. The POLA CADD Manual provides detailed explanations and command sequences of CADD design software. The POLA Project Management Manual is used by our Project Managers as a tool to track projects. The Draft Engineering Sustainabilty Measures contained in the Draft POLA Sustainability Guidelines for Engineering and Constructions provide requirements that ensure all POLA facilities adhere to the sustainability efforts of the City. The Engineering Division staff shall refer to these companion volumes for information on how to proceed through the design process.

01.02 DESIGNER'S RESPONSIBILITY

01.02.01 Overall Responsibility

The designer shall be aware that the exhibits are samples only and were prepared for specific jobs/conditions prior to the development of the 2008 EDG. It is the responsibility of the designer to make professional judgments with respect to the use of the 2008 EDG and to apply his/her knowledge and experience throughout the design process. This manual does not address all situations encountered in the design of Port facilities, and their applicability to a particular situation is to be determined by the designer. The designer is also responsible for compliance with codes, standards, and permit requirements.

01.02.02 Design Process

The Project Engineer shall (at the beginning of a project) review these Guidelines to determine all information that is applicable to the project design. This information shall be specifically shared with all members of the design team. All designers are responsible for meeting the applicable criteria or shall obtain Project Engineer approval for deviations from the criteria. Design reviewers shall compare the design documents against these Guidelines. The Project Engineer shall also perform a project closeout review to determine if any changes to the Guidelines are required.

01.03 FORMAT

01.03.01 Chapter Organization

The Engineering Design Guidelines are organized by chapters, with chapters 2 through 6 formatted to address design issues in a manner similar to the organization of a comprehensive set of Port drawings. The six chapters are as follows:

1. Introduction -- to clarify the Guidelines' purpose/scope, format, distribution, and revision process, as well as the user's responsibility.

2. General Design Overview -- to address general design issues, or applicable to multiple sections and included to avoid repetition.

3. Backland.

4. Buildings.

5. Wharf.

6. Special Facilities.
7. Other Criteria.
8. Index

01.03.02 Chapter Sections

The order and format of a chapter's sections, particularly within the Backland, Building, and Wharf chapters, are directly related to a set of design drawings. Each major subset of the contract drawings which could be included in a backland facility design project, for example, is covered as a separate section in the Engineering Design Guidelines Backland chapter (e.g., storm drains, sewers, structural, etc.).

01.03.03 Chapter Subsections

Generally, each section within a chapter of the Engineering Design Guidelines has seven subsections. They are listed below as arranged in these Guidelines:

- Overview
- Design Criteria
- Calculations/Worksheets
- Graphic Criteria
- Specifications
- Permits/Approvals
- Environmental Considerations
- Reference Drawings.

01.04 REVISIONS

01.04.01 Revision Notification

It is the responsibility of each Engineering Design Guidelines user to notify the Harbor Engineer responsible for revising the Guidelines (either directly or through the appropriate Section Head) when new guidelines are advisable and/or when existing guidelines warrant updating or deletion. In keeping with the provisions of its Agreement with the City of Los Angeles, the consultant user shall notify the appropriate Engineering Division Project Manager of any recommended revisions. New sentence—take out parentheses> (the latter will forward the suggestions, if approved, to the Harbor Engineer).

01.04.02 Revision Completion

The Harbor Engineer responsible for revising the Guidelines will review the proposed changes and/or additions with the Assistant Chief Harbor Engineer and Chief Harbor Engineer and obtain final approval. The distribution of revisions will follow the process outlined below under Distribution, 01.05.

01.05 DISTRIBUTION

01.05.01 Harbor Department Distribution

The Guidelines (or any page updates) will be distributed by the Harbor Engineer responsible for revising the Guidelines to all Chief Harbor Engineers, Harbor Engineers, Project Managers (within the Engineering Divisions), and all Section Heads. Other distribution within the Harbor Department is at the Chief Harbor Engineer's discretion.

01.05.02 Outside Distribution

One copy of the Engineering Design Guidelines will be provided at no charge to design consultant firms that have an Agreement with the Port of Los Angeles. Any other design firm wishing a copy shall be charged at a rate of $50 per copy. The Guidelines will be distributed to other organizations and agencies at the discretion of the Chief Harbor Engineer. The Port of Los Angeles will not be responsible for distributing copy updates outside of the Department. Therefore,

holders of these Guidelines should periodically request information about revisions (especially if starting a new project with the Port).

02 GENERAL DESIGN

02.01 OVERVIEW

This chapter contains information that is standard to many of the overall design elements described in detail in the chapters which follow in these Guidelines. Additional information included as Reference Drawings (in 02.08) are:

1. Abbreviations
2. Engineering Design Glossary
3. Organizations
4. Drawing Letter Designations

02.01.01 Reference Projects/Drawings/Specifications

The project design engineer shall provide reference reports, projects, drawings, and specifications on the title sheet. Reference drawing numbers on items identified for removal. Verify that referenced drawings are available for review.

02.01.02 Maintenance/Operations

The designer shall determine who is responsible for maintenance and operations of project facilities and shall involve the responsible party in the design process.

02.01.03 Physical Constraints

It is important when designing a project to take into account the physical constraints of the Port, such as:

1. Low lying land subject to tidal action which may affect the elevation of the groundwater table and the design of substructures.
2. Soil conditions (e.g. dealing with unconsolidated fill).
3. Project boundaries.
4. Adjacent uses and their impact on the project site.
5. Access to the site.

6. Seismic characteristics of the site area.

02.01.04 Coordination

All designs shall be coordinated with the appropriate disciplines, particularly those which may affect the project. The designer shall be aware of those processes which have a long lead time and should initiate them early in the start-up phase of the project. Examples of these processes are:

1. Survey
2. Geotechnical reports.
3. Site assessment/characterization.
4. Right-of-Way acquisition.
5. Permit approvals.

02.01.05 Working Clearances

The designer shall make sure that there are appropriate clearances between facilities to enable proper construction. Operational clearances between adjacent structures and equipment must meet code requirements. In the absence of such code requirements, the clearances shall be determined by practical operational constraints.

02.01.06 Abbreviations/Terms

Abbreviations used in these Guidelines and terminology related to Port engineering design are included as Reference Drawings Nos. 1-2 in 02.08 of these Guidelines.

02.01.07 Substructure Drawings

Substructure drawings are available at the Engineering Division of the Harbor Department, 425 South Palos Verdes Street, 3rd Floor, San Pedro, California 90731.

02.02 DESIGN CRITERIA

02.02.01 Design Approval

All designs must receive final approval from the Chief Harbor Engineer. The complete approval process is documented throughout the Harbor Department's Engineering Division Policy/ Procedure Manual.

02.02.02 Compliance

All designs, plans, specifications, and calculations shall comply with the requirements of all public authorities having jurisdiction to secure approvals and permits for construction. Where a conflict exists between various codes, the most restrictive code shall have precedence. The Chief Harbor Engineer, however, will make the final determination.

02.02.03 Design Document Preparation/Submission

1. Conformance:
   The designer shall conform to the drafting standards, layering, symbology, and other graphic criteria as presented in the POLA CADD Manual.

2. Preparation:
   Information presented in the drawings shall be organized in a logical, systematic manner. Drawings shall fully delineate the work to be done and the materials required. They shall be in sufficient detail and scope to facilitate permitting, bidding, and construction without further design, unless specifically noted.

3. Submission:
   All record drawings shall be submitted by the consultant on disk and on reproducible vellum or mylar. Lines and letters shall be black and permanent (i.e. ink).

4. Design Plans
   All drawings must be electronically generated on a CAD system and delivered to the Harbor Department in AutoCAD format or in a format compatible (by translation) with the AutoCAD system. If using a format other than an AutoCAD system, a translated representative sample (1 sheet minimum per discipline) may be required with each submittal. Complete translation to AutoCAD of the entire contract drawings is a requirement of the record drawing submittal. For simple projects,

manually produced drawings or CAD drawings in a non-AutoCAD format may be acceptable, if approved by the Chief Harbor Engineer.

5. Variety of Audiences. Overall design document preparation should take into account the variety of audiences that will use or review them, such as:

   a) Port Engineering Division staff.

   b) Regulatory agencies.

   c) Bidders.

   d) Contractors.

   e) Inspectors.

   f) Maintenance personnel.

   g) Facility operators.

6. Other Design Documents.
   All design documents (unless otherwise indicated in these Guidelines or directed by the Chief Harbor Engineer) shall be submitted in both an electronic and hard copy format. The Project Manager shall verify that the proposed method of electronic submittal is consistent with the Harbor Department's computer hardware, networking, and software systems (e.g. how information is layered and the manner of attachment of data files to drawings).

7. Reports.

   a) Report contents shall be presented in a logical, clear, and organized manner.

   b) Reports shall be prepared as follows, unless otherwise approved by the Chief Harbor Engineer:

      1) With a title page and table of contents including lists of exhibits, plates, and appendices.

      2) In MS Word.

      3) Printed (double-sided) on 8 1/2" x 11" white paper.

4) Bound (reports intended solely for reproduction may be unbound), with the name of the document on the binding.

5) Page numbering in the lower margin.

8. Drawings / Calculations / Worksheets / Specifications /Reports. Drawings, calculations, worksheets, specifications, and reports shall be submitted to the Port in accordance with the following:

   a) Engineering Design Guidelines

   b) CADD Manual

   c) Specifications (02.05)

02.03 CALCULATIONS/WORKSHEETS

02.03.01 Preparation/Submission

1. Contents:
   The calculations and/or worksheets must be clear, legible, and easily followed. Assumptions, baseline information, and logic of the solution must be clearly stated.

2. Preparation:
   Generally, calculations and/or work-sheets shall be presented on 8 1/2" x 11" white paper (or reduced in size to 8 1/2" x 11", where legibility can be preserved).

3. Electronic Format:
   The designer shall reference Design Criteria (02.02), Design Document Preparation/Submission, for a statement of electronic requirements. Where practical, the designer should consider using the Excel format for calculations and/or work-sheets not generated from off-the-shelf software. Permission to use a manual presentation format is at the discretion of the Chief Harbor Engineer.

02.03.02 Cost Estimates

Class "C" Cost Estimate (Conceptual):

The Class "C" Cost Estimate is to show order of magnitude only. In most cases, cost per square footage or per acreage is used for the estimate. The scope of the project is vague, and the scope of the estimate does not take into consideration most site-specific problems and other environmental problems. The Class "C" cost estimate is generally used in opening work orders to start a project, for general alternative studies, and for the 2nd through 5th year of the 5-year Capital Improvement Program (CIP). The estimate's contingency equals 30 to 40 percent depending on the uniqueness, complexity of the project, and available information. The effort involved in preparing a Class "C" cost estimate ranges from 2 person hours to less than 2 person days, depending on the uniqueness and complexity of the project. The Project Manager/Project Engineer will be responsible for preparing the Class “C” estimate.

Class "B" Cost Estimate (for Advertisement):

The Class "B" cost estimate is generally the estimate prepared just prior to advertising a project when contract documents are at least 90 percent complete.

Many site-specific problems are identified and included in the estimate. This type of estimate can be used for the 1st year of the 5-year CIP or proposed annual budget. The estimate's contingency typically equals 15 percent, depending on the completeness of the contract documents. The estimate may require more than 20 person days to scope and estimate, depending upon the complexity of the project. The Class "B" cost estimate is converted to a range and made public by the Construction Division when they advertise the project. The Project Manager/Project Engineer will be responsible for preparing the Class “B” estimate.

Class "A" Cost Estimate/Engineer's Estimate (for Bid Analysis):

The Class “A” Cost Estimate (also known as the Engineer’s Estimate) is developed from an advertised or nearly completed set of construction plans and specifications. Factors affecting accuracy include the nature of the work and the quality of the completed contract documents. This type of estimate should be a reasonable expectation of what a contractor will bid for a project. This estimate should be within plus or minus 10 percent of the apparent lowest bid and requires from 1 to 40 person days of preparation, depending upon the complexity of the project. This estimate shall be prepared in the same format as the project bid proposal to aid comparison with the bidders' submittals. The design team is responsible for preparing the quantity take-off (QTO) and the Specifications/Special Projects Section is responsible for preparing the Class “A” estimate.

Request for Cost Estimates

Request for cost estimates from various Department divisions shall be initiated through a memorandum addressed to the Chief Harbor Engineer, Engineering Division.

Records (Cost Estimates)

Reference cost estimating books, records of cost estimates, and bid analyses of advertised projects are filed in the Specifications and Special Projects Section.

Responsibility

It is the responsibility of the Project Manager to furnish the Division estimator related cost estimates and take-offs done for the project to assist Division estimator in preparing Final Class “A” Cost Estimate or to obtain from the consultant a Final Cost “A” Estimate when the design is prepared through a consultant. (Consultant furnished estimates shall be on the proposal schedule of the specification document with backup calculations of quantity take-offs and breakdown of unit prices quantifying all cost items, including lump sum items.

For consultant-prepared contract documents, a Final Class “A” Cost Estimate shall be furnished to the Engineering Division at least 14 working days prior to bid opening to allow Division estimator to review and finalize the cost estimate. The Division estimator prepares the Class “A” Cost Estimate and transmits by memorandum the confidential cost estimate to Construction Division prior to bid opening date.

02.04 GRAPHIC CRITERIA

The Designer shall prepare documents that will describe the project to the contractor. Each discipline requires a particular type of document that must show specific information. This section describes these two criteria. Refer to the Port's CADD Manual to learn how these documents are presented.

02.05 SPECIFICATIONS

02.05.01 General

Specifications consist of the written portion of the contract documents for Harbor Department construction projects that, in most cases, are publicly bid. Harbor Department specifications are organized in a similar fashion to the Construction Specifications Institute (CSI) Manual of Practice. The Harbor Department specifications are divided into 2 major components:

1. The first component, collectively referred to as the "boilerplate", is "modular" in format with only specific sections to be filled in by the specification writer, such as bid items, the contract time, amount of liquidated damages, etc.. Language in these subdivisions may not be changed without City Attorney approval through the Specifications and Special Projects Section Head.

   a) Bidding Requirements, which includes the Notice Inviting Bids, Information for Bidders, and Bidding Documents that contain bid forms where prices are entered.

   b) Contract forms establishing the contractual relationship between the Department and Contractor include the contract, bonds, and insurance requirement forms.

   c) General Conditions which state standardized construction requirements common to all projects, and Supplementary Conditions which modify and expand on the General Conditions.

2. The second component consists of the specification sections (comprising the last major subdivision), and is assembled mainly from the existing body of POLA Engineering Master Specifications. The specification writer selects sections from CSI Divisions 1 through 49 depending on the project work scope reflected principally on Drawings. The specification writer edits these generic sections to reflect project-specific conditions. Occasionally a new specification section must also be written.

   Specification sections are based on the CSI divisions, which define qualitative and detailed requirements for materials and workmanship.

02.05.02 The Boiler Plate

In the Notice Inviting Bids and Information for Bidders Section, bidders can get an overview of the project scope and requirements to determine whether or not they wish to bid. The specification writer sets the advertise, pre-bid, and bid opening dates in the Notice Inviting Bids Section. After the project schedule is determined, the specification writer can work with the Project Manager and the construction manager to determine the time frame for these dates assuming a standard 4 month period from advertise to Notice to Proceed.

The Bidding Documents Section provides a sequence of bid items where bidders will enter prices. The specification writer will typically create both lump sum and unit price bid items. A single lump sum bid item with a minimum number of additional unit price bid items and allowance items is the standard arrangement. Unit price bid items are included for work where there is a large quantity (e.g., tons of asphalt concrete) that is difficult to accurately determine. Contingency bid items, generally unit price, are also included for improvements that must be performed only if field conditions dictate. Allowance items are included for work that may be needed but is as yet undetermined. As opposed to other bid items, allowance items specify for the bidder the cost but not the scope-of-work or quantity.

The Bidding Documents also contain additional certifications, affidavits, and programs in several subsections. In the Good Faith Effort Program, the specification writer determines the percentage of Minority Business Enterprises (MBE), Women Business Enterprises (WBE), and Other Business Enterprises (OBE) based upon a Class B Estimate of the project cost.

The Contract Section establishes work to be performed and payment for that work as legally enforceable duties. The specification writer's principal input in this Section consists of determining the contract time, in calendar days, and liquidated damages penalty if Contractor fails to complete the work in the specified contract time. Contract time should be determined in conjunction with the Project Manager and construction manager and the following criteria:

1. Site availability.

2. Long lead time materials.

3. Typical contractor production rates for the type of work.

4. Rainy season.

5. Phasing.

6. Design/build and permit lead time.

7. Work by others at or near the site.

Liquidated damages must be calculated based upon the prorated rental rate for the subject property, obtained from Real Estate Division, plus salary overhead for Port employees.

The General Conditions are a single standardized set of construction requirements that are included in all specifications that are going out to bid. The Engineering Division and the City Attorney's office have specifically tailored these documents for Harbor Department projects, thus changes to these documents require Engineering Division management and City Attorney approval. Information contained in the General Conditions governs over information contained in all other sections of the specification. A faster option available to the specification writer who must change a portion of the General Conditions for the individual project is to create a Supplementary Conditions Section that supersedes or adds to the General Conditions. A typical supplementary condition is to add requirements for railroad protective insurance when the Work occurs adjacent to railroad tracks.

02.05.03 Specification Section

Specification sections define the project's individual work scopes through written qualitative descriptions. The specification writer should avoid repeating information in specifications that is more properly shown on drawings which graphically show the quantitative aspects of the project, e.g. dimensions, count, and the like.

1. <u>CSI Format:</u> The existing body of Harbor Department specification sections, referred to as the Master Specifications, follows CSI's Master Format 2004 edition for specifications divisions 1 through 49. This replaced the previous 1995 edition which used divisions 1 through 16. Individual section organization also follows CSI Section Format in arrangement of parts, articles, and paragraphs. CSI Page Format is also loosely followed in terms of fonts, indentations, margins, and the like. Refer to Master Format 2004 edition (S:\Share\Engineering Division\SPECS & SPECIAL PROJS\MasterFormat 2004\CSI Publication)

2. <u>Reference Specifications:</u> The Reference Specification (RS) is the Greenbook—Standard Specifications for Public Works Construction.

3. <u>Reference standards:</u> American Society for Testing and Materials (ASTM International) standards are the most commonly referenced standards in Harbor Department specifications.

4. Standard plans: Standard plans are 8 1/2 inch by 11 inch drawings and other standards called out on the drawings but are physically included in appendices at the back of the specifications.

5. Division 1: Division 1, General Requirements, includes sections with information applying to the entire project, such as SUMMARY OF WORK, SITE CONDITIONS, COORDINATION, and others. The specification writer will modify these sections to fit the project, and information the spec writer includes in them will govern information in the subsequent divisions 2 through 49 in the event of a discrepancy. Meetings with the Project Manager and tenant are essential to creating effective Division 1 Sections.

6. Divisions 2 through 49: Divisions 2 through 49 each treat a specific area of construction, such as Division 2, Existing Conditions, or Division 26, Electrical.

02.05.04 Addenda

Addenda are changes to specifications that are transmitted to bidders prior to bid opening. Addendum format consists of striking out text to be removed from the documents and placing gray background shading on text that has been added. The words “Addendum No. __” with the number are printed on the bottom of the affected pages (Reference Specifications Addendum Sample General Exhibit No. 1.)

02.05.05 Delta Revisions

Delta Revisions, while more common on drawings than specifications, sometimes occur to the specifications after bid opening. Format is the same as for addenda, except that the “Revision No. __” is printed at the bottom of the page.

02.05.06 Responsibilities

1. Project Manager shall notify Section Head of Specifications and Special Projects Section as early as possible when a new Project needs a specification.

Specifications and Special Projects Section will obtain specification number and the assigned specification writer will proceed in the preparation of the specifications.

02.05.07 Directions to Consultant for Preparing POLA Engineering Specifications

Consultants should apply these principles when drafting an original specification. Also review POLA Engineering Specifications when they are being used, for conformance to these principles.

1. Obtain specification number from S&SP Section through the Project Manager.

2. Consult with POLA specification writer regarding proper formatting and use of most current Master Specification Sections appropriate for the project, and to determine which sections will be provided by POLA and by the consultant.

3. Create outline specifications (normally at 40 percent completion of drawings) based on project scope. Confer with POLA specification writer.

4. Select specifications first from POLA Engineering's list of Master Specifications. If a required spec is not available from POLA, create the original spec based on Construction Specifications Institute (CSI) Master Format. Edit specifications to fit project.

5. Create and arrange paragraphs in sections as closely as possible in CSI Section Format (see 02.05.08 MOP, Figure SF-1). Prior to creating new articles, check Section Format to verify if a standard CSI article title could be used or modified to fit the work scope being described.

6. Organize text in CSI Page Format with the following POLA standard exceptions:

   a) Headers: Section name and number tabbed to right side of right pages, left side of left pages rather than centered. Underline Section Title.

   b) Footers: State section number rather than title with spec number directly below tabbed to right side of right pages, left side of left pages rather than centered.

   c) Other Titles: Underline part and article titles.

   d) Font size: Arial 12 pitch.

   e) Refer to 02.05.08, MOP 5.

f) For article and paragraph addressing, use Page Format, MOP1, levels and arrangement. Avoid run-on paragraphs by adding additional levels.

g) Tables, forms, and finish schedules may either be incorporated into the appropriate section or included as an appendix at the end of the specification.

7. Although consultant specification writers do not typically prepare POLA Engineering's General Conditions and General Requirements sections, avoid duplicating information in the technical specification sections that is already described in the General Conditions or General Requirements. Obtain copy of General Conditions to ensure compatibility with specification.

8. Assign contractual responsibility for each task to either the Contractor or the Engineer. Any work by Contractor, subcontractor, or consulting engineer hired by Contractor should be referred to as Contractor work; and work by any Port division, personnel, or consultant should be referred to by the Engineer. Do not use gender specific terms.

9. Place submittal requirements in the "Submittals" article in PART 1 of each section rather than scattering throughout the section. Review submittal requirements contained in the General Conditions to avoid conflict.

10. Specify means, methods, techniques, sequences, and procedures of construction only when:

    a) There is a compelling reason why POLA Engineering would prefer a particular method.

    b) Specific means, methods, techniques, sequences, and procedures will not unnecessarily restrict Contractor.

    c) POLA Engineering is willing to accept liability for specific means, methods, techniques, sequences, and procedures.

11. Verify recent changes in listings of reference standards and reference specifications, e.g. revised titles for ASTM standards. Verify changed section and paragraph numbers for referenced specifications.

12. Research information sources including trade and agency handbooks and websites.

13. Research Greenbook, ASTM, and other standards.

14. Research product information to ensure products and manufacturers are current and still available. If listing more than 1 manufacturer or product, limit list to 3 equivalent products.

02.05.08 Reference Design Manuals/Guidelines

Construction Specifications Institute Manual of Practice (MOP – available at Specifications Section) and CSI Master Format,2004 edition (available at S:\Share\Engineering Division\SPECS & SPECIAL PROJS\MasterFormat 2004\CSI Publication).

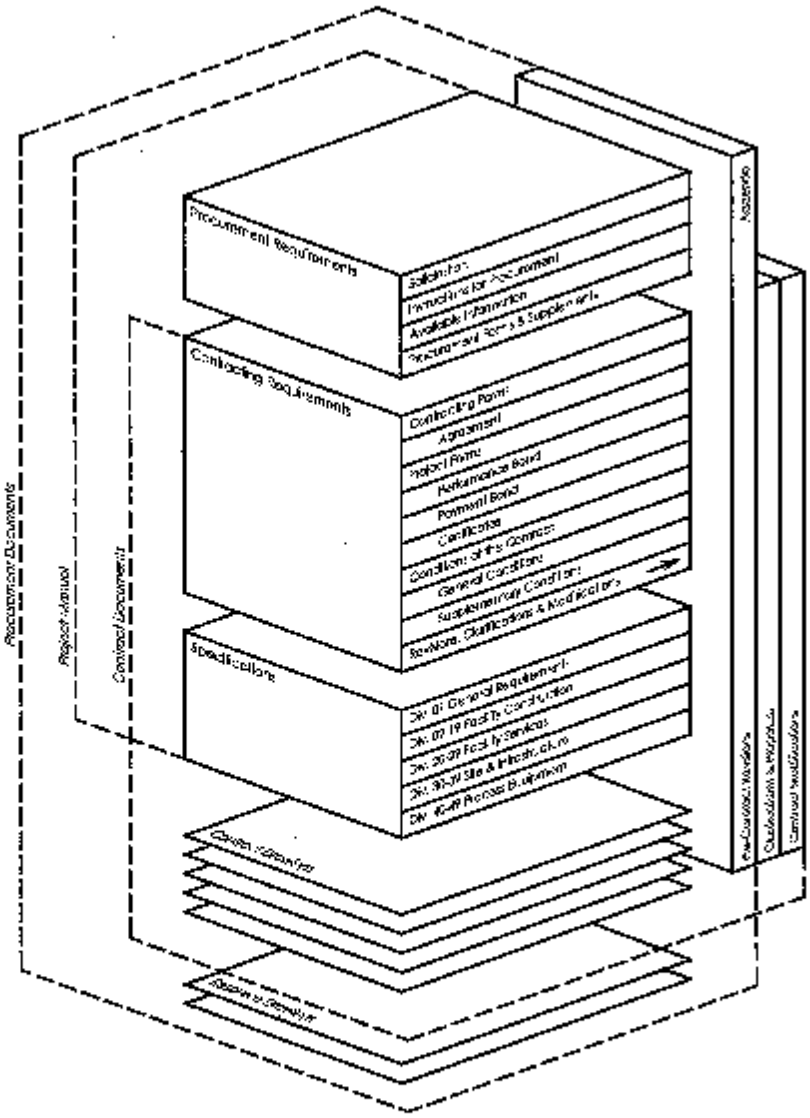
POLA Master Specifications are available at POLA Master Specifications.

Specification Guidelines Advisor: Carmen Bognot

02.05.09 List of Figures/Details

- Fig. 5.1A Construction Documents (See MOP)
- Exhibit 1 Specification Addendum Sample (See S:\Share\Engineering Division\Design Guidelines\Directives)

Figure 5.1-A
Construction Documents.



Section 35 59 40
MARINE TIMBER CONSTRUCTION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. MARINE TIMBER CONSTRUCTION consists of furnishing transportation, labor, materials, and equipment for constructing and repairing timber wharf members including beams, joists, decking, bracing, blocking, bullrails, and crane stop bumpers.

1.2 RELATED WORK

A. BASIC SITE MATERIALS AND METHODS	Section 02 00 01
B. METAL FABRICATIONS	Section 05 50 00
C. TIMBER PILES	Section 31 62 19

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM International):

ASTM A123	Standard Specification for Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products
ASTM A153	Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware
ASTM A307	Standard Specification for Carbon Steel Bolts and Studs, 60000 PSI Tensile Strength
ASTM A563	Standard Specification for Carbon and Alloy Steel Nuts

B. American Wood Preservers' Association (AWPA):

C-18 Standard for Pressure Treated Material in Marine Construction

P5 Standard for Waterborne Preservatives

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Exhibit No. 1 - Specification Addendum Sample

Section 35 59 40
MARINE TIMBER CONSTRUCTION

C. Reference Specification (RS):

Section 204	Lumber and Treatment with Preservatives
Section 305	Pile Driving and Timber Construction

D. Western Wood Products Association (WWPA):

Western Lumber Grading Rules

E. Western Wood Preservers Institute

Best Management Practices for the Use of Treated Wood in Aquatic Environments

1.4 MEASUREMENT AND PAYMENT

A. Payment for timber dock repairs shown on the Drawings will be payable under the "Timber Deck Repair" unit price bid item.

~~1.4~~ 1.5 SUBMITTALS

A. Furnish Certificates of Inspection in conformance with the Western Lumber Grading Rules.

B. Submit shoring plan for existing wharf areas in vicinity of pile cap, beams, and joists to be repaired. Shoring design shall be stamped by a California-registered civil engineer specializing in the design of marine structures.

1. Contractor's engineer shall not designate wharf members to be repaired to be part of shoring support system until such repairs have been completed.

C. Submit a written certification from an inspection agency authorized by the Western Wood Preservers Institute and the American Lumber Standards Committee that Best Management Practices (BMPs) were properly utilized in the preservative treatment of marine timber submerged either continuously or periodically in seawater including, but not limited to, cross bracing. Include a description and appropriate documentation of BMPs used.

~~1.5~~ 1.6 QUALITY ASSURANCE

A. Timber shall be grade stamped by WWPA.

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Spec. 2700

Exhibit No. 1 - Specification Addendum Sample

Section 35 59 40
MARINE TIMBER CONSTRUCTION

~~1.6~~ 1.7 DELIVERY, STORAGE, AND HANDLING

A. Store and handle materials in conformance with RS Subsection 305-2.2.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Timber: Douglas fir, No. 1. S1S minimum, in conformance with RS Subsection 204–1 unless shown otherwise on Drawings. Exceptions:

1. Cap beam material shall be Select Structural.

2. Wharf deck material shall be Port Orford cedar or Alaskan yellow cedar, No. 1. S1S1E.

B. Hardware: Galvanized in conformance with ASTM A123 and A153. Distributor: Cordova Bolt, (714) 739-7500, or (800) 352-2902. Hardware shall conform to requirements of the METAL FABRICATIONS Section and the following:

1.	Bolts:	ASTM A307
2.	Nuts:	ASTM A563
3.	Washers:	Malleable iron
4.	Spikes:	Square-shank, steel, wedge point, diamond head.
5.	Nails:	smooth shank.

C. Timber shall be treated in conformance with RS Subsection 204–2 and AWPA C18.

1. Exceptions to Subsection 204-2:

a. Preservative shall be ammoniacal copper zinc arsenate (ACZA) in conformance with AWPA P5.

b. Cedar wharf decking material shall be untreated.

2. Retention for beams, joists, blocking, butlrails, crane stop bumpers and other Douglas fir members not submersed in salt water, shall be 0.60 pounds per cubic foot in conformance with AWPA C18, Table, "Other Members Used in Marine Construction Minimum Retention Requirements", "Members Out of Water But Subject to Salt Water Splash and/or Ground Contact".

Addendum No. 2

Berths 73WXYZ/Berth 191 Wharf Rehabilitation

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Spec. 2700

Exhibit No. 1 - Specification Addendum Sample

Section 35 59 40
MARINE TIMBER CONSTRUCTION

3. Retention for under-wharf bracing shall be 2.50 pounds per cubic foot in conformance with AWPA C18, Table, "Other Members Used in Marine Construction Minimum Retention Requirements", "Timber and Plywood in Salt Water Use".

4. Material that is continuously or periodically submerged in seawater, including but not limited to cross bracing, shall be post-treated in conformance with "Best Management Practices for the Use of Treated Wood in Aquatic Environments" produced by the Western Wood Preservers Institute (WWPI). Visit the WWPI website at http://www.wwpinstitute.org/, "The Best Management Practices – BMPs", to download a free copy of the BMPs.

D. PVC and polyethylene wrapping material and accessories shall conform to the TIMBER PILES Section.

PART 3 - EXECUTION

3.1 PREPARATION

A. Refer to BASIC SITE MATERIALS AND METHODS Section for requirements concerning protection of existing improvements.

B. Selection of timber pieces:

1. Select individual pieces so that knots and obvious defects will not interfere with bolt placement.

2. Cut out and discard sections that contain defects that render a piece unable to serve its intended function.

3.2 INSTALLATION

A. Timber construction, including cuts and bores, shall conform to RS Subsection 305-2.3 and the following:

1. Cut timber with straight cuts to lengths indicated on Drawings.

2. Bolt holes shall be countersunk where indicated on Drawings. Install and tighten bolts and fasteners in accordance with Drawings.

a. After installation of bolted connections, fill countersunk recesses to flush with non-shrink mastic filler. Plug unused bore holes in conformance with RS Subsection 305-2.2.

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Spec. 2700

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MARINE TIMBER CONSTRUCTION

B. Treat field cuts, damaged surfaces, and drilled bolt holes in conformance with RS Subsection 204-2.3.

C. Timber wharf framing shall conform to RS Subsection 305-2.4.

3.3 REPAIRS

A. Perform cap beam and joist repairs without removing existing wharf deck wherever possible.

1. Under-wharf repairs shall be performed from beneath deck in areas where Drawings show existing structures on the deck that are not called out to be removed, including, but not limited to, product containment pans, sheds, piping, and the like.

B. Where cap beam repairs are shown on Drawings directly above pile repairs perform pile repairs first.

C. Perform removals associated with repairs as shown on Drawings.

1. Clean timber debris from harbor waters immediately upon discovery.

D. Wrap wharf braces in accordance with Drawings.

END OF SECTION

Berths 73WXYZ/Berth 191 Wharf Rehabilitation

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Spec. 2700

Exhibit No. 1 - Specification Addendum Sample

02.06 PERMITS/APPROVALS

02.06.01 General

The Project Manager must determine project permit requirements and ensure that plan checks and permits required by local, State, and Federal agencies have been obtained. In addition, at project inception, the Project Manager must submit an Application for Discretionary Permit (ADP) which triggers the project's environmental permits.

02.06.02 Application for Discretionary Permit (ADP)

An ADP is required for all construction jobs, even for small C&M jobs, capital improvement and maintenance jobs; and independent designs added by change order to existing contracts. Jobs with safety or environmental hazards may be eligible for an exemption in the interest of timeliness. The Project Manager, at project inception, shall submit the ADP form to the Real Estate Division. Real Estate Division assigns the ADP Number to the project and forwards the ADP application to the Environmental Management Division (EMD) and the Planning and Research Division.

EMD prepares the Environmental Assessment and determines if the project will be categorized as:

- Categorically Exempt
- Negative declaration
- Require an Environmental impact report

The 2 latter conditions will generate environmental requirements including local, state, and federal agency permits.

Planning and Research Division determines the project's Coastal Development Permit (CDP) status. Planning and Research advises whether project is exempt or permit is required and obtains permit when required.

02.06.03 Other Permits

Additional permits required by local, state, and federal agencies are detailed in the "Project Manager's Checklist, Part II" form in the Port of Los Angeles, Program Management Handbook.

02.06.04 List of Figures/Details

Port of Los Angeles, Program Management Handbook, "Project Manager's Checklist, Part II"

02.06.05 Port General Permit Procedures

Engineering Division issues several types of General Permits and they are as follows:

1. General Permit:
   This permit is issued only after an Application for Discretionary Permit (ADP) is filled out. Permit section personnel are responsible for verifying the terms and conditions are complete.

2. Heavy Lift / Load Permit:
   Any equipment or material with excessive weights requires an Engineering Permit. The Engineering Division must review structural capacity of Port structures relating to weight of permittee's load. Applicant obtains a short form/application from the Wharfinger Division.

3. Stockpiling Earth / Misc. Permit:
   The applicant/permittee must contact Construction Division prior to applying for a General Permit to verify number of loads, acceptability of material, and stockpile availability. After the permittee has verified the above, Engineering will issue a permit for stockpiling earth material and broken concrete/asphalt and apply a fee of $70.00 per load minimum.

02.07 ENVIRONMENTAL CONSIDERATIONS

The Port's policy is to "grow, and grow green," consistent with the Port's Master Plan and General Plan. Growth is required to accommodate future increases in cargo throughput. This growth must be "green" to protect the environment and improve the quality of life. A green terminal integrates sustainable design practices and new environmental initiatives that surpass current environmental standards. It encourages a comprehensive approach to reduce impacts and increase efficiency at every stage of the shipping process.

Green elements consider terminal design and construction, vessel operations, backland operations, and decommissioning.

Standard POLA environmental requirements include Storm Water Pollution Prevention Plans (SWPPP), waste management, storm water control, hazardous waste management, compliance with underground storage tank (UST) requirements, spill prevention and control, and AQMD compliance.

Standard green terminal design and construction will include Alternative Maritime Power (AMP) equipment on wharves, storm water controls, LEED certified buildings, low-glare lighting, energy efficiency measures, native vegetation buffers, and on-dock rail facilities.

Construction will use clean construction equipment (alternative fuels), construction demolition & waste management, storm water and errosion controls, non-creosote piles, recycled materials, and asbestos and lead paint abatement.

Terminal operator developed Environmental Management Systems (EMS) plan for potential impacts during terminal design, identify impacts during terminal operation, and provide monitoring and management to reduce impacts. An EMS is a continual cycle of planning, implementing, reviewing, and improving the process and actions that an organization undertakes to meet its environmental and business goals.

A green terminal establishes a common standard upon which additional environmental measures are added through consultation with the Port's tenants; promotes integrated whole-terminal design practices; involves terminal operators and shipping companies; and realizes environmental, social, and economic benefits.

02.08 REFERENCES

The following Exhibits are identified for reference:

1. Exhibit No. 1 - Abbreviations
2. Exhibit No. 2 - Engineering Design Glossary
3. Exhibit No. 3 - Organizations
4. Exhibit No. 4 - Drawing Letter Designations

EXHIBIT NO. 1 - ABBREVIATIONS

AAPA	American Association of Port Authorities
AASHTO	American Assoc. of State Highway and Transportation Officials
AC	Asphalt Concrete
ACE	Army Corps of Engineers (United States)
ACI	American Concrete Institute
ACWS	Asphalt Concrete Wearing Surface
ADA	Americans with Disabilities Act
ADP	Application for Discretionary Permit (Harbor Department's environmental assessment form)
AGMA	American Gear Manufacturers Association
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
AQMD	(South Coast) Air Quality Management District
AREMA	American Railroad Engineering and Maintenance Association
ASHRAE	American Society of Heating, Refrigeration, and A/C Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers Association
AWPB	American Wood Preservers Bureau
AWS	American Welding Society
AWWA	American Water Works Association
Bldg. & Safety	Building and Safety (Los Angeles City Department)
CAPA	California Association of Port Authorities
CBR	California Bearing Ratio
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CAL OSHA	California Occupational Safety and Health Administration
CIP	Capital Improvement Program
CMAA	Crane Manufacturers Association of America
CRSI	Concrete Reinforcing Steel Institute
CSI	Construction Specifications Institute
DOG	Division of Oil and Gas (California State Dept of Conservation)
DWP	Department of Water and Power (Los Angeles City)
EPA	Environmental Protection Agency
EWO	Engineering Work Order (Harbor Department)
FAA	Federal Aviation Agency
FS	Feasibility Study
"Green Book"	Standard Specifications for Public Works Construction
HVAC	Heating, Ventilating, and Air Conditioning
IAPA	International Association of Port Authorities
ICEA	Insulated Cable Engineers Association
IES	Illuminating Engineering Society

IEEE	Institute of Electrical and Electronics Engineers
IPCEA	Insulated Power Cable Engineers Association
ISO	International Standards Organization
JIC	Joint Industrial Council
LACFCD	Los Angeles County Flood Control District
MHHW	Mean Higher High Water
MLLW	Mean Lower Low Water
MSL	Mean Sea Level
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NRS	Non-Rising Stem
OC	On Centers
PIANC	Permanent International Association of Navigation Congresses
PUC	Public Utilities Commission
PW	Public Works (Los Angeles City Department)
RAP	Remedial Action Plan
RI	Remedial Investigation
RWQCB	Regional Water Quality Control Board
SAE	Society of Automotive Engineers Inc.
SAR	Service Advisory Report
SSPC	Steel Structures Painting Council
UL	Underwriters Laboratories, Inc.
WCCC	West Coast Crane Committee
WI	Woodwork Institute

EXHIBIT NO. 2 - ENGINEERING DESIGN GLOSSARY

ANCHORAGE	That portion of a harbor (or designated areas outside of harbors) in which ships are permitted to lie at anchor.
APRON	That portion of a wharf or pier lying between the waterfront edge and the (transit) shed. Strictly speaking, from the viewpoint of construction, that portion of the wharf carried on piles beyond the solid fill -- sometimes called apron wharf, wharf apron, or pier apron.
BALLAST	Stone, rock, water, or other material placed in a ship sailing light for the purpose of steadying it in rough seas.
BASIN, TURNING	Area of water or enlargement of a channel used for the turning around of vessels.
BAY	Area in a transit shed or warehouse between posts or columns or the area between lateral ceiling beams or trusses projected downward to wharf or warehouse floor. The beams, trusses, columns, or posts are numbered or lettered and used to designate the location of goods on wharf or in warehouse.
BEACON	Light used as an aid to navigation.
BEAM, CANTILEVER	The characteristic feature of a cantilever beam is that it is supported from only one end.
BELT, CONVEYOR	Conveyor consisting of wide belt, rope, or chain carrying bulk or package material.
BENCHMARK	Permanent point of known elevation, usually with reference to some established datum plane.
BERM	The nearly horizontal formation along a beach caused by deposit of material under influence of waves; a ledge at the bottom of bank or cut.

BERTH	The water area at the waterfront edge of a wharf, reserved for a vessel.
BITT	See "Moorings."
BOLLARD	See "Moorings."
BORING	Hole made in the ground by various methods, to ascertain the kind and extent of material beneath the surface (usually as part of foundation investigations for structures).
BREAKWATER	Engineering structure to afford shelter from wave action -- sometimes called mole or jetty.
BRIDGE	Structure erected over a river or water course, railroads, streets, or other obstacles, to make a passageway from one side to the other.
BRIDGE, BASCULE	Type of drawbridge in which the central span lifts through the arc of a circle on a trunnion by means of counterweights and electrically driven gears.
BRIDGE, DRAW	General term used for all bridges that can be moved to open a channel and permit the passage of vessels.
BRIDGE, LIFT	Type of bridge in which the central span is movable and is lifted vertically by towers containing electrically operated machinery, the span remaining in a horizontal position.
BRIDGE, PONTOON	The bridge is waterborne, continuously or wholly, and when being moved or opened, is carried on pontoons. Usual use is in military operations. Examples of permanent use are at Cologne, at Kaiser Wilhelm Canal at Hotenau, and at Curacao, N.W.I.
BRIDGE, SWING	All movable bridge types, revolving horizontally:

1. Single draw with pivot at the bulkhead, close to the edge of the coping. The axes of rotation are half the width of the bridge from the coping to bring the open bridge entirely within the bulkhead line.

2. Double draw with two spans of equal length, with the pivot supported on a structure in the middle of the channel, splitting the channel into two parts, each spanned by half the bridge when closed.

BUCKET	Container for temporarily holding quantities of materials in bulk while being conveyed from one point to another; part of equipment for moving earth or other material for excavation or filling.
BULKHEAD	Retaining wall to prevent sliding of earth or fill into water.
BULLRAIL	Guard (wooden, plastic, or metal) placed along the outer edge of a pier or wharf to prevent operating equipment from sliding.
BUOY	Floating object moored to the bottom, to mark a channel or point out the position of something beneath the surface of the water.
BUOY, ANCHORAGE	Buoy secured by chain or cable to moor a slip, having a ring on top to afford vessels a means of fastening thereto, without need of using the ship anchor.
BUOY, SEA	The first buoy encountered coming from the sea, marking the channel entrance to a harbor.
BUMPER, TRACK	Device placed at stub end of track to prevent railroad cars from overriding the end of track.
CABLE	General term applied to a rope or chain, used more or less interchangeably with rope.
CABLE, SUBMARINE	Single wire or bundle of wires that are armored, insulated, and waterproofed to carry an electric current underwater.
CAISSON	Watertight, hollow box or cylinder constructed of wood, metal, or concrete which is sunk into

	the earth where water occurs (or into water to a proper depth to secure a good foundation) and then filled with masonry, concrete, or other material to act as a supporting foundation for a structure.
CAMEL	Floating raft, usually of timber, to hold a ship off pier or wharf.
CANOPY	Ornamental projection over a window or doorway; a roofline covering, supported by pillars or posts, or projecting over a platform.
CAP	Horizontal timber resting on and fastened to the tops of a row of piles.
CAP-LOG	Tender or metal stringer running along the face of the wharf and elevated above the top surfaces -- sometimes known as an ordinance log.
CAPSTAN	Stationary vertical shaft concave drum machine for winding rope or chain, and used for hoisting or hauling.
CAR	Vehicle used on tracks (e.g, railroad car).
CATWALK	Narrow walkway, especially one high above the surrounding area, used to provide access or allow movement.
CHANNEL	The buoyed, dredged, and policed fairway through which ships proceed from the sea to their berth or from one berth to another within a harbor.
CHOCK	Wedge or block made to fit a space, to steady an object or prevent movement.
CHUTE	Framework, trough or tube, upon or through which objects are made to slide from a higher to a lower level.
CLEARANCE	Distance provided for a moving object to pass a fixed or moving object.

CLEAT	See "Mooring."
COFFERDAM	Temporary structure for the exclusion of water from a site during construction.
COLUMN	Vertical structural member designed to support a vertical load.
CONTAINER	Standardized metal box generally in 20' or 40' lengths capable of carrying freight that can be carried on ships or chassis.
CONVEYOR	Transfer or handling mechanism that affords continuous movement through application of power or by gravity.
CORE	The soil material from a test boring from which the nature of the underlying ground may be ascertained by inspection.
CRADLE	The moving platform (Marine Railway or Slipway) with keel blocks, moving on inclined tracks on which a ship is hauled out of the water.
CRANE	Machine for hoisting weights or cargo, moving them horizontally for limited distances, and lowering them to new locations.
CRANE, CARGO	Crane especially adapted to the transference of cargo between a vessel's hold and a wharf or lighter.
CRANE, CONTAINER	Dockside crane that transfers containers from ships to shore or vice versa.
CRANE, FLOATING	Crane mounted on a barge or pontoon which can be towed or self-propelled from place to place.
CRANE, GANTRY	Crane or hoisting machine mounted on a frame or structure spanning an intervening space with side tracking movement on railway tracks.

CRANE, PORTAL	Type of gantry crane with vertical legs with sufficient height and width to permit passage of vehicles or railroad equipment to pass beneath the lifting mechanism.
CRANE, SEMI-PORTAL	Type of gantry crane with one support on pier or wharf and the other on shed roof.
CRANE, WHARF	Any crane located on a wharf or pier to access the hold of the vessel alongside.
CRIB	Box shaped frames of timber or concrete, sunk and filled with rock or gravel, to form foundation for wharf and pier structures.
DATUM	Reference point for elevations of structures and water level.
DEADMAN	Block or object, usually buried in solid ground, to serve as an anchor to restrain some object or structure from movement.
DECK	The working surface of a pier or wharf.
DIKE	Bank, as of earth, erected as a barrier, especially an embankment to prevent inundations.
DOCK	The water area alongside a pier or wharf.
DOCK, FLOATING DRY	Buoyant structure or hull open at both ends capable of being flooded and sunk to controlled levels and pumped out and raised, into which ships may be shifted in order to lift them out of the water for repairs.
DOCK, GRAVING DRY	Dock into which a ship is floated for cleaning and repairs. It is fitted with gates which, when closed, permit the dock to be pumped dry.
DOCK, LOADING (or PLATFORM)	The location at which cargo is transferred from pier or wharf shed to a carrier.
DOLPHIN	Isolated cluster of piles and structure used as a support for mooring devices or marker lights.

DOOR, FIRE	Door of fire-resistant construction to close openings in walls adjoining areas where combustion is or may be taking place; also for openings in firewalls.
DREDGE	Machine for excavating material from the bottom of a body of water classified by type of excavating equipment used (e.g., bucket, dipper, ladder, hopper, hydraulic).
DUMPER, CAR	Mechanism for tilting a car to spill out the material carried in the car.
ELEVATION	Distance above or below an established datum plane.
ELEVATOR	A device for transporting vertically either people or goods.
ELEVATOR, FREIGHT	Elevator in warehouse or sheds, designed specifically for cargo or trucks.
ELEVATOR, MARINE LEG	Vertical bucket elevator used for unloading bulk material (generally grain) from vessels at a wharf or pier.
EMBANKMENT	Structure of rock or earth built up above the average ground line usually having uniform side slopes and width at top, mostly used for roads, rail-roads, or the improving of waterfront.
EROSION	The wearing away of soil by the force of a current, either water or wind.
FACILITY, BERTHING	Wharf structure fronting on navigable waters capable of mooring ocean-going vessels.
FACILITIES, HARBOR	Those aids, advantages, or conveniences provided for ships as distinguished from those provided by a port for cargo or passengers. Within the scope of this term are included: channels, anchorages, anchorage basins, mooring post,; mooring basins, dry docks, ship

	repair plants, tugboats, car floats, lighters, and ferries.
FACILITIES, PORT	Waterfront terminals, including structures, reservations, equipment appliances, and necessary collateral aids or conveniences for embarking/disembarking passengers and commodities transported (or to be transported) by water. This would include specifically: wharfs, piers, sheds, warehouses, railroads, water or street connection,; belt railroads and yards, and handling appliances.
FACTOR, SAFETY	The margin by which a structure is overdesigned to provide sufficient strength for additional or undetermined loads or stresses.
FENDER, FLOATING	See "Camel."
FILL	Material used to raise the level of a low area or make an embankment.
FIREWALL	Walls of fire-resistant materials to isolate a building from adjacent buildings or to divide a building into smaller areas where a fire may be contained.
FLOAT	Floating platform or shallow scow-shaped boat with a deck, used as a landing or working platform.
GANTRY	Structure that spans, bridges, or hangs over something.
GANTRY, CANTILEVER	Structure, the overhanging portion of which is supported at only one end.
GANTRY, FLOATING	Double cantilevered gantry crane installed on a barge or pontoon.
GANTRY, TRAVELING	Gantry which is capable of self-propulsion along rails.
GATES, STORM	Gates facing in a direction opposite to impounding water.

GEAR	Comprehensive term including all the equipment involved in performing a certain operation (e.g., hoisting gear, coaling gear, cargo handling gear).
GEAR, CARGO HAULING	Derricks, hoists, wharf cranes, lift jacks, etc., for loading or unloading cargo.
GRAPPLE	Device operating like a clamshell grab bucket but having three or more prongs on each side instead of shells made of plate.
GROIN	Barrier built out into the water from a beach or breakwater to trap drifting sand or arrest erosion.
GUY	Rope or chain to steady a boom, pole, or mast.
HARBOR	Area of water affording a natural or artificial haven for ships. In a proper and more limited sense, an area separated by natural or artificial indentations of shore line from the main body of water as the area within two headlands, or points between, which run the main ship channels leading to an open sea.
HEADROOM	The distance underneath a structure/obstruction or between it and the ground. Clearance measured in a vertical direction.
HOIST	Mechanism to raise heavy objects, generally by means of gear hanging from above.
HOOK	Piece of metal or other hard material, formed or bent into a curve or angle for catching or holding .
HOPPER	Temporary container for bulk material shaped like a funnel, but with four flat tapering sides arranged like an inverted truncated pyramid with the large end up and generally open and the small end down and generally closed by a gate or valve.

HYDRANT	Discharge pipe with valve and spout(s) from which water may be drawn.
JETTING	The process of sinking a pile or caisson by discharging a stream of water through a pipe or an opening in the pile or caisson below its tip.
JETTY	Engineering structure at the mouth of a river or harbor to control the water flow and currents; to maintain depth of channel; and to protect the harbor or beach.
LANDING	Floating platform or part of a wharf equipped with gangways to facilitate the landing of passengers from boats.
LEVEE	Embankment to prevent inundation.
LIGHTER	Barge or other small craft used in transferring cargo from ship to shore, or vice versa.
LIGHTHOUSE	Tower or other building with a powerful light, erected at the entrance of a port or at some important point on the coast to serve as guide to mariners.
LIGHTS, RANGE	Two lights so placed that when seen one above the other, they indicate the axis of a navigable channel for ships.
LINE	In hoisting, hauling, fastening, etc., a commonly used general term for a rope, chain, or cord -- especially when used for some particular purpose, as a tag line, handline, etc. Rope and line are used interchangeably, but rope is preferable whenever possible (as line has many diverse meanings).
LINE, PIERHEAD	Line set by the U.S. Army Corps of Engineers (or other competent authority), beyond which the pier may not extend.

LOAD	Weight or force applied externally, usually stated in pounds or tons. For design purposes, generally stated per square foot.
LOAD, DEAD	Load which is static or non-moving (i.e., does not vary). The dead load of a structure is usually the weight of the structure itself.
LOAD, DECK	Permissible weight to which a structure may be subjected, per unit of area.
LOAD, LIVE	Load which is not static or moves in location (i.e. varies in amount).
LOW WATER, MEAN	The average height of the low waters determined from the records taken in some predetermined period.
MOLE	Mound or massive work formed of masonry, large stones, etc., laid in the sea for protection from waves.
MONORAIL	Type of conveyor system run on over-head rails in a transit shed and used for stacking, unstacking, and moving cargo on the wharf.
MOORINGS	That which serves to secure a ship to a fixed place by means of lines/cables (other than the anchor chain, generally), e.g., bitts, bollards, cleats, etc. -- of different shapes and sizes.
PAVEMENT	Covering of solid materials to make a work surface or a surface for travel.
PIER	Structure or platform of timber, masonry, earth, or other material, built usually at right angles to the shoreline of the harbor and extending outwards to deep water, permitting vessels to lie at either side to discharge or receive cargo or passengers.
PILE/PILING	Large stake driven in the earth to support a building, pier, or other superstructure, or to resist lateral pressure in a bulkhead,

	cofferdam, etc. (e.g. batter piles, cluster piles, etc.). It is made of wood, metal or concrete.
PILE, FENDER	Pile driven close to a structure to prevent contact between vessel and structure.
PIT, BORROW	The bank from which gravel, sand, etc., is hauled to make a fill.
PORT	This is defined as:

1. A harbor plus terminal facilities.
2. A harbor provided with terminal and transfer facilities that enable it to be used in commerce.
3. Used in commerce to designate a harbor where vessels are loaded or discharged.
4. A location on a harbor or other water area equipped and in use for embarking or disembarking passengers or commodities transported by vessels.
5. Any place from which merchandise can be shipped for exportation or at which merchandise can be imported. Note: If there are no marked indentations of shore lines, a port may exist without a harbor(s); further, a port involves some degree of development for purposes of commerce.

QUAY	The term for a wharf generally used in Europe. A quay is usually of solid construction as distinguished from an open-pile structure. The quay system of wharf planning is a system in which a wharf, transit shed, marginal street, tracks, roadways, and warehouses are parallel to the ship at its berth (as distinguished from the pier system in which the wharf is at an angle to the other elements). A quay accommodates ships only on one side.
RAMP	Artificially inclined path, road, or track along which persons, animals, and wheeled vehicles may pass. It is primarily for the purpose of ascending or descending or changing their elevation.

RAMP, MOVING	Wood apron conveyor set at a moderate inclination and used for conveying persons, motor trucks, wheeled trucks, etc., up or down the grade. When the slope is so steep that special arrangements must be provided to prevent vehicles from running down the apron, it is usually called an apron elevator.
REVETMENTS	Engineering structures to protect from erosion and to hold in place banks of canals, rivers, and harbors.
RIGHTS, RIPARIAN	The rights of a person owning land containing or bordering a watercourse or other body of water in or to its banks, bed, or waters.
SCARP	An almost perpendicular slope occurring along the shore during periods of erosion.
SEA LEVEL, MEAN	The average height of the sea, determined by averaging the hourly heights of the tide for a period of time.
SEAWALL	Barrier along the shoreline to prevent encroachment of the sea by direct wave action.
SHED	Structure on a wharf or pier providing protection for cargo, stores, and passengers -- sometimes called a wharf shed or pier shed.
SHED, TRANSIT	Wharf structure for the short-time storage of merchandise in transit.
SILTING	The filling in of a river or harbor bottom by the depositing of matter being carried by suspension in a stream.
SLIP	Open space or tidal dock between piers. In a restricted sense, referring to ferries or small boats only, a slip is a water space protected by racks or floats on both sides and sufficient only for the accommodation of one vessel.

SLOPE	The inclination of a line with the horizontal; the numerical value of the relationship of their vertical rise or dip to the horizontal.
SOUNDING	The measured depth of water compared to some established datum plane.
SOUNDING, ECHO	Determination of depth of water by electronic equipment.
SPACE, AISLE	Space in cargo sheds or warehouses found necessary by operating experience; also usually required by fire regulations.
SPRINKLER	Sprinkler head (for fire protection); fitting at end of water line with orifice stopped by plug composed of an alloy with low melting point.
STAGE, LANDING	Platform entirely afloat, with one end afloat, or with one end afloat and the other pivoted and attached to a wharf, to facilitate the discharge of ships, passengers, and cargo at places of great variance in tide.
STOP, FIRE	See "Firewall."
STORAGE, GROUND	Storage systems where an entire supply of bulk material is carried at ground level. The term is also used to designate a combination system in which a portion only of the material is held in elevated bins for immediate use or distribution, with the larger part resting directly on the ground.
STRIP, RUBBING	Fender (horizontal or vertical) attached to face of the pier, wharf, or other structure, against which a vessel may lie and not come into contact with the face of the structure.
SWITCH, TRACK	Arrangement to permit flow of traffic from one track to another.
SYSTEM, SPRINKLER	Collection throughout a building of sprinkler heads connected by necessary pipe lines and controls.

TERMINAL — This is defined as:

1. The end of a movement in transportation.
2. The buildings, structures, or equipment at the end of a transportation movement for the transfer, handling, delivery, and reception of passengers and freight.

TERMINAL, RAIL/WATER — Terminal where freight is transferred between railway cars and boats.

TIDE — The rising and falling of the water of the sea produced by the attractions of the sun and moon.

TIE-BACK — Timber of steel cable, rod, or channel iron, I-beam, U-beam (or other form), running horizontally from a retaining wall to an anchor pile or deadman to compensate for the outward thrust of the fill.

TRACK, CROSSOVER — Track connecting two parallel tracks.

TRIPPER, CONVEYOR (BELT) — Device for causing load on a conveyor belt to be discharged at some predetermined point other than off the end of conveyor.

WAREHOUSE — Structure in which goods may be stored at a minimum risk from fire, theft, fraud, or deterioration for a necessary period of time prior to making further distribution. Warehouses perform this function for goods in transit or goods being merchandised, resulting in transit storage warehouses and merchandising warehouses.

WHARF — Structure or platform of timber, masonry, earth, or other material, built usually parallel to shore line of harbor or river extending outwards to deep water, permitting vessel to berth, discharge, or receive cargo/passengers.

WHARFS, RAILROAD — Those wharfs, piers, sheds, and structures thereon, owned, operated and controlled by a

	railroad; used principally for the accommodation of traffic passing over their respective lines of transportation. The term also includes such facilities as may be leased by railroad corporations.
WORKS, HARBOR	The system of engineering structures, jetties, breakwaters, basins, etc., including maintained channels, as executed for improving the navigability of a harbor and its availability and security for shipping. The term may include wharfs, docks, and all other fixed structures provided for accommodation of shipping in a harbor, but in a restricted sense, these facilities may be designated port works.
ZONE, INTERTIDAL	Vertical zone between high and low tide. The intertidal zone of a stationary structure is subject to alternate wetting and drying -- sometimes erroneously referred to as a splash zone.

EXHIBIT NO. 3 - ORGANIZATIONS

American Association of Port Authorities (AAPA)

American Association of State Highway and Transportation Officials (AASHTO)

American Concrete Institute (ACI)

American Gear Manufacturers Association (AGMA)

American Institute of Steel Construction (AISC)

American National Standards Institute (ANSI)

American Railroad Engineering and Maintenance Association (AREMA)

American Society of Mechanical Engineers (ASME)

American Society of Testing and Materials (ASTM)

American Wood Preservers Association (AWPA)

American Wood Preservers Bureau (AWPB)

American Welding Society (AWS)

American Water Works Association (AWWA)

California Association of Port Authorities (CAPA)

California Occupational Safety and Health Act (CAL OSHA)

Certified Federal Register (CFA)

Crane Manufacturers Association of America (CMAA)

Concrete Reinforcing Steel Institute (CRSI)

Federal Aviation Administration (FAA)

International Association of Port Authorities (IAPA)

Insulated Cable Engineers Association (ICEA)

Illumination Engineering Society (IES)

Institute of Electrical and Electronics Engineers (IEEE)

Insulated Power Cable Engineers Association (IPCEA)

International Standards Organization (ISO)

Joint Industrial Council (JIC)

National Electrical Code (NEC)

National Electrical Manufacturers Association (NEMA)

National Fire Protection Association (NFPA)

National Wire Institute (NWI)

Permanent International Association of Navigation Congresses (PIANC)

Society of Automotive Engineers, Inc. (SAE)

Society for Protective Coatings (SSPC)

Underwriters' Laboratories, Inc. (UL)

West Coast Crane Committee (WCCC)

West Coast Port Authorities (WCPA)

EXHIBIT NO. 4 - DRAWING LETTER DESIGNATIONS

DRAWING TYPE	LETTER DESIGNATION
Architectural	A
Coordinate Control	CC
Contamination/Clean-Up	C
Crane Rail	CR
Deck (Wharf)[1]	D/S
Dredging Plan	C
Electrical (including Street Lighting)	E
Fender (Wharf)	F
Float (Marina)	FL
Grading and Paving	GP
Landscape	LS
Mechanical (including Heating Ventilation)	M
Phasing (for Project)	C
Piles (Wharf)	P
Plumbing (Buildings)	PL
Railroad	RR
Removals	R
Sections (Wharf)	X
Sections (Backland and wharf)	XX
Sewers	SS
Signage	A
Site Plan (General Plans only)[2]	C
Storm Drains	SD
Street	C
Striping and Fencing	SP
Structural (Backland, Bldg., & Wharf)	S
Traffic Signal	TS
Water (Backland, Wharf)	W

1. Only the drawing entitled Deck Plan has the letter designation "D".

2. Site plans for specific disciplines use the designated letters for those disciplines (e.g., Electrical Site Plan =E),

03 BACKLAND

03.01 GENERAL

03.01.01 OVERVIEW

This section contains information related to the preparation of the following backland general contract drawings (see Exhibit Contract Drawings Nos. 1-7 in 03.01.08):

- Cover Sheet
- Title Sheet (T-1)
- Title Sheet (T-2)
- Site Plan (C)
- Coordinate Control Plan (CC)
- Phasing Plan (C)
- Contamination/Clean-Up Plan (C)

03.01.02 DESIGN CRITERIA

There is no specific backland general design criteria provided for this section.

03.01.03 CALCULATIONS/WORKSHEETS - Estimating

There are no estimating worksheets provided for this section. If there are any contamination/clean-up plans created under this section, an analysis and submission of cost breakdown is required. The cost impact of "phasing" a project is normally included in the unit lump sum cost of specific facility estimates.

03.01.04 GRAPHIC CRITERIA

Cover Sheet

This sheet consists of one layer and contains the title, specification number, and initial signatures and stamps.

Title Sheet

This sheet contains the vicinity map and index of drawings (drawing numbers/names, standard plans, and reference drawings), and general project notes (with abbreviations and general legend). It consists of the following layers:

1. Standard title sheet and text indicating index information, project notes, abbreviations, general legend, and the project site location arrow/information for the vicinity map.

2. Vicinity map of the entire harbor area.

3. Appropriate vicinity map text.

4. Water area shading.

Site Plan

This sheet includes an abbreviated general summary of what exists now on the site and what the overall results of the project are going to be. It consists of the following layers:

1. Base map (site plan) -- without text.

2. Main proposed surface improvements (site plan) -- without text.

3. Project boundaries, contractor storage yard, and areafill -- with text.

Coordinate Control Plan

This sheet consists of the following layers, indicating distance and bearings for the site parcel:

1. Base map (site plan) -- without text.

2. Main proposed surface improvements (site plan) -- without text.

3. The project boundaries, notes (including Field Book references, zone used, and last survey date), and coordinate control information, such as:

coordinates; metes and bounds description of each line (distance and bearing); property and lease lines; and pierhead line.

Phasing Plan

This sheet consists of the following layers:

1. Base map (site plan) -- without text.

2. Main proposed surface improvements (site plan) -- without text.

3. Project boundaries, phasing boundaries, temporary fencing, contractor storage area, and areafill -- with text.

Contamination/Clean-Up Plan

This sheet consists of the following layers:

1. Base map (site plan) -- without text.

2. Main proposed surface improvements (site plan) -- without text.

3. General clean-up plan indicating location (tied to a coordinate system) of potential contamination, project boundaries, and areafill -- with text and topographic contours.

03.01.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications relate to backland general (other sections may be required, depending on the project):

SECTION TITLE
Work Schedule
Excavation Safety Requirements
Removals
Trench Excavation and Backfill

03.01.06 PERMITS/APPROVALS

There are numerous environmental permits/approvals which may be required for contamination/clean-up work. The Environmental Management Division will determine which permits are necessary for each specific case. It is the Project Manager's responsibility to determine which non-environmental permits may be required.

03.01.07 ENVIRONMENTAL CONSIDERATIONS

The main environmental concern of this section is the delineation of known contaminated area, as described above.

03.01.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

Contract Drawing Number and Title:

1-2209 Pier 400 Backland Phase 1- Berths 401-403

1-2209-1*	Cover Sheet
1-2209 2*	General Notes, vicinity Map, index to drawings
1-2324	Horizontal Coordinate Control Map
1-2210 C-1	Phasing –Project Limits and Access
1-2209 C-1	Project Limits
1-2209 C-2	Phasing Plan - Site Availability

LAHD Standard Plans

* Drawing Nos. should be T-01 and T-02

03.02 FENCING

03.02.01 OVERVIEW

This section contains the following information related to the preparation of the fencing contract drawings:

- Site Plan (SP)
- Fencing Plan (SP)
- Fencing Details (SP)

03.02.02 DESIGN CRITERIA – Fencing

1. Non-Corrosive - Heavy galvanizing is required to minimize fencing corrosion due to the POLA's marine environment.

2. Security Fencing - Security fencing around the perimeter of a leased area shall be 8 feet high (5'-4" chain link fence on k-rail) with 1 foot barbed wire on top.

3. Internal Fencing - Internal fencing (within a leased area) should be 8 feet high chain link fence, but this may vary depending on tenant need.

4. Concrete Footings

   a) Terminal perimeter fencing line posts shall be designed with concrete footings.

   b) Internal lease fencing line posts (on existing backland pavement) shall be installed without concrete footings.

5. Street Fencing - Fencing at driveway exits should be set back to provide adequate site distance for exiting vehicles.

6. Fencing Only - If there is fencing but no striping to be done as part of the project, the fencing would be included in the grading and paving drawings (see Backland - Grading and Paving, 03-06).

03.02.03 CALCULATIONS/WORKSHEETS

Three are no calculations or worksheets provided in this Section.

03.02.04 GRAPHIC CRITERIA

The following are required in the contract drawings when there is fencing work:

- Fencing Plan
- Fencing Details

03.02.05 SPECIFICATIONS

The following sections in the POLA Department Master Specifications relate to fencing (other sections may be required, depending on the project):

SECTION TITLE
Treating Damaged Galvanizing
Chain Link Fences and Gates
Paints and Coatings

03.02.06 PERMITS/APPROVALS

The approvals listed below may be required when there is fencing work:

Fire Department Approval

Fire Department approval of the fencing plan may be required (to be determined by the Hydrant Unit on a case-by-case basis) whenever emergency access to a facility is impacted.

03.02.07 ENVIRONMENTAL CONSIDERATIONS

Security fencing around the perimeter of a backland facility that is adjacent to a public street may require a screen as an aesthetic mitigation measure. Landscaping shall be used when possible.

03.02.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2209 Pier 400 Backland Phase 1- Berths 401-403

- 1-2209 SP-1 Striping and Fencing Site Plan
- 1-2209 SP-2 Striping and Fencing Plan
- 1-2209 SP-41 Fencing Details

LAHD Standard Plans

03.03 RAIL

03.03.01 OVERVIEW

This section contains the following information related to the preparation of backland rail contract drawings:

- Railroad Track Site Plan (RR)
- Railroad Track Plan and Profile (RR)
- Railroad Details (RR)
- Cross Sections (XX)
- Compressed Air Plan (M)
- Compressed Air Details (M)
- Water System Details (W)

03.03.02 DESIGN CRITERIA

General Design Requirements

Railroad design for all Port-owned trackage shall meet the regulations, standards, and requirements of the following (any conflicts which arise must be resolved with the entities impacted):

1. General Orders of the California Public Utilities Commission (CPUC.) [All Port railroad facilities are under the jurisdiction of the CPUC.].
2. Harbor Department (as specified in these Guidelines or as otherwise approved by the Chief Harbor Engineer).
3. Pacific Harbor Line (which has a maintenance responsibility).
4. American Railway Engineering and Maintenance of Way Association's (AREMA) Manual for Railway Engineering.

Main Line Track Design

1. Horizontal Alignment.
   a) Curvature:
      1) Desirable = 7°30' (R=764‘).
      2) Maximum = 8°00' (R=716‘).
   b) Tangent between reversing curves:
      1) Desirable = 200 feet.
      2) Minimum = 100 feet.
   c) Minimum center line clearance between parallel tracks = 15 feet.
   d) Minimum horizontal clearance to structures (and fences) from track center line:
      1) Tangent track = 10 feet.
      2) Curve track = 11 feet.
2. Vertical Alignment.
   a) Desirable maximum grade = 1%.
   b) Length of vertical curve:
      1) SAG curves = rate of change of 0.1%/100 feet (V/L=.1).
      2) Summit curves = rate of change of 0.2%/100 feet (V/L=.2).
3. Turnouts. No. 10 minimum.

Industry Track Design

1. Horizontal Alignment.
   a) Curvature:
      1) Desirable = 10°00' (R=574’).
      2) Maximum = 12°30' (R=459’).

b) Minimum tangent between reversing curves = 60 feet.

c) Minimum center line clearance between parallel tracks = 14.5 feet.

d) Minimum horizontal clearance to structures (and fences) from track center line:

   1) Tangent track = 10 feet.

   2) Curve track = 11 feet.

Railyards (Intermodal)

Equipment Selection

The designer shall allow for flexibility in the equipment selected. With the exception of tenant-preferred equipment, the specifications of rail container terminal handling equipment will define the track spacing and requires the evaluation of numerous interdependent factors, such as:

1. Land availability.
2. Operating costs.
3. Development costs.
4. Volume throughput.
5. Mainline access.

Tangent vs. Curved Working Track

Although tangent layouts are preferable, it is assumed that straddle cranes and rubber tire mounted transtainers (overhead cranes) can efficiently load/unload containers on tracks up to 6°00' or 7°00' of curvature.

Track Length

1. Standard Car Length: The standard car length is 305 feet. This is the overall dimension of a five platform, double-stack well car, as manufactured by Gunderson. The designer should check current manufacturer literature.

2. Standard Train Length: The standard train length is twenty-two 305 foot cars (25 x 305 = 7,625 feet).

The track layout for the working or loading yard should accommodate at least one full standard unit train on 4 to 6 tracks depending on the length of the yard. Four tracks are desirable for the 25 cars six tracks are maximum.

The track layout for the storage support yard (if area is available and/or desirable by the customer) ideally should accommodate twice the capacity as the working yard. A 1:1.5 or even 1:1 ratio is acceptable. However, yard throughput and capacity will be significantly diminished.

1. Transverse Access: The track length should allow for gaps to accommodate transverse access.

2. Run-around Track: A run-around track should be provided to allow for operational flexibility.

Yard Design

Track grade in areas where rail cars are to be spotted shall not exceed 0.4%.

1. Vertical Alignment.

   a) Desirable maximum grade = 2%

   b) Length of vertical curve:

      1) SAG curves = rate of change of 1.2%/100 feet (V/L=1.2)

      2) Summit curves = rate of change of 2%/100 feet (V/L=2)

2. Turnouts.

   a) Desirable = No. 10
   b) Minimum = No. 8

Yard Cross Section

The designer shall submit with the other contract documents a yard cross section. A sample of cross section is included in Reference Drawings. The following information shall be included:

1. Location of tracks, lightpoles, and equipment wheel path at crane pads.

2. Travel and container staging lanes.

3. Utility corridor.

4. Center storage, if available.

5. Railroad clearance lines.

6. Perimeter roads and fence.

Compressed Air

1. Car Air Reservoir: The car air reservoir requires 15 cubic feet of compressed air at 85 psig.

2. Repressurization Time: The maximum time for repressurization of the total train system shall be 20 minutes.

3. Location of Hook-Up Outlets: Hook-up outlets shall be located at least at each break of train length.

Track Structure Components

The following shall be considered Port standards for Port-owned trackage, unless otherwise authorized by the Chief Harbor Engineer:

1. Ballast Depth: minimum 8 inches from bottom of tie. Twelve inches desirable

2. Rail size 136 lb. R.E. (pounds per yard)

3. Turnout components shall be as follows:

   a) Rail-bound manganese (RMG) frogs.

   b) 16'6" Sampson type switch points per A.R.E.M.A. Portfolio of Trackwork Plans Plan No. 221-00, Detail 5100, with manganese tipped switch points.

   c) Adjustable wedge rail braces.

4. Ties

a) Timber

1) Tie size - minimum of:

(a) 7 inches x 9 inches x 8 feet -- for industry/ backland (lower tonnage) tracks.

(b) 7 inches x 9 inches x 9 feet -- for main line or intermodal (high tonnage) tracks.

2) Tie spacing on-centers -- minimum of:

(a) 22 1/2 inches -- for industry/backland (lower tonnage) tracks (for exception, see "iv.").

(b) 19 1/2 inches -- for main line or intermodal (high tonnage) tracks (for exception, see "iv.").

(c) 22 1/2 inches -- for rail yard tracks (for exception, see " iv.").

(d) 18 inches -- at rail joints, regardless of location (includes industry/backland, main line, and rail yard).

3) Tie plate size -- minimum of 8" x 14" double shoulder.

4) Installation of rail anchors:

(a) Switch ties -- box anchor every tie.

(b) Jointed rail -- box anchor every third tie.

(c) Continuously welded rail -- box anchor every other tie.

5) Gage rods shall be installed through all curves having a curvature greater than 10°30' and at a spacing of 5 feet on-centers.

b) Concrete

1) Tie size - 7 inches x 9 inches x 8 feet – 6 inches

2) Tie spacing on centers – 24 inches

3) Fasteners

(a) Pandrol “e” clip for turnouts and other special track work.

(b) Safelok clip for all other tracks

4) Rail pads and insulators shall be used for all concrete tie applications.

5) Geotextile fabric shall be utilized for all track sections.

6) All other components shall be in accordance with AREMA standards.

Continuously Welded Rail

Continuously welded rail should be used for all main line (high tonnage) tracks, tracks in paved areas, and yard tracks (intermodal or high tonnage).

Highway/Street Railroad Grade Crossings - Crossing Surface Material

At highway/street railroad crossings, alternative forms of crossing surface materials other than asphalt (e.g., concrete or other material types) should be considered. Factors impacting this include:

1. Cost of crossing materials.

2. Volume and makeup of vehicular traffic.

3. Recommendation of maintaining railroad.

4. Condition of track structure.

Track Drainage

1. Drainage Diversion. All drainage should be diverted away from railroad tracks by appropriate pavement grades or should be intercepted by trench or slot drains.

2. Track Drains. Track drains should be constructed at the low point of the track grade and at all street crossings and yards unless there are no storm drains in the area (either existing or proposed) to which track drains can outlet. See "Track Drains" in Storm Drains, 03.07.02, for added detail.

3. Deviations. Deviations that require drainage to run across tracks must be approved by the Chief Harbor Engineer.

Pipeline Crossings

Pipelines on conduits crossing under railroad tracks shall be protected per AREMA guidelines.

Jacking/Tunneling

Jacking and tunneling shall be performed in accordance with the following:

1. Standard Specifications for Public Works Construction (Greenbook).
2. Cal O.S.H.A. requirements (Tunnel Safety Orders).
3. AREMA guidelines

03.03.03 CALCULATIONS/WORKSHEETS

There are no calculations or worksheets provided for this section.

03.03.04 GRAPHIC CRITERIA

1. Title Sheet
2. Index of Drawings
3. Coordinate Control Plan
4. Plan & Profile Sheets
5. Cross Sections
6. Details

03.03.05 SPECIFICATIONS

The following section in the Harbor Department Master Specifications relates to rail (other sections may be required, depending upon the project):

SECTION TITLE
Railroad Work
Railroad Track and Accessories
Welding of Rail

An additional section from production specification, “Running Rail” is also used for procurement.

03.03.06 PERMITS/APPROVALS

The approvals listed below may be required when there is rail work:

California Public Utilities Commission (CPUC) Approval

Specific CPUC approval is required for new public street crossings (or for modification to existing ones). Private crossings do not require CPUC approval however it is recommended the CPUC be included in the design review process for heavy use or non-standard crossing alignments.

Alameda Corridor Controlled Track

Permits and approvals are obtained in conjunction with the Alameda Corridor Transportation Authority and the Port’s Property Management and Engineering Divisions.

Industry/Tenant Approval

This type of approval involves railroads on Port property (e.g., in backland or at a terminal) and takes the form of an Agreement. The following cases require an Agreement:

1. Private crossing (when the tenant's entrance, driveway, or aisle way crosses railroad tracks outside the terminal lease).

2. When the tenant proposes to move, load, or un-load cars on tracks which are not within the lease area (Industrial Track Agreement used).

03.03.07 ENVIRONMENTAL CONSIDERATIONS

Timber Tie Disposal – Removal and disposal of existing timber ties shall conform to Master Specification Sections REGULATORY REQUIREMENTS and RAILROAD TRACK AND ACCESSORIES.

03.03.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2023 New Dock Street/Henry Ford Avenue Grade Separation

- 1-2023-5 Key Maps (Site Plan)
- 1-2023 RR-1-8 Railroad Track Plan and Profile
- 1-2023 RR-19-22 Railroad Details

1-2208 Pier 400 ICTF

- 1-2208 RR-1 Railroad Site Plan
- 1-2208 RR-4-31 Railroad Track Plan and Profile
- 1-2208 RR-32-38 Railroad Details
- 1-2208 RR-39-40 Switch Protection
- 1-2208 XX-1-22 Cross Sections

LAHD Standard Plans

CPUC Crossing Protection Standards

- No. 1-C
- No. 8
- No. 8A
- No. 9
- No. 9A

Turnout Tie Spacing (See 1-2208-32 to33)

Turnout Design Criteria Table – AREMA Portfolio of Trackwork Plans No. 910-02

03.04 STRIPING

03.04.01 OVERVIEW

This section contains the following information related to the preparation of the striping contract drawings:

- Site Plan (SP)
- Striping (SP)
- Striping Details (SP)

03.04.02 DESIGN CRITERIA

Parking Lots

For parking lot design information, the designer should refer to SPECIAL FACILITIES - Parking Lots (Section 06.04), in these Guidelines.

Street Striping

Striping on POLA streets shall meet the criteria as set forth in the CALTRANS Traffic Manual, Chapter G ("Markings") and the Los Angeles Department of Transportation design standards.

Striping Details

With the exception of tenant-preferred design, all details for striping dimensions, nomenclature, traffic lane widths, and truck tire stops shall be done in accordance with Striping Details as shown on the Reference Drawings.

03.04.03 CALCULATIONS/WORKSHEETS

Traverse calculations may be helpful in determining layout lines for striping. Calculations and worksheets shall be prepared in accordance with POLA Engineering Design Staff.

03.04.04 GRAPHIC CRITERIA

The following are required in the contract drawings when there is striping work:

- Striping Plan
- Striping Details

03.04.05 SPECIFICATIONS

The following sections in the POLA Department Master Specifications relate to striping (other sections may be required, depending upon the project):

SECTION TITLE
Pavement Markings
Chain Link Fences and Gates
Paints and Coatings

03.04.06 PERMITS/APPROVALS

The approvals listed below may be required when there is striping work:

Fire Department Approval

Fire Department approval of the striping plan may be required (to be determined by the Hydrant Unit on a case-by-case basis) whenever emergency access to a facility is impacted.

Department of Transportation (DOT) Approval

Los Angeles City DOT approval of the striping plan may be required if striping encroaches into a public right-of-way.

03.04.07 ENVIRONMENTAL CONSIDERATIONS

Removal of paint may be performed by water blasting to minimize the damage to the existing pavement. Remove and dispose all marking materials such as thermoplastic, epoxy, tape and paints. Treat or clean the debris as necessary.

03.04.08 REFERENCE DRAWINGS

The following contract drawing are identified for reference:

1-2549 Berths 121-126 Terminal Re-Striping

- 1-2549 SP-1 Site Plan
- 1-2549 SP-6 Striping Plan
- 1-2549 SP-9 Striping Details

LAHD Standard Plans

03.05 REMOVALS AND EXISTING SUBSTRUCTURES

03.05.01 OVERVIEW

This section contains the following information related to the preparation of backland removals and existing substructure contract drawings:

- Removals and Existing Substructures – Plan (R)

03.05.02 DESIGN CRITERIA

General

1. Determine all items to be removed, salvaged, and/or relocated.
2. Verify existing conditions and substructures (using as-builts, field investigations, survey)
3. Clearly indicate/identify limits of removal.

Coordination

Coordination is required with the following:

1. Engineering Division Sections: Electrical, Mechanical, and Structural.
2. Customers, agencies, other contractors, Construction & Maintenance Division, and Construction Division.
3. Real Estate, project site tenant(s), including adjacent tenants.
4. Utility owners (DWP, Gas Co., Pacific Bell), including Wharfingers for utility disconnects.
5. Risk Management and Environmental Management for hazardous removals (asbestos abatement, lead abatement, hydrocarbon-contaminated material).
6. Pacific Harbor Lines (PHL), when in the vicinity or within 10' of tracks.

Salvage

Identify salvage items; include delivery location, contact person, and phone number.

1. Request C&M (via memo) to identify items to salvage.

2. Salvaged asphalt concrete & unreinforced concrete rubble: coordinate with the Construction Division for the disposal at the Port's stockpile site per Specifications.

Building Demolition

Refer to 04 BUILDINGS, 08 Removals and Demolition.

Removals: Container Backland, Wharf, Roadways, Miscellaneous Areas

Clearly identify and describe items to be removed and/or salvaged within the project limits. Provide reference drawings, include:

1. Pavement: type and thickness

2. Substructures: type, material, and size of pipe; live or abandoned; contact name and number

3. Utility: name, meter number, type and size, contact name and number (power/electricity, water, gas, sewer, telephone, oil, etc.)

4. Pile-Supported Foundations. All pile-supported foundations shall be removed to elevation plus 5 M.L.L.W. (Mean Lower Low Water) or at least 5 feet below finished grade.

Potholing

Potholing may be required to verify locations of existing substructures where they could potentially interfere with proposed work. Proper measures/precautions need to be taken in areas of known or suspected contamination when potholing.

Abandoned Pipeline/Conduit Substructures

When substructures are no longer needed, the following guidelines will normally apply:

1. Abandon the substructure in its place if its depth is at least 5 feet below finished grade (abandonment shall be done in accordance with the "Green Book," Standard Specifications for Public Works Construction).

2. Remove the substructure if its depth is less than 5 feet below finished grade.

3. Hazardous Materials. The Environmental Management Division (EMD) should be contacted regarding special requirements for removal of substructures with hazardous materials.

Historical Assessment

The Project Manager shall request the EMD to perform a historical assessment on any existing facility at least 50 years old or of potential historical significance.

Disposal

1. Hazardous Waste-Disposal of all hazardous waste material shall be coordinated with the Risk Management and Environmental Management Divisions. The waste material shall be disposed of at an approved disposal site off Port property. Each project is evaluated for remediation on a case by case basis.

2. Items not to be salvaged or reused shall be disposed off Port property.

Environmental/Hazardous Materials

Suspected Contamination: An Environmental Site Assessment and Characterization must be done prior to demolition, if the project area has suspected contamination.

1. Asbestos Abatement

2. Lead Based Paint

3. Contaminated Soil, Hydrocarbon Impacted Soil and/or Water

4. Creosoted Timbers/Piles

03.05.03 CALCULATIONS/WORKSHEET

There are no calculations or worksheets provided for this section.

03.05.04 GRAPHIC CRITERIA

03.05.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications relate to removals and existing substructures (other sections may be required, depending on the project):

SECTION TITLE
Summary of Work
Coordination
Regulatory Requirements
Solid Resources Management
Excavation Safety Requirements
Basic Site Materials and Methods
Building Demolition and Removals
Selective Site Demolition
Asbestos Abatement
Lead Abatement

Standard Specifications for Public Works Construction "Greenbook"

- 5 Utilities
- 7-8 Project Site Maintenance
- 306-5 Abandonment of Conduits and Structures

03.05.06 PERMITS/APPROVALS

The permits listed below may be required when there is substructure and removal work:

Army Corps. of Engineers Permit

A Corps. Removal Permit is required when work is done in their jurisdiction (any land area in the tidal zone up to MHHW [Mean Higher High Water]).

Department of Public Works (P.W.) Permit

Sewer Cap Permit, the City of Los Angeles (Department of P.W, Bureau of Engineering.), must approve the sewer capping plans. Harbor Department credit will be established for the sewer facility charge.

Department of Building & Safety Permit

Demolition permit for structures, a plan check is required after obtaining the Sewer Cap Permit. Once approved, the Demolition Permit may be obtained. (S-21 License is required).

Hazardous Materials Permits

The removal and disposal of hazardous materials and wastes shall be in accordance with current regulatory requirements (e.g., AQMD, Fire Department, EPA, etc.). They vary depending on the type of hazardous materials or wastes involved.

03.05.07 ENVIRONMENTAL CONSIDERATIONS

Not Applicable.

03.05.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2343	Berth 142	Union Ice Building Demolition and Site Improvements.
	1-2343 R-1	Substructures, Demolition and Removal – Plan

LAHD Standard Plans

03.06 GRADING AND PAVING

03.06.01 OVERVIEW

This section contains the following information related to the preparation of grading and paving contract drawings:

- Site Plan (GP)
- Grading and Paving Plan (GP)
- Paving Details (GP)

03.06.02 DESIGN CRITERIA

Fencing Only

If there is fencing but no striping to be done as part of the project, the fencing should be included in the grading and paving drawings.

Asphalt Concrete (AC)

1. Slope/Grade Break. AC shall adhere to the following:

   a) Minimum design flowline slope = 0.5%.

   b) Maximum design flowline slope = 1.0% (the greatest slope within the drainage plane shall not exceed this percentage).

   c) Maximum Grade Break = 2.0%.

2. Container Terminal Pavement. Typical container terminal backland asphalt concrete pavement shall be 7 inches thick, with rock gradation per Class "Y" or Class “W” as defined in the specifications. Class “W” asphalt shall be finished with a slurry seal, due to the coarse nature of the aggregates and resulting surface finish.

3. Roadway Pavement. The typical roadway pavement shall be designed per Section E422.1 (Flexible Pavement Design) of the City of Los Angeles Street Design Manual.

a) A.C. wearing surface shall be Class C.

b) A.C. base shall be Class B. A.C. mixtures shall be per subsection 203-6.32 of the "Greenbook" (Standard Specifications for Public Works Construction).

4. Asphalt Viscosity. Asphalt viscosity grade shall be AR 16000 (PG 70-10) for container terminal pavement and AR8000 (PG 64-10) for other surfaces, per subsection 203-1 of the "Greenbook."

Concrete Surfaces

Typically, POLA does not use concrete pavement for the backland. However, concrete turning pads and runways are used for transtainer runs, and concrete slabs are used to protect structures like maintenance holes and vaults in backland areas. Concrete is also used for fueling stations, sidewalks, and longitudinal gutters. Concrete pavement joints shall be keyed.

Other Paved Surfaces

Other paved surfaces, such as interlocking paving stones and stamped concrete, have been used. Typically, they are found in recreational areas, such as Ports o' Call and the Cabrillo Marina.

Slurry Seal

This is typically used to maintain existing AC surfaces and shall be as specified in Section 32 01 13 of the Harbor Department Master Specifications.

AC Overlays

This is typically used for maintenance of existing AC surfaces and making minor changes in existing pavement grades. If necessary, existing pavement shall be cold planed to provide a minimum 2 inch thick overlay. Where overlays join existing pavement, a minimum 3” deep sawcut join line shall be constructed. All existing asphalt surfaces shall be covered with a tack coat prior to placing overlay.

Base Material

Base material shall be crushed miscellaneous base per Section 32 11 01 or 32 11 23 of the Harbor Department Master Specifications.

Pavement Grades

1. Grading Consistency. All pavement grades shall be designed to meet the existing grades in adjacent developed backland without creating ponding conditions.

2. Final Grade Considerations. As POLA is on low-lying land adjacent to the ocean and subject to a high ground water table and tidal action, final grade design needs to take the following considerations into account:

   a) Where possible, grades should limit the placement of substructures within the groundwater table.

   b) Tidal action within substructures like storm drain systems which outlet into the harbor.

   c) Desirable elevation for final grade shall be elevation 15 M.LLW (Mean Lower Low Water). Minimum elevation shall be 10 MLLW.

Wheel and Impact Loading

1. Pavement Section Design. Design of the pavement section shall be based on wheel loading criteria (types of equipment to be utilized) and C.B.R. (California Bearing Ratio) value of the subgrade. Design methods shall be approved by the Chief Harbor Engineer (reference 03.06.03).

2. In Container Terminals.

   a) For container terminals only, paving structural section and any other structure subject to vehicular loading shall be designed to withstand 100 kip wheel plus 25% impact loading, distributed over a 5 square foot contact area, unless otherwise directed. The loading criteria are based on a single main wheel of Front End Loader or Top Pick. Where underground structures may encounter loading from both main wheels, a wheelbase of 10 feet shall be assumed.

   b) For roadways outside container terminals, pavement sections shall be designed for HS-20 loadings.

Soils Report

A soils report is required indicating C.B.R. and unified soils classification. This information is necessary to design the structural pavement section.

Drainage

All drainage should be diverted away from railroad tracks and structures. Curbs should be constructed around buildings to prevent storm water flow run-on. Where curbs cannot be constructed, pavement should slope up to the building at a grade of 4%, and the building pad elevation should be set a minimum of 4 inches above surrounding finished grade.

Phased Construction

Phased construction shall consider all tenant requirements (e.g., access, lighting, etc.).

Longitudinal Gutters

Concrete longitudinal gutter flowlines shall have a minimum slope of 0.25% (0.2% acceptable when in Public Works jurisdiction). They shall be designed in accordance with LAHD Standard Plan H-201.

Concrete Curbs

Concrete curbs shall be designed in accordance with City of Los Angeles DPW BOE (http://eng.lacity.org/techdocs/stdplans/s-400/s410-2.pdf)Standard Plan S-410. Curbs shall be 6 inches high.

Paving Plan

The paving plan shall consist of definable planes made up of ridge lines, valleys, and grade breaks. This plan shall also show existing and proposed surface culture which will exist upon project completion (striping excluded).

Fill Material

When fill material is placed, a soil compaction report shall be filed with the City of Los Angeles Department of Building & Safety to certify said fill. Fill material on existing hydraulic landfill requires a variance filed with City of Los Angeles Department of Building & Safety.

Poor Subgrade Conditions

During construction of new pavement or in repair of existing pavement, conditions will be encountered where the subgrade cannot be compacted to the required 90 or 95%. This may be due to excessive fines or moisture in the soil. Unsuitable subgrade material should be excavated to a minimum depth of 24 inches. If the subgrade material can be compacted, select fill or CMB should be backfilled and compacted to 90% maximum density. If the newly exposed subgrade material still cannot be compacted, the use of geotextile fabric or geogrid should be considered and Crushed Miscellaneous Base (CMB) should be backfilled and compacted to 90% maximum density to the original subgrade elevation. In both cases base and paving material should be compacted per the specifications.

03.06.03 CALCULATIONS/WORKSHEETS

There are no calculations or worksheets provided for this section; however, for pavement structural calculations, the designer should refer to the Pavement Design Guide prepared by Moffat and Nichol for the Port of LA.which can be found in M:\users\engineering division\civil planning\0-library\pavement design guide.

03.06.04 GRAPHICS CRITERIA

Grading and paving sheets should include a site plan, individual plan sheets, and detail sheets. The site plan should show the entire project, with proposed breaklines and contours emphasized, individual sheet limits, and general grading notes. Individual grading and paving plan sheets should in general be 1” = 40’

scale, or 1" = 20' scale for detailed areas. These sheets should show proposed breaklines with a dark lineweight, proposed contours at a normal lineweight, and existing contours and elevations using a faded (gray) color. All breaks and intersections in breaklines should be labeled with coordinates and elevations. The slope of all planes should be labeled. Detail sheets should show pavement sections and any other details necessary.

03.06.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications relate to grading and paving (other sections may be required, depending on the project):

SECTION TITLE
Regulatory Requirements
Basic Site Materials and Methods
Excavation, Stockpiling, and Disposing of Chemically-Impacted Soils
Earthwork
Trench Excavation and Backfill
Cement Treated Base
Treated Permeable Base
Crushed Miscellaneous Base
Crushed Miscellaneous Base – Contractor Furnished
Base Course
Asphalt Concrete Paving
Asphalt Rubber Pavement
Pavement Markings
Excavation, Stockpiling, And Disposing Of Chemically-Impacted Soils
Slurry Seal
Cold Planing Existing Pavement

03.06.06 PERMITS/APPROVALS

The permits listed below may be required when there is grading and paving work:

Department of Building & Safety Grading Permit

A Building & Safety grading permit is required for grading (refer to Los Angeles Building Code, Chapter 3, Section 301c, for exceptions). The designer is

responsible for obtaining this permit. For grading in areas with existing uncertified fill (i.e., no prior soils compaction report was prepared), a building ordinance variance is required.

Any grading permit for a project that includes an acre or more of impermeable surface, 5,000 square feet of parking lot, or a parking lot of 25 or more spaces, will be required to comply with Standard Urban Stormwater Mitigation Plan (SUSMP) requirements. Please refer to Section 03.07 Storm Drains for more information on SUSMP.

Department of Public Works (P.W.) Permit

Grading and/or paving within the public right-of-way will require an A- or B-Permit from the City of Los Angeles, Department of Public Works, Bureau of Engineering. The B-Permit process is extensive, and will be required for any work that affects street pavement, grades, and curb and gutter grade and alignment.

Army Corps. of Engineers (ACE) Permit

An ACE Permit is required (obtained by the designer) when creating a landfill.

03.06.07 ENVIRONMENTAL CONSIDERATIONS

The major environmental consideration for grading is the presence of known or unknown contaminated soil and/or groundwater at the project site. If there is known or suspected contamination, specifications for its removal and/or treatment should be included, and tailored to the particular contaminant. If possible, grading should be designed to avoid “cut” areas where contamination is present.

Even if there is no known contamination at a project site, the industrial history of the Port makes the presence of contamination a possibility on any project. All projects that include any earthwork, including trenching, should include specification section “Excavation, Stockpiling, And Disposing Of Chemically-Impacted Soils”. This section deals with unanticipated contaminated soil.

Another environmental concern involved in grading design involves facilities handling potential pollutants. These include fueling facilities, equipment wash stations, trash storage and handling areas, and maintenance and repair facilities. All of these have the potential to contaminate storm water runoff, and should be

designed to contain runoff within their own boundaries, where it can be properly treated. The surrounding area should be graded to drain away from these facilities, so that "clean" runoff is not subject to contamination.

The designer should be aware of the State Water Pollution Prevention Program (SWPPP) requirements during construction of a project requiring grading and paving. For projects greater than an acre, a SWPPP plan must be developed by the contractor and submitted to the State for approval. Projects smaller than an acre that are subject to a Department of Building and Safety grading permit will be covered by the City's Wet Weather Erosion Control regulations. Projects smaller than an acre that do not require a grading permit are still subject to basic runoff and erosion control measures. Refer to the Regulatory Requirements specifications section for more information.

As noted under PERMITS/APPROVALS above, grading projects may be subject to SUSMP requirements, even if no storm drain work is planned. Regardless of whether SUSMP is required, the designer should seek to minimize paved areas, and, where possible, design grading to incorporate grassy swales or other bio-filtration/infiltration elements.

03.06.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2358 Pier 400 Backland - Phase II

1-2358 GP-1 Site Plan

1-2358 GP-6-35 Grading Plans

1-2358 GP-36-38 Grading Details

LAHD Standard Plans

5-7134 H-201-00 Concrete Longitudinal Gutter

03.07 STORM DRAINS

03.07.01 OVERVIEW

This section contains information related to the preparation of the following storm drain contract drawings:

- Site Plan (SD)
- Storm Drain Plan and Profile (SD)
- Trench Drain Detail (SD)
- Catch Basin (SD)
- Non-Std. M.H. (SD)
- SUSMP

03.07.02 DESIGN CRITERIA

General Design Requirements

Storm drain hydraulic and hydrology design shall be performed in accordance with the Department of Public Works, Bureau of Engineering's Storm Drain Design Manual (BOE_STORM_DRAIN_DESIGN_MANUAL) and Los Angeles County Department of Public Works Hydology Manual (http://ladpw.org/wrd/publication/engineering/2006_Hydrology_Manual/2006%20Hydrology%20Manual-Divided.pdf), unless otherwise specified in these Guidelines or approved by the Chief Harbor Engineer. Take note that in 1999 DPW Bureau of Engineering has adopted the LACDPW Hydrology Manual to replace the Hydrologic Design Section of BOE's Storm Drain Design Manual.

Substructures

Substructures that closely parallel, intersect, and/or interfere with the proposed storm drain shall be shown on storm drain plans and profiles.

Contamination

Storm drain plans and profiles shall indicate areas of suspected soil or groundwater contamination.

Dewatering

If tests show possible groundwater contamination at the site and/or at adjacent areas, dewatering should be avoided. Dewatering is to be considered the exception rather than the rule. If dewatering is necessary, the designer should start the process of applying for a National Pollution Discharge Elimination (NPDES) Permit as soon as possible, to avoid delaying construction.

Hydrology

1. Frequency. A 10 year rainfall frequency shall be used for the design of storm drains on Port property.

2. Isohyetal. The 50 year storm isohyetal to be used for the design of storm drains shall be:

   a) 1.33 inches/hour for Port storm drains on Terminal Island, in the Wilmington area, and in the Classification Yard.

   b) 1.55 inches/hour for proposed storm drains connected to existing Port storm drains in San Pedro.

   c) 1.77 inches/hour for proposed storm drains connected directly to the harbor in San Pedro.

   d) According to L.A. County or City standards for non-Port storm drains.

Pipe Alignment

Existing and proposed surface and sub-surface improvements shall be considered when setting horizontal and vertical pipe alignment. Possible soil and groundwater contamination areas shall be avoided whenever possible.

Hydraulic Design

1. Computer Analysis. Computer analysis of pipe hydraulics may be used with prior approval from the responsible Harbor Engineer (hydraulic design

shall be per City of Los Angeles, Department of Public Works Storm Drain Design Manual pressure flow design [based on Manning's equation]).

2. Grade Line. The hydraulic grade line shall be no less than 12 inches below the top (or lowest opening) of inlets, catch basins, maintenance holes, and other structures and shall be indicated on the profile plan. This criterion may be modified with prior approval from the Chief Harbor Engineer.

3. Outlet to Harbor. When the outlet is to the harbor, a water surface elevation of 5.43 MHHW (Mean Higher High Water) above mean sea level is used as the control for the hydraulic grade line.

4. For reinforced concrete pipe (RCP) storm drains in the Port, the smallest diameter to be used is 18 inches. Smaller diameters may be used for PVC or HDPE pipe.

Standard Urban Stormwater Mitigation Plan (SUSMP)

1. SUSMP requires that for the majority of new developments and many redevelopments, post-construction rainfall runoff be stored, infiltrated, or treated before being discharged. The requirements come from the Regional Water Quality Control Board (RWQCB), and are administered through the building or grading permit process by the City of Los Angeles Department of Building and Safety.

2. The reference manual for SUSMP at the Port is the Development Best Management Practices Handbook – Part B Planning Activities Best Management Practice, Third Edition by the City of Los Angeles, Department of Public Works, Bureau of Sanitation, Watershed Protection Division. Presently, “treatment” is very vaguely defined, and the processes used by most proprietary (BMP) units will meet the requirements. Future regulations will require the targeting of particular pollutants and set maximum discharge levels.which may require a different set of BMP.

3. The Manual sets standards for projects that fall under SUSMP requirements, which will include all but the smallest drainage projects at the Port. The Manual also sets out several different methods for calculating how much storm water must be treated or infiltrated, based on volume or flow rate. The method based on a 3/4” pattern storm has been used most successfully at the Port. This method is based on the Los Angeles County hydrology method and yields a minimum flow for a given tributary area which must be treated by a BMP.

4. The structural BMP chosen for each individual project should take into account the type of pollutants expected for each site, volume of runoff, and maintenance issues. A great number of BMPs are available, but due to the Port's large paved areas, proximity to receiving waters, high water table, and high land value, proprietary treatment BMPs have been the only systems installed to date. For redevelopment projects with small tributary areas drained by a few catch basins, catch basin insert filters are appropriate. For larger projects, an inline hydrodynamic system, with greater capacity, is more appropriate. The designer should keep in mind the performance of the chosen system with respect to tide levels. Many systems will not function if submerged. Infiltration, sand filters, or biofiltration should be considered for smaller new development projects with room for extensive landscaping.

5. The Bureau of Sanitation, Watershed Protection Division (WPD) has placed an increased emphasis on infiltration and bio-filtration BMPs. Container terminals are currently being designed with a large rock-filled infiltration trench under the trench drains (see drawing set 1-2342 Berths 145-147 Wharf Improvements), and smaller parking lot projects are incorporating olanting areas that filter storm water before it is discharged. The designer should meet with WPD early in the design process to ensure that an acceptable BMP has been chosen.

Materials

1. Pipe and Joints. Reinforced concrete pipe with rubber gasketed joints shall be used unless otherwise approved. When placed below the ground water table, within the tidal influence zone, or within hydraulic fill, pipes shall have a maximum water/cement ratio of 0.40; shall be wet-cast or spun-cast; and shall have a minimum inside and outside concrete cover of 1 1/2 inches.

2. Substitutions. When substituting pipe materials, the following factors should be considered: flow characteristics, durability, strength, type of joint, availability of pipe and/or special shapes, ease of installation, cost of material, and cost of installation.

3. Bedding. A minimum of Case 2 bedding shall be used when laying "in the wet" (in accordance with City of L.A. Standard Plan S 251, Pipe Laying in Trenches). Higher bedding cases may be required if the pipes are close to the surface or under railroad tracks. Where unsuitable base material is encountered, the Engineer shall direct the contractor to over-excavate an additional 2 feet and place a bedding material composed of 2 inch nominal

gradation rock per specification section 02323 Trench Excavation and Backfill.

Structures

1. Trench Drain.

   a) Slope -- minimum slope of trench drain invert shall be 0.25%.

   b) Trench drain detail -- trench drains shall be designed similar to the details on sheet SD-38 of drawing set 1-2358. A number of different proprietary trench drain former or liner systems with integrated gratings can be used, such as Trench Former HD-200 by ABT, Inc.

2. Catch Basins. Gutter type catch basins, grate frames, and grates shall be constructed per Standard Plans Exhibit No. 1 in 03.07.08. All other basins shall be per Standard Plans for Public Works Construction (American Public Works Association), as adopted by the City of Los Angeles Department of Public works.

3. Maintenance Holes.

   a) Storm drain maintenance holes shall be per Standard Plans for Public Works Construction (American Public Works Association), as adopted by the City of Los Angeles Department of Public works.

   b) Frame and Cover -- Maintenance hole frames and covers shall be per Standard Plans for Public Works Construction (American Public Works Association) 630-2, with L.A.H.D. lettering. For maintenance holes in container terminal backlands, the frame and cover shall be specified to meet the loading requirements described below.

4. Junction Structures. All junction structures shall be per Standard Plans for Public Works Construction (American Public Works Association), as adopted by the City of Los Angeles Department of Public Works.

5. Outlets.

   a) Flap gates -- flap gates are typically not used at the Port due to maintenance considerations. They should only be considered when backflow at high tide may damage upstream property or facilities..

b) Monolithic -- outlets passing through rock dikes or those which are susceptible to differential settlement or alignment disturbance shall be of monolithic construction.

c) Pile supported outlets -- the designer should consider using pile-supported outlets on rock slopes which are subject to settlement.

6. Structural Best Management Practices (BMPs) – Structural BMPs incorporated into the SUSMP for the project will in general be per the manufacturer's specifications, with a few exceptions. First, the structure and any associated maintenance holes must be able to withstand the loading described below. Second, the unit may need to be modified to operate within the tidal zone.

7. Loads. Storm drain structures subject to loads from container handling equipment shall be designed for 100 kip wheel loads (140 PSI) plus 25% impact loads (125 kip over a 5 square foot area).

Track Drains (Subsurface Drainage System)

1. Filter. A graded aggregate filter or filter cloth shall be provided to prevent soil grains from entering the drain.

2. Perforated Pipe. Perforated pipe (minimum diameter of 6 inches) with closed joints shall be used as drains. Invert elevations shall be set to lower the water level to the desired elevation.

3. Non-perforated Pipe. Non-perforated pipe with closed joints shall be used as collectors. The minimum diameter shall be 6 inches at a slope to provide minimum 2 F.P.S. velocity when flowing full. Where sufficient gradient is available, collectors shall be depressed below drains. When the pipe is half full, the pipe slope should achieve a 2 to 4 foot per second velocity.

4. Outlets. Outlets shall be designed in such a manner so as to minimize surface water, tidal water, or groundwater from entering the drainage system.

Final Grade Considerations

As the Port is on low-lying land adjacent to the ocean and subject to a high groundwater table and tidal action, final grade considerations need to take into account the following:

1. Avoid placing a storm drain system within the ground-water table if possible.

2. Tidal action on storm drain systems which outlet into the harbor.

Accommodating Future Extensions

1. Bulkhead. A bulkhead shall be designed at the end of the pipe to resist lateral earth loads. It shall be recessed at least 1 foot into the pipe to allow construction of future junction or transition structures. Where a bulkhead is subject to tidal action, it should be designed to resist hydraulic pressure, with no help from earth backfill. Typical materials for these bulkheads are brick and mortar.

2. Maintenance Hole or Box. A maintenance hole or box should be placed downstream from the end of the pipe to facilitate bulkhead installation and/or removal.

3. Cutoff Wall. A simple exterior cutoff wall should be installed downstream from the bulkhead or the outlet end of the pipe to be extended through the rock dike to facilitate dewatering. If the rock bedding is not sealed, concrete injection may be required downstream of the bulkhead.

4. Extending Existing Lines. Where existing storm drain lines are to be extended, Nos. 1-3 above do not apply (they are for new construction only). The specifications shall require the contractor to install any required bulkheads and cutoff walls to eliminate tidal action.

Jacking/Tunneling

Jacking and tunneling shall be performed in accordance with the following:

1. Standard Specifications for Public Works Construction ("Greenbook").

2. Cal O.S.H.A. requirements (Tunnel Safety Orders).

3. Department of Public Works, Bureau of Engineering's Storm Drain Design Manual.

03.07.03 CALCULATIONS/WORKSHEETS

Calculations and worksheets shall be prepared in accordance with Department of Building & Safety requirements and POLA Engineering Design Staff.

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

Storm Runoff Calculations

A drainage area worksheet shall be prepared for the proposed system, including:

1. Outlining of the drainage area, taking into account the area's topography, drainage problems, and future development plans.

2. Plotting of all existing and proposed storm drains in and adjacent to the drainage area.

3. Dividing the drainage area into sub-areas -- and calculating the acreage of the sub-areas.

4. Adding runoff information taken from a tabling sheet similar to the Storm Drain Design Manual drainage area worksheet.

   a) The runoff information shall include acreage, quantity of flow for design frequency, and the time of concentration above and below all junctions.

   b) Computer analysis of hydrology may be used with prior approval from the Chief Harbor Engineer.

5. Adding final pipe sizes to the drainage area worksheet.

Pipe D-Loads

Storm drain pipes subject to loads from container handling equipment shall be designed for 100 kip wheel loads (140 PSI) plus 25% impact loads (125 kip over a 5 square foot area). Depending on depth of the pipe, it may be necessary to consider a second wheel load (two-wheel main axle) spaced 10 feet from the first. Railroad loading shall be Cooper E-80. Pipe D-loads shall be calculated considering dead loads, including oil loads, determined by Martson's equation and live loads by Boussinesq's equation. Reference: Design and Construction of Sanitary and Storm Sewers by the American Society of Civil Engineers. In area not subject to container terminal equipment loads, Figure G-613 of the City of Los Angeles Storm Drain Design Manual can be used to determine required D loads.

03.07.04 GRAPHICS CRITERIA

Storm drain sheets should include a site plan, individual plan sheets, profile sheets, and detail sheets. The site plan should show the entire project, with proposed storm drain lines, individual sheet limits, and general storm drain notes. Individual grading and paving plan sheets should in general be 1" = 40' scale. These sheets should show proposed storm drain alignments in a dark lineweight, as well as proposed storm drain structures. Storm drain lines should show the outside pipe walls, and all storm drain lines should be stationed. Existing utilities should be shown in a light lineweight. All junctions, points of inflection, points of curvature, structures, and begin/end points on a storm drain line should be labeled with coordinates, station, and a description of the point (i.e. "Begin Line A", "Construct MH Type A", etc). Profile sheets should include a grid, and should be drawn with a 10:1 vertical scale exaggeration. Label all structures, grade breaks, and begin/end points with station, description, and invert elevation. Label all pipes with slope, diameter, and bedding type. Detail sheets should show all storm drain structures that are not represented by standard plans.

03.07.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications relate to storm drains (other sections may be required, depending upon the project):

SECTION TITLE
Basic Site Methods and Materials
Detection Tape
Trench Excavation and Backfill
Storm Drain System
Excavation, Stockpiling, and Disposing of Chemically-Impacted Soils
Cast-In-Place Concrete
Precast Concrete

Pipe Joints

All pipe joints are to be rubber gasketed, even above the water tables (per the "Green Book," Standard Specifications for Public Works Construction).

Detection Tape

All project substructures require detection tape to be placed over them.

Special Testing Requirements

The specifications shall include a statement that storm drain pipe does not require testing. Pipe strength certification, however, shall be required from the manufacturer.

03.07.06 PERMITS/APPROVALS

The permits/approvals listed below may be required when there is storm drain work:

Department of Building & Safety Grading Permit

Storm drain drawings and calculations, including SUSMP plan, must be submitted along with grading plans to obtain a Building & Safety grading permit (refer to Los Angeles Building Code, Chapter 3, Section 301c, for exceptions). The designer is responsible for obtaining this permit. The designer should coordinate with the Los Angeles Department of Public Works, Bureau of Sanitation, Watershed Protection Division regarding the proposed SUSMP system prior to submitting for plan check.

California Regional Water Quality Control Board Permits

A General NPDES Permit is required for discharge into the harbor as a result of construction dewatering; a Waste Discharge permit is needed for dewatering to land.

Army Corps. of Engineers (A.C.E.) Permit

This permit is required when constructing new storm drain outlets in harbor waters, even if the outlet is behind the pierhead line.

Department of Public Works (P.W.) Permit

This permit is required when connecting to or discharging into a P.W. storm drain, channel, or basin.

L.A. County Department of Public Works (P.W.) Permit

This permit is required when connecting to or discharging into a County P.W. storm drain, channel, or basin and may require utilizing County design criteria for the drainage area in place of City criteria.

Railroad Approval

This approval is secured from the appropriate railroad when encroaching into their right-of-way.

Other Approvals, As Appropriate

Other approvals may be needed if encroachment is involved.

03.07.07 ENVIRONMENTAL CONSIDERATIONS

The main environmental concern for storm drain design is the Standard Urban Stormwater Mitigation Plan, or SUSMP, as described above. The majority of Port projects requiring storm drains will be subject to SUSMP requirements. These requirements are still evolving and becoming stricter and more specific. Storm drain designers should contact the Bureau of Public Works, Department of Sanitation, Watershed Protection Division to verify the latest requirements prior to undertaking a SUSMP design.

The other major environmental consideration for storm drain design and construction is the possibility of encountering contaminated soil and/or groundwater during trench excavations. If there is known or suspected contamination, specifications for its removal and/or treatment should be included, and tailored to the particular contaminant. If possible, the storm drain alignment should be designed to avoid areas where contamination is present.

Even if there is no known contamination at a project site, the industrial history of the Port makes the presence of contamination a possibility on any project. All projects that include storm drains should include specifications for Excavation, Stockpiling, and Disposing Of Chemically-Impacted Soils sections. This section is specific to unanticipated contaminated soil.

03.07.08 REFERENCE DRAWINGS

Major storm drain lines within Port property are shown on LAHD substructures maps.

The following contract drawings are identified for reference:

1-2358 Pier 400 Backland Phase II.

1-2358 SD-1	Site Plan
1-2358 SD-7-32	Storm Drain Plans
1-2358 SD-35-37	Storm Drain Profiles
1-2358 SD-38	Storm Drain Details

1-2334 Berth 100 Container Wharf (SUSMP example).

1-2334 SD-1	Site Plan
1-2334 SD-2-3	Storm Drain Plans
1-2334 SD-4-5	Storm Drain Profiles
1-2334 SD-6-7	Storm Drain Details

LAHD Standard Plans

Catch Basin, Grate Frame, Grate

Standard Non-Rocking Maintenance Hole Frame and Cover

03.08 SEWERS

03.08.01 OVERVIEW

This Section contains information related to the preparation of the following backland sewers contract drawings.

- Site Plan (SS)
- Sewer Plan and Profile (SS)

Jurisdiction

1. Department of Public Works (DPW) Jurisdiction: Sewers in DPW jurisdiction shall always be designed in accordance with the Department of Public Works (DPW), Bureau of Engineering's (BOE) Sewer Design Manual.

2. Los Angeles Harbor Department (LAHD) Property and Jurisdiction:

   a) Sewers on LAHD property with pipe diameters 8 inches or larger shall be in accordance with the BOE Sewer Design Manual (BOE Sewer Design Manual) unless specified otherwise in these Guidelines. Sewer designs per the Sewer Design Manual may require permit variances from Building and Safety.

   b) Sewers with pipe diameters of 4 and 6 inches shall conform to the City of Los Angeles Plumbing Code.

03.08.02 DESIGN CRITERIA

1. Gravity System Design: For gravity system design refer to the following sections of the BOE Sewer Design Manual.

   a) Section F-200:

      1) Projection of Flows: Projected flow in container terminals is much less than flows projected in other industries. Flow estimation should be based on the number of people using the building facilities on a regular basis. Flow projection should NOT be estimated based on building square foot.

2) Design Flows: The design of sanitary sewers must consider minimum, average, and peak flows. Normally, ADWF (Average Dry Weather Flow) is determined or selected, and a factor is applied to determine PDWF (Peak Dry Weather Flow). The PDWF is the design flow used to select the pipe size. Minimum flows are used to determine if specified velocities can be maintained to prevent deposition of solids.

3) Minimum Velocity: Gravity sewers shall be designed for a minimum velocity of three Feet per Second (fps) using the PDWF that exists at the time the pipe is placed into service.

4) Minimum Slope: The minimum slope of a proposed slope shall provide a minimum velocity of 3 fps at PDWF.

5) Design Depth of Flow: Sewer pipe shall be sized so depth of PDWF shall be no more than one half the pipe diameter (d/D=depth of flow/pipe diameter= 0.5).

6) Calculation of Pipe Size. Use Manning's formula to calculate pipe size. A Manning's Roughness Coefficient of "n" = 0.014 shall be used, regardless of the type of pipe used.

b) Section F-300: Alignments Of Sewers

c) Section F-400: Sewer Materials And Structures

2. Pumping Plant and Force Mains Design: For pumping plant and force main design refer to the following section of the BOE Sewer Design Manual and additional recommendations.

a) Section F-700: Pumping Plant and Force Main.

b) Recommendations:

1) Pump plant design in container terminal area should specify grinder pump. Specifying grinder pump would allow the selection of small discharge pipe diameter size.

2) Provide air release valve system for pipe discharge length greater than 1000 feet.

3) Specify same level and pump control system as existing system at the Port.

4) Involve POLA Construction and Maintenance in the review and approval of the pump equipment and system selection.

3. Design Plans: Design Plans shall be prepared using Section F 500 of BOE Design Manual plans as a reference as well as past LAHD project plans such the Pier 400 projects
4. Miscellaneous Guidelines:

a) Substructures: Substructures that closely parallel, intersect, and/or interfere with the proposed sewer shall be shown on sewer plans and profiles.

b) Detection Tape: All project substructures require detection tape to be placed over them.

c) Contamination: Sewer plans and profiles shall indicate areas of suspected contamination.

d) Dewatering: The sewer profile shall indicate ground-water levels. Designs should avoid dewatering if possible. Dewatering is to be considered the exception rather than the rule.

e) Loads: Sewer structures subject to loads from container handling equipment shall be designed for 100 kip wheel loads (140 PSI) plus 25 kip impact loads (125 kip over a 4.95 square foot area). Calculations to determine bedding requirements shall be performed in accordance with the National Clay Pipe Institute Manual (1990 edition).

f) Shallow Cover: The designer may select alternate materials (e.g., ductile iron pipe) in the case of sewers with shallow cover, which are subject to heavy loads.

g) Alignment: Existing and proposed surface and sub-surface improvements shall be considered when setting horizontal and vertical pipe alignment. Possible soil and groundwater contamination areas shall be avoided whenever possible.

h) Bedding: A minimum of Case 2 bedding shall be used when laying "in the wet" (in accordance with City of L.A. Standard Plan S-251, Pipe Laying in Trenches).

i) Jacking/Tunneling: Jacking and tunneling shall be performed in accordance with the following:

1) Standard Specifications for Public Works Construction ("Green Book").

2) CAL OSHA requirements (Tunnel Safety Orders).

3) Department of Public Works, Bureau of Engineering's Sewer Design Manual.

03.08.03 CALCULATIONS/WORKSHEETS

Calculations and worksheets shall be prepared in accordance with the Department of Public Works, Bureau of Engineering's Sewer Design Manual. Calculations to determine bedding requirements shall be performed in accordance with the National Clay Pipe Institute Manual (1990 edition).

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

03.08.04 GRAPHIC CRITERIA

Bureau of Engineering's Sewer Design Manual, Section F 500 Preparation of Plans, should be used as a guide in preparing sewer plans.

03.08.05 SPECIFICATIONS

1. The following sections in the Harbor Department Master Specifications relate to sewers (other sections may be required, depending upon the project):

SECTION TITLE
Excavation Safety Requirements
Detection Tape
Earthwork
Trench Excavation and Backfill
Sanitary Sewer
Sewer Pump Station and Forcemain System
Basic Electrical Material and Methods

2. Design Manuals: Department of Public Works, Bureau of Engineering's Sewer Design Manual.

3. Codes: City of Los Angeles Plumbing Code.

4. Standard Specifications for Public Works Construction, “Greenbook.”

5. Department of Public Works, Bureau of Engineering's Standard Plans

03.08.06 PERMITS/APPROVALS

The permits/approvals listed below may be required when there is sewer work:

California Regional Water Quality Control Board Permits

A standard N.P.D.E.S. permit is required for discharge into the harbor as a result of construction dewatering; a Waste Discharge Permit is needed for dewatering to land.

Department of Public Works (DPW) Permit

This permit is required when connecting to or discharging into a P.W. sewer or when constructing a sewer in P.W. jurisdiction. The application is for a sewerage connection permit (a sewer facilities charge fee is established and paid before applying to City of Los Angeles Department of Building & Safety).

Los Angeles County Sanitation District Permit

This permit is required when connecting to or discharging into a Sanitation District service area (e.g., Classification Yard).

City of Los Angeles Department of Building & Safety Permit

A sewer plan check is required. The permit for sewer lines (part of the Plumbing Permit) may be obtained once the plans have been approved. When a sewer is designed to P.W. standards, it may violate City of Los Angeles Department of Building & Safety codes, requiring a variance.

Industrial Waste Permit

When the discharge is of non-domestic waste, an Industrial Waste permit is required and is obtained from the Los Angeles City Bureau of Sanitation.

Railroad Approval

This approval is secured from the appropriate railroad when encroaching into their right-of-way and/or also from the Harbor Belt Line.

Other Approvals, As Appropriate

Other approvals may be needed if encroachment in another jurisdiction is involved.

03.08.07 ENVIRONMENTAL CONSIDERATIONS

The City's policy of "ZERO SPILLS" shall be achieved during construction. Plans and/or specifications should contain a provision requiring the contractor to develop and submit to the Engineer for review and approval a written Spill Response Plan (SRP). The SRP shall be developed to respond to any construction related sewage spill.

03.08.08 REFERENCE DRAWINGS

Major sewer lines and pump stations located within Port property are shown on LAHD substructures maps.

The following contract drawings are identified for reference:

1-2209 Pier 400 Backland Phase I – Berths 401-403.

1-2209 SS-1	Site Plan
1-2209 SS-2	Sewer Plan and Profile
1-2209 SS-23-23A	Pump Plant Details & Sections
1-2209 SS-29	Air Release Details & Sections

LAHD Standard Plans

03.09 LANDSCAPE

03.09.01 OVERVIEW

Contents

This section contains the following information related to the preparation of the following landscape contract drawings:

- Site Plan
- Planting Plan and Details
- Irrigation Plan and Details
- Hardscape Plan
- Hardscape Details

Goals

The purpose of this Section is to provide landscape architects, maintenance contractors, and Harbor Department Construction and Maintenance Division personnel with landscape design/implementation criteria for all tenant and Harbor Department operated facilities to enable them to:

1. Maximize visual impact while responding to functional requirements and planting conditions, thereby promoting the highest quality of landscape in the Port and an attractive milieu.
2. Minimize service and maintenance by ensuring maximum standardization of materials, equipment, finishes, and flora.

03.09.02 DESIGN CRITERIA

Approval

All landscape designs must be reviewed by the Port staff and approved by the Chief Harbor Engineer, as well as other appropriate entities. Plans must include explanations relative to the efficient use of plants and water.

Timing of Landscape Installation

All approved landscape features shall be installed within 60 days of initial building occupancy or parcel use, except where weather conditions make this untenable.

General Design Requirements

Landscape and irrigation designs shall conform to the following:

1. City of Los Angeles Plumbing Code and the Los Angeles County Health Code.

2. City of Los Angeles Department of Public Works standard plans (these may be modified by the Port staff).

3. City of Los Angeles Departments of Building and Safety and Planning.

Cultural and Climatic Constraints

Within the Port, all landscape design should reflect the Southern California heritage (i.e., Spanish/Mediterranean), culture, and lifestyle. In addition, landscaped areas shall be compatible with seaside conditions.

Geological Constraints

All landscape design shall reflect consideration for the geological constraints in the Port area. Results from chemical analyses generally indicate that the following constraints exist:

1. Soil is:

    a) Alkaline

    b) Lacking in organic matter

    c) Brown to brownish-yellow, fine to medium sand with some silt, traces of shell, and dense gravel.

2. Extensive, relatively impervious, marl layers are common.

3. Groundwater and soil both contain high concentrations of chlorides and sulphates.

4. The saline groundwater table is close to the soil surface (5 to 10 feet).

5. Large portions of the Port are built on ocean dredged fill materials.

Areas to be Landscaped

All facilities shall provide landscape treatment for the following areas:

1. Areas lying between the property line and the perimeter fence/wall (especially areas which abut and extend along the public right-of-way).

2. Open areas surrounding and within buildings (i.e., adjacent to or within the maximum building footprint). This includes areas such as courts, patios, outdoor restrooms, employee rest areas, ingress/egress areas, front internal service drives, and the like.

3. Areas within and adjacent to parking lots, especially entries, exits, and ends of parking rows.

4. Areas not otherwise covered by paving/buildings or specifically designated for other than landscape development.

5. Any visually offensive areas such as storage, refuse, or laydown sites.

Planting Materials

1. Selection: Planting materials shall be selected from the Harbor Department approved Plant and Materials list (available from the Port staff) and be compatible with zone 24, per the current edition of Sunset's Western Garden Book (seaside conditions). In addition, all plant selection, size, and number, as well as site storage, installation, and maintenance shall conform to the sections of the drawings and specifications which govern landscape materials in public areas.

2. Planting Emphasis: Plantings shall emphasize the use of broad-leaved evergreen trees (flowering where possible), palm trees, and shrubs. Deciduous trees may be utilized, but consideration should be given to leaf drop and structural form. Grey/green leaf plants should be de-emphasized (except where needed for contrast and/or accent purposes). High impact landscape (e.g., trees, palms, colorful accent plant materials) should be considered in areas frequented by the public.

3. In Parking Lots: Trees shall be used throughout a parking lot to break up the "sea of asphalt" effect. Canopy trees shall be used between rows, with accent or contrasting types of trees at row ends.

Use of Climbing Plants and Vines

Climbing plants and vines, trained on pergolas, fences, walls, and other structures, shall assist in providing:

1. Flowering color.
2. Overhead shade.
3. Cover for unsightly objects.
4. Green leafy walls (clinging vines are not to be placed on building walls).
5. A deterrent to graffiti.

Use of Grassed Areas

Grassed areas shall be considered, if practical, in:

1. Courtyards, public gathering places, and areas surrounding pedestrian walkways.
2. Front yard areas.
3. Front ingress/egress areas and medians, where appropriate.

Use of Berms

Berms (earth mounds) shall be incorporated into the landscape design wherever possible, as they can:

1. Modulate flat terrain.
2. Assist in reducing noise, wind, dust, and visual pollution.
3. Assist where soil lifts are required.
4. Exaggerate and highlight landscape.

Alkaline Groundwater

1. Soil Lifts: Imported soil lifts (mounds) shall be considered to raise the rootball zones above the alkaline groundwater table.

2. Capillary Break: Intensely planted areas may need a capillary break (layer of subgrade drainage gravel with a separator and perforated agricultural drain tiles) to divert alkaline groundwater.

3. Salt-Tolerant Plants: Salt-tolerant plants shall be considered where the local elevation is low and close to the groundwater.

Unobstructed Vision

In all instances, landscape designs shall ensure that plantings do not obstruct motorists' field of vision. Shrubs should not grow above 3 feet and trees should not hang lower than 9 feet from the ground within 50 feet of intersections in conformance with City of Los Angeles Municipal Code, Chapter 6, Article 2, Section 62.200, Street Intersections -- Obstruction to Visibility [Paragraphs A and B]).

Parking Lot Landscape Design

1. Shrub Spacing/Effect: Shrubs should be spaced so that they can grow to their natural size without over-lapping. They should be offset to give a natural growth effect and minimize pruning (hedging and row effects are undesirable).

2. Use of Continuous Planting Strips: These strips are not acceptable between parking rows where they may be in conflict with natural pedestrian circulation patterns.

3. Use of Raised Medians: Where raised medians are used in lieu of wheel stops, all designs (landscape, hardscape, and irrigation) should work together to minimize maintenance and damage from vehicle overhang/drippage.

4. Curbs and Islands: All parking lot surface landscape should be surrounded with a six inch curb for protection; islands should be radiused to be compatible with vehicular circulation patterns.

Irrigation

1. Systems: All irrigation systems are to be below-ground, fully automated systems in compliance with the specifications for such systems.

2. Design Life Span: All irrigation systems should be designed to be operational for a minimum of 25 years.

3. Water Conservation: Use of water-conserving systems is strongly encouraged.

4. Backflow Control Devices.: All backflow control devices are to be screened so that they are not visible or subject to damage from parking circulation areas on the site or from public streets.

5. Utility Services: Utility services (including water/ power meters and service connections) shall be requested, paid for, and coordinated by the contractor, with installation by the appropriate utility company.

Site Maintenance

1. Landscape Areas: Landscape areas shall be designed for maximum impact and minimum maintenance. The designer is encouraged provide the following services:

   a) Use drought tolerant plants.

   b) Use profuse application of perennial flowers only in borders, raised planters, and areas needing color and accent.

   c) Limit the use of lawn, high maintenance ground covers, and middle height shrubs (3 to 6 feet) unless screening is desirable.

   d) Plant in masses or groves, limiting the number of plant types.

   e) Use trees, boulders, mounds, hardscape, and accent plantings for parking lots.

2. Site Maintenance Plan: The site maintenance plan shall be submitted with the landscape plans to the Engineering Division for review and approval. This plan shall include methods, frequency, locations, schedule, materials, and the name of individual(s) responsible for maintenance. If the plan is

submitted by the lessee, it shall be consistent with the requirements for maintenance which are described in the Parcel Lease Agreement.

Tree Spacing

To avoid visual obstructions and/or safety problems, tree locations shall be designed with great care when:

1. In the proximity of residential and other building entrances.

2. Traffic control signs may be affected.

Generally, trees should be approximately 40 to 50 feet apart. The designer should always be aware, however, of possible visual obstructions and/or safety problems (e.g., in proximity of traffic control signs, homes, and other building entrances). The chart below lists certain objects or locations which require tree placement no closer than a specified distance.

ITEM DESCRIPTION	TREE'S DISTANCE FROM OBJECT
Street Light	20 feet
Electrical Power Poles	20 feet
Fire Hydrants	10 feet
Water and Gas Meters	6 feet
Driveway Aprons and Crosswalks	6 feet
Alley Entrances	20 feet
Intersections (point of curb line intersect)	45 feet
Railroad Tracks	100 feet

03.09.03 CALCULATIONS/WORKSHEETS

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

03.09.04 GRAPHIC CRITERIA

Landscape plans should include a site plan; planting plans that include planting notes and legend , plant materials list showing quantities, common and botanical names and plant sizes and planting details; and irrigation plans that include irrigation notes, legend and symbols, locations of point of connection, irrigation controller, valves and heads, irrigation piping calculation, etc.

03.09.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications relate to irrigation and landscaping.

SECTION TITLE
Basic Site Materials and Methods
Earthwork
Irrigation System
Planting and Landscaping
Cast-In-Place Concrete

03.09.06 PERMITS/APPROVALS

The permits/approvals listed below may be required when there is landscape work:

Department of Building and Safety Permit

A landscape irrigation plan check is required when a backflow preventer is involved. This submission by the contractor is necessary to obtain a plumbing permit.

Health Department Certification

The Los Angeles County Health Department requires certification that the backflow preventer is operating properly. This application is coordinated by the contractor, with the backflow preventer inspected by a County-certified inspector.

03.09.07 ENVIRONMENTAL CONSIDERATIONS

When buildings are designed to achieve Leadership in Energy and Environmental Design (LEED) certification, landscaping shall be designed to achieve and comply with the requirements in achieving the certification.

03.09.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2280 Berths 302-305 Backland Expansion – Phase II.

1-2280 LS-1	Site Plan
1-2280 LS-1	Planting Plan
1-2280 LS-2-3	Irrigation Plan and Details

LAHD Standard Plans

03.10 Structural

03.10.01 OVERVIEW

Contents

This section contains information related to the preparation of the following backland structural contract drawings.

- Light Pole
- Truck Scale
- Sign Bridge
- Chassis Rack
- Wash Down

03.10.02 DESIGN CRITERIA

Design Code and Requirements

The Structures below shall be designed from the latest City of Los Angeles Building Code and any other regulating agencies which have authority over any portion of the work, including the State of California Department of Industrial Relations, Division of Occupational Safety and Health (DIRDOSH), and those codes and standards listed in the Contract Documents.

1. Light Pole

   a) Light Pole Foundation. The light pole foundation shall be designed for 1000 PSF soil pressure (unless a location specific soil report exists). Foundation pad fill shall be compacted to 90% relative density. See LAHD Standard Plan H-605 for detailing load criteria.

   b) Protection Barricade. See LAHD Standard Plan H-601 for the design of a light pole protection barricade.

2. Truck Scale

a) Requirements. The concrete pit shall be designed by the scale manufacturer in accordance with all applicable codes and specifications. The drawings and calculations for the scale pit shall be submitted as a shop drawing to the Chief Harbor Engineer and signed by a structural or civil engineer registered in the state of California.

b) Wheel Loading. Wheel loading for the scale components and adjacent areas of the pit wall as a surcharge live load shall be as defined by A.A.S.H.T.O. H-20-44 or as modified by the Caltrans Bridge Design Specifications, whichever governs.

c) Pit Material. If silty clay or other unsuitable material is present at the bottom of the pit excavation, it shall be removed at the direction of the engineer and backfilled with crushed aggregate base.

3. Sign Bridge

a) In addition to the City of Los Angeles Building Code requirements the sign bridge shall be designed to the "Standard Specifications for Structural supports for Highway Signs, Luminaries and Traffic Signals". The sizes of signs for any installation are controlled by the current "Manual on Uniform Traffic Control Devices for Streets and Highways."

b) The sign bridge should be designed to support structures having light, clean, simple lines, which will present the least hazard to motorists. The sign bridge should be functional with respect to providing adequate vertical clearance, sizing and location of structural members, and minimal maintenance.

c) The design of the sign bridge includes supporting the combined effects of dead, live, wind, seismic and possible ice loads. Sign bridge design analysis should consider the effects of deflection, minimum material thickness, dimensional tolerances, camber, sealed joints, vibration, and fatigue.

4. Chassis Rack

a) Load Verifications. Only preliminary designs of the chassis rack shall be prepared before receiving load verifications from the chassis rack manufacturer.

b) Anchor Bolt. An anchor bolt detail shall be prepared in connection with a chassis rack foundation. All anchor bolts are to be furnished with two nuts and one washer.

c) Embedments. All structural steel embedments shall be hot-dip galvanized in accordance with A.S.T.M. A123 for structural shapes/plates and A.S.T.M. A153 for threaded products after fabrication.

d) Soils/Footings. Actual soil conditions shall be verified prior to design. Footings are designed for 1500 PSF basic allowable soil pressure (or for the allowable soil pressure as specified by the geotechnical report).

5. Washdown Structure

a) The washdown building consists of an open framed structure with elevated concrete slab and sideramps of concrete construction. The roof canopy consists of steel framing members and metal deck construction. The base of the structure is supported on concrete continuous wall and isolated pad footings. The design of the washdown building includes supporting the combined effects of dead, live, wind, and seismic loads.

03.10.03 CALCULATIONS/WORKSHEETS

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

03.10.04 GRAPHIC CRITERIA

Structural plans shall show plan view with appropriate details and prepared according to the POLA CADD Manual.

03.10.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications relate to backland structures (other sections may be required, depending upon the project):

SECTION TITLE
Earthwork
Trench Excavation and Backfill
Concrete Reinforcement
Cast-In-Place Concrete
Concrete Block Masonry
Structural Steel

Miscellaneous Metals

03.10.06 ESTIMATING

Estimating worksheets shall be prepared in accordance with Exhibit No. 1 in 03.10.08.

03.10.07 PERMITS/APPROVALS

The permits listed below may be required when there is backland structural work:

Building and Safety Permits

City of Los Angeles Department of Building & Safety permits (structural and grading) are required for all structural foundations. In order to secure the permit, soil investigations are required for structures imposing significant loads. Examples are light pole foundations, chassis racks, sign bridges, and similar structures. Where a prior compaction report has not been approved by City of Los Angeles Department of Building & Safety, a variance shall be submitted.

03.10.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2211 Pier 400 Buildings and Gate Facilities Phase 1/Group 2

1-2211 TS-1	General Notes
1-2211 TS-20	Sign Support Details
1-2211-CTWR S-1	Foundation Plan (Container/Truck Wash Ramp)
1-2211-CTWR S-2	Roof Framing Plan
1-2211-CTWR S-3	Building Section
1-2211-CTWR S-4	Sections and Detail

LAHD Standard Plans
Exhibit No. 1 Estimating Worksheets

PROJECT TITLE: _____

WORLDPORT LA

CLASS C ESTIMATE

ESTIMATE NO.: _____
SHEET NO.: _____
PREPARED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____

BACKLAND STRUCTURAL

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL	NOTES
1	Light Pole Foundations (100', 40', 20' poles, etc.)		EA			
2	Truck Scale		EA			
3	Sign Bridge		LF			
4	Custom Platform		SF			
	TOTAL					
	CONTINGENCY 35%					
	GRAND TOTAL					

SOTest
11.02

Estimating Worksheets
03.10.08, Backld. Structural (Misc. #1)

Exhibit No.1

PROJECT TITLE: _____

WORLDPORT LA

CLASS B ESTIMATE

ESTIMATE NO.: _____
SHEET NO.: _____
PREPARED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____

BACKLAND STRUCTURAL

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL	NOTES
1	Light Pole Foundations					
	Reinforced Concrete		CY			
2	Truck Scale					
	Reinforced Concrete Foundation		CY			
	Scale Equipment		EA			
3	Sign Bridge Reinforced Concrete Foundation		CY			
	Structural Steel		LB			
	Stainless Steel Housing		SF			
4	Custom Platform					
	Reinforced Concrete foundation		CY			
	Concrete Steps & Floor		CY			
	Chair Lift		EA			
	Columns		EA			
	Canopy		SF			
	TOTAL					
	LOCAL MARKUP (Dependent on Reference Used) ____%					
	CONTINGENCY 15%					
	GRAND TOTAL					

SOTEL 1/94

Exhibit. No.1

PROJECT TITLE:
TYPE OF TERMINAL (Container, General Cargo, Auto, Oil, etc.):
DWG. NO.: SPEC. NO.:

WORLDPORT LA

CLASS A ESTIMATE QUANTITY SURVEY

ESTIMATE NO.:
SHEET NO.:
PREPARED BY: DATE:
CHECKED BY: DATE:

BACKLAND STRUCTURAL

ITEM	DESCRIPTION	QTY.	LENGTH	WIDTH	DEPTH						
1	Light Pole Foundation										
	Excavation										
	Fill										
	Formwork										
	Concrete										
	Reinforcement										
	Finish & Cure										
2	Truck Scale										
	Excavation										
	Fill										
	Formwork										
	Concrete										
	Reinforcement										
	Finish & Cure										
	Scale Equipment										
3	Stop Bridge										
	Excavation										
	Fill										
	Formwork										

SOTist
2/92

Exhibit. No.1

PROJECT TITLE: _____
TYPE OF TERMINAL (Container, General Cargo, Auto, Oil, etc.): _____
DWG. NO.: _____ SPEC. NO.: _____

WORLDPORT LA

CLASS A ESTIMATE
QUANTITY SURVEY
(cont'd.)

ESTIMATE NO.: _____
SHEET NO.: _____
PREPARED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____

BACKLAND STRUCTURAL

ITEM	DESCRIPTION	QTY.	LENGTH	WIDTH	DEPTH							
3	Sign Bridge (cont'd.)											
	Concrete											
	Reinforcement											
	Finish & Cure											
	Structural Steel											
	Stainless Steel Housing											
	Painting											
4	Custom Platform											
	Excavation											
	Fill											
	Formwork											
	Concrete											
	Reinforcement											
	Finish & Cure											
	Columns for Canopy											
	Canopy											
	Chain Lift											
	Handrails											

SOT:ni
9/92

Exhibit No. 1

PROJECT TITLE:
TYPE OF TERMINAL (Container, General Cargo, Auto, Oil, etc.):
DWG. NO.: SPEC. NO.:

WORLDPORT LA

CLASS A ESTIMATE

ESTIMATE NO.:
SHEET NO.:
PREPARED BY: DATE:
CHECKED BY: DATE:

BACKLAND STRUCTURAL

ITEM	DESCRIPTION	QUANTITY	MATERIALS		LABOR				TOTAL
			UNIT PRICE	AMOUNT	UNIT MAN	TOTAL MAN	RATE	AMOUNT	
1	Hide Tole Foundation								
	Excavation								
	Fill								
	Formwork								
	Concrete								
	Reinforcement								
	Finish & Cure								
2	Track Seals								
	Excavation								
	Fill								
	Formwork								
	Reinforcement								
	Finish & Cure								
3	Slab Bridge								
	Excavation								
	Fill								
	Formwork								
	Concrete								
	Reinforcement								
	Finish & Cure								
	Structural Steel								

Exhibit. No.1

PROJECT TITLE: _____
TYPE OF TERMINAL (Container, General Cargo, Auto, Oil, etc.): _____
DWG. NO.: _____ SPEC NO.: _____

WORLDPORT LA

CLASS A ESTIMATE
(cont'd.)

ESTIMATE NO.: _____
SHEET NO.: _____
PREPARED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____

BACKLAND STRUCTURAL

ITEM	DESCRIPTION	QUANTITY	MATERIALS		LABOR				TOTAL
			UNIT PRICE	AMOUNT	UNIT M.H.	TOTAL M.H.	RATE	AMOUNT	
3	Sign Bridge (cont'd.)								
	Stainless Steel Housing								
	Painting								
4	Custom Platform								
	Excavation								
	Fill								
	Formwork								
	Concrete								
	Reinforcement								
	Finish & Cure								
	Canopy								
	Chair Lift								
	Handrail								
	SUBTOTAL								
	TAX ON MATERIAL (8.25%)								
	OVERHEAD & PROFIT (150% of Labor)								
	TOTAL								
	GENERAL REQUIREMENTS 4%								
	CONTINGENCY 5%								
	GRAND TOTAL								

Exhibit. No. 1

03.11 MECHANICAL

03.11.01 OVERVIEW

This section contains the following information related to the preparation of the mechanical contract drawings for:

- Above/Underground Storage Tank
- CNG and LNG Facilities
- Clarifiers

Drawings include but are not limited to:

- Site Plan (M)
- Storage Tank Plans, Notes, Abbreviations, and Legends (M)
- Details (M)

03.11.02 DESIGN CRITERIA

Above/Underground Storage Tank

Mechanical design shall be in compliance with Division 31, the latest editions of the Los Angeles City Fire Department Standard No. 68, and with the requirements of any other governmental regulatory agency having jurisdiction.

Presently the design criteria in this section pertain primarily to the construction of above/underground storage tanks. Future editions of these Guidelines may contain information regarding additional backland mechanical designs. The designer should use the Mechanical Site Utilities Checklist to ensure that major areas pertaining to backland mechanical site utilities have been considered in the design.

1. Above Ground Storage Tanks

   a) Construction of Tanks: Tanks shall be constructed in accordance with the provisions of Sec. 57.31.06.

b) Tank Foundation and Supports: The foundation and supports for tanks shall comply with the provisions of Sec. 57.31.07. This section is not intended to prohibit the use of concrete, sand, or gravel pads of standard construction upon which large storage tanks are normally placed.

c) Tank Location shall be per Sec. 57.31.08.

d) Tank Spacing shall be per Sec. 57.31.09.

e) Control of Spills, Leaks and Overflows: The accidental discharge of hazardous substances from aboveground tanks shall be diverted by means of a drainage system as provided in Section 57.31.11 or shall be contained by dikes as provided in Section 57.31.12. These provisions may be altered at the discretion of the Chief when the tanks under consideration do not constitute a hazard.

f) Tank Venting shall be per Sec. 57.31.13.

g) Grounding and Bonding: All aboveground tanks not inherently grounded shall be electrically grounded or bonded as approved by the Chief.

h) Stairs, Walkways and Platforms: Stairs, walkways, catwalks, and similar equipment on or adjacent to aboveground tanks or within dike walls shall be of noncombustible construction and in locations approved by the Chief.

i) Gauging Devices: Gauging devices for aboveground tanks shall be of a type and design that will not continuously expose the vapor space above the liquid level in the tank, and will minimize liquid loss should the device be damaged mechanically or by fire.

j) Sources of Ignition: Sources of ignition shall not be within 25 feet of any aboveground tank containing:

   1) Class I liquids.

   2) Class II or III liquids at temperature above their flashpoints unless safeguarded as approved by the Chief.

k) Tanks Inside Buildings shall be per Sec. 57.31.18.

l) Ventilation in Buildings which Tanks are located shall be done per Sec. 57.31.19.

m) Reconditioning of Used Tanks: Tanks which are to be reconditioned or abandoned by welding, cutting, or other "hot work" methods, shall be rendered gas-free before any welding or cutting operations are conducted. All operations in connection with the reconditioning of used tanks using such methods shall be executed under supervision of experienced personnel and in compliance with L.A.F.D. Standards No. 27 and 48.

n) Insulation: Atmospheric tanks containing hazardous materials may be insulated by the application of insulating material approved by the Chief. Insulating materials shall be fire resistant and shall not decompose rapidly if exposed to fire.

o) Engine Fuel Tank shall be per Sec. 57.31.21.

p) Warning Placards and Signs shall be per Sec. 57.31.23.

q) Fire Protection for Tanks shall be per Sec. 57.31.24.

2. Underground Storage Tanks

a) New Underground Tank Requirement: Every new underground tank shall be provided with and meet the following minimum requirements:

1) Secondary containment in accordance with Section 57.31.33.

2) Construction, corrosion protection, and testing of underground tanks in accordance with Section 57.31.34.

3) Approved release detection monitoring in accordance with Section 57.31.39.

(a) Requirements – Every underground tank shall be provided with an automatic, continuous, electronic monitoring system designed and constructed to be capable of detecting the release of the stored hazardous substance.

(b) Approved Methods of Monitoring – Any or all of the following methods of monitoring may be incorporated into a monitoring system:

(1) Secondary Containment Monitoring

(2) Vadose Zone Monitoring

(3) Tank Level Monitoring

(4) Product Line Leak Detection

4) Approved spill and overfill prevention equipment in accordance with Section 57.31.42, Section 57.31.48, and Section 57.31.49.

b) Requirements for Existing: Every existing underground tank shall meet the following minimum requirements by January 1, 1985:

1) Facility inspection evaluation in accordance with Section 57.31.36.

2) Integrity testing in accordance with Section 57.31.37. Results of precision tests must be submitted to the Department within 90 days of the test to be considered current.

3) Soils investigation in accordance with Section 57.31.38.

(a) Site Assessment per Section 57.31.38.01.

4) Monitoring systems in accordance with Section 57.31.39.

5) Facility inspection and records in accordance with Section 57.31.40.

c) On or before December 22, 1998, the existing underground storage tank shall be replaced or upgraded to prevent unauthorized releases due to corrosion, spills, and overfills for the operating life of the underground storage tank.

d) Location of Underground Tanks shall be in accordance with Sec. 57.31.41.

e) Installation of Underground Tanks shall be in accordance with Sec. 57.31.42.

f) Venting of Underground Tanks shall be in accordance with Sec. 57.31.43.

g) Installation Inspection:

Underground tanks, secondary containment, monitoring systems, and piping shall not be covered until the installation has been tested and approved by the Chief.

Before the underground storage tank is placed in service, the underground storage systems shall be tested in operating condition using a precision test as defined in National Fire Prevention Association Pamphlet 329.

h) Suction Delivery System shall be in accordance with Sec. 57.31.45.

i) Pressure Delivery System shall be in accordance with Sec. 57.31.46.

j) Unauthorized Release shall be in accordance with Sec. 57.31.47.

k) Ground Level Service Openings: All service openings at ground level over or leading to the primary tank or secondary containment shall be so designed as to be liquid tight and not allow any drainage or contamination to enter through such opening and shall be installed a minimum of one inch above adjacent ground level.

l) Fill Box: Every fill box shall have a product identification label attached. The fill box fixture shall have a capacity of not more than five gallons and all metallic components shall be appropriately grounded. The fill box or cap shall be capable of being locked.

m) Security of Access: Access to a facility shall be secured by fences and/or locks or other equivalent protection approved by the Chief.

n) Temporarily Out of Service: Any underground storage tank which is temporarily out of service shall be monitored and inspected in the same manner as if it were in service.

o) Abandonment of Underground Tanks shall be in accordance with Sec. 57.31.52,

p) Repair of Underground Tanks shall be in accordance with Sec. 57.31.53.

q) Reinstallation shall be in accordance with Sec. 57.31.54.

r) Financial Responsibility shall be in accordance with Sec. 57.31.55.

s) Methanol Compatibility: At least one tank and all associated pipes and equipment shall be compatible with methanol in accordance with

AQMD rule 1170 when underground motor vehicle fuel storage tanks are installed or replaced.

t) Above/Underground Storage Tank Protection: Every owner or operator in charge of any atmospheric tank which has an opening exceeding six inches in any lateral dimension or which has a depth in excess of three feet, shall secure the tank from unauthorized entry. Provisions shall be made to secure unauthorized discharge from any atmospheric tank by locking valves in a closed position or by providing and maintaining equivalent protection as approved by the Chief.

u) Above/Underground Storage Tank Heating Equipment

1) Tanks requiring application of heat may be heated by hot water, low pressure steam coils within the tank, electrical heating units installed on the shell of the tank, or other method approved by the Chief.

2) When tanks require the heating of flammable or combustible liquids, the provisions of Section 57.30.66 of this article shall apply.

v) Above/Underground Storage Tank Layout: The designer shall prepare a clearly detailed layout for each tank installation.

w) Above/Underground Storage Tank Checklist: The designer shall use the Aboveground Storage Tank Checklist in Miscellaneous Exhibit No. 3 in 03.11.06 to help ensure that all the specific requirements related to tank installation have been met.

CNG and LNG Facilities

Mechanical design for CNG facilities shall be in compliance with NFPA 52, NFPA 70, and NFPA 54, and as per manufacturer's recommendations.

Mechanical design for LNG facilities shall be in compliance with NFPA 220, NFPA 80, NFPA 59A, and NFPA 68, including fittings, valves, supports, and piping system, shall be per ASWE B31.3.

1. CNG Equipment: CNG equipment is available in two models: time fill and fast fill. They are manufactured by Fuel Maker Corporation located in Toronto, Canada. CNG equipment is available at 3000 psi and 3500 psi respectively, depending upon the model or the car being filled up. To avoid partial fill up of tanks during cold weather, a natural gas dryer is highly recommended.

2. CNG Equipment Accessories: CNG equipment accessories such as hoses, nozzle assembly, cylinders and control panel assembly, and others are available from the equipment supplier.

3. Venting of Equipment: Proper venting of equipment shall be observed, especially when installing indoors.

4. Installation of Equipment: Equipment installation clearance on property lines and buildings is very strict and should be followed. Equipment can be installed out and indoors.

5. Natural Gas: Natural gas shall be required and be hooked to CNG equipment with corresponding BTUs and pressures to satisfy the equipment needs. Please refer to section 3.12 for natural gas piping design.

6. Compressed Gas Tubing Materials: Compressed gas tubing material shall be 0.035 wall 316 seamless stainless steel fittings and valves. All tubing and fitting shall be installed with proper support. Shut-off valve and relief valves shall be provided to repair the lines.

7. Electrical Work: Electrical work shall be required and design shall be based on NFPA 70 and equipment requirement. Explosion-proof materials and emergency shut-off shall be required. It is the responsibility of the Electrical Engineer to provide what is required to operate the system.

8. Guard Posts: Guard posts shall be provided to protect the equipment and its accessories from being hit by vehicles.

Clarifiers

1. When Required: Interceptors (clarifiers), including grease, oil, and sand interceptors, etc.) shall be provided when, in the judgment of the Administrative Authority, they are necessary for the proper handling of liquid wastes containing grease, flammable wastes, sand, solids, acid or alkaline substances, or other ingredients harmful to the building drainage system, the public or private sewer, or to public or private sewage disposal.

2. Approval: The size, type, and location of each interceptor (clarifier) or separator shall be approved by the Administrative Authority, in accordance with its standards.

3. Design

   a) Interceptors shall be constructed in accordance with the design approved by the Administrative Authority and shall have a minimum of two compartments with fittings designed for grease retention.

   b) There shall be an adequate number of manholes to provide access for cleaning all areas of an interceptor. A minimum of one (1) per ten (10) feet (3048 mm) of interceptor length is required. Manhole covers shall be gastight in construction having a minimum opening dimension of twenty (20) inches (508 mm).

   c) In areas where traffic may exist, the interceptor shall be designed to have adequate reinforcement and cover.

4. Location: Each interceptor (clarifier) cover shall be readily accessible for servicing and maintaining the interceptor in working and operating condition. The use of ladders or the removal of bulky equipment in order to service interceptors (clarifiers) shall constitute a violation of accessibility. Location of all interceptors (clarifiers) shall be shown on the approved building plan.

5. Construction Requirements shall be per Appendix H on the California Plumbing Code as amended by LA Plumbing Code Section H.105.0 as applicable
6. Relief Vent: Interceptors (clarifiers) shall be designed so that they will not become air bound if closed covers are used. Each interceptor (clarifier) shall be properly vented.

7. Maintenance of Interceptors: Interceptors shall be maintained in efficient operating condition by periodic removal of accumulated grease, scum, oil, other floating substances, and solids deposited in the interceptor.

8. Discharge: The waste pipe from oil and sand interceptors shall discharge as approved by the Administrative Authority.

03.11.03 CALCULATIONS/WORKSHEETS

There are no calculations or worksheets provided for this section. The designer shall, however, prepare anchor system calculations and tank sizing calculations along with the plans for review (or submittal).

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

Check Lists

Mechanical Site Utilities Checklist

1. Work to be done in project's mechanical specifications section
2. Work of other sections of the project's specifications
3. Codes and standards
4. Excavation and backfill
5. Pipe and/or conduit
6. Aboveground fuel/oil storage tanks
7. Foundation, supports, and concrete thrust blocks
8. Inspection and testing
9. Construction of manholes
10. Approval or rejection of work
11. Final inspection
12. Other

Permit/Compliance Process

1. Fire Department Permit (Division 31 and Standard No. 68 of L.A.F.D.)
2. State registration of tank
3. City of Los Angeles Department of Building & Safety Permit
4. A.Q.M.D. Rule 1170

General as applicable

1. Multiple plans submitted for plan check
2. Anchoring of potentially buoyant tanks
3. Tank leak detection system
4. Backfill
5. Tank foundation thickness
6. Remote fill automatic closing device
7. Alarm box location
8. Impact value of tank
9. Spill and overflows
10. Site characterization
11. Secondary containment
12. Concrete vaulting
13. Anchor system calculations
14. Tank sizing calculations
15. Drawings

Tank Location as applicable

1. Distance from wall, basement, and/or pits
2. Distance from property line
3. Distance from each other
4. Depth when vehicular loads
5. Depth when no vehicular loads
6. Loads carried by building foundations/supports

7. Tank truck maneuvering
8. Tank truck delivery restrictions
9. Tank installation layout

Piping as applicable

1. Vent pipe diameter when:
   a) Vapor recovery system required
   b) One fill only
2. Vent pipe capacity
3. Vent pipe termination – related to:
   a) Building roof
   b) Adjacent ground level or floor deck
   c) Building opening
4. Semi-horizontal run of vent pipe
5. Fiberglass reinforced plastic piping use restrictions
6. U.L. approval for fiberglass reinforced plastic piping
7. Flexible joints
8. Pressure pipe exemption

Service Openings as applicable

1. Liquid-tight
2. Location above adjacent ground level
3. Size of opening

03.11.04 GRAPHIC CRITERIA

Site Plan

This sheet reflects existing and proposed water features in the site area. It is made up of the following layers:

1. Base map (site plan) -- without text.
2. Main proposed surface improvements (site plan) -- without text.
3. Proposed mechanical features -- with text, general information (e.g., notes, legend, etc.), and sheet indexing information.

Above/Underground Storage Tank Plan, Details, and Notes

This sheet consists of the following layers:

1. Base map (design plan) -- without text.
2. All proposed surface improvements (design plan) -- without text.
3. Existing and proposed substructures (design plan) -- with text.
4. Proposed above/underground storage tank, details, and notes (notes may also appear on the Site Plan) -- with text.

Tank Leak Detection Panel and Details

This sheet consists of one layer and includes information regarding tank leaks and wiring, as well as any particular specialized details related to tank leaks -- with text.

Line Style

Line style for mechanical drawings shall be according to the POLA CADD Manual.

03.11.05 SPECIFICATIONS

The following sections in the POLA Department Master Specifications relate to backland mechanical (other sections may be required, depending on the project):

SECTION TITLE
Water Distribution
Fire Suppression Water Distribution

03.11.06 PERMITS/APPROVALS

The permits/approvals listed below may be required when there is backland mechanical work:

Fire Department Approval

The tank detection system must be approved (installation/testing/relocation/ erecting/altering/abandoning procedures must also be approved) by the Los Angeles Fire Department, Division 4 and 5, prior to applying for a City of Los Angeles Department of Building & Safety permit.

The compressed natural gas piping system layout and fire protection features must be approved by the Engineering Unit of the Los Angeles Fire Department prior to applying for a City of Los Angeles of Building & Safety plan check.

City of Los Angeles Department of Building and Safety Permit

A mechanical plan check (3 sets of plans must be submitted) is required. The Mechanical Permit may be secured once the plans have been approved.

Pressure Vessel Permit

A pressure vessel permit shall be required if a fast fill storage is installed.

03.11.07 ENVIRONMENTAL CONSIDERATIONS

The main environmental concern is the leakage of the tanks that may contaminate the water supply and the release of pollutants in the air.

We must also ensure that the discharge of waste is properly treated by the clarifiers before being discharged to the sewer.

The requirement and approval of the Southern California Air Quality Management District, SCAQMD, shall be obtained prior to construction.

03.11.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2702 UST Installation @ Berth 161

1-2702 T-1 Project Site Plan/Location Map

1-2702 M-0 Site Plan

1-2702 M-1 to 10 Mechanical plans and details

LAHD Standard Plans

03.12 GAS

03.12.01 OVERVIEW

This section contains the following information related to the preparation of backland gas contract drawings:

- Gas Site Plan (G)
- Gas System Plans (G)
- Gas System Details (G)

03.12.02 DESIGN CRITERIA

General Design Requirements

Systems design shall be in compliance with:

1. Los Angeles City Plumbing Code (latest edition).
2. Los Angeles City Fire Code (latest edition).

Depth of Cover

Gas lines shall have a minimum cover of 4 feet.

New Gas Services

The designer shall coordinate with the Southern California Gas Company for the location of new gas meters at the onset of design. Southern California Gas Company usually provides meters and gas regulators and Harbor Department installs earthquake valves and additional gas regulators as required.

Letter From the Gas Company

A letter from the Gas Company shall be obtained indicating whether or not the gas demand can be met, once the gas requirement is identified. Telephone No. (310) 605 4175.

Shut-Off Valves

The gas systems shall have shut-off valves installed before gas regulators and earthquake valves.

Gas Regulator and Earthquake Valve

Gas regulator and earthquake valve for gas service shall be approved by L.A. City Building & Safety.

Gas Piping Materials

Materials for the fire gas piping system shall be U.L. listed or be tested and approved by the City of Los Angeles Department of Building & Safety. It shall be the designer's responsibility during the plan check period to obtain variance for those items specified which are not approved by the City of Los Angeles Department of Building & Safety.

Corrosion Protection

Metal pipes (above or below ground) shall be protected against corrosion. Underground steel piping shall be coated and wrapped with PVC.

Gas Flow

Total gas flow demand shall be based on total flow requirement and pressure required shall be based on individual gas equipment.

Piping Materials

The following materials are used:

1. Steel Pipe. Black steel pipe welded or threaded schedule 40 minimum per ASTM A53B.

2. Polyethylene Yellow PE 2406-SDR11/11.5 per ASTM D 2513.

Valves for Gas Piping Systems

Buried valves for gas piping systems shall be butterfly or plug, ductile iron or cast iron with position indicator.

03.12.03 CALCULATIONS/WORKSHEETS

Calculations and worksheets shall be prepared in accordance with Department of Building & Safety requirements.

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Divisions latest format.

03.12.04 GRAPHIC CRITERIA

Site Plan

This sheet reflects existing and proposed gas features in the site area. It is made up of the following layers:

1. Base map (site plan) -- without text.
2. Main proposed surface improvements (site plan) -- without text.
3. Proposed gas features -- with text, general information (e.g., notes, legend, etc.), and sheet indexing information.

Gas Systems Plan

This sheet will contain specific information necessary to construct the water system. It consists of the following layers:

1. Base map (design plan) -- without text.
2. All proposed surface improvements (design plan) -- without text.
3. Existing and proposed substructures (design plan) -- with text.
4. Proposed gas system -- with text.

03.12.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications relate to backland gas (other sections may be required, depending upon the project):

SECTION TITLE
Gas Distribution
ExcavationSafety Requirements.
Detection Tape
Trench Excavation and Backfill
Asphalt Concrete Pavement
Cast-In-Place Concrete
Guard Posts
Paints and Coatings
Corrosion Control

03.12.06 PERMITS/APPROVALS

The permit and approval listed below may be required when there is backland gas piping work:

Building and Safety Permit

A gas plan check is required. The permit (part of Plumbing Permit) may be secured once the plans have been approved.

03.12.07 ENVIRONMENTAL CONSIDERATIONS

The main environmental concern is the occurrence of leaks which might cause explosion and health hazards.

03.12.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2009 Pier 400 Backland Phase 1 – Berths 401-403.

1-2009 G-1 Gas System - Plan

1-2009 G-2 Gas Piping - Detail

1-2206 Pier 400 Transportation Corridor South

1-2206 G-12 Gas Main Plan and Section

LAHD Standard Plans

03.13 WATER

03.13.01 OVERVIEW

This section contains information related to the preparation of the following backland water contract drawings (see Contract Drawings Exhibit Nos. 1-3 in 03.12.08):

- Site Plan (W)
- Water Systems Plan (W)
- Water Systems Details (W)

03.13.02 DESIGN CRITERIA

General Design Requirements

Water system design shall be in compliance with:

1. Los Angeles City Plumbing Code (latest edition).
2. Los Angeles City Fire Code (latest edition).
3. Regulations governing the control and cross connection promulgated by D.W.P. (The water purveyor may occasionally be other than D.W.P. When this occurs, all coordination, approvals, etc., shall be done with that purveyor instead of with D.W.P.).

Depth of Cover

Water lines shall have a minimum cover of 4 feet.

New Water Services

The designer shall coordinate with D.W.P. for the location of new water meters at the onset of design. D.W.P. usually provides and installs water meters to match the backflow preventer installed by the Harbor Department.

Shut-Off Valves

The water system shall have shut-off valves at locations of "T's" for proposed building taps and all fire hydrants.

Backflow Preventers

Backflow preventers for water systems shall be approved by D.W.P. and:

1. Be the reduced pressure type.
2. Have the lowest pressure loss at rated flow for the selected size.
3. Be installed contiguous to the meter by means of valves (unless otherwise approved by D.W.P.).
4. Be installed above grade.

Fire Protection Materials

Materials for the fire protection system shall be U.L. listed or tested and approved by Bldg. & Safety. It shall be the designer's responsibility during the plan check period to obtain variance for those items specified which are not approved by Bldg. & Safety.

Corrosion Protection

Metal pipes (above or below ground) shall be protected against corrosion. Specific requirements follow:

1. Underground piping shall be provided with corrosion protection by use of polyethylene film encasement in full accordance with A.W.W.A. (American Water Works Association) C105, "Polyethylene Encasement for Ductile Iron Piping for Water Standards."
2. Corrosion protection shall terminate no less than 12 inches above the adjacent finished surface.
3. Copper pipes penetrating through concrete shall be provided with sleeves to prevent contact between pipe and concrete.

4. Underground pipes 4 inches or more in diameter shall be laid on sand bedding. This bedding depth shall be no less than the difference between the radii of the pipe and the pipe joint.

Fire Hydrant Location

1. Distance Between Hydrants. The maximum distance between hydrants shall be 400 feet when located at the ends of container rows and adjacent to light standards (or as otherwise approved by the Fire Department).

2. Location Indicator. Fire hydrants adjacent to light poles are indicated by a 3 foot wide red band painted around the pole shaft 40 feet above ground.

Fire Flow

Total fire flow demand and minimum residual pressure required of a fire protection system shall be obtained from the Los Angeles Fire Department.

Piping Materials

1. Ductile Iron. Ductile iron, Class 52, manufactured per A.W.W.A. C151, shall be used for underground pipes at least 4 inches in diameter. The pipes shall be lined with cement mortar mechanical joints or push-on joints.

2. Steel. Steel, Schedule 40, and manufactured per A.S.T.M. 139-90 with flanged joint, shall be used for above ground pipes at least 4 inches in diameter.

3. Copper. Pipes smaller than 4 inches shall be copper, Type K, with silver solder joints.

Valves for Fire Protection Systems

Buried valves for fire protection systems shall be resilient wedge gate, N.R.S. (non-rising stem) and shall be provided with a valve box and position indicator or a post indicator, whichever is practical. Above ground valves shall be O.S.& Y. (outside stem and yoke). Fire hydrant control valves are not provided with a position indicator or post indicator.

Thrust Blocks

Information on thrust block details can be found in Reference Drawing 1-2209 W-37.

03.13.03 CALCULATIONS/WORKSHEETS

Calculations and worksheets for pipe sizes shall be prepared in accordance with Fire Flow Calculations.in 3.13.08.

Estimating

Estimating worksheets shall be prepared in accordance with POLA Engineering Division's latest format.

Service Advisory Report

Once the location of new water meters has been determined, the Service Advisory Report (SAR) can be requested from DWP. This is necessary for executing fire flow calculations, as it includes a pressure vs. flow chart for designated locations along DWP mains.

03.13.04 GRAPHIC CRITERIA

Site Plan

This sheet reflects existing and proposed water features in the site area. It is made up of the following layers:

1. Base map (site plan) -- without text.

2. Main proposed surface improvements (site plan) -- without text.

3. Proposed water features -- with text, general information (e.g., notes, legend, etc.), and sheet indexing information.

Water Systems Plan

This sheet will contain the specific information necessary to construct the water system. It consists of the following layers:

1. Base map (design plan) -- without text.
2. All proposed surface improvements (design plan) -- without text.
3. Existing and proposed substructures (design plan) -- with text.
4. Proposed water system -- with text.

Water Systems Details

This sheet consists of one layer and includes any particular specialized details (e.g., connections, fire hydrant, pipe protection, bends, and water line sections) -- with text.

Line Style

Line style for backland water drawings shall be as required by the POLA/CADD Manual.

03.13.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications relate to backland water (other sections may be required, depending on the project):

SECTION TITLE
Fire Service System
Water System

03.13.06 PERMITS/APPROVALS

The permit and approval listed below may be required when there is backland water work:

Fire Department Approval

The water system layout and fire protection features must be approved by the Hydrant Unit of the Los Angeles Fire Department prior to applying for a Bldg. & Safety Permit.

Building and Safety Permit

A water system plan check is required. The permit (part of Plumbing Permit) may be secured once the plans have been approved.

03.13.07 ENVIRONMENTAL CONSIDERATIONS

The main concern is the disposal of contaminated water after cleaning and testing of newly installed piping. It is mandatory that this contaminated water will not spill to the storm drain system and discharge to the channel.

03.13.08 REFERENCE DRAWINGS

The following exhibits are included as an example:

1-2209 Pier 400 Backland Phase 1 – Berths 401-403

1-2209 W-1 Water System Plan

1-2209 W-2 to 34 Water System Plan

1-2209 W-36 to 38 Water System Section and Details

LAHD Standard Plans

Calculations/Worksheets

Fire Flow Calculations

Analysis Results
Fire Flow Analysis

Title: BERTH 144 WHARF REPLACEMENT
Project Engineer: Pons Rongavilla
Project Date: 12/27/00
Comments: THIS COMPUTATION WILL SHOW THAT THE EXISTING WATER SUPPLIES MEET THE REQUIREMENT OF LA CITY FIRE DEPT.

Fluid Characteristics			
Liquid	Water at 70C(68F)	Specific Gravity	1.00
Kinematic Viscosity	0.108e-4 ft²/s		

Network Inventory			
Number of Pipes	37	Number of Tanks	0
Number of Reservoirs	2	- Constant Area:	0
Number of Junctions	38	- Variable Area:	0
Number of Pumps	0	Number of Valves	0
- Constant Power:	0	- FCV's:	0
- One Point (Design Point):	0	PBV's:	0
- Standard (3 Point):	0	- PRV's:	0
- Standard Extended:	0	- PSV's:	0
- Custom Extended:	0	- TCV's:	0
Multiple Point:	0	-	

Pipe Inventory			
Total Length	5,445.00 ft		
6 in	450.00 ft	10 in	3,320.00 ft
8 in	705.00 ft	12 in	990.00 ft

Title: BERTH 144 WHARF REPLACEMENT
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World Port of Los Angeles
Project Engineer: Pons Rongavilla
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Page 1

FIRE FLOW CALCULATIONS

Analysis Results
Fire Flow Analysis

Junctions @ 0.00 hr

Label	Constituent (mg/l)	Hydraulic Grade (ft)	Pressure (psi)	Demand (gpm)	Pressure Head (ft)
FH # 1	N/A	179.85	77.77	0.00	179.85
FH # 2	N/A	179.85	77.77	0.00	179.85
FH # 3	N/A	171.89	74.33	0.00	171.89
FH # 4	N/A	160.76	69.52	0.00	160.76
FH # 5	N/A	140.29	60.67	1,500.00	140.29
FH # 6	N/A	133.58	57.76	1,500.00	133.58
FH # 7	N/A	133.11	57.56	1,500.00	133.11
FH # 8	N/A	154.99	67.02	0.00	154.99
FH # 9	N/A	158.35	68.48	0.00	158.35
J-1	N/A	180.94	78.24	0.00	180.94
J-2	N/A	179.85	77.77	0.00	179.85
J-3	N/A	179.85	77.77	0.00	179.85
J-4	N/A	179.85	77.77	0.00	179.85
J-6	N/A	179.85	77.77	0.00	179.85
J-8	N/A	179.52	77.70	0.00	179.52
J-9	N/A	172.69	74.68	0.00	172.69
J-10	N/A	171.89	74.33	0.00	171.89
J-11	N/A	160.76	69.52	0.00	160.76
J-12	N/A	156.45	67.72	0.00	156.45
J-13	N/A	153.86	66.53	0.00	153.86
J-14	N/A	148.56	64.24	0.00	148.56
J-15	N/A	147.33	63.71	0.00	147.33
J-16	N/A	146.71	63.44	0.00	146.71
J-17	N/A	146.72	63.02	0.00	146.72
J-18	N/A	146.52	63.40	0.00	146.52
J-19	N/A	154.99	67.02	0.00	154.99
J-20	N/A	158.35	68.48	0.00	158.35
J-21	N/A	160.80	69.53	0.00	160.80
J-22	N/A	161.02	69.69	0.00	161.02
J-23	N/A	158.35	68.48	0.00	158.35
J-28	N/A	141.62	61.33	0.00	141.62
J-29	N/A	140.46	60.74	0.00	140.46
J-31	N/A	154.99	67.02	0.00	154.99
J-32	N/A	143.90	62.23	0.00	143.90
J-33	N/A	137.02	59.25	0.00	137.02
J-35	N/A	154.99	67.02	0.00	154.99

Reservoirs @ 0.00 hr

Label	Constituent (mg/l)	Hydraulic Grade (ft)	Reservoir Inflow (gpm)	Reservoir Outflow (gpm)
R-1-SAR # 1	N/A	182.03	N/A	2,362.24
R-2-SAR # 2	N/A	167.16	N/A	2,137.76

Pipes @ 0.00 hr

Label	Status	Constituent (mg/l)	Flow (gpm)	Velocity (ft/s)	From Grade (ft)	To Grade (ft)	Friction Loss (ft)	Minor Loss (ft)	Total Headloss (ft)	Headloss Gradient (ft/1000ft)
P-1-12"=100'	Open	N/A	2,362.24	6.72	182.03	180.94	1.09	0.00	1.09	10.91

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FIRE FLOW CALCULATIONS

Analysis Results
Fire Flow Analysis

Pipes @ 0.00 hr										
Label	Status	Constituent (mg/L)	Flow (gpm)	Velocity (ft/s)	From Grade (ft)	To Grade (ft)	Friction Loss (ft)	Minor Loss (ft)	Total Headloss (ft)	Headloss Gradient (ft/1000ft)
P-2-12"=100'	Open	N/A	2,362.24	8.70	180.94	179.85	1.09	0.00	1.09	10.91
P-3-10"=140'	Open	N/A	0.00	0.00	179.85	179.85	0.00	0.00	0.00	0.00
P-4-10"=80'	Open	N/A	0.00	0.00	179.85	179.85	0.00	0.00	0.00	0.00
P-5-10"=470'	Open	N/A	0.00	0.00	179.85	179.85	0.00	0.00	0.00	0.00
P-6-8"=50'	Open	N/A	0.00	0.00	179.85	179.85	0.00	0.00	0.00	0.00
P-7-8"=50'	Open	N/A	0.00	0.00	179.85	179.85	0.00	0.00	0.00	0.00
P-8-10"=50'	Open	N/A	2,362.24	8.65	179.85	178.52	1.33	0.00	1.33	26.52
P-9-10"=220'	Open	N/A	2,362.24	8.65	178.52	172.69	5.83	0.00	5.83	26.52
P-10-10"=30'	Open	N/A	2,362.24	8.65	172.69	171.85	0.80	0.00	0.80	26.52
P-11-10"=140'	Open	N/A	2,362.24	8.65	171.85	160.71	11.14	0.00	11.14	26.52
P-12-10"=200'	Open	N/A	2,362.24	8.65	160.71	155.41	5.30	0.00	5.30	26.52
P-13-12"=80'	Open	N/A	2,362.24	8.65	153.45	153.86	1.59	0.00	1.59	26.52
P-14-12"=200'	Open	N/A	2,362.24	8.65	153.86	148.55	5.30	0.00	5.30	26.52
P-15-12"=300'	Open	N/A	862.24	3.52	148.56	147.33	1.23	0.00	1.23	4.11
P-16-12"=150'	Open	N/A	862.24	3.52	147.33	146.71	0.62	0.00	0.62	4.11
P-17-12"=240'	Open	N/A	862.24	3.52	146.71	145.72	0.99	0.00	0.99	4.11
P-18-12"=380'	Open	N/A	-637.76	2.61	145.72	146.62	0.89	0.00	0.89	2.35
P-19-12"=380'	Open	N/A	-2,137.76	8.73	146.62	154.95	8.33	0.00	8.33	22.04
P-20-12"=370'	Open	N/A	-2,137.76	8.08	154.95	158.35	3.36	0.00	3.36	9.07
P-21-12"=270'	Open	N/A	-2,137.76	8.08	158.35	160.80	2.45	0.00	2.45	9.07
P-22-12"=90'	Open	N/A	-2,137.76	8.08	160.80	161.67	0.87	0.00	0.87	9.07
P-23-12"=60'	Open	N/A	-2,137.76	8.08	161.62	162.16	0.54	0.00	0.54	9.07
P-24-8"=120'	Open	N/A	0.00	0.00	158.35	158.35	0.00	0.00	0.00	0.00
P-25-8"=80'	Open	N/A	0.00	0.00	158.35	158.35	0.00	0.00	0.00	0.00
P-26-8"=140'	Open	N/A	0.00	0.00	171.85	171.85	0.00	0.00	0.00	0.00
P-27-8"=60'	Open	N/A	0.00	0.00	160.71	160.71	0.00	0.00	0.00	0.00
P-28-8"=60'	Open	N/A	1,500.00	17.02	148.52	140.23	8.28	0.00	8.28	137.73
P-29-8"=115'	Open	N/A	1,500.00	9.57	145.72	141.82	3.90	0.00	3.90	33.93
P-30-8"=40'	Open	N/A	1,500.00	9.57	141.82	140.48	1.34	0.00	1.34	33.93
P-31-8"=50'	Open	N/A	1,500.00	17.02	140.45	133.56	6.89	0.00	6.89	137.73
P-32-8"=115'	Open	N/A	0.00	0.00	154.95	154.95	0.00	0.00	0.00	0.00
P-33-8"=40'	Open	N/A	1,500.00	9.57	146.62	143.90	2.71	0.00	2.71	33.93
P-34-8"=50'	Open	N/A	1,500.00	17.02	143.90	137.02	6.89	0.00	6.89	137.73
P-35-8"=115'	Open	N/A	1,500.00	9.57	137.02	133.11	3.90	0.00	3.90	33.93
P-36-8"=40'	Open	N/A	0.00	0.00	154.08	154.08	0.00	0.00	0.00	0.00
P-37-8"=50'	Open	N/A	0.00	0.00	154.95	154.95	0.00	0.00	0.00	0.00

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FIRE FLOW CALCULATIONS

Fire Flow Analysis
Junction Report

Node Label	Elevation (ft)	Demand Type	Demand (gpm)	Demand Pattern	Calculated Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-20	0.00	Demand	0.00	Fixed	0.00	158.35	68.48
J-33	0.00	Demand	0.00	Fixed	0.00	137.02	59.25
J-35	0.00	Demand	0.00	Fixed	0.00	154.98	67.02
J-17	0.00	Demand	0.00	Fixed	0.00	146.72	63.02
J-31	0.00	Demand	0.00	Fixed	0.00	154.98	67.02
J-9	0.00	Demand	0.00	Fixed	0.00	172.69	74.68
J-5	0.00	Demand	0.00	Fixed	0.00	179.85	77.77
J-8	0.00	Demand	0.00	Fixed	0.00	178.52	77.20
J-18	0.00	Demand	0.00	Fixed	0.00	146.62	63.40
J-1	0.00	Demand	0.00	Fixed	0.00	180.84	78.24
J-11	0.00	Demand	0.00	Fixed	0.00	160.76	69.52
FH # 7	0.00	Demand	1,500.00	Fixed	1,500.00	133.11	57.58
J-28	0.00	Demand	0.00	Fixed	0.00	141.82	61.33
J-4	0.00	Demand	0.00	Fixed	0.00	179.85	77.77
FH # 9	0.00	Demand	0.00	Fixed	0.00	158.35	68.48
J-15	0.00	Demand	0.00	Fixed	0.00	147.33	63.71
FH # 6	0.00	Demand	1,500.00	Fixed	1,500.00	133.56	57.76
FH # 3	0.00	Demand	0.00	Fixed	0.00	171.99	74.33
J-14	0.00	Demand	0.00	Fixed	0.00	148.56	64.24
J-3	0.00	Demand	0.00	Fixed	0.00	179.85	77.77
J-19	0.00	Demand	0.00	Fixed	0.00	154.98	67.02
J-21	0.00	Demand	0.00	Fixed	0.00	160.60	69.53
J-10	0.00	Demand	0.00	Fixed	0.00	171.69	74.33
FH # 8	0.00	Demand	0.00	Fixed	0.00	154.98	67.02
J-2	0.00	Demand	0.00	Fixed	0.00	179.85	77.77
J-13	0.00	Demand	0.00	Fixed	0.00	153.86	66.53
J-16	0.00	Demand	0.00	Fixed	0.00	146.71	63.44
FH # 1	0.00	Demand	0.00	Fixed	0.00	179.85	77.77
J-22	0.00	Demand	0.00	Fixed	0.00	159.62	69.09
FH # 2	0.00	Demand	0.00	Fixed	0.00	179.85	77.77
J-23	0.00	Demand	0.00	Fixed	0.00	158.35	68.48
J-29	0.00	Demand	0.00	Fixed	0.00	140.46	60.74
FH # 5	0.00	Demand	1,500.00	Fixed	1,500.00	140.29	60.67
J-12	0.00	Demand	0.00	Fixed	0.00	156.45	67.22
J-32	0.00	Demand	0.00	Fixed	0.00	143.90	62.23
FH # 4	0.00	Demand	0.00	Fixed	0.00	160.76	69.52

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FIRE FLOW CALCULATIONS

Fire Flow Analysis
Pipe Report

Link Label	Length (ft)	Diameter (in)	Material	Roughness	Minor Loss	Initial Status	Current Status	Discharge (gpm)	Start Hydraulic Grade (ft)	End Hydraulic Grade (ft)	Headloss (ft)	Friction Slope (ft/1000ft)
P-21-12"=270'	270.00	12	Ductile Iron	140.0	0.00	Open	Open	-2,137.76	158.35	160.80	2.46	9.07
P-24-8"=120'	120.00	8	Ductile Iron	140.0	0.00	Open	Open	0.00	158.35	158.35	0.00	0.00
P-35-6"=115'	115.00	8	Ductile Iron	140.0	0.00	Open	Open	1,500.00	137.02	133.11	3.90	33.93
P-37-6"=50'	50.00	8	Ductile Iron	140.0	0.00	Open	Open	0.00	154.99	154.99	0.00	0.00
P-29-6"=115'	115.00	8	Ductile Iron	140.0	0.00	Open	Open	1,500.00	145.72	141.82	3.90	33.93
P-18-10"=380'	380.00	10	Ductile Iron	140.0	0.00	Open	Open	-637.76	145.72	148.62	0.89	2.35
P-36-8"=40'	40.00	8	Ductile Iron	140.0	0.00	Open	Open	0.00	151.59	151.59	0.00	0.00
P-10-10"=30'	30.00	10	Ductile Iron	140.0	0.00	Open	Open	2,362.24	172.09	171.09	0.00	26.52
P-7-8"=50'	50.00	8	Ductile Iron	140.0	0.00	Open	Open	0.00	179.85	179.85	0.00	0.00
P-6-12"=220'	220.00	10	Ductile Iron	140.0	0.00	Open	Open	2,362.24	178.52	172.09	6.43	26.52
P-33-8"=40'	40.00	8	Ductile Iron	140.0	0.00	Open	Open	1,500.00	146.62	143.93	2.71	33.93
P-19-10"=380'	380.00	10	Ductile Iron	140.0	0.00	Open	Open	-2,137.76	146.62	154.09	8.39	22.04
P-9-12"=100'	100.00	12	Ductile Iron	140.0	0.00	Open	Open	2,362.24	182.94	178.85	1.06	10.31
P-12-10"=200'	200.00	12	Ductile Iron	140.0	0.00	Open	Open	2,362.24	160.76	155.45	5.30	26.52
P-27-6"=60'	60.00	6	Ductile Iron	140.0	0.00	Open	Open	0.00	160.76	160.76	0.00	0.00
P-30-8"=40'	40.00	8	Ductile Iron	140.0	0.00	Open	Open	1,500.00	141.82	140.46	1.36	33.93
P-8-6"=50'	50.00	6	Ductile Iron	140.0	0.00	Open	Open	0.00	179.85	179.85	0.00	0.00
P-5-10"=470'	470.00	10	Ductile Iron	140.0	0.00	Open	Open	0.00	179.85	179.85	0.00	0.00
P-16-10"=150'	150.00	10	Ductile Iron	140.0	0.00	Open	Open	862.24	147.33	145.71	0.62	4.11
P-1-12"=100'	100.00	12	Ductile Iron	140.0	0.00	Open	Open	2,362.24	182.03	180.94	1.09	10.91
P-15-10"=380'	380.00	10	Ductile Iron	140.0	0.00	Open	Open	862.24	148.56	147.33	1.23	4.11
P-20-6"=60'	60.00	6	Ductile Iron	140.0	0.00	Open	Open	1,500.00	148.56	142.29	6.26	137.73
P-4-10"=80'	80.00	10	Ductile Iron	140.0	0.00	Open	Open	0.00	179.85	179.85	0.00	0.00
P-26-12"=370'	370.00	12	Ductile Iron	140.0	0.00	Open	Open	-2,137.76	154.99	156.36	3.36	9.07
P-32-8"=115'	115.00	8	Ductile Iron	140.0	0.00	Open	Open	0.00	154.99	154.99	0.00	0.00
P-22-12"=90'	90.00	12	Ductile Iron	140.0	0.00	Open	Open	-2,137.76	160.80	161.62	0.82	9.07
P-11-10"=140'	420.00	10	Ductile Iron	140.0	0.00	Open	Open	2,362.24	171.09	180.73	11.14	26.52
P-25-6"=140'	60.00	6	Ductile Iron	140.0	0.00	Open	Open	0.00	171.85	171.85	0.00	0.00
P-3-10"=140'	140.00	10	Ductile Iron	140.0	0.00	Open	Open	0.00	179.85	179.85	0.00	0.00
P-6-10"=50'	50.00	10	Ductile Iron	140.0	0.00	Open	Open	2,362.24	179.85	178.52	1.33	26.52
P-14-10"=200'	200.00	10	Ductile Iron	140.0	0.00	Open	Open	2,362.24	153.86	148.56	5.30	26.52
P-17-10"=240'	240.00	10	Ductile Iron	140.0	0.00	Open	Open	862.24	146.71	145.72	0.99	4.11
P-23-12"=60'	60.00	12	Ductile Iron	140.0	0.00	Open	Open	-2,137.76	161.62	162.16	0.54	9.07
P-25-6"=60'	60.00	6	Ductile Iron	140.0	0.00	Open	Open	0.00	159.35	158.35	0.00	0.00
P-31-6"=50'	50.00	6	Ductile Iron	140.0	0.00	Open	Open	1,500.00	140.46	133.58	6.89	137.73
P-13-10"=60'	60.00	10	Ductile Iron	140.0	0.00	Open	Open	2,362.24	155.45	153.86	1.59	26.52
P-34-6"=50'	50.00	6	Ductile Iron	140.0	0.00	Open	Open	1,500.00	143.90	137.02	6.88	137.73

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World Port of Los Angeles

Project Engineer: Dave Rangaville
Cyscomat v5.0 [042]
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FIRE FLOW CALCULATIONS

City of Los Angeles
Los Angeles Department of Water and Power - Water System

SAR #- 1

SAR NUMBER 3459

Fire Service Pressure Flow Report

SERVICE NUMBER 506204

For: 143 BERTH PR Date: 1-31-2000

Existing / Proposed 10 INCH off of the

16 inch main in NEPTUNE on the WEST side approximately

1628 feet SOUTH of SOUTH of B ST The System maximum pressure is:

100 psi base on street curb elevation of 10 feet above sea level at this location.

The distance from the DWP street main to the property line is 0 feet

System maximum pressure should be used only for determining class of piping and fittings.

CITY OF LOS ANGELES
FEB - 2 2000
ENGINEERING DIVISION
WATER DEPARTMENT

Residual Flow/Pressure Table for water system street main at this location

Flow (gpm)	Press. (psi)	Flow (gpm)	Press. (psi)	Flow (gpm)	Press. (psi)
0	91				
1200	90				
1750	89				
2175	88				
2540	87				
2870	86				
3165	85				
3440	84				
3695	83				
3940	82				
4170	81				
4390	80				
4600	79				
4805	78				
5000	77				

Meter Assembly Capacities

Domestic Meters
1 inch =56 gpm
1-1/2 inch =80 gpm
2 inch =160 gpm
3 inch =220 gpm
4 inch =400 gpm
6 inch =700 gpm
8 inch =1500 gpm
10 inch =2500 gpm

Fire Service
2 inch =250 gpm
4 inch =800 gpm
6 inch =1400 gpm
8 inch =2500 gpm
10 inch =5000 gpm

FM Services
8 Inch =2500 gpm
10 Inch =5000 gpm

These values are subject to change due to changes in system facilities or demands.

Comments:

This information will be sent to the Department of Building and Safety for plan checking.

This SAR is valid for one year from date above. Call DWP for recalculation or for reissue if no system changes have occurred.

For additional information contact the Water Distribution Services Section - SAN PEDRO

Phone: 1-31-2000 (310) 367-1232

ANSELMO COLLINS

ANSELMO COLLINS
Prepared by

JAN 31 2000
Approved by

026-234
Water Service Map

FIRE FLOW CALCULATIONS

City of Los Angeles

Los Angeles Department of Water and Power - Water System

NUMBER 3468

Fire Service Pressure Flow Report

SERVICE NUMBER 506262

For: 147 BERTH PR Date: 1-31-2000

Existing / Proposed 10 INCH off of the

12 inch main in NEPTUNE on the WEST side approximately

5193 feet SOUTH of SOUTH of B ST The System maximum pressure is

100 psi base on street curb elevation of 10 feet above sea level at this location.

The distance from the DWP street main to the property line2k feet

System maximum pressure should be used only for determining class of piping and fittings.

Residual Flow/Pressure Table for water system street main at this location

Flow (gpm)	Press. (psi)	Flow (gpm)	Press. (psi)	Flow (gpm)	Press. (psi)
0	90	3605	54		
755	88	3710	52		
1100	86	3815	50		
1370	84	3915	48		
1600	82	4015	46		
1805	80	4115	44		
1990	78	4210	42		
2165	76	4305	40		
2325	74	4395	38		
2480	72	4485	36		
2625	70	4575	34		
2765	68	4665	32		
2895	66	4750	30		
3025	64	4835	28		
3145	62	4920	26		
3265	60	5000	24		
3380	58				
3495	56				

Motor Assembly Capacities

Domestic Meters
1 inch =50 gpm
1-1/2 inch =96 gpm
2 inch =160 gpm
3 inch =220 gpm
4 inch =400 gpm
6 inch =700 gpm
8 inch =1500 gpm
10 inch =2500 gpm

Fire Service
2 inch =250 gpm
4 inch =600 gpm
6 inch =1400 gpm
8 inch =2500 gpm
10 inch =5000 gpm

FM Services
8 inch =2500 gpm
10 inch =5000 gpm

These values are subject to change due to changes in system facilities or demands.

Comments:

This information will be sent to the Department of Building and Safety for plan checking.

This SAR is valid for one year from date above. Call DWP for recalculation or for reissue if no system changes have occurred.

For additional information contact the Water Distribution Services Section - SAN PEDRO (213) 367-1232

Printed: 1-31-2000

ANSELMO COLLINS

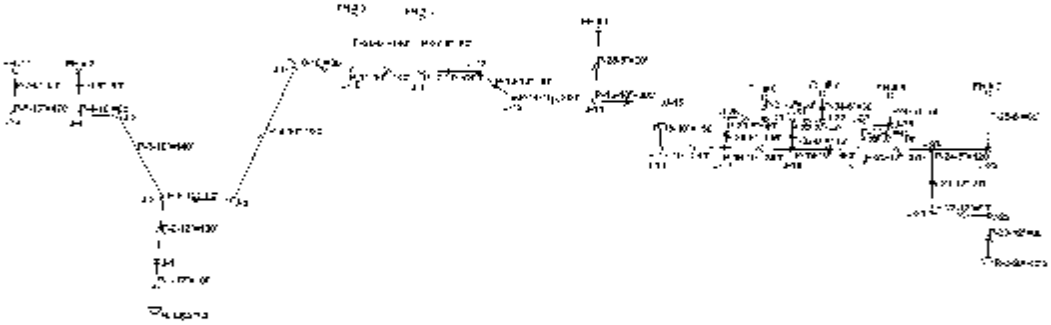
Prepared by

ANSELMO COLLINS
JAN 31 2000

024-204
Water Service Map

FIRE FLOW CALCULATIONS

Fire Flow Analysis



Title: BERTH 144 WHARF REPLACEMENT
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World Port of Los Angeles
Project Engineer: Dana Burgovitz
Cyberne. v2.0 [042]
Page 1 of 1

FIRE FLOW CALCULATIONS

03.14 ELECTRICAL

03.14.01 OVERVIEW

This section contains information related to the preparation of the following backland electrical contract drawings.

- Electrical Notes, Symbols, and Abbreviations (E)
- Electrical Site Plan (E)
- Single Line Diagrams (E)
- D.W.P. Substation Plan and Details (E)
- Pullbox and Maintenance Hole Schedules and Details (E)
- Electrical Conduit Details (E)
- Substation Equipment Foundation (E)
- Sign Bridge Plan and Details (E)
- Truck Scale Plan and Details (E)
- Automatic Equipment Identification Plan and Details (E)
- Intercom Pedestal Plan and Details (E)
- Load and Panelboard Schedules (E)
- Washdown & Pretrip Electrical Plan (E)

03.14.02 DESIGN CRITERIA

Required Services

The designer should check whether any of the following are required:

1. Public address service

2. Telephone system
3. Computer System
4. Electrical service and wiring for landscaping
5. High voltage >600V
6. Fiber optics
7. Security system
8. Video system
9. Underground (utility and distribution) detection system
10. Cable TV
11. Communications

General Design Requirements

Electrical designs shall be in compliance with the latest edition of the Los Angeles City Electrical Code.

Utilities

1. Removal or Relocation – It should be determined whether existing DWP power poles or SBC telephone poles are to be removed or relocated.
2. Time and Materials Accounting – Separate accounting for time and materials should be maintained when planning DWP pole and appurtenance relocations (to be used for shared costs).
3. Overhead Service Bracket – For overhead service, it should be verified whether or not DWP will provide a service bracket (no cost to Harbor Department).
4. Substation Grounding – For substation grounding, counterpole grounding shall be provided where the DWP station fence is within 18 inches of the customer substation fence. It is a DWP requirement that the customer station fence not touch their station fence, unless this grounding is provided.

5. Ground Grid System Access – Access to the ground grid system at the substation shall be provided if future switchgear is expected to be installed.

Street Light/Traffic Signals

See SPECIAL FACILITIES Section – Streets (6.01) in these Guidelines.

High Mast Light

When stubbing the telephone and PA system at the pole pedestal, there must be sufficient room on the pedestal; stubbing outside the pedestal should be considered.

Non-Lighting Loads on Lighting Poles

For non-lighting loads such as security cameras, monitoring devices, and other systems which will be mounted on light poles, the light pole power circuits shall not be used to feed nonlighting loads. A separate circuit must be installed from the nearest panel to the light pole to provide the necessary power for nonlighting loads. Nonlighting loads mounted on light poles shall not be screwed or penetrate or be welded to light poles. Mounting shall be done by strapping.

Landscape Irrigation System

Conduit and wire systems shall be used for wiring the controllers in the landscape sprinkler system. Direct burial type wiring is not acceptable.

Single Line Diagram

Short Circuit Analysis – A short circuit analysis shall be done of all electrical systems, stating all available short circuit currents on the single line diagram for all switchboards, panelboards, and any major equipment used.

Arc Flash Hazard Analysis – An arc flash hazard analysis shall be done of the entire electrical system stating the arc flash ratings and boundaries for all switchboards, panelboards, and any major electrical power distribution equipment used.

DWP Service Utility Vault Requirements

Utility vault requirements shall be transferred in full onto the contract drawings.

Light Poles Near Wharf

When setting poles near a wharf, there shall be no horizontal or vertical interferences with the back reach of the container cranes. The minimum clear space is 200 feet from the face of the wharf to the center of the light pole. Additional clearance may be required for specific crane backreach space requirements. Coordinate with Crane Specifications.

Reefers

1. Grade Installation – Reefers shall not be installed below grade (to prevent infiltration of water).

2. Monitoring – Conduits shall be installed for remote monitoring of reefers during the development of a large terminal.

3. Receptacle Assemblies – The receptacle assemblies for reefer outlets shall be manufactured as follows:

   a) The enclosure shall be welded, watertight construction; 11 gauge stainless steel front and bottom; 14 gauge stainless steel sides, back, and top.

   b) All fasteners and hardware shall be stainless steel.

   c) The interlocking power receptacle and circuit breaker module shall be interchangeable and manufactured by E.S.L. Power Systems, Inc.

   d) All internal wiring and connections shall be factory wired.

   e) One whole side of the box shall be removable to provide access to internal parts (required by the City of Los Angeles Department of Building & Safety.)

   f) A metal nameplate shall be installed on each receptacle pedestal showing the switchboard and circuit number (e.g., DBA-1M, DBB-2, etc.).

g) Reefer outlets shall be rated for 480v, 3, 32 AMP receptacle w/30 AMP trip circuit breaker. Designer shall specify the short circuit withstand rating in accordance with specific project requirements.

Pull Boxes

1. Detail – Detail for grounding pull box covers shall be shown as required by the City of Los Angeles Department of Building & Safety.

2. Maintenance Hole Covers – Maintenance hole covers do not have to be bonded to the ground as long as the ring is metallic and bonded. If the ring is concrete, then the cover needs to be bonded. Decision is to be made by Principal Electrical Inspector at the City of Los Angeles Department of Building & Safety.

3. Loads – Grounding pull boxes and covers shall be able to withstand 100 kip wheels plus 25% impact loading and shall be similar in shape to the City of Los Angeles standard plans or like structures.

Outdoor Lighting

1. Point by Point Calculations – Point by point calculations shall be done for outdoor lighting; as any other method does not provide satisfactory results.

2. Computer Printout – Where lighting of outdoors is involved in a design, a computer printout of the final lighting arrangement shall be obtained from the light fixture manufacturer.

3. Control Wiring – Drawings shall include control wiring for security and general lighting.

Excess Cabling Charge

An excess cabling charge for cable exceeding 150 feet shall be paid to DWP by the Harbor Department with an Interdepartmental Order.

Meter Sockets

Meter sockets are rated a minimum of 10,000 AIC. The specified rating of meter sockets must not be less than the available short circuit.

Main Breakers

When no single main breaker exists, there shall be no more than six breakers at any panelboard.

Concrete Pad

The concrete pad shall be extended in front of a switchboard by a minimum of 3 feet (preferably 4 feet), especially where DWP has to install their service meter (the 3 foot dimension of the concrete pad may have to be increased as required by code).

Crane Emergency Disconnect Button

A glass cover shall be used over a crane emergency disconnect button at all locations.

DWP Substation Plans/Details

Upon request by the designer, DWP will provide substation plans and details. The designer shall modify them to conform to the Harbor Department and specific job location requirements.

Crane Bus

Crane bus plans and details shall include the crane bus emergency shunt trip and ground fault detection system

Lighting Fixtures

Lighting fixtures reference shall be complete and of itself. Following are examples of how references should be made (with an incorrect sample in parenthesis, if appropriate):

1. Fixture type "A" = 40 foot steel pole, double arm, with two 400W. H.P.S. (high pressure sodium) lamps.

2. Fixture type "B" = 40 foot steel pole, double arm, with one 400W H.P.S. lamp (rather than "similar to 'A', except with one 400 W. H.P.S. lamp").

3. Fixture type "C" = 40 foot steel pole, double arm, with two 400W. Metal Halide lamps (rather than "similar to 'B', except with metal Halide lamps").

4. Fixture type "D" = 30 foot steel pole, double arm, with two 400W. Metal Halide lamps (rather than "similar to 'C', except 30 foot pole and 2 Metal Halide lamps").

Panelboard Schedule

A separate electrical panelboard schedule shall be shown for each and every panelboard, even if they are identical. Each panelboard shall also be identified by its own unique name (e.g., Panelboard A and Panelboard B).

Wiring

All circuit conductors shall be copper with type THHN/THWN insulations, 600V rating for all conductors. Equipment grounding conductors shall be sized adequately to withstand short circuits.

Conduits

1. Location – No changes from the design of horizontal, vertical, or underground conduit shall be made without first obtaining permission from the Chief Harbor Engineer. The contractor's "as-built" prints must show all changes in conduit positioning and depth.

2. Materials

   a) All underground conduits shall be non-metallic P.V.C. unless noted and installed in accordance with code requirements.

   b) The terminating 10 feet of all non-metallic conduit (measured from the finished surface) shall be rigid metal conduit with bonded 40 mil P.V.C. coating manufactured by KORKAP, CARLON, or an approved equal.

   c) All P.V.C. conduits shall be Schedule 40, unless otherwise noted.

3. Underground Conduit Bends

   a) All underground conduit bends, except at the termination of a conduit run, shall be Schedule 80.

b) In installing non-metallic P.V.C. conduits underground, all bends of 30 degrees and over shall be Schedule 80.

4. Minimum Depth - The minimum depth of direct burial conduits shall be 3 feet, 6 inches from the finished surface, unless otherwise noted.

5. Grounding – The Contractor shall ground all electrical equipment and conduit systems to meet code requirements.

6. Buried Stub-Outs – All underground conduit buried stub-outs shall be finished with concrete monuments 6 inches x 6 inches x 15 inches deep buried flush with the finished surface over the capped ends and a 3 inch square brass plate identifying the number and sizes of conduits.

7. Detection Tape – Detection tape shall be used over all conduits.

Metal Nameplate

A metal nameplate shall be provided for all electrical equipment. The nameplate shall list equipment operating parameters.

Ground Fault Protection

Ground fault protection shall protect circuit line wiring from line to ground short circuiting with a response time documented by calculations.

03.14.03 CALCULATIONS/WORKSHEETS

Calculations and worksheets shall be prepared in accordance with City of Los Angeles Department of Building & Safety requirements and POLA Engineering Design Staff.

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

Panelboard

When installing a 480V panelboard, a 277/480V 3 phase/4W panelboard shall be considered as a first choice. Note that 480V 3 phase/3W panelboards are not readily available.

Powerlink Panels and Circuit Breaker

Panelboards controlling lighting system shall be Square D powerlink panels with powerlink circuit breakers.

03.14.04 GRAPHIC CRITERIA

The Graphic criteria for Backland electrical design set shall include, but not be limited to, the following. The sheets shall be arranged with the general order as prescribed herein. Additional sheets may be inserted in the electrical design package as necessary.

- Notes, Symbols, Key Map, Abbreviations
- Overall Electrical Site Plan – show overall conduit run, switchgear locations, light pole locations, wharf electrical box locations, AMP box location(s), etc.
- Single Line Diagram, Load Schedules, Worst Case Voltage Drop Calculations
- Power Plans (Show power plan for the Backland)
- Reefer power plans
- Reefer Single Line diagrams, load schedule, substation layout, equipment schedule
- Reefer outlet design sheet
- Concrete pull box design sheet
- Lighting Plans Fixture Schedule, Lighting System Details

- Typical wharf section showing electrical conduit run and expansion joint design
- Switchgear equipment layout, fencing, conduit layout, and grounding grid
- AMP outlet design details, box elevation, connector details
- Miscellaneous Electrical details – Switchgear pad layout, switchgear elevation, pull box details, grounding details, guard post detail, underground conduit section, underground conduit stub up detail,
- Panel Schedule
- DWP service entrance design and Industrial Station (IS) equipment layout

03.14.05 SPECIFICATIONS

SECTION TITLE
Basic Electrical Materials and Methods
Grounding System
Field Tests
High Voltage Testing
5 Kilovolt Rated Shielded Cable
600 Volt or Less Wiring System
Crane Conductor Bus
Conduit Raceways
Rigid Galvanized Steel Conduit
PVC Conduit
Outlet, Junction, and Pull Boxes
Concrete Pullboxes
Reefer Pedestals and Receptacles
Service Meter
Transformers
4160 Volt Switchgear
Low Voltage Switchboard
Panelboard
Electrical Backboard
Lighting
Interior Luminaries

Bus Bars

Panelboards/switchboard bus bars shall be of 100% copper.

Splices

A note shall be added in the specifications that says, "All high voltage splices and terminations must be inspected by the Port of Los Angeles Inspector from the beginning of the splice work to its conclusion." High voltage cable installation shall be supervised by a cable manufacturer's representative.

Luminaires

1. Effective Projected Area – A note shall be added in the specifications that "Luminaires" support system is capable of handling the wind loads designated in the specifications with luminaires' effective projected area (E.P.A.) of 3.5 square feet minimum (or use actual E.P.A. if greater than 3.5 square feet)."

2. Alloy Content – The copper content of the aluminum alloy must be less than .50%.

03.14.06 PERMITS/APPROVALS

The permit and approval listed below may be required when there is backland electrical work:

Department of Water and Power Approval

The designer is responsible for coordinating with and securing approval from DWP for the type of service and service location. Subsequently, the contractor shall obtain approval for the service panelboard, switchboard, meter, or any equipment installation necessary for electrical service. The DWP Design Engineer shall be notified two working days in advance of construction.

Department of Building & Safety Permit

1. Plan Check –An electrical plan check is required per California Electrical Code Section. Examples of when a plan check is required are as follows:

a) A disconnecting means exceeding 600 amperes.

b) The additional loads exceed 600 amperes.

2. Electrical Equipment – All electrical equipment must be approved by the City of Los Angeles Department of Building & Safety or a variance obtained.

3. Permit – The electrical permit may be secured by a C-10 contractor once the plans have been approved.

4. Foundation Report – A foundation report for each light pole foundation is required to obtain a City of Los Angeles Department of Building & Safety permit (a separate report should be requested from the Testing Lab for each light pole foundation).

03.14.07 ENVIRONMENTAL CONSIDERATIONS

1. Alternative Maritime Power (AMP) system shall be designed to provide shore to ship electrical connection facility.

2. AMP connection voltage shall be 6.6kv, 3☐, 60Hz.

3. Each AMP vault shall include two 350a amp sockets with 3 phases, two pilot pins and provision of fiber optic connection.

4. Each amp vault shall be fed by a feeder circuit breaker located in a switchboard dedicated amp system, located behind a landside crane rail.

03.14.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2209 Pier 400 Backland Phase I – Berths 401-403.

1-2209 E-1	Electrical Notes, Symbols & Abbreviations
1-2209 E-1A-34	Electrical Site Plan
1-2209 E-36-37	Single Line Diagrams
1-2209 E38-39	Equipment Elevations

1-2209 E40-41	Equipment Layout
1-2209 E42-48A	Electrical Reefer Outlets
1-2209 E49-60	Single Line Diagram - Reefer Switchboard
1-2209 E61-62B	Single Line Diagram - Switchboard
1-2209 E63-72C	Equipment Elevation & Layout - Switchboard
1-2209 E-73	Switchgear Concrete Pad Layout
1-2209 E-74	Reefer Outlet Details
1-2209 E-75	Concrete Pull Box Details
1-2209 E-76-78	120’ High Mast Light Pole (Details)
1-2209 E-79	Electrical Details (Conduit)
1-2209 E-80	Substation No. 1 Details
1-2209 E81-84	Electrical Panel Schedules
1-2209 DWP-1-10	DWP Substation Plan and Details

LAHD Standard Plans

03.15 TERMINAL PLANNING

03.15.01 OVERVIEW

This section contains simplified information related to the planning of a Container Terminal, whether it is a new facility or the modification of an existing facility. This process is rather complex and requires a through and detailed study. The intent of this information is to serve as a guideline to the procedure required to complete this process. For brevity, we have omitted administrative procedures the Project Manager is required to complete during this process.

Outline:

1. Real Estate and Marketing send request to Engineering to proceed with the planning of a container terminal
2. Project Manager requests proposals from the available On-Call Terminal Planning consulting firms.
3. Project Manager evaluates and selects consulting firm and starts preparing a Contract Directive.
4. PM prepares contract Directive that shall include purpose, scope of work, deliverables, schedule, personnel assigned, compensation and other conditions of agreement.
5. Consultant signs Directive; PM circulates Directive for Executive Director signature and PM issues Notice to Proceed.
6. Planning process starts; PM is required to coordinate with consultant, shipping line, terminal operator, Real Estate and Marketing.
7. Consultant prepares the terminal planning study. This is an iterative process that will require a number of working meetings with the parties involved.
8. Consultant prepares and presents final report. Shipping line and Terminal Operator sign off on the proposed project and this process transitions from the planning stage to the design stage. Please see appropriate sections for the design of the facilities.

Basic Planning of Container Terminals:

Planning considerations for new and upgraded terminals are many and varied, including site evaluation, pre-existing conditions, project development issues, observance and adherence to environmental policies and the many varied elements of port planning. Detailed design of the container terminal will not be the same at any two terminals because of variations in ground conditions, and the constraints imposed by existing developments and the local environment. The main goal of this planning is an environmentally sustainable terminal with the optimization of the facilities with a high level of efficiency.

This basic planning process includes, but it is not limited to the following elements:

1. Static Planning

    1.1. Required Storage Capacity
    1.2. Required number of ground slots
    1.3. Selection of container handling systems
    1.4. Required annual container handling capability

2. Dynamic Planning

    2.1. Container flows in container terminals
    2.2. Required size of container handling equipment fleet for yard operations
    2.3. Simulation Analysis: Calibration, future scenarios, planning for higher CY capacity and automation

3. Berth Planning

    3.1. Berth Demand Modeling: Vessel arrival time, vessel call duration, dock crane demand, probability of early or late arrival and other parameters.
    3.2. Berth Planning: Determine working length of berth, location of crane rails, crane stops, truck circulation under the dock cranes and conceptual vessel tie-up arrangement.

4. Gate and CFS Planning

    4.1. Gate operations, process and sizing analysis
    4.2. Security requirements
    4.3. Traffic flow planning
    4.4. Size of CFS (if required)

5. Alternative Options

03.15.02 DESIGN CRITERIA

There are no design criteria relating to Terminal Planning

03.15.03 CALCULATIONS/WORKSHEETS

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

03.15.04 GRAPHIC CRITERIA

There are no graphic criteria relating to Terminal Planning

03.15.05 SPECIFICATIONS

There are no Harbor Department Master Specifications for Terminal Planning

03.15.06 PERMITS/APPROVALS

There are no permits required for this section. However, tenants will have to approve the terminal layout on the plans.

03.15.07 ENVIRONMENTAL CONSIDERATIONS

Sustainable Development guidelines, the Port's Clean Air Action Plan, current environmental regulations will have to be incorporated in the planning.

03.15.08 REFERENCE DRAWINGS

There are no reference drawings for this section.

04 BUILDINGS

04.01 GENERAL

04.01.01 OVERVIEW

This section contains the following information related to the preparation of building general contract drawings:

- Cover Sheet
- Title Sheet
- Project Notes
- Site Plan
- Coordinate Control Plan
- Phasing Plan

04.01.02 DESIGN CRITERIA

Building Address

The building address shall be noted prominently on the drawings (particularly on the title sheet) and the same address used for Bldg. & Safety permits. The address shall be assigned by Public Works if numbered off of a dedicated street. Otherwise the assignment is made by the Permits Section of the Port.

Building Ties

The building location shall be tied to the coordinate control map.

04.01.03 CALCULATIONS/WORKSHEETS

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

04.01.04 GRAPHIC CRITERIA

Cover Sheet

This sheet contains the title, specification number, signatures, and stamps.

Title Sheet

This sheet contains the title information including the project name, vicinity map, index (drawing numbers/names, standard plans, and reference drawings), general project notes (with abbreviations and general legend), and the vicinity map. It consists of the following information:

1. Standard title sheet and text indicating index information, project notes, abbreviations, general legend, and project site location arrow/information for vicinity map.

2. Vicinity map of the entire harbor area.

3. Appropriate vicinity map text.

4. Water area shading.

General notes and building data (area, occupancies, building type and required parking) could be on the Title Sheet or on a subsequent sheet.

Site Plan

This sheet includes a general summary of the proposed project including all improvements, project boundaries, and contractor storage yard.

Coordinate Control Plan (if necessary)

This information may be included on the site plan. This sheet indicates distance and bearings on the site. Additional information that could be included are project boundaries, notes (including Survey Field Book references, zone used, and last survey date), coordinate control information, metes and bounds description of each line (distance and bearing), property and lease lines if applicable, and pier-head line.

04.01.05 SPECIFICATIONS

There are no Harbor Department Master Specifications related to this section.

04.01.06 PERMITS/APPROVALS

Design criteria must comply with the latest City of Los Angeles Building Code.

04.01.07 ENVIRONMENTAL CONSIDERATIONS

Buildings must comply with the City's Green Buidlding Policy and must integrate POLA's Sustainability Guidelines. Buildings with at least 7,500 SF of floor area must be designed to achieve a rating level of silver.

04.01.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2114 Evergreen Terminal Redevelopment, Marine Buildings

LAHD Standard Plans

04.02 ARCHITECTURAL

04.02.01 OVERVIEW

This section contains information related to the preparation of the following architectural contract drawings:

- Title Sheet
- Site Plan
- General or Project Notes
- Disabled Access Sheet
- Floor Plan
- Dimension Plan
- Roof Plan
- Exterior Elevations and Details
- Building Sections and Details
- Enlarged Plans
- Wall Sections
- Reflected Ceiling Plan
- Interior Elevations and Details
- Finish Schedules
- Door Schedules
- Window Schedules
- Miscellaneous Details

04.02.02 DESIGN CRITERIA

Coordination

It is the responsibility of the architect to coordinate architectural designs with mechanical, plumbing, structural, electrical, and other disciplines to ensure compatibility.

General Design Requirements

1. Code - All buildings shall be designed to conform to the requirements set forth in the City of Los Angeles Building Code, Latest Edition, including requirements of the American Disability Act.(ADA)

2. LEED - Buildings shall abide to the requirements of the highest certification levels available to the project, set forth in the Leadership in Energy and Environmental Design's (LEED) environmental standards of the United States Green Building Council. When given the option to choose a material that is compliant to LEED standards as opposed to a non-compliant material, the LEED product will be chosen even in buildings that are not to be certified. See POLA Green Building Policy for buildings needing LEED certification (POLA Green Building Policy).

3. Parking lots or structures shall provide appropriate spaces as required by the code relative to the building occupancy. The plan shall show access in and out. Driving lanes identified as one or two-way access. The plans shall note lights, details of space sizes, and wheel stops (if used). The plans shall have examples of spaces for handicap, vans, compact, full size, etc.

4. Site Conditions - The construction documents shall indicate all existing physical site conditions. New construction shall be identified and fully dimensioned. Site information shall comply with industry standards.

   a) Provide Title

   b) Provide North Arrow

   c) Provide Scale

5. New Building Design - New buildings shall be designed considering economy, quality of materials, constructability, and ease of maintenance,. They shall be constructed as stipulated in item 2 "LEED".

6. Building Components - Building components shall be selected that are available without delay from manufacturers' standard catalogs, if possible. All products shall have City of Los Angeles “Research Report Numbers.”

7. Local Manufacturers - The use of manufacturers that are local to the Southern California region is preferred whenever possible (for availability and maintenance). Note: Materials from manufacturers within a 500 mile radius is a LEED standard.

8. Construction - Construction costs (within funding available for project) shall be maintained consistent with good design standards and construction practices, with specific consideration given to:

   a) Judicious allocation of space.

   b) Economical circulation patterns.

   c) Judicious selection of interior/exterior materials consistent with the type and function of the structure.

   d) Sprinkler systems shall be installed throughout all buildings.

   e) Life expectancy of 50 years with maintenance and operational costs consistent with the use of the building. Buildings shall conform to LEED standards of life cycle cost design.

   f) Conditional use requirements.

   g) Energy conservation as a part of LEED standards.

9. Standard Plans and Details - Standard plans and details if available (of the City of Los Angeles Bureau of Engineering and the Port) shall be used where applicable and approved by permitting authorities.

10. Building Drawings - Building drawings should include all construction within 10 feet of the building perimeter.

11. All buildings shall have their adjacent exterior flat areas slope away from the building’s face, as required by code.

Roofs

1. Colors of exposed roof material shall comply with “cool-roofs” standards when appropriate. Provide solar reflectance index of 78 for sope equal to or greater than 2:12, 29 for slopes less that 2:12.

2. Flat roofs shall have a minimum slope of 1/4 inch to 1 foot for drainage and provide overflow drains.

3. Parapets shall be a minimum of 18” above finished roof with cant strips.

4. Roof drains shall include overflow drains designed by Port standards.

5. All roof machinery such as HVAC equipment should be provided with appropriate crickets for drainage.

6. All roof projections such as stack vents shall be designed by industry standards so as not to leak within the interior of the building.

7. Metal roofs are allowed but must be Energystar color for roofs greater than 2:12.

8. All large mechanical roof equipment should be covered from view by screens.

9. All roof equipment shall be designed with vibration and sound isolators. Provide equipment pads when necessary.

10. Flat roofs shall have paths with protective padding to roof-mounted equipment.

Exterior Finishes

General

Care in design and construction is essential for windows and doors to prevent leakages.

Stucco

1. Stucco finish shall be as required by architectural design and approved by Chief Harbor Engineer.

2. Control joints must be spaced at not more than 10 feet on center.

3. Stucco beads shall be used at stucco termination and corner beads shall be used.

4. Colors shall be selected by the architect and approved by the Chief Harbor Engineer

.

Other

1. Metal finishes shall comply with industry standards for durability relative to Port environment.

2. Sidings shall comply with industry standards for durability relative to Port environment.

Windows

General

1. Window Cleaning - Windows shall be designed so that interior and exterior glass surfaces (including those in multi-story buildings) may be economically cleaned from the ground or from an OSHA-approved platform system.

2. Operable Windows - An option for window design/layout arrangement shall include operable windows in case of H.V.A.C. breakdown in a sealed building envelope.

3. Window Screens – Windows shall have interior window screens to offset glare at various times of the day.

Framed Windows

1. Design of the windows shall not allow leaks around the frames

2. Sealants shall be installed such that no leakage will occur.

3. Wndow finishes shall be Kinar finishes or better to resist local pollutants

Curtain Walls

1. The curtain wall frames shall be designed with Kynar finish.

2. Design shall clearly mandate that installed seals and sealants will not allow leakage to occur. Installers shall not stretch the insulation during construction

Doors

Frames

1. Metal frames shall be galvanized and painted.

2. Metal frames shall be installed before the wall is constructed.

3. In such buildings where wood frames are allowed they shall be weather resistant in exterior environments.

Rating

1. Doors shall be rated as per code.

2. Doors in exterior environments shall be weather resistant.

Hardware

1. Standard hardware shall be lever handled to meet ADA requirements.

2. Panic hardware shall comply with code requirements.

3. Locks shall be bolt latch for exterior doors and when required for interior doors.

4. Hinges shall be 5 knuckles.

5. Hinges shall be weather resistant to be approved by the Port.

Interior Finishes

Walls/Ceilings

1. Interior finishes shall contain low volatile organic compounds (VOC) and shall contain recyclable materials whenever possible. This includes gypsum board and ceiling tiles.

2. Paints shall have low VOC of not more than 50g/L for flats and 150g/L for non-flats.

Ceramic Tiles Finishes

1. For Walls- Glazed, Duraglazed or other approved materials.

2. Toilets shall have a minimum of 5'-0" high wainscot of ceramic tile on the fixtures wall and at least 4'-0" long on the perpendicular wall where the fixture is less than 3'-6" from the perpendicular wall..

3. Toilets, Kitchens, Janitor Closets, and any rooms that require the use of water shall use waterproofing per current industry standard.

Floors

1. Carpets shall comply with LEED recommendations, VOC should be not more.than 5g/L.

2. Tiles including adhesives shall comply with SCAQMD Rule No. 1168,.

3. Ceramic Tiles shall be unglazed porcelain type (with adhesive finish in wet locations).

4. Ceramic Tile bases shall be coved unless approved by the Chief Harbor Engineer.

Casework

1. Material selected shall be low VOC emitting, such as composite wood.

2. When case work shall be made of wood, design shall conform to the requirements of the WoodWork Institute (W.I.). Grades shall be determined per project by CHE.

3. Countertops of easement in kitchens or toilets shall have coved, 4" high minimum backsplashes.

Concealment

All pipes, vents, and related equipment shall be located in the interior building walls, furred spaces, or yard wall, whenever possible. The materials identified may be exposed if allowed by code and design cosideration warrants it to be exposed.

Separate Rooms

A building shall have separate rooms for mechanical, electrical equipment, and elevator rooms.

Approval of Materials and Colors

Samples of all materials and color swatches shall be submitted for approval during conceptual design and no later than design development.

Roof Gutters

A screen shall be placed over roof gutters.

Paving Adjoining a Building

For paving adjoining a building, the slope away from the building shall be as required by building codes.

- Isolation joints shall be detailed to indicate separation between paving and building footing.

Rooms

All rooms within a building shall be numbered, and labeled with room titles.

Door Frames

New door frames in masonry or concrete shall generally be of a type that can be installed before the wall is constructed.

Door Closers

Door closers (surface mounted) shall be installed a minimum of 6 inches away from any wall or other obstruction to avoid the closer striking the wall.

Cement Plaster

1. Control joints spaced at not more than 10 feet on center each way shall be used when specifying cement plaster.

2. Use medium Dashcoat or request approval from Chief Harbor Engineer for alternative style.

Summary of Port Building Types

1. Container Terminals

    a) Terminal Administration Building

    b) Mechanic and Repair Building

    c) Crane Maintenance Building

    d) Driver's Service Building

    e) Marine Operational Buildings

    f) Longshoremen Toilet

    g) Guard Houses

    h) Checker Booths

    i) Roadability Inspection Buildings

2. Cruise Terminals

    a) Cruise Terminal Buildings

    b) Guard Houses

    c) Storage Buildings

3. Marina Facilities

    a) Marina Operations Building

    b) Chandleries (Optional as an independent building)

    c) Boater's Toilets and Showers

d) Dry Storage (of Boats)

e) Boater's Storage

f) Boat or Yacht Repair Buildings

g) Launch Ramps or Cranes

4. Recreational

a) Sit Down Restaurants (Various Size)

b) Trinket Shops

c) Fast Food Restaurants

d) Boat Rentals

e) Public Toilets

f) Museums

g) Historic Buildings

h) Catalina Ferry Terminal Building

i) Aquariums

5. Miscellaneous Buildings

a) Port Administration Buildings

b) Construction and Maintenance Buildings

c) Testing Laboratories

d) Construction and Maintenance facilities, i.e., shops: carpentry, machine, paint, plumbing, etc.

e) Machine Building (Large Footprint Buildings with small operator population.

f) Large Storage Sheds

g) Red Car MAintenanace and Museum Building

NOTES:

1. Port Buildings can be of all occupancies except residential.

2. Port Buildings can be of all construction types.

Landscape

For landscape at buildings and irrigation criteria, see section 03.09, Landscape Plans.

Programming

1. Checklist - The designer should use the Architectural Programming (criteria at end of this section) at the onset of the conceptual design phase and before preparing schematic drawings, to ensure that all appropriate data has been collected and analyzed (including that from the Port).

2. Occupant Involvement - The proposed building occupant must be a prime participant in the programming.

3. Growth - The programming must take growth/expansion into account.

Schematic Drawings

1. Analysis of Project Requirements - The designer shall analyze the project requirements using the approved program (stated above in "Programming" and approved by the Chief Harbor Engineer) as a guide. Following this, the designer shall translate the schematic design elements in terms of the program objectives, identify innovative and advanced techniques, and incorporate these concepts into the building design.

2. Schematic Drawing Contents - Schematic drawings shall include:

   a) Diagrammatic plans of the site.

   b) Plans of the floors.

   c) Elevations.

   d) Cross-sections.

e) Perspective sketches and other sketches to illustrate the project program (alternative or additional sketches shall be prepared if requested by the Chief Harbor Engineer). Estimates of the approximate construction cost for each scheme shall be submitted with the scheme.

f) Computations of the required floor space, parking, yard, and other areas necessary for the proposed uses.

g) All studies necessary to illustrate any special problems of space utilization.

h) Approximate size, shape, and number of stories of the building.

i) Approximate arrangements of the floor space.

3. During the schematic design LEED goals shall be established through a target workshop by an authorized sustainable workshop.

4. Color boards of materials, exterior and interior shall be submitted. The Engineer shall approve color boards prior to completion of design development phase.

5. A finished scale model of Port buildings shall be submitted. The scale model shall be constructed of wood or some other durable material.

Design Development Phase

1. Plans and Specifications. Preliminary plans and specifications (in the design development phase) shall be complete enough to resolve all matters that materially affect the cost of the project and to assure compliance with all applicable standards and codes. This would include compliance with the code requirements relative to building, zoning, and planning as well as any other applicable governmental requirements. See the Graphic Criteria section for information that should be included on the appropriate plans.

2. Fixtures: In the design development phase, all fixtures (plumbing, electrical, etc.) must be specified.

3. Consultant architect shall finalize materials palette and provide specifications and “manufacturers cuts”.

4. Consultant architect shall finalize and approve both interior and exterior lighting fixtures.

04.02.03 CALCULATIONS/ WORKSHEETS

Calculations and worksheets are not applicable to architecture with the exception of cost estimates noted below (Revised). Title 24 calculations are provided by Mechanical and Electrical Engineers. From the information they provide, such elements as the size, type, and performance of the window is determined and wall assemblies are prepared.

Structural Engineers provide structural calculations for the permitting process.

Estimates

Class “C” estimate shall be prepared by the project architect at the conceptual design stage.
Class “ B” estimate shall be prepared by the project architect at the design development stage.
Class “A” estimate shall be prepared by the Specifications/Special Projects Section based on Quantity Take-Off (QTO) prepared by the project architect

04.02.04 GRAPHIC CRITERIA

Graphics are to be determined by design of the specific building design. Generically the signage shall be Helvetica or Roman C type caps and small fonts.

The signage shall be readable within 10 feet of its position to the viewer without eyeglasses necessary, except for persons with limited vision. The background shall be of a contrasting color to the lettering. Interior and exterior signage shall comply with POLA requirements and be submitted to the Chief Harbor Engineer for approval.

Architectural Programming Checklist

This checklist is for use at the onset of the conceptual building design phase and before preparing schematic drawings, to ensure that all appropriate data has been collected and analyzed. The information in those items indicated with an "*" are to be initially established by the appropriate Harbor Department representatives.

1. UTILIZATION DETERMINATIONS: Determine with the Harbor Department staff the utilization of proposed services and facilities.

2. CIRCULATION PATTERN: Establish internal and external public circulation patterns that affect movement of staff, equipment, materials, and all related supplies.

3. SPACE ALLOCATIONS: Review program space allocations.

4. PLAN REVIEW: Review regional, local, and redevelopment agency plans, correlating those programs with the project, if applicable.

5. LEGAL REQUIREMENTS: Consult with governing authorities concerning codes and regulations affecting the design.

6. GROSS SQUARE FOOTAGE: Determine gross square footage for the total building in relation to net space requirements.

7. BUILDING SYSTEMS: Initiate study of applicable building systems such as structural, mechanical, electrical, plumbing, material handling, elevators, floor-to-floor relationships, and all major building components.

8. BUILDING MATERIALS: Research building materials.

9. SEISMIC REQUIREMENTS: Review and investigate seismic requirements.

10. SYSTEMS PHILOSOPHY: Develop systems philosophy which parallels results of the engineering and architectural program study.

11. DISCIPLINE RESTRICTIONS: Investigate the restrictions applicable to each discipline due to available utilities or conditions of the site and other components of the redevelopment area. Make recommendations to avoid interference with the program development.

12. SYSTEM REQUIREMENTS: Conduct a preliminary investigation of building transportation, material handing, waste handling, communication, and security system requirements.

13. SUSTAINABLE REQUIREMENTS: In compliance with the standards required by the City of Los Angeles, all buildings shall aslso comply with the POLA Green Building Policy Resolution for all LEED certification requirements.

a) In addition, buildings that are less than 7,500 square feet, when choosing between a LEED certified product or another, then the consultant shall choose the LEED product.

b) Specification Writers and Construction Managers shall determine the certification goals of the project and the LEED Program.

14. COST EFFECTIVENESS: Maximize cost effectiveness by considering structural, mechanical, and electrical design -- particularly such combinations as optimum column spacing, floor-to-floor height, flooring requirements, and the like.

15. ECONOMICS TEST: Produce final test of structural, mechanical, and electrical concept economics.

16. PERSONNEL REQUIREMENTS: Establish the personnel/staffing requirements necessary for the operation and maintenance of the project with the Harbor Department staff.

17. UTILITIES: Determine on-site and off-site utility requirements for the project. Analyze on-site storage and energy generation requirements. Finalize utility availability with serving companies.

18. AVOIDING CONSTRUCTION DELAYS. To avoid major delays during construction, investigate optimum method of multi-phasing construction and or preordering long lead time mechanical/electrical equipment.

04.02.05 SPECIFICATIONS

The following divisions in the Harbor Department Master Specifications (POLA Master Specs) are related to architectural (other sections may be required, depending on the project):

DIVISION	DESCRIPTION
03	Concrete
04	Masonry
05	Metals
06	Wood and Plastics
07	Therman\l and Moisture protection
08	Openings
09	Finishes
10	Specialties
12	Furnishing
13	Special Construction

DIVISION	DESCRIPTION
32	Exterior improvements

Remodeling/Demolition

When remodeling or demolishing an existing building, the designer should reference the Harbor Department Master Specifications section 02.

04.02.06 PERMITS/APPROVALS

The following permit and approvals may be required when there is architectural work:

Fire Department Approval

Building architectural designs must be approved by the Fire Department prior to submission for a City of Los Angeles Department of Building & Safety permit.

Department of Building & Safety Permit

Building architectural designs must be approved by City of Los Angeles Department of Building & Safety through the plan check process, including zoning where necessary (Revised). Once plans are approved, a permit may be obtained (see following two paragraphs for special fees which may be applicable). During the design phase, a variance must be obtained for any building feature that does not meet the City of Los Angeles Building Code. Sub-approvals shall also be obtained from the Disabled Access Division of City of Los Angeles Department of Building & Safety and the Fire Department (see above). As part of the City of Los Angeles Department of Building & Safety permit approval, signoffs may be required from the Bureau of Engineering, Department Of Transportation., and the Planning Department.

Coastal Permits

Coastal Permits are available from the Port of Los Angeles Planning Department. All projects must conform to the Harbor Department's Master Plan.

Artwork and Art Development Fee

In accordance with the City of Los Angeles Ordinance Nos. 166724 and 166725, the Arts Development Fee (administered by the Cultural Affairs Department and collected by City of Los Angeles Department of Building & Safety during the permitting process) requires all new building projects to provide arts and cultural amenities for the employees, owners, and users of the development. The fee shall be equal to a maximum of 1% of the building permit valuation. On applicable projects, the consultant shall be responsible for coordinating the artist selection process and the art work with the project and with the Cultural Affairs Department.

School Development Fee

The School Development Fee is administered by the Los Angeles Unified School District and collected by City of Los Angeles Department of Building & Safety during the permitting process. If the building is publicly owned and operated, this fee SHOULD NOT be paid, as the Harbor Department is entitled to a waiver of the fee.

Cultural Affairs Commission

The architectural design of a project shall be submitted to the Los Angeles City Cultural Affairs Commission a minimum of 2 times (for schematic and final review and approval of aesthetic merit) or as required by contemporaneous standards. On larger projects, 4 submittals may be required (conceptual, schematic, preliminary, and final). The 100% contract drawings shall confirm and be a part of the final submittal. The qualities considered important (and on which the project is judged) include:

1. The design style of the building (or building complex) is expressive of its function and true to the nature of the activities it contains.

2. The materials used are of the best quality available within the budget and are appropriate to the character of the architecture.

3. The project takes into account its context and considers the buildings, streets, and the landscape that surround its boundaries.

4. Individual structures within the project relate to one another in compatible design styles, with all details of design relating to the overall character of the architecture.

5. Landscape creates pleasant environments both for people who may work in the project area and for those who pass by or visit.

04.02.07 ENVIRONMENTAL CONSIDERATIONS

The environmental considerations of the Port are to exceed the standards of the Title 24 program. The LEED program is an earnest goal of the Port. The goals are to achieve the following:

1. Prepare the buildings to resist heat lakes that increase air conditioning uses.

2. Prepare the building to contain heating services during the colder periods of the area by specifying properly sealed materials.

3. Prepare the building to maintain the health of the users by choosing healthy interior products.

4. Prepare the building to resist increased services from the Municipal Utilities.

5. Prepare the building to not waste potable water, particularly in landscaping, and moving waste products.

6. Prepare the building to not pollute water facilities such as the channels, inlets, and the ocean.

7. Choose materials and equipment that are recycled, sustainable and non-toxic (if practical).

8. Choose energy efficient lighting systems, mechanical systems, appliances and machinery.

9. Prepare the building to receive optimal daylighting and views while maintaining a minimal solar heat gain.

04.02.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2114Berth 225-232, Evergreen Terminal Redevelopment, Buildings Gate Facilities

1-2114 PM A1	Site Plan
1-2114 M T,2	General or Project Notes

1-2114 M T-1	Title Sheets
1-2114 M T-3	Handicap Notes
1-2114 M T-3.1	Handicap Notes
1-2114 M T-3.2	Handicap Notes
1-2114 M T-4	Abbreviations
1-2114 PM A1	Floor Plan
1-2114 A-A4 to A8	Dimension Plan
1-2114 PM A2	Roof Plan
1-2114 A-3	Exterior Elevations
1-2114 A-4	Building Sections and Details
1-2114 A-A17 & 18	Wall Sections
1-2114 PM A-2	Reflected Ceiling Plan
1-2114 PM A-5	Interior Elevations and Details (Trolley Plans are included)
1-2114 PM A-7	Door Details
1-2114 PM A-6	Finish Schedules
1-2114 PM A-6	Door Schedules
1-2114 PM A-6	Window Schedules
1-2114 PM A-8	Window Details
1-2114 PM A-10, A-13	Miscellaneous Details
1-2114 PM A-9	Roof Details
1-2114 PM A-11	Ceiling Details

LAHD Standard Plans

04.03 MECHANICAL

04.03.01 OVERVIEW

This section contains the following information related to the preparation of building mechanical contract drawings:

- Mechanical Schedules and Legend (M)
- Floor Plan (M)
- Roof Plan (M)
- Control Diagrams and Sequence of Operations (M)
- Section Views (M)
- Mechanical Details (M)

04.03.02 DESIGN CRITERIA

General Design Requirements

The designer shall meet all applicable regulations, standards, and guidelines of:

1. Latest Energy Efficiency Standards for Residential and Non-Residential Buildings, California Energy Commission (current edition). Forms verifying certification of compliance to these standards shall be a part of the drawings.
2. American Society of Heating, Refrigeration, and Air Conditioning Engineers (A.S.H.R.A.E.).
3. City of Los Angeles Mechanical Code.

Concealment

All pipes, conduits, vents, ducts, and related equipment shall be located inside of the building (concealed or in furred spaces) or yard wall, unless otherwise authorized by the Chief Harbor Engineer.

Plan Preparation

The following information shall be on mechanical plans:

1. Weight of every piece of equipment in excess of 200 lbs.
2. Equipment schedule, capacities, design criteria, etc.
3. Control diagram to coordinate with the specified sequence of operation.
4. Duct and appurtenant fitting layout, sizes, hangers, insulation, and flexible connection.
5. Type, size, and flow through of supply outlets and return inlets..
6. References to architectural drawings (wherever appropriate) such as reflected ceiling plans, roof plans, etc.

Outside Air

A minimum outside air shall be provided per the latest Los Angeles Building Code and California Energy Efficiency Standards. Not all spaces within a building may require conditioned air. Building and Safety shall be contacted regarding air conditioning for questionable spaces.

Design Temperatures

The maximum ambient summer temperature shall be 84°F dry bulb and 69°F wet bulb, with a minimum winter temperature of 40°F. Inside temperature shall be 78°F minimum for cooling and 70°F for heating. Relative humidity shall be within the comfort zone per A.S.H.R.A.E.

Face Velocity

Maximum face velocity through the heating coil shall be 800 FPM. Where applicable on central systems, the maximum face velocity through the cooling coil shall be 450 FPM.

Heat Pumps

Heat pumps shall be used for H.V.A.C. systems requiring 20 tons or lower, unless otherwise authorized by the Chief Harbor Engineer.

Filter

The filters shall be high efficiency/performance types designed to meet specifically installed equipment with a minimum 35% efficiency as determined by the National Bureau of Standards test.

Diffusers and Registers

Diffusers and registers shall match with the ceiling pattern and shall have separate or integral smudge rings (consult with the architect). Exact locations of diffusers, registers, etc. shall be as indicated on the reflected ceiling plan of the architectural drawings.

Air Duct System

1. Low Velocity - A low velocity air duct system shall be employed, with the maximum main duct air velocity of 1200 FPM and the maximum pressure drop in branch ducts of 0.08 inches per 100 feet.

2. In Open Areas -Ducts in open areas shall be rectangular.

Temperature Control

The building shall be divided into thermostatically controlled zones for maximum temperature control.

Thermostats

All thermostats shall be secured to prevent indiscriminate resetting.

Solar Energy

The designer shall address solar energy for feasibility and application.

Energy Storage

Energy storage shall be considered as a means for handling heating and air conditioning peak loads without creating corresponding peak demands on the utility (also as a tool in downsizing H.V.A.C. equipment).

Materials/Equipment

1. Sources - The designer shall provide a list showing three sources for all major equipment and major materials.

2. Approval - The designer shall secure Los Angeles City approval for all materials and equipment or shall obtain a variance from the appropriate authorities in a timely manner to avoid delaying construction.

30% Design Documents

At the 30% Review, the designer shall provide the following:

1. General layout of the system proposed -- including total loads, single line drawings, and schematic diagrams showing the general arrangement of mechanical piping systems and equipment.

2. Drawings -- including a large scaled plan and sections of the equipment room showing dimensions of all the equipment, ductwork, duct insulation, space for servicing equipment (with doors of sufficient size to admit the largest piece of equipment), and other necessary items which would take up appreciable space.

3. A separately bound volume designated as Mechanical Calculations (see Calculations Preparation)..

Equipment Arrangements/Installations

All equipment arrangements and installations shall be designed for safety, ease of operation, maintenance, and repair.

Equipment Location & Screen/Enclosure Design

Equipment location and screen/enclosure design shall be verified with the architect.

Mechanical Checklist

The designer should use the Mechanical Checklist in 04.03.09 to ensure that the drawings and specifications have been prepared carefully and clearly articulate the scope/intent of the job and the responsibility of the contractor in producing a satisfactory mechanical system.

04.03.03 CALCULATIONS/WORKSHEETS

Calculations Preparation

A separately bound volume designated as Mechanical Calculations shall be prepared by the designer at the time of the 30% review (or submittal). They shall meet the requirements of the California Energy Commission (as included in Title 24) and shall include all supporting data, rationale (system and equipment selection, engineering considerations, and life cycle cost), and calculations including, but not limited to, the details specified below:

1. Heat Gain and Loss Calculations -- for the building and/or room, as appropriate.

2. Pressure Drops Calculations -- for pump and compressor selection.

3. Equipment Losses Calculations -- duct, equipment, and other losses for fan selection.

4. Water Capacity and Pressure Calculations -- water capacity of pipe/equipment, as well as pressures used for system design and for expansion tank selection.

5. Gas and Liquid Pressure Drops Calculations -- for direct expansion refrigeration systems, gas and liquid pressure drops shall be provided across major components and gas velocity to return oil for hot gas and suction risers.

6. Water Heater Calculations -- capacity and makeup requirements.

7. Heat Exchanger Calculations -- temperature, flow, capacity, and heat rejection rates.

8. Single Line Schematic Diagram -- indicating load balance and/or heat balance, including the temperature, flow, and pressure gradient for all

mechanical system design. Diagrams shall contain the complete system component schematic to show how the system works.

9. The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

04.03.04 GRAPHIC CRITERIA

1. Site plan
2. Mechanical Floor Plan
3. Mechanical Roof Plan
4. Section plan
5. Legend
6. Control Diagrams and Sequence of Operations
7. Details

04.03.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications relate to mechanical:

SECTION TITLE
Heating, Ventilation, and Air Conditioning

04.03.06 PERMITS/APPROVALS

The permit listed below may be required when there is building mechanical work.

Building and Safety Permit

A mechanical plan check is required. The mechanical permit may be secured by the installer or contractor once the plans have been approved.

04.03.07 ENVIRONMENTAL CONSIDERATIONS

Specify using reduced ozone depletion or zero use of CFC-based refrigerants for new building. When reusing existing HVAC systems, conduct an inventory to identify equipment that uses CFC refrigerants and adopt a replacement schedule for these refrigerants.

Design an IAQ performance system to prevent the development of indoor air quality problems in building. Meet the minimum requirement of standard ASHRAE 62-1999 or local code whichever is more restrictive.

Design and install a permanent carbon dioxide CO2 monitoring system.

Design an effective delivery and mixing of fresh air HVAC system to support the safety, comfort, and well-being of occupants.

Design the building with occupant controls for airflow, temperature, and lighting for both perimeter and non-perimeter spaces.

Design separate exhaust and plumbing systems for rooms with contaminants to achieve physical isolation from the rest of the building.

Develop a construction IAQ management plan for the construction phase and before occupancy.

Specify Low-VOC materials in construction documents. Ensure that VOC limits are clearly stated in each section where paints, adhesives, and sealants are addressed.

Provide fundamental building systems commissioning.

04.03.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2325A Berths 93A&B – World Cruise Center Renovation

1-2325 M-1 Mechanical Legend, Notes & Schedules

1-2325 M-6 Mechanical Partial First Floor Plan

1-2325 M-13 Mechanical Roof Plan

1-2325 M-18 Mechanical Details

1-2325 M-23 Mechanical Controls

1-2325 M-24 Mechanical Controls & Sequence of Operation

1-2325 M-25 Mechanical Title 24

LAHD Standard Plans

04.03.09 Building Mechanical Checklist

Requirements

1. Plan check and permits
2. Scope of work
3. Intent
4. Approvals
5. Equipment deviations
6. Codes, rules, permits, and fees
7. Surveys and measurements
8. Drawings
9. Coordination with other trades
10. Protection/safety
11. Scaffolding, rigging, and hoisting
12. Material and workmanship
13. Noise criteria
14. Accessibility
15. Waterproofing/sealing at roof penetrations

16. Guarantee
17. Abbreviations
18. References
19. Definitions
20. Shop Drawings
21. Equipment design and installation
22. Equipment supports, foundations, and stands
23. Pipe sleeves
24. Escutcheons and plates
25. Spare parts
26. Motors, motor controls, and electrical work
27. Concrete work
28. Testing
29. Cutting and patching
30. Painting
31. Excavation and backfill
32. Access doors
33. Operating instructions
34. Others

Heating, Ventilating, Air Conditioning, & Refrigeration

1. Scope of work
2. Design criteria

3. Shop drawings
4. Pipes and fittings
5. Pipe hangers and supports
6. Valves, strainers, traps, and specialties
7. Thermometers and pressure gauges
8. Expansion joints
9. Orifice plates and flowmeters
10. Boilers and burner units
11. Boiler feedwater systems
12. Pressure reducing stations
13. Refrigeration equipment
14. Cooling towers
15. Heat exchangers
16. Water-circulating pumps
17. Condensate water pump
18. Air separators
19. Expansion tanks
20. Fuel-oil transfer pump
21. Water treatment equipment and systems
22. Direction radiation
23. Air conditioning units
24. Heating and ventilating units

25. Heating coils
26. Air filters
27. Fans
28. Unit heaters and cabinet unit heaters
29. Fan-coil units and thermal units
30. Flexible connections
31. V-belt drivers and belt guards
32. Acoustical treatment
33. Vibration treatment
34. Ductwork
35. Dampers and access doors
36. Diffusers, registers, and grilles
37. Thermal insulation
38. Temperature control systems
39. Motors, motor controllers, and electrical work
40. Motor control center

04.04 PLUMBING

04.04.01 OVERVIEW

This section contains the following information related to the preparation of the following plumbing contract drawings:

- Plumbing Legend, Schedules, & Notes (PL)
- Site Plan (PL)
- Plumbing Plan - Subfloor (PL)
- Plumbing Plan - Floor (PL)
- Plumbing Plan - Roof (PL)
- Riser Diagrams (PL)
- Plumbing Details (PL)

04.04.02 DESIGN CRITERIA

Jurisdiction

The area considered to be "building plumbing" is everything inside of or within 5 feet of the building.

General Design Requirements

The designer shall meet all applicable regulations, standards, and guidelines of (latest edition):

1. City of Los Angeles Plumbing Code.
2. Uniform Plumbing Code, International Association of Plumbing and Mechanical Officials.
3. California Energy Efficiency Standards

Concealment

All pipes, conduits, vents, ducts, and related equipment shall be located in the interior building walls, furred spaces, or yard wall, unless otherwise authorized by the Chief Harbor Engineer. Any equipment requiring servicing (e.g., clean outs, water hammer arrestors) shall be made accessible.

Meters and Devices

The designer shall coordinate the location of water meters and backflow prevention devices with D.W.P. (and with the Port, if the designer is a consultant).

Riser Diagrams

Waste, water, and gas piping riser diagrams shall indicate pipe sizes, fixtures, fixture units (GPM or CFH), and the slope at each section.

Copper Pipes Penetrating Concrete

Copper pipes penetrating through concrete shall be provided with sleeves to prevent contact between pipe and concrete.

Sewer Clean Outs

1. Grade. No sanitary sewer clean out shall be lower than grade.

2. Spacing. The maximum straight line distance between clean outs along straight runs is 50 feet in buildings and 100 feet in yard areas; each bend requires an additional clean out.

Toilet Rooms

Toilet rooms shall have 4 air changes per hour or 50 cfm per water closet or urinal, whichever is more cfm.

Automatic Trap Primer

1. Requirements - Each floor sink or floor drain trap shall be provided with automatic trap primers.

2. Accessible - Automatic trap primers must be accessible for service.

Hot Water Recirculating Pumps

When considering use of hot water recirculating pumps, the distance between fixtures needing hot water and the hot water source should be reviewed to determine the necessity for such pumps.

Materials/Equipment

1. Sources - The designer shall provide a list showing three sources for all major fixtures, equipment, and materials.

2. Approval - The designer shall use City of Los Angeles Bldg. & Safety approved materials and equipment, whenever possible, or shall obtain a variance from the appropriate authorities in a timely manner to avoid delaying construction.

3. Ductile Iron - Ductile iron, Class 52, manufactured per A.W.W.A. C151, shall be used for underground pipes at least 4 inches in diameter. The pipes shall double cement mortar lined push-on joints, Class 52.

4. Steel - Steel, Schedule 40, and manufactured per A.S.T.M. 139-90 with flanged joint, shall be used for above ground pipes at least 4 inches in diameter.

5. Copper - Pipes 3 inches and smaller shall be copper, Type L, with silver solder joints.

30% Design Drawings

At the 30% review, the designer shall provide the following:

1. General layout of the system proposed -- including schematic diagrams showing the general arrangement of plumbing piping systems and fixtures.

2. Drawings -- including a large scaled plan and sections of the equipment room showing all the equipment, piping, piping insulation, space for servicing equipment (with doors of sufficient size to admit the largest piece of equipment), and other necessary items which would take up appreciable space.

3. Plumbing calculations (see 04.04.03 below).

Equipment Arrangements/Installations

All equipment arrangements and installations shall be designed for safety and ease of operation, maintenance, and repair.

Plumbing Checklist

The designer should use the Plumbing Checklist (in 04.04.09) to ensure that the drawings and specifications have been prepared carefully and clearly spell out the scope/intent of the job and the responsibility of the contractor in producing a satisfactory plumbing system.

04.04.03 CALCULATIONS/WORKSHEETS

Calculations and worksheets for pipe sizes, flows, and pressures shall be prepared.

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

04.04.04 GRAPHIC CRITERIA

1. Site plan
2. Floor piping plan
3. Section plan
4. Riser diagram
5. Plumbing Legend
6. Details

04.04.05 SPECIFICATIONS

The following section in the Harbor Department Master Specifications relate to building plumbing (other sections may be required, depending upon the project):

SECTION TITLE
Building Plumbing

The specifications for plumbing shall also conform with rules and regulations of the City of Los Angeles Plumbing Code.

04.04.06 PERMITS/APPROVALS

The permit listed below may be required when there is plumbing work:

Building and Safety Permit

A plumbing plan check is required. The plumbing permit shall be secured by the installer or contractor once the plans have been approved.

04.04.07 ENVIRONMENTAL CONSIDERATIONS

Design water system that uses 30% less water than the water use baseline calculated for the building after meeting the Energy Policy Act of 1992 fixture performance requirements.

Specify high-efficiency fixtures to reduce consumption of municipal water and wastewater volumes.

Specify high-efficiency irrigation technology or use captured rain or recycled site water to reduce potable water consumption for irrigation by 50% over conventional means.

Specify Low-VOC materials in construction documents. Ensure that VOC limits are clearly stated in each section where paints, adhesives, and sealants are addressed.

04.04.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2325A Berths 93A&B World Cruise Center Renovation

1-2325A P-1	Legend, Abbreviations, Calculation, & Notes
1-2325A P-2	Site Plan

1-2325A P-5	First Level Partial Plumbing Plan
1-2325A P-10	Second Level Enlarged Plumbing Plan
	NO ROOF PLAN FROM THIS PROJECT
1-2325A P-12	1st Level Hot & Hold Water Piping Isometric Plan
1-2325A P-17	Plumbing Details

LAHD Standard Plans

04.04.09 BUILDING PLUMBING CHECKLIST

Requirements

1. Plan check and permits
2. Scope of work
3. Intent
4. Approvals
5. Equipment deviations/variances
6. Codes, rules, permits, and fees
7. Surveys and measurements
8. Drawings
9. Coordination with other trades
10. Protection/safety
11. Scaffolding, rigging, and hoisting
12. Material and workmanship
13. Accessibility
14. Waterproofing/sealing at roof penetrations

15. Guarantee
16. Abbreviations
17. References
18. Definitions
19. Shop Drawings
20. Existing services
21. Pipe sleeves
22. Trap primers
23. Insulation
24. Pipe supports
25. Escutcheons and plates
26. Spare parts
27. Concrete work
28. Testing
29. Cutting and patching
30. Painting
31. Excavation and backfill
32. Access doors
33. Operating instructions
34. Others

04.05 STRUCTURAL

04.05.01 OVERVIEW

Contents

This section contains the following information related to the preparation of building structural contract drawings:

- Structural General Notes (S)
- Typical Details (S)
- Floor Framing Plan(s) (S)
- Roof Framing Plan (S)
- Lateral Resisting Frame Elevations (S)
- Foundation Plan (S)
- Structural Frame and Details (S)
- Sections and Details (S)
- Miscellaneous Details (S)

04.05.02 DESIGN CRITERIA

Basis of Design

Calculations and drawings shall include the basis of design, such as:

1. Design criteria.
2. Loading.
3. Material properties.
4. Seismic Design Requirements.

5. Applicable codes, including the latest edition of the City of Los Angeles Building Code.

6. Results of geotechnical reports (e.g., foundation requirements, spread footings, mat foundations, and pile foundations).

7. Special Design Requirements.

Seismic Design Basis

A report shall be prepared stating the basis for the seismic design. This report shall be submitted to the Chief Harbor Engineer for review and conditional approval. Included in the report shall be:

1. A statement of general seismic design philosophy in narrative form.

2. All the required information as listed in Recommended Lateral Force Requirements ("Blue Book"), Chapter 1, Section A.4, prepared by the Seismology Committee of the Structural Engineers Association of California (latest edition).

3. Sketches, as required.

Geotechnical Reporting

A geotechnical report is required for all building structures in accordance with Chapter 18 of the City of Los Angeles Building Code. The extent of the geotechnical investigation is determined by the size and complexity of the project and the requirements of the City of Los Angeles Department of Building & Safety.

Framing

1. Loads. Framing shall be designed to accommodate both service and construction loads.

2. Roof Slope. Roofs shall have a minimum slope of ½ inch to 1 foot. The framing design is to achieve the minimum slope.

3. Lateral Resist Framing System. Design and detail lateral framing system to accommodate.

Structural Members

Structural members and their connections shall be shown on plans and detailed as designed.

Dimensions

Structural members and connections shall be dimensioned to show the system will connect properly.

04.05.03 CALCULATIONS/WORKSHEETS

There are no calculations or worksheets provided for this section. The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

Computer Calculations

All calculations shall be submitted in the format described in Recommended Lateral Force Requirements ("Blue Book"), Seismology Committee of the Structural Engineers Association of California.

04.05.04 GRAPHIC CRITERIA

Structural sheets shall be prepared per POLA's AutoCad manual and must have the following sheets:

1. Structural General Notes – should include specific design criteria and specifications regarding materials and sizing and shall have these major headings: general conditions; concret (all concrete penetrations shall be shown); reinforcing steel, structural steel and miscellaneous metals; metal deck; abbreviations; and design criteria.
2. Foundation Plan – this sheet should show building column lines and numbers, proposed foundation with all dimensions, foundation details for every different condition, size, tyoe of footing and appropriate schedules.
3. Framing Plans (Roof/Floor) – this sheet should contain building outline and interior walls; column lines and numbers; proposed framing plan showing member sizes and spacing, as well as weights, if steel, or reinforcing steel, all concrete penetrations; all dimension and materials.
4. Structural Rigid Frame Elevations – this sheet should indicate the specialized framing elevations referenced from framing plans.
5. Sections and Details – this sheet shoul show structural frame and appropriate details

6. Sections and Details – This sheet should include information regarding the manner of construction abd materials.
7. Typical Details – This sheet should include any particular specialized structural details necessary for construction clarification.

04.05.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications relate to building structural (other sections may be required, depending on the project):

SECTION TITLE
Steel Pipe Piles
Precast Concrete Piles
Concrete Reinforcement
Cast-In-Place Concrete
Precast Concrete
Nonshrink Concrete Mortar
Lightweight Insulating Concrete
Concrete Block Masonry
Treating Damaged Galvanizing
Structural Steel
Steel Decking
Metal Fabrications
Metal Stairs

Building Code

The specifications for the structural aspect of buildings shall conform to the rules and regulations of the latest City of Los Angeles Building Code.

04.05.06 PERMITS/APPROVALS

The permit listed below may be required when there is building structural work:

Department of Building & Safety Permit

A City of Los Angeles Department of Building & Safety pregrading inspection report is required. Building structural designs must also be approved by City of Los Angeles Department of Building & Safety through the plan check process. Once the plans have been approved, the permit may be obtained.

04.05.07 ENVIRONMENTAL CONSIDERATIONS

For new buildings, materials for protection of structural members shall be per existing codes, rules and regulations.
For existing buildings, coatings of structural members that will be disturbed shall be properly identified to ensure that hazardous materials are not present. If hazardous materials are identified, the plans should indicate the removal of the materials before any structural work is undertaken.

04.05.08 REFERENCE DRAWINGS (Typical structural plans)

The following contract drawings are identified for reference:

1-2211 Pier 400 Buildings and Gate Facilities Phase 1/Group 2

- 1-2211 TS-S1 General Notes
- 1-2211 TS-S4 Typical Details (Concrete)
- 1-2211 TS-S7 Typical Details (Masonry)
- 1-2211 TS-S9 Typical Details (Steel)
- 1-2211 TS-S13 Typical Details (Metal Deck)
- 1-2211 TS-S17 Typical Stair Details

1-2211 Container/Truck Wash Ramp (CTWR)

- 1-2211 CTWR-S1 Foundation Plan
- 1-2211 CTWR-S2 Roof Framing Plan
- 1-2211 CTWR-S3 Building Section
- 1-2211 CTWR-S34 Sections and Details

LAHD Standard Plans

04.06 ELECTRICAL

04.06.01 OVERVIEW

This section contains the following information related to the preparation of building electrical contract drawings:

- Electrical Notes, Symbols, and Abbreviations (E)
- Electrical Site Plan (E)
- Floor Plan - Lighting (E)
- Floor Plan - Power and Communication (E)
- Roof Plan (E)
- Single Line Diagram and Panelboard Schedules (E)
- Electrical Details (E)

04.06.02 DESIGN CRITERIA

Required Services

Check whether any of the following are required:

1. Public address (P.A.) service.
2. Telephone system.
3. Computer system.
4. Uninterruptable power supply system (UPS).
5. Electrical fire protection.
6. Emergency generator.
7. Electrical service and wiring for landscape.
8. Structured data wiring system.

9. Security system.

10. Video system.

11. Cable T.V.

General Design Requirements

Electrical design shall be in compliance with the latest edition of the City of Los Angeles Electrical Code.

Department of Water and Power Service Utility Vault Requirements

Utility vault requirements shall be transferred in full to the contract drawings.

Grounding Pull Box Covers

1. Detail - Detail for grounding pull box covers shall be shown as required by Bldg. & Safety.

2. Maintenance Hole Covers - Maintenance hole covers do not have to be bonded to the ground as long as the ring is metallic and bonded. If the ring is concrete, then the cover must be bonded (decision made by Principal Electrical Inspector at Department of Building & Safety).

Electrical Panelboard/Switchboard

When specifying an electrical panelboard and/or switchboard, the designer shall ensure that the following can be fitted into the specified panelboards:

1. Each separate individual breaker.

2. The sum total of all breakers.

Panelboard Schedule

A separate electrical panelboard schedule shall be shown for each and every panelboard, even if they are identical. Each panelboard shall also be identified by its own unique name.

Fire Alarm Circuit

When tapping service conductors for the fire alarm circuit, the following shall be specified: double lugs for the panelboard main, one lug for the service conductor, and another lug for the fire alarm conductor.

Wiring

1. Landscape Irrigation System - The conduit and wire system shall be used for wiring controllers in the landscape sprinkler system. Direct Burial Type wiring is not acceptable.

2. Materials/Sizing - Wiring shall be copper unless otherwise directed by the Chief Harbor Engineer. Circuit conductors shall be copper with Type THHN/THWN insulations, 600V. rating for each conductor. Equipment grounding conductors shall be sized adequately to withstand short circuits.

3. Concealment - Conduit shall be concealed unless otherwise directed by the Chief Harbor Engineer.

4. 4-Wire Systems - Neutral wire size shall be the same as the phase wires.

Outdoor Lighting

1. Type and Size - The type and size (size is typically a maximum of 30 feet) of lighting immediately adjacent to a building should be a joint decision between the Port's architect and the electrical designer. This does not apply to high mast light poles.

2. Open Spaces - If there are large open spaces between and around buildings, consideration should be given to also using some 100 foot light poles.

3. Exterior - Exterior lighting shall be High Pressure Sodium. The most energy efficient fixtures and lamps should be used.

4. Photocell/Timeclock - Outside lighting shall be controlled by a photocell and timeclock.

Interior Lighting

1. Type - Interior lighting shall be fluorescent except as otherwise authorized by the Electrical Engineer.

2. Diffusers/Lenses - Diffusers and lenses shall be 100% virgin acrylic.

3. Ceiling Fixtures - The exact location of the ceiling light fixture pattern shall be as indicated on the reflected ceiling plan of the architectural drawings.

4. Lighting Support - Lighting support shall meet Bldg. & Safety earthquake standards.

5. Locations to Avoid - Lighting fixtures shall avoid locations of sprinklers, air conditioners, and heaters.

6. Lamp Ballasts - Fluorescent lamp ballasts shall be High Power Factor class "P" rated. High Pressure Sodium lamp ballasts shall be High Power Factor.

7. Recessed Fixtures - Recessed fixtures over the ceiling shall permit access to allow for relamping (this note should be added to walls on architectural drawings).

Single Line Diagram

1. Short Circuit Analysis - A short circuit analysis shall be done of all electrical systems, stating all available short circuit currents on the single line diagram for all switchboards, panelboards, and any major equipment used.

2. Inclusions - Single line diagrams shall indicate all of the items mentioned in 03.13.04 for the Single Line Diagram and Panelboard Schedules.

3. Arc Flash Hazard Analysis – An arc flash hazard analysis shall be done of the entire electrical system stating the arc flash ratings, and boundaries for all switchboards, panelboards and any major electrical power distribution equipment used.

Distribution Centers

1. Duct System - An underfloor duct system shall be utilized (terminating in distribution centers).

2. Location - Distribution centers shall be located to avoid door swings.

Concrete Pads

Switchboards and motor control centers shall be supported on raised concrete pads. Pads shall be detailed in structural drawings.

Switches/Coverplates

1. Wall Switches - Wall switches should be used rather than pull chains.

2. Oversized - All switch and outlet coverplates shall be oversized.

Floor Outlets

All floor outlet locations shall be dimensioned.

Underground Service & Feeder Runs

Underground service and feeder runs shall avoid obstructions such as tanks and footings.

Meter Sockets

Meter sockets are rated a minimum of 10,000 AIC. The specified rating of meter sockets must not be less than the available short circuit.

Main Breakers

When no single main breaker exists, there shall be no more than six breakers at any panel-board.

Schedules

A minimum of two schedules should be included with the building electrical plans -- a lighting fixture schedule and a panelboard schedule.

Light Fixture Schedule Callout Sample

Each drawing reference shall be complete and stand alone. The following is an example of how references should be made (with an incorrect sample in parentheses, if appropriate):

1. Fixture type "A" = indicate fixture type. H.P.S. (high pressure sodium) lamps.

2. Fixture type "B" = indicate fixture type. H.P.S. lamp (rather than "similar to 'A,' except with one 400W. H.P.S. lamp").

3. Fixture type "C" = indicate fixture type. Metal Halide lamps (rather than "similar to 'B,' except with metal Halide lamps").

4. Fixture type "D" = indicate fixture type. Metal Halide lamps (rather than "similar to 'C,' except 30 foot pole and 2 Metal Halide lamps").

Conduits

1. Location - No changes from the design of horizontal, vertical, or underground conduit shall be made without first obtaining permission from the Chief Harbor Engineer. The contractor's "as-built" prints must show all changes in conduit positioning and depth.

2. Materials:

   a) All underground conduits shall be non-metallic PVC unless noted and installed in accordance with code requirements.

   b) The terminating 10 feet of all nonmetallic conduits (measured from the finished surface) shall be rigid metal conduit with bonded 40 mil P.V.C. coating manufactured by KORKAP, CARLON, or an approved equal.

   c) All PVC conduits shall be Schedule 40, unless otherwise noted.

3. Underground Conduit Bends:

   a) All underground conduit bends, except at the termination of a conduit run, shall be Schedule 80.

   b) In installing nonmetallic PVC conduits underground, all bends of 30 degrees and over shall be Schedule 80.

4. Minimum Depth - The minimum depth of direct burial conduits shall be 3 feet, 6 inches from the finished surface, unless otherwise noted.

5. Grounding - The contractor shall ground all electrical equipment and conduit systems to meet code requirements.

6. Buried Stub-Outs - All underground conduit buried stub-outs shall be furnished with concrete monuments 6 inches x 6 inches x 15 inches deep buried flush with the finished surface over the capped ends and a 3 inch square brass plate identifying the number and sizes of conduits.

7. Detection Tape - Detection tape shall be used over all conduits.

Metal Nameplate

A metal nameplate shall be provided for all electrical equipment. The nameplate shall provide equipment operating parameters.

Ground Fault Protection

Ground fault protection shall protect circuit line wiring from line to ground short circuiting with a response time documented by calculations.

480V. Panelboard

When installing a 480V service, the incoming service and the panel board voltage rating shall be 277/480V, 3 phase, 4-wire.

Bus Bars

Panelboard/switchboard bus bars shall be of copper.

04.06.03 CALCULATIONS/WORKSHEETS

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

04.06.04 GRAPHIC CRITERIA

1. Notes, Symbols, Key Map, Abbreviations.

2. Overall Electrical Site Plan.

3. Single Line Diagram, Load Schedules, Worst Case Voltage Drop Calculations.

4. Power Plans (Show power plan for each floor starting from very base floor up to the roof. Show each floor's power plan on separate sheet.)

5. Roof electrical plan.

6. Lighting Plans (Show lighting plan for each floor starting from very base floor up to the roof. Show each floor's lighting plan on separate sheet.)

7. Fixture Schedule, Lighting System Details.

8. Communications Plans (Show communication plan for each floor starting from very base floor up to the roof. Show each floor's communication plan on separate sheet. Show telephone and data system design, main telephonel/data room and backboard.)

9. Communication Riser Diagram.

10. Fire Alarm System Plans (Show Fire Alarm System plan for each floor starting from very base floor up to the roof. Show each floor's Fire Alarm System plan on separate sheet.)

11. Fire Alarm Fire Diagram and Battery Calculations.

12. Miscellaneous Electrical Details – Switchgear elevation, pull box details, grounding details, underground conduit section, and underground conduit stub up detail.

13. Panel Schedules.

14. Title 24 energy calculations and compliance forms.

04.06.05 SPECIFICATIONS

The following is a sample list of the Harbor Department Master Specifications which relate to building electrical design. Other sections may be required, depending upon the project:

SECTION TITLE

Basic Electrical Materials and Methods
Rigid Galvanized Steel Conduit
PVC Conduit
600 Volt or Less Wiring System
Outlet, Junction and Pull Boxes
Transformers
Service Meter
Low Voltage Switchboard
Grounding Systems
Panelboard
Outdoor Lighting Fixtures

04.06.06 PERMITS/APPROVALS

The permits/approvals listed below may be required when there is building electrical work:

Department of Water and Power Approval

The designer is responsible to coordinate with and secure approval from D.W.P. for the type of service and the service location. Subsequently, the contractor shall obtain approval for the service panelboard, switchboard, meter, or any equipment installation necessary for electrical service. The D.W.P. design engineer shall be notified two working days in advance of construction.

Building and Safety Permit

1. Energy Calculations. Energy calculations must be approved (for all applicable areas in compliance with California Administrative Code, Title 24, for energy conservation standards).

2. Electrical Equipment. All electrical equipment must be approved by Bldg. & Safety or a variance obtained.

3. Plan Check. An electrical plan check is required (Plan check requirements are per Electrical Code). Some examples of when a plan check is required are as follows:

   a) Total square footage of a new building exceeds 15,000 square feet, and load exceeds 42 KVA.

   b) A disconnecting means exceeding 600 amperes.

c) The additional loads exceed 600 amperes.

d) Space is conditioned over 1,000 square feet (heated/air conditioned).

e) When building occupancy requires an electrical emergency system.

f) When high voltage (greater than 600V.) is required for electrical service.

4. Permit. The electrical permit may be secured by a C-10 contractor once the plans have been approved.

04.06.07 ENVIRONMENTAL CONSIDERATIONS

1. Use light glare control measures and equipment wherever practical to reduce light spillage.

2. Minimize use of flood light fixtures and instead utilize down light fixtures with the total cutoff feature.

04.06.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2575 Berths 90-91 Temporary Cruise Terminal Baggage Handling Building

1-2575 E-1	Electrical Notes, Symbols, and Abbreviations
1-2575 E-2	Electrical Site Plan
1-2575 E-3-5	Floor Plan - Lighting
1-2575 E-6-8	Floor Plan - Power and Communication
1-2575 E-12-13	Single Line Diagram and Panelboard Schedules

1-2107A Banning's Landing Project

1-2107A E-11	Roof Plan
1-2107A E-12	Electrical Details

1-2450 Berths 225-232 Evergreen Terminal Admin Office Modification

1-2450 E-6 Title 24 Calculations & Compliance Forms

LAHD Standard Plans

04.07 FIRE PROTECTION SYSTEM

04.07.01 OVERVIEW

This section contains the following information related to the preparation of fire protection system contract drawings:

- Automatic Fire Sprinkler System Site Plan (FP)
- Automatic Fire Sprinkler System Plan (FP)
- Automatic Fire Sprinkler System Section and Details (FP)

04.07.02 DESIGN CRITERIA

General Design Requirements

The designer shall meet all applicable regulations, standards, and guidelines of (latest edition):

1. City of Los Angeles Plumbing Code.
2. National Fire Protection Association (N.F.P.A. 13 and other standards cross-referenced by N.F.P.A. 13) -- in hydraulic design of the system.
3. City of Los Angeles Fire Code.

Materials

All materials shall be U.L. listed or be tested and approved by City of Los Angeles Department of Building and Safety. It shall be the responsibility of the designer during the plan check period to obtain a variance from Bldg. & Safety for those materials specified which do not meet either of these requirements.

Pipes

1. Underground. Underground pipes 4 inches and larger shall be ductile iron, Class 52, manufactured per A.W.W.A. (American Water Works Association) C151, and shall be specified to be lined with cement mortar.

2. Above Ground. All above ground pipes shall be steel, Schedule 40, and manufactured per A.S.T.M. (American Society for Testing and Materials) 139-90.

3. Friction Losses. Pipe friction losses shall be determined on the basis of Hazen & Williams' formula or an approved fire sprinkler calculation method.

4. Wet-Pipe System. A wet-pipe system shall be used. The exception is in cold storage and freezer buildings and where expensive and water sensitive electrical equipment is present, where the following is used instead:

   a) In cold storage and freezer buildings -- a double interlocked, supervised, dry system with deluge valve controlled by an electric release system and pneumatic system pressure.

   b) In presence of high-value and water sensitive electrical/electronic equipment, the most effective of the following may be considered: clean agent fire extinguishing systems, dry chemical systems, foam systems, or halogenated hydrocarbon systems.

Corrosion Protection

1. Piping Encasement. Underground piping shall be provided with corrosion protection by use of polyethylene film encasement in full accordance with A.W.W.A. (American Water Works Association) C105, "Polyethylene Encasement for Ductile Iron Piping for Water Standards."

2. Termination. Corrosion protection shall terminate no less than 12 inches above the adjacent finished surface.

Valves

1. Buried. Buried valves shall be resilient wedge gate, N.R.S. (non-rising stem), and shall be provided with a post indicator or a position indicator when it is impractical to use the former.

2. Above Ground. Above ground valves for fire protection shall be gate valve, O.S.&Y. (outside screw and yoke) type, or butterfly valve.

3. Value Supervision. Valves shall be supervised open by an alarm system, which will cause the sounding of an audible signal at a constantly attended location.

Water Supply

Sprinkler systems shall be supplied with water from D.W.P. mains, either directly or through existing backland mains. The designer shall request an S.A.R. (Service Advisory Report) from D.W.P. for the pertinent point of connection at their mains -- to be used in the hydraulic calculations.

Plan Submission

The designer shall provide two sets of plans that have been approved by Bldg. & Safety before installation starts. At least one of the sets shall bear the original stamp of approval. The rest may be copies.

04.07.03 CALCULATIONS/WORKSHEETS

The designer shall prepare the hydraulic calculations at the same time as the submission of the approved plans, prepared per (and on worksheets similar in form to) N.F.P.A. 13.

04.07.04 GRAPHIC CRITERIA

1. Site plan
2. Fire Sprinkler Floor Plan
3. Roof Plan
4. Section plan
5. Legend
6. Details

04.07.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications relate to buildings (other sections may be required, depending upon the project):

SECTION TITLE
Fire Protection

04.07.06 PERMITS/APPROVALS

The permit listed below is required when there is fire protection system work:

Building and Safety Permit

A plan check is required of fire protection system plans. The plumbing permit shall be secured by the installer or contractor once the plans have been approved.

Fire Sprinkler System Checklist

Requirements

1. Hazard classification of occupancy
2. Classification of automatic sprinkler system to be used
3. Source of water (From S.A.R.from DWP)
4. Alarm valves
5. Pressure gauges
6. Pipes, valves, fittings, and types of joints
7. Pipe hangers, braces, and fasteners
8. Sprinkler heads
9. Supervisory switches
10. Water motor and gong
11. Plan check
12. Hydraulic calculations

13. Backflow preventer
14. Automatic sprinkler riser
15. Fire Department connection
16. Inspector's test valve
17. Control valve and post indicator

04.07.07 ENVIRONMENTAL CONSIDERATIONS

Specify fire suppression systems that use no HCFCs or Halons.

Specify Low-VOC materials in construction documents. Ensure that VOC limits are clearly stated in each section where paints, adhesives, and sealants are addressed.

04.07.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2325A Berths 93A&B World Cruise Center Renovation

1-2325A FP-1	Fire Protection Abbreviation, Legend, Notes, Symbol, and Site plan
1-2325A FP-10	1st Level Existing and Proposed Enlarged Fire Protection Plan
1-2325A FP-12	Fire Protection Elevation Plan
1-2325A FP-13	Fire Protection Details

LAHD Standard Plans

04.08 REMOVALS AND DEMOLITION

04.08.01 OVERVIEW

This section contains the following information related to the preparation of removals and building demolition contract drawings:

- Building Demolitions and Removals

04.08.02 DESIGN CRITERIA

General

1. Determine building(s) to be demolished.
2. Determine all items to be removed, salvaged, and/or relocated.
3. Verify existing conditions and substructures (using as-builts, field investigations, and/or survey).
4. Clearly indicate/identify limits of removal.

Coordination

Coordination is required with the following:

1. Customers, utility owners, agencies, other contractors, project site tenant(s), and adjacent tenants.
2. POLA Divisions: Construction & Maintenance and Construction Management, Real Estate, Environmental Management, Risk Management, and Wharfingers.
3. Utility owners: DWP, Gas Co., Pacific Bell, and Wharfingers for utility disconnects.
4. Risk Management and Environmental Management for hazardous removals (asbestos abatement, hydrocarbon contaminated material)
5. Pacific Harbor Lines (PHL), when in the vicinity or within 10' of the tracks.

Salvage

Identify salvage items (requires prior coordination/request with C&M), include delivery location, contact person and phone number.

Salvaged asphalt concrete & unreinforced concrete rubble: deliver to the Department stockpile site per specification section BUILDING DEMOLITION AND REMOVALS.

Building Demolition

Clearly identify and describe the building and all items within the building and project limits to be demolished and/or removed, including footings/foundation, if applicable. Provide:

1. Address
2. Size (square feet)
3. Type of building material
4. Number of stories
5. Reference drawing numbers
6. Method of demolition (as required by B&S)
7. Determine/indicate if protection fence and/or canopy is required (by B&S)
8. Request for asbestos and lead based paint survey/report
9. Unreinforced Masonry Building. When demolishing an unreinforced masonry building, the designer shall prepare detailed demolition drawings (per City of Los Angeles Department of Building & Safety requirements) to a preferred scale of 1/4" = 1'0".

Removals: Container Terminal Backland, Wharf, Roadways, Miscellaneous Areas

Refer to 03 BACKLAND, 05 Removals and Existing Substructures

Historical Assessment

The Project Manager shall request the E.M.D. to perform an historical assessment on any existing facility at least 50 years old or of potential historical significance.

Disposal

1. Asphalt Concrete and Unreinforced Concrete. Coordinate with Construction Management for the disposal at the Port's stockpile site per Specifications.

2. Hazardous Waste-Disposal of all hazardous waste material shall be coordinated with the Risk Management and Environmental Management Divisions. The waste material shall be disposed of at an approved disposal site off Port property. Each project is evaluated for remediation on a case by case basis.

3. Items not to be salvaged or re-used shall be disposed of off Port property.

Environmental/Hazardous Materials

Suspected Contamination - An Environmental Site Assessment and Characterization must be done prior to demolition if the project area has suspected contamination.

1. Asbestos Abatement

2. Lead Based Paint

3. Contaminated Soil, Hydrocarbon Impacted Soil, and/or Water

4. Creosoted Timbers/Piles

5. Molds: Identified as those that are considered long-term health threat

04.08.03 CALCULATIONS/WORKSHEET

There are no calculations or worksheets provided for this section.

04.08.04 GRAPHIC CRITERIA

Not Applicable.

04.08.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications relate to building demolition and removal (other sections may be required, depending upon the project):

SECTION TITLE
Summary of Work
Coordination
Regulatory Requirements
Solid Resources Management
Excavation Safety Requirements
Basic Site Materials and Methods
Building Demolition and Removals
Selective Site Demolition
Asbestos Abatement
Lead Abatement

Department of Building & Safety

Building Code (www.ladbs.org go to "Reports, Codes, & Publications", then "Information Bulletins"): LABC Chapter 33 Demolition of Buildings (Document P/BC 2002-039, formerly RGA 1-73) P/BC2002-039

Standard Specifications for Public Works Construction "Greenbook"

5	Utilities
7-8	Project Site Maintenance
306-5	Abandonment of Conduits and Structures

04.08.06 PERMITS/APPROVALS

The permits listed below may be required when there is substructure and removal work:

Army Corps. of Engineers Permit

Army Corps - Removal Permit is required when work is done in their jurisdiction (any land area in the tidal zone up to M.H.H.W. [Mean Higher High Water]).

Department of Public Works (P.W.) Permit

Sewer cap permit, the City of Los Angeles [Department of P.W.Bureau of Engineering,], must approve the sewer capping plans. Harbor Department credit will be established for the sewer facility charge.

Department of Building & Safety Permit

A plan check is required after obtaining the Sewer Cap Permit. Once approved, the Demolition Permit may be obtained. (C-21 License is required).

Hazardous Materials Permits

The removal and disposal of hazardous materials and wastes shall be in accordance with current regulatory requirements (e.g., A.Q.M.D., Fire Department, E.P.A., etc.). They vary depending upon the type of hazardous materials or wastes involved.

04.08.07 ENVIRONMENTAL CONSIDERATIONS

Not Applicable.

04.08.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2343 Berth 142 Union Ice Building Demolition and Site Improvements.

1-2343 R-1 Substructure, Demolition and Removal Plan

05 WHARF

05.01 General

05.01.01 OVERVIEW

This section contains information related to the preparation of the following wharf general contract drawings:

Cover Sheet (T)[1]
Title Sheet (T)
Coordinate Control Plan (CC)
Phasing Plan (C)
Dredging Plan (C)
Backfill and Shoring Protection Plan (C)

05.01.02 DESIGN CRITERIA

Dredging Slope

Typically, the maximum dredging slope is 2 1/4 horizontal to 1 vertical. This is subject to verification by the geotechnical report.

Orientation of Wharfs on Plans

Generally, the wharf shall be shown on the plan in such a way that the water-side is on the top of the drawing.

05.01.03 CALCULATIONS/WORKSHEETS

There are no wharf general calculations or worksheets provided for this section. The designer is, however, required to submit approximate dredge quantity calculations for the US Army Corps of Engineers application. Final dredge quantity calculations shall be prepared for the final plan/specifications review (or submittal).

Estimating

[1] The drawing number (with letter designations) is defined under 02.04 of these Guidelines

There are no estimating worksheets provided for this section. The cost impact of "phasing" a project is normally included in the unit and lump sum cost of specific facility estimates. Dredging, backfill, and shoring estimates are included in the Basic Wharf.

Design wharf section as follows:

1. Dredging -- by cubic yard (Marine Work).
2. Backfill -- by cubic yard (Earthwork).
3. Shoring -- by linear foot (Earthwork).

05.01.04 GRAPHIC CRITERIA

Cover Sheet

This sheet consists of one layer and contains the title, specification number, and initial signatures and stamps.

Title Sheet

This sheet contains the title information including the project name, vicinity map, index (drawing numbers/names, standard plans, and reference drawings), general project notes (with abbreviations and general legend), and the vicinity map. It consists of the following layers:

1. Standard title sheet and text indicating index information, project notes, abbreviations, general legend, and project site location arrow/information for the vicinity map.
2. Vicinity map of the entire harbor area.
3. Appropriate vicinity map text.
4. Water area shading.

Site Plan

This sheet includes an abbreviated general summary of what exists on the site after removals and what the overall results of the project are going to be. It consists of the following layers:

1. Base map (site plan) -- without text.

2. Main proposed surface improvements (site plan) -- without text.

3. Project boundaries, contractor storage yard, and areafill -- with text.

Coordinate Control Plan

This sheet includes the project boundaries, and consists of the following layers, that indicate distance and bearings on the site parcel:

1. Base map (site plan) -- without text.

2. Main proposed surface improvements (site plan) -- without text.

3. The,field notes include Field Book references, zone used, and last survey date, as well as coordinate control information, such as: coordinates; metes and bounds description of each line (distance and bearing); property and lease lines; and pierhead lines.

Phasing Plan

This sheet consists of the following layers:

1. Base map (site plan) -- without text.

2. Main proposed surface improvements (site plan) -- without text.

3. Project boundaries, phasing boundaries, temporary fencing, contractor storage area, and areafill -- with text.

Dredging Plan

This sheet consists of the following layers:

1. Elevations and contour lines -- without additional text.

2. Wharf outline, pierhead line, and shore facilities -- with text.

Backfill and Shoring Protection Plan

This sheet consists of one layer -- with text.

Line Style

Refer to the Port's CADD manual for line style for wharf general drawings.

05.01.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications relate to wharf general (other sections may be required, depending on the project):

SECTION TITLE
Coordination
Regulatory Requirements
Excavation Safety Requirements
Earthwork
Dredging
Rock

05.01.06 PERMITS/APPROVALS

A US Army Corps of Engineers Permit is required whenever there is dredging done. This and all other permits needed for wharf work are included in the Basic Wharf Design section.

05.01.07 ENVIRONMENTAL CONSIDERATIONS

Creosoted piles shall not be used.

05.01.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-1500 Berths 174-176 Wharf Improvements

1-1500 C-1 Cover Sheet

1-1500 C-4 Site Plan

1-1500 CC-5 Coordinate Control Plan

1-1500 C-6 Dredging Plan

1-1500 C-7 Backfill and Shoring Protection

1-1190 Berth 206 Container Wharf Extension

1-1190-1 Title Sheet[2]

1-1466 Wharf Improvements - Berths 218 - 221

1-1466 C-3 Site and Construction Phasing Plan

[2] The drawing number for the title sheet per the CADD manual should be T-2 with T-1 being the cover sheet

05.02 BASIC WHARF DESIGN

05.02.01 OVERVIEW

This section contains guidelines for the design of concrete wharf structures including embankment and dike construction, dredging, and ancillary features.

Wharfs for services other than container traffic should follow similar guidelines as appropriate. These guidelines must be adjusted and approved by the Chief Harbor Engineer (CHE) for project specific conditions of new wharfs and wharf upgrades and repairs.

05.02.02 DESIGN CRITERIA

General Guidelines for Concrete Wharfs

The following general wharf design guidelines are based on the most current wharf design at the Port of Los Angeles. The only exception to the application of these guidelines is that in the event that adjustments to these criteria are required for a specific site or berth design (due to changes in the most current engineering practices, standards, and/or specific site conditions), the Chief Harbor Engineer must approve such modifications. These guidelines shall apply to:

1. All design, construction, reconstruction, rehabilitation, and/or repair of existing and future concrete wharf structures in the Port.

2. The repair of earthquake-damaged concrete wharfs, regardless of whether batter piles or vertical piles are currently providing the lateral force resisting system to resist the effects of seismic ground motions.

Codes

Wharf design shall conform to the codes, standards, and/or requirements listed below (using the most current editions). In cases of conflict between codes, the most restrictive requirement (as interpreted by the Chief Harbor Engineer) shall govern the design. The designer shall present any conflicts in codes, standards, or guidelines to the Chief Harbor Engineer for discussion and resolution. The list of requirements includes:

1. Port of Los Angeles – the latest adopted version of the POLA Code for Seismic Design, Upgrade and Repair of Container Wharfs.

2. Concrete -- Building Code Requirements for Reinforced Concrete, ACI 318, American Concrete Institute, with the following additional requirements:

   a) The minimum concrete cover over reinforcement shall be 3 inches for prestressed concrete piles, wharf beams and slabs, and all concrete placed against soil.

   b) The cast-in-place concrete used in wharfs shall have a minimum ultimate strength of f'c = 5000 PSI at 28 days and a maximum water/cement ratio of 0.40.

   c) The concrete used in precast piles shall have a minimum ultimate strength of f'c = 6500 PSI at 28 days and a maximum water/ cement ratio of 0.38.

3. Structural steel -- Steel Construction Manual, American Institute of Steel Construction (A.I.S.C.).

4. Distribution of wheel loads -- Bridge Design Specifications, A.A.S.H.T.O.

5. Welding -- Structural Welding Code - Steel (A.W.S. D1.1) and Structural Welding Code - Reinforcing Steel (A.W.S. D1.4), American Welding Society.

6. Timber -- National Design Specifications for Wood Construction.

7. For items not covered in Nos. 1-6 above -- City of Los Angeles Building Code. For any items not covered in this Code, design criteria and standards should be based on current accepted engineering practice related to the design of marine terminals.

Special Moment Resisting Frame

The wharf shall typically be designed as a special moment resisting frame supported by vertically driven reinforced piles. The piles are connected to the wharf as an integral part of the special moment resisting frame. No batter piles shall be used unless special provisions are made to ensure ductility to the satisfaction of the Chief Harbor Engineer. This frame is specially detailed to provide ductile behavior as described in “The Port of Los Angeles Code for Seismic Design, Upgrade and Repair of Container Wharves”.

Erosion Control

A sufficiently deep cutoff wall (or other means) shall be provided along the back of the wharf to prevent erosion of backland materials by tidal action or other waterside disturbances under the wharf. The slope beneath the wharf shall be protected from erosion by the placement of appropriately sized riprap (or by other approved means).

Dike or Cut Slope

The dike or cut slope beneath the wharf shall be designed to withstand the same seismic forces as the wharf structure. It shall retain the soil behind the slope under the design earthquake loading.

Flexible Connections

Flexible connections shall be provided where utilities pass from the backland through the cutoff wall or other rigid structure at the back of the wharf.

Project Description/Site Conditions

The structural designer shall supply a short description of the new construction as part of the conceptual design, including a description of the existing site conditions and how they influence proposed construction.

Ship Characteristics

Information on ship characteristics is provided in 07.01 to assist in:

1. Calculating forces on the fendering system.
2. Determining bollard pull.
3. Designing berth length and width between berths.
4. Selecting cranes with adequate outreach and height.

Geotechnical Report

1. Site Specific. The structural designer shall request a site specific geotechnical report (signed by a registered geotechnical engineer):

   a) As the basis for the foundation and seismic design of the wharf.

   b) To provide information on safe and economical dike or embankment construction, pile driving, and dredging.

2. Coordination. Coordination with the geotechnical requirements for the backland design is required.

Design Assumptions

The Harbor Department has jurisdiction over the structural design of the wharfs and the geotechnical design of the dikes or embankments. The City of Los Angeles Department of Building & Safety will review and approve electrical, mechanical and grading work. This Department will also coordinate special design requirements with the Harbor Department for all wharfs that support buildings with public occupancy. The California State Lands Commission has jurisdiction for the design of liquid bulk wharfs (oil terminals).

1. Basis of Design - The Engineer of Record (designer) should prepare a “Basis of Design” document (codes, design criteria, loadings, etc.) prior to commencing the conceptual design. Any requirements not specifically called out in these guidelines will be determined by the CHE and should be incorporated in the “Basis of Design” document.

2. Project Description/Site Conditions - The structural designer should supply a short description of the new construction as part of the conceptual design, including a description of the existing site conditions. Particular attention should be given to the construction phasing as required by the port, the tenant or by technical requirements. A site specific geotechnical report is required for the design. The Port of Los Angeles (POLA) will provide site specific seismic hazard criteria to the designer (Portwide Groundmotion and Palos Verdes Fault Study).

3. Loading - The wharf should be designed for the maximum equipment and cargo loading as well as for the maximum berthing and mooring loads likely to be imposed on the structure over its economic life.

4. Changing Design Requirements - Port requirements for container wharfs are constantly evolving, particularly regarding ship size, container cranes and seismic requirements. The wharf designer should take into account how new requirements may affect the design criteria.

5. Wharf Foundation:

   a) Erosion Control: A sufficiently deep cutoff wall (or other means) should be provided along the back of the wharf to prevent erosion of backland materials by tidal action or other waterside disturbances under the wharf. The slope beneath the wharf should be protected from erosion by the placement of appropriately sized riprap (or by other approved means). The cutoff wall should not be part of the lateral force resisting design.

   b) Dike or cut slope: The dike or cut slope beneath the wharf retains the soil under static and seismic conditions and should have a minimum static safety factor of 1.5. For the seismic design of dikes or cut slopes see POLA Code For Seismic Design, Upgrade, And Repair Of Container Wharfs.

6. Flexible Connections - Flexible connections should be provided where utilities pass from the backland through the cutoff wall or other rigid structures at the back of the wharf.

7. Ship Characteristics - New wharfs should be designed to accommodate 9100 TEU vessels. Ship characteristics are provided in Section 07.01 and are for information only. Ship data provided by the customer should control the design. Ship characteristics are provided to assist in:

   a) Calculating the required energy and reaction for the fendering system.

   b) Determining bollard pull.

   c) Selecting the required berth length.

   d) Selecting cranes with adequate outreach and height.

Guidelines for Concrete Wharfs for Container Operations

Structural Systems

The structural designer shall use the following criteria when designing the wharf structural systems:

1. Wharf -- designed as a special moment resisting frame.

2. Wharf Deck -- two-way flat plate.

3. Foundation -- open field piles.

4. Piling -- 24 inch octagonal precast, prestressed concrete, or equivalent square pile.

5. Lateral resistance -- vertical piles in bending.

6. Fender system -- solid rubber buckling column systems with protector panels.

7. Crane rails -- pile supported and connected horizontally by continuous wharf deck or other means to control the gauge of the rails.

8. Crane storage pocket spacing -- typically 162 feet apart.

Vertical Loads

1. Uniform Live Load - The uniform live load should be (both inboard/outboard of waterside crane girder):

   a) 1000 psf -- for the design of deck and girders.

   b) 800 psf -- for the design of piles.

2. Concentrated Loads - Design should provide for 100 kip wheel loads (140 PSI) + 25% impact loads = 125 kip (2 wheels located at 13 feet O.C. with a wheel print area of 4.95 square feet).

3. Gantry Crane Rail Girders - The design should provide for the following:

   a) The crane girder load will be determined on a case by case basis and should be approved by the CHE before commencing the preliminary design. The minimum crane girder load should be 50 kip/foot for 100 foot gage crane rails.

   b) Side thrust at crane rails - As determined by crane manufacturer.

   c) One Broken Pile Criteria - Outboard crane girder on row A should be able to support the operating crane with one interior pile removed by damage. The intent of designing the crane girder for a one broken pile condition is to permit crane operations until the pile can be repaired at an appropriate time.

d) Two Broken Piles Criteria - Outboard crane girder on row A should be able to support the crane dead load with two adjacent piles removed by damage. The intent of designing the crane girder for a two broken pile condition is to permit transfer of cranes to the other side of the damaged wharf until the pile can be repaired at an appropriate time.

e) The crane girder should be designed as a beam on elastic foundation to take the elastic pile shortening and the pile tip movement under load into account.

4. Railroad Load - Designs should provide for AREMA Manual for Railway Engineering Cooper E80 loads plus 15% impact load if railroad loading is required by the customer.

5. Part of the wharf deck may be designed as Heavy Lift Section: If used, loads will be determined by the CHE.

6. Utility Vault Covers - A.A.S.H.T.O. HS 20 – 44 trucks or 1000 PSF live load.

7. Power Trench Covers - A.A.S.H.T.O. HS 20 – 44 trucks or 1000 PSF live load.

Lateral Loads

1. Mooring and Berthing Forces:

   a) Mooring bitt line load - Depend upon the ship size and should be approved by the Chief Harbor Engineer.

   b) Berthing and Breasting loads - Depend upon the ship size and should be approved by the CHE. Fenders shall be designed in accordance with the “Guidelines for the design of Fender Systems:2002”, Report of Working Group 33 of the Maritime Navigation Commission by the International Navigation Association (PIANC 2002)[3]. For smaller ships the approach velocity should be appropriately increased.

2. Seismic Design: Project specific seismic hazard criteria will be provided by the POLA. The seismic design is discussed in greater detail in the Seismic Design Section of these guidelines.

[3] These guidelines make the reference to an approach velocity obsolete by introducing the Abnormal Berthing Condition with different adjustment factors.

Load Combinations, Allowable Stresses, and Load Factors

The concrete wharf components should be designed for the load factors and load combinations as stipulated in the Building Code Requirements for Reinforced Concrete, A.C.I. 318. In addition the following load factors and load combinations should be considered:

1. Load factors (L.F.) for the design of container crane girders and pile supports (not applicable for seismic loading):

   a) Stowed condition - L.F. = 1.4 for crane wheel loads due to the dead load of cranes or due to wind.

   b) Operating condition - L.F. = 1.45 for wheel loads due to the dead load of cranes plus operational wind and container loading.

   c) All code allowable reductions for wind should be taken into account.

   d) Design of crane girders: The design of the crane girder for broken pile conditions may be based on reduced load factors as follows:

      1) Acceptance criteria for the effect of a single broken pile:

         (a) Load factor on crane operating load = 1.45

         (b) Maximum crane girder moment = ΦM_n

         (c) Maximum pile load = 0.75 P_n

      2) Acceptance criteria for the effect of two broken piles:

         (a) Load factor on crane dead load = 1.15

         (b) Maximum crane girder moment = ΦM_n

         (c) Maximum pile load = 0.85 P_n

2. Load factors for the design of piles in the soil should be as recommended by the geotechnical report, but not less than 2.0. This load factor is not applicable for seismic loading.

3. Dead load + mooring: use the same load factor as for live loads based on latest Navy criteria.

4. Dead load + berthing: use the same load factor as for live loads. Do not use any code reduction factors for temporary loading.

5. For loads due to earth pressure, see the geotechnical report.

Materials

Materials should meet the following strength, code, and other requirements.

1. Cast in Place Deck Concrete.

   a) f'c = 5000 PSI

   b) W/C ratio: 0.40

2. Precast Concrete Piles.

   a) Concrete:

      1) f'c = 6500 PSI
      2) W/C ratio: 0.38

   b) Effective prestress: 1000 PSI to 1200 PSI

3. Precast Concrete - Cut off wall, firewalls, utility vaults -- f'c = 5000 PSI.

4. Reinforcing:

   a) All reinforcing bars except listed below -- A.S.T.M. A615, Grade 60.

   b) Pile dowels -- A.S.T.M. A706, Grade 60.

   c) Spiral pile reinforcing -- A.S.T.M. A 82.

   d) Prestressing strands -- A.S.T.M. 416, Grade 270K.

5. Structural Steel:

   a) Plates and shapes -- A.S.T.M. A36.

   b) Bolts and nuts -- A.S.T.M. A307.

   c) All ferrous metal should be galvanized, except where designated otherwise.

d) Corrosion protection and coating should be per Port specifications.

e) Lumber and Timber: Douglas fir should be used in all cases.

Container Cranes

The designers should refer to section 06.05, Cranes (Special Facilities chapter of the Engineering Design Guidelines) to ensure that the wharf is able to handle the necessary cranes and associated equipment.

Design Checklist

The designer should use the Checklist of Basic Wharf Design to ensure that the drawings and specifications have been prepared carefully.

05.02.03 CALCULATIONS/WORKSHEETS

Calculations are required for the wharf structural design. The structural criteria used by the designer (design criteria, loading, structural materials specified, and the requirements for the construction as they affect the design such as phasing etc.) should be listed on the first pages of the calculations (see sample Table of Contents for structural calculations on 05.08). As a minimum, they shall include the following items:

1. Title of the project.

2. Short description of the project and the structural system to be used.

3. Applicable codes and standards, including geotechnical criteria.

4. Short description of materials (steel, concrete, reinforcing bars, timber, and protective coating).

5. Ship criteria (length, beam and draft, size, and approach velocity).

6. Environmental conditions (tidal levels, current, wave, wind, seismic criteria, and temperature).

7. Loads (vertical/horizontal); mooring, breasting, and berthing loads shall be called out separately.

8. Load combinations, allowable stresses, and strength requirements. Structural and geotechnical requirements shall be called out separately.

9. Other site and project specific conditions important for the design and construction of the project. If necessary, refer to other specifications or reports for a more detailed description.

10. The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

Estimating

Estimating worksheets for the wharfs should be prepared including careful documentation. See Estimating Worksheets in 05.02.08.

Independent Review

The calculations should be clear and self-contained (i.e., readable without reference to contract specifications or contract drawings). Adequate descriptive text and sketches must be provided to make an independent review possible.

Clarity of Inclusions

1. Superseded Calculations. Superseded calculations may be included, but shall be clearly crossed out and marked "superseded".

2. Final Calculation Results. The final results of the calculations (e.g., reinforcing bar sizes and spacing, required beam dimensions, etc.) shall be underlined or marked so that they are prominent.

3. Cross References/Pagination. Cross references (with page numbers) shall be provided when the results of one part of the calculations are used as input for other parts of the calculations.

4. Sketches. Sketches of related structures shall be included, if necessary, to clarify calculations.

5. Unusual Formulas. References shall be provided for unusual formulas. The procedures or code paragraphs which were followed shall be clearly described.

6. Computer Program Results.

a) Calculations may include the results from an electronic digital computer program. A sketch of the complete mathematical model used to represent the structure in the computer-generated analysis shall be provided. Data provided as computer input shall be clearly distinguished from those computed in the program. The output information shall include all input data and units. The final results shall be clearly marked.

b) All calculation submittals which include a computer output shall meet the requirements of the Recommended Lateral Force Requirements (Chapter 1, Paragraph A.5), issued by the Seismology Committee of the Structural Engineers Association of California.

c) An index cataloging computer results, pages on which the results are found, etc., shall be included.

05.02.04 GRAPHIC CRITERIA

Plans should generally follow the examples of the latest POLA wharf projects. A set of these projects will be made available to the designer by POLA.

05.02.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications relate to basic wharf design (other sections may be required, depending upon the project):

DESCRIPTION
Dewatering
Earthwork
Dredging
Ratproofing
Rock
Concrete Wharf Construction
Rubber Fenders
Cast Steel Bollard
Prestressed Concrete Piles
Indicator Pile Testing
Welding of Crane Rails
Timber Bullrails and Crane Stop Bumpers
Crane Rail

05.02.06 PERMITS/APPROVALS

The designer shall list all agencies requiring permits (and state the person responsible for application and coordination of each permit) and present the list to the Chief Harbor Engineer for review. Permits are generally handled by the Permit Section of the Engineering Division. The Permit Section will be supported by the pertinent Sections of the Engineering Division. The permits listed below may be required. They are listed for information only. The list may not be comprehensive.

US Army Corps of Engineers (ACE) Permit

US Army Corps of Engineers (ACE) Permit. All new construction in the water area requires an ACE permit. This permit must be obtained prior to the Notice to Proceed being issued to the contractor.

California Regional Water Quality Control Board Permit

This permit is also required.

California Coastal Permit

This permit is required prior to advertising.

Department of Building & Safety Permits

The City of Los Angeles Department of Building & Safety permits (electrical, mechanical, etc.) are each required prior to construction of that element for which the permit is to be issued -- secured by the Section responsible for that element for in-house projects. No permit is required for the wharf structure, because its design is within the Port's jurisdiction.

AQMD Rule 1166 Permit

This permit is required prior to excavation of soil containing volatile organic compounds (preferably prior to advertising) -- secured by either the lead Section or by the Structural Section for in-house projects.

05.02.07 ENVIRONMENTAL CONSIDERATIONS

Creosoted piles shall not be used.

05.02.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2359 Pier 400 Container Wharf Phase II Berths 404-406

LAHD Standard Plans

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Estimating Worksheets

PROJECT Berth 100 Container Wharf
NO. 51-012

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NO. 51-012

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PROJECT TITLE: _____ TYPE OF TERMINAL (Container, General Cargo, Autos, Oil, etc.): _____
TYPE OF CONSTRUCTION (Concrete or Timber): _____

WORLDPORT LA

CLASS C ESTIMATE

ESTIMATE NO.: _____
SHEET NO.: _____
PREPARED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____

WHARF

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL	NOTES
1	wharf, Type of Service & Construction		SF			
	TOTAL					
	CONTINGENCY (Range 15%-35% depends on unit cost accuracy) ____ %					
	GRAND TOTAL					

SOTm
11/92

Estimating Worksheets

Estimating Worksheets

PROJECT TITLE: _____
TYPE OF SERVICE (Container, General Cargo, Auto, Oil, etc.): _____
TYPE OF CONSTRUCTION (Concrete or Timber): _____ LENGTH: _____ WIDTH: _____

WORLDPORT LA

CLASS B ESTIMATE

ESTIMATE NO.: _____
SHEET NO.: _____
PREPARED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____

WHARF

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL	NOTES
1	Mobilization		SF			
2	Dredging					
3	Furnish Piles					
4	Furnish Piles					
5	Drive Piles (Including Staging)					
6	Drive Piles (Including Staging)					
7	Quarry Run Rock					
8	Underlayer Rock					
9	Riprap Rock					
10	Filter Rock					
11	Rat Proofing					
12	Concrete					
13	Railroad Track					
14	Crane Rail					
15	Miscellaneous Metals					
16	Deck Oil					
17	Base					

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Estimating Worksheets

PROJECT TITLE: _____
TYPE OF SERVICE (Container, General Cargo, Auto, Oil, etc.): _____
_____ TYPE OF CONSTRUCTION (Concrete or Timber): _____ LENGTH: _____ WIDTH: _____

WORLDPORT LA

CLASS B ESTIMATE
(cont'd.)

ESTIMATE NO.: _____
SHEET NO.: _____
PREPARED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____

WHARF

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL	NOTES
18	A.C. Pavement		SF			
19	Fender Piles					
20	Fenders					
21	Water System					
22	Fuel System					
23	Electrical System					
24	Timber Construction					
25	Mooring Bitts					
26	Firewalls					
27	Removals					
28	Earthwork					
	GRAND TOTAL					

This estimate format is also used for replacement Cost Estimates except for Removals and Earthwork items.
Contingency is not necessary since unit costs account for contingencies.

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Estimating Worksheets

PROJECT TITLE: _____
TYPE OF SERVICE (Container, General Cargo, Auto, Oil, etc.): _____
TYPE OF CONSTRUCTION (Concrete or Timber): _____
LENGTH: _____ WIDTH: _____
DWG. NO.: _____ SPEC. NO.: _____

WORLDPORT LA

CLASS A ESTIMATE QUANTITY SURVEY

ESTIMATE NO.: _____
SHEET NO.: _____
PREPARED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____

WHARF

CST DIVISION	DESCRIPTION	QTY.	LENGTH	WIDTH	DEPTH					
2	SITEWORK									
02050	Demolition									
02200	Earthwork									
02350	Piles									
02410	Railroad Work									
02480	Marine Work									
02500	Paving and Surfacing									
02600	Piped Utility Materials									
02900	Fuel Distribution									
3	CONCRETE									
03100	Concrete Formwork									
03200	Concrete Reinforcement									
03250	Concrete Accessories									
03300	Cast-In-Place Concrete									

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9/92

Estimating Worksheets

PROJECT TITLE: _____
TYPE OF SERVICE (Container, General Cargo, Auto, Oil, etc.): _____
_____ TYPE OF CONSTRUCTION (Concrete or Timber): _____ LENGTH: _____ WIDTH: _____
DWG. NO.: _____ SPEC. NO.: _____

WORLDPORT LA

CLASS A ESTIMATE
QUANTITY SURVEY
(cont'd.)

ESTIMATE NO.: _____
SHEET NO.: _____
PREPARED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____

WHARF

CSI DIVISION	DESCRIPTION	QTY.	LENGTH	WIDTH	DEPTH							
5	METALS											
05010	Metal Materials											
05030	Metal Finishes											
05500	Metal Fabrication											
05990	Miscellaneous Metals											
6	WOOD											
06130	Heavy Timber Construction											
16	ELECTRICAL											
16050	Basic Electrical Materials & Methods											
16300	High Voltage Distribution											
16400	Service & Distribution											
16500	Lighting											
16700	Communications											

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9/92

PROJECT TITLE: _____
TYPE OF SERVICE (Container, General Cargo, Auto, Oil, etc.): _____
TYPE OF CONSTRUCTION (Concrete or Timber): _____
LENGTH: _____ WIDTH: _____
DWG. NO.: _____ SPEC. NO.: _____

WORLDPORT LA

CLASS A ESTIMATE

ESTIMATE NO.: _____
SHEET NO.: _____
PREPARED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____

WHARF

CSI DIVISION	DESCRIPTION	QUANTITY	MATERIALS		LABOR			TOTAL
			UNIT PRICE	AMOUNT	UNIT MAN.	TOTAL MAN.	RATE	AMOUNT	
2	SITEWORK								
02050	Demolition								
02200	Earthwork								
02350	Piles								
02450	Railroad Work								
02480	Marine Work								
02500	Paving and Surfacing								
02600	Piped Utility Materials								
02680	Fuel Distribution								
3	CONCRETE								
03100	Concrete Formwork								
03200	Concrete Reinforcement								
03250	Concrete Accessories								
03300	Cast-In-Place Concrete								
5	METALS								
05050	Metal Materials								
05500	Metal Finishes								

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Estimating Worksheets

PROJECT TITLE: _____
TYPE OF SERVICE (Container, General Cargo, Auto, Oil, etc.): _____
TYPE OF CONSTRUCTION (Concrete or Timber): _____
LENGTH: _____ WIDTH: _____
DWG. NO.: _____ SPEC. NO.: _____

WORLDPORT LA

CLASS A ESTIMATE (cont'd)

ESTIMATE NO.: _____
SHEET NO.: _____
PREPARED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____

WHARF

CSI DIVISION	DESCRIPTION	QUANTITY	MATERIALS		LABOR				TOTAL
			UNIT PRICE	AMOUNT	UNIT M.H.	TOTAL M.H.	RATE	AMOUNT	
05500	Metal Fabrication								
05990	Miscellaneous Metals								
6	WOOD								
06130	Heavy Timber Construction								
16	ELECTRICAL								
16050	Basic Electrical Materials & Methods								
16320	High Voltage Distribution								
16400	Service and Distribution								
16500	Lighting								
16700	Communications								
	SUBTOTAL								
	TAX ON MATERIAL (8.25%)								
	OVERHEAD & PROFIT (150% of Labor)								
	TOTAL								
	CONTINGENCY 4%								
	GRAND TOTAL								

SOURCE: 9/92

Estimating Worksheets

05.03 REMOVALS AND DEMOLITION

05.03.01 OVERVIEW

This section contains the following information related to the preparation of wharf removal and demolition contract drawings:

- Removals and Existing Substructures Plan (R)
- Wharf Demolition Sections (R)

05.03.02 DESIGN CRITERIA

Historical Assessment

The Designer should request the Environmental Management Division to perform an historical assessment on any existing wharf facility at least 50 years old, of potential historical significance, or where timber piles are involved. The US Army Corps.of Engineers (ACE) Permit requires historical assessments for structures more than 50 years old.

Salvage

The Designer should request the Construction and Maintenance Division to identify all items to be salvaged prior to bidding. All items to be salvaged must be identified in the contract documents and delivered to a location specified by that Division.

Disposal

1. A/C and Concrete. Uncontaminated A/C and concrete (non-reinforced or with reinforcing removed) shall be disposed of at the Port's stockpile site.
2. Hazardous Waste. Disposal of all hazardous waste material shall be coordinated with the Risk Management and Environmental Management Divisions; it shall be disposed of away from Port property.

Suspected Contamination

An Environmental Site Assessment/Characterization must be coordinated with the Environmental Management Division (EMD) prior to demolition if the project area has suspected contamination.

Safety/Health Issues

The designer shall be aware of specific soil conditions and potential safety/health issues or problems (e.g., oil leakage) associated with the removal of piles, wharf, etc.

Pile Removal

1. Clearance. The Project Manager shall obtain clearance from EMD for pile removal. For disposal of preservative-treated timber piles, a letter from EMD must go into the project file indicating disposal location and classification of the piles.

2. Pile-Supported Foundation. All pile-supported foundations shall be removed to elevation plus 5 MLLW (Mean Lower Low Water) or at least 5 feet below finished grade.

3. Wharf Piles. Piles which cannot be removed may be broken off below the mudline, if approved by the Chief Harbor Engineer.

Coordination

The designer shall coordinate wharf removals/demolition in a timely manner with following persons:

1. Project site tenant(s), as well as any impacted tenants adjacent to the project site -- for all removal work.

2. Appropriate utility (DWP, Gas Co., or Pacific Bell) and the Property Management Division -- for all removal related water and power disconnects.

3. Risk Management and Environmental Management Divisions -- for all hazardous removals (e.g., for asbestos, hydrocarbon contaminated soil, etc.).

4. Harbor Belt Line General Manager -- for removals impacting the railroads.

5. Water Quality Control Board -- whenever piles are removed, wharf deck is demolished, etc.

6. US Coast Guard -- whenever a timber wharf is involved.

Dredging

The Project Manager must request an analysis of dredging material from EMD whenever an ACE permit is needed for wharf removal/demolition or for water deepening.

05.03.03 CALCULATIONS/WORKSHEETS

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

05.03.04 GRAPHIC CRITERIA

Removal and demolition sheets shall be prepared per POLA's AutoCad manual and must have the following sheets:

1. Removals and existing substructures plan – this sheet should show existing surface features.
2. Wharf demolition sections.

05.03.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications relate to wharf removal and demolition (other sections may be required, depending upon the project):

SECTION TITLE
Coordination
Regulatory Requirements
Construction and Demolition Waste Management
Selective Site Demolition
Building Demolition and Removals

05.03.06 PERMITS/APPROVALS

An ACE permit is required whenever there is removal/demolition work connected with piles, deck, timber wharf, etc. All permits needed for wharf work are included in the Basic Wharf Design Section, Permits/Approvals.

05.03.07 ENVIRONMENTAL CONSIDERATIONS

See 05.03.02 for historical assessment, hazardous waste disposal and contamination assessment.

05.03.08 REFERENCE DRAWINGS

The following contract Drawings are identified for reference:

1-2342 Berths 145-147 Wharf Improvements

- 1-2342 RS-1 Removal and Demolition Berth – Site Plan
- 1-2342 RD-1-8 Removal Pile and Deck Plan
- 1-2342 RX-1-6 Removal – Berth Cross Section

LAHD Standard Plans

05.04 WHARF SECTIONS

05.04.01 OVERVIEW

This section contains information related to the preparation of the wharf section contract drawings:

- Typical Wharf and Cross Section

05.04.02 DESIGN CRITERIA

Typical Sections

Typical sections shall represent typical conditions on the wharf (e.g., dike section, embankment section, etc.), with contractor details indicated (e.g., ratproofing, filter fabric, etc.).

Orientation of Sections

In all sections, the waterside of the structure shall be shown on the right side.

Dredging Sections

Dredging sections are generally drawn at intervals of 50 feet.

05.04.03 CALCULATIONS/WORKSHEETS

There are no calculations or worksheets provided for this section. The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

05.04.04 GRAPHIC CRITERIA

Typical Wharf Cross Sections

This sheet should include the following: pierhead line; distance from the face of the; locations; elevations of all breakpoints of the top wharf surface; tolerances for the dredge line and rock fills; and an asterisk where dimensions require field verifications.

Dredging Sections

This sheet should show existing surface – (dashed), wharf structure (if applicable) and dredge line

Line Style - Line style for wharf section drawings shall be per the Port's Cadd manual.

05.04.05 SPECIFICATIONS

There are no Harbor Department master specifications relating to wharf cross sections.

05.04.06 PERMITS/APPROVALS

There are no permits/approvals necessary for wharf cross section work.

05.04.07 ENVIRONMENTAL CONSIDERATIONS

There are no environmental considerations for wharf cross section.

05.04.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2359 Pier 400 Container Wharf Phase II – Berths 404-406

1-2359 X-1 Typical Wharf Cross Section – A1

LAHD Standard Plans

05.05 RAIL

05.05.01 OVERVIEW

This section contains information related to the preparation of the following wharf rail (both rail-road and crane rail) contract drawings:

1. Railroad:

   a) Railroad Track Plan (RR)

   b) Railroad Track Profiles (RR)

   c) Railroad Details (RR)

2. Crane Rail:

   a) Crane Rail Details (CR)

   b) Crossing Frog Plan and Details (CR)

   c) Crane Rail Stop Details (CR)

   d) Crane Rail Expansion Joint (CR)

05.05.02 DESIGN CRITERIA

General Railroad Design Requirements

Railroad design shall meet the regulations, standards, and requirements of the following (any conflicts which arise must be resolved with the entities impacted):

1. General Orders of the California Public Utilities Commission (CPUC) [all Port railroad facilities must comply with CPUC General Orders].

2. Harbor Department (as specified in these Guidelines or as otherwise approved by the Chief Harbor Engineer).

3. American Railway Engineering & Maintenance of Way Association's Manual for Railway Engineering.

Railroad -- Industry Track Design

1. Horizontal Alignment:

   a) Curvature:

      1) Desirable = 12°30' (R=459 feet).

      2) Maximum = 15°00' (R=383 feet).

   b) Minimum tangent between reversing curves is 60 feet.

   c) Minimum clearance between parallel tracks = 14.25 feet.

   d) Minimum horizontal clearance to structures (and fences) from track center line:

      1) Tangent track = 10 feet.

      2) Curve track = 11 feet.

2. Turnouts:

   a) Desirable = No. 9.

   b) Minimum = No. 7.

Railroad Trackage Components

The following shall be considered standards, unless otherwise authorized by the Chief Harbor Engineer:

1. Ballast depth – 6 inches minimum. If the wharf design will not allow 6 inches of ballast to be constructed under the ties, then lean concrete should be placed under them.

2. Rail size -- 136 lb. R.E. (pounds per yard)

3. Turnout components shall be as follows:

   a) Rail-bound manganese (RMG) frogs.

   b) 16'6" Sampson type switch points per A.R.E.M.A. Plan No. 221-00, Detail 5100, with manganese-tipped switch points.

c) Adjustable wedge rail braces.

4. Tie size -- minimum of 7 inches x 9 inches x 8 feet.

5. Tie spacing on-centers -- minimum of 22 1/2 inches (except at rail joints, where the spacing shall be 18 inches).

6. Tie plate size -- minimum of 8" x 14" double shoulder.

7. Installation of rail anchors:

   a) Switch ties -- box anchor every tie.

   b) Jointed rail -- box anchor every third tie.

   c) Continuously welded rail -- box anchor every other tie.

8. Gage rods shall be installed through all curves having a curvature greater than 10°30' and at a spacing of 5 feet on centers.

9. All other components shall be in accordance with AREMA standards.

Crossing Frogs

When railroad tracks cross crane rails, a special crossing frog design is required. Design of the frogs shall provide travel of the crane wheel flange across the intersection point. As the crossing frog is a specialty design, the type of frog is dictated by the type of railroad track and crane rail intersection.

Crane Rail Design

1. Load. The crane rail shall be designed for at most 50k/ft live load.

2. Wharf Plan. The crane rail is shown on the general wharf plan.

3. Type/Installation. The rail used shall be a 171 lb. rail and shall be installed on crane girders designed for the wharf.

4. Extension of Existing Container Wharf. When extending an existing container wharf, the designer shall take into account the potential downslope movement of the wharf and its effect on crane rails.

Crane Rail Detail

A detail of the Gantrex System (or equivalent) shall be included with the plan submission.

1. Crane Rail Detail
   a) Rail fastening system
   b) Rail Splicing
2. Power Systems on Wharf
   a) Cable Reel System or
   b) Bus Bar System

05.05.03 CALCULATIONS/WORKSHEETS

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

05.05.04 GRAPHIC CRITERIA

Include a site plan, track plan, profiles, and cross sections to convey appropriate detail. Drawings shall be per POLA CADD manual.

05.05.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications relate to wharf railroads or crane rails (other sections may be required, depending upon the project):

SECTION TITLE
Railroad Work
Crane Rail
Railroad Track and Accessories
Welding of Rail

An additional production specification Section “Running Rail” is also used for procurement.

05.05.06 PERMITS/APPROVALS

There are no permits/approvals necessary for this section because wharf rail work is on Port property. However, all improvements must be consistent with P.U.C. General Orders.

05.05.07 ENVIRONMENTAL CONSIDERATIONS

Timber Tie Disposal – Removal and disposal of existing timber ties shall conform to Master Specification Sections REGULATORY REQUIREMENTS and RAILROAD TRACK AND ACCESSORIES.

05.05.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2032 Berths 302-305 Project

- 1-2032 RR11-21 Railroad Track Plan
- 1-2032 RR22-29 Railroad Track Profiles
- 1-2032 RR31-49 Railroad Details
- 1.2032 CR1-2 Crane Rail Details

1-1915 Berths 302-305 Container Wharf

- 1-1915 S40-41 Crossing Frog Plan and Details (No. 5)
- 1-1915 S26 Crane Rail Stop Details (No. 6)

Crane Rail Expansion Joint (No. 7)

LAHD Standard Plans

05.06 PILES

05.06.01 OVERVIEW

This section contains the following information related to the preparation of contract drawings for the design of wharf deck piles.

05.06.02 DESIGN CRITERIA

Type of Piles

1. Vertical piles are to be used. The use of batter piles is subject to limitations in paragraph 5 of this subsection.
2. Concrete, wood and steel piles are allowed.
3. Concrete Piles

   a) Standard size. The standard pile is a 24" octagonal precast prestressed concrete pile. Larger size solid or hollow piles may be proposed for situations where the 24" octagonal pile is not a cost effective solution.
   b) Pile Strength. Precast , prestressed concrete pile strength (f'_c) shall be a minimum of 6,500 psi at the time of driving and 4,500 psi at the time of tendon stress transfer.
   c) Concrete mix design. Concrete for piles shall contain a minimum of 8 sacks of cementitious material per cubic yard of concrete. The maximum allowable water to cement ratio shall be 0.38. the maximum aggregate size shall pass a ¾ inch sieve.
   d) Concrete cover. The minimum concrete cover to the spiral reinforcement shall be 3 inches.

4. Clearance
   An approximate minimum of 4'-0" clearance shall be used between the deck/beam soffit and top of dike to allow for adequate post earthquake inspection and repairs.
5. Batter Piles
   Batter piles to support the wharf or pier shall not be used without prior written approval from the Chief Harbor Engineer (see section 4.2, Basic Wharf Design). However, batter piles may be used for isolated structures with low seismic mass, such as ladside anchors, mooring and breasting dolphins.
6. Wood
   a) Wood piles should only be used when project criteria and site circumstances dictate.

b) The type and grade of wood shall be based on the published stress values in the ANSI/AF&PA National Design Specification (NDS) for Wood Construction.
c) Deterioration
   1) The use of wood piles is discouraged due to the deterioration potential and associated higher maintenance cost.
   2) Coating system shall be used.
   3) Routine visual pile inspections shall be performed.

7. Steel Piles
   a) Steel piles should only be used when project criteria and site circumstances dictate.
   b) Corrosion
      1) The use of steel piles is discouraged due to corrosion potential and associated higher maintenance cost.
      2) Corrosion barrier coating systems could be used.
      3) Routine visual pile inspections shall be performed.
      4) Sacrificial thickness could be added to the pile to account for corrosion.
      5) Cathodic protection systems could be used.
   c) Material. Steel piles shall be according to ASTM A572 or A709

8. Connection to the Wharf Deck
   a) All concrete or steel piles shall use ASTM A706 dowels to connect to the deck.
   b) The extension of pile prestressing strands into the deck shall not be used for the pile deck connection.
   c) Dowels that are extended from piles shall not be bent outwards and all dowels shall be confined by transverse reinforcement..

Concrete Pile Capacity

1. Vertical. The vertical ultimate pile capacity in the soil shall be established by a registered geotechnical engineer. The geotechnical analysis shall be verified by wave equation analysis and by new or existing pile tests as necessary and adjusted for site specific conditions by an indicator pile test program. Establishment of vertical pile capacity by the Engineering News formula is not acceptable.

2. Lateral. The lateral ultimate pile capacity in the soil shall be established by a registered geotechnical engineer. The method shall take into account the increased lateral resistance by the rock dike and the potential movement of the rock dike due to settlement, soil pressure, and seismic conditions.

3. Soil Pile Capacity. The ultimate pile capacity in the soil (vertical and lateral) must not exceed the structural capacity of the pile and must be at least two times than pile demand load.

Load Tests

A pile load test (vertical and/or lateral, depending upon the project) may be considered for very large new wharf construction. This determination is made by the designer in conjunction with the appropriate Engineering Division staff.

Driving

1. Preliminary driving criteria are in the specifications. For each larger project,driving criteria are developed following a geotechnical report.
2. Piles shall not be driven through riprap with a maximum rock size larger than 500 lbs.
3. Non-displacement structural steel piles may be required if piles need to be driven close to the top of the rock embankment of an existing wharf. The specific details shall be addressed in the geotechnical report.

Additional Pile Design Criteria

Additional pile design criteria can be found in the Basic Wharf Design section, Design Criteria (05.01.02), and should be reviewed.

05.06.03 CALCULATIONS/WORKSHEETS

The designer shall prepare pile calculations for the final plan/specifications review.

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

Estimating

When estimating the quantity needed, cut-off requirements should be considered. Due to driving difficulties, a certain percentage of piles are destroyed during the installation process. The number of extra piles to be ordered for each specific project should be verified with the Construction Management Division.

Estimating worksheets for the wharf (which include line items related to piles) are found in the Basic Wharf Design Section.

05.06.04 GRAPHIC CRITERIA

Pile drawings should include a Pile Plan showing grids, wharf oulline and existing and proposed piles and Precast Concrete Pile details showing sections, pick-up points, necessary fabrication data, etc.Graphic Criteria for pile drawings shall be per the Port's CADD manual.

05.06.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications relate to precast, prestressed concrete wharf piles (other sections may be required, depending upon the project):

SECTION TITLE
Rock
Steel Pipe Piles
Precast Concrete Piles
Cast-In-Place Concrete
Timber Piles

05.06.06 PERMITS/APPROVALS

Necessary wharf permits/approvals are covered in the Basic Wharf Design section, Permits/Approvals.

05.06.07 ENVIRONMENTAL CONSIDERATIONS

Use of wood piles with preservatives shall follow the latest guidelines of the US Army Corp of Engineers and other regulatory agencies.

05.06.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2359 Pier 400 Container Wharf Phase II – Berths 404-406

1-2359 PD-1 Prestressed Concrete Pile – Details

1-2359 PD-2 Prestressed Concrete Pile – Details

1-2359 PD-3 Prestressed Concrete Pile – Details

LAHD Standard Plans

05.07 DECK

05.07.01 OVERVIEW

This section contains the following information related to the preparation of wharf deck contract drawings:

- General Wharf Layout Plan (D)
- Deck Plan (D)
- Deck Slab Reinforcing (S)
- Crane Girder Reinforcing (S)
- Stowage Pin Anchors (S)
- Crane Power Trench Details (S)
- Utility Vaults -- Sections and Details (S)
- Mooring Bitts and Ladders (S)
- Typical Deck Expansion Joint (S)
- Cable Reel Boxes
- Bus Bar Boxes
- Crane Tie Downs

05.07.02 DESIGN CRITERIA

Concrete

1. Concrete Cover. The minimum concrete cover to the reinforcing at all sides of the deck shall be 3 inches.

2. Minimum/Maximum. The concrete for the deck shall contain a minimum of 7 sacks of Portland cement (Type II) per cubic yard of concrete. The maximum allowable water to cement ratio shall be 0.40. The maximum

aggregate size shall be able to pass a 1 1/2 inch sieve. The maximum aggregate size shall be adjusted downward in areas of congested reinforcing as required.

Special Details

1. The length of wharf units between expansion joints should generally be between 400 and 800 feet. Shorter or longer wharf units should be approved by the CHE.

2. It is recommended that the length of an anglepoint concrete wharf unit, measured from the anglepoint to the next expansion joint, not be shorter than 250 feet on both sides. This distance is measured at the waterside concrete edge.

3. Special Details: The Port of Los Angeles (POLA) will provide guidelines for details of wharf expansion joints. The shear key at these joints has a capacity to transfer an ultimate shear force of 3500 kips. The use of these details is recommended. Other details may be used, but must be justified by a detailed design, including calculations.

4. Pile-deck connections: These connections should be established by dowels and must be carefully detailed as described in the POLA Code For Seismic Design, Upgrade, and Repair Of Container Wharfs.

Expansion Joints

1. Design and Detailing. Care shall be taken in the design and detailing of expansion joints to facilitate concrete placement and avoid spalling of concrete edges.

2. Spacing. Expansion joint spacing is usually every 450 feet (in multiples of 450 feet) if the deck is 900 feet or longer. Wharfs shorter than 700 feet usually do not have an expansion joint. Larger distances should be particularly analyzed.

Adjoining Wharfs

Special precautions shall be taken whenever a new wharf adjoins an existing wharf. It is important to decrease the possibility of downslope movement with the new wharf. The designer shall ensure that there is a proper transition if the adjoining deck has a different slope or is at a different elevation.

Crane Girders

1. Design. Unequal pile shortening shall be accounted for in the design of the deck. The crane girder shall be designed as a beam on an elastic foundation.

2. Construction Sequence. The construction sequence of crane girders shall be accounted for in the design and detailing of the deck.

Stowage Pins

Stowage pin location, details, and spacing for container cranes must be adjusted by the designer to site specific conditions and particular crane characteristics. Work shall be coordinated with the Port.

Reinforcing Bars

1. Detailing. Detailing of reinforcing bars for the stirrups shall allow for easy placement and shall be specifically shown in the drawings.

2. Crane Anchor Bolt Placement. The reinforcing bars in the top of the crane girders shall be designed and detailed so as to allow accurate placement of the crane anchor bolts.

Additional Deck Design Criteria

1. Bollard. A standard bollard shall be designed in accordance with POLA Standard Plan H-301 (Drawing No. 5-7156).

2. Wharf Ladder. Metal wharf ladders shall be designed in accordance with POLA Standard Plan H-302 (Drawing No. 5-7157).

3. Strong Motion Instrumentation Box. These boxes shall be designed in accordance with POLA Standard Plan 1-1000-21.

4. Other. Additional design criteria pertinent to decks can be found in the Basic Wharf Design section, Design Criteria (05.01.02), and should be reviewed.

05.07.03 CALCULATIONS/WORKSHEETS

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

05.07.04 GRAPHIC CRITERIA

Wharf Deck plans should include Wharf Deck Layout plan, Deck Plan, Deck Slab Reinforcing Plan, Crane Girder Reinforcing plan, Stowage Pin Anchor details, Crane Power Trench details, Utility Vault sections and details, Mooring Bits and Ladders details and Typical Deck Expansion Joint details,Graphic criteria for wharf deck drawings shall be per POLA CADD manual.

05.07.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications relate to wharf decks (other sections may be required, depending upon the project):

SECTION TITLE
Concrete Wharf Construction
Treated Damaged Galvanizing
Metal Fabrications
Paints and Coatings

05.07.06 PERMITS/APPROVALS

Necessary permits/approvals are covered in the Basic Wharf Design section, Permits/Approvals.

05.07.07 ENVIRONMENTAL CONSIDERATIONS

Stormwater runoff shall not be allowed to discharge directly into the ocean. Runoff must comply with the SUSMP requirements of the Watershed Protection Division of the Bureau of Sanitation.

05.07.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2359 Pier 400 Container Wharf Phase II – Berths 404-406.

1-2359 D-15 to 27	Deck Plan
1-2359 S-2 to13	Deck Slab Reinforcing
1-2359 S-18 to 19	Crane Girder Reinforcing
1-2359 S-49	Stowage Pin Anchor – Plan and Details
1-2359 S-28&29	Crane Power Trench Details
1-2359 S-22	Typical Vaults – Structural Details
1-2359 S-14 to 17	Deck Expansion Joint and Details

LAHD Standard Plans

05.08 FENDERS

05.08.01 OVERVIEW

This section contains the following information related to the preparation of fender system contract drawings:

- Fenders

05.08.02 DESIGN CRITERIA

1. Wharf Fenders. Wharf fenders should be of the buckling column type. When the wharfs have a common berthing line, attention should be paid to match fenders at adjacent berths.

2. Hull Pressure. The maximum hull pressure should be 5000 PSF, unless specifically directed otherwise by the Chief Harbor Engineer or specific vessel requirements.

3. Fender Panel. The rubbing section of the fender panel should be UV-stabilized UHMW polyethylene with a maximum friction factor of 0.2 or less.

4. Corrosion Protection. The steel frame of the fender panel should be coated with an approved coating system. To provide additional corrosion protection, the minimum thickness of rolled sections should be 1/2 inch. If sealed tubular sections are used, the minimum thickness may be reduced to 3/8 inch. Units should have a coating material applied by the manufacturer and approved by the CHE.

05.08.03 CALCULATIONS/WORKSHEETS

The designer shall prepare calculations on worksheets in compliance with POLA's Engineering Division's latest format.

05.08.04 GRAPHIC CRITERIA

Fender drawings shall include Fender Sysytem showing elevations, sections including the face beam.and shall be prepared per the POLA CADD manual.

05.08.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications relate to wharf fenders (other sections may be required, depending upon the project):

SECTION TITLE
Rubber Fenders
Corrosion Control

05.08.06 PERMITS/APPROVALS

The necessary wharf permits/approvals are covered in the Basic Wharf Design section, Permits/Approvals.

05.08.07 ENVIRONMENTAL CONSIDERATIONS

There are no environmental considerations for Fenders.

05.08.08 REFERENCE DRAWINGS

The following contract drawings are identified as reference:

1-2359 Pier 400 Container Wharf Phase II – Berths 404-406.

1-2359 F-1 "A" Face Fender System – Elevations and Section

1-2359 F-2 Fender System – Face Beam

LAHD Standard Plans

05.09 WATER

05.09.01 OVERVIEW

This section contains the following information related to the preparation of the following wharf water contract drawings:

- Wharf Water Plan (W)
- Wharf Water Sections and Details (W)
- Wharf Water Vault Plan and Details (W)

05.09.02 DESIGN CRITERIA

Coordination

It is the responsibility of the designer to coordinate wharf water systems with the other wharf facilities designers.

Ship Connections

1. Connections for Domestic Water. Each ship connection assembly for domestic water shall be provided with a reduced pressure type backflow preventer, strainer, meter, hose connection fitting, and valves.

2. Spacing between Assemblies. Spacing between ship connection assemblies shall be 180 feet.

3. Connection Assembly. Ship connection assembly shall be in a vault and provided with hinged lids. Lids must be structurally designed to carry expected vehicular traffic and heavy equipment, yet reasonably light for manual opening.

4. Drain Holes. Ship connection vaults must be provided with two 4-inch diameter drain holes.

5. Design Flow. Design flow for ship connection shall be 250 GPM at a residual pressure of no less than the total pressure losses between the connection and the ship water intake manifold.

6. Shut-Off Valve. A shut-off valve shall be provided for each branch to ship connection as it branches off of the main. Section valves on the main (perpendicular to branch valves) shall be provided to facilitate shutdown of a section during repair or maintenance without turning off the entire system.

7. Backflow Device. Use a U.L. approved backflow device which demonstrates the lowest pressure loss at the rated flow.

8. Backflow Device. Install with a minimum clearance of 12 inches between relief valve discharge port and floor or grade.

Pipe Lines

1. Penetrating Bulkhead. Pipe line penetrating the bulkhead shall be:

   a) Provided with flexible joints to allow for movement caused by earth settlement behind the bulkhead.

   b) Done with a sleeve, the diameter of which shall be at least 2 inches bigger than that of the carrier pipe.

2. Materials.

   a) Underground: Ductile iron class 52 for 4” and larger, Tyton joint per A.W.W.A. C151, double cement-mortar lined class 350 mechanical joint fittings per A.W.W.A. C110.

   b) Under Wharf. Ductile iron class 53 mechanical joint for A.W.W.A. C151 double cement-mortar lined and with double cement-mortar lined class 350 mechanical joint fittings per A.W.W.A. C110.

3. Installation Restrictions. Installation of pipe lines within 130 feet from the face of the wharf shall be avoided (except those lines going through the bulkhead).

4. Under the Wharf. Corrosion-protected pipe hangers and sway bars shall be used for pipe sections under the wharf.

Thrust Blocks/Restraints

Thrust blocks or restraints shall be installed at mechanical joints or push on joints to prevent separation when the system is subjected to forces tending to pull the components apart.

Corrosion Protection

Metal pipes and appurtenant fittings, pipe hangers, bolts, and nuts shall be protected from corrosion. Specific requirements follow:

1. Underground piping shall be provided with corrosion protection by use of polyethylene film encasement in full accordance with A.W.W.A. C105, "Polyethylene Encasement for Ductile Iron Piping for Water Standards."

2. Under the wharf, ductile/cast iron pipes (including bolts, rods, and clamps) shall be coated with coal tar epoxy Koppers Bitumastic 300-M with preparation solvent Koppers-2CB.

3. Corrosion protection shall terminate no less than 12 inches above the adjacent finished surface.

4. Pipes penetrating through concrete shall be provided with sleeves to prevent contact between the pipe and concrete.

05.09.03 CALCULATIONS/WORKSHEETS

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

Pressure Calculations*

Minimum pressure at public main	70.0 psi
Static head loss from the connection to the ship water manifold (70'x.433)	-30.3 psi 39.7 psi
Friction loss through meter at 250 gpm flow rate (from manufacturer's data)	-5.0 psi 34.7 psi
Friction loss through backflow preventer at 250 gpm (from manufacturer's data)	-6.7 psi 28 psi

Friction loss through strainer at 250 gmp (from manufacturer data)	-1.5 psi
Remaining pressure for friction loss through pipe, valve, fittings, and 2-1/2" hose	26.5 psi

*Required if no fire hydrant plan check approval from LAFD.

Wharf Water Checklist

Requirements:

1. Required flow
2. Source
3. Meter
4. Backflow preventers
5. Valves
6. Coordination (work of others)
7. Meter and backflow assembly support
8. Pipe material
9. Pipe size
10. Pipe connections and fittings
11. Flexible connection
12. Restraints and thrust blocks
13. Pipe hangers and sway bars
14. Wharf penetration
15. Pipe sleeve

16. Sealant for annular space between carrier pipe and sleeve
17. Ship connection assembly: meter, strainer, backflow preventer, hose connection fitting, and valves
18. Vault drains
19. Support for ship connection assembly
20. Vault lid
21. Painting
22. Corrosion protection
23. Restraints and thrust blocks
24. Pressure calculations
25. Plumbing plan check

05.09.04 GRAPHIC CRITERIA

Site Plan

This sheet reflects existing and proposed water features in the site area. It should show a base map, main proposed surface improvements and water features and prepared per the POLA CADD manual.

Water Systems Plan

This sheet will contain specific information necessary to construct the water system including the base map, proposed surface improvements, existing and proposed substructures and the proposed water system and prepared per the POLA CADD manual

05.09.05 .SPECIFICATIONS

Refer to Harbor Department Master Specifications. Specifications for plumbing shall conform with the rules and regulations of the City of Los Angeles Plumbing Code.

SECTION TITLE

Water Distribution
Gas Distribution
Excavated Safety Req.
Detection Tape
Trench Excavation and Backfill
Asphalt Concrete Pavement
Cast-In-Place Concrete
Guard Posts
Paints and Coatings
Corrosion Control

05.09.06 PERMITS/APPROVALS

Building and Safety Permit

Necessary wharf permits/approvals are covered in the Basic Wharf Design section, Permits/Approvals (05.02). A plumbing permit is required to be obtained by the piping system installer following the designer's submission of the water plans for plan check.

05.09.07 ENVIRONMENTAL CONSIDERATIONS

The main environmental concern is the disposal of contaminated water and waste (paper cups, newspapers, etc.) collected in the water vault, spilling into the channel.

05.09.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2210 Pier 400 Wharf.

1-2210 W-1	Water Piping Schematic, Legend and Notes
1-2210 W-2 to 6	Wharf Water Plan
1-2210 W-7 to11	Wharf Water Sections and Details

LAHD Standard Plans

05.10 ELECTRICAL

05.10.01 OVERVIEW

This section contains information related to the preparation of the wharf electrical contract drawings:

- Electrical Notes, Symbols, and Abbreviations (E)
- Electrical Site Plan (E)
- Wharf Electrical Plan (E)
- Wharf Power & Telephone Box Details (E)
- Crane Bus Plan (E)
- Electrical Details (E)

05.10.02 DESIGN CRITERIA

General Design Requirements

Electrical designs shall be in compliance with the latest edition of the City of Los Angeles Electrical Code.

Utilities

1. Removal or Relocation. It should be determined whether existing DWP power poles or SBC telephone poles are to be removed or relocated.
2. Time and Materials Accounting. Separate accounting for time and materials should be maintained when planning DWP pole and appurtenance relocations (to be used for shared costs).

Fire Protection

1. Electrical Wiring. Where required (e.g., timber wharf), electrical wiring shall be provided for the fire protection system.

2. Alarm System. The designer shall determine whether a sprinkler system exists (and the number of sprinkler heads). If there are at least 100 heads, a fire alarm system is required.

Lighting Poles Near Wharf

When setting poles near a wharf, there shall be no horizontal or vertical interferences with the back reach of the container cranes. The minimum clear space is 200 feet from the face of the wharf to the center of the light pole.

Crane Conductor Bar System

1. Bill of Materials. The following bill of materials should be specified as being provided by the contractor:

   a) Hot stick, splice cover remover (Insul 8, Cat. No. 2202).

   b) High voltage tester (Insul 8, Cat. No. 22030).

   c) Welding fixture (Insul 8, Cat. No. 26322).

2. Delivery. These should be delivered to the Construction and Maintenance Division, with a note added under the bill of material list that says, "Contractor shall deliver these items to POLA Construction & Maintenance Division at Berth 161. Contact _____at Extension _____ _____."

Details

Details shall be designed and included for the following:

1. Wharf Telephone Box.

2. Wharf Electrical and Telephone Outlet Box.

References

Each drawing reference shall be complete in and of itself. Following is an example of how references should be made (with an incorrect sample in parentheses, if appropriate):

1. Fixture type "A" = 40 foot steel pole, double arm, with two 400W. H.P.S. [high pressure sodium] lamps.

2. Fixture type "B" = 40 foot steel pole, double arm, with one 400W. H.P.S. lamp (rather than "similar to 'A,' except with one 400W. H.P.S. lamp").

3. Fixture type "C" = 40 foot steel pole, double arm, with two 400W. Metal Halide lamps (rather than "similar to 'B,' except with metal Halide lamps").

4. Fixture type "D" = 30 foot steel pole, double arm, with two 400W. Metal Halide lamps (rather than "similar to 'C,' except 30 foot pole and 2 Metal Halide lamps").

Panelboard Schedule

A separate electrical panel-board schedule shall be shown for each and every panel-board, even if they are identical. Each panelboard shall also be identified by its own unique name (e.g., Panelboard A and Panelboard B).

Wiring

All circuit conductors shall be copper with Type THHN/THWN insulations, 600V rating. Equipment grounding conductors shall be sized adequately to withstand short circuits.

Conduits

1. Location. No changes from the design of horizontal, vertical, or underground conduit shall be made without first obtaining permission from the Chief Harbor Engineer. The contractor's "as-built" prints must show all changes in conduit positioning and depth.

2. Materials.

   a) All underground conduits shall be non-metallic PVC unless noted and installed in accordance with code requirements.

   b) The terminating 10 feet of all nonmetallic conduit (measured from the finish surface) shall be rigid metal conduit with bonded 40 mil PVC coating manufactured by KORKAP, CARLON, or an approved equal, UNO on drawings.

c) All P.V.C. conduit shall be Schedule 40, unless otherwise noted.

3. Underground Conduit Bends.

   a) All underground conduit bends, except at the termination of a conduit run, shall be Schedule 80.

   b) In installing nonmetallic PVC conduits underground, all bends of 30 degrees and over shall be Schedule 80.

4. Minimum Depth. The minimum depth of direct burial conduits shall be 3 feet, 6 inches from the finished surface, unless otherwise noted.

5. Grounding. The contractor shall ground all electrical equipment and conduit systems to meet code requirements.

6. Buried Stub-Outs. All underground conduit buried stub-outs shall be furnished with concrete monuments 6 inches x 6 inches x 15 inches deep buried flush with the finished surface over the capped ends and a 3 inch square brass plate identifying the number and sizes of conduits.

7. Detection Tape. Detection tape shall be used over all conduits.

Metal Nameplate

A metal nameplate shall be provided for all electrical equipment. The nameplate shall provide equipment operating parameters.

Ground Fault Protection

Ground fault protection shall protect the circuit line wiring from line to ground short circuiting with a response time documented by calculations.

05.10.03 CALCULATIONS/WORKSHEETS

Worksheets shall be prepared for Crane Bus System Calculations, Voltage Drop Calculations, Branch Circuit Calculations for Wharf Outlet and Short Circuit Calculations per current POLA practice.

05.10.04 GRAPHIC CRITERIA

The Graphic Criteria for Wharf electrical design set shall include but not limited to the following list below. The sheets shall be prepared per the POLA CADD manual and arranged with the general order as prescribed herein. Additional sheets may be inserted in the electrical design package as necessary.

- Notes, Symbols, Key Map, Abbreviations.
- Overall Electrical Site Plan – Show overall conduit run, switchgear locations, light pole locations, wharf electrical box locations, AMP box location(s), etc.
- Single Line Diagram, Load Schedules, Worst Case Voltage Drop Calculations
- Power Plans (show power plan for the wharf)
- Power Trench Plan --, show crane bus bar in the trench with clearance dimensions
- Lighting Plans Fixture Schedule, Lighting System Details
- Typical wharf section showing electrical conduit run and expansion joint design
- Switchgear equipment layout, fencing, conduit layout, and grounding grid
- AMP outlet design details, box elevation, and connector details
- Miscellaneous Electrical Details – Switchgear pad layout, switchgear elevation, pull box details, grounding details, Power Trench detail, underground conduit section, and underground conduit stub up detail.
- Panel Schedules

05.10.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications relate to wharf electrical (other sections may be required, depending upon the project):

SECTION TITLE
Basic Electrical Materials and Methods
Wharf Receptacle Assemblies
Rigid Galvanized Steel Conduit
PVC Conduit
600 Volt or Less Wiring System
Outlet, Junction and Pull Boxes
Grounding System
Crane Conductor Bus

05.10.06 PERMITS/APPROVALS

The following permit may be required when there is wharf electrical work:

Building and Safety Permit

Necessary wharf permits/approvals are covered in the Basic Wharf Design section, Permits/Approvals. An electrical permit is required for all electrical equipment, obtained by a C-10 contractor following the designer's submission of the electrical plans (per Electrical Code Section 93.0206), for plan check and approval by City of Los Angeles Department of Building & Safety. Examples of when a plan check is required are as follows:

1. A disconnecting means exceeds 400 amperes.

2. The new loads added exceed 400 amperes.

3. High voltage (greater than 600V) is required for electrical service.

05.10.07 ENVIRONMENTAL CONSIDERATIONS

1. The wharf design shall include alternative maritime power (AMP) vault design.

2. AMP vaults shall be located strategically at the wharf, to accommodate various vessels berthing patterns, specific to the wharf user.

3. Each AMP vault shall include 2 amp outlets, each rated 350a, 6.6kv, 30 phase, 60hz.

05.10.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2359 Pier 400 Container Wharf Phase II – Berths 404-406.

1-2359 E-1	Electrical Notes, Symbols, and Abbreviations
1-2359 E-11	Grounding & Expansion Joint Details
1-2359 E-6-9	Wharf Electrical Plan
1-2359 E-12	Wharf Power & Telephone Box Details
1-2359 E-18-24	Crane Bus Plan
1-2359 E-15, 27-28	Electrical Details
1-2359 E-12	Switchgear Concrete Pad Layout
1-2359 E-25	High Mast Light Pole
1-2359 E-26	Pull Box & Maintenance Hole Schedule & Details
1-2359 E-16	Crane Power Pad & Interchange
1-2359 E-14,17	Transition Section Pad Details

LAHD Standard Plans

06 SPECIAL FACILITIES

06.01 STREETS

06.01.01 OVERVIEW

This section contains the following information related to the preparation of street contract drawings:

- Cover Sheet (T-1)
- Title Sheet (T-2)
- Street Plan and Profile (C)
- Street Cross Sections (XX)
- Street Lighting Plan and Details (E)
- Traffic Signal Plan (TS)

06.01.02 DESIGN CRITERIA

General Design Requirements

1. Street Design. Street design (other than for backland) shall be performed in accordance with the Department of Public Works (P.W.), Bureau of Engineering's Street Design Manual, and/or CALTRANS Highway Design Manual, unless specified in these Guidelines or otherwise approved.

2. P. W. Jurisdiction. In P.W. jurisdiction:

   a) All contract drawings must be prepared on P.W. supplied border sheets (B-permit plan templates can found in Bureau of Engineering B-permit Templates and Information).

   b) Elevation datum shall be in accordance with P.W. standards using Mean Sea Level as Elev. 0.00

   c) Horizontal Control must be tied to Bureau of Engineering Survey control points.

3. Electrical Design. Electrical design shall be in compliance with the latest edition of the City of Los Angeles Electrical Code.

4. Federal Funding. If federal funding is paying for improvements, CALTRANS or other standards may be applicable.

Port Truck Traffic

The traffic index in the P.W. Street Design Manual should be adjusted to account for the concentrated truck traffic in the Port.

Structural Paving Section

The street structural paving section shall be designed to withstand CALTRANS H-20 loadings in accordance with Chapter 600 "Design of the Pavement Structural Section." If the street is in the backland and container loading occurs regularly, an increased structural paving section will be required.

Traffic Signals

Traffic signals shall be designed to the Los Angeles Department of Transportation's criteria.

Street Signage

Signage on Port streets shall meet the criteria as set forth in the U.S. Department of Transportation's manual, Uniform Traffic Control Devices.

Street Striping

Striping on Harbor Department streets shall meet the criteria as set forth in the CALTRANS Traffic Manual, Chapter G ("Markings"), and the Los Angeles Department of Transportation design standards. Refer to Striping and Fencing, 03.02.

Lane Width

The street lane width should be consistent with the volume of truck traffic, turning movements, and Public Works standards (if applicable).

Street Fencing

Fencing should be set back to provide an adequate sight distance for driveway egress and to allow for placement of traffic signage (i.e., speed signs, "stop" signs). Refer to Striping and Fencing, Section 03.02.

Street Design Considerations

Street design shall consider many factors for inclusion in the design. Some key components are the following:

1. Selection of Design Speed
2. Geometric Design Elements. These design elements include vertical and horizontal alignment, and sight distance
3. Other Street features such as widths of pavement and shoulders, horizontal clearances, etc.
4. Design Capacities. The design capacity is the maximum volume of traffic for which a projected highway can provide a selected level of service (LOS)
5. Street Utilities (i.e., gas, water, power, sewer, phone, fire protection)
6. Drainage needs
7. Other street elements such as curbs, gutters, sidewalks, fencing, etc.
8. Lighting needs and levels
9. Available right-of-way
10. Bicycle lane requirements
11. Traffic requirements
12. On-street parking requirements
13. Landscaping requirements

Cross Sections

The number of street cross sections provided shall be adequate to allow for the accurate calculations of the volume of cut and fill.

Curb Return Radii

The minimum curb return radii at street intersections shall not be less than 25 feet. If there is extensive truck traffic, turning radii shall be designed to accommodate California semi-trailer truck turning movements as shown in the CALTRANS Highway Design Manual (Chapter 400).

Future Expansion

The design of the street should take into consideration future expansion into backland areas, with the design of the structural section being consistent with the proposed backland.

Street Landscape

The designer shall consider whether electrical service and wiring are required for street landscape. A conduit and wire system shall be used for wiring the controllers in the landscape irrigation system. Direct Burial Type wiring is not acceptable. For further information, see the Landscape section, 03.09.

Electrical Utilities

1. Removal or Relocation. The designer should consider whether existing D.W.P. power poles or SBC telephone poles are to be removed or relocated.

2. Time and Materials Accounting. Separate accounting for time and materials should be maintained when planning D.W.P. pole and appurtenance relocations (to be used for shared costs).

3. D.W.P. Notification. The D.W.P. Design Engineer should be notified two working days in advance of construction.

Street Lighting

1. Photocell. Street lighting shall be controlled by a photocell.

2. Computer Printout. Where street lighting is involved in a design, a lighting distribution computer printout of the final arrangement should be obtained from the lighting fixture manufacturer (not necessary for small projects).

3. Street lighting shall be high pressure sodium, cutoff type fixture.

4. See Sec 03.14 for lighting fixture drawing reference.

Wiring

All circuit conductors for lighting shall be copper with Type THHN/THWN insulation, 600V rating for all conductors. Equipment grounding conductors shall be sized adequately to withstand short circuits.

Lighting Conduits

1. Location - No changes from the design of horizontal, vertical, or underground conduit shall be made without first obtaining permission from the Chief Harbor Engineer. The contractor's "as-built" prints must show all changes in conduit positioning and depth.

2. Materials:

   a) All underground conduits shall be non-metallic P.V.C. unless noted and installed in accordance with code requirements.

   b) The terminating 10 feet of all non-metallic conduit (measured from the finish surface) shall be rigid metal conduit with bonded 40 mil P.V.C. coating manufactured by KORKAP, CARLON, or an approved equal.

   c) All P.V.C. conduits shall be Schedule 40, unless otherwise noted.

3. Underground Conduit Bends:

   a) All underground conduit bends, except at the termination of a conduit run, shall be Schedule 80.

   b) When installing non-metallic P.V.C. conduits under-ground, all bends of 30° and over shall be Schedule 80.

4. Minimum Depth - The minimum depth of direct burial conduits shall be 3 feet, 6 inches from the finished surface, unless otherwise noted.

5. Grounding - The contractor shall ground all electrical equipment and conduit systems to meet code requirements.

6. Buried Stub-Outs - All underground conduit buried stub-outs shall be furnished with concrete monuments 6 inches x 6 inches x 15 inches deep, buried flush with the finished surface over the capped ends and a 3 inch square brass plate identifying the number and sizes of conduits.

7. Detection Tape - Detection tape shall be used over all conduits.

Metal Nameplate

A metal nameplate shall be provided for all electrical lighting equipment. The nameplate shall provide equipment operating parameters.

06.01.03 CALCULATIONS/WORKSHEETS

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

06.01.04 GRAPHIC CRITERIA

Street plans shall have the following sheets prepared per the POLA CADD manual:

1. Cover sheet which should show project title specification number, initial signatures and professional engineer’s stamp.
2. Title sheet which should contain project name, vicinity map, index to drawings, sitte plan, phasing/routing plan and general project notes
3. Street plan and profile. Should show profile grid, street profile, existing and proposed substructures, proposed street in plan view.
4. Street cross sections which should show profile grid, existing grade lines and proposed pavement surfaces.
5. Street lighting plan and details. Show all proposed surface improvements, existing and proposed substructures at locations of potential conflict only and proposed street lighting.

6. Traffic signal plan showing all proposed surface improvements, exisring and proposed substructures at locations of potential conflict only and proposed traffic signal plan.

06.01.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications relate to streets (other sections may be required, depending on the project):

SECTION TITLE
Earthwork
Trench Excavation and Backfill
Crushed Miscellaneous Base
Asphalt Concrete Paving
Slurry Seal
Pavement Markings
Cold Planing Existing Pavement
Cast-In-Place Concrete
Basic Electrical Materials and Methods

06.01.06 PERMITS/APPROVALS

The permits/approvals listed below may be required when there is street work:

Department of Water and Power Approval

The designer is responsible to coordinate with and secure approval from the Department of Water and Power (DWP) for the type of service and service location. Subsequently, the contractor shall be responsible for coordinating and obtaining service from DWP.

Department of Building and Safety Permit

An electrical permit may be obtained following submission of plans and approval during the plan check process. A plan check is required (Plan check requirements are per Electrical Code Section 93.0206) in the following cases:

1. An overcurrent device exceeds 400 amperes.

2. The additional loads exceed 400 amperes.

3. When high voltage (greater than 600V.) is required for electrical service.

Department of Public Works (P.W.) Permit

A "B" permit is also required when the street is in P.W. jurisdiction. This is a two-part permit -- a "BD" permit for plan checking/approval and a "BC" permit for construction and inspection.

Fire Department Approval

Approval is required from the Los Angeles Fire Department whenever fire hydrants are required or vehicular access is modified.

06.01.07 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2206 Pier 400 Transportation Corridor.

- 1-2206-1 Cover Sheet
- 1-2206-2 Title Sheet
- 1-2206-3 Title Sheet
- 1-2206 C-8 Street Plan and Prifile
- 1-2206 C-29 Street Cross Sections
- 1-2206 E-8 Street Lighting Plan and Details

LAHD Standard Plans

06.02 MARINAS

06.02.01 OVERVIEW

This section contains the following information related to the preparation of the following small craft marina contract drawings:

- Berth Layout (FL)
- Float Details (FL)

06.02.02 DESIGN CRITERIA

Guideline References

In the design of a marina, the following references shall be consulted (however, design criteria specified in 06.03.02 have precedence over these documents):

1. Layout & Design Guidelines for Small Craft Berthing Facilities, California Dept. of Boating and Waterways, 1984 (or later edition).
2. Small-Craft Harbors: Design, Construction, and Operation, U.S. Army Corps. of Engineers, 1974 (or later edition).
3. Layout, Design and Construction Handbook for Small Craft Boat Launching Facilities, California Dept. of Boating and Waterways, 2000.
4. Planning and Design Guidelines for Small Craft Harbors, American Society of Civil Engineers, Manual 50, 1993.

Depth of Water Areas

The minimum depth of water areas shall be 10 feet when the sea level is at 0.00 Mean Lower Low Water (M.L.L.W.) The depth shall be increased if required by vessel characteristics or in areas subject to shoaling.

Berths

1. Single Berths. Single berths shall generally be provided, in lieu of double berths.

2. Berth Widths. All berths shall be wide enough to accommodate power boats.

3. Berth Length. The length of a berth must be sufficient so that no part of the vessel extends over the main walkway and no more than 5 feet of the vessel extends into the fairway.

Parking

Information regarding parking lots may be found in the following sections:

1. Landscape, 03.09.

2. Parking Lots, 06.04.

Handicap Access

Handicap access requirements shall comply with the Americans with Disabilities Act (ADA) Standards for Accessible Design.

Sanitary Facilities

In addition to restrooms for marina tenants and guests, separate provisions must be made for the general public.

Launching Ramps

Special consideration must be given to salt water drainage from boats and trailers retrieved from the bay. As this drainage accelerates the deterioration of A.C. pavement, concrete wash down areas should be provided as close to the launch ramp as practical, with sealants applied to A.C. surfaces.

Finger floats

Finger floats with an intermediate pile shall be a minimum of five feet wide.

Guide Piles

1. Cut-Off. Guide piles shall be cut off at +14 M.L.L.W.

2. Materials. Concrete piles are preferred (for durability and strength) over treated timber piles.

3. Installation Tolerances. Installation tolerances for guide piles must be coordinated with the adjustability of the pile guides. It is common for piles to move slightly during driving due to soil conditions in most of the harbor.

4. Lateral Loads. Lateral loads from berthing impact are considered separate and not additive to wind, wave, and current loads.

Loadings for Floating Structures

1. Buoyancy Calculations. Buoyancy calculations must be approved prior to the fabrication of any floats.

2. Additional Buoyancy. Additional buoyancy shall be provided at finger ends where there is a guide pile and at all locations of point loads.

3. Float Balance. Concrete float units shall be weighed with a "3 point" scale to determine if the float is balanced. Unbalanced floats can be staggered to re-store balance.

4. Freeboard. Dead load maximum freeboard shall control over live load minimum freeboard.

Thin-Wall Concrete Floats

The concrete mix design curing method and the casting yard handling are critical elements in minimizing cracking of thin-wall concrete floats.

Flotation

Flotation shall be integral with or securely attached to the dock structure and adequately protected from damage, deterioration, and water absorption so that no buoyancy is lost as the facility ages.

Future Maintenance Dredging

Floating structures shall be laid out to allow for future maintenance dredging near storm drain outfalls or other areas subject to shoaling.

Gangways

1. Friction. To minimize friction in gangway hinges and toeplates, U.H.M.W. polyethylene or nylon bushings/rub strips may be utilized.

2. Slip Resistance. The slip resistance of the gangway deck non-skid surface material shall be verified under both wet and dry conditions prior to approval.

3. Handrail. Incorporating a truss-type handrail as a structural element of the gangway will minimize its weight.

4. Dimensioning. When dimensioning gangways, the run out distance over the entire tidal range should be carefully considered. The toe plate length should be included.

5. Maximum Slope. Handicap access requirements shall be considered in selecting maximum slope.

6. Security. Unauthorized access to floating docks shall be discouraged by providing a locking gate at the upper end of each gangway. Exiting from the dock shall not require a key.

Water Service

1. Approval. The approval of the combined domestic/ fire water service for floats shall be obtained early in the project from both the Los Angeles Fire Department and City of Los Angeles Department of Building & Safety.

2. Flexible Hose Connections. Special attention shall be paid to flexible hose connections to shore service to ensure durability, serviceability, and unrestricted movement over the tidal range. Special approval from City of Los Angeles Department of Building & Safety is required, and the Plumbing Code does not recognize flexible hose connections.

3. Hose Bibb. One hose bibb shall be provided for each berth. The Plumbing Code requires an anti-backflow device.

4. Color of Fire Hose Cabinets. Yellow (rather than red) fire hose cabinets shall be utilized, as the yellow color is more stable under sunlight.

5. Isolation Valves. Isolation valves shall be installed at frequent intervals on the float water system to minimize out-of-service time when maintenance is required.

6. Above Sea Level. All water service lines shall be installed above sea level.

Electrical

1. Grounding. The float electrical system, including transformers, shall be grounded to a landside ground rod (rather than to a ground plate immersed in sea water) to minimize the chance of stray currents affecting nearby vessels.

2. Considerations. Some considerations the designer should analyze are:

   a) Whether to include a public address system and/or on-dock phones.

   b) Methods of placing transformers on a floating dock, so that feed from shore may be 480V.

   c) Whether metering of power to individual slips is required and/or meters should be remote reading or integrated with the marina management system.

3. Lighting. Main walkway floats shall be lighted with low mounted fixtures to minimize the glare to approaching vessels. Lighting levels shall consider spillover from adjacent sources.

4. All electrical lines shall be installed above sea level.

Appurtenances

1. Shoreside Lockers. Rental lockers may be provided for boaters at convenient locations on shore, preferably in conjunction with restroom facilities. These lockers should be no less than 6 feet high, 2 feet wide, and 2 1/2 feet deep.

2. Dinghy Storage. An adequate storage space shall be provided for dinghies. A minimum 6 foot width of the main float walkway is to be maintained if used for dinghy storage.

3. Trash. Adequate trash containers shall be provided near the head of each gangway.

4. Oil Disposal. An acid-resistant waste oil collection system shall be provided for disposal of waste engine oil and hydraulic fluids.

5. Dock Lockers. One dock locker box constructed of durable maintenance-free materials shall be provided for each berth. Dock lockers shall not be used for supporting of utilities.

6. Signage. A signage program shall be developed to mark fairways, gangways, and individual berths for both waterside and landside users (see Signage, 06.02).

7. Debris. The need for debris booms to trap debris carried into the marina by storm drains or other inflows shall be considered.

Materials

1. Selection Process. Materials should be selected based in part on minimizing long-term maintenance requirements. Selection of the most appropriate material for any application is a compromise of many considerations, made even more difficult by structures utilizing a composite of multiple materials.

2. Wood Products. Usage of timber, plywood, or other wood products in or near the splash zone should be avoided or minimized because of the potential for deterioration in this wet, damp environment. Protective coatings, fasteners, and pressure treatment of wood with preservatives are not recommended as they may not perform adequately over the long term due to environmental factors.

3. Plastics. Plastics must be evaluated for the specific formulation and application proposed. Plastics are subject to deterioration and cracking from ultra-violet radiation and other environmental factors. The chemical formulation, including color, may inhibit, but will not prevent this deterioration. Use of any plastic (glass fiber reinforced, polyethylene, poly vinyl chloride, recycled, etc.) should be based on a successful long-term similar application.

4. Concrete. Concrete performance is dependent upon application, mix design, curing, finishing, and handling. All these factors must be addressed care-fully in specifying concrete for thin-wall floating docks.

5. Aluminum Alloys. Aluminum alloys, as well as the anodizing or other finishes, should be appropriate for the marine environment (e.g., the anodizing specification must consider durability and thickness). The final appearance of anodized aluminum is influenced both by the anodizing process and the base alloy.

Landscape

For landscape information, the designer should consult Landscape, 03.09 in these Guidelines.

06.02.03 CALCULATIONS/WORKSHEETS

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

Calculations and worksheets shall be prepared for pile design, floating dock structural design, electrical design, water system design, and floating dock buoyancy/freeboard.

06.02.04 GRAPHIC CRITERIA

The following are required in the contract drawings when there is marina work:

- Berth Plan
- Float and Dock Details

06.02.05 SPECIFICATIONS

There are no Harbor Department Master Specifications relating specifically to marinas. However, some wharf and signage specifications sections are pertinent. Specifications for marinas shall include floating docks and appurtenances, gangways, guidepiles, electrical/plumbing systems, and signage.

06.02.06 PERMITS/APPROVALS

The permits/approvals listed below may be required for marina work:

Army Corps. of Engineers Permit

This permit is required whenever there is construction in the water.

California Regional Water Quality Control Board Permit

This permit is required whenever there is construction in the water and/or dredging.

Fire Department Approval

The water system layout and fire protection features must be approved by the Hydrant Unit of the Los Angeles Fire Department prior to applying for a City of Los Angeles Department of Building & Safety permit.

Department of Building & Safety Permits

1. Electrical. An electrical plan check is required for marina construction. The electrical permit may be obtained by the contractor once the plans have been approved.

2. Plumbing. A plumbing plan check is required. The plumbing permit may be obtained by the contractor once the plans have been approved.

06.02.07 ENVIRONMENTAL CONSIDERATIONS

Use industry Best Management Practices to control pollution sources such as fuel spills, oil from oily bilges, litter, storm water runoff, used solvents and cleaners, and sewage.

Evaluate all materials such as paints and coatings to ensure that they are not harmful to the marine environment.

06.02.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-1430 West Channel/Cabrillo Beach Recreational Complex.

1-1430 F-1-8 Berthing Layout – Site 1 through 8

1-1430 F11-18	Electrical Layout – Site 1 through 8
1-1430 F-21-28	Plumbing & Locker Box Layout – Site 1 through 8
1-1430 F-32	Fuel Dock Layout – Site 3
1-1430 F-33	Utility Installation / Locker Box Details
1-1430 F-34-35	Utility Installation Details
1-1430 F-36-38	Electrical One Line Diagrams
1-1430 F-39	Aluminum Gangway
1-1430 F-40	Prestressed Concrete Pile Details
1-1430 F-41	General Float Details
1-1430 F-42	Concrete Flotation Module
1-1430 F-43	Mooring Layout Plan
1-1430 F-44	Mooring Details
1-1430 F-45	Dredging Plan
1-1430 F-46	Signage Layout Plan
1-1430 F-47	Float Signage Details

LAHD Standard Plans

06.03 PARKING LOTS

06.03.01 OVERVIEW

This section contains the following information related to the preparation of parking lot contract drawings:

- Striping Plans -- Parking Lot (SP)

06.03.02 DESIGN CRITERIA

General Design Requirements

Parking lot designs shall comply with:

1. City of Los Angeles Building Code. Building or portions of buildings shall be accessible to persons with disabilities. The design and construction of accessible building elements shall be in accordance with chapter 11A and section 1114B.1.1.

2. City of Los Angeles Planning and Zoning Code. Section 12.21 of this Code specifies general parking lot requirements, including number of parking spaces required, driveway dimensions, enclosure wall requirements, landscaping, required bicycle parking, employee shower facilities, and requirements and limitations for signage and fencing. There is some flexibility regarding the City's requirements when parking lots are designed for Port property that is not adjacent to or adjoining a public street. The Planning and Zoning Code requirements vary for the different land use zones found on Port property. Contact the property manager for the specific project site to determine the land use zoning.

3. City of Los Angeles Department of Building & Safety (LADBS). Use the LADBS Information Bulletin / Public - Zoning Code publication titled “Parking Design,” document number P/ZC 2002-001, as a guide to design.

4. Refer to the following sections of these Design Guidelines for additional information: Fencing, 03.02; Striping, 03.04; Grading and Paving, 03.06; and Landscape, 03.09.

Types of Vehicles

The designer shall be aware of all types of vehicles which may use or pass through the parking lot: They may include automobiles, recreational vehicles, boat trailers, trucks, and cargo handlers.

Parking Lanes

Design parking lanes with internal circulation (i.e., avoid dead end parking lanes). LADBS information buletin "Parking Design" specifies minimum widths for lanes serving as access to parking stalls.

Stalls

1. Standard Stalls. Standard stall dimensions are 9 feet wide and 18 feet long.

2. Compact Stalls. Minimize the number of "compact only" spaces. Compact stalls are narrower and shorter than standard stalls, with dimensions of 8 feet wide and 15 feet long. When compact stalls must be used to provide the minimum number of required parking spaces, place them at the ends of the aisles to minimize obstruction of the circulation pattern.

3. Handicapped Stalls. Handicapped stalls (number of stalls, stall dimensions, signage, and pavement markings, etc.) shall comply with the State of California Architectural Barriers Law (Parking Requirements). Use the LADBS Information Bulletin / Public - Building Code publication titled "Accessibility Details for Parking," document number P/BC 2002-084 as a design guide

4. Stall Wheel Stops. Minimize use of wheel stops. Wheel stops interfere with street sweeping equipment and form ground level dead air zones where debris accumulates. Wheel stops should only be used in parking lots when necessary to avoid damage to structures. Use parking row medians where space allows.

Parking Row Medians

1. Paved. A raised median with paving or other architectural surface treatments is preferred between parking rows rather than the use of wheel stops.

2. Landscape. City of Los Angeles Zoning Code requires that a given percentage of landscaping be constructed interior to parking lots. Refer to Section 12.21 of City of Los Angeles Planning and Zoning Code for landscaping requirements. Design landscaping irrigation and drainage to contain water within medians. Do not allow irrigation water to drain across paved surfaces. Avoid median landscape treatments which obstruct parked vehicles. Include paved walk-throughs for pedestrian circulation. Consider using recessed perimeter landscaping to treat runoff by bioretention and biofiltration to reduce runoff flow rates and to reduce pollutant loadings.

3. Curb. Where parking paving abuts landscape, a 6 inch high concrete curb shall be used to retain landscape materials, unless the landscaping is recessed to serve as initial runoff treatment. Curbs shall be Type "C" as shown in Department of Public Works Standard Plan S-410-2, Types of Curb and Gutter. Gutter width for perimeter curbs shall be 2 feet. Gutter width for median curbs shall be 1 foot.

Striping

General striping shall be 4 inch wide white lines. Striping for handicapped stalls shall be 4 inch wide blue lines. Striping between stalls shall be double 4 inch wide lines 24 inches apart (from the outside of one line to the outside of the other line). Standard 9 foot wide parking stalls include 1 foot of between-stall striping on each side, so that the clear space for each 9 foot stall is 7 feet.

Pavement

A typical pavement section for areas not subject to heavy load vehicles shall be 3 inches A.C. on 4 inches C.M.B. Asphalt Concrete shall be Class C, AR-8000 or PG 64-10. Test existing soil to confirm the adequacy of a typical section and compact in conformance with the project specifications.

Drainage

Divert drainage away from structures. Maximum slope within accessible parking area shall not exceed 2%. Drain to grated drainage structures, curb inlets, or to the street. Use grates with spacings designed to allow safe bicycle traffic.

06.03.03 CALCULATIONS/WORKSHEETS

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

06.03.04 GRAPHIC CRITERIA

Parking lot drawings shall be prepared per the POLA CADD manual and may consist of the following sheets:

Cover Sheet

This sheet contains the title, specification number, and initial signatures and stamps.

Title Sheet

1. This sheet contains the title information including the project name, vicinity map, index (drawing numbers/names, standard plans, and reference drawings), general project notes (with abbreviations and general legend), and the vicinity map.

Site Plan

1. This sheet includes an abbreviated general summary of what exists on the site after removals and what the overall results of the project are going to be.

Parking Lot Plan

This sheet should show coordinates, distances and bearings on the site parcel.

Phasing Plan

This sheet should show the main proposed surface improvements (site plan), project boundaries, phasing boundaries, temporary fencing, contractor storage area, and area fill.

06.03.05 SPECIFICATIONS

The following sections in the Master Specifications have applicability for parking lots.

SECTION TITLE
Earthwork
Trench Excavation and Backfill

SECTION TITLE
Crushed Miscellaneous Base
Asphalt Concrete Paving
Slurry Seal
Pavement Markings
Cold Planing Existing Pavement
Chain Link Fences and Gates
Cast-In-Place Concrete
Paints and Coatings
Basic Electrical Materials and Methods

06.03.06 PERMITS/APPROVALS

The permits/approvals listed below may be required when there is parking lot work:

Bldg. & Safety Permit

Submit the parking lot plans to Bldg. & Safety for plan check and approval, and to obtain a building permit.

Department of Public Works (PW) Permit

Driveways entering a public street require a P.W. permit.

Department of Transportation (DOT) Approval

DOT approval may be required prior to issuance of the PW permit.

06.03.07 ENVIRONMENTAL CONSIDERATIONS

All projects must comply with the Endangered Species Act. Check all projects for the presence of threatened or endangered species.

The Historic Preservation Act requires federal agencies to consider the effects of their actions on historic site, structures, or other cultural resources.

Projects must take into consideration the impacts to the environment of project related noise.

Parking lot striping shall comply with the National Ambient Air Quality Standards. Paints and solvents shall comply with requirements of the Southern California Air Quality Management District (SCAQMD) as well as stormwater regulations.

Parts of NEPA and SEQR require that the Visual Environment be considered for all projects. A visual assessment would take into consideration the views "to and from " the project.

Comply with California State Laws that apply whenever a project is directly undertaken, funded, or approved by local, regional, and state agencies. SEQR is more restrictive than NEPA.

Projects that have been determined to have significant impacts to the environment require preparation of an Environmental Impact Statement.

06.03.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2209 Pier 400 Backland Phase I – Berths 401-403

1-2209 SP-1A Master parking plan and legal description

1-2358 Pier 400 Backland Phase II – Berths 404-406

1-2358 SP-43 Striping Details

City of Los Angeles Building Code – Chapter 11B Accessibility to Public Buildings, Public Accommodations, Commercial Buildings & Public Funded Housing

Table 11B-6 Spaces Required

Figure 11B-18A Double Parking Stalls

Figure 11B-18B Single Parking Stalls

Figure 11B-18C Diagonal Parking Stalls

Figure 11B-24 Access Aisle at Passenger Loading Zones

City of Los Angeles Department of Building & Safety Information Bulletin / Public - Zoning Code

P/ZC 2002-001	Parking Design
P/BC 2002-084	Accessibility Details for Parking

LAHD Standard Plans

06.04 RAIL YARDS (INTERMODAL)

06.04.01 OVERVIEW

This section contains the following information related to the preparation of intermodal rail facility contract drawings, including but not limited to:

- Site Plan (RR)
- Cross Sections (XX)
- Track Alignment Plan (RR)
- Railroad Track Plan and Profile (RR)
- Compressed Air Plan (M)
- Compressed Air Details (M)

06.04.02 DESIGN CRITERIA

General Design Requirements

Railroad design shall meet the regulations, standards, and requirements of the following (any conflicts which arise must be resolved with the entities impacted):

1. General Orders of the California Public Utilities Commission (CPUC) [all Port railroad facilities are under the jurisdiction of the CPUC].
2. Harbor Department (as specified in these Guidelines or as otherwise approved by the Chief Harbor Engineer).
3. Pacific Harbor Line (which has a maintenance responsibility).
4. American Railway Engineering & Maintenance of Way Association's (AREMA) Manual for Railway Engineering.

Related Sections

The designer should refer to the Backland (Section 03) and Building (Section 04) Sections of these Guidelines for information which is applicable to and required for an intermodal rail yard.

Equipment Selection

The designer shall allow for flexibility in the equipment selected. With the exception of tenant preferred equipment, the specifications of rail container terminal handling equipment will define the track spacing and requires the evaluation of numerous interdependent factors, such as:

1. Land availability.
2. Operating costs.
3. Development costs.
4. Volume throughput.
5. Mainline access.

Tangent vs. Curved Working Track

Although tangent layouts are preferable, it is assumed that straddle cranes and rubber tire mounted transtainers (overhead cranes) can efficiently load/unload containers on tracks up to 6°00' or 7°00' of curvature.

Track Length

1. Standard Car Length. The standard car length is 305 feet. This is the overall dimension of a five platform, double-stack well car, as manufactured by Gunderson. The designer should check current manufacturer literature.
2. Standard Train Length. The standard train length is twenty-five 305 foot cars (25 x 305 = 7,625 feet).

The track layout for the working or loading yard should accommodate at least one full standard unit train on 4 to 6 tracks depending upon the length of the yard. Four tracks are desirable for the 25 cars while six tracks would be the maximum needed.
The track layout for the storage support yard (if area is available and/or desireable by the customer) ideally should accommodate twice the capacity as the working yard. A 1:1.5 or even 1:1 ratio is acceptable, though yard throughput and capacity will be significantly diminished.

- Transverse Access. The track length should allow for gaps to accommodate transverse access.

- Run Around Track. A run around track should be provided to allow for operational flexibility.

Yard Cross Section

The designer shall submit with the other contract documents a yard cross section. A sample of cross section is included in Reference Drawings. The following information shall be included:

1. Location of tracks, lightpoles, and equipment wheel path at crane pads.

2. Travel and container staging lanes.

3. Utility corridor

4. Center storage, if available.

5. Railroad clearance lines.

6. Perimeter roads and fence.

Compressed Air

1. Car Air Reservoir. The car air reservoir requires 15 cubic feet of compressed air at 85 psig.

2. Repressurization Time. The maximum time for repressurization of the total train system shall be 20 minutes.

3. Location of Hook-Up Outlets. Hook-up outlets shall be located at least at each break of train length.

06.04.03 CALCULATIONS/WORKSHEETS

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

06.04.04 GRAPHIC CRITERIA

Rail yard plans shall be prepared per the POLA CADD manual and may consist of the following sheets:

1. Title Sheet
2. Index of Drawings
3. Coordinate Control Plan
4. Plan & Profile Sheets
5. Cross Sections
6. Details

06.04.05 SPECIFICATIONS

The following sections in the Harbor Department Master Specifications have applicability for parking rail yards (intermodal), other sections may be required, depending upon the project.

SECTION TITLE
Railroad Work
Welding of Rail
Timber & Switch Ties
Storm Drain System
Compressed Air

06.04.06 PERMITS/APPROVALS

Necessary permits/approvals which may be applicable to and required for an intermodal rail yard may be found in the Backland (sections 03.02.07-03.13.07) and Buildings (sections 04.02.07-04.07.07) chapters of these Guidelines.

06.04.07 ENVIRONMENTAL CONSIDERATIONS

Timber Tie Disposal – Removal and disposal of existing timber ties shall conform to Master Specification Sections REGULATORY REQUIREMENTS and RAILROAD TRACK AND ACCESSORIES.

06.04.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2208 Pier 400 ICTF

1-2208 XX-1-22	Cross Sections
1-2208 RR-4-31	Railroad Track Plan and Profile
1-2208 CA-1, 4,13,14	Compressed Air Plan
1-2208 CA-17-24	Compressed Air Details
1-2208 DS-1-18	Storm Drain, Track Drain Plans, and System Details
1-2208 RR-39-40	Switch Protection

06.05 CRANES

06.05.01 OVERVIEW

This section contains information related to the purchase, relocation, and/or modification of dockside gantry cranes in the Port, in addition to related wharf design requirements.

Note: The below information is for modified "A" frame ship to shore dockside container cranes. There are the low profile (shuttle boom) cranes, Inverted "L" or "Gooseneck" crane boom cranes, and Rail Mounted Gantry (RMG) Cranes.

06.05.02 DESIGN CRITERIA

General Design Requirements

During crane fabrication, assembly, wiring, installation, testing, and maintenance, the wharf designer and crane manufacturers shall conform to the pertinent articles and sections of the codes, standards, requirements, and current technical practices of:

1. The organizations included as Miscellaneous Exhibit No. 1 in 06.06.08 (latest version).

2. The City of Los Angeles Electrical Code.

Wharf Designs

Wharf designers should perform the following functions to take into account container crane requirements:

1. The wharf crane girders shall be designed for 50 kips per linear foot (working load). Crane manufacturers design the cranes within these load restrictions.

2. Clearances at and above ground level shall be checked to ensure that they are adequate for crane operation both laterally and tranversely along the wharf.

3. Elevation differences between seaside and landside gantry rails shall be noted for crane move or delivery for the raising or lowering of the seaside crane legs.

4. Verify the power supply voltage level if it is 4.16 kv and power connection (conductor bar or cable) on the wharf for the crane.

5. Design magnetic stations (positions) at transition locations, curves, places of obstructions, and/or at specific locations (for crane slow gantry) due to safety considerations and electric power source distribution transfers.

6. Verify limitations and conditions to wharf's loading and operations (e.g., wharf load distribution on loading the container crane from a barge onto the wharf).

7. Verify crane operational live load is within the wharf's loading and design limits.

8. Verify that wharf stowage pin sockets will align with stowage pins on the crane.

9. Ensure that crane's as-built scaled drawings are provided (a reproducible set plus 4 copies), indicating any deviations from the original design.

10. Notify the terminal operator, purchaser, or crane owner involving any changes to the wharf, as it may alter the crane design, fabrication, or relocation plans.

11. Coordinate with crane manufacturer for safe delivery and water transport clearance under Vincent Thomas Bridge during lower low water condition.

Equipment Minimum Performance

To determine the minimum performance of ship to shore crane equipment, the following items shall be considered:

1. Lift capacity at all crane trolley positions and at maximum outreach:

   a) Under twin 20 ft. Spreader - 65 LT

   b) Under Cargo Hook - 100 LT

2. Operating speeds, including those of:

   a) Long travel (gantry), against 45 mph wind.- 150 fpm

   b) Cross travel (trolley loaded), against 45 mph wind - 800 fpm

c) Cross travel (trolley unloaded) - 800 fpm

d) Hoist (rated load) - 250 fpm

e) Hoist (no load) - 600 fpm

f) Lowering hoist (rated load) - 250 fpm

g) Lowering hoist (no load) - 600 fpm

h) Time to raise or lower boom - 2.5 min. to boom stowed position, and 4.5 min. to boom horizontal maintenance position.

i) Acceleration and deceleration time (gantry) with rated load, time to full speed into a 50% wind load - 5.0 sec.

j) Acceleration and deceleration time (trolley) with rated load, time to full speed into a 50% wind load - 4.5 sec.

k) Main hoist:

1) With rated load acceleration, time to rated speed - 2.0 sec.

2) With rated load deceleration, time from rated speed to stop - 1.5 sec.

3) With empty spreader acceleration time to maximum speed - 4.0 sec.

4) With empty spreader deceleration, time from rated speed to stop - 2.5 sec.

3. Trolley: Fleet through rope towed or machine on trolley.

4. Gantry: Equalizer system articulation feature – 8 wheels per main leg.

5. Main Hoist Removal:

a) Four Fall reeving system with anti-sway (electronic)

b) Trim/List/Skew with rope snag protection

c) Slack rope detection

6. Electric Drive:

a) TMEIC GE all AC in all motions with crane LCMS and RCMS crane management features, Ethernet communications between crane drive controller, operator interface, and yard management with latest Microsoft Windows configuration.

b) 4160 VAC, Cable reel with fiber optic or connector bus, trolley festoon system, headblock cable reel

7. Paint System: "No Lead"

8. Warranty:

   a) Crane Structure - 10 to 20 yrs

   b) Crane machinery – 5 yrs

   c) Electrical components – 2 yrs

   d) Components that are replaced during the warranty period - 5 yrs. After intallation

   e) Paint Guarantee - 10 yrs. Degree of rust shall be no more than ISO4628/3-1982/E.

   f) Galvanizing guarantee - 10 yrs.

   g) Software Upgrades at no additional cost - 3 yrs.

Equipment Dimensions/Clearances

To determine the appropriate dimensions and clearances for crane equipment, the following items shall be considered:

1. Span between center to center of the gantry crane rail shall be 100 ft. (Rail Gauge).

2. Crane operational outreach from the center of the seaside gantry rail shall be 211 ft., assume 25 ft. space between seaside gantry rail and ship fender.

3. Backreach from landside gantry rail shall be 75 ft.

4. Lift above the top of the rail shall be 120 ft.

5. Lift below the top of the rail shall be 60 ft.

6. Total lift shall be 180 ft.

7. Clearance of 55 ft. shall be between the two seaside main legs.

8. Overall crane width (bumper to bumper) shall be 85 ft.

9. Clear height from the ground to the portal frame shall be minimum of 55 ft.

10. Height to the end of the boom in the raised stowed position shall not exceed 300 ft., and not to exceed 366 ft. in the vertical maintenance position.

Special Features

The following special features (along with any special feature requirements) for a container crane shall be considered, as follows:

1. Bridge crane capacity shall be capable of lifting the heaviest component in the machine house.

2. Trim and list and skew features (±3% from 0).

3. Quick change headblock with a twist lock connection to the lifting beam.

4. Telescopic liftbeam - shall be 20', 40', or 45'.

5. Heavy lift cargo hook - 100 LT.

6. Maximum vertical boom deflection at boom tip with rated load at outreach should not exceed 8 inches from peak to trough.

7. Adequate gantry frame stiffness to avoid dynamic reasonance in trolley and gantry travel.

8. Operator's cab air conditioner and air filtration system with a positive internal air pressure to prevent entry and to filter ship propulsion diesel engine exhaust.

9. Remote ground level control station booth in a locked enclosure for maintenance use, located under the center of the landside sill beam, shall

include all operating controls and indicators for spreader maintenance and gantry display and crane operation with exception to boom operations.

10. Lighting -- shall be 1000 W. High Pressure Sodium, with light fixture mounting arranged to avoid structure obstructions. Walkway lighting shall be incandescent or fluorescent.

11. Communication system -- shall be a minimum of 5 stations (cab, machinery house, boom hoist control station, ground level, and boom tip). System shall be sound powered by Gaitronics.

12. Slack rope limiting system.

13. Electrical power pick-up on the water side of seaside crane trucks.

14. Radio communication sets -- minimum number to be determined.

15. Elevator -- shall be rack and pinion type, with a required number of landing platforms. Minimum performance standards of the elevator cab shall be considered. For example, the elevator cab shall transport a minimum of 900 pounds, and the inside cab area shall transport 3 persons per travel. Speed control with variable frequency speed control.

16. Automatic rail set hydraulic parking brake system.

17. Gantry anti-collision system with slow down shall be an ultrasonic system.

18. Harmonic filter and power factor correction shall correct power to 95% real power on DC electronic drive.

19. Emergency AC drives for boom, trolley, and gantry.

20. Stowage pins -- shall match dock sockets, with emphasis on stowage pin accessibility and clearance for one person to set and remove the pins. The pins, with or without a lever, shall not require more than 40 pounds of force to lift from their storage pockets. They shall be mounted at the center of sill beams.

21. Electrical power source -- shall be 4160 V., 3 Phase, 60 Hertz.

22. Kilowatt hour meter with demand indicator -- shall be installed at ground level.

23. Headblock/spreader electrical connection -- minimum number of conductor ballony cables with the number of Pyle pin connectors to be

determined. Communication shall be through a G.E. Genius communication bus.

24. Control system of the crane and the lifting equipment -- shall be interlocked to provide a "fail safe" system. In case of a power failure and/or control voltage failure, the mechanical braking systems on the crane shall lock in a "hold" position until normal power or control power has been restored.

25. Load cell -- shall be provided to prohibit release of the mechanical braking system when load assurance circuits detect an uneven and/or overloaded cargo.

26. Electric motors -- shall be designed for solid state drives. Motors shall have a 1.15 service factor. A factory certified test report is required for each motor.

27. Brakes -- the main hoist, boom hoist, gantry and trolley brakes shall be disc/rotor type by Bubenzer.

28. Anemometer and alarm system -- shall be 2-stage warning type.

29. Gantry flash warning lights, with audible speakers -- shall be a minimum of 90 db.

30. Electric drive -- shall have a self-diagnostic system, data logging, and event reporting.Encoders -- shall be provided for positioning with key interlocks for bypass.

31. Encoders – shall be provided for positioning with key interlocks for bypass

32. Maximum crane weight -- the number of tons or number of pounds.shall be indicated

33. Crane gantry trucks -- shall be capable of negotiating a radius bend (number of degrees to be determined) of the gantry rail track. Gantry track wheel widths shall be considered.

34. Lightning arrester -- shall take into consideration:

    a) Voltage rating for suitability with the system voltage.

    b) Power current-interrupting rating in terms of system short circuit current.

c) Surge current capacity.

d) Impulse characteristics.

35. Spare parts list for the mechanical and electrical systems (e.g., fuses, lamps, ballasts, circuit breakers, control cards, etc.).

36. Enclosures for spare fuses -- shall have provisions for these, under lock, with instructions on what type of fuses to purchase and the name/address of vender (this requirement is for large fuses not commonly kept on hand or a fuse that is critical to a load it serves).

37. Original set of system drawings, including specifications and dimensions -- shall be of a standard size that can be duplicated.

38. Ship anti-collision system -- shall be provided to prevent the crane boom from colliding with the ship's superstructure during crane gantry movement (similar to Ansaldo, Italy post-panamax cranes equipped with an infrared detection system).

39. Crane electrical requirements, dimensions, and weight -- shall be compared to wharf for:

    a) Wharf structural support.

    b) Stowage pin sockets.

    c) Electrical power supply.

    d) Gantry rail type and dimensions, including curves.

    e) Forward, backreach, and side obstructions.

    f) Crane power pick-up (electric power trench or cable reel).

40. Outdoor equipment, enclosures, and components -- shall be N.E.M.A. approved for the location.

41. Electrical meters and indicators -- shall be properly scaled for the full range of normal operations.

Document Preparation

The following documents (and a list of the documents), one complete set for each crane unit, shall be prepared. If consultant prepared, it shall be submitted to the Port along with a form requiring an authorized Port representative's signature acknowledging their acceptance. All publications and documents shall be in the English language, with dimensions in both English and Metric:

1. As-built drawings -- system drawings, specifications, and dimensions (original drawings shall be of a standard size that can be duplicated).

2. Operations/users manual.

3. Maintenance manual.

4. Non-destructive testing procedures, including the type and frequency of the structural test.

5. Lubrication requirements.

6. Electrical tune-up values, including system speeds with the corresponding voltage, current values, and actual start-up data.

7. Software back-up disks for reinstalling lost hard disk data, along with the latest disk operating system with computer software manuals, guides, codes, and abbreviations.

8. Troubleshooting guidelines.

9. Electric Service Field Engineer contact name and telephone number.

10. Warranty contract.

Certified For Use

The crane shall be certified by a licensed safety inspector and certified under Cal OSHA and per OSHA standards to be ready for use.

Crane Manufacturers

1. References. Crane manufacturers shall provide the Port with references of current crane users (to facilitate a review of the equipment/service quality).

2. Parts & Service Availability:

a) Crane electric drive manufacturers shall have representation and service facilities in the Southern California area. Crane parts shall be available within the United States.

b) The same manufacturer shall be used for the following container crane parts:

1) Electric motors.

2) Motor accessories.

3) Control components.

4) Diagnostic system.

5) Sensors.

6) Other related items.

c) The crane manufacturer shall make provisions for direct contact between the Port and the crane drive supplier for warranty or repair service in case of emergency.

3. Field Training. The crane manufacturer shall provide a “to be determined” number of hours of operational, maintenance, and troubleshooting field training of crane equipment.

06.05.03 CALCULATIONS/WORKSHEETS

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

06.05.04 GRAPHIC CRITERIA

There are no contract drawings pertaining to cranes.

06.05.05 SPECIFICATIONS

There are no Harbor Department Master Specifications relating specifically to cranes, however, the following production specification sections address crane work:

Crane Relocations	Crane Drive Replacement
Crane Modification	Chair, Control, and Consoles
Relocation of Crane	Container Crane(s) – Performance Requirements
Container Crane Structural	Container Crane Structural
	Container Crane Dynamic Brake System
	Container Cranes Electrical Drive Replacement

06.05.06 PERMITS/APPROVALS

The permit listed below may be required when there is wharf work in conjunction with cranes:

Department of Building & Safety Permit

An electrical plan check is required when designing a wharf for container cranes or fabrication of a new container crane. Once the plans have been approved, the electrical permit may be secured by a C-10 contractor. Wharf and Crane electrical permits are separate permits.

Tenant own Cranes: Cranes moved or relocated by the tenants require Harbor Engineering permit.

06.05.07 ENVIRONMENTAL CONSIDERATIONS

Addition of cranes in an existing terminal will require an EIR.

06.05.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

Illustration of Crane Dimensions (No. 2)

LAHD Standard Plans

LIST OF ORGANIZATIONS

1. American Gear Manufacturers Association (AGMA)
2. American Institute of Steel Construction (AISC)
3. American National Standards Institute (ANSI)
4. American Railway Engineering and Maintenance-of-Way Association (AREMA)
5. American Society of Mechanical Engineers (ASME)
6. American Society of Testing and Materials (ASTM)
7. American Welding Society (AWS)
8. California Division of Safety and Health (CAL/OSHA)
9. Code of Federal Regulations (CFR)
10. Crane Manufacturers Association of America (CMAA)
11. Federal Aviation Administration (FAA)
12. Insulated Cable Engineers Association (ICEA)
13. IlluminationEngineering Society (IES)
14. Institute of Electrical and Electronics Engineers (IEEE)
15. Insulated Power Cable Engineers Association (IPCEA)
16. International Standards Organization (ISO)
17. National Electrical Manufacturers Association (NEMA)
18. National Fire Protection Association (NFPA)
19. Steel Structures Painting Council (SSPC)
20. Underwriters' Laboratory (UL)

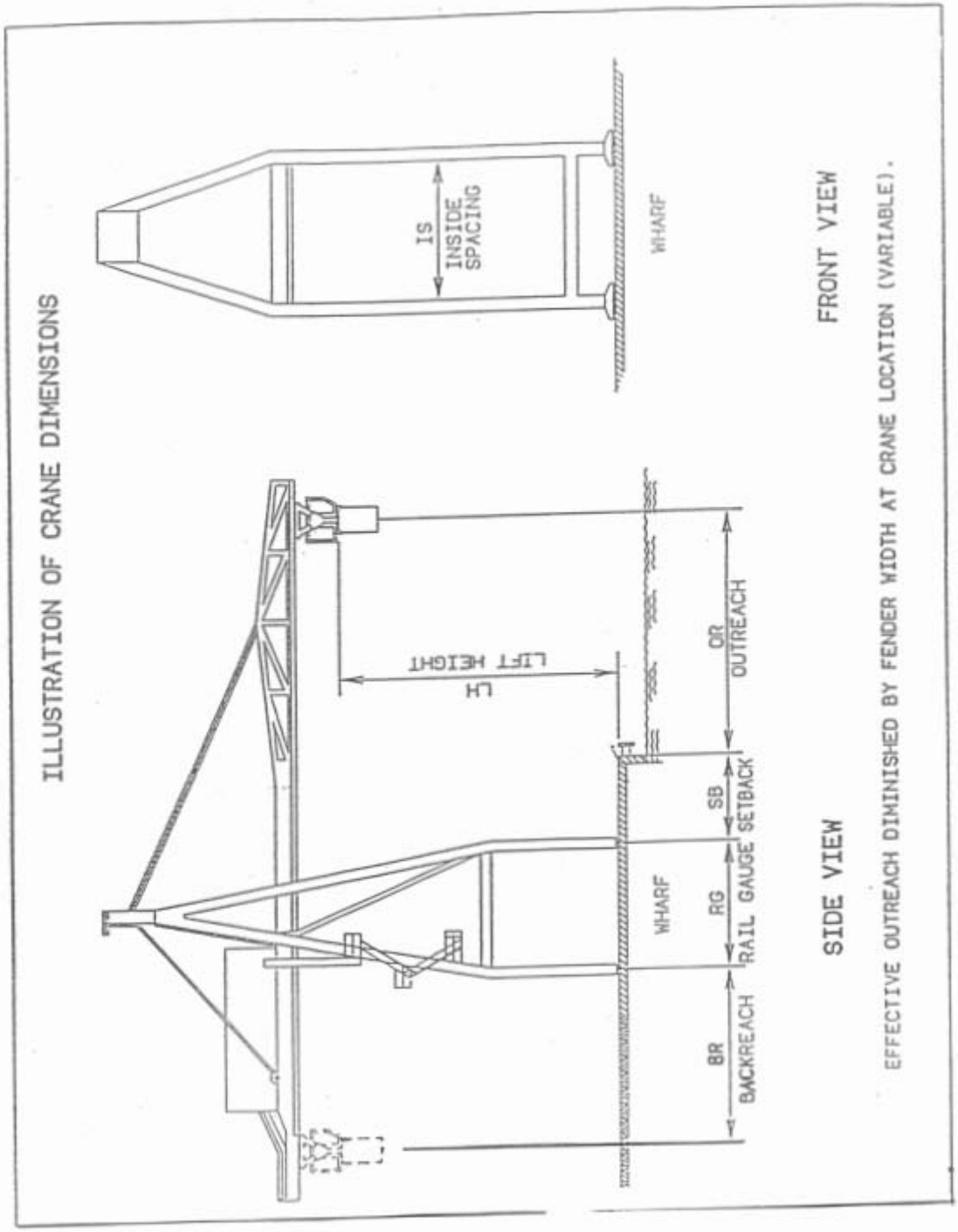

Illustration of Crane Dimensions
06.06.08, Spec. Facil. - Cranes (Misc. #2)

07 OTHER CRITERIA

07.01 SHIP CHARACTERISTICS

07.01.01 OVERVIEW

This section contains information on ship characteristics pertinent to the Port of Los Angeles.

07.01.02 DESIGN CRITERIA

Ship Characteristic Resources

1. Engineering Design Guidelines. Information about ship characteristics may be found in this section, with the Harbor Department's Structural Section staff as an additional resource.

2. Lloyd's Register of Ships.

   a) The latest edition is available from the Port pilots. Information (e.g., deadweight, length, breadth, draft, and depth of vessels) is arranged according to the name of the ship.

   b) Restrictions -- information is only arranged by ship name, not ship type, and ship displacement information is not listed.

3. Clarkson Register of Tankers.

   a) Although this register is not available from the Harbor Department, typical abstracts are available from the Harbor Department, Engineering Division, Structural Section.

   b) Restrictions -- ship displacement information is not listed.

4. Other Resources. Other information about ship characteristics may be obtained from the project tenant, the Port pilots, and/or from technical literature.

Typical Ship Characteristics

A list of typical ship characteristics for the Port of Los Angeles is included in this section as Reference No. 1.

Main Geometrical Particulars of Ships

A table which includes some information on the relationship between deadweight, displacement, and other data is included in this section as Reference No. 2. It is included in the International Association of Ports and Harbors Guidelines for Port Planning and Design (2001).

Comparison Tonnage Terminology

Definitions of comparison tonnage terminology are included in this section as Reference No. 3.

Selection of Ship Characteristics

Due to the factors listed below, the ship characteristics used for a particular project shall be carefully selected and approved by the Chief Engineer:

1. Wharfs are often designed to meet specific tenant requirements.

2. Characteristics for the same type and size of ship can vary widely (e.g., short and wide ships can have the same deadweight tonnage as long and narrow ships).

07.01.03 CALCULATIONS/WORKSHEETS

Ship Displacement Tonnage Estimate

The best estimate of the displacement tonnage for ships (other than tankers or for partially laden ships) can be established by first determining the displaced volume of water which equals the overall length x breadth x draft multiplied by a block factor (which varies between 0.75 and 0.85) that accounts for hull shape. Although not exact, this estimate is adequate for berthing energy calculations required for the design of wharf fender systems.

Tanker Displacement Tonnage Estimate

1. Formula (Full). For full tankers, the displacement is closely related to the deadweight tonnage (D.W.T.) of the ship and is calculated as follows (with all units in Long Tons [i.e., 2240 lbs. per ton]): Displacement = 1.2 x D.W.T. + 3000.

2. Formula (Partially Laden). Displacement of a partially laden tanker is calculated as follows: Displacement = (0.2 + %/100) D.W.T. + 3000 (partial loading is expressed as a percentage of the deadweight tonnage, thus if tanker is 70% loaded, replace %/100 with 0.7)

07.01.04 GRAPHIC CRITERIA

There are no graphic criteria relating to ship characteristics.

07.01.05 SPECIFICATIONS

There are no Harbor Department Master Specifications relating to ship characteristics.

07.01.06 PERMITS/APPROVALS

There are no permits/approvals necessary for this section.

07.01.07 ENVIRONMENTAL CONSIDERATIONS

See Alternative Maritime Power requirements in Section 5.10 Wharf - Electrical.

07.01.08 REFERENCE DOCUMENTS

The following reference documents are identified for reference:

No. 1 Typical Ship Characteristics

No. 2 Main Geometrical Particulars of Ships

No. 3 Comparison Tonnage Terminology

VESSEL CHARACTERISTICS[1]

SHIP TYPE	NAME	DWT[2]	DISPL.[3]	LENGTH (ft.)	BREADTH (ft.)	DRAFT (ft.)
PANAMAX (C-9) CONTAINER 2500 TEU	PRESIDENT LINCOLN		50,000±	890	105	40
POST PANAMAX (C-10) CONTAINER 4300 TEU		53,648	77,000±	905	129	41
CAR CARRIER, LARGE	WALLENIUS			653	106	30
CAR CARRIER, STANDARD				600	100	25-30
SAMSUNG CONTAINER 1200 TEU				525	90	35
SAMSUNG CONTAINER 2000 TEU				650	106	38
SAMSUNG CONTAINER 3600 TEU				942	106	37
TANKER		100,000	130,000±	940	132	50
TANKER		150,000	185,000±	950	145	56
TANKER		65,000	85,000±	820	112	42
T-2 TANKER		16,350	22,000±	524	68	30
CARGO	ALASKAN MAIL (68)	22,200	32,000	605	82	35
PASSENGER	QE II	15,724	49,896	963	105	32.5
CAR CARRIER	SUN ACE (61)			556	89	26
CAR CARRIER	SUN HOPE (79)			508	91	26
CAR CARRIER	SUNBELT PIXIE (78)			603	88	29
CONTAINER	SHINKASU MARU (81)			726	102	36
CONTAINER	EVER LIGHT	28,898		669	98	37

1. Where information is not available, cell is left blank.
2. DWT = Deadweight Tonnage (Long Ton).
3. DISPL. = Displacement (Long Ton)

REFERENCE NO. 1

Vessel Characteristics
07.01.08. Other Criteria - Ship Charact. (Gen. #1)

International Assoc. of Ports & Harbors

IAPH GUIDELINES ON PORT SAFETY AND ENVIRONMENTAL PROTECTION.

June 10, 1987

TABLE 2

MAIN GEOMETRICAL PARTICULARS OF SHIPS

Ship	DWT	LOA	LBP	B	Depth	LOADED: Overall Height	LOADED: Max. draught	LOADED: Max. displacement	LOADED: Projected longitudinal area Above water	LOADED: Projected longitudinal area Under water	LOADED: Projected rudder area	Rudder ratio	BALLAST: Draught	BALLAST: Corresponding displacement	BALLAST: Projected longitudinal Area Above Water	BALLAST: Projected longitudinal Area Under Water
	Tonnes	m	m	m	m	m	m	Tonnes	m²	m²	m²	%	m	Tonnes	m²	m²
								TANKERS								
1	550 000	414.2	401.1	63.0	35.9	72.5	20.6	631 000	4 100	11 500	2 x 114	1.00	14	228 000	16 550	4 030
2	430 000	370.0	365.2	70.0	31.3	70.0	24.6	485 000	3 100	8 960	136	1.52	13	314 000	7 750	4 590
3	200 000	341.0	330.7	51.0	27.4	61.3	21.3	318 000	3 300	7 700	100	1.41	12	148 000	5 900	3 300
4	120 000	275.0	262.4	40.8	19.7	50.0	15.1	137 000	2 000	3 950	55	1.39	9.0	70 000	3 900	2 030
5	80 000	244.0	230.0	42.67	20.0	50.0	14.1	120 000	2 000	3 230	-	-	6.75	54 500	3 700	1 530
6	37 500	178.146	165.0	46.5	15.3	46.5	10.375	36 315	1 575	3 110	30.22	1.77	5.71	19 800	2 470	915
								ORE CARRIERS								
7	215 500	327.0	310.0	50.0	25.5	55.0	19.2	250 400	3 500	5 950	94.3	1.61				
8	160 202	299.3	285.0	43.0	23.8	50.0	17.6	192 100	3 379	4 900	63.6	1.65	10	179 500	5 511	3 000
9	121 022	273.2	258.0	39.0	23.5	53.0	16.5	145 350	3 160	4 260	51.3	1.44				
								BULK CARRIERS								
10	150 000	303.8	290.0	43.3	24.7	57.4	17.4		3 350	5 050						
11	75 400	261.6	243.0	32.3	18.3	51.1	11.6	77 500	3 000	2 030	45.3	1.61				
12	19 100	151.9	141.5	22.6	13.0	42.4	8.6	25 000	1 320	1 360	23.7	1.74	6.2	15 100	1 810	870
13	141 415	283.5	271.0	47.0	21.5		15.25	165 125	1 707	4 120	62.50	1.66	1.66	73 220	3 763	2 076
14	222 000	315.0	305.0	55.0	25.0		10.20	262 270	2 071	5 551	2 x 72.4	1.39	8.70	122 125	4 831	2 162

REFERENCE NO. 2

TABLE 2 (CONT.)

Ship	Capacity TEU	LOA m	LBP m	B m	Depth m	Total height m	Maximum draught m	Max. displacement tonnes	Projected longitudinal area: Above water ship only m²	Above water with deck cargo m²	Under water m²	Rudder area m²	Rudder ratio %	Transverse thruster: Location	No x HP
							CONTAINER SHIPS								
	4 300	275.2	-	39.4		67.0	12.3	77 000	3 600	4 000	3 200				
26	2 564	250.5	247.0	32.3	24.2	52.0	13.0	71 000	4 000	5 400	2 000	52.0	1.63	Bow	2 x 1000
27	2 800*	200.4	260.4	32.2	19.5	48.9	10.4	50 600	3 100	3 900	2 400	50.4	2.09		
28	1 830	241.4	225.0	30.5	19.2	52.2	10.7	41 300	2 396	3 176	1 970	47.2	1.97	Bow	1 x 1000
29	1 434	200.1	192.0	30.5	18.2	48.0	10.3	24 404	1 425	2 136	1 976	33.9	1.70		
30	989	189.2	173.3	27.0	16.2	48.8	11.4	36 201	490		1 300	31.9	1.61	Bow	2 x 650
31	605	152.775	142.0	21.0	13.0	48.04	9.700	22 469	1 335		2 990	25.0	1.51		
32	2 526	243.44	230.0	32.2	18.0	53.58	13.0	70 040						Bow	2 x 1 200

* 1096 x 35' + 200 x 40'

Ship	Capacity Tonnes	LOA m	LBP m	B m	Depth m	Total height m	Draught loaded m	Displacement loaded tonnes	Projected longitudinal area loaded: Above water m²	Under water m²	Rudder area m²	Rudder ratio %	Barge characteristics: Type	Dimensions overall L x B x D	Dwt Tons	Sailing speed m/s
							BARGES									
33	44 200	261.4	234.0	32.5	18.3	44.3	11.4	62 100	3 600	2 650	38.0	1.43	33 [illegible]	38.6x 7.5 x 4.3	575	57
34	33 000	266.1	225.6	32.0	27.0	49.6	10.0	45 000	54 400	2 200	40.6	2.21	18 SECTIONS	33.3x13.7 x 5.2	664	1.0
35	2 500	99.5	93.2	10.6*	10.5	23.1	5.4		900	500	2 x 5.2	2.00	12 ABOVE	16.0x 6.7 x 3.1	140	0.7
													+ 3 BARGE			

* catamaran hull : breadth single hull = 4.47m

REFERNECE NO. 2

Main Geometrical Particulars of Ships

TABLE 2 (CONT.)

Ship	Capacity	LOA	LBP	B	Depth	Total height	Max. Draught	Max. Displacement	Projected longitudinal area: Above water	Projected longitudinal area: Under water	Rudder area	Rudder ratio	Bow thruster	Tank characteristics
	m³	m	m	m	m	m	m	Tonnes	m²	m²	m²		No. x HP	
								BULK CARRIERS						
15	125 000	274.4	262.0	42.0	26.1	56.5	12.9	183 500	5 900	3 350	50.2	1.74	2 x 1000	Membrane spherical
16	125 000	297.5	274.0	43.4	25.0	50.7	11.2	100 600	6 600	3 100	51.0	1.65		Membrane
17	75 000	257.5	231.5	34.0	20.7	51.5	11.5	71 600	4 000	2 700	55.5	1.90	1 x 1000	Integrated
18	40 000	200.0	184.8	29.3	18.6	49.5	8.5	34 000	2 974	1 571	25.1	1.59		
19	4 000	136.9	98.5	17.4	9.4		6.1	6 020	983	559	12.0	2.30		
								BULK CARRIERS						
20	101 500	255.5	239.5	35.5	23.5	56.0	13.5	94 040	3 460	3 070	51.1	1.71	1 x 1 200	Self supported
21	75 000	226.3	215	34.2	21.6	52.5	11.0	75 200	2 810	2 710	45.2	1.56		Self supported
22	53 400	216.4	201.0	32.3	18.4	52.2	11.0	56 900	2 220	2 210	40.0	1.70		Independent
23	40 200	194.1	182.4	29.0	18.9	61.1	10.4	41 600	1 880	1 910	37.6	1.64		Self supported
24	22 200	171.0	159.0	24.4	15.5	42.2	8.8	25 240	1 740	1 420	22.0	1.65		Self supported
25	9 500	126.2	116.5	18.4	9.8	34.5	7.3	11 590	1 420	840	14.1	1.85		

REFERENCE NO. 2

Main Geometrical Particulars of Ships

Reference No. 3:

Comparison Tonnage Terminology

For vessels, there are two general types of “tons.” One is weight, and used to be measured in long tons of 2,240 pounds. Sometimes tons are measured in metric tons equivalent to 2,205 pounds, a negligible difference for design purposes. The other type of ton is not a weight at all but rather a volume, equaling 100 cubic feet of enclosed space for a "vessel ton." With regard to merchant ships, gross, net, and deadweight tonnage figures are normally used. The relationship between these figures varies unless ships are of the same type. For example:

Type	Gross	Net	Deadweight
Freighter	20,000	3,000	7,000
Tanker	6,700	4,000	10,000
Passenger Liner	20,000	12,000	10,000

Gross Register or Gross Tonnage (g.t.)

The gross register is the total cubic capacity of all enclosed space at 100 cubic feet to the ton. It is used for general purposes and in national maritime registers.

Net Register or Net Tonnage

Measured in the same way as gross register, except the net register is the capacity of enclosed space less than that of the engine and boiler rooms, crew accommodations, fuel tanks, etc. (non-cargo areas).

Displacement Tonnage

This equals the weight of the volume of water displaced by the hull of the ship. It equals the total weight of the ship and everything on board. The volume of water displaced varies a little according to whether the water is salt, fresh, or in particular parts of the world. A given ship can have an infinite number of displacement tonnages depending on how much cargo, fuel, etc. it is carrying, thus several specific displacement tonnages have been defined. Displacement "light" is the weight of the vessel without cargo, stores, or bunker fuel. Displacement "loaded" is the weight of the vessel including a full load of cargo, stores, and bunker fuel. Displacement tonnage is needed for design (e.g. fender design), but unfortunately is not normally quoted in reference books for merchant ships, although it is for warships. Since the 1922 Washington Naval Treaty the official figure for warships has been standard displacement, which equals the full

displacement less the weight of fuel and reserve feed water for the boilers. Equations are available which allow displacement tonnage to be calculated from other types of tonnage such as deadweight tonnage.

Deadweight Tonnage (dwt.)

Deadweight tonnage is the number of tons that a vessel can transport of cargo stores and bunker fuel. It is the difference between the number of tons of water a vessel displaces "light" and the number of tons it displaces when submerged to its "load line" (Plimsoll line). Deadweight tonnage is used interchangeably with deadweight carrying capacity. The deadweight tonnage of a ship is a good indication of its cargo-carrying and earning capacity.

Cargo Tonnage

Cargo tonnage is either by "weight" or "measurement." The weight ton is taken in either long tons or metric tons. The measurement ton is usually 40 cubic feet, but in some instances a larger number of cubic feet is taken for a measurement ton. Note that a weight ton of cargo in most instances occupies less than 100 cubic feet (a vessel ton);. Hence the vessel's cargo tonnage in weight tons may exceed its net tonnage in vessel tons.

07.02 SEISMIC DESIGN

07.02.01 OVERVIEW

This section contains seismic design guidelines pertinent to wharf and some waterfront structures in the Port of Los Angeles. The following are not covered by these guidelines:

1. Bridges -- shall be designed in accordance with CALTRANS standards, most current edition. Any deviation from the CALTRANS standards shall be approved by the Chief Harbor Engineer.

2. Buildings -- they shall be designed in accordance with the City of Los Angeles Building Code, most current edition.

3. Other Structures -- the seismic design criteria for other structures such as movable bridges and access trestles, pipelines and tanks will be decided on a case-by-case basis by the appropriate Engineering Division personnel.

07.02.02 DESIGN CRITERIA

Philosophy

The guiding philosophy to be used for seismic design of wharfs is to provide life safety and damage control. This philosophy should be based on a two level design criteria (see the paragraph which follows).

Wharf Two Level Design Criteria

1. Probabilistic Basis - A two level design criteria will be defined on a probabilistic basis. Ground and/or spectral acceleration risk levels will be expressed in probability of exceedance in an appropriate time span.

2. Determination of Risk Levels - Risk levels to be used will be determined in joint consultation between the Engineering Division and the designer.[4]

3. Criteria - The criteria are:

[4] More than one level of CLE events may be chosen for cost sensitivity studies at the conceptual stage.

a) Moderate earthquakes (defined as operating level earthquakes [OLE]).

   1) These should be resisted by wharf structures and retaining structures/dikes with only minor non-structural damage.

   2) From a design standpoint, deformations of the wharf structures should not result in significant residual cracking or spalling of the concrete or permanent elongation of the steel reinforcement. Permanent deformations of earth-retaining structures should be either less than a few inches or less than levels that will lead to structural damage, whichever is more critical.

   3) The wharf structure should remain in service following the OLE. Repairs to the structure should be minor and should be made without interruption to operations.

b) Large earthquakes (defined as contingency level earthquakes [CLE]).

   1) These should be resisted by wharf structures and retaining structure/dikes in a manner which prevents collapse and major structural damage.

   2) Damage to support systems shall be limited to allow operation of container cranes after repair.

   3) Structural damage that does occur to main support members should be detectable and accessible for inspection and repair.

   4) Design should be such that damage to foundation elements below ground level does not affect load capacity of the structural system.

Earthquake Ground Motion Parameters

The following specific ground motion parameters for horizontal and vertical earthquake components (and for both the OLE and CLE events)[5] will be defined by the designer(s) based on results of existing studies and shall be compatible with the site conditions underlying the project areas:

1. Peak ground acceleration.

2. Peak ground velocity.

[5] The parameters shall be consistent with the risk levels chosen.

3. Elastic acceleration response spectra for 5% damping (covering the longest periods of interest).

4. If time histories are required, a minimum of seven acceleration time histories[6] for CLE events representative of source/site conditions.

5. Design for vertical accelerations is expected to be limited to such items as structural cantilever elements.

6. Soil embankment analysis shall consider only horizontal accelerations, unless otherwise requested by Port engineers.

Fault Rupture

The potential magnitudes of surface ground rupture in the horizontal and vertical directions within the project area shall be provided by the Port or the design consultant[7] for project design use and approved by the Chief Harbor Engineer.

Earthquake Response & Structural Deformation Analysis

For purposes of analyzing the earthquake response and induced deformations of structures due to both OLE and CLE events, two- and three-dimensional idealizations should be used. For earthquake dynamic response analyses, pile-supported container wharfs or berthing structures and retaining structures/dikes may be analyzed independently, if appropriate. In considering the overall earthquake performance, however, the effects of permanent retaining structure/dike deformations on stresses induced in and the resulting performance of the individual elements of pile-supported wharf structures should be analyzed as follows:

1. Dike Retaining Structural Analysis Methods.

   a) Simplified Dynamic Analysis Methods:

      1) For OLE events -- these methods may be used to evaluate the permanent deformation response of the dike-retaining structures for OLE events (e.g., those based on the Newmark Approach).

      2) For CLE events -- these methods (combined with nonlinear dynamic response analysis methods) should be used to determine

[6] Histories will be compatible with the elastic design spectrum over the period range of interest,
[7] The magnitudes and zones shall be consistent with risk levels adopted for OLE and CLE events.

the permanent deformations of the dike-retaining structures and associated foundation soils (together with any structural elements such as sheet piles).

b) Non-Linear Dynamic Response Analysis Methods -- these methods (in combination with simplified dynamic analysis methods) should be used for CLE events:

1) Site-specific CLE input acceleration time histories should be applied at an appropriate firm ground transmitting boundary interface at a depth to determine histories acting on the dike structure and foundation soils.

2) Deformational analyses should include the potential effects of pore pressure buildup in the dike, back-land fill, and substructure soils.

3) Post-earthquake stability should also be assessed.

4) The potential reinforcing effects of piles installed in the embankment should also be considered.

2. Piled Berthing Structure Analysis Methods.

a) Simplified Elastic Response Spectral Analyses -- these may be used to assess the earthquake response of the wharf structures to OLE events.

b) Dynamic Response Analyses (of the wharf structure for CLE events) – These analyses should initially use elastic methods based on appropriate response spectral accelerations. Structure components that are expected to exceed elastic behavior limits should be further analyzed using appropriate non-linear techniques to determine the effect of local plastic hinging, resulting in redistribution of internal moments, shears, and forces.

c) Two-Dimensional, Non-Linear Dynamic Response Analysis -- After the structure is initially proportioned using the elastic approach, this analysis should be conducted for the wharf structure for CLE event(s) based on appropriate ground motion time histories. Time histories used for analyses should reflect potential modifications to site specific CLE ground motion histories, arising from results of the dynamic response analyses conducted for dike-retaining structures.

d) Ductility Requirement Analysis -- Sections of structural members that undergo inelastic deformation should be shown to be ductile (or be

made ductile, in the case of concrete piles) by confinement or by other effective means. The analysis should show that shear and bond failures in concrete structural components do not precede the formation of a flexural inelastic mechanism.

e) Alternative Innovative Structure Types:

1) For alternative innovative structure types that use "Added Damping and Stiffness" (ADAS) elements or fused link elements, the elements should be designed and detailed to ensure ductile behavior.

2) In addition, non-ADAS elements should be proportioned to ensure overall structure compatibility for the inelastic deformations.

3) All structural elements forced to undergo the related distortion should be evaluated to ensure adequate performance without significant damage.

3. Fault Rupture -- The conceptual design of a container wharf or berthing structures should also reflect the potential effects of fault rupture associated with earthquake events on the Palos Verdes fault.

Landfill Performance Requirements

The acceptability of the landfill performance, in terms of the results of the following analyses, will be determined by the Engineering Division in relation to the intended land use. Earthquake performance requirements for landfill, which follow, are guided by ground stability and settlement requirements in relation to the intended land use:

1. Of primary concern are potentially liquefiable fill soils. To define the earthquake performance of potentially liquefiable soils in either existing or new landfills, liquefaction analyses for OLE and CLE events should be performed using standard penetration test (SPT) data and/or cone penetrometer test (CPT) data to determine liquefaction strengths. Results of these analyses should be expressed in terms of:

a) Potential for surface manifestation of subsurface liquefaction, using a factor of safety of 1.0 with respect to liquefaction strengths.

b) Post-liquefaction settlement potential using a factor of safety of 1.0 with respect to liquefaction strengths.

c) Average residual undrained strength in liquefied zones using a factor of safety of 1.0 with respect to liquefaction strengths.

2. For CLE events, site response analyses using CLE acceleration time histories input at an appropriate "firm ground" transmitting boundary interface at depth should be used to determine earthquake-induced cyclic shear stress ratios. The liquefaction potential of landfill soils determined from such analyses may be evaluated using total stress or effective stress approaches.

3. For OLE events, the Seed Simplified Method may be used to determine earthquake-induced cyclic shear stress ratios and the liquefaction potential of landfill soils.

4. Land use requirements in relation to critical facilities, such as the transportation corridor and oil tanks, will require (as a minimum) no surface manifestation of subsurface liquefaction. Acceptable settlements for these facilities and questions related to the magnitude and extent of residual strengths in liquefied zones shall be evaluated based on structural and foundation requirements for these facilities.

07.02.03 CALCULATIONS/WORKSHEETS

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

07.02.04 GRAPHIC CRITERIA

There are no graphic criteria for this section.

07.02.05 SPECIFICATIONS

There are no Master Specifications for this section.

07.02.06 PERMITS/APPROVALS

See POLA's Code for Seismic Design, Upgrade & Repair on Container Wharf.

07.02.07 ENVIRONMENTAL CONSIDERATIONS

There are no relevant environmental considerations for this section.

07.02.08 REFERENCE DOCUMENTS

The following documents are identified for reference:

POLA's Code for Seismic Design, Upgrade & Repair on Container Wharf

LAHD Standard Plans

07.03 NAVIGATION CHANNELS & AIDS

07.03.01 OVERVIEW

This section contains information on navigation channels and aids pertinent to the Port of Los Angeles.

07.03.02 DESIGN CRITERIA

Navigation Channels

Resources - A designer of Port projects may find the following resources helpful in altering navigation channels.

1. "Map of California Coordinate System, Zone 5, Showing the United States Harbor Lines," produced by the Permits & Right-of-Way Section – shows the location of US Pierhead Lines along with California State Plane Coordinates for each Pierhead Point in both Zone 7 (NAD27) and Zone 5 (NAD83).

2. "Berth Lengths," produced by the Permits & Right-of-Way Section – shows the ground lengths of berths.

Altering Channels - If embarking on a project that will alter the width of a channel, it is necessary to:

1. Meet with the Port Pilots to review their navigational needs.

2. Coordinate any changes with the Port's Right-of-Way Section staff so that they may update the Port Harbor Lines Map (which reflects any channel, slip, basin, or pierhead changes made after publication of the Army Corps Of Engineers Harbor Lines Map).

3. Communicate changes made to the:

   a) Port's Real Estate Division

   b) Port Pilots

   c) United States Coast Guard (USCG) (so that they may revise navigational charts, if necessary).

4. Investigate procedures required by the Army Corps of Engineers

Navigation Aids

Resources - A designer of Port projects may find the following helpful in selecting navigation aids:

1. "Chart No. 1," published by the USCG (latest edition) - describes types of navigational aids.

2. "Chart No. 18751, Los Angeles and Long Beach Harbors," published by the Coast and Geodetic Survey, National Ocean Service, National Oceanic and Atmospheric Administration (NOAA) - identifies the location/type of all charted navigational aids in the harbor.

Hazards to Navigation - The Designer shall identify any hazards to navigation (e.g., jetty, breakwater, mole, dolphin, outfall, pipeline, floating structure, or shoaling) in the project area and notify the USCG. They will publish information on the hazard (description and location) in the “Local Notice to Mariners” and will recommend the appropriate type(s) of navigation aid(s).

Navigation Aids - Navigation aids, which the designer may consider, include:

1. Lights - they define a specific point or points and are typically used on a jetty, a mole, or at the end of a dock or breakwater.

2. Daymark - used when a structure is in the same location as the edge of a navigation channel.

3. Range lights or range marks - range lights are a pair of lights which define a center line alignment of a navigation channel. The forward range is positioned lower than the back range. Range marks are identifiable unlighted targets used for the same purpose.

4. Floating marks - these may be used for hazards which are partially or totally submerged (e.g., broken mooring dolphins).

Regulatory Aids - Regulatory aids are designed for controlling the speed of watercraft, the type of watercraft, and the necessary warning information (no wake, no swimming, etc.) in the harbor. Examples of regulatory aids are:

1. Sign mounted on a floating structure.

2. Buoys painted with signage information.

07.03.03 CALCULATIONS/WORKSHEETS

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

Navigation Channels

1. New pierhead lines must be defined in NAD83 California State Plane Coordinates, Zone 5.

2. Traverses must be run on new pierhead lines to make sure they fit within existing pierhead lines.

Navigation Aids

1. The height above water of a navigation aid is calculated depending upon whether it is on land or in the water. On land, the height is measured from mean low water (MLW). In the water, the height is measured from the water line. In addition, for those navigation aids that are located in the water, the depth of the ocean at the location of the aid must be measured from MLW.

2. There are several ways to calculate the position of a navigation aid: the angles from two or more prominent charted landmarks, the bearing and distance to a prominent charted landmark, or its geodetic coordinates - latitude and longitude. State plane coordinates are not an acceptable method of describing the position of navigation aid.

07.03.04 GRAPHIC CRITERIA

Navigation Channels

A map must be prepared to show the before and after configurations of the pierhead lines when altering navigation channels. To distinguish between US pierhead lines and points (Federal) and Port of Los Angeles pierhead lines and City points, use the letters US and LA, respectively, before the pierhead point's number. The plan must be prepared in NAD83 California State Plane Coordinates, Zone 5.

Navigation Aids

When installing navigation aids, a plan view is required. The plan must describe the aid, indicate its position, and show the area into which it will be installed. Include a vicinity map to narrow down the location of the installation within the Port of Los Angeles. The plan must be prepared in NAD83 California State Plane Coordinates, Zone 5.

07.03.05 SPECIFICATIONS

There are no Harbor Department Master Specifications relating to navigation channels or aids. Typically, floating aids are specified by the buoy's model number and a description relative to its purpose. The description would include any required markings on the buoy.

07.03.06 PERMITS/APPROVALS

Navigation Channels

In the past, any changes to the US Pierhead Line had to be approved by the U S Army Corps of Engineers (ACE). Today, we only notify them of the proposed changes.

Navigation Aids

There are two types of navigation aids: temporary and permanent. Temporary aids are those that will be on station for 6 months or less. A permit application is not required for a temporary aid. However, when planning to install a temporary aid, plans should be submitted to the USCG for review before it is established. The USCG publishes the location of all temporary aids in the Local Notice to Mariners.

Permanent aids require a permit from the USCG and ACE. A Private Aids to Navigation Application, form CG-2554, must be submitted to the USCG, Aids to Navigation Branch, Private Aids to Navigation (PAtoN). This application includes a Nationwide Permit 1 from the ACE for Aids to Navigation.

07.03.07 ENVIRONMENTAL CONSIDERATIONS

Navigation Channels

The effect on water circulation within the Port of Los Angeles should be considered when altering navigation channels. A new channel configuration may affect sediment transport, trash mobility, and water quality, among other things.

Navigation Aids

The materials used for navigation aids should be non-toxic in nature so that they do not affect the marine environment in which they will be on station. Care should be taken when installing aids with lights or horns. Shields should be installed on lights so that they do not shine directly into near-shore residential areas.

07.03.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-1241-2, Map of California Coordinate System, Zone 5, Showing the United States Harbor Lines.

1-2063-3 Berths Lengths.

Chart No. 1 United States of America, Nautical Symbols, Abbreviations, and Terms, latest edition.

Chart No. 18751 Los Angeles and Long Beach Harbors.

1-2601 Watchorn Basin Obstructions.

1-2601 C-1 Buoy Installation Plan

LAHD Standard Plans

07.04 SURVEY AND RIGHT-OF-WAY

07.04.01 OVERVIEW

This section contains survey and right-of-way information pertinent to the Port of Los Angeles.

07.04.02 DESIGN CRITERIA

Establishing Stationing

1. Linear Stationing. Linear stationing is generally established parallel to the pierhead line. Stationing should be calculated using the most current existing data (assistance is available from the Port's Right-of-Way Section). Information regarding the use of linear stationing follows:

   a) Linear stationing is used with sewers, storm drains, roads, and streets; curves are handled in a circular manner.

   b) Linear stationing is also used with railroads; however, curves may be spirals.

2. Grid Stationing. Grid stationing is two-directional and is used for backland, buildings, and wharfs. Wharf stationing is generally shown as parallel and perpendicular to the pierhead line. Backland and building stationing may also be positioned in a north-south, east-west manner. Establishing grid stationing (parallel and perpendicular to the pierhead line) is done as follows:

   a) The first coordinate axis is perpendicular to the pierhead line (0+00 at the pierhead line), with "plus" values extending out into the water and "minus" values (e.g., -0+50) extending onto land.

   b) The second coordinate axis is parallel to the pierhead line (at right angles), with values to be established linearly using the most current existing data.

Plane Table Coordinates

One plane table coordinate is included on each coordinate control plan. Benchmark and monument information is available from the Port's Survey Section through the Project Manager. Benchmark elevations can be adjusted by

using the Survey Datum Conversion Table (City of Los Angeles Standard Plan S 704 0).

Legal Descriptions

The designer should consult with the Port's Right-of-Way Section when preparing a legal description for a building permit application. If the legal description is to be used for a building permit application, it must be accompanied by a street address (obtained from the Permit Section).

Presentation of Coordinate Control Information

Coordinate control information is presented on a coordinate control plan. A plan is prepared for each project and is to identify coordinate controls, survey controls, affected tenants, and boundary conditions.

Developing a Coordinate Control Plan

In developing a coordinate control plan, the Project Manager shall collect current as-built information and establish stationing conventions (using the Port's Right-of-Way Section staff as a resource). Once stationing conventions are established, the Right-of-Way Section will review the stationing methods for consistency with other as-built construction and monumentation. They will also coordinate with the Survey Section of the Construction Management Division.

Property and Lease Maps

Property and Lease Maps (also known as Permit Maps) reflect survey information. They include boundary information with bearings and distances and may be used to verify ownership, investigate easement rights, etc. Each map has a field tie that relates to a surveyed monument in the field. The following information shall be included in this map (an example of a Permit Map is included in Reference Drawings):

1. Lessee/Permitee Name
2. Authority Number
3. Areas and Parcel Numbers
4. Curve Data

5. Bearing and Distance

6. Prominent features (e.g. Vincent Thomas Bridge, channels, etc.)

Aerial Photomaps

Aerial photomaps (also known as planimetric maps) are based on plane table coordinates, which are corrected for earth curvatures. They may be used by designers for design layouts. The maps are available in the Engineering Division's vault (at 1"=40') and in AutoCAD format (N:\cadd\planimetrics).

Right-of-Way Map

Although this map does not show stationing or a plane table coordinate, it does use a plane table coordinate as a basis for the map's preparation. The following information shall be included in this map (an example of a right-of-way map is included in Reference Drawings):

1. Areas and parcel numbers

2. Property owner's name

3. All property to be acquired (by fee title or for surface, underground, or overhead rights)

4. Curve data

5. Bearings and distances

6. Prominent features (e.g., Vincent Thomas Bridge, channels, etc.)

07.04.03 CALCULATIONS/WORKSHEETS

Traverse and area calculations shall be prepared for each parcel.

The designer shall prepare all calculations on worksheets in compliance with POLA's Engineering Division's latest format.

07.04.04 GRAPHIC CRITERIA

The designer shall use the smallest size drawing such that all information on the map is legible. Suitable drawing sizes are 1-size, 2-size, 4-size and 5-size. The drawings shall be prepared in compliance with the latest edition of the POLA Engineering Division Right-of-Way CADD standards.

07.04.05 SPECIFICATIONS

There are no Harbor Department Master Specifications relating to survey and right-of-way.

07.04.06 PERMITS/APPROVALS

There are no permits/approvals necessary for this section.

07.04.07 ENVIRONMENTAL CONSIDERATION

The designer shall coordinate with the Real Estate and Environmental Divisions to obtain the necessary environmental documents.

07.04.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-1993-2 Permit Map – Authority No. P733 Eagle Marine Services, LTD.

1-2301-1 POLA/POLB Right-of-Entry and Property Acquisition Agreements – Revised Right-of-Entry Map

LAHD Standard Plans

07.05 SITE REMEDIATION

07.05.01 OVERVIEW

This section contains information related to the preparation of a hazardous waste site mitigation plan package.

07.05.02 DESIGN CRITERIA

Initiation

The Engineer files an Application for Development permit (ADP) which authorizes the Environmental Management Division (EMD) to develop an Environmental Assessment and to perform the investigative and design work described herein when required by the Environmental Assessment.

Site Assessment

The Site Assessment portion of a site clean-up project involves the following tasks:

1. Review of existing information.
2. Formal evaluation of the site to verify a release.
3. Identification of potential responsible parties.
4. Evaluation of the need for emergency remedial action.
5. Identification of the appropriate regulatory agencies.
6. Planning and preparation of a timetable for site mitigation activities.
7. Initiating an environmental assessment within the Harbor Department.

Remedial Investigation

1. Tasks. The Remedial Investigation (R.I.) involves the following tasks:

    a) Hazardous waste investigation.

    b) A "site characterization" plan.

c) Identification of migration pathways/receptors.

d) Consideration of regulatory agency concerns.

e) Evaluation of public health/environmental concerns.

f) Investigation of:

1) Soil/groundwater contamination.

2) Land use.

3) Surface water.

g) Consideration of California Environmental Quality Act (C.E.Q.A.) requirements.

h) Development of a Community Relations Plan, if appropriate.

2. Workplan Elements. The R.I. portion of the workplan should include the following elements:

a) Executive summary.

b) Site description and background information, including:

1) Description of the general nature of the problem.

2) Information on past/present site ownership.

3) Description of past/present activities and information on types, quantities, and concentrations of hazardous wastes/materials used, treated, stored, transferred, disposed of, or handled. A site map delineating each of these areas must be provided.

4) Groundwater data -- depth to first groundwater, maximum well depths, flow direction and gradient of groundwater, well logs, screen intervals, and any other relevant information.

5) Surface water information including site drainage and proximity to harbor waters.

6) Soil type, soil permeability, soil analysis, boring logs, and soil pH.

7) Proximity to critical habitats which may contain endangered species.

c) Site map -- the site map should show all important features (e.g., substructures, pipelines, etc.) in sufficient detail and accuracy to locate and report all existing and future work performed at the site.

d) Sampling and Analysis Plan -- this Plan should address all field activities to be performed. Since the site characterization process is iterative, the results of initial sampling may indicate the need for further sampling to fully determine the extent of contamination. Provisions must, therefore, be made to accommodate a second or third phase plan, if necessary. The Plan should describe or provide:

1) Sampling objectives and protocols.

2) Sampling methods, sampling devices, quality assurance and control protocols, chain of custody, sample packaging, transportation, and other details in conformance with E.P.A. document SW-846, unless otherwise specified.

3) Sampling locations (indicated on site map), justifications for the choices, and chemical analyses to be performed in order to adequately define the extent (vertical and horizontal) and nature of contamination.

4) Identification of a state-certified laboratory to perform the chemical analyses.

5) Engineering specifications for all installations including soil borings and monitoring wells.

6) Provisions for gaining access to and obtaining samples from adjacent properties, as appropriate.

e) Health and Safety Plan -- this Plan must cover all measures taken to protect on/off site populations from exposures to hazardous wastes/materials during workplan activities. The Plan should include, but is not limited to: key personnel, responsibilities and qualifications, job hazard analysis, risk assessment summary, exposure monitoring plan, protective equipment, work zones and security measures, decontamination procedures, general safe work practices, standard operation procedures, hospital locations and maps, contingency plans, training requirements, and documentation of the medical surveillance program.

f) Community Relations Plan -- this Plan identifies community concerns and provides opportunities for individuals concerned about or potentially affected by the remedial activity to be performed at the site . The Plan must outline the ongoing steps for informing local residents about activities at the site and for responding to inquiries from citizens or public entities.

g) Treatability studies -- All pilot studies, bench studies, and/or other activities which will be performed to evaluate the treatability of contaminated materials shall be described.

h) Time schedule -- a time schedule of the proposed activities shall be provided.

i) Regulatory agency requirements -- appropriate regulatory agencies must be notified for required permits or variances necessary to implement the workplan activities, including but not limited to:

1) California Environmental Protection Agency (CAL E.P.A.).

2) United States Environmental Protection Agency (E.P.A.).

3) South Coast Air Quality Management District.

4) Regional Water Quality Control Board.

5) Los Angeles City Fire Department.

6) Los Angeles County Fire Department.

7) State Department of Toxic Substance Control

Feasibility Study

1. Tasks. The Feasibility Study (F.S.) involves the following tasks:

a) Evaluation of remedial action alternatives.

b) Recommended remedial action with justification.

c) Evaluation of public health and environmental concerns.

d) Risk assessment.

e) Setting clean-up levels.

2. Workplan Elements. The F.S. portion of the workplan should include the following elements:

a) Executive summary -- briefly describing the current situation, the purpose of the remedial action, the potential or actual hazards, and exposure pathways.

b) Preliminary remedial technologies -- a master list outlining potentially feasible technologies, along with a screening of each to ensure its feasibility.

c) Development of alternatives -- addressing the objectives of the remedial action, as well as the development of alternatives incorporating the remedial technologies and other considerations. "No action" must also be considered to provide a basis for the other alternatives being considered. The resulting alternatives must then be screened to ensure feasibility.

d) Evaluation of alternatives -- a detailed evaluation of the alternatives passing the screening shall be performed, addressing the following analyses:

1) Technical.

2) Environmental.

3) Public health.

4) Regulatory agency.

e) Risk assessment (clean up criteria) -- a proposed Remedial Action Plan (R.A.P.) must consider the full range of options available: no action, complete removal, background or non-detectable levels. If a clean up is proposed where contaminants are not removed to background levels, a risk assessment must be approved and conducted (to establish and justify clean up standards specific to the site and contaminants under review).

f) Schedule -- a schedule for the Feasibility Study tasks shall be submitted.

Remedial Investigation Report

This Report must be submitted for review and approval in accordance with the approved workplan schedule. It shall summarize the results of the Remedial Investigation, as well as the reduction and interpretation of all information generated/compiled during the investigation process.

Feasibility Study Report

This Report must be submitted in accordance with the approved workplan schedule. The Report will summarize the results of the F.S., as well as the reduction and interpretation of all information generated/compiled during the study process. It shall include the recommended remedial action.

Remedial Action Plan

1. Description. The Remedial Action Plan (R.A.P.) follows the R.I./F.S. and will involve a review and approval by agencies. It provides specific operational details about the approved alternative.

2. Contaminant Levels. When remediation of a site involves a small volume of localized soil contamination (e.g., oil spillage near waste storage drums), workplan submittals may not require the amount of information outlined in this section. If contaminant levels are based on present land use, deed restrictions/notifications may be required. The Environmental Management Division should be consulted for further information.

Typical LAHD Hazardous Waste Sites

Los Angeles Harbor Department contaminated sites can be classified into “Cal Sites” (California Department of Toxic Substances designation), Federal Superfund Sites, and leaking underground storage tanks, or L.U.S.T. sites, regulated by Los Angeles Regional Water Quality Control Board.

An example of a Cal Site at LAHD is the San Pedro Boatyard. Examples of Superfund sites at LAHD are the Koppers site and the 22nd Street Annex site.

“Dig and Haul” is the most common remediation method for soil contamination used at LAHD contaminated sites. This method involves excavating soils and stockpiling them within enclosed lined, bermed, and fenced areas at the project site. After soil samples in stockpiles are tested, they are transported to the

proper treatment, storage, and disposal facility (TSDF) for disposal or incineration.

Personnel visiting contaminated sites should obtain information from EMD on current site conditions prior to visiting. If contaminants have been exposed that create unhealthful airborne concentrations, either use appropriate protective gear, such as respirators and goggles, or postpone visit to site until EMD verifies that concentrations have declined.

The Engineer shall verify the status of the site characterization and any recommendations prior to excavating for remediation or other excavation work.

07.05.03 CALCULATIONS/WORKSHEETS

There are no calculations or worksheets provided for this section.

07.05.04 GRAPHIC CRITERIA

The remedial action plan should contain drawing(s) depicting, at a minimum:

1. Sampling locations
2. Identification of specific wastes to be removed or remediated and waste volumes, if known
3. Limits of each proposed waste removal or remediation

07.05.05 SPECIFICATIONS

Site remediation specifications must be specifically developed for each project in conjunction with EMD and are therefore not included in the Master Specifications. However, the following sections in the Harbor Department Master Specifications provide additional information concerning site remediation. In addition, there is a Master Specification for contingency cases of unexpected contaminated soil discovery.

Specifications

SECTION TITLE
Regulatory Requirements
Basic Site Materials and Methods
Excavating, Handling, and Disposal of

Chemically-Impacted Soils

07.05.06 PERMITS/APPROVALS

The Environmental Management Division will determine the permits/approvals necessary for each specific site remediation.

07.05.07 ENVIRONMENTAL CONSIDERATIONS

Careful monitoring of contractor site remediation activities by technical consultants and inspection staff is necessary to ensure compliance with the scope of the Remediation Action Plan and permit requirements.

07.05.08 REFERENCE DRAWINGS

There are no reference drawings included in this section.

07.06 GEOTECHNICAL

07.06.01 OVERVIEW

This section contains geotechnical guidelines required in the design of wharfs, backland, light poles, buildings, foundations, slopes, and other structures or projects that require geotechnical investigations.

07.06.02 DESIGN CRITERIA

A directive to perform a geotechnical investigation needs to be issued, usually to the “on call” Geotechnical Consultant Contractor. The Consultant shall follow and abide by City of Los Angeles Building Code and all other applicable caode and requirements.

Boring and Testing Program

A boring and Cone Penetration Test (CPT) sounding investigation program shall be conducted. Depths, locations, and number of borings shall be determined by a Geotech Engineer based on the requirements of the project. These may be changed based upon engineering judgment on the basis of observed conditions in the field during the exploration program. The program shall include:

1. Borings to depths determined by the Geotech Engineer.

2. CPT Soundings in the backland area as determined by the Geotech Engineer.

Samples will be recovered for soil classification and laboratory testing. Alternating Standard Penetration Test Samples with either ring-lined barrel or Shelby tube samples at 5-foot intervals. Drilling mud from borings shall be transported off of Harbor Department property.

Laboratory Tests

A laboratory testing program shall be conducted by a City of Los Angeles Certified test lab in general accordance with the following preliminary program. The type and number of test may be changed using engineering judgement based on the results of the field exploration program.

Test	ASTM

Test	ASTM
A. Index Testing	
Moisture Content/Density	D-2216
Specific Gravity	D-854
Atterberg Limits	D-4318
Sieve Analysis	D-422
B. Soil Strength	
Direct Shear (Sets)	D-3080
Consolidated Undrained Triaxial	D-3080
C. R-Value Tests	California Test 301
D.Consolidated Incremental Stress Control	D-2435
E. Chemical	
Corrosion Potential (soil pH, sulphate content, chloride content, electrical resistivity)	G-51 D-1411

Note: Number of tests shall be determined by the Geotech Engineer for each project.

Geotechnical Analysis and Recommendation

Analysis and recommendation shall include but not limited to the following:

1. Shallow and deep excavations.

    a) Open excavations.

    b) Braced excavations.

    c) Shoring requirements.

2. Evaluation of compacted fills and their performance.
3. Earth pressures acting on walls and retaining structures.
4. Design and evaluation of dewatering systems and operations.
5. See page analysis and control.
   a) Design of drainage blanket.
   b) Design of lining for seepage control.
   c) Erosion control.
6. Analysis of settlement and volume expansion.
7. Design and analysis for slope stability and protection.
8. Liquefaction potential, prevention, mitigation, and remediation.
9. Construction of pile supported structures.
10. Submerged and partially submerged retaining structures.
11. AC pavement design.
12. Geotechnical parameters for existing wharfs seismic upgrade.
13. Soil structure interaction evaluation under static and seismic loading conditions.
14. Geotechnical seismic analysis and recommendations.
15. Geotechnical parameters for the design of foundations, etc.
16. Other geotechnical considerations.

Deliverables

After all field investigations, analyses, and recommendations are complete, a final geotechnical report shall be submitted to the Port. Upon completion of the design drawings, the geotechnical engineer will sign and stamp the Port drawings to satisfy the City of Los Angeles Department of Building and Safety

(LADBS) permit requirements. The geotechnical engineer will submit the geotechnical report to LADBS' Grading Division for their conditions, comment, and acceptance.

Construction Services

The geotechnical engineering consultant shall provide services during the project's construction phase.

1. Investigate unforeseen field conditions and problems, and provide consultation on an as-needed basis.

2. Observe earthwork during excavation for footings and provide certification for compacted backfill for footings.

3. Prepare earthwork report upon completion of foundation for submittal to the LADBS.

4. Develop and monitor indicator pile program to establish pile tip elevations, pile lengths, blow counts, pile driving, and refusal criteria.

5. Provide assistance during pile driving for unforeseen conditions and hard driving conditions. Provide recommendations during easy driving below refusal blow count.

07.06.03 CALCULATIONS/WORKSHEETS

The geotechnical engineer will perform all analysis and calculations pertaining to the geotechnical information requested.

07.06.04 GRAPHIC CRITERIA

The final geotechnical report shall contain the following graphs, drawings, charts, and tables:

1. AutoCAD site location.

2. Boring/CPT sounding information chart.

3. Present Borings/CPT soundings location map.

4. Soil profile along area of slope and wharf or backland.

5. Regional Physiographic and major active faults drawing.
6. Geologic structure map.
7. Palos Verdes Fault Map.
8. Design Acceleration Design Spectra for CLE 7 OLE.
9. Displacement estimates using CLE 7 OLE time histories.
10. Survey data boring and CPT sounding locations.
11. Idealized soil profile and strength parameters.
12. OLE and CLE Response spectra with and without fling effects.
13. Axial capacities for 24-inch octagonal precast, prestressed piles or any other steel or concrete piles used.
14. Summary of soil corrosivity test results.
15. Logs of borings.
16. Results of CPT soundings.
17. Laboratory Results.
18. P-Y curves and spring values for lateral pile analysis.
19. Results of slope stability analysis.
20. Results of bearing, lateral earth pressures and other required geotechnical analysis.

07.06.05 SPECIFICATIONS

Scope of work shall include, but not be limited to, the following geotechnical engineering tasks, activities, and services.

Geotechnical planning and design and preparation of plans, specifications, estimates, calculations, studies, reports, and/or providing support for the following:

1. Site characterization.
2. Slope stability.
3. Excavations.
4. Geotechnical and seismic study.
5. Submerged retaining structures.
6. Retaining walls.
7. Foundations.
8. Mechanically Stabilized Earth (MSE) Walls.
9. Seismic upgrade (geotechnical) of existing structures (wharfs, etc.).
10. Pile driving and installation program.
11. Fill compaction and performance.
12. Liquefaction.
13. Settlement and soil expansion.
14. Building and Safety permit requirements.
15. Seepage – Dewatering - shoring.
16. Erosion control.
17. Other geotechnical work not mentioned.

The following subtasks may be utilized in the completion of the geotechnical planning and design work set forth above:

1. Field testing,explorations, and instrumentation.
2. Laboratory testing.
3. Soil structureinteraction evaluation analysis (static seismic conditions)
4. Earth pressure determinations and analysis.

5. Shoring recommendations and analysis.

6. Geotechnical analyses/parameters for existing structures (wharfs, etc.) pursuant to sismic upgrade efforts

7. Settlement analysis.

8. Stone column analysis and recommendations.

9. Recommendations on prevention, mitigation, and remediation on potential geotechnical issues.

10. Analysis for pile capacity and pile foundations.

11. Perform sisemic analysis and provide recommendations.

12. Perform seepage and seepage control analysis.

13. perform drainage blanket analysis and design.

14. Perform analysis and design of lining for seepage control.

15. Perform analysis for erosion control.

16. Perform tests, analysis, investigations, reports and recommendationsfor other geotechnical issues not mentioned above.

The following support services may be utilized in the completion of the geotechnical planning and design work set forth above:

1. Sanitary sewer design support.

2. Structural design support.

3. Architectural design support.

4. Provide construction support.

5. Monitor pile indicator program and provide driving criteria.

6. Submit soil foundation report to City of Los Angeles Department of Building and Safety.

07.06.06 PERMITS/APPROVALS

07.06.07 ENVIRONMENTAL CONSIDERATIONS

07.06.08 REFERENCE DRAWINGS

There are no reference drawings for this section.

07.07 GENERAL PERMIT

07.07.01 OVERVIEW

This section contains guidelines pertinent to obtaining a general permit from the Port of Los Angeles.

07.07.02 DESIGN CRITERIA

Design shall conform to the latest edition of City of Los Angeles Building, Electrical, Mechanical and /or Plumbing Codes and with generally accepted engineering standards and practices.

07.07.03 CALCULATIONS/WORKSHEETS

Calculations and worksheets shall be submitted by applicant in generally accepted engineering format.

07.07.04 GRAPHIC CRITERIA

There are no graphic criteria relating to general permit.

07.07.05 SPECIFICATIONS

There are no Harbor Department Master Specifications relating to general permit.

07.07.06 PERMITS/APPROVALS

When the Port of Los Angeles (POLA) customer (tenant) desires to make a modification/alteration to the POLA property, they are required to submit an application. Customer approaches the Planning and Research Division (P&R) with a request to construct or modify Port property. P&R determines if the project scope, schedule, location, etc., is acceptable to the Port. If so, P&R instructs the customer to fill out an Application for Discretionary Project and /or Right to Use Harbor Department Property (ADP) application. Applicant returns the original with a wet signature along with seven (7) sets engineering plans signed and stamped by a California registered Civil/Structural Engineer. (Plans should be 24”X36” unless the project is small. such as soil boring, fence, etc., in which regular size ,

8.5X11 or 11X17, sketch will suffice). P&R receives the ADP and plans, assigns an ADP number for the proposed activity, retains the original ADP,and one copy of the project drawings. P&R may scan the ADP and the sketches and posts them on the Development Permits e-mail box. The e-mail box can be accessed by Engineering, Real Estate, and Environmental Management Divisions so they will know if any new ADP has come in so they can start processing the ADP. P&R will then transmit one copy of the ADP and the project drawings to Environmental Management and Real Estate Divisions and four copies to Engineering.

PLANNING AND RESEARCH DIVISION: P&R makes a coastal assessment. If a Coastal Development Permit is necessary (typically Level I, II, or III permits), a recommendation to the Board of Harbor Commissioners (BHC) is required who will approve or dispprove the Coastal Development Permit. Otherwise, the Coastal Assessment is considered "exempt," and an exemption assessment is made. P&R will forward the Coastal Assessments to Engineering. Once P&R receives the RED determination and the EMD assessment, they will prepare a letter to the applicant informing hime/her that the project is approved or disapproved and instructing him/her that he /she needs to get a Harbor Engineer's permit from Engineering Division, Permit Section. P&R needs to send a copy of the letter to Engineering

REAL ESTATE DIVISION (RED): RED determines if the proposed project scope, schedule, etc. are acceptable to the Port and if the applicant has an entitlement to occupy the project area and forwards their determination to P&R.

ENVIRONMENTAL MANAGEMENT DIVISION (EMD): EMD makes an Environmental Assessment and forwards it, along with additional environmental conditions to P&R.

ENGINEERING DIVISION (PERMITS): Permit Section will receive permit–related documents from P&R Division via e-mail or hand delivered and enters it in the Permit Tracking System.. Upon receipt of the documents PERMITS reviews the project drawings and determines if the drawings need to be circulated to other Engineering Sections for review and/or comments. If review by other Engineering Sections is required, the project drawing set is stamped with "PLAN REVIEW;" list the additional reviewing Engineering sections; and hand delivers it to the section's head and follows up with an e-mail requesting for a return date.

Once all reviews have been completed, the drawings are returned to PERMITS. If the drawings are stamped revis and resubmit, PERMITS will contact the applicant and instructs applicant to pick-up reviewed set of drawings, address the comments and return the marked up drawings and four five sets of the revised

drawings After the drawings are approved by the reviewer all four sets are signed and approved by the Permit Section head and the Chief Harbor Engineer

Upon receipt of the Letter to the Applicant from P&R, the General Permit is finalized and the applicant is contacted and informed that the permit is ready for pick-up.

If there is a deposit required, the deposit amount is due upon pickup. When the applicant/Permittee arrives to sign for the GEP, they are escorted to the Cashier's office on the 4th floor, where they will pay the deposit and get a receipt. PERMITS will also keep a copy of the receipt and keep it in the office file until the work has been "signed-off" by the inspector. One copy of the permit will be retained by PERMITS, one copy of the permit and the stamped drawings will go to Construction Division Inspection Section, two copies will go to the applicant and one copy of the permit and unstamped drawing set will go to P&R.

When the inspector has approved the project as complete and signed-off on the inspector copy, that copy is delivered to PERMITS. Upon receipt of the as-built drawings by PERMITS, the return of the deposit if any is initiated. A "City of Los Angeles Harbor Department Accounting Section AUTHORITY FOR EXPENDITURE" (AFE) is required. This form is filled out by PERMITS and signed by the Chief Harbor Engineer and the Executive Office and then forwarded to the Accounting Division, where the AFE number is assigned. It should take approximately 10 business days for the Permittee to receive their deposit fees.

PERMITS updates the Permit data base status as closed; scans the as-built drawing; and places the hard copies in the vault at Berth 93.

07.07.07 ENVIRONMENTAL CONSIDERATIONS

An environmental assessment is prepared by Environmental Management Division and any environmental documentation that may be required will have to be prepared by the applicant.

07.07.08 REFERENCE DRAWINGS

There are no reference drawings for this section.

07.08 DREDGING

07.08.01 OVERVIEW

This section contains information on dredging pertinent to the Port of Los Angeles. Dredging is defined as excavation performed within navigable waters as defined by Mean High Water (MHW) which is approximately at elevation +4.80 feet at the Port of Los Angeles.
Dredging project can be initiated by the Engineering Division for major tenants and tenants with long term leases with the concurrence of the Real Estate Division; by the Real Estate or Marketing Divisions with a request to the Engineering Division; and by tenants with a request to the real Estate Division who will then endorse the request to the Engineering Division.

07.08.02 DESIGN CRITERIA

Capital Dredging

The purpose of capital dredging is to create a new berth, harbor, or waterway or to deepen existing facilities to allow access for ships with deeper draft.

1. Determine Depth
   a. Dredge design criteria for container terminals is determined by the individual requirement of the terminal tenant. Dredging to a final depth of -53 feet is current practice. Shallower depths may be used for design if such requirements are specified.
   b. Capital dredging for container terminals may include dredging of the existing dike for the purpose of removing material unsuitable to resist seismic loads. The new dike would then have to be rebuilt.
   c. In the case of new harbor or waterway, the dredge depth may vary and will be determined by the project scope.

Maintenance Dredging

The purpose for maintenance dredging is to restore the depth of water at a berth as it was originally designed for the safe berthing of vessels.

1. Monitor Water Depth

a) Periodically review the sounding maps prepared by the Survey Section to see that the water depth remains within acceptable ranges for any particular location.

b) Request from Survey Section any updated sounding maps.

c) Update sounding maps for liquid bulk petroleum terminals annually, container terminals every three years or as required by lease agreement, and all other terminals/berths every ten years or upon request by the Port Pilots, tenants, Real Estate Division, or as needed.

2. Determine the depth to be restored.

   a) Determine the berth's original design depth by reviewing the original wharf drawings or any subsequent wharf modifications.

   b) Determine the berth's previously maintenance dredged depth by reviewing maintenance dredging records.

3. Obtain a precondition survey, when necessary, to prepare sampling plan.

   a) Review the most current sounding map for the area.

   b) If the most current sounding map is more than three years old, a new one must be prepared. Submit a Survey/Sounding Request to the Survey Section.

4. Identify the area to be maintenance dredged.

   a) The site to be maintenance dredged is typically selected by two methods: historical interval or by request. Historical interval means the typical amount of time between maintenance dredging episodes for that area. Maintenance dredging may also be requested either from our tenants or by various Port Divisions.

   b) The Limits of Dredging for a site covers a length of wharf or dike that typically stretches from one Pierhead Point to the next. The site may also coincide with the coverage for the sounding map of the area.

07.08.03 CALCULATIONS/WORKSHEETS

For both capital and maintenance dredging, Autodesk Land Desktop is used to determine the area to be dredged and the volume of material to be removed.

The general location of the site is required in geodetic coordinates for permitting purposes. These can be obtained with the help of the Permits and Right of Way Section's spreadsheet tools.

07.08.04 GRAPHIC CRITERIA

Capital and maintenance dredging projects are described graphically the same way. They include both plan views and section views. A vicinity map is provided to locate the dredging project within the Port. The area to be dredged is shown with plan views of the site's limits of dredging stretching from left to right with the water at the top of the sheet. Typical sections are provided to show the existing seafloor profile and the dredge and overdredge depths to be achieved. The sections are usually obtained for a change in the wharf's typical section or a change in the extents of dredging. The only other drawing required would be a plan view of the disposal area that will receive the dredged material. All plans must be prepared in NAD83 California State Plane Coordinates, Zone 5. They must reference the Pierhead Points, the local berth numbers, and stationing.

07.08.05 SPECIFICATIONS

Master Specifications Section 35 20 23, Dredging, is typically used for projects involving any dredging. In addition, Sections on Selective Site Demolition (02 41 13), Earthwork (31 00 00) and Rock (35 42 37) will generally have to be included.

07.08.06 PERMITS/APPROVALS

Dredging activities at the Port fall under the oversite of several regulatory agencies including various Divisions within the Port.

United States Army Corps of Engineers (USACE)

Dredge Application have to be submitted to the USACE. Note that USACE will require Waste Discharge Permit from the Los Angeles Regional Water Quality Control Board (LARWQCB) for disposal of dredged materials. The application can be submitted to USACE while the Waste Discharge Permit is being processed by the LARWQCB) but final approval will only be made by USACE when the Waste Discharge Permit is submitted to USACE.

United States Environmental Protection Agency (USEPA)

USACE will generally ask the US Environmental Agency to review our application and the accompanying environmental documentation and provide input on the application. Note that the USACE will require Post-Dredging and Monitoring Reports.

Los Angeles Regional Water Quality Control Board (LARWQCB)

An NPDES Waste Discharge Permit from the LARWQCB will generally be required. The permit will have to be submitted to the USACE before USACE approves the dredge application.

California Coastal Commission

For maintenance dredging, a Consistency Certification will have to be secured from the Coastal Commission to find that the dredging is consistent with the Port's Master Plan.

California Department of Fish and Game (CDF&G)

California Department of Fish and Game will only be involved when the dredging operations when a wetland area is affected, in which case an eel grass survey is required and a Streambed Alteration Agreement will be required. A Caulerpa Taxifolia survey will also have to be conducted not more than 90 days and not less that 30 days prior to the start of dredging operation. The report will have to be submitted to CDF&G as well as the National Marine Fisheries Service.

The Port of Los Angeles

An ADP will have to be prepared and submitted to Planning and Research Division. The ADP process will determine the environmental documentation required for the project.

07.08.07 ENVIRONMENTAL CONSIDERATIONS

Dredging activities have two primary environmental considerations. These are the degree of sediment contamination and the monitoring of water for contamination during dredging.

The degree of sediment contamination is determined prior to dredging. A three tiered process is used. Tier one involves bulk chemistry testing to determine the levels of various chemicals in the sediment. Tier two involves obtaining

bioassays. These are water column mortality tests with organisms that are typically found within the Port. Lastly, tier three involves bioaccumulation testing. The surviving organisms are sequestered within an environment that includes a portion of the sediments for a standard amount of time to determine the levels at which they absorbed the chemicals into their tissues. The results of this three tiered testing will determine where and how the dredged material may be disposed.

Water quality monitoring is performed during dredging operations to determine if the chemicals within the sediments are being resuspended into the water column. If this is found to be the case, measures are taken to minimize the spread of the sediment plume by such means as silt screens.

Prior to initiation of any USACE permitted dredging activities, a pre-construction Caulerpa Taxifolia survey shall be conducted to determine the presence of Caulerpa. An Eelgrass survey may also be needed for shallow areas or where eelgrass maybe present i.e., Cabrillo Beach, Cabrillo Marina or Pier 300Shallow Water Habitat. Engineering shall submit a request to Environmental Management Division (EMD) to perform these surveys which will be carried out by ED's consultants. The survey work shall be completed not earlier than 90 days and no 30 days prior to the start of dredging activities.

07.08.08 REFERENCE DRAWINGS

The following contract drawings are identified for reference:

1-2220 2001 Dredging.

- 1-2220 G-1 General Notes & Vicinity Map
- 1-2220 G-2 Anchorage Road Soil Storage Site
- 1-2220 C-1 Berth 226-232 Dredging Plan
- 1-2220 XX-1 Berth 226-232 Cross Sections Stations 100+00 & 102+00

1-2448 2004 Maintenance Dredging.

- 1-2448 G-01 General Notes & Vicinity Map
- 1-2448 G-02 Disposal Location and Haul Route
- 1-2448 C-1 Berth 36 - Dredging Plan

1-2448 XX-1 Berth 36 - Typical Sections

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The Port of Los Angeles Code for Seismic Design, Upgrade and Repair of Container Wharves

City of Los Angeles Harbor Department

May 2010

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FOREWORD

In 2004, the City of Los Angeles Harbor Depart, also known as the Port of Los Angeles (POLA), adopted "The Port of Los Angeles Code for Seismic Design, Upgrade and Repair of Container Wharves" dated May 18, 2004 as the seismic code for container wharf structures at the Port of Los Angeles. That document is referred to as "POLA Seismic Code 2004".

Since 2004, POLA has endeavored to improve and update the POLA Seismic Code 2004. This endeavor has resulted in an updated document for the seismic code for marginal container wharf structures. Upon adoption by the City of Los Angeles Harbor Department, the updated document will come into effect and supersede the POLA Seismic Code 2004. The updated document will be referred to as "POLA Seismic Code 2010".

POLA Seismic Code 2010 provides updates and revisions to the POLA Seismic Code 2004. The POLA Seismic Code 2004 has been revised and reformatted to include changes in the seismic design requirements and to address review comments from the public during an industry-wide workshop held in 2005 cosponsored by POLA and the American Society of Civil Engineers (ASCE). The requirements in the POLA Seismic Code 2004 have been updated to reflect the conclusions of experimental research and technical studies conducted since its publication. Other additional revisions were made in a continued effort to improve the code requirements for marginal container wharf structures at the Port of Los Angeles.

Upon adoption of the POLA Seismic Code 2010, any variances and modifications not in compliance with the POLA Seismic Code 2010 will require explicit approval by POLA.

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STANDARDS AND GUIDELINES

Marginal container wharves analysis and design shall comply with the provisions of POLA Seismic Code 2010 and the following documents as applicable. The provisions of POLA Seismic Code 2010 shall supersede the requirements of all other documents if there are disagreements.

LABC	International Conference of Building Officials and California Building Standards Commission. *The City of Los Angeles Building Code.* 2008.
CBC	California Building Standards Commission. *California Building Code*. 2007.
ASCE 7-05	American Society of Civil Engineers. *Minimum Design Loads for Buildings and Other Structures*. 2005.
ACI-318	American Concrete Institute. *Building Code Requirements for Structural Concrete*. 2005.
AISC	American Institute of Steel Construction. *Specifications for Structural Steel Buildings*. 2005.
ASTM	American Society for Testing and Materials. *American Society for Testing and Materials (ASTM) Standards in Building Codes*. 2007.
NEHRP	National Earthquake Hazards Reduction Program. *NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures*, *FEMA 450-1*. 2003.

DEFINITIONS

Capacity-protected: Structural elements such as pile caps, deck beams, and deck slabs that are designed to have a greater capacity than the adjacent ductile members such as piles. Refer to Section 1.6.6.

Code: The Port of Los Angeles Code for Seismic Design, Upgrade and Repair of Container Wharves (POLA Seismic Code 2010).

Contingency Level Earthquake (CLE): The seismic event that produces ground motions associated with a 475-year return period. The 475-year return period ground motions have a 10 percent probability of being exceeded in 50 years.

Design Earthquake (DE): Design earthquake as defined in ASCE 7-05 Section 11.2.

Diameter (Pile Diameter): Diameter of circular cross-section or diameter of circle inscribed within non-circular cross section.

Dike: Engineered assembly of rock material used to retain fill or cut slopes for container wharves.

Ductile Design: Design of structural elements that provide significant displacement and rotation capacity beyond yield strength through the use of detailing, such as confinement. Refer to Section 1.6.7.

Dynamic Magnification Factor (DMF): A factor to account for effects of higher order modes. Refer to Section 1.6.4.1f.

Embankment: Fill material or cut slopes protected or stabilized by dike.

Expansion Joint: A joint between two wharf units with a shear key that allows relative longitudinal movement (movement parallel to shore) but restricts relative transverse movement (movement perpendicular to shore).

Expected Strength: The strength of a structural member based on the most probable (expected) material properties. Refer to Section 1.6.2.

Hydrodynamic Mass: Mass of the water around the pile which is accelerated with the movement of the pile due to action of pressure under seismic load. Refer to Section 1.6.1.

Inertial Load: Loading on the piles from the response of the seismic mass due to seismic ground acceleration. Refer to Section 1.7.5.1.

Kinematic Load: Loading on the piles from permanent ground deformation. Refer to Section 1.7.5.2.

Linked Wharves: Two or more wharf units that are joined by one or more expansion joint(s).

Lower-bound Lateral Soil Spring: The lowest lateral soil spring representing the softest soil behavior. Refer to Section 1.7.5.1.

Marginal Container Wharves: Waterfront structures parallel to the shoreline that project from the land into a body of water used for transfer of containers. Typically, marginal wharves have a minimum of one row of piles located landside of or close to the dike crest.

Modal Response Spectrum Analysis: Spectral analysis that captures transverse, longitudinal and rotational modal responses. Refer to Section 1.6.4.1

Non-seismic Piles: Piles that resist no more than 10% of the total lateral seismic load. These piles are typically located waterside of the dike crest in deeper water and primarily carry vertical load.

Operational Level Earthquake (OLE): The seismic event that produces ground motions associated with a 72-year return period. The 72-year return period ground motions have a 50% probability of being exceeded in 50 years.

Performance-based Design: Design based on specific criteria and performance objectives associated with acceptable levels of damage at specified levels of seismic hazard.

Pile-deck Joint: The moment resisting connection between the top of the pile and the deck.

Plastic Hinge: The region of the pile where concrete or steel strain exceeds the strain associated with the yield strength. Refer to Section 1.6.4.2.

Pseudo-static Seismic Slope Stability Analysis: A slope stability evaluation where earthquake load is represented by an equivalent horizontal static load. Refer to Section 1.7.2.2.

Post-earthquake Static Slope Stability Analysis: A static slope stability evaluation using soil parameters following an earthquake to account for potential earthquake induced soil strength loss. Refer to Section 1.7.2.3.

Seismic Mass: The mass of the structure dead load and a portion of the design live load that contributes to the seismic response. Refer to Section 1.6.1.

Seismic Piles: Piles that resist most of the lateral seismic load. These piles are typically located landside of or close to the dike crest

Single-mode Transverse Analysis: Spectral analysis that captures the transverse modal response of the structure.

Soil-structure Interaction (SSI): The process in which the response of the soil influences the deformation of the structure and the deformation of the structure influences the response of the soil.

Upper-bound Lateral Soil Spring: The highest lateral soil springs representing the stiffest soil behavior. Refer to Section 1.7.5.1.

Wharf End Unit: A wharf structure with one expansion joint at one end.

Wharf Unit: A wharf structure between two expansion joints or an independent structure without expansion joints.

SYMBOLS AND NOTATIONS

Unless noted otherwise all units are in pounds, inches and seconds.

A_e	Pile effective shear cross-sectional area (80% of gross cross-sectional area for solid circular or octagonal piles)
A_{sc}	Total cross-sectional area of dowel bars in the pile-deck joint
A_{sp}	Cross-sectional area of transverse reinforcement
B	Width of a wharf unit in feet
c	Depth from the extreme compression fiber to the neutral axis at flexural strength
c_o	Concrete cover plus half the diameter of the transverse reinforcement
D'	Diameter of the pile-deck joint core measured to the centerline of the confinement steel
d_b	Dowel diameter
DL	Dead load in moments, shear forces, or axial forces due to self-weight of the wharf deck, 1/3 of the pile weight between the deck soffit and $5D_p$ below the dike surface, crane self-weight and weight of any permanently attached equipment or fixtures
D_p	Diameter of the pile
E	Earth lateral pressure
e	Eccentricity between the wharf center of mass and center of rigidity
EQ	Earthquake lateral load due to OLE, CLE or DE
E_{sh}	Confining steel modulus of elasticity
F	Wharf total lateral seismic force of the wharf strip considered at Δ_d
f'_c	Specified compressive strength of unconfined concrete at 28 days
f'_{ce}	Expected concrete compressive strength
F_d	Wharf deck member, moment, shear and axial demands
F_o	Design moment, shear and axial forces for deck members
F_p	Prestress compressive force in pile taken as zero at top plastic hinge
f_{pu}	Ultimate strength of prestressing strands
f_{pue}	Expected prestressing strand ultimate strength
f_y	Nominal yield strength of longitudinal reinforcing steel, dowels, or structural steel
f_{ye}	Expected yield strength of longitudinal reinforcing steel, dowels, or structural steel
f_{yh}	Nominal yield strength of confining or transverse steel
f_{yhe}	Expected yield strength of confining or transverse steel
g	The distance between the top of the pile steel shell and the deck soffit
H	The distance between the center of the pile top plastic hinge and the center of the pile in-ground plastic hinge
j	Time step of the time-history record not more than 0.05-second interval
K	(0.5 x PGA / gravity) where PGA is the peak ground acceleration in feet/second^2 and gravity is 32.2 feet/second^2
k	Curvature ductility factor determined as a function of μ_ϕ
k_e	Secant wharf stiffness at seismic demand
k_i	Initial elastic stiffness of the wharf structure based on cracked section properties
k_s	Secant stiffness of the wharf structure at the considered seismic demand
$k_{s,n}$	k_s at iteration step n
$k_{s,n-1}$	k_s at iteration step n-1
k_y	Yield acceleration coefficient

L	Distance from the center of the pile top plastic hinge to the pile point of contra-flexure
l_a	Actual embedment length of dowels anchored in the pile-deck joint
LL	Live load in moments, shear forces or axial forces due to the design uniform live load
L_L	Length of the shortest exterior wharf unit in feet
L_p	Plastic hinge length
L_{sp}	Strain penetration length
m	Time-history record number
m_{crane}	Mass of crane
$m_{crane,deck}$	Part of the crane mass positioned within 10 feet above wharf deck
M_n	Nominal moment capacity
$M_{p,in\text{-}ground}$	Pile plastic moment capacity at the in-ground plastic hinge including effect of axial load on piles due to crane dead load
$M_{p,top}$	Pile plastic moment capacity at the top plastic hinge including the effect of axial load on piles due to crane dead load
$m_{seismic}$	Seismic mass
P_a	External axial load on pile (compression is taken as positive and tension as negative)
p-y	Inelastic lateral soil springs
T_{crane}	Translational elastic period of the crane mode with the maximum participating mass
T_{wi}	Initial elastic period of the wharf structure based on cracked section properties
T_{ws}	Secant period of the wharf structure
U	Total design load in moments, shear forces or axial forces
V_a	Shear strength due to the smallest axial load demand
V_c	Concrete shear strength
V_n	Pile nominal shear capacity
V_o	Pile shear demand
V_p	Pile plastic shear
V_s	Transverse reinforcement shear strength
V_{sk}	Expansion joint shear key force due to OLE, CLE or DE
V_Δ	Total wharf lateral seismic force at the displacement demand determined using pushover analysis
W	Effective dead load of the wharf strip considered
α	Angle between the line joining the centers of the compression zones at top and in-ground plastic hinges and pile axis
β	Factor determined as a function of wharf unit length
Δ_c	Displacement capacity corresponding to the performance level considered
Δ_d	Displacement demand corresponding to the earthquake level considered
$\Delta_{d,j}$	Δd at time step j
$\Delta_{d,j,m}$	Δd at time step j for time-history record number m
$\Delta_{p,m}$	The pile plastic displacement capacity due to rotation of the plastic hinge at OLE, CLE or DE specified strain limit
Δ_t	Displacement of wharf due to transverse excitation
Δ_{ti}	Spectral displacement demand for single-mode transverse response corresponding to wharf initial elastic period, T_{wi} using 0.05 damping ratio

Δ_{ts}	Spectral displacement demand for single-mode transverse response corresponding to wharf secant period, T_{ws} using effective damping ratio, ξ_{eff}
$\Delta_{ts,\,n}$	Δ_{ts} at iteration step n
$\Delta_{ts,\,n-1}$	Δ_{ts} at iteration step n-1
$\Delta_{ts,\,n-2}$	Δ_{ts} at iteration step n-2
Δ_{X1}, Δ_{X2}	Combined X-axis displacements due to excitations in the transverse and longitudinal directions
$\Delta_{X,\,j,\,m}$	Combined X-axis displacements due to excitation in the transverse and longitudinal directions for time step j and time-history record number m
Δ_{XL}	X-axis displacement due to longitudinal excitation
$\Delta_{XL,\,j,\,m}$	X-axis displacement due to longitudinal excitation for time step j and time-history record number m
Δ_{XT}	X-axis displacement due to transverse excitation
$\Delta_{XT,\,j,\,m}$	X-axis displacement due to transverse excitation for time step j and time-history record number m
Δ_{y}	Displacement when the considered pile plastic hinge develops
Δ_{Y1}, Δ_{Y2}	Combined Y-axis displacements due to excitations in the transverse and longitudinal directions
$\Delta_{Y,\,j,\,m}$	Combined Y-axis displacement from excitations in the transverse and longitudinal directions for time step j and time-history record m
Δ_{YL}	Y-axis displacement due to longitudinal excitation
$\Delta_{YL,\,j,\,m}$	Y-axis displacement due to longitudinal excitation for time step j and time-history record m
Δ_{ys}	Wharf structure system yield displacement determined from the intersection of the elastic and post-yield branches of the bilinear approximation of the force-displacement curve
Δ_{YT}	Y-axis displacement due to transverse excitation
$\Delta_{YT,\,j,\,m}$	Y-axis displacement due to transverse excitation for time step j and time-history record m
ε_c	Extreme fiber concrete compressive strain
ξ_{eff}	Effective damping ratio
ε_p	Prestressing strands tensile strain
ε_s	Steel shell extreme fiber strain
ε_{sd}	Dowel reinforcement tensile strain
ε_{smd}	Strain at peak stress of dowel reinforcement
ϕ	Strength reduction factor, 0.85 for OLE and CLE and 1.0 for DE
ϕ_m	Curvature at OLE, CLE, or DE specified strain limit
$\phi_{p,m}$	Pile plastic curvature at OLE, CLE or DE specified strain limit
ϕ_y	Yield curvature determined when the considered plastic hinge develops
μ_Δ	Displacement ductility
μ_ϕ	Curvature ductility
ρ_s	Effective volumetric ratio of confining steel = (volume of confining steel in one loop) / (volume of concrete core for a length equal to the confining steel spacing along the pile length)

θ	Angle of the critical shear crack with respect to the longitudinal axis of the pile
$\theta_{p,\,m}$	Pile plastic rotation at OLE, CLE or DE specified strain limit

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CHAPTER 1
SEISMIC DESIGN OF NEW CONTAINER WHARVES

1.1 PURPOSE

The purpose of this chapter is to provide seismic code provisions to safeguard life, protect against major structural failures, limit damages, and minimize economic losses due to seismic events for new marginal container wharves.

The intent of the provisions provided in this chapter is to achieve performance goals for the seismic design of new marginal container wharves at three levels of ground motions:

a. Operating Level Earthquake (OLE): No significant structural damage. Damage location to be visually observable and accessible for repairs. Minimum or no interruption to wharf operations during repairs may occur.

b. Contingency Level Earthquake (CLE): Controlled inelastic structural behavior and limited permanent deformations. Damage location to be visually observable and accessible for repairs. Temporary or short term loss of operations may occur.

c. Design Earthquake Level (DE): Safeguard life and against major structural failures.

1.2 SCOPE

The scope of this chapter is to provide performance-based provisions for the seismic design of new marginal container wharves at the specified earthquake. General seismic design criteria, load combinations, analytical and design requirements, detailing requirements, geotechnical and soil-structure requirements are provided.

In order to achieve seismic performance goals, seismic performance criteria provided in terms of material strain limits for each earthquake level are specified.

1.3 PERFORMANCE REQUIREMENTS

The design of new marginal container wharf structures shall satisfy the strain limits at the three levels of ground motions provided in this section.

1.3.1 Ground Motions

Three levels of site-specific ground motions shall be determined for the design of wharf structures as defined in Table 1-1.

Table 1-1: Ground Motions

Earthquake	Probability of Exceedance	Return Period
Operating Level Earthquake (OLE)	50% in 50 years	72
Contingency Level Earthquake (CLE)	10% in 50 years	475
Design Earthquake Level (DE)	"Design Earthquake" as defined in ASCE 7-05 Section 11.2.	

1.3.2 Strain Limits

The strain limits for piles at OLE, CLE and DE are provided in Table 1-2, Table 1-3, and Table 1-4.

Table 1-2: Seismic Piles Top Plastic Hinge Strain Limits

Pile	Design Level		
	OLE	CLE	DE
Solid Concrete Piles	$\varepsilon_c \leq 0.005$ $\varepsilon_{sd} \leq 0.015$	$\varepsilon_c \leq (0.005 + 1.1\ \rho_s) \leq 0.025$ $\varepsilon_{sd} \leq 0.6\varepsilon_{smd} \leq 0.06$	ε_c [(b)] $\varepsilon_{sd} \leq 0.8\varepsilon_{smd} \leq 0.08$
Round Hollow Concrete Piles [(a)]	$\varepsilon_c \leq 0.004$ $\varepsilon_{sd} \leq 0.015$	$\varepsilon_c \leq 0.006$ $\varepsilon_{sd} \leq 0.4\varepsilon_{smd} \leq 0.04$	$\varepsilon_c \leq 0.008$ $\varepsilon_{sd} \leq 0.6\varepsilon_{smd} \leq 0.06$
Steel Pipe Piles: Concrete Plug with Dowels	$\varepsilon_c \leq 0.010$ $\varepsilon_{sd} \leq 0.015$	$\varepsilon_c \leq 0.025$ $\varepsilon_{sd} \leq 0.6\varepsilon_{smd} \leq 0.06$	ε_c [(b)] $\varepsilon_{sd} \leq 0.8\varepsilon_{smd} \leq 0.08$

[(a)] If the interior of hollow concrete piles is filled with concrete, all strain limits shall be the same as for solid concrete piles.
[(b)] No limit.

Table 1-3: Non-seismic Piles Top Plastic Hinge Strain Limits

Pile	Design Level	
	OLE and CLE	DE
Solid Concrete Piles	$\varepsilon_c \leq 0.005$ $\varepsilon_{sd} \leq 0.015$	ε_c [(b)] $\varepsilon_{sd} \leq 0.8\varepsilon_{smd} \leq 0.08$
Round Hollow Concrete Piles [(a)]	$\varepsilon_c \leq 0.004$ $\varepsilon_{sd} \leq 0.015$	$\varepsilon_c \leq 0.008$ $\varepsilon_{sd} \leq 0.6\varepsilon_{smd} \leq 0.06$
Steel Pipe Piles: Concrete Plug with Dowels	$\varepsilon_c \leq 0.010$ $\varepsilon_{sd} \leq 0.015$	ε_c [(b)] $\varepsilon_{sd} \leq 0.8\varepsilon_{smd} \leq 0.08$

[(a)] If the interior of hollow concrete piles is filled with concrete, all strain limits shall be the same as for solid concrete piles.
[(b)] No limit.

Table 1-4: In-ground Plastic Hinge Strain Limits for Seismic and Non-seismic Piles

Pile	In-ground Plastic Hinge Location	Design Level		
		OLE	CLE	DE
Solid Concrete Piles	Hinge form at depth ≤ 10 D_p	$\varepsilon_c \leq 0.005$ $\varepsilon_p \leq 0.015$	$\varepsilon_c \leq (0.005 + 1.1\ \rho_s) \leq 0.008$ $\varepsilon_p \leq 0.025$	$\varepsilon_c \leq (0.005 + 1.1\ \rho_s) \leq 0.025$ $\varepsilon_p \leq 0.035$
	Hinge form at depth >10 D_p	$\varepsilon_c \leq 0.008$ $\varepsilon_p \leq 0.015$	$\varepsilon_c \leq 0.012$ $\varepsilon_p \leq 0.025$	ε_c [(b)] $\varepsilon_p \leq 0.050$
Round Hollow Concrete Piles[(a)]	Hinge form at depth ≤ 10 D_p	$\varepsilon_c \leq 0.004$ $\varepsilon_p \leq 0.015$	$\varepsilon_c \leq 0.006$ $\varepsilon_p \leq 0.025$	$\varepsilon_c \leq 0.008$ $\varepsilon_p \leq 0.025$
	Hinge form at depth >10 D_p	$\varepsilon_c \leq 0.004$ $\varepsilon_p \leq 0.015$	$\varepsilon_c \leq 0.006$ $\varepsilon_p \leq 0.025$	$\varepsilon_c \leq 0.008$ $\varepsilon_p \leq 0.050$
Steel Pipe Piles	Hinge form at depth ≤ 10 D_p	$\varepsilon_s \leq 0.010$	$\varepsilon_s \leq 0.025$	$\varepsilon_s \leq 0.035$
	Hinge form at depth >10 D_p	$\varepsilon_s \leq 0.010$	$\varepsilon_s \leq 0.035$	$\varepsilon_s \leq 0.050$
Steel Pipe Piles Filled with Concrete	Hinge form at depth ≤ 10 D_p	$\varepsilon_s \leq 0.010$	$\varepsilon_s \leq 0.035$	$\varepsilon_s \leq 0.050$
	Hinge form at depth >10 D_p	$\varepsilon_s \leq 0.010$	$\varepsilon_s \leq 0.035$	$\varepsilon_s \leq 0.050$

[(a)] If the interior of hollow concrete piles is filled with concrete, all strain limits shall be the same as for solid concrete piles.
[(b)] No limit.

Where:

ε_c = Extreme fiber concrete compressive strain

ρ_s = Effective volumetric ratio of confining steel = (volume of confining steel in one loop) / (volume of concrete core for a length equal to the confining steel spacing along the pile length)

ε_{sd} = Dowel reinforcement tensile strain

ε_{smd} = Strain at peak stress of dowel reinforcement

D_p = Diameter of the pile

ε_p = Prestressing strand tensile strain

ε_s = Steel shell extreme fiber strain

1.4 GENERAL SEISMIC CRITERIA

1.4.1 Wharf

a. The seismic design of a new marginal container wharf structure shall comply with provisions in Section 1.6.

b. The structural system shall be based on the strong beam (deck) and weak column (pile) frame concept. All plastic hinges shall be designed to occur in the piles. All elements of the deck shall be capacity-protected as defined in Section 1.6.6.

c. The wharf shall be designed as a moment-resisting frame consisting of a reinforced concrete deck supported by vertical piles. Pile plastic hinge region and pile-to-deck ductile connection shall be detailed according to Section 1.6.7. Battered piles shall not be used.

d. For non-seismic piles, if a plastic hinge is developed the non-seismic piles shall comply with the detailing requirements of the seismic piles according to Section 1.6.7.

e. The pile-deck joint forces determined based on the maximum induced moments, shears and axial forces in the pile shall be in equilibrium.

f. The design of concrete elements shall comply with the provisions of this Code and ACI-318-05. The design of steel elements shall comply with the provisions of this Code and AISC 13th edition.

g. Crane-wharf interaction shall be evaluated per Section 1.6.4.3.

1.4.2 Embankment and Dike

a. The embankment and dike shall be designed according to Section 1.7.

b. The clearance between the deck soffit and the top of the dike or embankment shall be a minimum of 3.5 feet.

1.4.3 Utilities and Pipelines

Utilities and pipelines connections shall be designed to accommodate the maximum seismic deformation including ground surface rupture at the following locations:

a. Where utilities and pipelines pass from the backland through the cutoff wall or other rigid structure at the back of the wharf.

b. Where utilities and pipelines span across expansion joints of individual wharf units.

1.5 LOAD COMBINATIONS

The following load combinations shall be used to determine seismic moment, shear and axial demands for wharf deck and pile cap, and seismic shear and axial force demands for piles:

$$U = (1 \pm K)\ DL + 0.1\ LL + E + EQ \qquad (1\text{-}1)$$

$$U = (1 \pm K)\ DL + E + EQ \qquad (1\text{-}2)$$

Where:

$U =$ Total design load in moments, shear forces or axial forces

K = (0.5 x PGA / gravity) where PGA is the peak ground acceleration in feet/second^2 and gravity is 32.2 feet/second^2

DL = Dead load in moments, shear forces, or axial forces due to self-weight of the wharf deck, 1/3 of the pile weight between the deck soffit and $5D_p$ below the dike surface, crane self-weight and weight of any permanently attached equipment or fixtures

LL = Live load in moments, shear forces or axial forces due to the design uniform live load

E = Earth lateral pressure

EQ = Earthquake lateral load due to OLE, CLE or DE

1.6 ANALYTICAL AND DESIGN REQUIREMENTS

1.6.1 Seismic Mass

The seismic mass, $m_{seismic}$ shall include:

a. The mass of the wharf deck.
b. 1/3 of the mass of piles with the tributary length measured from the bottom of deck soffit to $5D_p$ below the surface of pile embedment.
c. The mass of any permanently attached equipment/ fixtures.
d. Mass due to the minimum of 10% of the design uniform live load or 100 pounds per square foot.
e. The hydrodynamic mass, if the pile diameter is greater than 2 feet.
f. The part of crane mass not less than $m_{crane,deck}$ or 0.05 m_{crane}

where,

$m_{crane,deck}$ = Part of the crane mass positioned within 10 feet above wharf deck
m_{crane} = Mass of crane

1.6.2 Material Properties

The capacity of ductile elements, except shear, shall be based on the following material properties:

Expected concrete compressive strength	$f'_{ce} = 1.3f'_c$
Expected yield strength of longitudinal steel, dowels, or structural steel	$f_{ye} = 1.1f_y$
Expected yield strength of confining or transverse steel	$f_{yhe} = 1.0f_{yh}$
Expected prestressing strand ultimate strength	$f_{pue} = 1.05f_{pu}$

Where:

f'_c = Specified compressive strength of unconfined concrete at 28 days
f_y = Nominal yield strength of longitudinal reinforcing steel, dowels, or structural steel
f_{yh} = Nominal yield strength of confining or transverse steel
f_{pu} = Ultimate strength of prestressing strand

1.6.3 Modeling Requirements

The analytical model shall represent all significant structural components including, but not limited to structural configurations, seismic mass, material and section properties, and soil-structure interaction properties as follows:

a. The analytical model shall accurately represent distribution of seismic mass, structural member properties, joint and boundary conditions and contain sufficient nodes and elements to capture the critical structural seismic responses.

b. The analytical model shall include soil-structure interaction using upper bound and lower bound lateral soil springs. See Section 1.7. The contribution of soil passive pressure at the cut-off wall shall not be used to reduce wharf displacement demand or to increase wharf displacement capacity.

c. Pile cracked section proprieties shall be used based on the expected material properties provided in Section 1.6.2.

d. The pile effective stiffness shall be determined using the expected material properties provided in Section 1.6.2.

e. The wharf deck-to-concrete pile connection shall be modeled as shown in Figure 1-1, which includes, but is not limited to, the following:

   1. A node to capture the pile plastic moment capacity at the deck soffit.
   2. The length of the first pile element below the soffit shall have reinforced concrete section properties and be at least 16 inches in length.
   3. For piles connected to the deck with dowels, a pile element with the strain penetration length, L_{sp} shall be provided as follows:

$$L_{sp} = 0.12 f_{ye} d_b \tag{1-3}$$

Where:

f_{ye} = Expected yield strength of dowels in kips per square inch
d_b = Dowel diameter

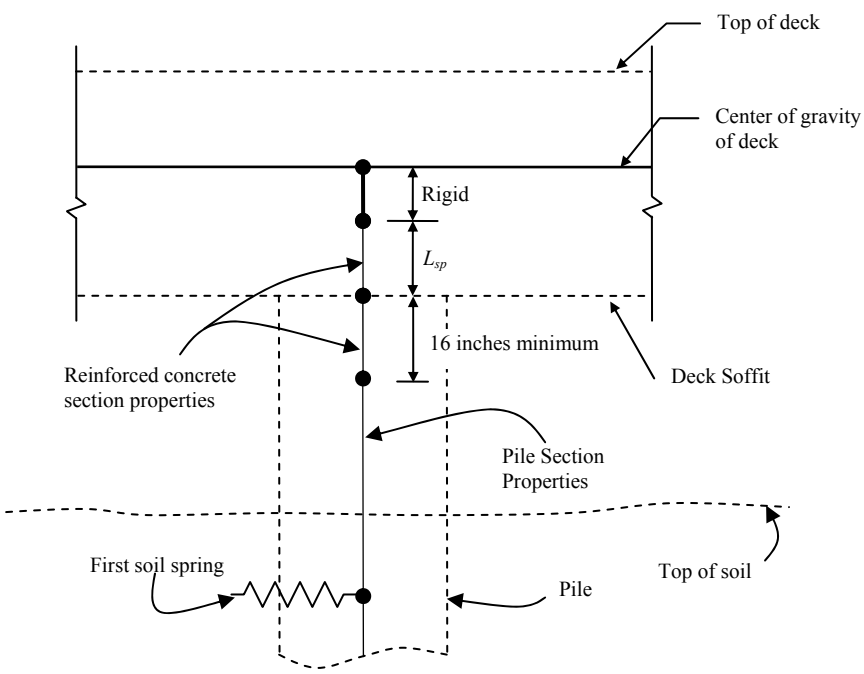

Figure 1-1: Modeling of Pile-to-Deck Connection (Not-to-Scale)

1.6.4 Displacement Demand and Capacity

Displacement demand, Δ_d of the wharf shall not be greater than the displacement capacity, Δ_c. of the wharf:

$$\Delta_d \leq \Delta_c \tag{1-4}$$

1.6.4.1 Displacement Demand of Wharf

a. Displacement demand, Δ_d shall be determined at OLE, CLE, and DE per Section 1.3.1 using upper bound and lower bound soil spring strength and stiffness values per Section 1.7.5.1.

b. The displacement demand shall include the effect of kinematic load per Section 1.7.5.2 and combined effect of inertial and kinematic loads per Section 1.7.5.3.

c. Displacement demand shall be determined using Multi-modal Spectral Analysis per Section 1.6.4.1e.

   Exceptions:

   Single-mode Transverse Analysis may be used to determine displacement demand per Section 1.6.4.1f for straight wharf units if all the following conditions are met:

   1. 400 feet < L_L < 800 feet
   2. 100 feet < B < 120 feet
   3. Less than 20% variation in the initial elastic stiffness of the wharf structure along the wharf length.
   4. Crane-wharf interaction analysis is not required per Section 1.6.4.3.

   Where:

   L_L= Length of the shortest exterior wharf unit in feet
   B = Width of a wharf unit in feet

d. Nonlinear Time-history Analysis per Section 1.6.4.1g shall be used to verify Multi-modal Spectral Analysis or Single-mode Transverse Analysis for special conditions as required by the POLA.

e. For Multi-modal Spectral Analysis, sufficient modes shall be included such that 90% of the participating mass is captured, a damping ratio of 5% shall be used, and wharf displacement demand, Δ_d, shall be determined as follows:

$$\Delta_d = \max\left(\sqrt{\Delta_{X1}^{\ 2} + \Delta_{Y1}^{\ 2}} \text{ or } \sqrt{\Delta_{X2}^{\ 2} + \Delta_{Y2}^{\ 2}}\right) \tag{1-5}$$

$$\begin{aligned} \Delta_{X1} &= \Delta_{XL} + 0.3\Delta_{XT} \\ \Delta_{Y1} &= \Delta_{YL} + 0.3\Delta_{YT} \end{aligned} \tag{1-6}$$

$$\begin{aligned} \Delta_{X2} &= 0.3\Delta_{XL} + \Delta_{XT} \\ \Delta_{Y2} &= 0.3\Delta_{YL} + \Delta_{YT} \end{aligned} \tag{1-7}$$

Where:

Δ_{XL} = X-axis displacement due to longitudinal excitation, refer to Figure 1-2
Δ_{XT} = X-axis displacement due to transverse excitation, refer to Figure 1-2
Δ_{YL} = Y-axis displacement due to longitudinal excitation, refer to Figure 1-2
Δ_{YT} = Y-axis displacement due to transverse excitation, refer to Figure 1-2
Δ_{X1}, Δ_{X2} = Combined X-axis displacements due to excitations in the transverse and longitudinal directions
Δ_{Y1}, Δ_{Y2} = Combined Y-axis displacements due to excitations in the transverse and longitudinal directions

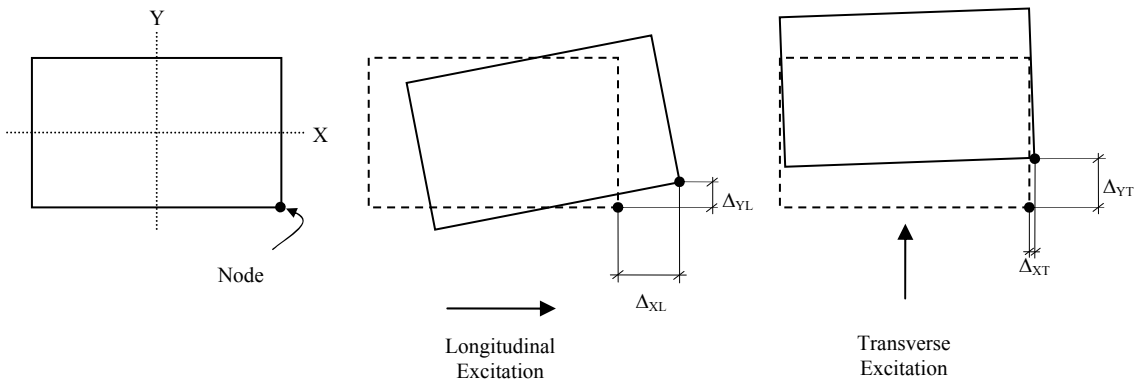

Figure 1-2: Multi-modal Spectral Analysis

f. For Single-mode Transverse Analysis, the displacement demand Δ_d, shall be determined as follows:

$$\Delta_d = \Delta_t \text{ x DMF} \tag{1-8}$$

Where:

Δ_t = Maximum of Δ_{ti} or Δ_{ts}

Δ_{ti} = Spectral displacement demand for single-mode transverse response corresponding to wharf initial elastic period, T_{wi} using 0.05 damping ratio

$$T_{wi} = 2\pi\sqrt{\frac{m_{seismic}}{k_i}} \tag{1-9}$$

k_i = Initial elastic stiffness of the wharf structure based on cracked section properties

Δ_{ts} = Spectral displacement demand for single-mode transverse response corresponding to wharf secant period, T_{ws} using effective damping ratio, ξ_{eff}

$$T_{ws} = 2\pi\sqrt{\frac{m_{seismic}}{k_s}} \tag{1-10}$$

k_s = Secant Stiffness of the wharf structure at the considered seismic demand

$$\xi_{eff} = 0.10 + 0.565\left(\frac{\mu_\Delta - 1}{\mu_\Delta \pi}\right) \tag{1-11}$$

$$\mu_\Delta = \frac{\Delta_{ts}}{\Delta_{ys}} \tag{1-12}$$

Δ_{ys}= Wharf structure system yield displacement determined from the intersection of the elastic and post-yield branches of the bilinear approximation of the force displacement curve, refer to Figure 1-3

Δ_{ts} shall be determined using an iterative procedure with convergence tolerance such that $\left|100 - \frac{\Delta_{ts,n}}{\Delta_{ts,n-1}}\right| \leq 3\%$

DMF =

Single Wharf Unit:

DMF = 1.80 - 0.05 LL / B ≥ 1.10 for OLE (1-13)

DMF = 1.65 - 0.05 LL / B ≥ 1.10 for CLE/DE, UB springs (1-14)

DMF = 1.50 - 0.05 LL / B ≥ 1.10 for CLE/DE, LB springs (1-15)

Linked Wharf Exterior Unit:

DMF = 1.55 - 0.04 LL /B ≥ 1.10 for OLE (1-16)

DMF = 1.35 - 0.02 LL /B ≥ 1.10 for CLE/DE, UB springs (1-17)

DMF = 1.16 - 0.02 LL /B ≥ 1.10 for CLE/DE, LB springs (1-18)

Linked Wharf Interior Unit

DMF = 1.10 (1-19)

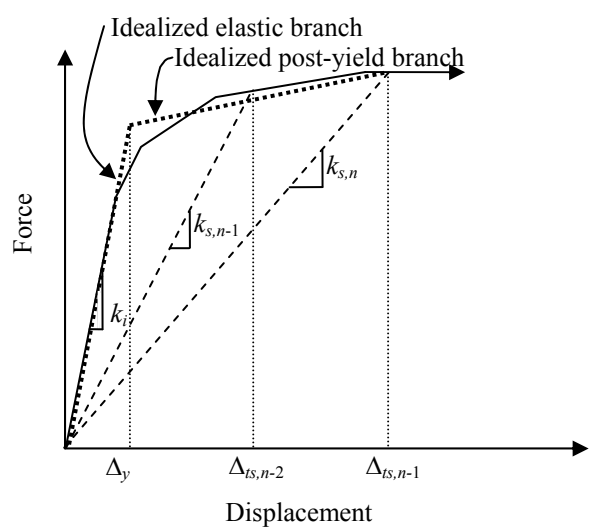

Figure 1-3: Force-displacement Curve

g. For Nonlinear Time-history Analysis, seven orthogonal sets of spectrum-compatible time-histories and nonlinear material properties shall be used. The displacement demand shall be determined using the maximum of the average displacements for each response parameter as follows:

$$\Delta_d = \max\left[\Delta_{d,j}\right]_{j=1}^{j=\max time\ step} \tag{1-20}$$

$$\Delta_{d,j} = \text{average}\left[\Delta_{d,j,m}\right]_{m=1}^{m=7 records} \tag{1-21}$$

$$\Delta_{d,j,m} = \sqrt{\Delta_{X,j,m}{}^2 + \Delta_{Y,j,m}{}^2} \tag{1-22}$$

$$\begin{aligned} \Delta_{X,j,m} &= \Delta_{XL,j,m} + \Delta_{XT,j,m} \\ \Delta_{Y,j,m} &= \Delta_{YL,j,m} + \Delta_{YT,j,m} \end{aligned} \tag{1-23}$$

Where:

$\Delta_{XL,j,m}$= X-axis displacement due to longitudinal excitation, refer to Figure 1-2, for time step *j* and time-history record number *m*

$\Delta_{XT,j,m}$= X-axis displacement due to transverse excitation, refer to Figure 1-2, for time step *j* and time-history record number *m*

$\Delta_{YL,j,m}$ = Y-axis displacement due to longitudinal excitation, refer to Figure 1-2, for time step *j* and time-history record number *m*

$\Delta_{YT,j,m}$= Y-axis displacement due to transverse excitation, refer to Figure 1-2, for time step *j* and time-history record number *m*

j = Time step of the time-history record not more than 0.05-second interval

m = Time-history record number

1.6.4.2 Displacement Capacity of Wharf

Displacement capacity, Δ_c of the wharf shall be determined at OLE, CLE and DE based on the strain limits provided in Section 1.3.2 using two lateral soil spring conditions: upper bound and lower bound. Displacement capacity shall be the lesser of displacement capacity at pile top plastic hinge or displacement capacity at pile in-ground plastic hinge determined as follows:

$$\Delta_c = \Delta_y + \Delta_{p,m} \tag{1-24}$$

$$\Delta_{p,m} = \theta_{p,m} \times H \tag{1-25}$$

$$\theta_{p,m} = L_p \phi_{p,m} = L_p(\phi_m - \phi_y) \tag{1-26}$$

Where:

Δ_y = Displacement when the considered pile plastic hinge develops

$\Delta_{p,m}$ = The pile plastic displacement capacity due to rotation of the plastic hinge at OLE, CLE or DE specified strain limit

H = The distance between the center of the pile top plastic hinge and the center of the pile in-ground plastic hinge

$\theta_{p,m}$ = Pile plastic rotation at OLE, CLE or DE specified strain limit

$\phi_{p,m}$ = Pile plastic curvature at OLE, CLE or DE specified strain limit

ϕ_m = Curvature at OLE, CLE, or DE specified strain limit
ϕ_y = Yield curvature determined when the considered plastic hinge develops
L_p = Plastic hinge length determined based on Table 1-5

Table 1-5: Plastic Hinge Length

Pile	Top Hinge [(a)]	In-ground Hinge
Solid Concrete Piles	$L_p = 0.08L + 0.12 f_{ye} d_b \geq 0.2 f_{ye} d_b$	$L_p = 2\ D_p$
Round Hollow Concrete Piles	$L_p = 0.08L + 0.12 f_{ye} d_b \geq 0.2 f_{ye} d_b$	$L_p = 2\ D_p$
Steel Pipe Piles with Concrete Plug and Dowels	$L_p = 0.3 f_{ye} d_b + g$	Not applicable
Steel Pipe Piles	Not applicable	$L_p = 2\ D_p$

[(a)] Alternatively, for solid concrete piles $L_p=0.08L+0.15 f_{ye} d_b \geq 0.3 f_{ye} d_b$ may be used.

Where:

L = Distance from the center of the pile top plastic hinge to the pile point of contra-flexure
f_{ye} = Expected yield strength of dowels in kips per square inch
d_b = Dowel diameter
g = The distance between the top of the pile steel shell and the deck soffit
D_p = Diameter of the pile

1.6.4.3 Crane-wharf Interaction

a. Crane-wharf interaction analysis shall be required if:

$$T_{crane} \leq 2T_{wi} \tag{1-27}$$

Where:

T_{crane} = Translational elastic period of the crane mode with the maximum participating mass
T_{wi} = Initial elastic period of the wharf structure based on cracked section properties

b. If crane-wharf interaction analysis is required, the displacement demand, Δ_d of the wharf shall be calculated using Nonlinear Time-history Analysis per Section 1.6.4.1g.

1.6.5 Piles

1.6.5.1 Moment Capacity

Pile plastic hinges moment capacities shall be determined using the following:

a. Expected material properties as defined in Section 1.6.2.

b. Largest axial load to obtain highest moment capacity for the design of capacity protected elements.

c. Smallest axial load to obtain the smallest pile displacement capacity for the design of piles.

1.6.5.2 Shear

Pile shear demand, V_o shall not be greater than the pile shear capacity ϕV_n :

$$V_o \le \phi V_n \tag{1-28}$$

Where:

V_o = Pile shear demand
V_n = Pile nominal shear capacity
ϕ = Strength reduction factor, 0.85 for OLE and CLE and 1.0 for DE

1.6.5.2.1 Shear Demand

a. The pile shear demand, V_o shall be calculated as follows:

$$V_o = 1.25 \times V_p \tag{1-29}$$

b. Pile plastic shear, V_p shall be determined based on load combinations per Section 1.5 using nonlinear static pushover analysis with upper bound soil springs and including the effect of the axial load on piles due to crane dead load.

c. In lieu of Section 1.6.5.2.1a, pile shear demand, V_o may be calculated as follows:

$$V_o = 1.25\left(M_{p,top} + M_{p,in-ground}\right)/H \tag{1-30}$$

Where:

$M_{p,top}$ = Pile plastic moment capacity at the top plastic hinge including the effect of axial load on piles due to crane dead load
$M_{p,bottom}$ = Pile plastic moment capacity at the in-ground plastic hinge including effect of axial load on piles due to crane dead load
H = The distance between the center of the pile top plastic hinge and the center of the pile in-ground plastic hinge

1.6.5.2.2 Shear Capacity

a. Pile shear capacity ϕV_n, shall be calculated as follows:

$$\phi V_n = \phi\left(V_c + V_s + V_a\right) \tag{1-31}$$

$$V_c = k\sqrt{f_c^{'}} \times A_e \tag{1-32}$$

$$\mu_\phi = 1 + \frac{\phi_{p,dem}}{\phi_y} = 1 + \frac{\theta_{p,dem}}{L_p \phi_y} \tag{1-33}$$

$$V_s = \frac{\pi}{2} \times \frac{A_{sp} \times f_{yh}\left(D_p - c - c_o\right) \times \cot(\theta)}{s}, \theta = 35° \tag{1-34}$$

$$V_a = 0.85(P_a + F_p)\tan(\alpha) \tag{1-35}$$

$$\tan(\alpha) = \frac{D_p - c}{H} \tag{1-36}$$

Where:

V_c = Concrete shear strength
V_s = Transverse reinforcement shear strength
V_a = Shear strength due to the smallest axial load demand
k = Curvature ductility factor determined as a function of μ_ϕ, refer to Figure 1-4
A_e = Pile effective shear cross-sectional area (80% of gross cross-sectional area for solid circular or octagonal piles)
μ_ϕ = Curvature ductility
A_{sp} = Cross-sectional area of transverse reinforcement
c = Depth from the extreme compression fiber to the neutral axis at flexural strength, refer to Figure 1-5
c_o = Clear concrete cover plus half the diameter of the transverse reinforcement
s = Center-to-center spacing of transverse reinforcement
θ = Angle of the critical shear crack with respect to the longitudinal axis of the pile, refer to Figure 1-5
P_a = External axial load on pile (compression is taken as positive and tension as negative)
F_p = Prestress compressive force in pile taken as zero at top plastic hinge
α = Angle between the line joining the centers of the compression zones at top and in-ground plastic hinges and the pile axis, refer to Figure 1-6
β= 1.0 for existing structures, and 0.85 for new design

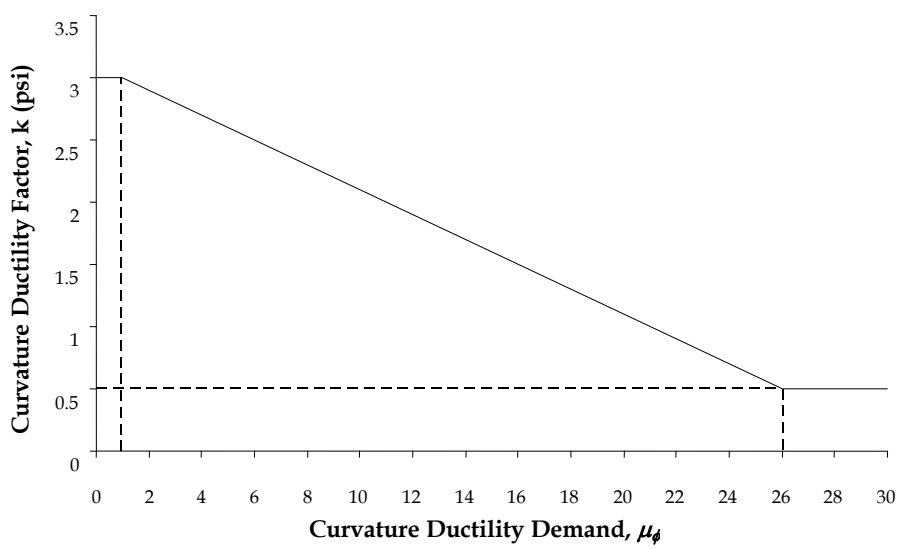

Figure 1-4: Curvature Ductility Factor Versus Curvature Ductility Demand

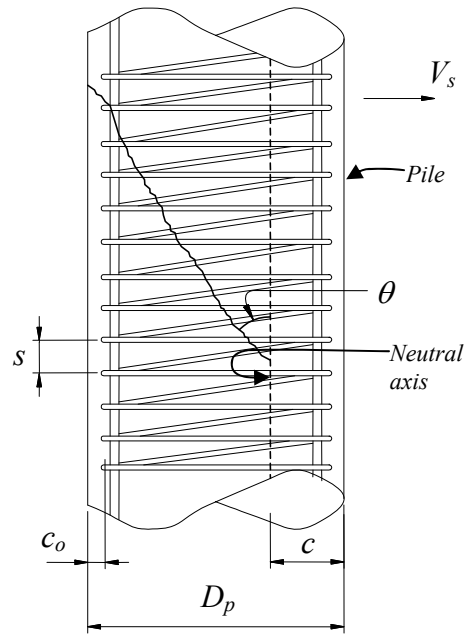

Figure 1-5: Pile Transverse Reinforcement Shear Strength Component

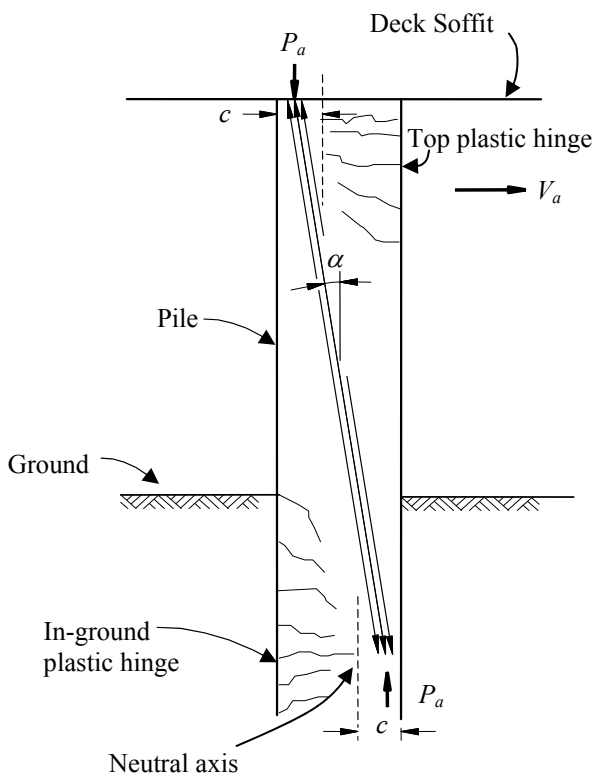

Figure 1-6: Pile Axial Force Shear Strength Component

1.6.5.3 P-Δ Effects

Additional secondary forces due to the effective dead load and the lateral seismic displacement demand (P-Δ) shall be calculated at OLE, CLE and DE. P-Δ effects may be ignored if the following is satisfied:

$$\frac{F}{W} \geq 4\frac{\Delta_d}{H} \tag{1-37}$$

Where:

F = Total lateral seismic force of the wharf strip considered at Δ_d
W = Effective dead load of the wharf strip considered
Δ_d = Displacement demand corresponding to the earthquake level considered
H = Distance from the center of the pile top plastic hinge to the center of the pile in-ground plastic hinge

1.6.5.4 Pile Transverse Reinforcement

The pile plastic hinge region shall comply with the following requirements:

a. The core of seismic piles in the plastic hinge region shall be confined over a minimum length of $2L_p$, with a minimum $\rho_s = 0.016$.
b. The core of non-seismic piles shall have a minimum $\rho_s = 0.008$.
c. Pile transverse reinforcement shall comply with the maximum requirements of Sections 1.6.5.1, 1.6.5.2.2 and 1.6.6.2.

1.6.6 Deck

1.6.6.1 Deck Members

a. Design moment, shear and axial forces for wharf deck members, F_o shall be calculated as follows:

$$F_o = 1.25 \times F_d \tag{1-38}$$

b. Wharf deck member, moment, shear and axial demands, F_d shall be determined based on load combinations per Section 1.5 using nonlinear static pushover analysis with upper bound soil springs and including the effect of the axial load on piles due to crane dead load.

1.6.6.2 Pile-Deck Joint

The pile-deck joint design shall comply with the following requirements:

a. Joint shear principal stresses due to maximum joint forces using load combinations per Section 1.5 shall comply with ACI-318.

b. The principal tension stresses shall be less than $\sqrt{12f_c'}$ and the principal compression stresses shall be less than $0.3f_c'$, where f_c' is the concrete compressive strength of the deck.

c. The effective volumetric ratio of confining steel, ρ_s around the pile dowels anchored in the pile-deck joint shall comply with the following:

$$\rho_s = \max \text{ of} \left[\frac{0.46A_{sc}}{D'l_a} \left[\frac{f_{ye}}{0.0015E_{sh}} \right] \text{ or } 0.016 \right] \tag{1-39}$$

Where:

A_{sc} = Total cross-sectional area of dowel bars in the pile-deck joint
f_{ye} = Expected yield strength of the dowels
D' = Diameter of the pile-deck joint core measured to the centerline of the confinement steel
l_a = Actual embedment length of dowels anchored in the pile-deck joint
E_{sh} = Confining steel modules of elasticity

1.6.6.3 Expansion Joint

a. The wharf expansion joints shall be designed for the combined effect of seismic deformation, seismic forces and thermal expansion.

b. The expansion joint shear key force, V_{sk} due to OLE, CLE or DE shall be calculated as follows:

1. For wharf units with 400 feet ≤ L_L ≤ 800 feet and 100 feet ≤ B ≤ 120 feet

$$V_{sk} = \beta \left(\frac{V_\Delta e}{L_L} \right) \tag{1-40}$$

Where:

L_L = Length of the shortest exterior wharf unit
B = Width of wharf unit
β = Factor determined as a function of wharf unit length, refer to Figure 1-7
V_Δ = Total wharf lateral seismic force at the displacement demand determined using pushover analysis
e = Eccentricity between the wharf center of mass and center of rigidity

2. For wharf units with 800 feet < L_L ≤ 950 feet or 120 feet < B ≤ 140 feet, use β=1.5.

3. For L_L > 950 feet or B > 140 feet, V_{sk} shall be determined using nonlinear time-history linked wharf analysis.

c. For determining wharf expansion joint shear capacity according to ACI-318, a reduction factor, ϕ of 0.85 shall be used.

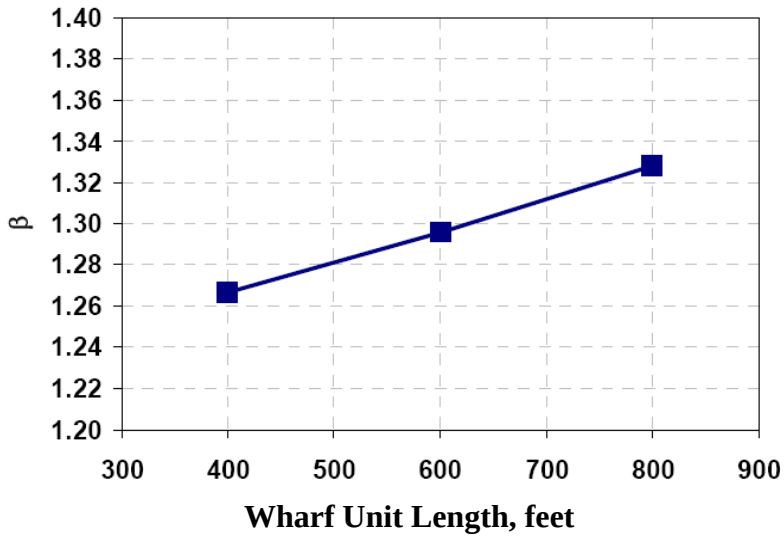

Figure 1-7: β Versus Wharf Unit Length

1.6.7 Detailing Requirements

a. The minimum concrete cover shall be 3 inches.

   Exception: For headed reinforcing bars such as pile dowels or shear stirrups, the cover may be reduced to 2 ½ inches at the top surface only.

b. All piles shall use ASTM A706 dowels to connect to the deck.

c. The pile-deck joint region for seismic pile shall be confined according to Section 1.6.6.2.

d. Dowels that are extended from piles into wharf deck or beam shall not be bent outwards.

e. If the principal tensile stress in the pile-deck joint region exceeds 3.5 $\sqrt{f_c'}$ where f_c' is the concrete compressive strength of the deck, additional joint shear reinforcements are required.

f. The extension of pile prestressing strands into the deck shall not be used for the pile-deck joint.

1.7 GEOTECHNICAL AND SOIL-STRUCTURE INTERACTION REQUIREMENTS

1.7.1 Liquefaction

Liquefaction potential of the soils in the immediate vicinity of or beneath the wharf structure and associated embankment or dike shall be evaluated. The strains in the piles induced by liquefaction effects shall not exceed the strain limits provided in Section 1.3.2.

1.7.2 Slope Stability and Seismically Induced Lateral Spreading

1.7.2.1 Static Slope Stability

a. Static slope stability analysis shall be performed for the embankment or dike.

b. Backland surcharge load shall be included in the analysis.

c. The minimum backland load shall be 250 pounds per square feet for the first 75 feet from the back end of the wharf, and 1,200 pounds per square feet for the remaining backland area.

d. The long-term static factor of safety of the embankment or dike shall not be less than 1.5.

e. For temporary conditions during construction, the static factor of safety shall not be less than 1.25 and the surcharge load value shall not be less than 250 pounds per square feet for the entire backland area.

1.7.2.2 Pseudo-static Seismic Slope Stability

a. Pseudo-static seismic slope stability analysis shall be performed for the embankment or dike to determine the yield acceleration coefficient, k_y.

b. Backland surcharge load shall be included in the analysis.

c. The minimum backland load shall be 250 pounds per square feet for the first 75 feet from the back end of the wharf and 800 pounds per square feet for the remaining backland area.

d. If liquefaction and/or strength loss of the site soils is expected, the residual strength of liquefied soils, strength compatible with the pore pressure generation of potentially liquefied soil and/or potential strength reduction of clays shall be used in the analysis.

1.7.2.3 Post-earthquake Static Slope Stability

a. Post-earthquake static slope stability analysis shall be performed for the embankment or dike.

b. Backland surcharge load shall be included in the analysis.

c. The minimum backland load shall be 250 pounds per square feet for the first 75 feet from the back end of the wharf and 800 pounds per square feet for the remaining backland area.

d. The static factor of safety immediately following OLE, CLE, or DE shall not be less than 1.1.

e. If liquefaction and/or strength loss of the site soils is expected, the residual strength of liquefied soils strength compatible with the pore pressure generation of potentially liquefied soil and/or potential strength reduction of clays shall be used in the analysis.

1.7.3 Lateral Spreading-free Field

a. The earthquake-induced lateral deformations of the embankment or dike and associated foundation soils shall be determined for OLE, CLE, and DE using the peak ground acceleration at the ground surface. The effects of liquefaction on soil properties shall not be included in the determination of peak ground acceleration.

b. If liquefaction and/or strength loss of the site soils is expected, residual strength of liquefied soils strength compatible with the pore pressure generation of potentially liquefied soil and/or potential strength reduction of clays shall be used in the analysis.

c. The presence of piles shall not be included in the "free field" evaluations.

1.7.4 Seismically Induced Settlement

Seismically induced settlement shall be addressed in the analysis and design for both unsaturated and saturated soils and its effects on piles.

1.7.5 Soil-structure Interaction

Inertial and kinematic load conditions shall be analyzed for the pile design as follows:

1.7.5.1 Inertial Load

a. Level ground inelastic lateral soil springs (p-y springs) shall be developed for the site specific soil conditions.

b. Upper bound estimates of the spring strength and stiffness shall be determined by multiplying the level ground, p-y springs values by a factor of 2.0.

c. Lower bound estimates of the spring strength and stiffness shall be determined by multiplying the level ground, p-y springs values by a factor of 0.3.

1.7.5.2 Kinematic Load

a. Kinematic load on seismic piles shall be calculated based on the site-specific conditions.

   Exception: For seismic piles with 24-inch diameter and having an embedment length of at least 20 feet into the dike, kinematic load need not be considered when the permanent free field embankment or dike deformations determined per Section 1.7.3 are less than 3 inches for OLE, less than 12 inches for CLE and less than 36 inches for DE.

b. Deformations shall be restricted so that the pile strains comply with Section 1.3.2.

1.7.5.3 Combination of Inertial and Kinematic Loads

a. The inertial load and kinematic load on seismic piles shall be combined.

   Exception: For seismic piles with 24-inch diameter and having an embedment length of at least 20 feet into the dike, inertial and kinematic pile loads need not be combined.

1.7.6 Earth Pressure

The earth pressure on the wharf structure resulting from static and seismic load conditions including the effect of pore water pressure in the backfill shall be calculated.

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CHAPTER 2
UPGRADE AND REPAIR CRITERIA FOR EXISTING WHARVES

2.1 PURPOSE AND SCOPE

This chapter provides requirements for the upgrade and repair of existing container wharves damaged by seismic or other natural disasters or events.

2.2 SEISMIC UPGRADES

a. Existing wharf seismic upgrade shall comply with the performance requirements of this Code for the design of a new wharf or as approved by POLA.

b. The overall seismic capacity of existing wharf shall not be reduced by the seismic upgrade.

c. Existing wharf seismic upgrade also includes embankment and dike.

2.3 STRUCTURAL REPAIRS

a. The damage to existing container wharves caused by seismic or other natural disasters or events shall be repaired in compliance with the requirements provided in this chapter based on the level of damage determined by the "Damage Ratio". A "Damage Ratio", expressed in a fraction or percent, shall be calculated as follows:

$$\text{Damage Ratio} = \frac{\text{Estimated Repair Cost}}{\text{Estimated Replacement Cost}}$$

Where:

Estimated Repair Cost is equal to an estimated cost of the repairs required to restore the damaged wharf members and components to comply with the requirements of this Code for the damaged wharf unit. Wharf members and components include decks, beams, piles, cut-off walls, embankments, dikes, all connections, and other supporting elements.

Estimated Replacement Cost is equal to an estimated cost of replacing the entire wharf unit.

b. When the Damage Ratio for structural damage does not exceed 0.1 (10%), the structural damages shall be repaired such that the existing wharf is restored, at a minimum, to the pre-event condition.

c. When the Damage Ratio for structural damage exceeds 0.1 (10%) but does not exceed 0.5 (50%), the damaged wharf members and components shall be repaired and strengthened such that all repaired and strengthened structural members, all connections associated with the damaged structural members, all structural members supported by the damaged members, and all structural members supporting the damaged members comply with the performance requirements of this Code for the design a new wharf.

d. When the Damage Ratio for structural damage exceeds 0.5 (50%), the entire existing wharf shall be repaired and strengthened as necessary such that the entire wharf complies with the performance requirements of this Code for the design of a new wharf.

e. Portions of existing wharf may be replaced with a new wharf which complies with the performance requirements of this Code for the design of a new wharf to satisfy wharf strengthening requirements.

f. The overall seismic capacity of existing wharf shall not be reduced by the repairs or replaced portions.

g. Wharf components also include embankments and dike.

2.4 NONSTRUCTURAL REPAIRS

a. For all Damage Ratios determined according to Section 2.3.a nonstructural repairs that do not adversely affect any structural member or any part of the existing wharf may be repaired with the same materials of which the wharf was constructed.

b. The overall seismic capacity of existing wharf shall not be reduced by the nonstructural repairs.

END OF THE CODE