

FINAL

GENERAL SERVICES MAINTENANCE STAFFING ANALYSIS

Technical Memorandum

B&V PROJECT NO. 193528



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Executive Summary

Purpose: The purpose of this analysis was to evaluate the tasks performed by the Port of San Diego (Port) General Services Department (GS) and compare them to staffing levels and the expected level of service. The analysis looked at existing and anticipated future workloads. GS provides numerous functions that affect almost all aspects of the Port's operation – both within the organization and areas affecting the general public, tourists, and businesses. When looking at staffing, it is also important to understand the overarching objectives that guide GS activities. The Port's vision and mission provide insight into this topic.

Vision: To foster a world-class Port through excellence in public service.

Mission Statement: The San Diego Unified Port District will protect the Tidelands Trust resources by providing economic vitality and community benefit through a balanced approach to maritime industry, tourism, water and land recreation, environmental stewardship and public safety.

- **Economic Vitality and Maritime Industry.** The Port facilities serve as a major part of the San Diego region's economic viability and a critical mechanism for promoting and maintaining San Diego's highly desirable quality of life. With oversight of two maritime cargo terminals, two cruise ship terminals, and leases of hundreds of tenant and sub tenant business, the Port serves as a key economic engine to the region.
- **Community Benefit and Tourism.** The condition and appearance of the Port's facilities affects the reputation of not just the Port as an organization, but also how the San Diego region is viewed as a community, travel destination, and desirable place to conduct business.
- **Water/Land Recreation and Environmental Stewardship.** One of the Port's many responsibilities is to protect the bay and its resources. This includes a commitment to sustainable operations and responsible development of a world class waterfront which includes tideland areas, beachfronts and over twenty public parks.
- **Public Safety.** Properly maintained facilities are paramount to the health and welfare of both employees and the public.

With such important needs at stake and the integral nature of GS in supporting the above areas, it is critical that staffing levels be adjusted as they effect the department's ability to meet expectations. A frequently asked question (FAQ) style summary is provided below to provide an overview of the study. The main body of this technical memorandum provides more details on the analysis.

Executive Summary – Frequently Asked Questions

Q. How was the analysis performed?

A. This analysis was performed using a step by step approach as follows:

- **Creating the Analysis Database.** A thorough asset list was obtained from Port staff along with a list of 17 trade groups/job functions (groundskeepers, electricians, plumbers, fleet maintenance

staff, etc.). The asset list was divided into four main groupings: Facilities Assets, Fleet/Vessel Assets, Grounds/Exterior Assets, and Docks/Piers/Wharf Assets.

- **Applying Standards and Adjustments.** Industry staffing standards were applied to each type of asset to estimate overall staffing needs per trade group. The industry standards cover over 90% of the Port's typical operations. Where industry standards were not available, specific discussions were held with Port staff to understand the specialized maintenance needs (for example docks, piers and wharfs; public artwork, etc.). Adjustments and scaling factors were made to adjust to specific facilities, fleet/vessel types, and location specific needs. All of these adjustments are described more fully in the technical memorandum.
- **Applying Level-of-Service.** Four level-of-service categories were defined to characterize the needed service levels starting at Port Minimum and escalating up to Port Excellence. Certain areas require more than standard maintenance (bay front for example) and other areas require less than typical maintenance levels (for example warehouses in isolated locations). This process is described more fully in the technical memorandum.
- **Calculating Full Time Equivalents (FTEs) per Trade.** FTEs were calculated for all the Port trades and compared to current levels.
- **Documenting the Findings.** Findings were made by comparing the recommended industry standard staffing loads to current staffing loads. Findings were summarized based on trades.

Q. What standards were used in the analysis?

A. After extensive research, it was found that there are no clearly defined industry standards for maintenance staffing levels for the ports industry. However, based on previous Black & Veatch team experience and review of papers and presentations on asset and maintenance management given at past American Association of Port Authorities (AAPA) conferences, several references are available from comparable industries. These standards and guidelines are described below:

- For general facilities maintenance, the **International Facility Management Association (IFMA)** provides appropriate benchmarking of staffing levels for various facility types by trade.
- Ports, similar to campuses for higher education institutions, function as compact cities with much of the same infrastructure and challenges in a more asset-dense environment. The **Association of Physical Plant Administrators (APPA) for Higher Education Facilities** provides equivalent service level definitions and associated maintenance characteristics for each service level for facilities, custodial, and grounds maintenance.
- Finally, studies from **the Transportation Research Board** and **Government Fleet** provided methodologies and staffing ratios for determining optimum fleet/vessel maintenance technician staffing levels to maintain diverse fleets such as the Port's.

Q. What were the service levels used to support the analysis?

A. Four service levels were identified for use in the analysis of facility and grounds assets. How each of these service levels are characterized or determined varies based on the asset and maintenance

type. For example, characteristics for how a facility is maintained to a Port Excellence level will differ from the characteristics for how grounds or a park are maintained to a Port Excellence level. However, in general, the four service levels can be characterized as follows:

- **Port Excellence.** Showpiece facilities. Assets are highly functional and in excellent condition. Service and maintenance calls are responded to immediately. Assets are upgraded on a regular basis and kept current with modern standards.
- **Port Standard.** Typical or normal facilities. Assets are usually functional and in good operating condition. Service and maintenance calls are responded to in a timely manner.
- **Port Fundamental.** Assets are mostly functional, but they suffer occasional breakdowns. Service and maintenance call response times are variable and sporadic and are dependent upon the availability of resources.
- **Port Minimum.** Assets where a strategic decision has been made to perform minimal maintenance activities primarily associated with basic upkeep, perimeter security, and site safety. Typically occurring in situations where assets are planned for near term replacement. Equipment and building components can be routinely broken and inoperative.

Q. What service level was assumed or assigned for the analysis for the majority of assets?

A. Following review of the maintenance characteristics associated with the service levels identified in the industry standards utilized for this analysis, the average and desired service level for the majority of assets was **Port Standard** (representing level 2 of the 4 service levels with level 1 being a “showcase facility” and level 4 being maintained to the minimum level of maintenance necessary). It was determined that based on current staffing levels, the Port is currently able to maintain assets to a **Port Fundamental** level of service (representing level 3 of the 4 service levels).

Q. What are the key findings from the analysis?

A. The key findings are summarized below:

- GS staffing levels are appropriate in 10 of the 17 trade categories including administrative support, carpentry, HVAC, lead/foremen, locksmiths, management, fleet/vessel maintenance, divers/boat operators, equipment operators, and parking meters. Having an “appropriate staffing level” was defined to be within 1 person of the current FTE count
- GS staffing levels are slightly below target (2 – 4 FTEs) in 4 of the 17 trade categories. These trades include custodial, painting, plumbing, and planning/scheduling.
- GS staffing levels are significantly below target (5 or more FTEs) in 3 of the 17 trade categories. The trades include electrical, general maintenance workers, and grounds maintenance support personnel.
- The Port was not found to be overstaffed in any trade category.

Q. How do the findings of the analysis compare to current staffing levels?

A. This study estimated a GS staffing total load of 122 FTEs. This compares to 93 currently budgeted positions (not all positions are currently filled) in 2016.

Q. What are the risks of not being staffed appropriately?

A. Staffing levels that are below industry standards expose organizations to a number of risks. While GS has done a commendable job managing activities with the current staffing, management should be cognizant of added risk to the Port. The key risks include:

- **Deferred Maintenance.** Less than standard staffing levels require more staff to be able to respond to unplanned (or reactive) maintenance activities. This results in maintenance activities that prevent breakdowns and asset failures (also referred to as preventive maintenance) being deferred or not being performed altogether. This typically results in higher overall costs when unmaintained assets eventually fail.
- **Safety.** Lack of maintenance personnel puts a greater strain on resources and longer lead times to correct deficiencies. Delays in maintenance increases the likelihood of further degradation of the asset which in turn, exposes the Port to more potential health/safety/risk issues for both the public and the Port's employees.
- **Appearance/Image Issues.** The Port plays an important part in local tourism and the regional economy. Lack of GS staffing impacts the appearance and desired image of the Port's tourism and business environment.

Q. How were staffing needs impacted by the management of contracted facilities?

A. Although a facility's maintenance might be performed by a contracted entity or be the responsibility of the tenant/sub tenant, the management of the associated maintenance contracts and/or tenant agreements does have some impact on staffing levels for GS staff. The facilities must be regularly inspected to ensure adherence to lease requirements and contracts must be continually reviewed and, once at end of term, rebid and renegotiated. For purposes of this analysis, it was agreed that the project team should take a conservative approach to staffing level estimates. Therefore, although the tools have been put in place allowing for the calculation of this impact in the future, the current estimates do not include detailed workload demands for the management of contracted facilities. Instead, it was determined that these demands fell within the reasonable margin of error provided by the industry standards and guidelines used for the analysis.

Q. What are the next steps proposed from the analysis?

A. The following summarizes the key next steps:

- **Complete Immediate Staffing Plan.** It is recommended that the Port staff be directed to close the staffing gaps through a prioritized hiring process and formalized staffing plan. The Port should

prioritize positions and fill needs using a multi-year phased process starting in 2017 based on the gaps identified.

- **Employ Enterprise Asset Management System.** The enterprise asset management efforts now underway will provide a mechanism for performing more in depth GS department operational analysis. This tool should be used to assess maintenance loads, work order completion rates, and reactive versus preventative maintenance ratios.
- **Establish a Placeholder for a Future Staffing Plan Update.** Staffing should not be considered a static business process but a continual assessment process as business needs and conditions change. It is recommended that a staffing update be performed in the future if there have been significant changes to the Port's Strategic Plan. It is recommended that these coincide since strategic planning sets the overall organizational objectives and the GS department is highly affected by those strategic decisions.

Q. How was preventative vs. reactive maintenance determined?

A. An industry standard of 1:6 (reactive to preventive maintenance) was assumed. The Port is likely not at this target yet due to current staffing levels (doing more reactive activities). However, this is an appropriate target for staffing. The enterprise asset management system summarized in the next steps section will also provide metrics on the ratio between preventive and reactive to ensure staffing levels are aligned with industry best practices.

Q. What are the limitations of this analysis?

A. The main limitations of this type of analysis include:

- **Industry Standards Limitation.** This analysis was based on industry standards, which by their definition are built upon data from many organizations which will have similarities and differences from the organization being assessed. This analysis used adjustments where appropriate to fine tune the industry standard data to more specific and relevant data for the Port's operation. Details of the adjustments can be found in the technical memorandum.
- **Quantification of Specific Port Activities.** The Port is a unique organization and the GS department responsibilities cover broad range of activities. While it would be prohibitively expensive and time consuming to define and assess every single activity, the majority of them were believed to be captured through the information gathered from the GS and Engineering departments during investigation phase. Therefore, some Port activities may not be fully captured in the analysis and require more FTEs than shown. Any missed activities are believed to be minor in nature and having an overall effect of less than 2 FTE per trade total.

Q. What tools are available to continue to assess staffing levels on a go-forward basis?

A. The Port is currently developing a new Enterprise Asset Management System, which will include a new Computer Maintenance Management System. When implemented in 2017, this system will be a

valuable tool for staffing assessment. The new CMMS will provide better forecasting and staffing diagnostic capabilities than current systems provide. It will also allow better tracking of preventive versus reactive maintenance activities.

Introduction

The purpose of this analysis is to assess staffing levels for the Port of San Diego (Port) General Services Department (GS). GS provides numerous functions that affect the Port's operation – both within the organization and areas affecting the general public, tourists, and businesses. When looking at staffing, it is also important to understand the overarching objectives that guide GS activities. The Port's vision and mission provide insight into this topic.

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- **Public Safety.** Properly maintained facilities are paramount to the health and welfare of both employees and the public.

With such important needs at stake and the integral nature of GS in supporting the above areas, it is critical that staffing levels be adjusted as they effect the department's ability to meet expectations. Therefore, as part of the Port's overarching major maintenance and asset management program initiatives, Port staff teamed with Black & Veatch to analyze GS staffing requirements. The recommendations and a description of the methodology used to develop the staffing levels are contained within this technical memorandum and are organized as follows:

- **Current Operating Environment.** Provides an overview of the key functions of the GS department as well as current staffing levels and organization for purposes of comparison to the recommendations resulting from the analysis.
- **Basis of Estimates.** Describes the detailed methodologies utilized to develop the staffing recommendations for GS. Includes descriptions of asset categories, service levels, relevant maintenance characteristics for each asset type and service level, calculation methods, and industry guidelines and benchmarks used for developing recommendations.
- **Analysis Results & Recommendations.** Details the results of the recommended staffing calculations and recommendations on changes to current staffing levels. Also provides

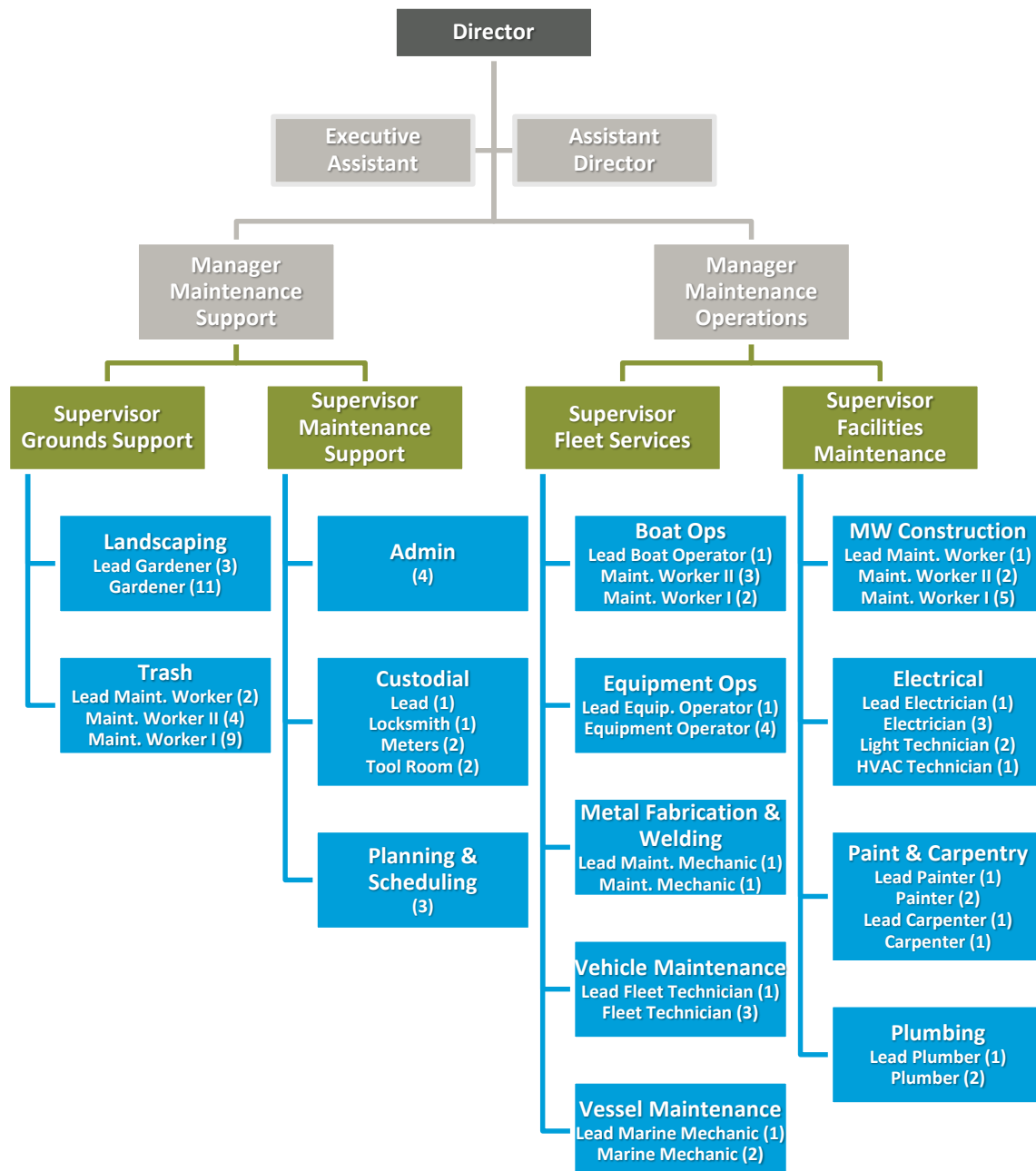
recommendations for implementation in alignment with related asset management program initiatives.

- **References.** Citations for the industry standards, guidelines, and benchmarks utilized for developing the staffing recommendations.

Current Operating Environment

GS is currently comprised of 93 budgeted positions responsible for managing and ensuring the ongoing performance of the organization's equipment and infrastructure. This is accomplished through a systematic approach to planned maintenance and repairs to equipment, and via support services that enhance the public's experience in using District facilities. The department is currently structured as shown in Figure 1.

Figure 1. Current General Services Maintenance Staff Organization



From an infrastructure perspective, the department is responsible for the stewardship and maintenance of a wide variety of assets include facilities, cruise ship terminals, fleet vehicles, marine vessels, docks, piers, wharfs, public art displays, water/wastewater/stormwater utility infrastructure, open spaces, parks, playgrounds, athletic fields/courts, hardscapes, street pavement and associated

signage, planting/flower beds, revetments, and beachfronts. Maintenance activities associated with this infrastructure includes development and execution of the preventive maintenance program, corrective maintenance, responding to tenant service requests, inspections, emergency repairs, and new construction support. In addition, the department manages numerous maintenance service agreements, provides support services (trash/debris removal, furniture/equipment moves, special events support), utilities management support, tenant/lease space management, and project management support.

It should be noted that the Port follows an approach whereby leads/foremen are actually “working” leads/foremen that also conduct maintenance activities in addition to their crew lead responsibilities. This is a good practice and is aligned with industry guidelines and accounted for in the analysis.

For purposes of the analysis and to align with the industry guidelines and benchmarks used to develop the resulting recommendations, current staff positions were organized and placed into “trade groups” representing their respective work/job trades and functions. The result is shown in Table 1 and also utilized in **Analysis Results & Recommendations**.

Table 1. Current and 2008 Staff Counts by Trade Group

TRADE GROUP	CURRENT BUDGETED POSITION COUNT	COMMENTS/NOTES
Administrative Support	4	
Carpentry	1	Lead carpenter included in leads category
Custodial	2	Includes tool room personnel but not parking meter staff. Lead included in leads category
Divers/Boat Operators	5	Shown as maintenance workers I/II in org chart
Electrical	5	Shown as electricians and light technicians in org chart. Lead electrician included in leads category
Equipment Operators	4	Lead equipment operator included in leads category
Fleet / Vessel Maintenance	6	Includes metal fab maintenance mechanic, fleet technicians and marine mechanics in org chart. Associated leads included in leads category
Generalists	7	Maintenance workers I/II under MW Construction in org chart. Lead included in leads category
Grounds Maintenance	24	Gardeners and maintenance workers I/II under grounds category in org chart. Leads included in leads category
HVAC	1	
Leads / Foremen	16	Includes all leads/foremen from all areas including gardening, maintenance workers, custodial, boat ops, equipment operators, etc.
Locksmiths	1	

TRADE GROUP	CURRENT BUDGETED POSITION COUNT	COMMENTS/NOTES
Management / Supervisors	8	Includes supervisors, managers, assistant director and director
Painting	2	Lead painter included in leads category
Parking Meters	2	
Planning / Scheduling	3	
Plumbing	2	Lead plumber included in leads category
TOTALS	93	

It should be noted that although the staff counts by trade group provide interesting comparisons for the eventual recommendations, they bore no impact to the calculation methods and results and are provided for comparison purposes only.

Basis of Estimates

Depending on data availability, there are multiple valid methods for determining recommended staffing levels for general services maintenance. For example, one method includes a review of detailed maintenance history (work orders that include accurate and detailed labor hours for all maintenance tasks performed) and analysis of planned, reactive, and deferred maintenance. Another is to establish service level maintenance expectations for each asset and then utilize various industry standards to determine the optimum number of maintenance personnel based on asset type, expected service level, and maintenance trade(s) relevant for that asset.

At this time, the Port does not retain the detailed maintenance history information necessary to analyze past work orders and planned, reactive, and deferred maintenance. However, implementation of the supporting maintenance management system and work processes is already underway as part of an overarching Port asset management program to support this analysis in the future. Therefore, the method of defining service levels and utilizing industry standards for each asset was utilized to determine optimum maintenance staffing levels for general services.

After extensive research, it was found that there are no clearly defined industry standards for maintenance staffing levels for the ports industry. However, based on previous Black & Veatch team experience and review of papers and presentations on asset and maintenance management given at past **American Association of Port Authorities (AAPA)** conferences, several references are available from comparable industries. These standards and guidelines are described below:

- For general facilities maintenance the **International Facility Management Association (IFMA)** provides appropriate benchmarking of staffing levels for various facility types by trade.
- Ports, similar to campuses for higher education institutions, function as compact cities with much of the same infrastructure and challenges in a more asset-dense environment. The **Association of Physical Plant Administrators (APPA) for Higher Education Facilities** provides equivalent service level definitions and associated maintenance characteristics for each service level for facilities, custodial, and grounds maintenance.
- Finally, studies from the **Transportation Research Board** and **Government Fleet** provided methodologies and staffing ratios for determining optimum fleet maintenance technician staffing levels to maintain diverse fleets such as the Port's.

Each of the aforementioned industry studies and reports are cited in the References section of this technical memorandum.

The following describes the methodology and calculations utilized to determine the optimum staffing level recommendations presented within this memorandum.

ASSET TYPES & INDUSTRY STANDARDS

As previously discussed, based on the availability of data the methodology utilized to analyze optimum staffing levels is based on defining service level targets for each type of asset. General Services maintains facilities assets; exterior and grounds assets such as parks, green space, revetments, and playgrounds; and fleet (vehicle and marine vessel) assets.

Researching various industry guidelines identified good alignment with standards for each of the trades associated with maintaining facilities (e.g. plumbing, carpentry, electrical, etc.), grounds,

parks, playgrounds, hardscapes, streets/roadways, fleet vehicles and marine vessels. However, some Port asset and maintenance activities were found to be outside of these industry guidelines. This included elevator maintenance, maintenance of the docks/piers/wharfs, railroad rights of way, public artwork, and utilities infrastructure. Further analysis and discussion with Port staff identified that all but maintenance of the docks/piers/wharfs represented a statistically insignificant amount of workload for general maintenance staff. Therefore, maintenance workloads and staff requirements for maintenance of docks, piers and wharfs were determined as a special circumstance class of assets by analyzing past maintenance history, extrapolating out for future good maintenance practices, and added to staff counts determined for other asset types using industry guidelines.

SERVICE LEVEL DEFINITIONS

Through review of the industry standards and benchmarks, a common practice is to develop four target service levels for each asset category and trade/maintenance type. Because the names of these service levels varied across industry standards, a common set of service level designations were developed for the Port and mapped to the applicable industry standard. For the purposes of this analysis the four identified service levels utilized were:

- Port Excellence
- Port Standard
- Port Fundamental
- Port Minimum

How each of these service levels are characterized or determined varies based on the asset and maintenance type. Characteristics for how a facility is maintained to a Port Excellence level will differ from the characteristics for how grounds or a park are maintained to a Port Excellence level. Although the service level concept easily applied to facilities, custodial, and grounds; it was less applicable for fleet maintenance. After review of several industry standards and guidelines, a different method utilizing the concept of vehicle equivalent units (VEU's) was utilized for fleet maintenance.

In general, for all asset types with the exception of fleet, a weighting of maintenance personnel was applied to each service level, using Port Standard as the baseline, as shown in Table 2. For example, if industry standards and benchmarks indicated that 1 full time equivalent (FTE) should be in place for every 100,000 maintainable square feet (MSF) then that measure was used for the Port Standard service level. If that same facility was designated to be maintained at a Port Excellence service level, then 1.5 FTE's would be required accordingly.

Table 2. Service Level Staffing Weighting

PORT SERVICE LEVEL	WEIGHTING
Port Excellence	1.5
Port Standard	1.0
Port Fundamental	0.75
Port Minimum	0.5

The following sections identify the service level definitions and maintenance characteristics for each of the asset and maintenance types utilized in this analysis.

Facilities

The APPA defines four comparable service levels for the maintenance of facilities. These service levels are mapped to the Port service levels along with a description in Table 3 below.

Table 3. Facilities Service Level Definitions

APPA DESIGNATION	PORT DESIGNATION	DESCRIPTION / CHARACTERISTICS	EXAMPLE FACILITIES
Showpiece Facility	Port Excellence	Maintenance activities appear highly focused. Typically, equipment and building components are fully functional and in excellent operating condition. Service and maintenance calls are responded to immediately. Buildings and equipment are regularly upgraded, keeping them current with modern standards and usage.	[None Currently Identified]
Comprehensive Stewardship	Port Standard	Maintenance activities appear organized with direction. Equipment and building components are usually functional and in operating condition. Service and maintenance calls are responded to in a timely manner. Buildings and equipment are regularly upgraded, keeping them current with modern standards and usage.	Port Administration Building
Managed Care	Port Fundamental	Maintenance activities appear to be somewhat organized, but they remain people dependent. Equipment and building components are mostly functional, but they suffer occasional breakdowns. Service and maintenance call response times are variable and sporadic without apparent cause. Buildings and equipment are periodically upgraded to current standards and usage, but not enough to control the effects of normal usage and deterioration.	Port Administration Building Garage and Storage
Crisis Response	Port Minimum	Minimal maintenance activities primarily associated with basic upkeep, perimeter security, and site safety. Equipment and building components can be routinely broken and inoperative. Service and maintenance calls are treated as last.	Storage Silos, TAMT

To aid in identifying the appropriate service level for each facility, it is important to look at the maintenance characteristics and activities associated with that facility. For example, a facility where maintenance is largely preventive (versus reactive) and system breakdowns are extremely rare is likely maintained to a Port Excellence service level. Conversely a facility with almost no preventive maintenance and frequent building system breakdowns is likely maintained to a Port Minimum

service level. These characteristics are highlighted in Table 4 and were used to assign each facility to a service level.

Table 4. Facilities Service Level Maintenance Characteristics

LEVEL	1	2	3	4
Description	Port Excellence	Port Standard	Port Fundamental	Port Minimum
Preventive vs. Reactive Maintenance	90-100% PM	75-90% PM	25-75% PM	0-25% PM
Service Efficiency	Highly Organized	Organized w/ Direction	Somewhat Organized	Minimal Upkeep
Building System Reliability	Breakdowns Rare	Few Breakdowns, Less than Mean Time Between Failure (MTBF)	Periodic Failures	Many Not Functioning

Custodial is largely a contracted maintenance activity within most organizations and the Port is no exception. However, in determining the staffing level necessary for these maintenance contracts it is also valid to look at desired service levels and maintenance characteristics for each facility's custodial maintenance services. Table 5 identifies the appropriate APPA and Port service level designations along with associated descriptions.

Table 5. Custodial Service Level Definitions

APPA DESIGNATION	PORT DESIGNATION	DESCRIPTION / CHARACTERISTICS	EXAMPLE FACILITIES
Orderly Spotlessness	Port Excellence	<ul style="list-style-type: none"> Floors and base moldings shine and/or are bright and clean; colors are fresh. There is no build up in corners or along walls. All vertical and horizontal surfaces have a freshly cleaned or polished appearance and have no accumulation of dust, dirt, marks, streaks, smudges, or fingerprints. Lights all work and fixtures are clean. Washroom and shower fixtures and tile gleam and are odor free. Supplies are adequate. Trash containers hold only daily waste, are clean and odor-free. 	[None Currently Identified]

APPA DESIGNATION	PORT DESIGNATION	DESCRIPTION / CHARACTERISTICS	EXAMPLE FACILITIES
Orderly Tidiness	Port Standard	<ul style="list-style-type: none"> Floors and base moldings shine and/or are bright and clean. There is no buildup in corners or along walls, but there can be up to two days' worth of dust, dirt, stains, or streaks. All vertical and horizontal surfaces are clean, but marks, dust, smudges, and fingerprints are noticeable upon close observation. Lights all work and fixtures are clean. Washroom and shower fixtures and tile gleam and are odor free. Supplies are adequate. Trash containers hold only daily waste, are clean and odor-free. 	General Services Maintenance Building
Casual Inattention	Port Fundamental	<ul style="list-style-type: none"> Floors are swept or vacuumed clean, but upon close observation there can be stains. A buildup of dirt and/or floor finish in corners and along walls can be seen. There are dull spots and/or matted carpet in walking lanes. There are streaks or splashes on base moldings. All vertical and horizontal surfaces have obvious dust, dirt, marks, smudges, and fingerprints. Lamps all work and fixtures are clean. Trash containers hold only daily waste, are clean and odor-free. 	[None Currently Identified]
Moderate Dinginess	Port Minimum	<ul style="list-style-type: none"> Floors are swept or vacuumed clean, but are dull, dingy, and stained. There is a noticeable buildup of dirt and/or floor finish in corners and along walls. There is a dull path and/or obviously matted carpet in the walking lanes. Base molding is dull and dingy with streaks and splashes. All vertical and horizontal surfaces have conspicuous dust, dirt, smudges, fingerprints, and marks. Lamp fixtures are dirty and some lamps (up to 5 percent) are burned out. Trash containers have old trash. 	Navy Pier Office & Parking Facility

Similar to facility maintenance, it is also helpful to understand the custodial maintenance characteristics associated with each service level for determining the desired custodial service levels for each facility. Table 6 provides example characteristics for floors, restrooms, lighting, etc. for determination of custodial service levels.

Table 6. Custodial Service Level Maintenance Characteristics

LEVEL	1	2	3	4
Description	Port Excellence	Port Standard	Port Fundamental	Port Minimum
Floors	Bright/Shiny	Minimal Dust	Few Stains	Dull/Dingy/ Stained
Surfaces	Freshly Cleaned	Clean w/ Few Marks	Obvious Dust, Dirt, Smudges	Conspicuous Dirt, Dust
Restrooms	Freshly Cleaned	Clean w/ All Supplies	Obvious Dust, Dirt, Stains	Conspicuous Dirt, Dust
Trashcans	Daily Waste, Odor Free	Daily Waste, Odor Free	Daily Waste, Odor Free	Old Waste, Malodorous
Light Fixtures	Freshly Cleaned	Clean	Clean	Dirty

Grounds and Exterior Maintenance

Grounds and exterior maintenance is more complex and encompasses turf management (e.g. mowing, aeration, re-sodding), pest and weed control, irrigation, flower and plant beds, litter removal/waste management, parks and playground equipment maintenance, and management of hardscapes (sidewalks, patios) and street pavement. Table 7 maps the APPA service level designations to the Port service levels and provides associated maintenance characteristics for each of the aforementioned maintenance activities for each service level.

Table 7. Grounds Service Level Definitions & Maintenance Characteristics

LEVEL	1	2	3	4
APPA Designation:	State of the Art	High Level	Moderate Level	Minimum Level
Description:	Port Excellence	Port Standard	Port Fundamental	Port Minimum
Turf Care	Optimum	High	Moderate	Minimal
<i>Mowing</i>	3-5 days	5 days	10 days	Monthly to Biannual
<i>Aeration</i>	Min 4 per Year	Min 2 per Year	As Needed	None
<i>Reseed/Sod</i>	As Needed	As Needed	As Needed	None
IPM	Yes	Yes	Yes	None
<i>Nutrients</i>	Optimum	Adequate	As Needed	None
<i>Pests</i>	Immediate	Noticeable	Complaint	Complaint
<i>Weeds</i>	<= 1%	<= 10%	Noxious	Complaint
Irrigation	"Smart"	Automatic	Temp	None
Flowers	Extensive	Moderate	Perennials	Min-None
<i>Changes</i>	2-3 Min	2 Min	None	None
<i>Deadhead</i>	Continuous	Weekly	None	None
<i>Bed Maint.</i>	Weekly	Weekly	2 per Year	None

LEVEL	1	2	3	4
APPA Designation:	State of the Art	High Level	Moderate Level	Minimum Level
Description:	Port Excellence	Port Standard	Port Fundamental	Port Minimum
Plantings	Extensive	Developed	Minimal	Min-None
<i>Pruning</i>	Optimum	1 Min	2-3 Years	Complaint
<i>Bed Maint.</i>	Weekly	Weekly	Monthly	None
Surfaces	Yes	Yes	Yes	Minimal
<i>Cleaning</i>	Continuous	As Needed	Complaint	Complaint
Litter	Yes	Yes	Yes	Minimal
<i>Site</i>	Every Day	5 Days per Week	2-3 per Week	Bi-weekly
<i>Receptacles</i>	Every Day	Every 2-5 Days	2-3 per Week	Complaint
Repairs	Immediate	As Needed	Complaint	Complaint
Inspections	Every Day	5 Days per Week	Weekly	Monthly
EXAMPLES	[None Currently Identified]	Chula Vista Bayside Park Volleyball Courts	[None Currently Identified]	Imperial Beach Pond 20

Fleet Vehicle and Marine Vessel Maintenance

Fleet assets were also assessed to determine required staffing levels. As previously mentioned service levels are not as appropriate for determining optimum staffing for fleet assets. This is primarily due to the service level being inherently aligned with the fleet asset type – its purpose and use.

Fleet maintenance staffing levels were determined utilizing the concept of Vehicle Equivalent Units (VEU's). VEU's are based off of the maintenance of a standard passenger sedan. Other fleet asset types are then compared to the passenger sedan and given a weighting factor indicating whether that fleet asset type requires more or less maintenance per year, on average. For example, if the standard passenger sedan is weighted at a 1.0, a public safety patrol vehicle, which is also typically a passenger sedan but has additional safety equipment and technology installed is weighted at a 3.0. This equates to a public safety patrol vehicle requiring 3.0 times the amount of annual planned maintenance than the average passenger sedan. Table 8 lists the fleet vehicle and marine vessel asset classifications and assigned VEU's utilized in this staffing analysis.

Table 8. Fleet Asset Classifications & Vehicle Equivalent Units (VEU's)

DESCRIPTION	VEHICLE EQUIVALENT UNITS (VEU)
Small Engine Equipment	0.50
Trailers	0.50
ATV / Personal Watercraft	0.50
Boat/Vessel - Class A (<16')	0.75

DESCRIPTION	VEHICLE EQUIVALENT UNITS (VEU)
Mobile Equipment (Pumps, Generators)	0.75
Sedans	1.00
Boat/Vessel - Class I (16-26')	1.00
Ride-on Mowers	1.00
SUV	1.00
Light Duty Trucks	1.50
Public Safety Boat/Vessel - Class A (<16')	2.00
Emergency Generators	2.00
Fork Lifts	2.50
Public Safety Boat/Vessel - Class I (16-26')	3.00
Patrol Cars	3.00
Medium Duty Trucks	3.00
Boat/Vessel - Class II (26-40')	5.00
Mobile Passenger Gangways	5.00
Public Safety Boat/Vessel - Class II (26-40')	5.00
Bush Hog Mowers	5.00
Graders	5.00
Heavy Duty Trucks	5.00
Loaders/Tractors/ Excavators	5.00
Wood Chippers	5.00
Dump Trucks	6.00
Street Sweepers	6.50
Boat/Vessel - Class III (40-65')	8.00
Fire Boats	8.00
Gotwald Cranes	8.00
Garbage Trucks	8.00
Public Safety Boat/Vessel - Class III (40-65')	10.00
Crane Trucks	10.00

Docks, Piers and Wharfs

Docks, piers and wharf are specialized assets and required working closely with the Port staff to define activities. Service levels were not defined and utilized for staffing calculations for these assets. This was due to a lack of industry standards, guidelines or benchmarks to define the specific maintenance characteristics that would align with each service level (including the number of staff per maintainable area for each asset). In addition, maintenance of the facilities and grounds located

on these assets is addressed in the facilities and grounds/exterior asset calculations. The remaining maintenance to be addressed for these assets is largely structural in nature and therefore could be considered safety related (e.g. is the pier structurally sound and able to meet the safety requirements necessary to serve its intended purpose). Defining varying service levels for this type of maintenance would not be appropriate.

Instead of utilizing service levels and industry standards for determining staffing requirements for these assets, Black & Veatch worked with Port staff to review previous maintenance history in the existing SAP work order system. Labor hours by trade were extracted from the maintenance history and used as a baseline to determine future manpower requirements for maintenance of these assets.

CALCULATION METHODS

Several calculations were utilized to determine the optimum number of maintenance personnel necessary to maintain Port assets to desired service levels. The following sections describe the specific industry standards and calculation methods utilized for each asset type and, in the case of facilities assets, each trade involved in maintaining that asset.

Facility Trades

The International Facility Management Association (IFMA) guidelines and benchmarks were utilized to identify the number of maintainable square feet per FTE by trade for the Port Standard designated service level as shown in Table 9.

Table 9. IFMA & APPA Maintainable Square Feet per FTE by Trade

TRADE	MAINTAINABLE SQUARE FEET (MSF) PER FTE
Electricians	217,000
Plumbers	712,000
HVAC	912,000
Carpenters	812,000
Generalists	159,000
Locksmiths	2,500,000
Painters	438,000
Custodial	33,700
Administrative Support	563,000
Planners/ Schedulers	485,000
Lead/Foremen	277,000
Management	417,000

Leveraging the efforts of Phase 1 of the asset management program, the Port already maintained a registry of facilities assets along with maintainable square feet for each facility. Port staff were asked to assign each facility to one of the four designated service levels and based on the existing

asset data and service level assignment, optimum staffing levels were determined for each trade using the guidelines and weightings shown above.

Grounds and Exterior Maintenance

Exterior and grounds maintenance staff requirements utilize a subcategorization of grounds/exterior assets rather than building trades. For example, the level of effort necessary to maintain manicured planting bed with flowers and ornamental shrubs and trees is much greater than the maintenance of a natural habitat or xeriscaped area. To address the varying levels of effort a maintainable square footage per FTE was determined based on the subcategory of grounds/exterior asset as shown in

Table 10.

Industry guidelines were developed utilizing data from organizations in all regions of the country including areas with much shorter growing seasons than Southern California. An adjustment factor was added to the applicable subcategories to account for the extended San Diego growing season. Finally, similar to facility trades, a service level designation was then used to weight the number of FTE's required for each asset (Port Excellence = 1.5, Port Standard = 1.0, Port Fundamental = 0.75, and Port Minimum = 0.5).

Table 10. APPA Grounds FTE's by Grounds Type (Adjusted for Growing Season)

GROUND TYPE	STANDARD MAINTAINABLE SQUARE FEET (MSF) PER FTE	GROWING SEASON ADJUSTMENT	ADJUSTED MAINTAINABLE SQUARE FEET (MSF) PER FTE
Main Grounds	456,120	25%	342,090
Manicured Beds	267,500	25%	200,625
Open Areas & Hardscapes	2,640,300	0%	2,640,300
Playgrounds, Exercise Areas and Athletic Fields	1,640,850	0%	1,640,850
Revetments	1,640,850	0%	1,640,850
Street Pavement	1,960,200	0%	1,960,200

Similar to facility assets, the Port had developed an inventory of grounds and exterior assets through the development of the AMP tool as well as the Port's geographic information system (GIS). This allowed for the identification of each grounds/exterior asset and determination of the associated maintainable square footage used in the staffing calculations.

Fleet Vehicles & Marine Vessels

As previously discussed, each Port fleet vehicle and marine vessel asset was assigned a vehicle equivalent unit (VEU) that represented the comparative effort necessary to complete planned maintenance on that asset on an annual basis. Passenger sedans represent the baseline (1.0) with each vehicle or vessel type weighted compared to the passenger sedan. A dump truck might require

6 times the annual planned maintenance of a passenger sedan and result in a VEU of 6.0 whereas an all-terrain vehicle (ATV) might require only half the amount of planned maintenance and result in a VEU of 0.50.

Based on historical data from the Society of Automotive Engineers (SAE), automotive dealerships and service centers, and municipal fleet operators, planned maintenance of 12-15 labor hours per year has been identified as a standard for passenger sedans. In an effective maintenance organization, the ratio of planned to reactive maintenance is 6:1 meaning planned maintenance should account for 83% of all maintenance hours and reactive 17% of all maintenance hours.

For purposes of this analysis, a standard of 15 hours of planned maintenance has been applied. Therefore, if a passenger sedan requires 15 hours of planned maintenance, 17% (or 2.5 hours) represents the associated reactive maintenance for a total annual maintenance estimate for a passenger sedan of 17.5 person hours.

Table 11. Total Maintenance Hours by Vehicle/Vessel Type

DESCRIPTION	VEU'S	PLANNED MAINT. LABOR HRS	REACTIVE MAINT. LABOR HRS	TOTAL MAINT. HOURS
Small Engine Equipment	0.50	7.50	1.28	8.78
Trailers	0.50	7.50	1.28	8.78
ATV / Personal Watercraft	0.50	7.50	1.28	8.78
Boat/Vessel - Class A (<16')	0.75	11.25	1.91	13.16
Mobile Equipment (Pumps, Generators)	0.75	11.25	1.91	13.16
Sedans	1.00	15.00	2.55	17.55
Boat/Vessel - Class I (16-26')	1.00	15.00	2.55	17.55
Ride-on Mowers	1.00	15.00	2.55	17.55
SUV	1.00	15.00	2.55	17.55
Light Duty Trucks	1.50	22.50	3.83	26.33
Public Safety Boat/Vessel - Class A (<16')	2.00	30.00	5.10	35.10
Emergency Generators	2.00	30.00	5.10	35.10
Fork Lifts	2.50	37.50	6.38	43.88
Public Safety Boat/Vessel - Class I (16-26')	3.00	45.00	7.65	52.65
Patrol Cars	3.00	45.00	7.65	52.65
Medium Duty Trucks	3.00	45.00	7.65	52.65
Boat/Vessel - Class II (26-40')	5.00	75.00	12.75	87.75
Mobile Passenger Gangways	5.00	75.00	12.75	87.75
Public Safety Boat/Vessel - Class II (26-40')	5.00	75.00	12.75	87.75
Bush Hog Mowers	5.00	75.00	12.75	87.75
Graders	5.00	75.00	12.75	87.75

DESCRIPTION	VEU'S	PLANNED MAINT. LABOR HRS	REACTIVE MAINT. LABOR HRS	TOTAL MAINT. HOURS
Heavy Duty Trucks	5.00	75.00	12.75	87.75
Loaders/Tractors/ Excavators	5.00	75.00	12.75	87.75
Wood Chippers	5.00	75.00	12.75	87.75
Dump Trucks	6.00	90.00	15.30	105.30
Street Sweepers	6.50	97.50	16.58	114.08
Boat/Vessel - Class III (40-65')	8.00	120.00	20.40	140.40
Fire Boats	8.00	120.00	20.40	140.40
Gotwald Cranes	8.00	120.00	20.40	140.40
Garbage Trucks	8.00	120.00	20.40	140.40
Public Safety Boat/Vessel - Class III (40-65')	10.00	150.00	25.50	175.50
Crane Trucks	10.00	150.00	25.50	175.50

Using the total maintenance hours per classification of vehicle, a total number of vehicle/vessel maintenance hours is calculated by multiplying the number of vehicles or vessels in each classification times the quantity of maintenance hours for that classification. This results in a total number of annual maintenance hours for all Port vehicle and vessel assets.

To determine the number of personnel necessary to maintain those assets requires converting maintenance, or wrench-time-hours to full time equivalents. A standard working year is comprised of 2,080 labor hours per person. Paid time off, including holidays and vacation/sick leave, need to be subtracted from these available hours. In addition, not all remaining hours can be considered time spent actually maintaining vehicles/vessels as there is time that needs to be allotted for training, meetings, shop time, time for mobilization, etc. Industry guidelines use a percentage of 75% of available time for actual wrench-time (or time available to maintain assets). Wrench-time hours were determined using the following calculation:

$$(2,080 \text{ labor hrs} - 248 \text{ PTO hrs}) \times 0.75 = 1,374 \text{ maintenance hrs per employee} *$$

** Note that this is an average and some will be higher and lower based on supervisory duties*

Each fleet, maintenance, or vessel mechanic that is fully dedicated to performing vehicle or vessel maintenance can be assumed to be available for 1,374 labor hours per year. In addition, several of the Port's lead/foremen in vehicle/vessel maintenance are hands-on and available to perform maintenance for at least some percentage of their available time. These percentages were discussed with Port staff and used, in combination with those staff fully dedicated to vehicle/vessel maintenance, to determine the required number of personnel necessary to complete the total annual maintenance hours for Port vehicle and vessel assets.

Docks/Piers/Wharfs

Docks, piers and wharfs were determined to be asset types that did not adhere to the available industry standards and guidelines used for the staffing calculations for the previously covered assets.

To determine staffing needs that incorporated maintenance efforts associated with these assets an analysis was conducted on historical maintenance activities (work orders) completed for these assets. A “typical” year was identified by Port staff and then the labor hours, by trade, were analyzed for all of the work orders associated with dock, pier or wharf assets during that time period. This resulted in a quantity of hours, by trade, that were above and beyond previous calculations for facilities or grounds/exterior assets as shown in Table 12.

Table 12. Docks, Piers and Wharfs Maintenance Workload

TRADE GROUP	TOTAL HOURS
Boat Crew	113.0
Carpentry	528.0
Diver	460.0
Electrical	1,806.0
Equipment Operators	1,098.0
General	2,454.5
Grounds Support	1.0
Locksmith	80.0
Painting	567.0
Planning & Scheduling	132.0
Plumbing	1,608.0
Total	8,847.5

Utilizing the same calculation to identify available maintenance hours per year for each employee that was used for fleet/vessel assets, a full time equivalent for each trade was determined by dividing the total hours for each trade by available maintenance hours (1,374) to result in an FTE adjustment that was added to each facility trade staff person calculation. For example, 1,608 hours of plumbing resulted in an additional 1.17 ($1,608 \div 1,374 = 1.17$) plumbing staff added to the number resulting from the facility assets analysis.

Special Circumstance Assets & Job Functions

Lastly, there were additional asset types identified during discussions with Port staff. Examples include the public art displays, maintenance of utility infrastructure (water, wastewater lines and 9 sewer lift stations), railroads and railroad crossings, and elevators. However, discussions with staff indicated that the level of maintenance efforts for these assets when compared to the asset types previously discussed were not as significant and therefore were not included in the calculations. It was decided that the staffing levels identified from the analysis of the aforementioned asset types would include an appropriate margin of error necessary to address maintenance of these additional asset types.

In addition, there are key job functions within the General Services Department that are not necessarily directly related to the maintenance of assets. Examples include the boat operators, divers, and parking meter technicians. These are important job functions in the operation of the

Port however were not included in the staffing calculations as their functions were not directly related to the maintenance of Port of assets. For purposes of this analysis the number of staff in these functions was assumed to be currently adequate and remain the same moving forward assuming no significant change in volume of tasks or duties.

Analysis Results & Recommendations

The following sections detail the analysis results by the aforementioned general Port asset types: facilities, grounds/exterior assets, fleet vehicles and marine vessels, and docks/wharfs/piers. An overall summary result and recommended next steps is also provided for future planning and execution purposes.

FACILITIES

As previously discussed, the analysis for facilities identified the maintainable square footage, by trade group, for each facility. In addition, if a specific trade was currently contracted out for that facility it was indicated as such. This was done such that the calculation methodology would provide the necessary framework to identify the additional staff, should a currently contracted facility's trade maintenance be brought "in-house", that would be necessary to take on maintenance of that trade for that facility. For example, if custodial services for a large facility are currently contracted but planned to be brought back in house in subsequent years, the increase in workload would have a corresponding need to increase staff. This information is summarized in Table 13.

Table 13. Facilities Staffing Analysis Results

TRADE GROUP	IN-HOUSE FTE'S	CONTRACT FTE'S
Administrative Support	4	0
Carpentry	2	0
Custodial	5	11
Electrical	9	0
Generalists	12	0
HVAC	1	0
Leads / Foremen	7	0
Locksmiths	1	0
Management / Supervisors	6	0
Painting	4	0
Planning / Scheduling	5	0
Plumbing	3	0
TOTALS	59	11

Although a facility's maintenance might be performed by a contracted entity or be the responsibility of the tenant/sub tenant, the management of the associated maintenance contracts and/or tenant agreements does have some impact on staffing levels for GS staff. The facilities must be regularly inspected to ensure adherence to lease requirements and contracts must be continually reviewed and, once at end of term, rebid and renegotiated. For purposes of this analysis, it was agreed that the project team should take a conservative approach to staffing level estimates. Therefore, although the tools have been put in place allowing for the calculation of this impact in the future, the current estimates do not include detailed workload demands for the management of contracted

facilities. Instead, it was determined that these demands fell within the reasonable margin of error provided by the industry standards and guidelines used for the analysis.

GROUNDS / EXTERIOR ASSETS

Grounds and exterior assets were analyzed using a similar methodology to facilities. However, instead of building trades, the type of ground or exterior asset was assessed against a recommended area (maintainable square feet) to be maintained per FTE. For grounds and exterior assets, the calculation method provides a total number of grounds support personnel. That number is then used, based on a 7:1 recommended ratio of staff to leads/foremen, to identify the number of grounds support staff and associated leads/foremen. The results are summarized in Table 14.

Table 14. Grounds / Exterior Staffing Analysis Results

ASSET TYPE	MAINTAINABLE SQUARE FEET (MSF)	MSF PER FTE	IN-HOUSE FTE'S
Main Grounds	3,244,105	342,090	9.48
Manicured Beds	2,841,738	200,625	14.16
Open Areas / Hardscape	29,126,177	2,640,300	10.11
Playgrounds / Exercise Areas	90,874	1,640,850	0.06
Revetments	807,690	1,640,850	0.49
Street Pavement	4,488,632	1,960,200	2.29
SUBTOTAL	36,270,650	N/A	36.59
Grounds Lead / Foremen ($36.59 \div 7$)	N/A	N/A	5
Grounds Support Staff (<i>Subtotal – Lead</i>)	N/A	N/A	31
TOTAL			36

FLEET VEHICLES & MARINE VESSELS

Vehicles and marine vessel staffing requirements were developed utilizing the concept of vehicle equivalent units (VEU's) and utilizing to calculate the number of labor hours of both planned and reactive maintenance labor hours necessary to maintain the Port's fleet of vehicles, small engine equipment, ATV's, mowers, and marine vessels. The VEU calculation method identifies the number of maintenance hours that must be staffed (wrench-time hours) per year based on the makeup of the Port's fleet vehicle and vessel inventory. In addition, guidelines indicated that one lead/foremen position should exist for every 6 fleet/vessel maintenance person staff position. Total number of recommended fleet maintenance personnel based on industry guidelines are show in Table 15 and Table 16.

Table 15. Fleet/Vessel Generic Staff Calculation (not including lead/foremen)

VEU'S	HRS (PLANNED MAINT.)	HRS (REACTIVE MAINT.)	AVAILABLE MAINT. HRS / YEAR	TOTAL MAINT. HRS	REQUIRED FLEET MAINT. STAFF
654.5	9,817.5	1,676.3	1,374.0	11,493.8	8.37

Table 16. Fleet/Vessel Staffing Calculation (including lead/foremen)

TRADE GROUP	IN-HOUSE FTE'S
Fleet/Vessel Maintenance	8.37
Lead / Foremen (1 per 6 maintenance staff)	1.40
TOTALS	9.77

Although the analysis recommends a total of approximately 10 staff (roughly 8 ½ maintenance staff and 1 ½ lead/foremen), the Port utilizes an approach where three of the current four leads/foremen related to vehicle and vessel maintenance are hands-on and available to complete maintenance activities. Based on discussions with Port staff this includes the Boat Ops Lead at 90% hands-on, Equipment Ops Lead at 80% hands-on, and the Metal Fabrication/Welding Lead at 75% hands-on. Using a basic calculation of required lead/foremen and wrench-time hours that require staffing each year while also using the assumed hands-on percentages of current leads/foremen, the current staff breakdown can sufficiently meet staffing requirements. Assuming that these leads will continue to be available for maintenance activities at current percentages, the staffing recommendations can be adjusted as shown in Table 17.

Table 17. Fleet/Vessel Maintenance Staffing Analysis Results

CATEGORY	STAFF COUNT
Fleet/Vessel Maintenance	6
Lead / Foremen (3 hands-on at current availability)	4
TOTALS	10

DOCKS/PIERS/WHARFS

Lastly, a final adjustment based on historical work orders was added to each trade group to account for typical annual workload requirements related to maintenance on docks, piers and wharfs. These trade group adjustments are shown in Table 18.

Table 18. Docks/Piers/Wharfs Staffing Analysis Results

TRADE GROUP	ADDITIONAL FTE ADJUSTMENTS
Carpentry	0.38
Electrical	1.31
Equipment Operators	0.80
Generalists	1.79
Painting	0.41
Plumbing	1.17
TOTAL	5.87

OVERALL RESULTS & NEXT STEPS

The overall staffing analysis resulted in a recommendation of 122 staff, compared to a current budgeted position count (not all positions are currently filled) of 93. Table 19 summarizes the recommendations per trade group. There was one final adjustment made to the recommended staff counts to account for a director level position. This position was not included in the industry guidelines and benchmark calculations but has been included to allow for a direct comparison to current staffing levels. Highlights of the results include:

- GS staffing levels are appropriate in 10 of the 17 trade categories including administrative support, carpentry, HVAC, lead/foremen, locksmiths, management, fleet/vessel maintenance, divers/boat operators, equipment operators, and parking meters. Having an “appropriate staffing level” was defined to be within 1 person of the current FTE count
- GS staffing levels are slightly below target (2 – 4 FTEs) in 4 of the 17 trade categories. These trades include custodial, painting, plumbing, and planning/scheduling.
- GS staffing levels are significantly below target (5 or more FTEs) in 3 of the 17 trade categories. The trades include electrical, generalists, and grounds maintenance support personnel.
- The Port was not found to be overstaffed in any trade category.

Table 19. Staffing Analysis Summary Results

TRADE GROUP	CURRENT STAFF	RECOMMENDED STAFF	DELTA
Administrative Support	4	4	–
Carpentry	1	2	+1
Custodial	2	5	+3
Divers/Boat Operators	5	5	–
Electrical	5	10	+5
Equipment Operators	4	4	–
Fleet / Vessel Maintenance	6	6	–
Generalists	7	14	+7
Grounds Maintenance	24	31	+7
HVAC	1	1	–
Leads / Foremen	16	16	–
Locksmiths	1	1	–
Management / Supervisors	8	8*	–
Painting	2	4	+2
Parking Meters	2	2	–
Planning / Scheduling	3	5	+2
Plumbing	2	4	+2
TOTALS	93	122	+29

* Note – Management / Supervisors recommended staff was adjusted +1 from calculations to account for director level position which was not included in industry guideline calculations.

It is recommended that the Port begin a phased process to bring staff counts up to recommended levels. While the GS team has done a good job managing activities with the current staffing, management should be cognizant of this added potential risk to the Port. The key risks include:

- **Deferred Maintenance.** Less than standard staffing levels require more staff to perform reactive activities. Preventive maintenance is therefore deferred which then risks higher overall costs when unmaintained assets fail. Since assets generally last years to decades, this risk can be masked for a period of time.
- **Safety.** Lack of maintenance personnel puts a greater strain on resources and longer lead times to correct deficiencies. Delays in maintenance increases the likelihood of further degradation of the asset which in turn, exposes the Port to more potential health/safety/risk issues for both the public and the Port's employees.
- **Appearance/Image Issues.** The Port plays an important part in local tourism and regional business development. Lack of GS staffing impacts the appearance and desired image of the Port's tourism and business environment.

Key next steps should include:

- **Complete Immediate Staffing Plan.** Based on commissioner direction, it is recommended that the Port staff be directed to close the staffing gaps through a prioritized hiring process and formalized staffing plan. The Port should prioritize positions and fill needs using a multi-year phased process starting in 2017 based on the gaps identified. As new FTEs are brought on board, GS management should assess effectiveness and prioritize needs annually as conditions change.
- **Employ Enterprise Asset Management System.** The enterprise asset management efforts now underway and will provide a mechanism for performing more in depth GS department operational analysis. This tool should be used to assess maintenance loads, work order completion rates, and reactive versus preventative maintenance ratios.
- **Establish a Placeholder for a Future Staffing Plan Update.** Staffing should not be considered a static business process but a continual assessment process as business needs and conditions change. It is recommended that a staffing update be performed in the future if there have been significant updates to the Port's Strategic Plan. It is recommended that these coincide since strategic planning sets the overall organizational objectives and the GS department is highly affected by those strategic decisions.

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