



County of San Mateo

Department of Public Works

Facilities Planning, Design and Construction – Capital Projects

Skylonda Fire Station No. 58 Replacement

17290 Skyline Boulevard

Woodside, CA. 94062

Attachment No TBD

Item TBD

DESIGN NARRATIVE

* * *

Bridging Documents

March 16, 2015

Prepared by:



* * *



Design Narrative

Table of Contents

INTRODUCTION.....	4
▪ Design Narrative & Bridging Documents	
▪ Project Overview	
▪ Summary of Primary Applicable Codes and Standards	
SUSTAINABLE DESIGN	9
▪ Overview	
▪ CalGreen Requirements	
▪ LEED Certification	
▪ Owner’s Project Requirements (OPR)	
CIVIL/SITE DESIGN.....	11
▪ Overview	
▪ Civil Codes and Standards	
▪ Site Design	
▪ Stormwater Strategy	
▪ Utilities	
ARCHITECTURAL DESIGN	17
▪ Overview	
▪ Architectural Code Requirements	
▪ General Building Design	
STRUCTURAL DESIGN	25
▪ Overview	
▪ Structural Codes and Standards	
▪ Design Approach	

- Structural Design Criteria

BARRACKS/OFFICE – SPACE REQUIREMENTS.....28

- General
- Administration and Training Areas
- Residential and Living Areas
- Building Services Areas

TECHNOLOGY AND COMMUNICATIONS DESIGN.....44

- Applicable Codes and Standards
- Technologies Systems

ELECTRICAL DESIGN.....47

- Overview
- Applicable Codes and Standards
- Electrical Systems
- Fire Alarm Systems

MECHANICAL AND PLUMBING DESIGN52

- Overview
- Applicable Codes and Standards
- Mechanical Systems
- Plumbing Systems
- Fire Protection Systems

Introduction

Design Narrative & Bridging Documents

The intent of this Design Narrative document, together with the supporting information contained in these Bridging Documents (BD's), is to provide proposing Design-Build Entity's (DBE) with a basis of design for the performance and operational requirements for this Project in the preparation of Bids. Information regarding the scope, application, and objectives for this project are as specific as can be provided, given the current development of the project and the nature of the procurement process; it will be the responsibility of the proposing DBE to understand the content contained in these BD's, and to provide a proposal that demonstrates how the Project's objectives will be met. The selected DBE will also use these documents in developing their final design to construct a project that meets the County's programmatic, performance, scheduling, and budgetary requirements.

Project Overview

The County of San Mateo (County) owns the property and buildings comprising the Skylonda Fire Station No. 58 located at the "Four-Corners" area, providing fire protection services for Kings Mountain, La Honda, Upper Woodside, and Skyline Boulevard. CalFire provides the fire protection services under a service contract with the County, staffing the Fire Station with personnel and fire fighting apparatus.

Based on a "Needs Assessment" prepared for the County in late 2013, it was determined that the existing Barracks and Office Buildings constructed in the late 1930's are nearing the end of their useful life. The following deficiencies were identified as representing the primary challenges to meeting the emergency response time goals, performance levels, and service objectives for the Fire Station:

- **Space Allocation Assessment:** The current space allocation given the age of the buildings and the subsequent increase in personnel over the years does not meet current "best-practices" for fire station planning.
- **Structural Assessment:** A structural assessment determined that both buildings are at risk of being rendered uninhabitable following a seismic event; thereby creating the potential for the disruption of the ability to provide essential services to the community.
- **Site Assessment – Vehicular Access:** Vehicular access to and from the site currently presents safety and response time challenges. Access from Skyline Boulevard at the west end of the site is via Linwood Way; a narrow single-lane road which serves as shared access to the adjoining residential area. The alignment of the intersection of Linwood Way and Skyline Boulevard does not allow for safe entry and/or egress from/to eastbound Skyline Boulevard. Egress to Skyline Boulevard at the east end of the site is frequently blocked by parked vehicles at the adjoining commercial development (Alice's Restaurant). This is a very popular weekend destination, and limited on-site parking availability frequently results in vehicles parking in a manner which blocks egress, thereby increasing response times to calls.

- **Site Assessment – Circulation:** The existing configuration of three separate buildings requires the station personnel to run up hill from the Barracks to the Office to retrieve the emergency call location, and to then continue uphill to the Apparatus Building when responding to an alarm. The need to traverse over two hundred feet creates a challenge to meeting the targeted performance level response time from receipt of alarm to departing the facility, and presents a safety hazard to the fire station personnel who are frequently required to navigate the path of travel during nighttime hours or inclement weather conditions with poor visibility.
- **Site Assessment – Security:** The fire station site is not secured from the adjoining residential and commercial developments, resulting in periodic instances of unauthorized pedestrian traffic occurring on the site. Due to the configuration of the existing buildings, visual surveillance of the Apparatus Building is not possible on a continuous basis.
- **Site Assessment – On-Site Wastewater Treatment:** The site is not served by a sanitary sewer system. On-site sewage treatment is provided via an existing septic system and leach field. The existing leach field is in compliance with the counties ordinance requiring a minimum two hundred foot separation from a water reservoir; however, the existing leach field has been paved over to accommodate the fire vehicle access to the Apparatus Building, and is in violation of the county’s ordinance which prohibits the installation of impervious paving over leach fields.

The County intends to build a replacement Fire Station Barracks/Office Building that will consolidate the functions and operations of the two existing structures into a single structure. The Barracks/Office Building will contain:

- Administrative offices and related support spaces
- Combined conference and training room
- Kitchen and dining room
- Dayroom
- Fitness room
- Dorm rooms
- Men’s restroom and showers
- Women’s restroom and shower
- Uni-sex accessible restroom
- Laundry room

A new primary vehicular access connection shall be provided to Skyline Boulevard to facilitate improved traffic sightlines and vehicle turning radiuses. The new access connection shall incorporate traffic signalization capable of being operated from the fire fighting apparatus vehicles to improve safety for accessing and egressing the site.

A new septic system and upgraded leach field shall be constructed to serve the Barracks/Office and Apparatus Buildings. The new upgraded leach field shall conform to all requirements of the County Department of Environmental Health and all applicable ordinances and regulations.

The Fire Station must remain operational at all times during the construction of the improvements. Based on this requirement a phased construction implementation is required. The general construction phasing approach acceptable to the County would consist of the following:

- **Phase 1:** Construction of the new Barracks/Office Building including the provision of new or relocated propane storage tank and new or relocated emergency generator. The new Barracks/Office Building will be tied-in to the existing leach field on a temporary basis.
- **Phase 2:** Following completion and turn-over of the new Barracks/Office Building the existing Barracks and Office Buildings shall be demolished.
- **Phase 3:** Construction of the new primary vehicular access connection to Skyline Boulevard. Construction of the new septic system and upgrade of the existing leach field, including tie-in to the new Barracks/Office Building and existing Apparatus Building.

The DBE will be responsible for developing a construction phasing strategy that is acceptable to the County, and that allows for continuous 24/7 operations, including access and egress from the site. The DBE construction phasing strategy shall also address the temporary relocation of all equipment, supplies and fire fighting apparatus, and shall include provisions acceptable to the County for protecting items from the weather and construction activities, including the incorporation of security measures. The DBE will also be responsible for providing all temporary utilities, including temporary power required to facilitate the construction phasing and cut-over of building systems.

A future replacement of the existing Apparatus Building is anticipated and should be considered in the design planning for the Barracks/Office Building, but the design and construction of this future replacement will not be part of the current project scope (N.I.C. – not in contract).

The Barracks/Office Building will be built at the existing County of San Mateo Skylonda Fire Station No. 58 Facility located at 17290 Skyline Boulevard in Woodside, CA (Project Site). The project scope will include the demolition of the existing Barracks and Office Buildings following completion and occupancy of the new consolidated facility. See Specification Sections 011000 “Summary of Work” and 024116 “Structure Demolition” for additional information.

The Barracks/Office Building will be defined as an Essential Services Facility (Essential Facility) per the California Building Code, and will be designed to maximize building operations after extreme environmental events such as earthquakes, flooding, wind and storms. In addition to code-required structural strengthening, the Barracks/Office Building will contain a number of non-structural systems that will be defined as ‘Critical’ to the continued operation of the facility. These Critical non-structural systems are listed in Specification Section 014600 and cover building systems such as HVAC, Electrical, Plumbing, and Telecommunication systems. Such Critical systems typically require seismic anchoring, bracing, special seismic certification, and special inspections.

- **Fire Station Designated as an Essential Services Facility** per California Code of Regulations (CCR) Title 24, Part 1, Chapter 4
- Risk Category: **IV** (ASCE/SEI 7, Current Edition)
- Seismic Design Category: **D**
- Design earthquake spectral response acceleration short period (Sds) for Project: Per County's Geotechnical Report.
- Wind Exposure Category: As determined by AHJ for Project Location and Project Type.
- The calculated story drift for acceptable lateral systems shall not exceed 75% of the values allowed by ASCE 7 Table 12.2-1. (See structural portion of narrative for acceptable lateral system types)
- The calculated story drift for non-structural components, systems, equipment and support/anchoring shall be based on the full (100%) values allowed by ASCE 7 Table 12.2-1.
- Fire Station designed for Immediate Operation per ASCE/SEI 7, and includes seismic provisions for non-structural components as described in Specification Section 014600 and individual Division 03-33 Specification Sections. The general intent of these non-structural seismic provisions is to maximize the post-seismic immediate operation of these systems and their components.
- Redundant systems and connections, on-site resources, backup energy systems, and other strategies will be utilized to maximize the immediate operation of this facility after natural emergency events (seismic, flooding, storms, etc.).

The Barracks/Office Building will contain an infrastructure of telecommunication, IT, electrical power, and building conditioning systems. Many of these systems will be designed with measures that increase their redundancy, strength, and self-sufficiency so they will meet Essential Facility requirements. A number of the public safety areas/functions within the Barracks/Office Building are governed by specialty Codes and Standards. This narrative and supporting specifications describe these requirements and identify the specialty Codes and Standards to the extent possible, given the resolution of the current project requirements, but the DBE will fully review, define, and understand these parameters and successfully implement them into the design and construction of the Barracks/Office Building.

Summary of Primary Applicable Codes and Standards

The following summarizes the primary codes and standards affecting the Barracks/Office Building. See the other sections of this design narrative and the Specifications for listings of codes and standards applicable to specific portions or systems of the project. This is not a comprehensive listing:

- **CBC (Current Edition):** California Building Code; all applicable Title 24 requirements – including the new energy code requirements.
- **ASCE/SEI 07-10:** Important criteria governing structural design loads for the project. The seismic requirements for non-structural components will be especially important.

- **NEC Article 708:** Critical Operations Power Systems (COPS). Important for entire facility. Describes electrical power system and distribution requirements for the building, including redundant backup power and connection for backup portable generator. The designated COP's will cover the entire facility.
- **LEED:** The project shall comply with the County of San Mateo 'Sustainable Green Building Policy'. The DBE will be responsible for applying for and successfully submitting the credit requirements for obtaining the highest practicable LEED rating level.
- **San Mateo County ISD – Telecommunication Guidelines Version 2.4:** Guidelines for the Design of Telecommunication Infrastructure for San Mateo County Facilities. This County standard is included as an Appendix to the Specifications and is applicable for ISD-controlled systems.
- **NFPA 13:** Fire suppression system standards. The entire Barracks/Office Building will be equipped throughout with an NFPA 13 sprinkler system.
- **NFPA 72:** Fire alarm and signaling code.
- **NFPA 75:** Standard for fire protection of IT equipment.
- **NFPA 110:** Emergency and Standby Power Systems. Entire facility will need a secondary power supply via diesel powered generator to power 100% of building for 72 hours of run-time, or only identified critical loads subject to acceptance by the County.

Sustainable Design

Overview

The project is required to meet both current CALGreen Standards and compliance with the County of San Mateo 'Sustainable Green Building Policy'. The design shall focus on LEED strategies that will allow the facility to operate in a 'stand-alone' condition; for instances when typical incoming utilities, communication and other infrastructure may not be available. A high level of redundancy and on-site resources will be integrated into the design to allow this to happen. The general strategy will be to reduce building loads while maximizing system efficiency and on-site power/energy generation. The facility will need to be carefully designed, with efforts to maximize passive and sustainable strategies for building operation while minimizing its impact on the surrounding neighborhood and local natural processes.

CalGreen Requirements

The project shall achieve a minimum of CALGreen Tier I compliance. This will include compliance with the latest edition of "Savings by Design, Healthcare Modeling Procedures" and all required verification submittals to the AHJs. Considering that the project will be required to comply with the County of San Mateo 'Sustainable Green Building Policy', compliance is anticipated to be straightforward to achieve. The DBE is encouraged to use measures and strategies that meet both CALGreen and LEED requirements.

LEED Certification

To comply with the County of San Mateo 'Sustainable Green Building Policy' the project will require LEED certification. The DBE will be responsible for conducting the entire LEED certification process. This will include (but is not limited to):

- Applying to USGBC
- Coordinating requirements with the County's Commissioning Agent (Cx) for Enhanced Commissioning (see below)
- Including at least one LEED AP from the DBE
- Obtaining County requirements (via Charrette, OPR, County credit items, etc.)
- Determining actual credits to seek (see below)
- Integrating credit requirements into the project
- Coordinating and collecting credit submittals for submission
- Submitting the project credits to USGBC
- Responding to USBGC comments to complete certification process
- Successfully complete commissioning process

IMPORTANT NOTES:

The Enhanced Commissioning (EAc3) credit is strongly encouraged for this facility and should be considered as a requirement. Enhanced commissioning will further ensure that the building and its systems are tested and operate as intended. The County will contract with a Commissioning Agent (Cx) for this project; the DBE will be responsible for coordinating with the Commissioning Agent, integrating commissioning requirements into the project and successfully completing the commissioning process requirements for the project.

Owner's Project Requirements (OPR)

It is recommended that the LEED process start very early in the design phase. The document which LEED uses to capture the initial process is called the Owner's Project Requirements (OPR). The DBE shall work with the County by both facilitating the process for producing the OPR and clearly communicating scheduling milestones for obtaining the County's OPR document. In turn, the DBE will use the OPR to create their response document called the Basis of Design (BOD). Both documents and the process to create them are required by the DBE to achieve LEED compliance.

INTENT

The intent of the OPR document, per the LEED Reference Guide, is to provide clear and concise documentation of the County's goals, the projects' functional requirements, and the expectations of the building's use and operation as it relates to commissioned systems.

This document shall also be utilized throughout the project delivery and commissioning process to provide an informed baseline and focus for design development and for validating systems' energy and environmental performance.

Updates to the OPR document throughout the course of project delivery shall be made by the County based on decisions and agreements coordinated with and agreed upon by the DBE. It should be adapted as needed to suit the project, remaining reflective of the LEED intent.

Civil/Site Design

Overview

A new Barracks/Office Building is proposed across from the existing Apparatus Building. In order to achieve ADA access and avoid steep slopes, the finished ground floor will be at approximately the same elevation as the Apparatus Building. With similar finished floor elevations, the sewer from both buildings should be gravity fed to the on-site sewer treatment system.

Proposed improvements may require removal of some existing trees. The DBE shall be responsible for coordinating the design of the improvements to minimize the removal of existing trees (especially “Heritage” trees), and to confirm that all trees proposed for removal are approved in advance by the appropriate Authority Having Jurisdiction (AHJ).

LEACH FIELD

The existing septic system and leach field is described and shown on the “Septic System Repair Plan” dated 10/27/2005 as filed with the County. The effluent from the septic tank, located in the driveway in front of the existing Barracks Building, is pumped to the leach field lines under the pavement in front of the Apparatus Building. There is approximately 241-feet of existing leach field trench. Reports from staff indicate the system operates acceptably. Per County code, the leach field must be a minimum of 200-feet from the edge of the reservoir. The existing leach field meets this requirement. Per County code, the surface above the leach field must be permeable. The existing surface is impermeable asphalt pavement, and therefore does not meet current code requirements.

RESERVOIR AND WATER SUPPLY

The Skylonda Mutual Water Company water supply reservoir, treatment, and distribution pumps are located immediately downhill of the site. This reservoir provides the primary water service to the local residents, including the Skylonda Fire Station. The fire station is served via a 5/8” meter off Blakewood Way, and billed to “Cal Fire Station”.

UTILITY EASEMENT

There is a 10-foot public utility easement (PUE) that runs along the northeasterly property line and then cuts through the site.

This section addresses site-specific codes and standards, site design, stormwater strategy, and existing and proposed utilities.

Civil Codes and Standards

The primary codes and standards governing Civil/Site design include, but are not limited to, the following:

CODES

- **CBC (Current Edition):** California Building Code; all applicable Title 24 requirements – including the new energy code requirements.

STANDARDS

- **State Water Resources Control Board (SWRCB)**
 - The SWRCB manages National Pollutant Discharge Elimination System (NPDES) Permit Compliance for the federal Water Pollution Control Act (Clean Water Act) by issuing General Permits for Discharges of Storm Water Associated with Construction Activity for areas that disturb 1-acre or more.
- **Bay Area Stormwater Management Agencies Association (BASMAA)**
 - The publication “Blueprint for a Clean Bay” establishes best management practices for Construction related pollution prevention.
- **County of San Mateo**
 - An Encroachment Permit will be required for all work in County right of way.
 - San Mateo County’s Water Pollution Prevention Program provides guidelines for low impact development.
 - An on-site sanitary sewer treatment permit will be required from the department of environmental health.
 - A Grading & Drainage Permit will be required.
- **Caltrans**
 - An Encroachment Permit will be required for all work within the State right of way.
- **LEED**
 - The project shall comply with the County of San Mateo ‘Sustainable Green Building Policy’

Site Design

VEHICULAR ACCESS

- The existing vehicular access is proposed to remain. An additional access point is proposed at Skyline Boulevard (Skyline) just south of the Apparatus Building. A conceptual level grading scheme was developed that provides this new access at a maximum of 8% slope. Because Skyline is at a much higher elevation than the rest of the site, the new vehicular access road will require significant grading with retaining walls. A steep paving gradient will be needed in order to maintain the access from the south (near Alice's Restaurant).
- Vehicular maneuverability shall safely accommodate anticipated trucks and engines without complicated turning maneuvers. Vehicular access shall be demonstrated using templates or simulations to the satisfaction of the County and Fire Department.

PARKING

- Parking should be provided to meet code requirements, CalFire staffing needs, and public parking requirements.

PAVING

- The site is currently paved with asphalt concrete. The pavement near the Apparatus Building appeared to be in good condition during a site visit on 11/21/2013. The pavement near the Barracks Building appeared to have sections in very poor condition with significant alligator cracking and patches. The sections in very poor condition shall be reconstructed.
- Because of the heavy loading and turning in a small space from the fire apparatus, any proposed permeable pavement will likely need to be permeable pavers with good interlocking properties. Other permeable pavement such pervious asphalt, pervious concrete, or grass/rock pave cell systems would likely suffer extensive spalling or raveling under heavy turning tires.

VEHICLE WASH AREA

- The existing vehicle wash area is an uncovered concrete pad adjacent to the Apparatus Building on the south side. It is sloped to a center drain with an oil separator tank that then drains to an outfall downslope of the paved area. This wash area is to remain without modifications.

VEHICLE FUELING AREA

- The vehicles are currently refueled in front of the Apparatus Building, just to the north. There is an above-ground tank that sits on a concrete pad immediately to the north of the existing apparatus building. The fueling area is to remain without modifications.

SELF-SUFFICIENT OPERATIONS

- The nature of the site requires it to have a high level of self-sufficiency, allowing for continuous operation during emergency situations. The design should focus on strategies that will allow the facility to operate in a 'stand-alone' condition and function throughout the construction phase. To facilitate this, a certain level of redundancy or temporary facilities (such as sewer lines) may need to be integrated into the design. In addition, maximizing passive sustainable and reuse strategies will further enhance the self-sufficiency of the site. On-site stormwater infiltration, rainwater harvesting, and graywater reuse should be integrated into the design to reduce both operating costs and to meet permitting/LEED requirements.

SITE ACCESSORIES

- The existing hose drying rack shall be maintained or replaced in-kind and relocated to a location as directed by the County.
- The existing drafting pit shall be maintained or replaced in-kind and relocated to a location as directed by the County.
- Other site accessories to be disturbed shall be maintained or replaced in-kind as directed by the County.

Stormwater Strategy

The project's stormwater system must meet the requirements of multiple agencies including, but not limited to the SWRCB, BASMAA, and San Mateo County. In addition, the site must achieve LEED credits to comply with the County of San Mateo 'Sustainable Green Building Policy' and should pursue LEED stormwater credits SS6.1 and SS6.2. To address these requirements the following stormwater strategy should be considered:

REDUCE RUNOFF RATE AND QUANTITY

Reduce runoff rates and quantity by using impervious area reduction, onsite infiltration, and detention utilizing some of the following strategies:

- If infiltration rates and groundwater levels permit their use, utilize permeable paving such as permeable concrete or pavers in the parking lot. ADA accessible architectural grade permeable concrete will also be considered for pedestrian walkways. The permeable paving system shall be analyzed for subsurface storage capacity during large events. If needed to prevent stormwater from seeping through the pavers at low points during large rain events, provide supplementary subsurface storage at the low point of the permeable paving. Choose permeable paving colors that are high albedo and contribute to achieving LEED credit SS7.1 – Urban Heat Island Effect.
- Install a rainwater harvesting system to reuse roof water for toilet flushing or irrigation.
- If additional storage is required for stormwater, evaluate the use of additional stormwater facilities such as a rain garden, and stormwater planters.

- If the site infiltration rates and seasonal high groundwater do not support the use of infiltration facilities, consider the use of stormwater detention facilities such as underground storage and balance these facilities with the impervious area reduction techniques discussed above as needed to achieve both LEED stormwater points.
- Provide treatment in place whenever possible through the use of landscaping, or permeable paving. Where this is not possible, use vegetated bio-filtration facilities to treat concentrated runoff. Such facilities include rain gardens, planters, or swales (generally sized at 4% to 6% of the impervious area) before infiltrating on-site or discharging into the public storm system.

Utilities

The existing underground utilities will need to be identified. A septic system repair plan drawing is available and shows the possible routing of sewer lines. There are underground gas lines from the propane tanks, electrical lines from the generator, electrical lines serving the sewer pump, and water lines serving the 3 buildings. These lines will need to be located in the field when design of the new site is being prepared.

PROPOSED SANITARY WASTE SYSTEMS

- With similar finished ground floor elevations, the sewer from both buildings (new Barracks/Office and existing Apparatus Building) should be gravity fed to the new on-site sewer treatment system. For phasing requirements, the existing septic tank and leach field are to be temporarily re-used. A new system can be placed at a lower elevation, eliminating the need for the existing pumped system.
- Per County Ordinance 03740, the sewer treatment system and leach field must be a minimum of 200-feet from the edge of the reservoir. In order to incorporate a leach field beyond the 200-foot zone, and maintain service during construction, the design should consider re-use and upgrade of the existing leach field; to incorporate replacement of the older existing leach field lines with a new system. Subgrade infiltration utilizing a system similar to the 'Infiltrator Systems' trench, or an equivalent system may allow for a reduction in the length of infiltration trench required. The newer leach field lines could continue to be used as expansion or overflow.
- A permeable surface shall be utilized to replace the existing impermeable asphalt pavement above the leach field. The limits of the new permeable surface shall extend for the entire 'apron area' fronting the existing Apparatus Building. A permeable paver system rated for the anticipated heavy loads and turning maneuvers associated with the fire apparatus shall be utilized.
- Sewer treatment with an advanced treatment system (secondary treatment or better) could be considered for grey water reuse. Effluent from the buildings will drain to a septic tank, followed by the advanced treatment system, and sent to a below-grade infiltration system and/or re-used as grey water. The DBE shall evaluate an advanced treatment system such as the 'Orenco AdvanTex System', or equivalent.

PROPOSED STORM WATER SYSTEMS

- If changed from impervious asphalt pavement to permeable pavers, the project will substantially offset the increased impervious area from the new Barracks/Office Building and the new access to Skyline. Because the pavers would not be considered 100% permeable, there will need to be some additional stormwater treatment and detention required to meet LEED C.3 requirements. One or more treatment planters may be required. Additional treatment/detention planters may be needed to obtain the related LEED credits. Final area of planter(s) will need to be determined during design of the site, and will depend on many factors, including paver type, limits of pavers, project phasing, planter design, etc.
- Additional site drainage would consist of minor area drains with outfalls to the ditch along Blakewood Way.

Architectural Design

Overview

The Barracks/Office Building and associated site improvements will enhance the County of San Mateo and CalFire's ability to meet the emergency response time goals, performance levels, and service objectives established for the Skylonda Fire Station, while providing for the continuity of operations necessary to insure the provision of emergency services following extreme environmental events such as earthquakes, flooding, wind and storms. The project will be designed to meet Essential Services Facility requirements.

Architectural Code Requirements

See the Primary Applicable Codes and Standards listed earlier in this document, as these will affect the architectural design. The general code and permit requirements for architectural design include, but are not limited to, the following:

BUILDING CODE SUMMARY:

- **CBC (Current Edition): California Building Code; all applicable Title 24 requirements – including the new energy code requirements.**
 - Building Construction: (Type V-B)
 - Building Structure: Meet Essential Facility Standards
 - Risk Category: IV (ASCE 07-10)
 - Seismic Design Category: D
 - Design earthquake spectral response coefficients: See County-supplied geotechnical report.
 - Seismic Relative Displacement – Design shall accommodate seismic relative displacement of 0.02 times the story height in addition to thermal movement that may be present.
 - Fire Protection: NFPA 13 wet pipe automatic fire sprinkler system throughout.
 - Fire Alarm: Throughout Building per NFPA 72 w/ audible and visual alarms.
 - Smoke Detection System: Throughout Building.
 - Building Energy: Meet California Energy Code (Title 24, Part 6) Meet non-residential compliance through prescriptive or performance paths and all mandatory requirements.
 - Building Sustainability: Meet County of San Mateo 'Sustainable Green Building Policy' requirements and CALGreen Tier I compliance.
 - Building Accessibility: Meet CBC Chapter 11B and any applicable County of San Mateo requirements for all areas of the facility serving the general public.

- **Building Performance:** Maximize the self-sufficiency of the facility for post-seismic operation through employing hardened and seismically certified critical building systems, redundant systems, emergency power generation and maximizing the efficiency of systems and building enclosure to minimize building loads.

ZONING CODE SUMMARY:

The project will need to meet the following:

- Meet all applicable County of San Mateo zoning requirements, including applicable “Scenic Corridor” regulations.

PERMIT REQUIREMENTS:

The project will need to obtain the following:

- County of San Mateo Building Permit.

General Building Design

The Barracks/Office Building will be an important public safety facility that will allow the County to provide daily emergency services to the citizens of San Mateo County. To achieve this, the building design must maximize measures that will allow the facility to operate, at times, without utilities and immediately after an earthquake, flood, wind and/or severe storms. The facility’s ability to be self-sufficient is targeted at seventy-two hours before generator fuel, and facility water (potable and graywater) supplies will need to be replenished. As a public safety facility, the environment can often be stressful and involve 24/7 operations. The fire station personnel are typically on duty for a period of seventy-two hours before being relieved by the next shift. During this period the Barracks/Office Building becomes their home; supporting all administrative operations as well as the preparation of meals, active and passive recreational activities, sleeping, and general personal hygiene. The building design shall provide occupants with a calm and comfortable work environment to allow them to focus on their tasks and, when needed, provide relief from the demands of their work.

Based on the program requirements and feasible site location options a two-story Barracks/Office Building design is envisioned by the County. A two-story structure will allow for a segregation of the dorm rooms and associated restroom/shower functions from the administrative offices, conference/training, kitchen/dining, and dayroom. This proposed segregation isolates the more active functions from those requiring isolation from excessive noise.

To facilitate accessibility for the public to meet with fire station personnel or to utilize the conference/training facility for community events, it is recommended that these functions be located on the ground floor level.

The following sections describe the building design objectives, organized from site location, general exterior and interior design and materials, to a listing of individual building room requirements.

SITE LOCATION

A recommended location for the Barracks/Office Building has been shown in the BD's. This location addresses the following essential performance criteria:

- **Circulation:** The recommended site location places the Barracks/Office Building within close proximity to the existing Apparatus Building, thereby improving the response time to emergency calls. The location, across the concrete vehicle apron from the existing Apparatus Building will allow for a relatively flat and well illuminated circulation route, reducing the risk of injury to the fire station personnel responding to alarms during nighttime hours or inclement weather conditions.
- **Security:** The recommended site location provides the Barracks/Office Building with a visual sightline to the existing Apparatus Building, thereby improving the ability to monitor the site and Apparatus Building to maintain security.
- **Vehicular Access:** The recommended site location accommodates the turning radius required for the fire apparatus vehicles to enter and exit the Apparatus Building with an economy of maneuvers; thereby enhancing the response time to emergency calls and improving the safety for fire station personnel while minimizing the potential for damage to vehicles and the building.

The recommended site location for the Barracks/Office Building attempts to minimize the foundation costs by locating the building on top of the existing slope to the greatest extent possible while also accommodating vehicular access to the Apparatus Building. The DBE has the option to propose either a two-story building situated on top of the existing slope, or a two-story building with one level cut into the existing downhill slope, subject to acceptance by the County. Cutting one level into the existing downhill slope offers the potential to reduce the apparent building massing when viewed from Linwood Way. The DBE must comply with all code requirements for egress/exiting from the lower level (basement), and must provide for a safe, well illuminated and convenient path of travel to the vehicle apron.

The DBE may propose alternative site locations for the Barracks/Apparatus Building subject to acceptance by the County. However, the proposed alternate site location must address the essential performance criteria described above.

BUILDING ENCLOSURE AND MATERIALS

The ultimate selection of the exterior building materials, their arrangement, and attachment to the supporting structure will be the responsibility of the DBE. The selection of exterior building materials shall provide for a durable, low-maintenance, energy conserving building envelope meeting the requirements for "Moderate Fire Hazard Severity Zones" per the current edition of the California Building Code (CBC). The exterior materials and finishes shall also compliment the adjacent residential development. Performance criteria for possible building enclosure materials and components are described in the specifications (Divisions 03-08, w/ exterior painting/high performance coatings covered

in Division 09). These specifications cover the most likely exterior enclosure materials and components that will be used for the Barracks/Office Building and cover a wide range of possible options. These specifications describe performance, energy efficiency, durability, security, and quality requirements that are intended to meet code and County objectives for the facility. Alternate enclosure materials and components may be used, but the DBE must prove equivalency or better to the specification requirements.

- **Energy Code and LEED:**

- Building enclosure materials and their performance will be highly influenced by California Energy Code, LEED and CALGreen Tier I requirements. Select materials, assemblies, and their placement so they meet applicable criteria.
- The most effective strategy to meet both project and sustainability objectives is to minimize building enclosure U-values and solar heat gain through windows/skylights.
- Project is located in Climate Zone 3, per California Energy Code.
- Use prescriptive or performance compliance approaches to meet energy code; mandatory energy code requirements are listed below for specific enclosure components.

- **Roof:**

- Steep slope roof encouraged to provide rainwater discharge to gutters and downspouts and to minimize the potential for damage from falling tree branches.
- Meet requirements of Specification Section 073000 'Roofing'
- Meet LEED SSc7.2 - Heat Island Effect, Roof requirements
- Meet applicable LEED credit criteria for energy performance, low-emitting/recycled/regional materials, etc. (for credits selected for project LEED certification)
- Meet applicable prescriptive or performance compliance requirements of the California Energy Code
- Meet mandatory requirements for Solar Ready Buildings, per California Energy Code
- Roof assemblies to have a maximum weighted average U-factor not exceeding 0.075
- Roof assemblies air sealed to prevent infiltration from exterior (assuming no attic space is needed) and from interior conditioned spaces
- Roof assemblies to meet wind uplift requirements called out in specifications and for site conditions

- **Walls:**

- Meet requirements of Specification Section 074000 'Wall Cladding'
- Framing, cladding, and cladding supports/support system shall meet seismic and drift requirements of Specification Section 014600 'Seismic Design Requirements For Nonstructural Elements'
- Use weather barriers (WRB) meeting Specification Section 072500 'Weather Barriers'

- Meet applicable LEED credit criteria for energy performance, low-emitting/recycled/regional materials, etc. (for credits selected for project LEED certification)
 - Meet applicable prescriptive or performance compliance requirements of the California Energy Code
 - Wall Assemblies to have a maximum weighted average U-factor not to exceed 0.105
- **Vertical Fenestration/Glazing:**
 - Meet requirements of Specification Section 084113 'Glazed Aluminum-Framed Assemblies'
 - Meet requirements of Specification Section 088000 'Glazing'
 - Glazing and glazed assemblies to meet seismic and drift requirements of Specification Section 014600 'Seismic Design Requirements For Nonstructural Elements'
 - Design glazing and glazed assemblies to minimize the possibility of glass fall-out after a design seismic earthquake for both safety and to maintain integrity of building envelope
 - Meet applicable LEED credit criteria for energy performance, thermal comfort, daylighting and views, low-emitting/recycled/regional materials, etc. (for credits selected for project LEED certification)
 - Meet applicable prescriptive or performance compliance requirements of the California Energy Code
 - Glazing and glazed assemblies to have a maximum air infiltration rate of 0.3 cfm/ft²
 - Design and place glazed assemblies to limit solar heat gain
 - Maximize daylighting to daily-use interior spaces
- **Horizontal Fenestration/Glazing:**
 - Meet requirements of Specification Section 086300 'Metal-Framed Skylights'
 - Meet requirements of Specification Section 088000 'Glazing'
 - Glazing and glazed assemblies to meet seismic and drift requirements of Specification Section 014600 'Seismic Design Requirements For Nonstructural Elements'
 - Meet applicable LEED credit criteria for energy performance, thermal comfort, daylighting and views, low-emitting/recycled/regional materials, etc. (for credits selected for project LEED certification)
 - Meet applicable prescriptive or performance compliance requirements of the California Energy Code
 - Glazing and glazed assemblies to have a maximum air infiltration rate of 0.3 cfm/ft²
 - Design and place skylights/glazed horizontal assemblies to limit solar heat gain
 - Design and place skylights/glazed horizontal assemblies to meet OSHA fall protection requirements
 - Maximize daylighting to daily-use interior spaces; skylights are a good strategy to bring daylight into larger spaces and rooms/spaces away from exterior walls
- **Doors:**
 - Meet requirements of the following Specification Sections:

- 014600 'Seismic Design Requirements For Nonstructural Elements' for seismic and drift requirements.
 - 081113 'Hollow Metal Doors and Frames' for exterior hollow metal doors
 - 081200 'Acoustic Door and Frame Assemblies' for doors and glazed framing systems requiring an STC rating of 35 or higher.
 - 084113 'Glazed Aluminum-Framed Assemblies' for exterior entry doors
 - 084229 'Automatic Entrances' for ADA electronic door operators/openers
 - 087100 'Door Hardware and Hardware Schedule' for exterior door hardware and related access control/security requirements
 - 088000 'Glazing' for glass installed in doors
 - 281000 'Access Control and Intrusion Detection' for access control systems used on all exterior doors
- All typical hardware is to be commercial grade.
 - Interior Doors: Flush wood doors are assumed for most of the typical interior doors in office areas, dorm rooms, and main building circulation spaces. (Exceptions include utility/mechanical doors, main building entry doors, specialty doors, and doors with low visibility that are used for utility functions or that require a heavy-duty metal door for durability).
 - Meet applicable LEED credit criteria for energy performance, thermal comfort, low-emitting/recycled/regional materials, etc. (for credits selected for project LEED certification)
 - Meet applicable prescriptive or performance compliance requirements of the California Energy Code
 - Exterior Door assemblies to have a maximum air infiltration rate of 0.3 cfm/ft² (single-leaf swinging and sliding) or 1.0 cfm/ft² (swinging double doors)
 - All exterior doors will require access control hardware – Specification Section 087100 'Door Hardware' describes access control requirements for *typical* exterior (and interior) doors anticipated for this project. Actual access control requirements may vary, depending on the DBE actual design.
 - All exterior access doors are required to be ADA/accessibility – compliant. This includes the doors, hardware, thresholds, door operation, approaches to doors, and required door clearances.
- **Insulated Floors/Slabs-on-grade:**
 - For floor assemblies or slabs-on-grade that separate conditioned spaces from unconditioned spaces or the ground, meet requirements of the following Specification Sections:
 - 033000 'Cast-In-Place Concrete' for concrete floors and slabs, including vapor retarders
 - 071413 & 071416 'Fluid Applied Waterproofing' for floor and slab assemblies requiring applied waterproofing to prevent water intrusion
 - 07147 'Foundation Waterproofing' for slabs in ground contact and not isolated from ground by a vapor retarder

- Meet applicable LEED credit criteria for energy performance, thermal comfort, low-emitting/recycled/regional materials, etc. (for credits selected for project LEED certification)
- Meet applicable prescriptive or performance compliance requirements of the California Energy Code (CALGreen)
- Raised Mass Floors: Minimum 3 inches of lightweight concrete over metal deck or have a maximum weighted average U-factor not to exceed 0.269
- Other Floors: Have a maximum weighted average U-factor not to exceed 0.071
- Heated Slab Floors: Meet Section 110.8(g) mandatory requirements of California Energy Code (CALGreen)

INTERIOR DESIGN AND MATERIALS

All interior finishes and fixtures shall strive to obtain the highest practicable LEED points within their respective categories. Interior materials will consist of durable, commercial grade products complying with local and state codes, standards and regulations to include mandatory CALGreen measures.

- General flooring: materials will range from tile floors, resilient tile flooring, resilient sheet flooring and carpet tile. Floor base will be resilient, wood, or tile. See specifications for specific criteria.
- Typical interior walls and partitions: consist of wood or metal stud framing with gypsum wall board assemblies and a paint finish.
 - Additional surface-applied wall finish materials may include wood wall paneling, commercial wall tile, decorative wall coverings and protective wall coverings.
 - Wall, floor and ceiling STC ratings classified by ASTM E143 will be used to provide the desired level of acoustic separation desired by the County and to meet CALGreen requirements (STC = 40 min for interior).
- Ceilings: acoustic suspended panels, fiberglass suspended panels, acoustic plaster and/ or gypsum wall board with paint finish. Appropriate paint finishes range from washable eggshell in lobby and corridors to scrubable semi-gloss in kitchen and utility areas.
- Cabinetry: plastic laminate or wood veneer with countertops of plastic laminate, solid surface or simulated stone.
- Additional materials and products: include stainless steel toilet partitions and restroom accessories, horizontal louver blinds, tempered glass guardrails, resilient stair treads/risers and steel guardrails, carpet walk off mats, rubber walk off mats and sealed concrete.
- Horizontal louver blinds and roller shades will be utilized for solar/ glare control as well as privacy.
- Light fixtures to be commercial grade and energy efficient.
- Furniture, Fixtures and Equipment (FF&E): Not in Contract (NIC).

Mechanical Rooms will require high sound and vibration control, to minimize transmission to nearby occupied rooms and spaces.

Interior Design and Materials are further described in the following specification divisions:

- Division 01 for LEED, Indoor air quality, Non-structural seismic requirements
- Division 05 for metal interior fabrications, metal interior stairs, pipe and tube railings, and misc. decorative metal
- Division 06 for finish carpentry, casework, decorative wood stairs/handrails or paneling, and FRP plastic wall panels
- Division 07 for sealants, firestopping, and fire-resistive joint systems
- Division 08 for interior doors, door hardware, access doors, interior storefront systems, interior acoustic glazed frames, mirrors, security glazing, and typical interior glazing
- Division 09 for interior finishes, wall framing, and paint/coatings
- Division 10 for interior specialty products and equipment
- Division 11 for projection screens
- Division 12 for interior blinds, countertops, floor mats and grilles

Structural Design

Overview

The DBE will need to design a structural system that meets the requirements of this design narrative in combination with the performance-based specifications and preliminary programming documents.

The Skylonda Fire Station must remain immediately operational in the event of extreme environmental loading from flood, wind, and earthquakes. This requirement applies to all building systems including, but not limited to: structural, HVAC, plumbing, power, lighting, telecom and communications systems. Accordingly, the Skylonda Fire Station is considered an Essential Facility and is classified as a Risk Category IV building as defined by ASCE 7-10. The structural design of the building must consider the performance of the building in the event of extreme environmental loading. Therefore, the allowable lateral force resisting systems have been limited to those explicitly listed in this narrative. Structural anchoring and bracing of nonstructural building systems and components will be required, and may fall under the structural engineering scope, per the DBE discretion.

Structural Codes and Standards

The primary codes and standards governing structural design include, but are not limited to, the following:

CODES

- CBC (Current Edition): California Building Code; all applicable Title 24 requirements – including the new energy code requirements.

STANDARDS

- ASCE/SEI 07-10: Minimum Design Loads for Buildings and Other Structures.
- FEMA 543: Design Guide for Improving Critical Facility Safety from Flooding and High Winds.
- AISC 360: Specification for Structural Steel Buildings
- AISC 341: Seismic Provisions for Structural Steel Buildings
- ACI 318: Building Code Requirements for Structural Concrete and Commentary
- AWS D1.1: Structural Welding Code
- AWS D1.4: Structural Welding Code – Reinforcing Steel
- AWS D1.8: Structural Welding Code - Seismic Supplement
- CRSI: Concrete Reinforcing Steel Institute

Design Approach

FOUNDATION

The foundation system must be selected to support the structure under both gravity loads and extreme environmental loading such as earthquakes. Reference the County-supplied geotechnical report for recommendations for foundation type and design criteria. Address all hazards identified in the geotechnical report including potential liquefaction, soil strength loss, and surface displacement due to faulting or seismically induced lateral spreading or lateral flow.

The design of the foundations of the building must allow the building to remain operational after a seismic event by addressing the consequences from liquefaction and soil strength loss, such as:

- Total and differential settlement
- Lateral soil movement
- Lateral soil loads on foundations
- Reduction in foundation soil-bearing capacity and lateral soil reaction
- Increases in soil lateral pressures on retaining walls

One option is a partial basement beneath the building. Underground portions of the structure shall be designed per the County-supplied geotechnical report, including surcharge loading where appropriate. All below grade portions of the structure will require adequate waterproofing, where applicable, to prevent ground water intrusion, including appropriate concrete mix design and concrete joint design. Design of basement floors and similarly approximate horizontal elements below grade shall be designed for the lateral and upward pressure of water, where applicable per the geotechnical report.

GRAVITY SYSTEM

The gravity framing system of the building shall be designed to meet all applicable codes and standards.

LATERAL SYSTEM

Given the Skylonda Fire Station is located in a very high seismic area, the design of the lateral system is of critical importance. Per the geotechnical report, the Skylonda Fire Station is located in Site Class C. The mapped spectral response acceleration parameter at a one second period, S_1 , is greater than 1.09. Therefore, the structure is expected to be in Seismic Design Category D. See County supplied geotechnical report for additional information.

To reliably achieve the desired seismic performance of the building, the following types of irregularities as defined by ASCE 7 Table 12.3-1 and Table 12.3.2 are not allowed:

- Extreme Torsional Irregularity
- Stiffness– Soft Story Irregularity
- Stiffness– Extreme Soft Story Irregularity
- Discontinuity in Lateral Strength – Weak Story Irregularity
- Discontinuity in Lateral Strength – Extreme Weak Story Irregularity

Additionally, all other irregularities as defined by ASCE 7 Table 12.3.1 and Table 12.3.2 will be carefully considered in the design to prevent excessive damage to a gravity load carrying element that could prevent the continued occupancy of the building.

The lateral force resisting system of the building shall be designed to meet all applicable codes and standards. Tie-downs shall be used to resist shear wall uplift forces. The foundation shall be designed to carry all gravity and seismic loads.

SEISMIC DESIGN OF NONSTRUCTURAL ELEMENTS

The Skylonda Fire Station will contain infrastructure of architectural, mechanical, electrical, plumbing, and telecommunication systems. Elements of these systems that are critical to the continued operation of the facility must be seismically anchored or braced. Additionally, special seismic certification may be required for some of these elements. Seismic design requirements for nonstructural elements are defined in the Specifications. These requirements include design criteria, definition of critical components, and submittal requirements. A structural engineer registered in the State of California shall prepare, stamp, and sign all required structural drawings and calculations.

Structural Design Criteria

DEAD LOADS

Vary based on actual building and equipment operating weights

LIVE LOADS

Per Chapter 4 of ASCE 7-10

SEISMIC LOADS

See County-supplied geotechnical report for Site Class and other seismic design parameters

WIND LOADS

Per Chapters 26-31 of ASCE 7-10

SNOW LOADS

Per Chapter 7 of ASCE 7-10

RAIN LOADS

Per Chapter 8 of ASCE 7-10

FLOOR DEFLECTION CRITERIA

Per Chapter 16 of the current CBC

STORY DRIFT – LATERAL SYSTEM

The recommended story drift shall not exceed 75% of the values allowed by ASCE 7-10 Table 12.2-1

Barracks/Office - Space Requirements

General

The building spaces can be grouped into the following three sub categories as described in the Building Space Program:

- Administrative and Training spaces should be adjacent to the main building entry lobby for limited public use.
- Residential and Living spaces are solely for use by the fire station personnel, and the Dorm Rooms and Restroom/Showers should be collocated and physically segregated from the Administrative and Training spaces, and from other spaces likely to generate excessive noise (Kitchen/Dining, Day Room, etc.).
- Building Services spaces should be located for efficient connection to site utilities and equipment, and to minimize construction costs associated with the internal distribution of systems within the building.

Below are listed specific requirements for programmatic elements (rooms/spaces) within the building. These descriptions are intended to highlight specific design criteria and requirements for the program elements of this project and work in conjunction with the provided specifications and programming documents.

Building Circulation: General

General/common building circulation is listed as an efficiency factor on the programming spreadsheets (Building Common Space) as well as part of a contingency factor for the overall building, since circulation will be highly dependent on the building layout and site constraints for the facility.

Administrative and Training Areas: (Entry Lobby)

The entry lobby area can be considered to be the 'Public Entry Area' for the Barracks/Office. This is an important component of the building and serves several functions:

- Primary building entry for fire station personnel
- Building entry for all visitors
- Public face of building to the community
- Controlled access point between the public use spaces of the building and the areas beyond for sole use of the fire station personnel
- Location for building security and surveillance
- Location for the display of fire station memorabilia, public information announcements, etc.
- Access to interior stairway connecting levels

The following programming and performance criteria are applicable:

- **Architectural**
 - Tall ceiling height
 - Access to natural daylight
 - Solar/ glare reducing shades if windows do not face north
 - Wood wall base
 - Wood veneer casework for fire station memorabilia and public information announcements
 - Painted wood wainscot paneling or similar wall finish
 - Resilient sheet flooring
 - Egg-shell gyp. bd. wall paint finish
 - Acoustical insulation and high STC wall assemblies to minimize noise to/from surrounding rooms
 - Sound absorbing, light reflective acoustic suspended ceiling system
 - Interior blinds/ shades for privacy
 - CalFire Signage – wall-mounted
 - All glazing to be tempered
 - All doors & windows to be thermally broken w/ insulated glazing
 - Auto door operator and ADA buttons for at least one leaf per set of doors
 - Entry floor mats (LEED IEQc5)
 - Meet egress requirements
 - Fully ADA/accessible
- **FFE**
 - None
- **Mechanical/Plumbing**
 - Fully conditioned and sprinklered; factor in ceiling height
- **Electrical**

- High efficiency LED lighting/controls for high volume space
- Lighting for any specialty signage
- Typ. wall power receptacles
- Additional power receptacles as needed for equipment
- Power for access control and door hardware
- See Technology for additional info
- **Technology**
 - Security Camera outside of main entry
 - Intercom from main entry
 - Coordinate security system requirements, as specified or required

Administrative and Training Areas: (Offices)

Private offices are required for the Fire Captain, Battalion Chief, Engineer and Medical Officer. See the programming spreadsheet for size requirements. All offices are to be located in close proximity to each other and the Entry Lobby.

Enclosed offices in general will have access to natural daylight and have clear sightlines to the existing Apparatus Building. The internal office arrangement will vary depending on its specific use and requirements, but will generally follow County standards for the County Government Center. The following are typical requirements for private offices:

- **Architectural**
 - Access to natural daylight
 - Acoustical insulation and high STC wall assemblies to minimize noise to/from surrounding rooms
 - Resilient wall base
 - Sound absorbing, light reflective acoustic suspended ceiling system
 - Carpet tile flooring
 - Egg-shell wall paint finish
 - Glazed frames (relites) for visual connection to adjacent corridor
 - Interior blinds/shades for privacy
 - Solar/ glare reducing blinds/shades
 - Fully ADA/accessible
 - See Division 08-12 Specifications for interior material and component requirements
- **FFE**
 - None
- **Mechanical/Plumbing**
 - Fully conditioned and sprinklered
- **Electrical**
 - Suspended ceiling system integrated lighting per IESNA

- Typ. wall power receptacles along wall base
- Additional power receptacles needed for any specialty equipment
- At each desk: (4) power plugs w/ (1) on UPS; via power/data wall outlets
- See technology for additional info
- **Technology**
 - Min (2) data per room; via power/data wall outlets
 - Min. (1) Wall mounted telephone outlets
 - Paging Speakers
 - Coordinate security system requirements, as specified or required

Administrative and Training Areas: (Conference/Training)

A Conference/Training Room is required for use by the fire-station personnel, and may occasionally be utilized for community events. See the programming spreadsheet for size requirements. The Conference/Training Room shall be located in close proximity to the Offices and the Entry Lobby.

The Conference/Training Room shall have access to natural daylight. The internal arrangement will vary depending on its specific use and requirements, but will generally follow County standards for the County Government Center. The following are typical requirements for Conference/Training Rooms:

- **Architectural**
 - Access to natural daylight
 - Acoustical insulation and high STC wall assemblies to minimize noise to/from surrounding rooms
 - Resilient wall base
 - Sound absorbing, light reflective acoustic suspended ceiling system
 - Carpet tile flooring
 - Egg-shell wall paint finish
 - Glazed frames (relites) for visual connection to adjacent corridor
 - Interior blinds/shades for privacy
 - Solar/ glare reducing blinds/shades
 - Fully ADA/accessible
 - See Division 08-12 Specifications for interior material and component requirements
- **FFE**
 - None
- **Mechanical/Plumbing**
 - Fully conditioned and sprinklered
- **Electrical**
 - Interior lighting with dimming capability per IESNA
 - Lighting for any specialty signage
 - Typ. wall power receptacles

- Flush recessed floor box with power receptacles at conference table
- Additional power receptacles as needed for equipment
- See technology for additional info
- **Technology**
 - Min (2) power/data/coax wall outlets for video monitors
 - Flush recessed floor box with tel/data ports at conference table
 - Paging Speakers
 - Coordinate access control and security system requirements, as specified or required

Administrative and Training Areas: (General Admin. Storage + Copy/Print)

The General Admin. Storage + Copy/Print Room will be utilized for storage of office supplies and shall accommodate a photocopier/scanner and networked printers. Countertop workspace shall be provided to accommodate a desktop printer and to support general workflow and processes for collating documents, preparing packages and documents for courier distribution, mail sorting, etc. See the programming spreadsheet for size requirements. The room shall be located in close proximity to the Offices and the Conference/Training Room.

The internal arrangement will vary depending on its specific use and requirements, but will generally follow County standards for the County Government Center. The following are typical requirements:

- **Architectural**
 - Sound absorbing, light reflective acoustic suspended ceiling system
 - Acoustical insulation and high STC wall assemblies to minimize noise to/from surrounding rooms
 - Plastic laminate cabinets
 - Plastic laminate countertops
 - Resilient wall base
 - Carpet tile flooring
 - Egg-shell wall paint finish
 - Fully ADA/accessible
 - See Division 08-12 Specifications for interior material and component requirements
- **FFE**
 - Seismic anchoring of FF&E
 - Copier and equipment (by County)
- **Mechanical/Plumbing**
 - Fully conditioned and sprinklered; venting to meet LEED IEQc5 requirements
 - NFPA 13 wet pipe fire sprinkler system
- **Electrical**
 - Suspended ceiling system integrated lighting per IESNA
 - Typ. wall power receptacles along wall base and countertops

- Additional power receptacles needed for office and specialty equipment – coordinate room requirements with County
- See technology for additional info
- **Technology**
 - Paging speaker
 - Min (4) data per room; via power/data wall outlets
 - Min. (1) Wall mounted telephone outlet
 - Additional data for office and specialty equipment – coordinate room requirements with County

Administrative and Training Areas: (Storage)

The Storage Room is for storage of equipment, office and cleaning supplies, and furniture (FF&E) to accommodate the multi-use function of the Conference/Training Room. It is recommended that two Storage Rooms be provided; one for the equipment, office and cleaning supplies, and one for the furniture (FF&E). Coordinate room sizes and requirements with the County, building design, and selected FF&E used for the Conference/Training Room. The following are typical requirements for Storage Rooms:

- **Architectural**
 - Gypsum hard-lid ceiling
 - Resilient wall base
 - Carpet tile flooring
 - Egg-shell wall and ceiling paint finish
 - See Division 08-12 Specifications for interior material and component requirements
- **FFE**
 - Metal storage shelving racks
 - Seismic anchoring of FF&E
 - See Storage Shelving Specification for additional info.
- **Mechanical/Plumbing**
 - Fully conditioned and sprinklered
- **Electrical**
 - Utility grade lighting w/ protective cages; Adequate lighting for code-compliance, safety and maintenance per IESNA
 - Typ. wall power receptacles along wall base
 - See technology for additional info
- **Technology**
 - Coordinate access control and security system requirements, as specified or required

Administrative and Training Areas: (Uni-Sex Restroom)

The Uni-Sex Restroom will be used by the fire station personnel and visitors, and shall be located in centralized area for easy access from all spaces. The following are typical requirements for the Uni-Sex Restroom:

- **Architectural**
 - Fully ADA/accessible, including all equipment
 - Privacy glazing where windows occur
 - Acoustical insulation and high STC wall assemblies to minimize noise to/from surrounding rooms
 - Wall mounted mirror
 - Moisture resistant gypsum wall board and ceiling
 - Porcelain tile flooring, walls and wall base
 - Semi-gloss wall and ceiling paint finish
 - Stainless steel toilet accessories
- **FFE**
 - None
- **Mechanical/Plumbing**
 - Fully conditioned and sprinklered; venting for restrooms
 - Commercial grade floor-mounted toilets – low flow
 - Commercial grade touch-less faucets – low flow
 - Commercial grade touch-less soap dispenser
 - Commercial grade sinks
 - High efficiency, low noise hand dryers – meet energy code
- **Electrical**
 - Recessed lighting per IESNA
 - Convenience GFCI receptacles at sink/counters
- **Technology**
 - Paging speakers
 - Coordinate access control and security system requirements, as specified or required

Residential and Living Areas: (Day Room)

The Day Room is used by the fire station personnel for passive recreational activities and informal meetings. See the programming spreadsheet for size requirements. The Day Room shall be located in close proximity to the Kitchen and Dining Rooms and should be segregated from the Dorm Rooms.

The Day Room shall have access to natural daylight. The internal arrangement should allow for a variety of seating configurations to accommodate passive recreational activities such as watching television, playing cards, and reading. The following are typical requirements for the Day Room:

- **Architectural**

- Access to natural daylight
- Acoustical insulation and high STC wall assemblies to minimize noise to/from surrounding rooms
- Painted wood wainscot paneling or similar wall finish
- Wood wall base
- Gypsum hard-lid ceiling
- Carpet tile flooring
- Egg-shell wall paint finish
- Solar/ glare reducing blinds/shades
- See Division 08-12 Specifications for interior material and component requirements
- **FFE**
 - None
- **Mechanical/Plumbing**
 - Fully conditioned and sprinklered
- **Electrical**
 - Interior lighting with dimming capability per IESNA
 - Lighting for any specialty signage
 - Typ. wall power receptacles
 - Additional power receptacles as needed for equipment
 - See technology for additional info
- **Technology**
 - Min (2) power/data/coax wall outlets for video monitors
 - Cable TV
 - Paging Speakers
 - Wall phone
 - Coordinate access control and security system requirements, as specified or require

Residential and Living Areas: (Dorm Rooms)

The Dorm Rooms are used by the fire station personnel for sleeping accommodations and the storage of personal items. Two sizes of Dorm Room are to be provided; a one-bed and two-bed configuration. See the programming spreadsheet for size requirements. The Dorm Rooms shall be located in close proximity to the Restroom/Showers, and should be segregated from the Administrative and Training Areas and the Kitchen/Dining and Day Room.

The Dorm Rooms shall have access to natural daylight. The internal arrangement should allow for a bed, desk, night table and three lockable/vented wardrobe cabinets per bed for storage of clothes, shoes and personal items. The following are typical requirements for the Dorm Rooms:

- **Architectural**
 - Access to natural daylight

- Acoustical insulation and high STC wall assemblies to minimize noise to/from surrounding rooms
- Resilient wall base
- Sound absorbing, light reflective acoustic suspended ceiling system
- Carpet tile flooring
- Egg-shell wall paint finish
- Solar/ glare reducing blinds/shades
- See Division 08-12 Specifications for interior material and component requirements
- **FFE**
 - Lockable/vented wood veneer wardrobe cabinets
- **Mechanical/Plumbing**
 - Fully conditioned and sprinklered
- **Electrical**
 - Interior lighting per IESNA
 - Typ. wall power receptacles
 - Additional power receptacles as needed for equipment
 - See technology for additional info
- **Technology**
 - Min (2) power/data/coax wall outlets for video monitors
 - Paging Speakers
 - Coordinate access control and security system requirements, as specified or require

Residential and Living Areas: (Kitchen/Dining)

The Kitchen/Dining Room is used by the fire station personnel to prepare meals and for communal dining. See the programming spreadsheet for size requirements. The Kitchen/Dining Room shall be located adjacent to the Pantry, and in close proximity to the Day Room, and should be segregated from the Dorm Rooms.

The Kitchen/Dining Room shall have access to natural daylight and have clear sightlines to the existing Apparatus Building. The internal arrangement should accommodate communal seating for a minimum of eight. The following are typical requirements for the Kitchen/Dining Room:

Size cabinetry for bulk storage and design the Kitchen to accommodate commercial grade equipment (e.g. multi-pot coffee maker). Appliances will be stainless steel, electric and high-end residential or light commercial grade to support production of large volume meals (during activations).

- **Architectural**
 - Access to natural daylight
 - Plastic laminate cabinets
 - Acoustical insulation and high STC wall assemblies to minimize noise to surrounding rooms

- Moisture resistant gypsum wall board and ceiling
- Resilient wall base
- Resilient floor tile
- Satin wall and ceiling paint finish
- Stainless steel commercial grade appliances
- Solar/ glare reducing shades
- Solid surface countertops
- Fully ADA/accessible
- **FFE**
 - See Appliance specification
- **Mechanical/Plumbing**
 - Fully conditioned and sprinklered; venting for general kitchen
 - Cooktop range to have commercial hood for venting
 - Full plumbing to support kitchen function, including equipment connections
 - Kitchen sink and water supply connections to appliances including dishwasher, coffee maker and ice maker
 - Floor drain
- **Electrical**
 - Recessed lighting for kitchen function with dimming capability
 - Typ. wall power receptacles
 - Dedicated circuits as required to minimize power interruptions
 - GFCI power receptacles on counters – assume (1) duplex every 3 feet
 - Additional power receptacles needed for kitchen equipment
 - See technology for additional info
- **Technology**
 - Paging Speakers
 - Power/data wall outlets as specified or required for equipment (e.g. flat-panel television, PC)
 - Cable TV
 - Wall phone

Residential and Living Areas: (Fitness)

The Fitness Room is used by the fire station personnel for active recreational activities. See the programming spreadsheet for size requirements. The Fitness Room shall be located in close proximity to the Restroom/Showers.

Access to natural daylight is desirable. The internal arrangement should accommodate a variety of exercise equipment and free-weights, and include space for matt exercises. The following are typical requirements for the Fitness Room:

- **Architectural**
 - Access to natural daylight
 - Acoustical insulation and high STC wall assemblies to minimize noise to surrounding rooms
 - Sound absorbing, light reflective acoustic suspended ceiling system
 - Resilient wall base
 - Resilient floor tile
 - Egg-shell wall paint finish
 - Glazed frames (relites) for visual connection to adjacent corridor
 - Solar/ glare reducing shades
 - See Division 08-12 Specifications for interior material and component requirements
- **FFE**
 - Full-height mirrors along one wall
- **Mechanical/Plumbing**
 - Fully conditioned and sprinklered
 - Provide exhaust
- **Electrical**
 - Suspended ceiling system integrated lighting per IESNA
 - Typ. wall power receptacles
 - Additional power receptacles needed for exercise equipment
 - See technology for additional info
- **Technology**
 - Paging Speakers
 - Power/data wall outlets as specified or required for equipment (e.g. exercise machines, flat-panel television)
 - Cable TV
 - Wall phone

Residential and Living Areas: (Laundry)

See the programming spreadsheet for size requirements. The Laundry Room shall be located in close proximity to the Restroom/Shower and Dorm Rooms.

The internal arrangement should accommodate a minimum of three washing machines and three dryers, with space for a work counter or table for folding clean clothes and bed linens. Wall-mounted vinyl coated wire-rack shelving shall be provided for clean bed linens and laundry cleaning supplies. The following are typical requirements for the Laundry Room:

- **Architectural**
 - Acoustical insulation and high STC wall assemblies to minimize noise to surrounding rooms
 - Sound absorbing, light reflective fiberglass panel suspended ceiling system
 - Resilient wall base
 - Resilient floor tile
 - Egg-shell wall paint finish
 - See Division 08-12 Specifications for interior material and component requirements
- **FFE**
 - None
- **Mechanical/Plumbing**
 - Fully conditioned and sprinklered
- **Electrical**
 - Suspended ceiling system integrated lighting
 - Typ. wall power receptacles
 - Additional power receptacles needed for equipment
 - See technology for additional info
- **Technology**
 - Paging Speakers
 - Power/data wall outlets as specified or required for equipment (e.g. washing & drying machines)

Residential and Living Areas: (Restroom/showers)

These areas include separate Men's & Women's Restrooms/showers located adjacent the Dorm Rooms. The Men's Restroom/shower shall include a minimum of three shower stalls, three urinals, three toilet stalls, and three sinks. The Women's Restroom/shower shall include a minimum of one shower stall, one toilet stall, and two sinks. The following are typical requirements for the Restroom/showers:

- **Architectural**
 - Fully ADA/accessible, including all equipment
 - Privacy glazing where windows occur
 - Acoustical insulation and high STC wall assemblies to minimize noise to/from surrounding rooms
 - Wall mounted mirrors
 - Moisture resistant gypsum wall board and ceiling
 - Porcelain tile flooring, walls and wall base
 - Semi-gloss wall and ceiling paint finish
 - Stainless steel toilet partitions
 - Stainless steel toilet accessories
 - Simulated stone countertops

- **FFE**
 - None
- **Mechanical/Plumbing**
 - Fully conditioned and sprinklered; venting for restrooms
 - Commercial grade floor-mounted toilets – low flow
 - Commercial grade urinals – low flow
 - Commercial grade touch-less faucets – low flow
 - Commercial grade touch-less soap dispenser
 - Commercial grade sinks
 - High efficiency, low noise hand dryers – meet energy code
 - Floor drains and water spigot for janitorial
- **Electrical**
 - Recessed lighting per IESNA
 - Convenience GFCI receptacles at counters
- **Technology**
 - Paging speakers
 - Coordinate access control and security system requirements, as specified or required

Building Services Areas

Building Service Areas include the HVAC equipment room, Electrical room, IT Room, and Janitor Closet. These rooms, their size, location and requirements will depend on the building design and building systems selected by the Design-Build Entity. Because of this, general size and room requirements are given for these areas. The Design-Build Entity will be responsible for providing final design and construction that meets specification and code requirements.

Building Services Areas: (Mechanical)

Interior space has been allocated to the HVAC equipment, and it would be ideal to locate as much of this equipment within the building for optimal protection, operation, and durability. The following are some general room requirements:

- **Architectural**
 - Locate for proper positioning of intake louvers (away from ground, protected from public)
 - Locate for proper adjacencies to other support/utility rooms to meet code, performance and building requirements
 - Adequate clearance for maintenance of equipment
 - Door sizing for code-compliant egress and to accommodate equipment servicing and replacement
 - Acoustic and vibration isolation measures required for room and equipment
 - Min STC 50 wall, floor, ceiling assemblies in addition to sound/vibration isolation
 - Epoxy coated flooring

- Fire rated enclosures, as specified or required by code
- **FFE**
 - As specified or required for code, maintenance, or function
 - Seismic anchoring of FF&E
- **Mechanical/Plumbing**
 - Fully conditioned and sprinklered, as specified or required by code
 - Provide minimum 2-inch diameter water service for any make-up water
 - Floor drains, where required for equipment, function, maintenance
 - See Division 23 Specifications
- **Electrical**
 - Adequate lighting for code-compliance, safety and maintenance per IESNA
 - Meet NEC 708 requirements
 - See Division 26 Specifications
 - See technology for additional info
- **Technology**
 - Wall phone
 - Provide data drops as required by equipment
 - See Division 27-28 Specifications
 - Coordinate access control and security system requirements, as specified or required

Building Services Areas: (Electrical)

The Electrical Room will have many of the considerations required and described for the Mechanical room (See Mechanical Room). A portion of the electrical equipment may be located at the exterior of the building in cabinets (e.g. switchgear) and other portions within the Mechanical Room.

- **Architectural**
 - See Mechanical Room for similar requirements
- **FFE**
 - See Mechanical Room for similar requirements
- **Mechanical/Plumbing**
 - See Mechanical Room for similar requirements
- **Electrical**
 - See Mechanical Room for similar requirements
 - NEC 708 requires specific conduits and wiring for power systems
- **Technology**
 - See Mechanical Room for similar requirements

Building Services Areas: (IT Room)

The IT Room contains the IT/telecom and radio/dispatch systems equipment for the facility. It is the location where primary connections to incoming telecommunication utilities are made. Further coordination with the County will be required by the DBE to clarify system requirements. The following describes the major design components required for the IT Room:

- **Architectural**
 - Walls: Fire treated plywood sheathing with intumescent paint finish
 - Resilient wall base
 - Electrostatic dissipative resilient flooring
 - Open ceiling
 - Ceiling-hung conduit/cable trays to equipment racks/cabinets
 - Air sealed from rest of building
- **FFE**
 - Floor- and wall-mounted open equipment racks
 - Seismic anchoring of FF&E
- **Mechanical/Plumbing**
 - All HVAC systems located in IT Room require separate room air conditioning via N+1 redundant CRAC units
 - No wet plumbing systems/piping within or above room – isolate from water intrusion
- **Electrical**
 - Utility grade lighting w/ protective cages; Adequate lighting for code-compliance, safety and maintenance per IESNA
 - Power with full generator and UPS back-up
 - R56 grounding of room and equipment
 - See Division 26 Specifications
 - See technology for additional info
- **Technology**
 - Paging speaker
 - Wall phone
 - Coordinate access control and security system requirements, as specified or required
 - See 'Technology and Communications Design' section for additional information
 - See Division 27 & 28 Specifications

Building Services Areas: (Janitor Closet)

A Janitor Closet shall be provided to support facility maintenance requirements. The Janitor Closet shall be designed for utility and durability. The room must be air sealed from the rest of the building and meet LEED IEQc5 Indoor Chemical and Pollutant Source Control requirements.

- **Architectural**
 - Resilient sheet flooring
 - Air sealed from building, including at doors
 - Fiber-reinforced plastic (FRP) wall paneling
 - Resilient wall base
 - Semi-gloss wall and ceiling paint finish
 - Wall and door protection
 - Stainless steel janitorial shelving and accessories
 - Heavy duty doors and hardware
- **FFE**
 - None
- **Mechanical/Plumbing**
 - Fully conditioned and sprinklered; venting ,if needed, to meet LEED IEQc5 requirements
 - Floor drain
 - Mop sink
- **Electrical**
 - Utility grade lighting w/ protective cages
 - GFCI power receptacles for janitorial and for any required equipment
- **Technology**
 - Coordinate access control and security system requirements, as specified or required

Technology and Communications Design

Applicable Codes and Standards

The primary codes and standards governing Technology and Communications design include, but are not limited to, the following:

CODES

- CBC (Current Edition): California Building Code; all applicable Title 24 requirements – including the new energy code requirements.

STANDARDS

- San Mateo County ISD – Telecommunication Guidelines Version 2.4: Guidelines for the Design of Telecommunication Infrastructure for San Mateo County Facilities
- NEC Article 708: Critical Operations Power Systems (COPS)
- FEMA 543: Design Guide for Improving Critical Facility Safety from Flooding and High Winds
- LEED NC – BC+D: Building will comply with County of San Mateo ‘Sustainable Green Building Policy’
- NFPA 75: Standard for the Fire Protection of Information Technology Equipment
- IEC 62040-1-1/UL 1778: Standards for Uninterruptible power systems (UPS)

Technologies Systems

COMMUNICATIONS ROOMS AND PATHWAYS

Incoming cable terminations will be made in the IT room of the new Barracks Building, which will serve as the main point of entry (MPOE) for the telecommunications service of the new Barracks Building and the existing Apparatus Bay. ¾-inch by 4-foot by 8-foot fire rated plywood backboards will be provided on every wall in the IT room. The IT room will have a telecommunications ground bus bar with a copper ground to the main electrical panel and to building steel. Termination blocks will be wall mounted and will cross-connect with the PBX switch and distribute dial tone throughout the facility.

The existing Apparatus Building communication service is provided from the existing Call Center Building. Following completion of the new Barracks/Office Building the communication service for the existing Apparatus Building will require cut-over. This will require coordination with the local service provider to main existing communication services to the existing Apparatus Building during the cut-over period.

The building pathways within the new Barracks Building will consist of two 4-inch conduit from the IT room to the nearest service provider connection point.

Metallic 2-gang outlet boxes with single gang adapters with 1 inch metallic conduit/raceways to accessible ceiling space will be provided for routing and termination of voice, data and CATV cabling. Telecom locations will be based on Owner input. Raceway installed per ANSI/TIA/EIA-569-B standards.

COMMUNICATIONS CABLING

The copper backbone system will consist of multi-pair Category 3 copper cable terminated on patch panels, one pair per port. Multi-pair copper count to be coordinated with the Owner requirements for the new building.

The fiber optic backbone cabling will consist of multiple strand multimode and or single mode fiber optic cable and will run from the IT room to the telecommunication rooms/closets in the building. Fiber optic cables will terminate in rack-mounted fiber optic distribution units. Fiber optic connectors and bulkhead types shall be to the latest San Mateo County Telecommunication Guidelines.

Horizontal cabling is recommended to be Category 6. This cabling will be provided from the telecommunication rooms/closets to user outlets and other multimedia locations such as security cameras and wireless access points throughout the building. These cables will utilize a cable tray and j-hook support system in concealed ceiling spaces for distribution.

ELECTRONIC ACCESS CONTROL AND INTRUSION DETECTION

Electronic card key access will be provided at identified entry doors and any site gates that are secure. All exterior doors will be monitored via door position switches and CCTV. A keypad with and LCD display will be provided at the main entrance for arm/disarm operation as well as determining which doors are operational or not. Design and selection of the access control and intrusion detection systems will require coordination with the County so it is compatible with existing County systems.

Metallic single-gang outlet boxes with ½ -inch metallic conduit/raceways to accessible ceiling space will be provided for routing and termination of the security/access control cabling. Security/access control locations will be based on County input. Raceway installed per ANSI/TIA/EIA-569-B standards.

IP VIDEO SURVEILLANCE AND RECORDING

Additional security is provided via an IP Video Surveillance System. The system is comprised of a software platform for which the IT Team can either use to configure storage servers themselves, or a pre-configured storage server can be provided. IP-Based video surveillance cameras are designed at primary entry points and other designated areas for video capture. These cameras will be connected to the IT Infrastructure via Cat6 cables to the Server Room where the storage devices are recommended to be housed. Coordinate with the County for the quantity and location of surveillance monitors.

DBE to verify with County the requirements of any existing standards that may serve as the basis of design for this system. Training for programming and configuration of this system will also be required. The successful bidder will set up and program the system for fields of view, frames per second, bandwidth, and other features that create a robust and effective video capture technology.

INTERCOM/PAGING ADDRESS SYSTEM

The paging system will be designed to provide program distribution and all-call to speakers throughout and provide local amplification. Coverage will be included for the entire interior of both buildings as well as exterior areas as designated by the Owner. The system will be required to be interfaced to the telephone system for general paging from any telephone instrument. Design and selection of the notification systems will require coordination with the County so it is compatible with the existing County systems.

One inch metallic conduit/raceways will be provided for routing and termination of the Paging System. Speaker and volume control locations will be based on Owner input. Raceway installed per ANSI/TIA/EIA-569-B standards.

Electrical Design

Overview

The electrical, fire alarm, and lighting systems of the new building will be designed to meet current electrical, energy and green building codes. New equipment and systems will be selected with emphasis on energy efficiency, performance, and maintainability.

The final selection of the electrical, fire alarm, and lighting systems, their components and controls will be the responsibility of the DBE. Performance criteria for possible building electrical equipment, systems, and components are described in the Division 26 and 28 specifications. These specifications cover the most likely electrical and fire alarm equipment, systems, and components that will be used for the Barracks/Office Building. These specifications involve performance, energy efficiency, robustness, and quality requirements that are intended to meet code and County objectives for the facility. Alternate basis and manufactured equipment may be used, but the DBE must prove equivalency to the specification requirements.

- Energy Code and LEED
 - Electrical group of the DBE must work closely with the building design group to ensure building enclosure materials and their performance meets California Energy Code and the County of San Mateo 'Sustainable Green Building Policy'. Select materials, assemblies, and their placement so they meet applicable criteria and Energy performance.
 - Select lighting systems, components and controls to work in conjunction with the building envelope compliance for light pollution and controllability.
 - Use prescriptive or performance compliance approaches to meet energy code.
 - The electrical power distribution system is to be provided with metering, disaggregation of circuits, voltage drop, circuit controls for 120 volt receptacles, demand response controls and equipment, and an energy management control system (EMCS) in accordance with California Energy Code.
 - Any roof penetrations will be sealed at membrane penetrations and sealed with material and sealants that meet applicable LEED credit criteria for low-emitting/recycled/regional materials, etc.
 - Electrical group of the DBE will coordinate efforts for the locations and mountings for any solar components or future solar components. Meet mandatory requirements for Solar Ready Buildings per California Energy Code.

All electrical and lighting systems, components, and controls will strive to obtain optimum LEED points within their respective categories. Design for commercial grade products complying with local and state codes, standards and regulations to include mandatory CALGreen measures.

Applicable Codes and Standards

CODES

Applicable parts of the 2013 triennial edition of Title 24, California Code of Regulations (CCR) include:

- Part 2 – California Building Code (CBC)
- Part 3 – California Electrical Code (CEC)
- Part 6 – California Energy Code
- Part 9 – California Fire Code
- Part 11 – California Green Building Standards Code (CAL Green Code)

STANDARDS

Applicable NFPA (National Fire Protection Association) Codes and Standards include:

- 2011 NFPA 70 – National Electrical Code (NEC)
- 2013 NFPA 70B – Recommended Practice for Electrical Equipment Maintenance
- 2012 NFPA 70E – Standard for Electrical Safety in the Workplace
- 2013 NFPA 72 – National Fire Alarm and Signaling Code
- 2012 NFPA 101 – Life Safety Code
- 2013 NFPA 110 – Standard for Emergency and Standby Power Systems
- 2014 NFPA 730 – Guide for Premises Security
- 2010 NFPA 1620 – Standard For Pre-Incident Planning

Applicable NECA Codes and Standards

- LEED 2009
- UL Standards (Underwriters Laboratories)

Electrical Systems

POWER DISTRIBUTION

The main electrical power service for the new Barracks/Office Building shall be derived from a Pacific Gas & Electric service transformer with a secondary voltage at 120/208 volt, 3 phase, 4-wire. The PG&E

utility transformer shall be pad-mounted. Located within close proximity to the PG&E utility transformer shall be a main switchboard, rated at 400A and housed in a NEMA 3R enclosure. The 400A main switchboard will be provided with utility meter, main circuit breaker and a distribution section. Power will be distributed from the main switchboard to each building via underground feeders. In order to consolidate the electrical services for the site, the existing 225A, 120/240V, 3 phase, 4 wire PG&E service to the Apparatus Building will be removed and reconnected to the new main switchboard. Existing electrical panelboards serving the Apparatus Building will be replaced as part of the service upgrade to match new 120/208V, 3 phase, 4 wire electrical service. As part of the new construction, there are existing PG&E poles and overhead lines that may be need to be relocated. The new site entrance is located within close proximity of the existing PG&E poles. PG&E services to the existing buildings shall be maintained until the new Barracks/Office Building is constructed. The existing Barracks and Admin Office Buildings will be demolished and original PG&E service removed after full operation of the new Barracks/Office Building

Receptacles and circuiting shall be designed per requirements indicated on the Specific Design Criteria. AFCI and GFCI protection shall be provided for residential areas. A tap-out system shall be provided to serve the new Barracks/Office Building. Upon activation, the tap-out system shall energize lighting within the dorm rooms, hallways, lobby, kitchen, and offices/work areas and de-energize kitchen equipment.

The building distribution system shall be designed according to the 2013 California Energy Code Section 130.5, including but not limited to the following:

1. Disaggregation of electrical circuits: system shall permit the disaggregated measurement of electrical load energy uses downstream from the service meter according to Table 130.5-B. Additive and subtractive methods may be used to determine aggregate and disaggregated energy use.
2. Voltage drop: feeder conductors shall be sized for a maximum voltage drop of 2 percent at design load, branch circuit conductors shall be sized for a maximum voltage drop of 3 percent at design load.
3. Circuit controls for 120 volt receptacles: controls are to be provided in private offices, open offices, areas, reception lobbies, conference rooms, kitchens, and copy rooms, to automatically shut off task lighting and other plug loads when the area is not occupied.
4. Demand responsive controls and equipment: Demand responsive controls and equipment shall be capable of receiving and automatically responding to at least one standard based messaging protocol which enables demand response after receiving a demand response signal.

EMERGENCY POWER

The existing project site is supported by an existing emergency generator in a NEMA 3R enclosure, located between the Barracks and Admin Office Buildings. The emergency generator is rated at 80kW, 120/240V, 1 phase, 3 wire, with a 175 gallon sub-base fuel tank. Based on the size of the fuel tank, the

generator can provide approximately twenty-four hours runtime at 100% full load. The existing generator is less than 8 years old. However, the voltage rating is not compatible with the proposed new electrical service size for 120/208V, 3 phase, 4 wire. In addition, based on discussions with the local fire marshal, the new Barracks/Office Building will need to comply with the requirements of NEC Article 708 for Critical Operations Power Systems (COPS). Article 708 has electrical requirements that significantly impact the parameters for the emergency generator system. The emergency generator will need to support the electrical loads for the entire Barracks/Office Building, along with the existing emergency loads from the existing Apparatus Building. The emergency generator is also required to provide a minimum of seventy-two hours runtime at 100% full load. The following option may be considered by the DBE, subject to approval by the County:

1. Provide a new 125kW/156.3kVA generator. The new generator would be rated at 120/208V, 3 phase, 4 wire and sized to accommodate loads for the entire Barracks/Office Building and the majority of the Apparatus Building. Provide a minimum sub-base fuel tank size suitable to support seventy-two hours runtime at 100% full load. A new emergency distribution panel and associated branch circuit panelboards for the Apparatus Building and the Barracks/Office Building shall be provided. The new generator shall be installed within close proximity of the Main Switchboard. A new automatic transfer switch with bypass isolation shall be provided as part of the new construction for the Barracks/Office Building. The existing generator will be decommissioned and turned over to the County once normal service to the new Barracks/Office Building is online and the building is operational.

LIGHTING

Based on current Title 24 Code requirements, residential unit areas are required to have high-efficacy lighting, which typically consists of fluorescent or LED luminaires. It would be cost effective as part of the new construction to provide high-efficacy LED luminaires that have lower wattage, are more energy efficient, and require less maintenance and lamp replacement. Automatic lighting controls, such as the use of occupancy sensors for interior lighting, will achieve energy savings by shutting off luminaires in unoccupied spaces. 10-20% energy savings can be achieved through automatic shutoff of lighting in unoccupied spaces. For larger spaces with lots of daylight, daylight sensors can be provided to dim luminaires located near the daylight zones.

As part of the new construction, LED pole-mounted luminaires are recommended for illumination along the vehicular roadways and pedestrian walkways. LED or fluorescent luminaires are recommended for building-mounted lighting at entry areas. All exterior lighting will be controlled via photocell and lighting control panel.

New interior lighting shall consist of fluorescent and LED luminaires to comply with Title 24 requirements and achieve energy efficiency and cost savings. Residential occupancy areas such as kitchens, bathrooms, and dorm rooms shall be provided with high-efficacy luminaires. Non-residential areas shall be controlled via occupancy sensors or lighting control panel. Residential areas shall be controlled via manual controls or vacancy sensors. A tap-out system shall be provided to serve the new Barracks/Office Building. Upon activation, the tap-out system shall energize lighting within the dorm rooms, hallways, lobby, kitchen, and offices/work areas and de-energize kitchen equipment.

Fire Alarm Systems

An automatic, addressable, fire alarm system will be provided to meet the requirements of the adopted editions of the California Building Code (IBC with California Amendments), California Fire Code (IFC with California Amendments), NFPA 72 and the County of San Mateo.

The fire alarm system will provide system alarm, supervisory and trouble signal monitoring, and alarm notification for the building. A communicating transmitter will facilitate off-premises monitoring of the individual signals to a listed central station facility. The system will have batteries to provide a secondary power source in case of primary power loss to the control panel or any remote power supply.

Activation of system smoke detectors, manual pull stations, sprinkler water flow switches and suppression systems will initiate alarm signals on the fire alarm control panel (FACP) and fire alarm annunciator (FAA), and activate the audible and visible notification appliances throughout the building. Activation of sprinkler tamper switches, HVAC duct smoke detectors and Carbon Monoxide detectors will initiate supervisory signals, which will annunciate on the FACP and the FAA.

Automatic fire detection will be provided throughout the building. Manual pull stations will be provided at building exits. Combination smoke and carbon monoxide detectors, with integral audible sounder bases, will be provided within barracks dorm rooms. Audible and/or visible alarm appliances will be provided throughout the building.

Control outputs will be provided for fire safety functions, such as air handler shut down, fire smoke damper closure and fire door release.

Mechanical and Plumbing Design

Overview

The HVAC and Plumbing systems of the new building will be designed to meet current mechanical, plumbing, energy and green building codes. New equipment and systems will be selected with emphasis on energy efficiency, functionality and maintainability.

Because this building and its design will be strongly influenced by its performance requirements – particularly seismic and sustainability objectives—equipment, as well as their placement and attachment, must be selected to meet those objectives.

The final selection of the Mechanical and Plumbing systems, their components and controls will be the responsibility of the DBE. Performance criteria for possible building mechanical equipment, systems, and components are described in the Division 22 and 23 specifications. These specifications cover the most likely mechanical equipment, systems, and components that will be used for the Barracks/Office Building. These specifications involve performance, energy efficiency, robustness, and quality requirements that are intended to meet code and County objectives for the facility. Alternate basis and manufactured equipment may be used, but the DBE must prove equivalency to the specification requirements.

- Energy Code and LEED:
 - Mechanical group of the DBE must work closely with the building design group to ensure building enclosure materials and their performance meet California Energy Code and the County of San Mateo ‘Sustainable Green Building Policy’. Select materials, assemblies, and their placement so they meet applicable criteria and Energy Performance.
 - Select mechanical systems, components and controls to work in conjunction with the building envelope and external/internal sources of thermal loads and air contaminants.
 - Employ the use of partial and full economizing.
 - Project is located in Climate Zone 3, per California Energy Code.
 - Use prescriptive or performance compliance approaches to meet energy code.

All mechanical systems, components, and controls will strive to obtain optimum LEED points within their respective categories. Design for commercial grade products complying with local and state codes, standards and regulations to include mandatory CALGreen measures.

Applicable Codes and Standards

The primary codes and standards governing Mechanical and Plumbing design include, but are not limited to, the following:

CODES

Applicable parts of the 2013 triennial edition of Title 24, California Code of Regulations (CCR) include:

- Part 2 – California Building Code (CBC)
- Part 4 – California Mechanical Code (CMC)
- Part 5 – California Plumbing Code (CPC)
- Part 6 – California Energy Code
- Part 9 – California Fire Code
- Part 11 – California Green Building Standards Code

STANDARDS

- LEED NC – BC+D: Building will comply with the County of San Mateo ‘Sustainable Green Building Policy’
- NFPA 1221: Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems (current edition)
- NFPA 13: Standard for the Installation of Sprinkler Systems
- NFPA 72: National Fire Alarm and Signaling Code
- NFPA 75: Standard for the Fire Protection of Information Technology Equipment

Mechanical Systems

Below are mechanical system options for the Barracks/Office Building which may be considered by the DBE, subject to approval by the County.

- (Option 1) VRF/Heat Recovery with Fan Coils. Provide a Variable Refrigerant Flow and Heat Recovery system with individual Fan Coils mounted in each of the room spaces. Ventilation will be through the Heat recovery unit and may be supplemented by natural ventilation.
- (Option 2) VRF/Heat Recovery with Radiant Heating and Cooling Panels. Provide a Variable Refrigerant Flow and Heat Recovery system with radiant heating and cooling panels at each conditioned spaces. Ventilation will be through the Heat recovery unit and may be supplemented by natural ventilation
- (Option 3) Forced Air Furnace Heating System with natural ventilation. Provide a furnace system to heat the building and natural ventilation to cool the building during warm conditions.

VRF/Heat Recover with Fan coils to provide space heating & cooling

Commercial VRF Condensing Units: Provide (1) condensing unit per floor to be located on a pad located outdoors in close proximity to the building. VRF units shall provide heat recovery ability. Fan coils with outside air connections will serve individual rooms and each room will have temperature control. The IT room will have a 24/7 cooling only split system. All equipment shall be sized to meet the new heating and cooling load.

Commercial Kitchen: Kitchen hood exhaust duct will rise up thru the roof.

Residential Laundry room: Gas dryer vent duct with maximum 4" diameter up thru the roof. Combustion air intake louvers on laundry closet door/ wall provide required makeup air for dryer operation.

Bathroom Exhaust System: Each Restroom/Shower Room shall be provided with a ceiling mounted exhaust fan ducted through the roof for discharge.

Control System: DDC system to be provided by the VRF system manufacturer for mechanical system control and monitoring capability. Additional control of the radiant ceiling panels to be provided for temperature and humidity control.

VRF/Heat Recovery with Radiant Heating/Cooling Panels to provide space heating & cooling

Commercial VRF Condensing Units: Provide (1) condensing unit per floor to be located on a pad located outdoors in close proximity to the building. VRF units shall provide heat recovery ability. Units with radiant heating and cooling panels will serve individual rooms and each room will have temperature control. The IT room will have a 24/7 cooling only split system. All equipment shall be sized to meet the new heating and cooling load.

Commercial Kitchen: Kitchen hood exhaust duct will rise up thru the roof.

Residential Laundry room: Gas dryer vent duct with maximum 4" diameter up thru the roof. Combustion air intake louvers on laundry closet door/ wall provide required makeup air for dryer operation.

Bathroom Exhaust System: Each Restroom/Shower Room shall be provided with a ceiling mounted exhaust fan ducted through the roof for discharge.

Control System: DDC system to be provided by the VRF system manufacturer for mechanical system control and monitoring capability. Additional control of the radiant ceiling panels to be provided for temperature and humidity controls. Radiant panel controls shall be by radiant panel manufacturer.

Forced Air Furnace heating and Natural Ventilation for Cooling

Provide a Forced air furnace in the mechanical room and ducted air to all the conditioned spaces. The IT room will have a 24/7 cooling only split system. All equipment shall be sized to meet the new heating and cooling load.

REDUNDANCY REQUIREMENTS

The mechanical system is not a true redundant system. To have a full redundant system, the design would need to incorporate duplicate equipment systems. This may be evaluated further depending on the facility requirements. If cooling systems are lost, natural ventilation may be utilized through operable windows to cool the spaces. Electric space heaters may be provided on specific areas as needed when the central heating system is down.

Plumbing Systems

The Plumbing system of the new building will be designed to meet current plumbing, mechanical, energy and green building codes. New fixtures and systems will be selected with emphasis on energy efficiency, water efficiency, functionality and maintainability.

SANITARY SEWER AND VENT SYSTEM

Provide the following:

Waste and vent sewer at every plumbing fixtures such as water closet, lavatory, tub/shower, kitchen sinks, washer/dryer, janitor mop sinks, floor drain and sinks, indirect waste receptors, and other fixtures.

Collect all waste in to a sewage ejector pump and storage system that will tie into the existing upgraded leach field.

Pipe condensate from mechanical equipment to indirect receptors.

Provide floor drains and floor sinks with trap primer. Locate trap primers where accessible, otherwise, install inside wall with an access panel.

Provide Trash Enclosure with floor drain with trap primer and sediment bucket. As required, provide a hose bib at or near the Trash Enclosure.

STORM DRAINAGE SYSTEM

Provide roof drains and overflow drains on roof. Pipe primary storm drainage to street curb. Daylight termination of secondary storm drainage outside building. Provide patios and courtyards with area drains to be piped to building or site storm drainage system.

To conform to the site stormwater strategy, it may be necessary to provide a rainwater harvesting system to achieve LEED credits. Roof storm drainage would be diverted to a cistern for storage before treatment to be utilized for toilet flushing and site irrigation.

DOMESTIC WATER SYSTEM

Provide domestic CW and HW to the following:

- Bathroom toilet fixtures (water closets, lavatories, and showers)
- Kitchen Sinks and Dishwasher
- Washer/Dryer box
- Janitor mop sinks
- Trap primers (CW only) to serve floor drains
- Mechanical equipment requiring make-up water with backflow device

- Hose bibs

Provide a reduced-pressure type backflow preventer or acceptable equivalent per Water Department requirement.

Provide a packaged domestic water softening system to serve all potable water fixtures.

Hot water shall be provided by a storage tank type propane gas water heater sized per ASPE guidelines.

The building will have one domestic water meter. Water supply will be from the neighboring water pumping station that supplies domestic water for the community.

Provide low-flow plumbing fixtures as follows:

- Water closets: wall-hung/floor mount with 1.28 gallons per flush
- Urinals: wall-hung with 1/8 gallon per flush
- Private Lavatories with 1.0 gpm faucet
- Public lavatories: wall-hung or counter-mounted (TBD during design) with .5 gpm outlet, electronic faucet.
- Kitchen Sink: stainless steel or refer to architectural for final fixture selection. Provide with 0.5 gpm max flow faucet.
- Shower: 1.8 gpm shower head.

Provide irrigation water to planters as required.

Provide interior and exterior hose bibs with vacuum breaker.

To conform to the site stormwater strategy, it may be necessary to provide a reclaimed water piping system to non-potable and site irrigation fixtures.

PROPOANE GAS SYSTEM

Provide the following:

Provide a gas storage tank sized to provide at least a twenty day supply of fuel, and pipe the distribution system to serve all building appliances in both the Barracks/Office Building and Apparatus Building.

Provide a “kill switch” with reset button in the Kitchen which is compatible with the commercial grade gas stove/oven appliance. The “kill switch” shall be wired to shut-off the fuel supply and shut-down the appliance in the event of an emergency dispatch.

MATERIALS

Sanitary sewer (SS) and vent system: Cast iron, no-hub with standard-type coupling above ground and heavy-duty coupling below ground.

Storm water system: Cast iron, no-hub with standard-type coupling above ground and heavy-duty coupling below ground.

Potable domestic cold water (CW) system: Type L above ground; Type K for below ground.

Potable domestic hot water (HW) system: Type L above ground, insulated per current Title 24 requirements.

Reclaimed water system: Type L copper above ground, Type K copper for below ground.

Irrigation System (IR): Type L for above ground, Type K for below ground.

Propane gas system:

- Above ground: Schedule 40, A53 black steel pipe and threaded malleable iron fittings for above ground installation. Galvanized for piping exposed to weather.
- Below ground: Schedule 40, A53 black steel pipe and threaded malleable fittings 2-1/2 inches and smaller. Welded pipe 3 inches and larger. Pipe below grade wrapped with double thickness Scotchwrap No. 51 applied over Scotchwrap pipe primer. Factory applied epoxy coating to equivalent thickness with field wrapped or epoxied joints approved. Alternately, Polyethylene piping with tracer wire to meet CMC.

Condensate drain system: Type M copper, solder joints.

The sanitary system is proposed to be equipped with an on-site holding tank in the event the main sanitary line out of the building is out of service in an emergency.

Fire Protection Systems

The fire station building will be sprinklered throughout with an NFPA 13-compliant system. The system shall be a wet pipe, hydraulically calculated fire sprinkler system designed for light and ordinary hazard occupancies. DBE to secure a current water supply flow test report to determine available water pressures and capacity for fire sprinkler system design.

FIRE SPRINKLERS

The primary codes and standards governing Fire Protection System design include, but are not limited to, the following:

Applicable parts of the 2013 triennial edition of Title 24, California Code of Regulations (CCR) include:

- Part 2 – California Building Code (CBC)

- Part 3 – California Electrical Code (CEC)
- Part 6 – California Energy Code
- Part 9 – California Fire Code
- Part 11 – California Greed Building Standards Code
- Part 5 – California Plumbing Code

Applicable NFPA (National Fire Protection Association) Codes and Standards include:

- 2013 NFPA 13 – Standard for the Installation of Sprinkler systems
- 2013 NFPA 24 – Standard for the Installation of Private Fire Service Mains and their Appurtenances
- 2014 NFPA 25 – Standard for Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems
- 2013 NFPA 72 – National Fire Alarm and Signaling Code
- 2010 ASCE/SEI 07 – Minimum Design Loads for Buildings and Other Structures
- FM Global Approval Guide
- UL Standards (Underwriters Laboratories)
- UL Online Certifications Directory

FIRE SPRINKLERS AND STANDPIPES

Fire sprinkler system in accordance with National Fire Protection Association (NFPA) 13, state and local codes and fire marshal requirements.

- Connection to public water main, with isolating gate valve, post indicator valve and fire department connection.
- Double detector check valve assembly with drain and method of forward testing.
- Conceal piping, except where approved by the Construction Manager.
- Valves, accessories and electrical connections for a complete and operable system.
- Tamper, flow, and pressure switches. Coordinate location and type of tamper, flow, and pressure switches with the fire alarm system.
- Sprinkler control valves with test connections, supervisory initiating devices and water flow initiating devices.

Sprinklers

- Quick response sprinklers at Light Hazard areas
- Recessed or concealed sprinklers in finished ceilings with white polyester finish
- Brass or white polyester finish in areas open to structure
- Intermediate temperature sprinklers at skylights
- Hanging, restraints and bracing per NFPA 13 and California Building Code.

- Anchorage per NFPA 13 and California Building Code for use in concrete which is subject to cracking in a seismic event.
- Dry pipe system or dry sprinklers at areas subject to 40 degrees Fahrenheit, or less.
- Method of draining all piping.

MATERIALS

- In accordance with NFPA, UL Listed or FM Approved for its fire protection use.
- Schedule 10 and Schedule 40 black steel pipe.
- CSFM approved for fire protection