

BOULEVARD FIRE STATION ARCHITECTURE BASIS OF DESIGN

Standards References:

- 2010 California Green Building Code
- 2010 California Building Code
- San Diego Regional Standard Drawings (Current Edition)
- County of San Diego, Boulevard Subregional Plan
- Standard Specifications for Public Works Construction (Greenbook) Current Edition

Project Description:

Project consists of a new Fire Station of approximately 8,500 square feet on a currently vacant site. The crew quarters facility will be single story wood frame stud construction while the detached apparatus bay and supporting functions may be of similar structure or a pre-engineered metal building (PEB). The use of steel studs is not required but is desirable. The station will consist of bunks, restrooms, captain's office, dayroom, kitchen/dining, fitness area, clean room, study, turn out lockers, laundry, workshop, drive-thru apparatus bay to house 7 apparatus, limited public area and ADA restroom, and an outdoor patio area which is plumbed for a barbeque. A 40,000 gallon water tank (10,000 gallon of which is potable) will also be installed above or below ground as supply for fire suppression including filling apparatus and sprinkler systems for both buildings. The tank shall have a 2" FDC fill connection and 4" standpipe available.

The project's parameters for program adjacencies, parking, and entrances in conjunction with the topography and utility locations facilitated the concept diagrams for the substation, however, D-BE's are free to provide their own ideas and versions of what they think will work best in the space which meets the parameters noted. The possibility of using a PEB for the apparatus bay is one idea to provide a durable, cost effective solution and D-BE's are encouraged to pursue the most cost effective and suitable structural and material selections. Additional storage and enlarged building area for both the living quarters and apparatus bay are desirables.

The anticipated functional service life of the built portions of this project is 50 years. In addition to other requirements, the design and construction will minimize adverse effects on the exterior environment, will enhance the quality of the indoor environment, and will minimize consumption of energy, water, construction materials, and other resources, while providing function, amenity, and comfort specified.

The entire site is a 24 hour facility that will require emergency generation power at full capacity for 72 hours. The staff parking and rear portion of the station will be fully secure with perimeter fencing of wrought iron or powder coated galvanized metal. The generator and trash enclosure, and 40,000 gallon water tank shall be located on site such that efficiency in utilization, safety, aesthetics, and code requirements are met. The entire building shall also be ADA accessible. Only the detached apparatus bay and its

supporting functions shall fall under the category of Essential Service Design. All buildings shall maintain setbacks of at least 100' from all property lines with a minimum of 200' from Ribbonwood Road.

Style and Finishes

The architectural style of the exterior of the fire station living quarters shall complement the surrounding community. Ceilings in the living quarters shall be acoustic tile or hard lid as appropriate. The detached apparatus bay and related functions shall exhibit the typical construction of a PEB with exterior finishes as appropriate. Apparatus roofing shall be standing seam metal and the interior side of the exterior walls shall be insulated metal sandwich panels or furred with gypsum wallboard. All other interior walls may be gypsum wall board over stud framing. Ceilings shall be hard lid or open to structure as appropriate for the function of the space and be a minimum of 10'-0". All windows shall be dual pane with tinted low-e glazing. Hollow metal doors shall receive hardware which is appropriate to the function of the space and agreeable with the station's security needs. Cipher locks shall be installed at exterior doors and between staff and public areas. Above all, the materials utilized shall maintain a durability that is consistent with the varied climate of the region as well as the use of the building. Interior finishes shall also present a durability that will withstand the daily high usage representative of a fire station. Turnout lockers shall be metal and large enough to accommodate the gear of the fire personnel. Apparatus bay doors shall be of the sectional type and operated both electronically and manually.

Space Allocation

The apparatus bay and its support functions will be shared by County Fire and Cal Fire. Within the living quarters, three crew bunk rooms, a captain's bunk/office, and two bathrooms with showers shall be provided for Cal Fire. Three crew bunk rooms, a captain's bunk/office, and two bathrooms with showers shall also be provided for County Fire Authority representatives. These living spaces shall be segregated through the use of doorways. All other functions of the living quarters will be shared including the kitchen/dining, fitness area, study, report writing and dayroom. Per NFPA standards, residential washers and dryers shall be segregated from the turn out dryer and extractor, in this instance they will likely be in two separate buildings.

Functional Relationships

The spatial organization of the interior spaces is directly related to the provision of the most efficient response time of fire personnel to emergency calls. Spaces shall be designed to allow for fast and easy flow of fire personnel from any point in the living quarters directly to the apparatus for response. Special consideration shall also be given to isolating bunk rooms from spaces which may contain noisier functions like the dayroom, kitchen, and fitness areas and utilizing soundproof gypsum wallboard where applicable.

Parking

Twelve secured oversized (10'x20') parking spaces shall be provided for the fire staff. One public and one van accessible public parking space shall also be provided. The non-public areas of the site shall be controlled by an automatic gate with keypad access,

opticom, and knoxbox. A covered carport with solar panels for staff parking is desired but not required. The drive-thru capability of the apparatus bay shall also allow for a large concrete apron at the rear for potential training usage.

Special Systems

The apparatus bay shall be equipped with an Air-Vac vehicle exhaust removal system and a station alerting system shall be installed throughout both buildings. Also, an oil/water separator shall be provided in the drive apron for the ability to wash apparatus. A hose drying rack made of concrete shall also be provided. The apparatus bay will accommodate a compressor with cord reel drops providing air and power to service the apparatus. The apparatus bay will also house a clean room for work on sensitive equipment and a breathing air compressor room with bottle storage, SCBA fill station, and medical air refill. The SCBA and medical air fill stations will be relocated from an existing station and it will be the responsibility of the contractor to adequately install, run utilities, test, calibrate, and have this equipment certified prior to occupancy. No security system is required. An above ground Con Vault fueling tank with a 750/250 gallon diesel-gasoline split system with dual pumps is desired but not required. No fuel management system is required with this desirable.

Public Area

Public access to the Fire Station is a minimal function of this facility, however, this area is to be separate and secure from the rest of the station. An exterior emergency 911 phone shall be provided as well as an automatic door release button controlled from the report writing office.

Public Area Functional Relationships

The ADA restroom shall all be adjacent to the lobby. The report writing office shall also have direct visual access to the lobby and exterior public parking. A locked door shall separate the lobby and the rest of the station while the front public lobby entrance shall always remain open. The report writing office shall have a lockable sliding window and counter which opens into the lobby and casework for providing built in desk space and storage.

Apparatus Bay and Support Functions

The apparatus bay shall be a standalone structure separate from the living quarters and falls under the Essential Services Design category.

Apparatus Bay and Support Spaces Functional Relationships

The apparatus bay shall be sized accordingly to house seven apparatus stacked two deep with drive-thru capability. Sufficient circulation and maneuverability shall be taken into account with the design of the bays and their access and egress in regards to the turning radii of each apparatus and the potential to form a training apron to the back of the apparatus bay. Turn out lockers shall be readily accessible from the apparatus bay and provided to accommodate twelve personnel. Hose storage, compressed air drops, and cord reels shall be installed. A total of 24 lockers shall be provided with sufficient

storage space for both entities' various types of gear. NFPA requires that these lockers be segregated from the apparatus bay or be designed such that a constant movement of air is on the turn-outs to prohibit the accumulation of particulate matter. The clean room, turn out lockers, storage, print/ice, medical storage, breathing air room, workshop and restroom shall all directly open to the apparatus bay. High density sealed concrete floor finish in the apparatus bay is desired but not required. D-BE shall provide a commercial grade ice machine capable of producing at least 400lbs of ice per day with an adequate storage bin, turnout dryer, extractor, and lockable medical storage cabinet. Apparatus bay casework includes workbenches in the clean room and work shop, hose storage, printer station, and heavy load wood storage shelves.

Living Quarters

The bunk rooms shall have access through a secure corridor and have direct access to the restrooms and showers within that corridor. Direct flow from the bunks to the apparatus bay is desired. Each bunk room shall also have a window to the exterior which meets code standards for emergency escape.

Living Quarters Functional Relationships

Staff bunks shall each be provided with two extra long pillow top twin beds with built-in headboard and drawers below, two double wardrobe cabinets with drawers below and electrical outlets, two nightstands, and two nightstand lamps. Each room shall be hard wired for cable and internet and provided with a 32" flat screen TV wall mount. Flat screen LED TV's for each staff bunk room are desirable. The Captain's bunk/office shall be provided with 1 extra long pillow top twin bed with built-in headboard and drawers below, one double wardrobe cabinet with drawers below and electrical outlet, one nightstand, one nightstand lamp, one desk, and one desk chair. Each Captain's bunk/office shall be hard wired for cable and internet and provided with both a 32" LED flat screen TV and wall mount. Bathroom finishes shall be tile or solid surface material with for durability and ease of maintenance.

Shared Living Spaces

The kitchen/dining, fitness area, dayroom, study, laundry area, and report writing office shall be shared by both County Fire Authority and Cal Fire.

Shared Living Spaces Functional Relationships

All shared spaces shall maintain as direct a route as possible to the apparatus bay in the event of an emergency response call. Kitchen, dining, dayroom, and fitness area may be grouped together as they contain louder functions. All spaces shall be easily accessed from the bunk rooms and maintain a direct flow through the building. All spaces shall be designed to accommodate a maximum of 12 personnel. Concrete countertops are preferred in the kitchen as well as stained non skid concrete floors. The kitchen shall receive stainless steel commercial grade appliances inclusive of a dishwasher, range, hood, two refrigerators, sink, and garbage disposal. Kitchen storage casework shall be maximized with two large pantries provided. An open configuration between the kitchen, dining, and dayroom with a large kitchen island separating the spaces is preferred. The

dining room shall receive table and chairs in accordance with the maximum personnel. The dayroom shall be provided with 7 "First Responder" rocker/recliners from Fire Station Outfitters and it shall be wired for cable and internet. Include one 50" flat screen LED TV with wall mount, HDMI stereo receiver, and built in surround sound system with subwoofer. The TV will be mounted between built in wall cabinets with room for additional AV equipment and media storage. The study shall have table and chairs to accommodate six staff with built in wall to wall bookcase on one wall. The entry door to the study shall have a glazed lite for visual access. The study will be wired for cable and internet and provided with one 42" flat screen LED TV mounted on the wall. Provide a large capacity residential washer and dryer in the laundry room with a built in counter and storage cabinet. The fitness room shall have rubberized mat flooring and the entry door shall have a glazed lite for visual access. The fitness room shall be wired for internet and cable and provided with a 36" flat screen LED TV mounted on the wall. One fitness room wall shall also be a wall to wall mirror. The following is the list of workout equipment to be provided:

- 95T Achieve Treadmill from Life Fitness
- 95C Achieve Lifecycle Bike
- Multi-purpose workout bench
- Utility bench
- Counter balanced Smith Machine
- Olympic weight tree
- 400lb Olympic weight set with bar
- (5) 50lb rubber encase dumbbell sets
- 3 tier horizontal dumbbell rack
- (5) 30lb kettlebell sets

Complete Program Summary

Functional Area		BOULEVARD FIRE STATION (SQ. FT.)
PUBLIC SPACES		
	Subtotal	170
APPARATUS BAY & SUPPORT FUNCTIONS		
	Subtotal	4,025
LIVING QUARTERS (COUNTY)		
	Subtotal	610
LIVING QUARTERS (CAL FIRE)		
	Subtotal	610
SHARED		
	Subtotal	1680
UTILITIES		
	Subtotal	300
	<i>Building Net Area</i>	7,395
CIRCULATION		
	Subtotal	1109.25
	<i>Building Gross Area</i>	8,504
ANCILLARY STRUCTURES		
	Subtotal	385

Complete Program Breakdown

Functional Area	Program Spaces	BOULEVARD FIRE STATION (SQ. FT.)
PUBLIC SPACES		
	Lobby	85
	Public Toilet (accessible)	85
	Subtotal	170

Functional Area	Program Spaces	BOULEVARD FIRE STATION (SQ. FT.)
APPARATUS BAY & SUPPORT FUNCTIONS		
	Apparatus Bay for (7) engines	2,940
	Workshop	70
	Printing alcove	30
	Medicine Storage	50
	Storage	100
	Locker Room	380
	Restroom	85
	Clean Room	170
	Breathing Room	200
	Subtotal	4,025

Functional Area	Program Spaces	BOULEVARD FIRE STATION (SQ. FT.)
LIVING QUARTERS (COUNTY)		
	Captain's Bunk/Office (County)	110
	Bunk	110
	Bunk	110
	Bunk	110
	Bathroom	85
	Bathroom	85
	Subtotal	610

Functional Area	Program Spaces	BOULEVARD FIRE STATION (SQ. FT.)
LIVING QUARTERS (CAL FIRE)		
	Captain's Bunk/Office (CAL FIRE)	110
	Bunk	110
	Bunk	110
	Bunk	110
	Bathroom	85
	Bathroom	85
	Subtotal	610

Complete Program Breakdown (cont.)

Functional Area	Program Spaces	BOULEVARD FIRE STATION (SQ. FT.)
SHARED		
	Kitchen & Dining	500
	Day Room	300
	Fitness Room	290
	Laundry	100
	Storage (County)	85
	Storage (Cal/Fire)	85
	Study	200
	Report Writing	120
	Subtotal	1680

Functional Area	Program Spaces	BOULEVARD FIRE STATION (SQ. FT.)
UTILITIES		
	Electrical Room (at Apparatus Bay Building)	140
	Janitor's Closet	80
	Data Room	80
	Subtotal	300

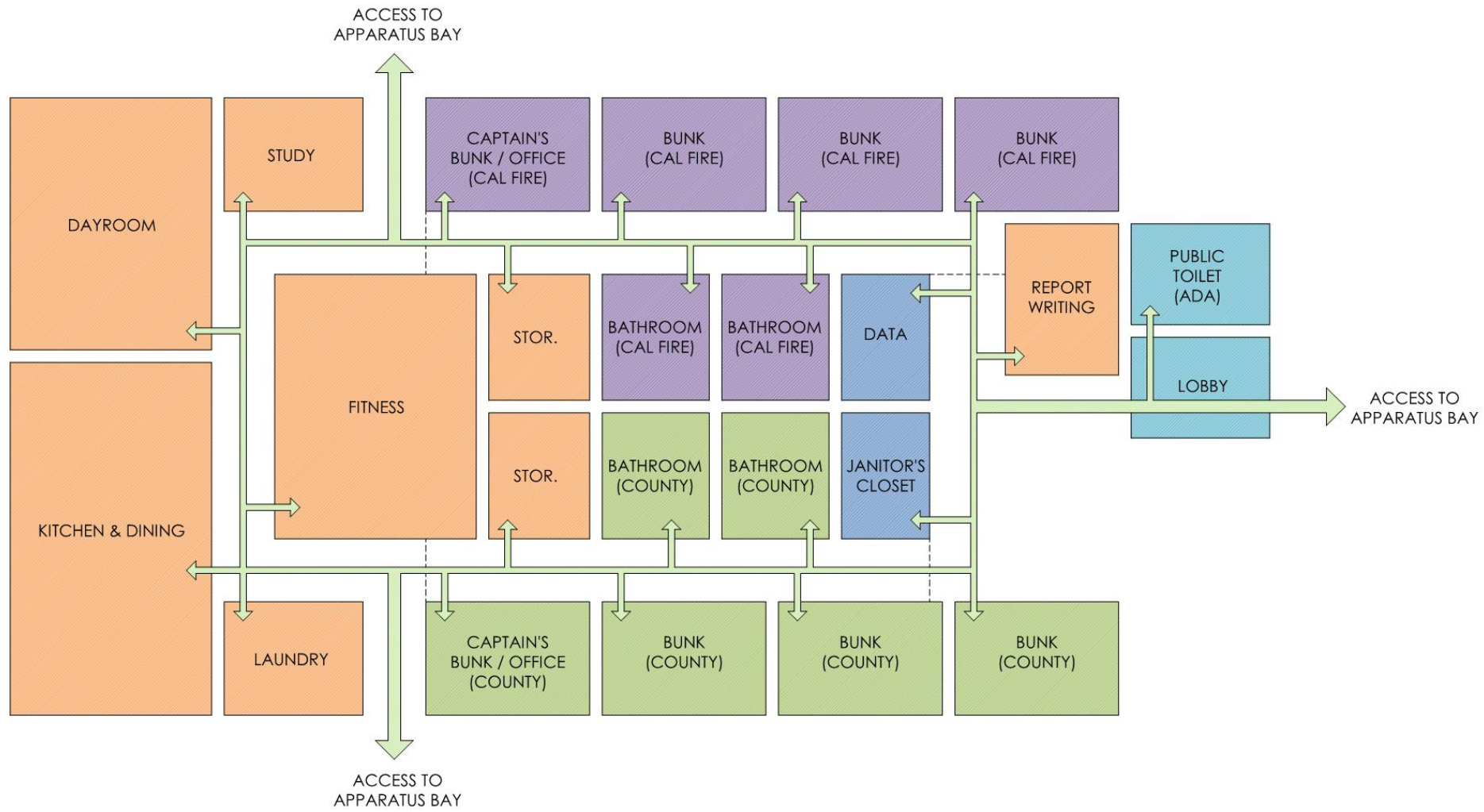
Building Net Area 7,395

Functional Area	Program Spaces	BOULEVARD FIRE STATION (SQ. FT.)
CIRCULATION		
	Circulation	7,395 x 15%
	Subtotal	1109.25

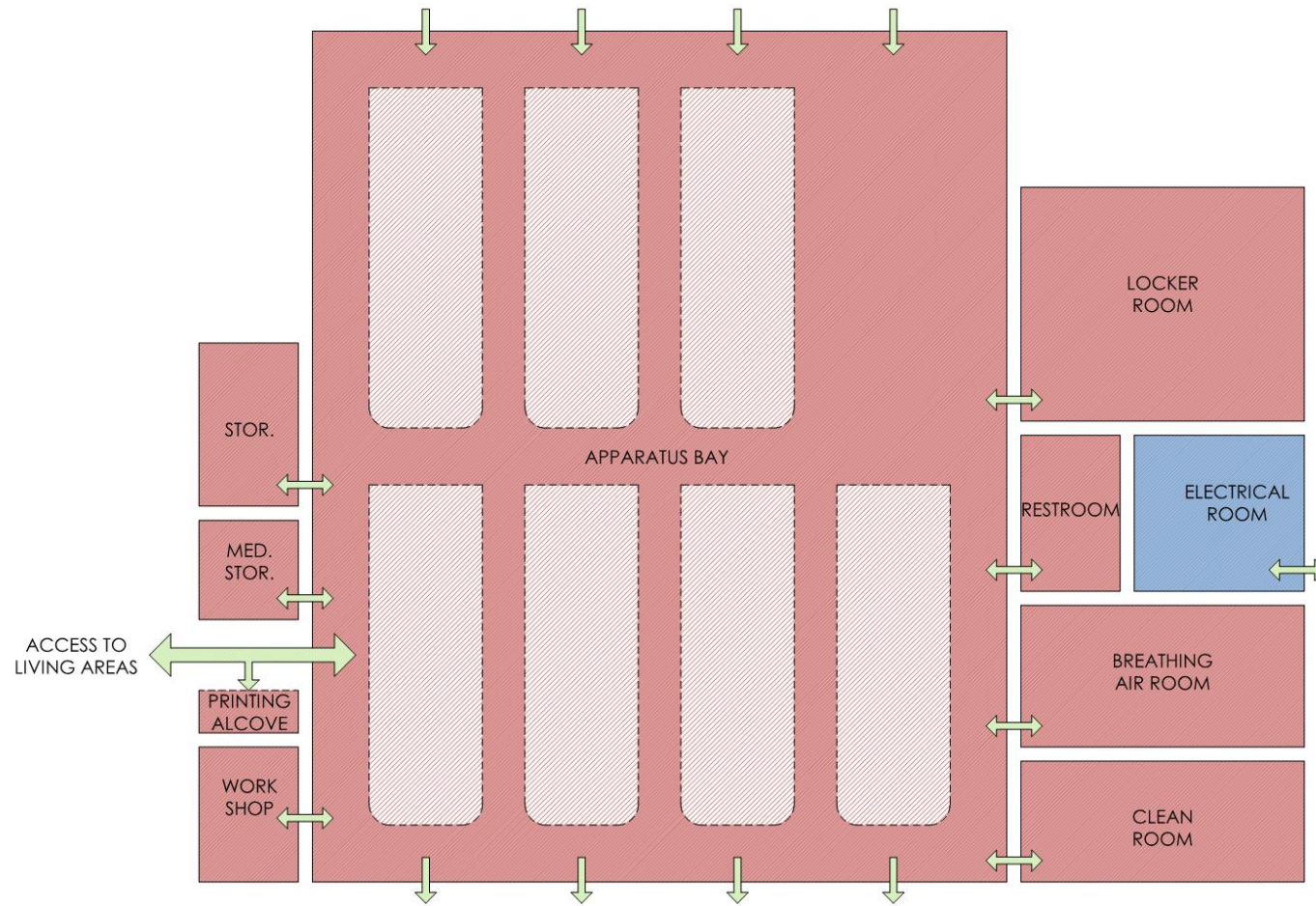
Building Gross Area 8,504

Functional Area	Program Spaces	BOULEVARD FIRE STATION ANCILLARY SPACE (SQ. FT.)
ANCILLARY STRUCTURES		
	Generator Enclosure	385
	Subtotal	385

Conceptual Programming Diagram Living Quarters



Conceptual Programming Diagram Apparatus Bay



BOULEVARD FIRE STATION STRUCTURAL BASIS OF DESIGN

Structure: Detailed listing of design criteria:

1. The basis structural system of the Fire Station can be described as follows:
 - The structural system may consist of a wood frame stud construction or of a Pre-Engineered Metal building with wood framed infill walls. Steel studs are not required but may be used in lieu of wood studs as a desirable.
 - The floor will be Slab-on-Grade reinforced concrete.
 - The foundation will consist of a series of grade beams below the bearing with square column footings below steel columns. Alternate foundation systems as developed by the DB-E will be considered.

The Design Criteria that should be used to design the building will include the following:

- Structural Design will be in accordance with the California Building Code (CBC) 2010.
- Apparatus Building shall be designed as an Essential Service Facility
- Seismic and Wind design will conform to 2010 CBC and ASCE 7-05 with Use Occupancy Category IV ($I_E = 1.5$ and $I_W = 1.15$)
- Seismic Design Category is D
- Basic Seismic Force Resisting System Wood/Metal framed Shearwalls.
- Wind: In accordance with ASCE 7-05 section 6.5.6.3 and Figure 6-1 shall be Exposure C, 85 mph
- Roof Live Loads: Use 20 psf
- Floor Live Loads: Use 50 psf + 20 psf partition

Special Inspections: All Concrete including Foundations, Walls, Slabs and Beams, Masonry and all Steel Field Welding will require Special Inspection.

Concrete Mix: Concrete shall have 15-20% flyash content.

BOULEVARD FIRE STATION CIVIL BASIS OF DESIGN

Standards References:

- MUTCD 2010 Edition
- Standard Specifications for Public Works Construction (Greenbook) Current Edition
- San Diego Regional Standard Drawings (Current Edition)
- Caltrans Standard Plans and Specifications (Current Edition)
- County of San Diego SUSMP
- County of San Diego Hydrology Manual
- AASHTO "A Policy on Geometric Design of Highways and Streets", (Current Edition)

Civil Project Description:

The project includes site grading, drainage and utilities as necessary for the construction of a new Fire Station in Boulevard, CA.

Site Demolition

The existing site is undeveloped land with native desert scrub vegetation. Removal of vegetation and shall be conducted as required for construction of the project. Limits of vegetation removal shall be limited to the requirements of construction. Refer to the environmental document for further information on biological impacts including nesting bird surveys, sensitive vegetation and rare plant avoidance and other mitigation measures.

Site Grading and Drainage

Earthwork will be required to prepare the site, building pad and subgrade for the new building foundations. A report titled Geotechnical Evaluation - Proposed Boulevard Fire Station by Ninyo and Moore dated March 30, 2012 (the geotechnical report) has been prepared and is included within the RFP. Earthwork recommendations in the geotechnical report shall be followed. Note that the recommendations include the requirement for geotechnical review of the project plans as well as observation and testing during construction.

The site naturally slopes from the West to East with approximately 60' in elevation change from one side of the site to the other. An underground storm drainage system does not exist to serve the project site. The project shall direct runoff from the site to the natural terrain via surface flow and use of energy dissipation devices after treatment and detention as required by the County of San Diego SUSMP.

The proposed grading at the building shall slope the surface away from the building in order to prevent ponding water near the foundation. Roof runoff from the proposed building shall be collected in roof gutters and directed to downspouts. Onsite drainage

shall be directed across the site and collected or routed as required to minimize erosion. Stormwater drainage and stormwater treatment facilities shall be designed and constructed to comply with the County of San Diego SUSMP and County of San Diego Hydrology Manual. A Storm Water Management Plan (SWMP) and Hydrology Study shall be prepared by a Registered Civil Engineer and submitted to the County of San Diego for review and permitting. The SWMP shall address the County's Hydromodification Management Plan (HMP) requirements. Low Impact Development, Source Control and Site Design BMP's shall be implemented.

Sanitary Sewer System

Sewer service to the site does not exist. A public sewer main is not available in the adjacent streets. A septic system shall be installed on-site to handle all wastewater from the building. The septic system design is discussed in another section of this RFP. Sewer pipes shall be routed from the building point(s) of connection to the septic tank. A sewer pump may be required in order to lift discharge from the septic tank to the leach field. Sewer cleanouts shall be designed at 100 ft intervals and all turns shall be in the direction of the on-site main. The minimum velocity of the sewer system shall be 2.0 ft/sec.

Water System

Water service to the site does not exist. A public water main is not available in the adjacent streets. The project will utilize groundwater via well(s) to be constructed as part of the project. A preliminary report titled Hydrogeologic Site Reconnaissance – Proposed Boulevard Fire Station, by Ninyo and Moore revised July 22, 2011 (the preliminary hydrogeologic report) has been prepared and is included within the RFP. A follow-up Phase I hydrogeologic evaluation of an existing well at the existing fire station was conducted by Ninyo and Moore as documented in a report titled Hydrogeologic Evaluation – Phase I – Proposed Boulevard Fire Station dated May 25, 2012 (the Phase I report). The Phase I report is also included within the RFP. The preliminary hydrogeological report, the Phase I report and the geotechnical report all contain relevant information regarding groundwater. The reports indicate that adequate groundwater should be available to support the proposed fire station. As a part of the project a comprehensive hydrogeologic evaluation, including subsurface exploration and aquifer testing, shall be conducted during the design phase of the project. The Mitigated Negative Declaration states that the average demand of the fire station is expected to be approximately 150 gallons per day.

Site Access/ Parking/ Pavement

Site access shall be provided from Manzanita Dulce Road. A new driveway connection shall be made for the main site access point. The number of required on-site parking spaces is discussed in another section of this RFP. Accessible parking spaces shall be provided with appropriate striping and signage per ADA and the California Building Code (Title 24). An accessible path shall be provided from the accessible parking spaces to the building entrance. An accessible path shall also be provided to from Manzanita Dulce Road to the building entrance. PCC pavement shall be constructed for all vehicular surfaces. The paving thickness shall be in accordance with the

recommendations of the Geotechnical Report prepared for the project. Improvements to Manzanita Dulce Road may be required as part of the Site Plan.

Erosion and Sediment Control During Construction (SWPPP)

The preliminary site studies indicate that the potential disturbed area for the project will be less than one acre, therefore a State of California General Permit for Construction Activities would not be required. Should the project design indicate that the disturbed area be greater than one acre, the contractor shall hire a Qualified SWPPP developer (QSD) to prepare a SWPPP document including erosion and sediment control plans in accordance with the State of California General Permit requirements. Regardless of the size of the disturbed area, the project shall implement construction phase BMP's and monitoring in accordance with County of San Diego requirements.

BOULEVARD FIRE STATION LANDSCAPE BASIS OF DESIGN

Standards References:

- Standard Specifications for Public Works Construction (Greenbook) Current Edition
- San Diego Regional Standard Drawings (Current Edition)
- County of San Diego Water Efficient Landscape Design Manual
- County of San Diego, Boulevard Community Plan

Project Setting:

Surrounding land uses near the area of the proposed project include vacant and undeveloped land to the west and rural residential to the north, south and east. The topography on the site slopes upward to the west, and the site elevation ranges from approximately 3,530 to 3,600 feet above mean sea level (amsl). The site is currently undeveloped and is covered by a sparse to moderate growth of native chaparral, shrubs, and non-native plants.

Project Design:

Planting

All exterior landscaped open space areas associated with the project will be planted and irrigated per the County of San Diego Water Efficient Landscape Design Manual. The document incorporates the requirements of the County's Water Conservation in Landscaping regulations with landscape design guidelines and installation specifications. It provides guidance in preparing the various components of landscape plans which may be required as part of a discretionary or ministerial permit process.

The landscape and site design concept will be focused on enhancing the visual quality of the surrounding community. Plants will be selected and planted appropriately based on their adaptability to the climate, geologic and topographical conditions of the project site. Low-water use, deep-rooted plants and native species are highly recommended. Selection of plants will also be based on the adaptability to on site soil conditions. Use of turf is not allowed within the project area unless an active recreational area is warranted for the site.

Highly flammable plant materials and mulches such as straw or small wood chips should be avoided. Refer to the Landscape Design Manual for fuel management requirements and recommended low fuel, ignition resistive plant materials.

Plantings in transitional areas (planting zone between non-native landscape and undeveloped areas) will consist of a combination of site adaptive and compatible native and non-native species. The mix of native and non-native plant materials should generally vary, with areas contiguous to existing native vegetation being planted with predominately native plant material. Invasive plant species, as defined by the Landscape Design Manual, are not allowed within the project site. In addition, revegetation of barren areas on site will be required to compensate for any desert scrub

impacted as a result of construction. See mitigation measure Bio-3 in the Mitigated Negative Declaration.

Irrigation

All irrigation systems will be designed to avoid runoff, seepage, low head drainage, overspray or other similar conditions onto adjacent property, non-irrigated areas, walks, roadways or structures. Overhead irrigation will not be permitted within 24 inches of an impermeable surface.

The irrigation systems will be automatic and installed to provide coverage for all planting areas shown on the plans. Low precipitation equipment will provide sufficient water for plant growth with a minimum of water loss due to run-off. Irrigation systems will use high quality automatic control valves, timers, moisture sensing devices, and other necessary irrigation equipment. All drip systems will be adequately filtered and regulated per the manufacturer's recommended design parameters. Irrigation components will be of non-corrosive materials. Moisture sensing devices will be installed as required to monitor soil moisture levels.

All irrigation improvements will conform with the County's Landscape Design Manual requirements.

BOULEVARD FIRE STATION MECHANICAL BASIS OF DESIGN

Standards References:

- 2010 California Green Building Code
- 2010 California Mechanical Code
- 2010 California Building Code
- 2008 California Building Energy Standards for Residential and Non-Residential Buildings (Title 24)
- ASHRAE Design Standards
- SMACNA Design Standards

HVAC Mechanical Project Description:

The project includes the design of the heating, ventilating, and air conditioning (HVAC) system required to control and maintain space indoor conditions appropriate for occupancy during the cooling and heating seasons at the new Fire Station in Boulevard, CA. This system is comprised of equipment, air distribution, and controllers as described in the paragraphs below.

Systems will include the following:

- Heating and cooling for work stations, hallways, kitchen, bunk rooms, and fitness area
- Dedicated 24-hour cooling for telecom room
- Exhaust for laundry area, turn out area, bathrooms, electrical room, and kitchen (with hood)
- Tail piece exhaust for apparatus way. System will include rails, snorkels, connections, fan and controls.
- All refrigerant piping, ductwork, distribution, controls and test and balance to ensure a complete and operational system.
- Dryer vent system.

HVAC Equipment

The HVAC equipment to be installed as part of this project will be:

- Variable refrigerant flow (VRF) system, which will be comprised of indoor fan coil units connected on one or more centralized outdoor units. The indoor units will be connected to the centralized outdoor units via refrigerant piping lines. Among other features, this system has the capability of providing simultaneous heating and cooling as demanded by the individual zones of the building. Outside air will be provided as described in previous option.
- Heating and cooling will be provided for workstations, hallways, kitchen, bunk room and fitness area.
- Unit heaters only shall be installed in the Apparatus Bay, no cooling is required.

Exhaust air fans will also be provided to discharge environmental air to outdoors and to maintain the proper building pressurization. Exhaust systems shall support laundry area, turnout area, bathroom, electrical rooms and kitchen.

Vehicle exhaust removal shall be accomplished through the use of an Air-Vac system.

All HVAC systems selected will be designed as mandated by the Standards mentioned above and according to all code and local jurisdictional requirements to ensure complete, operational and balanced system.

Air Distribution System

The air distribution system associated with HVAC equipment will be mainly comprised of sheet metal round/rectangular ductwork, air devices (such as diffusers and grilles), and accessories (such as dampers, louvers, flexible duct, flexible connections, etc). The ductwork layout will be designed following the design procedures outlined by ASHRAE and SMACNA. Air devices will be selected to maintain an overall maximum sound level of 30 NC. Balancing dampers will be incorporated to ensure proper air balance in the spaces.

Control System

In general, the operation of the HVAC system will be controlled by an electronic control system that will allow the implementation of the following control strategies: scheduling, adjustment of space temperature set points, after-hours operation, space temperature (and CO2 concentration, if applicable) monitoring, and economizing operation mode among others.

The proposed control system will have one of the following two architectures:

A central or main controller that oversees the operation of all HVAC units with "slave" controllers installed in each heating/cooling unit. Each controller will have an electronic memory where all applicable control strategies will reside.

Each HVAC unit will be controlled by dedicated/individual electronic controller with the ability to implement the control strategies mentioned above into the operation of the controlled unit.

Exhaust fans serving individual/single restrooms will typically be controlled through corresponding space lighting switch. Telecom room will be controlled by the thermostat and kitchen exhaust will be controlled by switch on hood.

Test & Balance

At the completion of the installation, the HVAC system will be tested and balanced according to approved standards such as NEBB and/or AABC. In addition, the performance of the HVAC system will comply with the 2010 California Green Building Code.

BOULEVARD FIRE STATION PLUMBING BASIS OF DESIGN

Standards References:

- 2010 California Green Building Code
- 2010 California Plumbing Code
- 2010 California Building Code
- 2008 California Building Energy Standards for Residential and Non-Residential Buildings (Title 24)
- IAPMO Installation Standards

Plumbing Fixtures:

Plumbing fixtures will comply with maximum flow requirements. Fixtures will include dual flush valve water closets (no automatic sensors), lavatories, kitchen sink, showers, mop sink, wash box at the clothes washer, and hose bibbs along the exterior walls. Floor drains will be provided in all Toilet Rooms, the kitchen area, the Laundry Room and in the turnout area. Floor sinks will be provided at the air compressors. Drainage at the clothes washer/extractor will be a trough connected to the sewer system. The apparatus bay shall receive trench drains.

Plumbing Systems:

Plumbing systems will consist of propane, domestic hot and cold water, compressed air, condensate, sand-oil waste, storm drain and sanitary waste and vent systems. The building drain will connect to the sewer pipe provided by others at the 5-foot line from the building which will connect to the on-site septic tank. Heat trace tape will be wrapped on all water piping subjected to freezing conditions. A water stubout will be provided for the ice maker in the refrigerator. Propane for the gas range, water heater, clothes dryer, and barbeque grill (if any) will be provided by a leased or rented on-site horizontal storage tank. Compressed air for shop air usage will be provided by an air compressor (16.8 acfm) with an air dryer, filters, oil separator and an 80 gallon vertical receiver. A breathing air compressor with a charging rate of 26.4 scfm will also be provided. A sand-oil interceptor will be provided for the drains in the apparatus bay.

Hot Water System:

Hot water will be provided by a propane-fired water heater and circulated to all fixtures requiring hot water by means of an in-line circulating pump at the water heater.

BOULEVARD FIRE STATION ELECTRICAL BASIS OF DESIGN

General Requirements:

1. Codes, Standards and Regulations:
 - The building shall be design in compliance with the 2010 edition of the International Building Code (IBC), 2011edition of the National Electrical Code (NEC), California Energy Commission (Title-24), County of San Diego Municipal Code, Local Fire Department Regulations and all applicable editions of codes, ordinances and requirements of the local Authority Having Jurisdiction (AHJ).

2. The design, methods, products, testing and installation shall be in compliance with the following national and local electrical standards:
 - National Electrical Code (NEC)
 - National Electrical Manufacturers Association (NEMA)
 - Insulated Power cable Engineers Association (IPCEA)
 - Institute of Electrical and Electronic Engineers (IEEE) Standards
 - Underwriters Laboratories, Inc. (UL)
 - Electronic Industries Association (EIA) Standard 570
 - American National Standards Institute (ANSI)
 - American National Standards Institute (ANSI)
 - Illuminating Engineering Society of North America (IESNA)
 - National Fire Protection Association (NFPA)
 - California Energy Commission Ttitle-24 (CEC)
 - County of San Diego Fire Department Regulations

3. The Contractor shall coordinate all electrical requirements contained herein and within the Architectural, Mechanical, Plumbing, Civil, Structural and landscape design build documents.
 - Division 16 includes all in materials, equipment, fabrication, installation and tests required for fully operational and safe systems,

including, but not limited to, all appurtenances and features, as defined within the outline specifications and in this electrical basis of design, required for conformance with applicable Codes and approval by the Authorities Having Jurisdiction.

- All materials and methods of installation shall be provided in minimum as defined within the outline specifications and in this electrical basis of design.
- All equipment and accessories shall be new, free from defects and listed by Underwriters' Laboratories, Inc. or bearing its label as defined within the outline specifications and in this electrical basis of design
- All equipment and accessories shall be in compliance with the applicable standards and with all applicable National, State and local Codes.
- All items of a given type shall be the products of the same manufacturer. Contractor shall provide same manufacturer's product throughout the project.
- The contractor shall provide Utility coordination shop drawings for electric, telephone and CATV. The shop drawings shall coordinate with the utility consultant drawings in all aspects.
- The Contractor shall provide design confirmation of all utility sizes, utility capacities, utility points of connections and utility conduit quantities and sizes. All utility information referenced in the outline specifications and in this electrical basis of design are intended for bidding purposes only and may not reflect actual system requirements.
- The Contractor shall provide and install a complete and fully functional fire alarm system for the project that is operational, tested in place in accordance with the Local Fire Marshal.

Electrical Systems Descriptions:

1. Electrical Service Entrance:

- The existing SDG&E overhead service shall be re-routed underground between existing SDG&E service pole #44758 and service pole #44760 to ensure and maintain Fire Station access. The undergrounding of the existing overhead SG&E service shall be provide and installed in full coordination with SDG&E coordinated shop drawings and per current SDG&E service guide requirements. The SDG&E underground duct and associated infrastructure shall be provided and installed by the design build contractor. The underground duct shall consist of 1-4”C.O. with pull rope from existing SDG&E pole #44759 to an driveway rated SDG&E manhole (sized by SDG&E) located adjacent to the new Fire Station exit driveway designated as “MH-1”. From the manhole MH-1, provide and install 1-4” underground duct with pull rope to the existing SDG&E service pole #44760 to the West. Additionally, from the manhole MH-1, provide and install 1-4” underground duct with pull rope to the existing SDG&E service pole #P247524 to the North.
- The electrical primary service for the Fire Station shall be minimum rated at 600A, 208Y/120V, 3-phase 4-wire. The primary system shall be provided from the new MH-1 via 1-4”C.O. to a pad mounted SDG&E service transformer located within 100 feet of the main electrical room. The primary service and secondary service conduit size, quantities and trenching requirements shall be provided in accordance with the most current edition of the SDG&E service guide. The secondary service from the SDG&E pad mounted transformer shall be via 2-2”C.O. to the main electrical room. The electrical service limits of work shall be contained within the project property line.
- The electrical switchgear located in the dedicated SDG&E main electrical room shall consist of a SDG&E approved Under Ground Pull Section (UGPS), SDG&E approved Meter / Main Section and a

Distribution Section, all Nema 1 rated. The room shall be SDG&E and NEC compliant and shall be minimum 80 square feet of floor area.

- The UGPS shall be fully rated at 600A, 208Y/120V, 3-phase 4-wire with an available in-rush current (AIC) withstand rating of 42kAIC.
- The fully rated Meter / Main section shall include an SDG&E meter socket and 600AF / 600AT main service disconnect. The breaker shall be 100% rated.
- The distribution section #1 shall be fully rated and include provisions for a standby Automatic Transfer Switch, 600A rated, 4-pole type.
- The distribution section #2 shall be fully rated and include provisions circuit breakers to accommodate the complete building and site build out.
- The entire switchgear system shall be provided with 600A rated buss, 42kAIC rated.
- The service shall be provide with switchgear manufacturer provided Transient Voltage Surge Suppressor (TVSS).
- The manufacturer of all switchgear, distribution and branch circuit panel boards shall be by Square D, no exceptions or substitutions.

2. Signal Service Entrance:

- The existing AT&T overhead service shall be re-routed underground between existing SDG&E service pole #44758 and service pole #44760 to ensure and maintain Fire Station access. The undergrounding of the existing overhead AT&T service shall be provide and installed in full coordination with AT&T coordinated shop drawings and per current AT&T service guide requirements. The AT&T underground duct and associated infrastructure shall be provided and installed by the design build contractor. The underground duct shall consist of 1-4" C.O. with pull rope from existing SDG&E pole #44759 to an driveway rated AT&T bolt down pullbox (sized by AT&T) located adjacent to the new Fire

Station exit driveway designated as "PB-1". From the pullbox PB-1, provide and install 1-4" underground duct with pull rope to the existing SDG&E service pole #44760 to the West. Additionally, from the pullbox PB-1, provide and install 1-4" underground duct with pull rope to the existing SDG&E service pole #P247524 to the North

- Telephone: The serving utility for the telephone service shall be AT&T. The point of connection (POC) shall be via the new AT&T pullbox "PB-1". The AT&T MPOE shall be in the building telephone / Data room which shall be a minimum 50 square feet of floor area. The POC and MPOE shall be connected via 2-2" underground routed conduits. The telephone system shall include all paging and panic alert integrated systems. The system will be fully functional and tested in place.
- CATV: Provide 1-2"C.O. stubbed adjacent to new "PB-1" to the building main telephone / data room for future CATV service.
- Fiber Optics: Provide 1-2"C.O. stubbed adjacent to new "PB-1" to the building main telephone / data room for future fiber optic building service.

3. Power Distribution System:

- Provide 208Y/120V 3-phase 4-wire panel boards within the main electrical room to serve all mechanical, plumbing, lighting and general device loads.
- All panel boards shall have bolt on type circuit breakers with copper bussing.
- All feeders and branch circuits shall be routed in EMT conduit, minimum ¾" in size.
- The minimum size conductor shall be #12AWG. All conductors shall be copper type THW or THHN. MC CABLE AND ALUMINUM CONDUCTORS ARE PROHIBITED.

- Division 16 shall provided all equipment not provided with a VFD with combination motor/starters correctly sized.

4. Stand-By Generator:

- The entire 600A service shall be served by a 208Y/120V 3-phase 4-wire 225KVA / 180kW diesel engine generator with integral skid mount day tank. The day tank shall be sized to provide the engine with 72-hours of run time.

5. Interior Lighting:

- The lighting design will be engineered to the architectural selection.
- The lighting design shall be engineered to be compliant in all aspects of the current California Energy Commission (CEC) Title-24 requirements.
- The lighting design shall be in accordance with the Illumination Engineering Society of North America (IESNA) recommended foot-candle levels and best practices for all applicable interior space type and use.
- The engineered lighting system shall meet or exceed .90 watts per square foot to meet or exceed LEED requirements.
- Automated controls (motion sensors, time clocks, photocell, etc) shall be utilized where applicable for maximized energy savings.
- Exit signs shall be engineered in accordance to the Architectural egress plan, NFPA requirements and with final approval of the local Fire Marshall.
- Minimum emergency egress path foot-candle levels shall be designed and engineered within the interior lighting system via a central inverter system on a life safety system in all a egress corridors, stairwells and hallways, to include large assembly areas.

6. General Lighting Parameters:

- Storage / Utility Spaces: 1' x 4' surface fluorescent wrap and or wire guarded industrial fluorescent.
- Lobbies / Public Spaces: LED Down Lights and or 2' x 4' recessed fluorescent.
- Private and Open Offices: Direct / Indirect lay in center perforated fluorescent or LED.
- Bunk Rooms: 2' x 2' recessed fluorescent.
- Apparatus Bay: 1' x 4' surface fluorescent wrap.
- Kitchen: 2' x 2' kitchen rated recessed fluorescent.
- Dining: Recessed dimmable lensed LED down lights.
- Dayroom: Recessed dimmable LED down lights.

7. Exterior Lighting:

- The lighting design will be engineered to the architectural selection.
- The lighting design shall be engineered to be compliant in all aspects of the current California Energy Commission (CEC) Title-24 requirements.
- The lighting design shall be in accordance with the Illumination Engineering Society of North America (IESNA) recommended foot-candle levels and best practices for all applicable exterior space type and use.
- All exterior lighting fixtures shall be photocell on / timeclock off controlled to optimize energy reduction.
- Minimum emergency egress path foot-candle levels shall be designed and engineered within the exterior lighting system via a central inverter system on a life safety to provide emergency illumination at all egress doors and the path to the designated

exterior area of assembly as designated by the architectural egress plan.

- Areas such as the building façade, flag pole, security areas and landscape lighting at sidewalks shall be provided with dedicated lighting circuitry and automatic controls.
- Provide and install wall mounted fluorescent high cut fixtures on the exterior of each end of the apparatus bays controlled by an interior manual switch for use as exterior engine night time work lights.
- All exterior Project lighting shall be installed and operated consistent with the requirements of the San Diego County Code, Division 9. Light Pollution Code (Zone B) for lamp type and shielding requirements. All outdoor lighting would be shielded and directed downward to minimize or avoid the potential for spillover onto adjacent properties.

Low Voltage Systems Descriptions:

1. Telephone:

- Provide the MPOE in tele/data room on a 4' x 8' x 3/4" fire-treated painted plywood backboard painted to match the interior adjacent wall color.
- Provide at the tele/data backboard an AT&T required ground bus bar with 1-#6 AWG conductor to the building grounding electrode.
- Provide dedicated Two (2) telephone four-plex receptacles at the tele/data backboard.
- All telephone systems cabling shall be installed in EMT conduit, min 3/4" with pullstring throughout.

2. Internet Technologies (I.T.) Structured Cabling:

- Provide and install a head end rack mounted I.T. and structured cabling system with a minimum 25% spare port space for a building wide data system. The system shall consist but not be limited to all pathways, device jacks, cabling, routers, switches, patch panels, racks, and rack mounted UPS equipment.
- Provide one (1) Cisco WAP 121 wireless Access point.
- Provide and install one (1) Cisco RV220W Firewall & Router Wireless Access Point (contractor provided).
- Provide and install one (1) Cisco SD2005 5- port switch (contractor provided).
- Provide dedicated Two (2) I.T. four-plex receptacles at the tele/data backboard.
- Provide and install internet connections via data jacks at all workstations, lobby desk, captains office, library/meeting room and bunk rooms.
- Provide and install a dedicated fax line at the front lobby and library/meeting room.
- All I.T. systems cabling shall be installed in EMT conduit, min 3/4" with pullstring throughout.

3. Fire Alarm:

- The Fire Alarm System shall be provided as a deferred approval, design Build Performance package, as part of the design build Electrical Contractors scope of work. The provided fire alarm system shall be a Fire-Lite Ms-9050ud and AES-7788FULP based system, no exceptions or substitutions will be entertained. Reference the electrical specifications for additional design criteria.

4. Alerting:

- The alerting system shall be a “full house” interior system and time clocked exterior speaker system by Comtech, series 10. Provide and install HUB model 10 touch screen module for remote programming with all rack mounted model 10 Hardware. The Comtech series 10 head end systems shall be I.T. rack mounted. The system shall include an integrated minimum sized 100amp amplifier. The speaker system shall consist of speakers rated at a minimum of 2 watts with exterior speakers rated at a minimum of 5 watts. The complete and installed speaker system shall not exceed 80% of the rated amplifiers capacity. The system shall be provided complete, operational and fully functioning as certified tested in place. The system shall consist, but not be limited to, the following:
 - Bunk Room: Alerting speaker, music speaker, volume control.
 - Hallways/Corridors: Alerting speaker with egress light, music speaker, volume control.
 - Fitness room: Alerting speaker, music speaker, volume control, LED light bar.
 - Dayroom: Alerting speaker with egress light, music speaker, volume control.
 - Apparatus Bay: Alerting speaker with egress light, music speaker, volume control, LED light bar.
 - Lobby/Entry: Alerting speaker with egress light, music speaker, volume control, Still alarm, front door bell.
 - Private and open offices: Alerting speaker with egress light, music speaker, volume control.
 - Exterior Spaces: Weatherproof horn speaker time clock over ride controlled.

5. Exterior Antenna Tower:

- Provide and install one (1) Rohn 45G – 30' tall antenna tower with concrete base installed on outside of the station in proximity to the electrical/communications room. Tower installation to include any necessary grounding rods and wires. Provide 2-4" to tele/data room backboard via underground routing.
- Two (2) VHF radio antennas are to be provided, but not installed. The range of the antennas shall be 151 to 159 MHZ. Contractor will also provide a cross arm for installation of the antennas to the antenna base w/LMR wire, 2 poly phasers for lightning protection, as well as BNC and RJ25 connectors.

6. Smart Building Initiative:

- Building monitoring and controls shall be provided, designed and installed to provide:
 - Tridium JACE web server using Tridium AX Supervisor Software.
 - BACnet-based HVAC, lighting and inverter controllers, where applicable.
 - A comprehensive web server control points list for mapping purposes in compliance with eh County's point nomenclature.
 - Remote communication to the County's Building Automation System using the County's LAN.
 - Electricity demand management strategies.

- Real time metering of site electricity, HVAC and lighting electricity, site propane and site irrigation consumption, as applicable, integrated to web server with local controls graphical user interface QA Graphics residing on the web server.
- San Diego Gas & Electric Savings by Design Program (SBD) using the Whole building Approach :
 - The County will initiate contact with SBD and submit a Letter of Interest for the project. If applicable, the D-BE must complete a Design Team Application and Integrated Design Stipend during the conceptual or schematic design phase. D-BE will work with the Owner and SBD on how to optimize the energy efficiency of the project and to confirm that recommended design changes are feasible. At the earliest opportunity, the D-BE must submit plans, Title 24 compliance calculations, and other design documents to SBD. SBD will issue an Incentive Agreements to the County and D-BE after the selection and design of the SBD recommended energy efficiency enhancements is finalized. Prior to ordering, purchasing, and/or installing the selected energy efficient options, the Owner and D-BE must have entered into SBD Agreements. The D-BE shall notify the County of substantial completion so that SBD on-site verification can take place. The D-BE must allow access to the completed facility for on-site verification and, if selected, participate in measurement and evaluation studies. SBD may request, and the D-BE must then provide, integrated design analysis reports, manufacturers

specifications, equipment cut sheets, and incremental cost verification to verify completed project matches the design proposed in the Agreement.

Boulevard Fire Station

