VENTURA COUNTY
TODD ROAD JAIL
HEALTH AND PROGRAMING UNIT

600 TODD ROAD, SANTA PAULA, CA 93060

VOLUME 2

2A – SCOPE OF CONSTRUCTION
2B – SPECIFICATIONS

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DESIGN CRITERIA:

The following criteria are provided to define the scope of the project and provide guidance to the Design-Builder. The Design-Builder is responsible for ensuring that design and construction of all improvements complies with all laws, codes, and regulations applicable to local detention facilities and that all systems are complete, integrated, cohesive and functional for their intended purposes.

The Design-Builder shall provide detailed calculations and design documentation for all systems prior to construction and submit for review by the applicable Authority Having Jurisdiction (AHJ). Performance criteria identify minimum levels of quality, materials, and workmanship.

Codes & Standards:

The site grading and drainage, pedestrian and vehicle circulation, and site utility design of the project shall be based on but not limited to the following codes and standards:

- ❑ 2016 California Building Code (CBC), California Code of Regulation, Title 24, Part 2-Volumes 1 and 2 as amended therein.
- ❑ 2016 California Green Building Standards Code (CalGreen), California Code of Regulation, Title 24, Part 11 as amended therein.
- ❑ 2016 California Plumbing Code (CPC), California Code of Regulation, Title 24, Part 5 as amended therein.
- ❑ 2016 California Fire Code (CFC), California Code of Regulation, Title 24, Part 9 as amended therein and as amended by local ordinance.
- ❑ Ventura County Waterworks Manual, 2nd Edition
- ❑ Project Processing and Procedures Manual – Ventura County Third Edition, May 2003
- ❑ Ventura County Standard Specification (VCSS)
- ❑ Ventura County Sewerage Manual
- ❑ Ventura County Road Standards
- ❑ Ventura County Standard Land Development Specifications
- ❑ Ventura County Building & Safety Permit Information and Handouts
- ❑ Ventura County Land Development Manual
- ❑ Ventura County Landscape Design Criteria
- ❑ Watershed Protection District Design Manual (VCFCD)

- Ventura County Technical Guidance Manual for Storm Water Quality Control Measures, Manual Update 2011; Errata Update 2015.
- Items not covered herein and in the above documents shall conform to the applicable provisions of the applicable City of Santa Paula and Ventura County Construction Standards, City of Santa Paula Fire Department informational bulletins, municipal codes, council resolutions and ordinances. Public sewer or water mains, if any, may be required to be designed in accordance with City of Santa Paula Design and Construction Standards.

BASIS OF DESIGN:

Surface Drainage:

The existing topography sheet flows at an easterly direction. Off-site runoff from the agricultural farmland is intercepted by a drainage channel along the edge of the existing access road. With the addition of the 63,000-square foot building, the access road and channel will be realigned to the north to circumvent the new footprint.

In between the proposed building and the existing parking lot to the west, there is an existing concrete gutter that will be cut-off by a proposed corridor on the south side of the building, connecting to an existing structure. The gutter has a tributary area of about 0.8-acre, upstream of the corridor. This drainage area will be re-routed around the building through a new concrete ribbon gutter with a very minimal longitudinal slope (0.0028 ft./ft.). This proposed ribbon gutter will act as the main storm water conveyance, collecting and conveying runoff from the entire westerly side of the site, including roof drains.

Storm water runoff generated within the project limits, including all impervious areas, roof drains, and developed pervious areas, shall be captured and conveyed towards appropriate Best Management Practices (BMPs) for infiltration and/or treatment, prior to discharging off-site, to the maximum extent practicable. The realigned access road will have a super-elevated cross slope that allows runoff to drain on-site to allow for treatment.

By intercepting runoff from the agricultural area, commingling of off-site and on-site flows is avoided, eliminating the requirement to treat the off-site runoff as well. An exception will be the 0.8-acre drainage area on the westerly side of the project that will be re-routed around the building. Runoff generated from this area will need to be accounted for in the BMP sizing, along with the rest of the on-site drainage.

Initial peak flow calculations for the existing and proposed conditions utilized the Ventura County Watershed Protection District's Time of

Concentration Calculator and the VCRat 2.6 program. With the preliminary grading concept increasing the overland flow path on the westerly side of the project, the time of concentration - defined as the time required for runoff to travel from the hydraulically most distant point of a watershed to its outlet - increased in the proposed condition. This resulted in a reduction of peak flows compared to the existing condition, offsetting the increase in impervious area. Consequently, mitigation (i.e. detention) will not be required to minimize the impacts of development on the existing drainage system.

Storm Water BMPs:

To mitigate the potential water quality impacts, Best Management Practices will be implemented to reduce the hydrologic and water quality impacts associated with the development, as described in the 2011 Ventura County Technical Guidance Manual (TGM), Errata Update 2015, and the Ventura County Municipal Storm Water Permit (Order 2010-0108). Additionally, a Post Construction Storm Water Management Plan (PCSMP) will need to be prepared for the project, which specifies the storm water quality mitigation employed and its proper sizing. The document will also include a Storm Water Treatment Device Access and Maintenance Agreement, and a Maintenance Plan.

For the construction phase, a Storm Water Pollution Prevention Plan (SWPPP) and Erosion Control Plan are required. These documents specify how a construction project will minimize storm water pollution through the application of appropriate temporary BMPs. SWPPPs are designed to comply with California's General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities and issued by the State Water Resources Control Board.

Referencing the Geotechnical Data Report (Fugro USA Land, Inc. Project No. 04.62160076_R1, dated January 13, 2017), low percolation rates, clayey layers beneath the potential basin locations, and a ground water elevation of about 8 ft. below existing grade, there is adequate information to assert technical infeasibility of storm water infiltration. Therefore, a biofiltration BMP will be used and sized to treat 1.5 times the Storm Water Quality Design Flow not retained using Retention BMPs. If further investigation is conducted in the design phase that shows otherwise, then an infiltration BMP should be constructed.

The proposed BMP is a vegetated swale for biofiltration treatment and release. The runoff from the $EIA_{allowable}$ (Effective Impervious Area) and developed pervious surfaces can also be accounted for in the sizing of the vegetated swale BMP, simultaneously addressing the mitigation requirements of Step 7 of the TGM.

Site Access, Circulation and Parking:

Access for emergency vehicles must be provided at all times, and access roads must be designed to adequately support the imposed loads of fire protection apparatus, meet the required widths, turning radii and other requirements for vehicle circulation including turnarounds, pullouts, and vertical clearance.

Accessible parking for disabled persons must be provided in accordance with all state and federal laws, and with appropriate access aisles, signage, and accessible routes to the facilities they are intended for.

Accessible pedestrian path(s) of travel must be provided from building exits to public way and safe dispersal areas per ADA and Building Code requirements.

Bicycle parking and electric vehicle charging stations shall be provided in accordance with CalGreen and the applicable sections of the Ventura County Code.

New and Existing Utilities:

There are existing utilities in proximity of the project where the proposed utilities can connect, including sanitary sewer, domestic water (and possibly fire water), electrical, communications, irrigation, and gas lines. Some existing utilities such as water, electrical, and communication lines will be cut-off by the proposed location of the building and will need to be relocated. Further site investigations must be conducted to provide a more thorough list of conflicting utilities. On-site drainage will connect to the channel adjacent to the relocated access road at the northeasterly limits of the project area. Utility (sewer, water, etc.) and access easements may need to be revised prior to construction.

DESIGN CRITERIA:

Landscaping and views to nature are an important part of creating the therapeutic environment intended for this facility. Attention has been made to allow for direct views to courtyard spaces so each inmate will have a view to nature. Therefore, the landscaping will be of vital importance to the function of the new facilities. Note that the individual courtyards have a demising wall between them to restrict viewing across the yard to adjacent units. This wall need only be high enough

The following criteria and the Criteria Documents in general are provided to define the scope of the project and provide guidance to the Design-Build Entity. The Design-Build Entity is responsible for ensuring that design and construction of all improvements complies with all laws, codes, and regulations applicable to Ventura County, and that all systems are complete and functional for their intended purpose.

The Design-Build Entity shall include in his completed design, a landscape plan, an irrigation plan and color renderings to show plantings in courtyards and around perimeter of new structures. The design may include additional information as necessary to support the design presented, including the required design analyses described in these narratives. The following list represents what should be included in the landscape package but it is not intended to limit the Design-Build Entity from providing additional information as needed.

- Automatic Irrigation System – Complete automatic irrigation system for all planted areas as described on the planting plans.
- Planting Plan – Complete planting plan that takes into consideration the characteristics and value of the indigenous landscape in the region combined with responsible selection and implementation of new planting materials that are consistent with the existing Ventura County facilities.
- Plant Materials at Inmate Courtyards – Shrubs, groundcovers and trees are allowed for plant material selections in the inmate courtyards. Consideration should be made for plants that are frost and drought hardy and require a minimum of maintenance.
- Plant Materials at Other Site Locations – Match the existing plant materials insofar as they meet the other requirements for low water usage, frost and drought tolerance, and low maintenance.
- Design Concept – Provide color renderings to show planting context in courtyard, around perimeter of new structures and parking areas.

Sustainable Design

The Design-Build Entity shall consider all aspects of sustainable design to develop a water-efficient, low-maintenance landscape.

Quality Assurance

The Design-Build Entity shall submit a landscape needs related soil test analysis for review. Soil sampling is used to determine the nutrient supplying ability of the soil. This information is required in order to determine what fertilizers and forms of organic amendments needs to be supplemented. The accuracy and usefulness of the soil test depends on the soil sample submitted. Care must be taken to submit a good sample for the test results to be reliable and Design-Build Entity is directed to obtain all landscape related soil samples after all rough and final grading operations have been completed. The Design-Build Entity shall collect a soil sample for analysis from all planting areas to receive new planting. Special consideration shall be directed to the extents of the building pad areas where the potential exists for lime treatments which would have a detrimental effect on new plants.

Irrigation System Design Criteria and Requirements

Provide an irrigation system in coordination with the planting plan. The irrigation plan is to be designed by, and bear the stamp of, a California licensed landscape architect or certified irrigation designer. Materials and workmanship shall be in accordance with local codes and ordinances except where the provisions of this document exceed those codes or ordinances. In that case, these provisions prevail. The irrigation system shall be underground and shall be centralized computer controlled. All irrigation controllers shall be located in areas inaccessible to inmates. Irrigation can be by any conventional automatic delivery system – spray, rotor, or subsurface drip – with the exception of surface drip hose, which is prohibited. All spray irrigation must provide head-to-head coverage and be zoned by hydrozones.

Water and energy efficiency shall be a key element of the landscape design. Use PVC piping, automatic controllers, booster pumps, soil moisture sensors, weather stations, etc. as necessary to provide irrigation for efficient water use. Equipment to eliminate low-head drainage shall be utilized as necessary. Provide a narrative describing landscaping and irrigation design strategies, including water use calculation methodology used to determine savings and, if non-potable water is used, specific information about source and available quantity.

Warranty and Maintenance

The Design-Build Entity shall warranty the irrigation system, parts and workmanship, for one year after completion and acceptance. Maintenance of the irrigation system shall be provided for one year after

acceptance. Maintenance shall include winterizing the system if the maintenance period occurs during the fall or winter months, monitoring irrigation flows and spray heads for clogging and malfunctions and adjustments of spray patterns to ensure 100% coverage of all planted areas. The Design- Build Entity shall provide one training session for the on-site grounds maintenance staff at the completion of the maintenance period. Design-Build Entity shall provide one-year warranty that all trees and shrubs and groundcovers.

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GENERAL:

The following represents criteria for the design elements represented in the drawings, specifications and room data sheets and as such provides guidance to the Design-Builder. The Design-Builder is responsible for ensuring that the design and construction of this project complies with all laws, codes and regulations applicable to local detention facilities.

Performance criteria identify minimum levels of quality, materials and workmanship. These design criteria are intended to convey minimum requirements and where options are allowable those will be identified. Where no substitutions are allowed those items will also be identified. If not specifically excluded but not specifically allowed, other options may be considered.

Some portions of the project will require delegated design by the manufacturer of the products and/or systems. In those cases, the Design-Builder shall provide detailed calculations and design documentation for such systems prior to construction and submit for review by the applicable Authorities Having Jurisdiction.

Codes and Standards:

The architectural design of the project will be based on the following codes and standards:

- 2016 California Building Code (CBC), California Code of Regulation, Title 24, Part 2-Volumes 1 and 2 as amended therein.
- 2016 California Mechanical Code (CMC), California Code of Regulation, Title 24, Part 4 as amended therein.
- 2016 California Plumbing Code (CPC), California Code of Regulation, Title 24, Part 5 as amended therein.
- 2016 California Electrical Code (CEC), California Code of Regulation, Title 24, Part 3 as amended therein.
- 2016 California Fire Code (CFC), California Code of Regulation, Title 24, Part 9 as amended therein.
- 2016 California Energy Code, California Code of Regulation, Title 24, Part 6 as amended therein.
- 2016 California Green Building Standards.
- American Society of Civil Engineers – Minimum Design Loads for Buildings and Other Structures (ASCE 7-10)
- American Concrete Institute - Building Code Requirements for Structural Concrete (ACI 318-11)
- American Institute of Steel Construction – Steel Construction Manual (AISC 360-10)
- American Institute of Steel Construction - Seismic Provisions for Structural Steel Buildings (AISC 341-10)

- American Welding Society AWS D-1.1, "Structural Welding Code-Steel", latest edition.
- American Welding Society AWS D-1.3, "Structural Welding Code-Sheet Steel"' latest edition.
- American Iron and Steel Institute - Specification for the Design of Cold-Formed Steel Structural Members (AISI S100-07/S2-10)

BASIS OF DESIGN:

General Design Criteria:

The building design is based on the following preliminary code analysis:

Occupancy: B – Office for most of the southern half of the Support Building.

I-3 – All housing and other areas where ability to freely egress the building is restricted. Condition 4: This occupancy condition shall include buildings in which free movement is restricted from an occupied space. Remote-controlled release is provided to permit movement from sleeping units, activity spaces and other occupied areas within the smoke compartment to other smoke compartments.

Construction Type:

Option 1	Option 2
Type 1A	Type 1B

Note: I-3 not allowable in any other Construction Types for buildings over 5,200 sf.

Allowable Building Areas:

Allowable Building Area for B (accessory):

	Type 1A	Type 1B
Basic:	Unlimited	Unlimited

Allowable Building Area for I-3 (primary):

	Type 1A	Type 1B
Basic:	Unlimited	15,100 SF
Frontage Increase*:		15,100 SF Increase
Subtotal Allowable:		30,200 SF
Sprinklers Increase:		60,400 SF Increase
TOTAL ALLOWABLE		90,600 SF

*It is assumed that due to the position on the property the full 100% increase is achievable.

Actual Building Area:

Occupancy	Area
B (I-3overlay)	11,800 SF
I-3 Occupancy:	39,618 SF
TOTAL	51,418SF

Construction: Separated (provide 2-hour occupancy separation between B and I-3)

Note that the existing building is Type 1A construction. If the new building is a Type 1B construction then a 3-hour Fire Wall must be provided at the connection to the existing building with 3-hour rated openings. For this reason, Type 1A construction is highly recommended throughout.

Construction Requirements for Type 1A Construction:

Structural Frame: 3 hours (except for member supporting roof loads only which may be 1 hour)

Bearing Walls:

- Exterior: 3 hours
- Interior: 3 hours (except for members supporting roof loads only which may be 1 hour)

Non-bearing Walls and Partitions:

- Exterior: Greater than 30 feet – Non-rated
- Interior: Non- rated

Floor Construction and Secondary Members:

2 hours

Roof Construction and Secondary Members:

1-1/2 hours

Protection of Openings:

- Exterior: None Required
- Interior: 20 minutes for smoke and draft assemblies

  45 minutes for 1-hour wall penetrations (Maximum 1296 sq. in. panels glazed openings)

  90 minutes: for 2-hour wall penetrations (Maximum 100 sq. in. glazed opening)

Combustible Material in Type I and II Construction:

Allowable materials: Combustible materials shall be permitted in buildings of Type I or II construction in the following applications and in accordance with Sections 603.1.1 through 603.1.3:

1. Thermal and acoustical insulation, other than foam plastics, having a *flame spread index* of not more than25**.**

Exceptions:

1. Insulation placed between two layers of noncombustible materials without an intervening airspace shall be allowed to have a flame spread index of not more than 100.
2. Insulation installed between a finished floor and solid decking without intervening airspace shall be allowed to have a flame spread index of not more than 200.
2. Foam plastics in accordance with Chapter 26.
3. Roof coverings that have an A, B or C classification.
4. Interior floor finish and floor covering materials installed in accordance with Section 804.
5. Millwork such as doors, door frames, window sashes and frames.
6. Interior wall and ceiling finishes installed in accordance with Sections 801 and 803.
7. Trim installed in accordance with Section 806.
8. Where not installed over 15 feet (4572 mm) above grade, show windows, nailing or furring strips and wooden bulkheads below show windows, including their frames, aprons and show cases.
9. Finish flooring installed in accordance with Section 805.
10. Partitions dividing portions of stores, offices or similar places occupied by one tenant only and that do not establish a corridor serving an occupant load of 30 or more shall be permitted to be constructed of fire-retardant-treated wood, 1-hour fire-resistance-rated construction or of wood panels or similar light construction up to 6 feet (1829 mm) in height.
11. Stages and platforms constructed in accordance with Sections 410.3 and 410.4, respectively.
12. Combustible exterior wall coverings, balconies and similar projections and bay or oriel windows in accordance with Chapter 14.
13. Blocking such as for handrails, millwork, cabinets and window and door frames.
14. Light-transmitting plastics as permitted by Chapter 26.

15. Mastics and caulking materials applied to provide flexible seals between components of exterior wall construction.
16. Exterior plastic veneer installed in accordance with Section 2605.2.
17. Nailing or furring strips as permitted by Section 803.11.
18. Heavy timber as permitted by Note c to Table 601 and Sections 602.4.7 and 1406.3.
19. Aggregates, component materials and admixtures as permitted by Section 703.2.2.
20. Sprayed fire-resistant materials and intumescent and mastic fire-resistant coatings, determined on the basis of fire-resistance tests in accordance with Section 703.2 and installed in accordance with Sections 1704.12 and 1704.13, respectively.
21. Materials used to protect penetrations in fire-resistance-rated assemblies in accordance with Section 713.
22. Materials used to protect joints in fire-resistance-rated assemblies in accordance with Section 714.
23. Materials allowed in the concealed spaces of buildings of Types I and II construction in accordance with Section 717.5.
24. Materials exposed within plenums complying with Section 602 of the California Mechanical Code.
25. Fire-retardant-treated wood shall be permitted in:
    - 25.1. Nonbearing partitions where the required fire-resistance rating is 2 hours or less.
    - 25.2. Nonbearing exterior walls where no fire rating is required.
    - 25.3. Roof construction, including girders, trusses, framing and decking.

Basis of Design Materials:

Floors:

Exposed Concrete: The majority of the floors in the facility will be exposed concrete with 2 coats of liquid penetrating hardener/densifier similar to Ashford Formula in accordance with manufacturer's instructions. The first coat to be applied when the concrete has acquired initial set in accordance with manufacturer's instructions. The second coat will be applied immediately prior to substantial completion and then all floors polished using commercial floor buffing machines. Due to construction activities, if floors are not protected from stains and other contamination the Contractor may be required to burnish the floors with mechanically driven abrasive pads to remove the contamination prior to application of the final coat of hardener/densifier.

Vinyl Composition Tile: Multi-purpose, Interview, and Staff Areas.

Seamless Sheet Vinyl Flooring: In medical and other areas indicated where cleanliness and washabiltiy is a concern. Provide seamless vinyl flooring with heat welded seams and 6" high integral cove base.

Carpet Tile: Administration Area

Ceramic Tile: Staff toilet rooms, Tile should be unglazed through-color porcelain with epoxy modified latex thin-set grout except as noted otherwise.

Inmate Showers: Resinous floor and wall coating.

Inmate Shower Drying Areas: Treated as exposed concrete on grade with 2 coats of penetrating concrete sealer/densifier.

Base:

No Base: In general, all exposed concrete floors with Concrete or CMU walls will have no applied base to walls except at locations with finish floor materials. The wall/floor junction should be specially treated with pick resistant sealants in a cove where practical. Where rubber base is not provided, paint the first course of CMU a contrasting color. Avoid expansion joints in the concrete floor at this location if possible. Use asphalt impregnated construction paper as a bond breaker in this condition if required.

Resilient Base: Provide at walls with finish flooring other than ceramic tile.

Tile Base: Provide in concert with ceramic tile flooring in a cove base configuration.

Seamless Sheet Vinyl Flooring Base: As noted above, provide heat welded seamless vinyl cove base in conjunction with seamless vinyl flooring.

Walls:

Security Requirements: Walls shall be categorized as one of the following:

- ❑ Maximum: Solid grouted CMU construction with minimum #4 reinforcing bars at 8" on center each way.
- ❑ Medium Security: Solid grouted CMU construction with minimum #4 reinforcing bars at 8" on center vertically with horizontal reinforcing as required for structural continuity.
- ❑ Minimum Security: Solid grouted CMU construction with minimum #4 reinforcing bars at 16" on center vertically with horizontal reinforcing as required for structural continuity.
- ❑ Non-rated Cementitious Security: Solid grouted CMU construction with reinforcing as required for structural continuity.

Exterior Walls: Insulating CMU (Hi-R Wall or equivalent)

Insulating Requirements: Minimum R-19 total assembly.

Interior Walls:

Concrete Masonry Units or Precast Tilt Up Concrete, Painted: Minimum 6" thick precast concrete or medium weight concrete masonry units with semi-gloss or waterborne epoxy paint.

Impact Resistant Gypsum Board Walls, Painted: Minimum 5/8" thick impact resistant wall board on steel studs of gage and spacing to satisfy minimum structural requirements per Gypsum Association standards. Paint with semi-gloss or waterborne epoxy paint.

Security Impact Resistant Gypsum Board Walls: Minimum 4 inch by 18 gage steel studs at 16 inches on center with 16 gage by 3/4" galvanized flattened expanded metal lath spot welded or secured with #12 washer head screws at 12 inches on center vertically with one or more layers of gypsum, wallboard as required for stated fire or acoustical performance. The outer layer will be impact resistant wallboard. Paint with semi-gloss or waterborne epoxy paint.

Gypsum Board Walls, Painted: Minimum 5/8" thick resistant wall board on steel studs of gage and spacing to satisfy minimum structural requirements per Gypsum Association standards. Paint with semi-gloss or waterborne epoxy paint as indicated.

Ceramic Tile Walls: Unglazed ceramic tile over appropriate substrate but no less than fiberglass faced gypsum tile backer or cement backer boards. Provide setting method appropriate to the use and substrate used per Tile Council of America standards. Utilize epoxy modified latex grout.

Elevated Slabs:

The deck will be reinforced with reinforcing bars and filled with minimum 3000 psi concrete.

Stairs and Railings:

Stairs: Concrete metal pan stairs with steel channel or tube (plate stringers not allowed), with painted steel guard rails and stainless steel hand rails.

Miscellaneous Exterior Guard Railings: Galvanized and painted steel pipe or tube railings as required by code.

Ceilings:

Acoustical Panel Ceiling: Heavy Duty 2'x2' grid ceiling with square edge acoustical lay-in panels. All grid and panels are white.

Impact Resistant Acoustical Panel Ceiling: Heavy Duty 2'x2' grid ceiling with square edge impact resistant acoustical lay-in panels secured with hold down clips.

Gypsum Board Ceiling: Standard ceiling suspension framing per 2013 CBC Standard Gypsum Board Ceiling Details for Suspended and Joist Framing Construction. Minimum 5/8" thick type X gypsum board with standard finishing and texture system. Paint with 2 coats of 100% acrylic latex semi-gloss (inmate areas) or eggshell (staff and public areas) paint over recommended primer.

Moisture Resistant Gypsum Board Ceiling: Standard ceiling suspension framing per 2013 CBC Standard Gypsum Board Ceiling Details for Suspended and Joist Framing Construction. Minimum 5/8" thick glass fiber faced gypsum panel ceilings with setting type finishing compound over the entire surface of the exposed panel face and texturing as selected. Paint with 2 coats of water borne epoxy paint over compatible primer.

Impact Resistant Gypsum Board Ceiling: Standard ceiling suspension framing per 2013 CBC Standard Gypsum Board Ceiling Details for Suspended and Joist Framing Construction. Minimum 5/8" thick impact resistant gypsum board with standard finishing and texture system. Paint with 2 coats of 100% acrylic latex semi-gloss (inmate areas) paint over recommended primer.

Security Impact Resistant Gypsum Board Ceiling: Support framing consisting of minimum 18 gage studs at 16 inches on center framed between walls or suspended from structure above as require to support loads. Attach 16 gage by 3/4" galvanized flattened expanded metal lath to the framing spot welded or secured with #12 washer head screws at 12 inches on center. Apply a layer of minimum 5/8" thick impact resistant gypsum board with standard finishing and texture system. Paint with 2 coats of 100% acrylic latex semi-gloss (inmate areas) paint over recommended primer.

Non-perforated Double Skin Metal Plank Ceiling System: Non-perforated 16 gage steel (A40 zinc coated) by 24-inch-wide nominal 2-inch-thick double skin metal plank ceiling with either formed steel center core or double hat channel core. Individual panels are field welded at reinforced ship-lapped edges.

Non-Detention Doors and Frames:

Hollow Metal Doors and Frames: Utilize HMMA Custom Hollow Metal doors and frames where indicated. Door frames will be minimum 16 gage A60 coated steel. Exterior Door Frames will be minimum 16 gage A60 coated steel and interior doors will be minimum 18 gage A60 coated steel.

Wood Doors in Hollow Metal Frames: Utilize door frames as identified above for hollow metal doors and frames. Provide factory finished select all heart hardwood 5 ply with minimum slip matched veneers.

Hardware: Grade 1 mortise hardware; Schlage, Corbin-Russwin or Best, LCN Closers (no exceptions).

Roofing:

Roof System: Single ply membrane over extruded polystyrene insulation shall provide a minimum system R-Value of R-30.

Polyisocyanurate or expanded polystyrene plastic insulation is not acceptable. Provide tapered insulation as required as crickets to attain positive slope to roof drains and scuppers.

Single Ply Membrane Roofing: Fully Adhered, 60 mil PVC providing a minimum FM1-90 wind uplift rating.

Standing Seam Metal Roofing: At sloped roof areas (clerestories), provide 22-guage galvalume coated steel standing seam roofing with 3 coat 70% fluoropolymer coating

Alternative Membrane Roof Systems: Non-fleece backed TPO is also acceptable.

Membrane Roof Systems Not Allowed: Built-up Roofing.

Roof Accessories:

Roof Hatches: minimum 30"x36" roof hatches with safety railing systems and Ladder up system on the access ladder.

Roof Jacks: Pre-molded EPDM rubber with clamping rings.

Equipment Curbs: Custom fabricated pre-engineered insulated metal curbs. See mechanical narrative.

Walk Pads: Molded modular walk pads adhered to roofing membrane in a contrasting color from roof access points to all rooftop items which require regular maintenance access.

Scuppers, Conductor Heads, Gutters and Downspouts: A60 galvanealed steel sheet in gauges and forms per SMACCNA standards. Factory finish with minimum 2 coat 70% fluoropolymer coating system. Secure to building elements as recommended by SMACCNA.

Skylights: Provide SolaTubes for the Medical Area circulation spaces as indicated.

Louvers and Vents:

Extruded aluminum louvers with 2 coat 70% fluoropolymer finish system. Provide bird screens or insect screens were required to limit specific threats.

Millwork:

Architectural Cabinets: AWI or WI certified quality grade plastic laminated faced cabinets with flush overlay design. Provide European design 32 mm hardware system.

Hardware:

Pulls: Wire Pulls as specified.

Drawer Guides: Ball bearing full extension and partial extension guides as required for the application.

Hinges: 32 mm fully concealed heavy duty adjustable hinges.

Locks: Olympus Locks 777/888 series for removable builder's cylinder core compatible with established building standard keyway. Provide with ETS/ETST reinforcement trim and spacers.

Grommets: Plastic grommets as required.

Countertops:

Plastic Laminate Countertops: Horizontal grade plastic laminate on particle board or MDF substrates with minimum 1/2" thick by 1-1/2" deep solid surfacing nosings for use in staff areas.

Solid Surfacing Countertops: Custom fabricated solid surfacing made of minimum 1/2" thick solid surfacing on particle board or MDF substrates with 1-1/2" deep nosings for use in public and inmate accessible areas.

Furniture Fixtures and Equipment:

Detention Furnishings: Provided as part of the Design-Builder scope of work as defined by the Room Data Sheets and Specifications.

- Wall Mounted Painted Steel Bunk.
- Floor Mounted Stool with Stainless Steel Seat
- Wall Mounted Swing Stool with Stainless Steel Seat
- Accessible Wall Mounted Stainless Steel Desk
- Fixed Table with Stainless Steel Seats
- Molded Polymer Armless Seating
- Rotationally Molded Polymer Segmented Lounge Chairs
- Rotationally Molded Polymer Cube
- Television Brackets
- Television Enclosures
- Dayroom Video Visitation Stations (standard)
- Dayroom Video Visitation Stations (accessible)

Recreation Yard Security Mesh:

1/2" x 3" x 8 gage galvanized welded wire panels or approved alternative.

Vertical Transportation:

Hydraulic Elevator with Stainless steel frame, door and cab. May be holed hydraulic, holeless hydraulic, or machine-room -less. Cab sized to allow for transport of a gurney.

Acoustical Control:

In accordance with the American Correctional Association (ACA) 4th Edition and 2010 Standard Supplement Performance-Based Standards for Adult Local Detention Facilities (ALDF) 4th Edition (New Construction Only) noise levels in dayrooms shall not exceed the following:

- Unoccupied – 45dba (A Scale), building services systems shall be on and in normal operating condition. Mid-frequency average reverberation time (T 60) must be less than 1.0 sec.
- Occupied – 70dba (A Scale) for a minimum of 15 seconds of continuous average measurement in normal operating conditions.

ACA recommends that all monitoring shall be conducted in close proximity to the correctional officer's post. If a correctional officer's post is not identified then monitoring shall be conducted at a location considered best to monitor housing noise levels. Measurement shall be conducted a minimum of once per accreditation cycle be a qualified source.

Provide additional fiberglass acoustical control panels where required to meet these criteria. Acoustical panels will have minimum 16 gage factory painted perforated metal or Tectum as a surface for protection of the fiberglass insulation behind.

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GENERAL:

Building walls will provide a secure perimeter around the new Behavioral Housing Facility attached to the existing facility via a connecting corridor. The number of doors and windows through the secure perimeter will be minimized as allowed by Code. Doors and windows passing through the secure perimeter walls will contain detention grade windows, frames, doors, and hardware. Existing Central Control will be interfaced with the new building door and security controls. The integrated door controls, cameras, and intercoms will allow the facility staff to efficiently and safely control circulation.

Detention Equipment Contractor:

The Detention Equipment Contractors (DEC's) shall be pre-qualified to bid this scope of work in order to maintain the highest level of quality. Refer to Section 01 35 13 for qualification requirements. Each contractor must have a proven history of successfully completing correction projects of similar size and scope. All work shall be completed in accordance with the current requirements of codes, standards, and agencies. This scope shall include:

- ❑ Detention Hollow Metal
- ❑ Detention Hardware
- ❑ Security Glass
- ❑ Coordination, integration, and interfacing required with the door locking control systems.
- ❑ Training and demonstration to the Owner for the operation and maintenance of all equipment provided.

The project may include additional scopes of work that the General Contractor may choose to be provided by the DEC. This work may include the following

- ❑ Commercial Hardware
- ❑ Commercial Hollow Metal
- ❑ Commercial Glass
- ❑ Metal Wall Panels

All existing security glass, hardware, and hollow metal in the facility will remain. New security glass, hardware, and hollow metal will be added to the expansion to extend the secure perimeter around the entire facility.

Detention Hollow Metal:

The Detention Hollow Metal will be manufactured by a nationally recognized manufacturer equal to Trussbilt. The security detention Hollow Metal Doors, Frames, and Windows will be custom fabricated and shall comply with:

- ❑ ASTM F1450-12a Standard Test Methods for Hollow Metal Swing Door Assemblies for Detention and Correctional Facilities

- NAAMM 863 Guide Specifications for Detention Security Hollow Metal Doors and Frames
- ASTM F1643 Standard Test Methods for Detention Sliding Door Locking Device Assembly.

Dayroom window frames shall be designed so the inmate side has a frame that is as flush to the glass as possible to eliminate a "ledge" for setting objects or climbing upon. Bars over windows shall not be used to allow for clear unobstructed observation of inmates.

Detention Hollow Metal Frames for detention doors and detention windows shall be constructed of 12-gauge steel in all areas. Cell doors shall be constructed of 12-gauge steel. Detention Hollow Metal Doors for utility rooms can be 14-gauge. Center mounted cuff ports will also be utilized in all cells.

Detention Hardware:

The facility has a combination of pneumatic sliding devices and electro-mechanical sliding devices and swing doors. This arrangement shall be carried into the new housing unit. Section entry doors shall be pneumatic sliding devices equal to the existing Airteq pneumatic sliding devices. Cell doors will be electro-mechanical swing and sliding devices. The electro-mechanical hardware will be equal to Southern Folger. All existing key cylinders are Southern Steel. The new housing unit will be a separate area and can be keyed differently than the existing. The successful DEC shall coordinate the key schedule with the owner for approval. Detention hardware shall include but is not necessarily limited to mechanical and electro-mechanical security locks for swinging doors and sliding devices as utilized per the following:

Secure interior section (dayroom) entry doors shall utilize a pneumatic sliding device by Airteq or Southern Steel, equipped with paracentric key cylinders. These doors will be controlled/monitored from Central Control.

Secure perimeter exterior doors, controlled circulation swing doors and control rooms shall utilize an electro-mechanical wide jamb lock equal to the Southern Steel 10120 series motorized lock for swinging door applications, equipped with paracentric cylinders and shall include a triple biased magnetic door position switch equal to the Southern Steel 200 MRS. These doors will be controlled/monitored from Housing Control or Central Control as appropriate. All motorized swing locks will be provided with a ½ cycle function to allow the door to remain unlocked during designated hours and emergency release.

Doors to activity rooms, offices, mechanical and electrical rooms, laundry room, medical supplies, section offices, section classrooms and section janitor's closets will utilize a mechanical lock equal to the Southern Steel 10500 series with a door position switch.

All detention doors shall be monitored for lock bolt position either through a bolt sensor integral to the lock or through a bolt position monitor in the bolt strike equal to the Southern Steel 500CL.

Shower doors where indicated on the plans will be stainless steel with detention grade mesh panels in the upper and lower sections for proper airflow. Shower doors will be provided with remotely controlled locks.

Remotely controlled yard pedestrian swing gates will utilize a solenoid lock equal to the Southern Steel 1050D.

Cuff and shackle ports in cell doors shall be center mounted. Cuff ports shall utilize a deadbolt lock equal to Southern Steel 1010. When in a fire-rated opening, these doors will utilize a Southern Steel 1017 series snap-lock.

Paracentric key cylinders shall be kept to a minimum.

Doors shall utilize miscellaneous hardware where applicable, which will include pulls, closer, hinges, stops, and weather-striping.

Security Glass:

Pre-approved glass manufacturers, Global Security Glazing or Sheffield Plastics, will provide the Security Glass. A variety of glass types & thickness will be utilized. The products selected will offer the level of secure protection against physical attack required in various locations. Spares should be provided for backup stock.

Narrow slit glazing of 5" or less at the back of the cells does not have to carry a detention attack rating. It should be frosted or affected so that it allows light but does not allow inmates to see clearly into the pipe chase.

Glass-Clad Polycarbonate laminates will be used at all detention locations. A variety of glass types & thickness will be utilized. The products selected will offer the level of secure protection against physical attack required at various locations in the facility. These products shall comply with HPW TP-0500.02 level II through IV forced entry and WMFL level II and III Ballistic, Physical, and Flame, attack testing requirements. Refer to sheet SE0.0 for the detention glazing to be used for this project. Glazing is indicated in the detention symbol by the doors and windows on the plans. Provide insulated glazing as required by the DBE energy design including but not limited to:

Standard Security Glass Clad Polycarbonate:

- ❑ High Security: 1" Glass Clad Polycarbonate (WMFL level II - 60-minute physical attack, ASTM F 1915-12 Grade 1 - 60-minute containment).
- ❑ Medium Security: 3/4" Glass Clad Polycarbonate (WMFL level III - 30-minute physical attack, ASTM F 1915-12 Grade 2 - 40-minute containment).

- Low Security: 11/16" Glass Clad Polycarbonate (HPW Level II Forced entry, ASTM F 1915-12 Grade 3 - 20-minute containment).
- Vandal Resistant: 9/16" Glass Clad Polycarbonate (HP White Level I-TP-0500.02, ASTM F 1915 Grade 4 – 10-minute containment).

Insulated Security Glass:

- High Security: 1-5/8" SB70XL tinted tempered glass clad polycarbonate laminate air-gap unit, equal to Global Security Glazing Secur-Tem + Poly SP028 with hermetically sealed air-gap insulation, or approved equal. H.P. White (TP-0500-03) Level B Ballistics, ASTM F 1915-98 Grade 1 – 60-minute containment rated.
- Medium Security: 1-3/8" SB70XL tinted tempered glass clad polycarbonate laminate air-gap unit, equal to Global Security Glazing Secur-Tem + Poly SP019 with hermetically sealed air-gap insulation, or approved equal. WMFL Level III 30-minute physical attack, HP White (TP-0500) Level IV forced entry, ASTM F 1233 9mm ballistics, ASTM F 1915-05 Grade 2 – 40-minute containment rated.
- Low Security: 1-15/16" SB70XL tinted tempered glass clad polycarbonate laminate air-gap unit, equal to Global Security Glazing Secur-Tem + Poly 2116 or approved equal. H.P. White TP-0500.02 Level II forced entry, ASTM F1915-12 Grade 3 – 20-minute containment, H.P. White TP-0500.02 Level B ballistic rating (Spall; no penetration).

Fire Rated Security Glass (where fire ratings occur):

- High Security: 2" UL fire rated for 60 minutes, equal to Global Security Glazing Ultimax 60-SP028 (60-minute containment rating)
- Medium Security: 1-13/16" UL fire rated for 60 minutes, equal to Global Security Glazing Ultimax 60-SP019 (40-minute containment rating)
- Low Security: 1-3/4" UL fire rated for 60 minutes, equal to Global Security Glazing Ultimax 60-2116 (20-minute containment rating)
- Vandal Resistant: 1-5/8" UL fire rated for 60 minutes, equal to Global Security Glazing Ultimax 60-2117 (10-minute containment rating).

DESIGN CRITERIA:

The following criteria are provided to define the scope of the project and provide guidance to the Design-Builder. The Design-Builder is responsible for ensuring that design and construction of all improvements complies with all laws, codes, and regulations applicable to local detention facilities and that all systems are complete, integrated, cohesive and functional for their intended purposes.

The Design-Builder shall provide detailed calculations and design documentation for all systems prior to construction and submit for review by the applicable Authority Having Jurisdiction (AHJ). Performance criteria identify minimum levels of quality, materials, and workmanship.

Codes & Standards:

The Structural design of the project shall be based on the following codes and standards:

- 2016 California Building Code (CBC), California Code of Regulation, Title 24, Part 2-Volumes 1 and 2 as amended therein.
- 2016 California Green Building Standards.
- American Society of Civil Engineers – Minimum Design Loads for Buildings and Other Structures (ASCE 7-10)
- American Society of Civil Engineers – Building Code Requirements for Masonry Structures (ASCE 5-13)
- American Society of Civil Engineers – Specification for Masonry Structures (ASCE 6-13)
- American Concrete Institute - Building Code Requirements for Structural Concrete (ACI 318-14)
- American Institute of Steel Construction – Steel Construction Manual (AISC 360-10)
- American Institute of Steel Construction - Seismic Provisions for Structural Steel Buildings (AISC 341-10)
- American Welding Society AWS D-1.1-10, "Structural Welding Code-Steel", latest edition.
- American Welding Society AWS D-1.3-08, "Structural Welding Code-Sheet Steel"' latest edition.
- American Iron and Steel Institute - Specification for the Design of Cold-Formed Steel Structural Members (AISI S100-07/S2-10)

BASIS OF DESIGN:

General Design Criteria:

The structural design of the project shall be based on the following design criteria:

- Dead Loads: In addition to the self-weight of the structural framing members, dead loads include but are not limited to suspended mechanical ducts, piping including the weight of the water, plumbing and fire protection pipes, electrical lighting and cables, ceiling, floor finishes, access flooring, insulation and roofing.
- Live Load:
  - Roof = 20 psf
  - Stairs = 100 psf
- Seismic:
  - Seismic Design Category D
  - Importance Factor, IE = 1.25
  - Risk Category III
  - All life safety equipment shall be anchored using an Ip=1.5. This includes the emergency generators, fire sprinkler system exhaust systems for smoke and egress lighting. All equipment related to the above systems shall have special seismic certification.
- Wind:
  - Ultimate Design Wind Speed - 115 mph
  - Exposure Level - Exposure C

Structural Systems

System description:

- The facility will be constructed using the following materials: The roof system will consist of 2-1/2" light weight concrete over 2W x 20-gauge metal deck spanning to steel beams. The steel beams will be supported by a mix of steel girders and concrete masonry unit (CMU) bearing walls. The bearing and shear walls will be 8" thick solid grouted reinforced CMU (medium weight) walls. The lateral system will consist of intermediate reinforce masonry shear walls. The walls will be supported by conventional shallow foundations.
- The non-bearing security walls will be free standing solid grouted reinforced 8" CMU (medium weight) walls.
- Second level floors will be concrete over metal deck supported by steel beam framing.
- The facility will be separated from the existing building by seismic joints as needed.

- The roofs consist of fireproofed metal deck spanning to fireproofed steel beams or joist.
- The clerestory roofs consist of bare metal deck spanning to steel beams.
- The cells will be load bearing and shall be designed to support their own vertical and lateral loads.

ALTERNATE SYSTEMS:

The structural design of the project shall make provisions for the following alternates to the systems and equipment.

Alternates Allowed

- Tilt-up, precast or cast-in-place concrete walls
- Hollow core concrete plank for the roof with light weight concrete topping

Alternates Not Allowed

- Open web joists are not permitted unless a security ceiling is provided in secure areas.
- Post-tensioned concrete is not permitted.

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DESIGN CRITERIA:

The following criteria are provided to define the scope of the project and provide guidance to the Design-Builder. The Design-Builder is responsible for ensuring that design and construction of all improvements complies with all laws, codes, and regulations applicable to local detention facilities and that all systems are complete, integrated, cohesive and functional for their intended purposes.

The Design-Builder shall provide detailed calculations and design documentation for all systems prior to construction and submit for review by the applicable Authority Having Jurisdiction (AHJ). Performance criteria identify minimum levels of quality, materials, and workmanship.

Codes & Standards:

The mechanical design of the project shall be based on the following codes and standards:

- 2016 California Building Code (CBC), California Code of Regulation, Title 24, Part 2-Volumes 1 and 2 as amended therein.
- 2016 California Electrical Code (CEC), California Code of Regulation, Title 24, Part 3 as amended therein.
- 2016 California Mechanical Code (CMC), California Code of Regulation, Title 24, Part 4 as amended therein.
- 2016 California Plumbing Code (CPC), California Code of Regulation, Title 24, Part 5 as amended therein.
- 2016 California Energy Code, California Code of Regulation, Title 24, Part 6 as amended therein.
- 2016 California Fire Code (CFC), California Code of Regulation, Title 24, Part 9 as amended therein.
- 2016 California Green Building Standards.
- Items not covered herein and in the above documents shall conform to the applicable provisions of the following codes and standards: ASHRAE Standards, SMACNA Standards.

BASIS OF DESIGN:

General Design Criteria:

The mechanical design of the project shall be based on the following design standards:

- Provide a Mechanical System including but not limited to chillers, boilers, pumps, air handling units, air distribution, VAV boxes, piping, controls, TAB and commissioning complete in place, tested and approved, as specified, and as needed for a complete, usable, reliable and proper installation. All equipment shall be installed per the criteria documents and manufacturer's recommendations.

- Provide design, engineering, installation, start-up, testing, adjusting, load balancing and commissioning of complete and operational electrical systems and related distribution.
- Provide detailed engineering calculations for all systems prior to construction to confirm final sizes and equipment configurations and submit for approval by the County. Performance Criteria shall identify minimum levels of quality, materials and workmanship.
- The Design-Build Entity shall provide all commissioning required through completion of construction. A commissioning agent shall be hired by the County to verify the Design-Build Entity commissions the building to meet performance requirements.
- The entire mechanical system design must be based on an overall level of quality and maintainability commensurate with a County owned, long term investment. The design shall incorporate proven technology and equipment.
- The mechanical system shall be designed using the most stringent and latest adopted editions of the codes, standards and guidelines published.
- All mechanical equipment and materials shall be installed to not be damaged or cause damage to other systems during a seismic event.

Utility Incentives – SCE:

- Design-Build Entity shall provide consulting and construction assistance to the County to obtain Savings by Design energy incentive financing from Southern California Edison (SCE).
- Refer to Savings by Design Participant Handbook, published by SCE.
- Create and submit to SCE Savings by Design application(s).
- Provide energy modeling software and simulations required by the Savings by Design Program.
- Establish the Title 24 baseline.
- Demonstrate to SCE the energy model and electric energy savings in excess of Title 24 minimums.
- Complete the Savings by Design contract with SCE for available rebates to the owner.

Design Standards:

The mechanical design of the project shall be based on the following design per ASHRAE Standards:

- City: Santa Paula

- Latitude: 34.4
- Longitude: 119.1
- Outdoor Summer Design Conditions: 94°F DB/70°F WB.
- Outdoor Winter Median of extremes: 28°F DB.

Room temperature shall be as indicated below:

- Housing Day Room & Inmate Cells: 75°F Cool/70°F Heat
- Housing Administrative Segment: 75°F Cool/70°F Heat
- Support Administration/Staff Services: 75°F Cool/70°F Heat
- Support Storage: 78°F Cool/68°F Heat
- Support Medical Exam: 75°F Cool/70°F Heat
- Conference Rooms: 75°F Cool/70°F Heat
- Support Main Circulation: 75°F Cool/70°F Heat
- Ventilation and exhaust rates will be designed to meet the 2016 CMC requirements.
- Space humidity essentially will not be controlled. However, the design of air conditioning systems will be provided to maintain space humidity under 70%.

Existing Conditions:

The site is served by two existing centrifugal chillers tagged as CH-1 and CH-2. CHI-1 is a 325-ton nominal capacity centrifugal chiller provided as a replacement for an old heat absorption chiller. The new chiller is manufactured by Multistack, equipped with (3) three Turbocore compressors and is approximately five years old. Chiller CH-1 is used most of the time with the exception of the short time allocated for the CH-2 operation once a week for approximately 3 hrs. or when chiller CH-1 is under maintenance or repairs. Nevertheless, the Turbocore compressors maintenance can be performed with the rest of compressors operation uninterrupted. Chiller CH-2 is 360-ton nominal capacity centrifugal chiller manufactured by York and is at the end of useful service life. This chiller is used only as a backup for CH-1.

Only one chiller operates at any time. The existing facility peak cooling load is approximately 300-ton that means the chiller plant is maxed out. Both chillers are furnished with two cooling towers intended to serve only one operating chiller. Bypass piping is provided for the two cooling towers connection in order to allow for the cooling towers maintenance and use with either chiller.

The chilled water distribution is provided via Variprime chilled water piping loop configuration with the existing 12" dia. piping size within the central plant. It appears the piping is large enough to accommodate both chillers should the chillers be required to run at the same time. The loop is required to operate at a minimum water flow that is not working well with the York chiller at the part load conditions, due to the condenser water flow requirements mandated by the chiller's manufacturer.

The existing central plant is located in a close proximity from the future location planned for the new building addition. At the present time, the central plant has sufficient capacity for the existing site with no spare cooling capacity left for the future expansion.

The existing central plant is on emergency power apparently due to the county power grid failures occurring several times a year.

The existing heating systems at the jail are provided for the individual buildings. The systems were not evaluated during the site visit and have no impact on the DLR Group scope of work.

Indoor Design Conditions:

The indoor design conditions are indicated for the occupied spaces and shall be selected with the short time swing of ±3°F.

- ❑ Classrooms: 75°F Cool/70°F Heat
- ❑ Dayrooms: 75°F Cool/70°F Heat
- ❑ Corridors/Hallways: 75°F Cool/68°F Heat
- ❑ Staff Offices/Reception/Conference: 75°F Cool/70°F Heat
- ❑ Medical Exam Rooms: 75°F Cool/70°F Heat
- ❑ Medical Offices: 75°F Cool/70°F Heat
- ❑ Support Administration/Staff Services: 75°F Cool/70°F Heat
- ❑ Public visit: 75°F Cool/72°F Heat
- ❑ Public Restrooms: 75°F Cool/72°F Heat
- ❑ Storage/ File Rooms: 75°F Cool/68°F Heat
- ❑ Dormitories/Cells: 75°F Cool/70°F Heat
- ❑ Control room: 75°F Cool/70°F Heat
- ❑ IT Room/Security electronics: 72°F Cool

- Electrical/ Mechanical Rooms: 80°F Cool
- The summer unoccupied design temperature shall not exceed 85°F to prevent excessive heat storage in the space and to assure the house plants will survive the space elevated temperature. The unoccupied room winter minimum temperature shall be 55°F to control mold development.
- Ventilation/exhaust rates, direct exhaust requirements, and positive/negative pressure relations shall be designed to meet the 2016 CMC requirements and NFPA standards. The space pressurization shall be maintained negative for all areas where there is a potential for the cross contamination and spread of a disease dirty linen, toilets, and bio hazard storage.
- Smoke detection systems shall be designed to meet the 2016 CMC and the NFPA standards.
- Humidity control: The air conditioning systems shall be designed to ensure the summer humidity is maintained below 70% RH during part load conditions. In general, humidity shall not be controlled unless specifically required by the owner or by this document.
- Demand control ventilation strategies and CO2 sensors shall be provided in all classrooms and conference rooms to meet the 2016 CMC and 2016 CEC Title 24.

Building Hours of Operation:

To be provided by the Owner, this will be critical to final system selection due to the elevated occupancies at specific times of the year. The staff however will be available 24/7.

Occupancy Heat Gain:

Space	Basis	Heat Gain Sensible/Latent
Exam Room	2 people	250/200 Btu/hr.
Mental Health	3 people	250/200 Btu/hr.
Offices	100 ft²/person	250/200 Btu/hr.
Conference/Meeting	15 ft²/person	250/200 Btu/hr.
Holding	7 people	200/145 Btu/hr.
Corridor/Hallway	300 ft²/person	250/200 Btu/hr.
Lockers	10 people	250/200 Btu/hr.
Dormitories	12 people	250/200 Btu/hr.
Public visit	13 visitors/13 inmates	250/200 Btu/hr.
Culinary Arts	12 people	250/200 Btu/hr.
Classrooms	13 people	250/200 Btu/hr.
Storage room	1 person	250/200 Btu/hr.

Internal Heat Gains:

Space	Equipment Load	Lighting Load
Exam Room	1.5 W/ft^2	1.2 W/ft^2
Private Office	1.5 W/ft^2	0.75 W/ft^2
Open Office	1.5 W/ft^2	1 W/ft^2
Conference/Meeting Rooms	1.5 W/ft^2	1.2 W /ft^2
Classroom	1.5 W/ft^2	1.2 W/ft^2
Copy/work	3 W/ft^2	1.2 W/ft^2
Culinary	3.0 W/ft^2	1 W/ft^2
Holding cell/Dormitories	n/a	0.6 W/ft^2
Toilets	n/a	0.6 W/ft^2
Hallways	n/a	0.6 W/ft^2
Storage rooms	n/a	0.6 W/ft^2

Note: Actual heat gain from lighting shall be determined by the lighting designer.

Miscellaneous Internal Heat Gains:

The equipment heat gain listed in the project program will be used to perform cooling load calculations. Calculations will include air handling unit's fan motor heat, if motor is in air stream.

- Thermal comfort zones shall be defined by the design using ASHRAE best practices and shall be submitted for the Owner's review and approval. Design team will determine the appropriate quantity and layout for zone distribution systems and shall coordinate all thermostat and temperature sensor locations with the Owner during the Schematic Design Phase. However, the design team will recommend the following minimum requirements:
  - Office Spaces: No more than four private offices on a single comfort zone.
  - Conference Rooms: Conference rooms shall be an independent comfort zone.
  - Exam/Interview rooms: No more than four rooms on a single comfort zone.

- Classroom will be an independent comfort zone.
- Culinary Arts will be an independent comfort zone.
- Dayroom will be an independent single zone.
- Sleeping Room will be an independent comfort zone.

- Security registers shall be provided as required in all security areas and all inmate accessible areas with the locations submitted for review by the Owner during the design phase to ensure proper air distribution in occupied/unoccupied spaces. Register locations shall be designed using ASHRAE and SMACNA best practices.
- Standard registers shall be provided in non-secure areas. Register locations shall be designed using ASHRAE and SMACNA best practices.

Energy Conservation Measures:

The overall goal of the project is to provide the design that reflects and develops sustainable living environment. This will be accomplished through the architecture and programming, but also through developing a mechanical scheme that reduces carbon footprint and pushes as much as possible to reduce the buildings annual energy consumption through innovative design.

The proposed for this project equipment shall comply with the OPR requiring the equipment to last approximately 30 years. Although the good quality equipment cost is higher than the low grade commercial equipment lasting 12 to 15 years, the reduced maintenance and long equipment life will benefit the installation in a long run. Having equipment with shorter operating life effects will increase the carbon footprint, will affect the payback and creates disruptions associated with the equipment replacement.

Building Envelope:

The new building envelope shall exceed the requirements of the 2016 Title 24 Part 6 California Energy Code for minimum thickness of roof and wall insulation. Refer to the architectural design criteria for detailed design of the building envelope.

Building Envelope: Provide thermal insulation of a performance up to 20% greater than the minimum required to the California Energy Code.

Fenestration: Double pane windows.

The building envelope must be as energy efficient as possible to reduce the overall heat gain/loss and therefore, consume less energy to heat or cool it. Based on the California Energy Commission Title 24, we would recommend the following insulation values in the envelope.

Building Envelope Recommendations:

Location	Assembly Type	Title 24 Min. R-Value	Recommended Insulation Min. R-Value	Remarks
All Exterior Walls	Above grade	R-13	R-21	Rigid insulation with R-7 per inch
Roof		R-19	R-30	Bat insulation

Energy Usage Reduction Measures:

A goal of the project team is to pursue an energy conscious design. This shall be accomplished in a number of ways including the following:

- Use equipment that will offer long operating life.
- Pipe and duct insulation minimum thickness shall exceed the California Energy Code by a minimum of 20%.
- Air handling units utilizing exhaust air heat recovery.
- Air cooled
- Premium efficient ECM or VFD driven motors shall be provided for equipment.
- Variable speed pumping.
- High efficiency condensing boilers.
- CO2 sensors to reduce outside air quantities during reduced occupancy periods in high occupancy spaces.
- Use of non-heat generating solid state light fixtures.
- Tight schedule of systems operation.
- System monitoring and control through the building management system.

Noise Criteria:

Sound and noise transmission between spaces as well as from the mechanical systems is of critical importance to the buildings program. The Mechanical Systems design will incorporate the noise criteria for occupied spaces in order to maintain the following:

Area	Average NC (DB)	Octave Band Number							
		1	2	3	4	5	6	7	8
Private Office/Conference Room/Holding	30	57	48	41	35	31	29	28	27
Exam Rooms	35	60	53	46	40	36	34	33	32
Public Office	40	64	57	51	45	41	39	38	37

Comfort Control:

The thermal comfort of an individual in a space is dependent on a number of factors as follows:

Dry bulb temperature (temperature of the air)

Wet Bulb Temperature (measure of moisture level in the air)

Clothing Type (Clo value)

Air Movement

Radiant Temperature (mean temperature of the space surfaces)

Air Handling Unit Outside Air Intake:

a. Each air handling unit shall be provided with two outside air intakes: one to provide minimum outside air flow and the other to facilitate the economizer operation.

b. When outdoor air quality is unhealthy due to the agricultural activities and as determined by the provided under this project weather station, the air handling units will be directed by the BMS to operate at the minimum required outside air, which will be measured by air flow measuring station and controlled by a modulating control damper (between 0.15 cfm per sq. ft. and the minimum occupied space OA capacity setting. MERVE 8 pre-filter and a charcoal filter will be installed in the outside air stream to remove outside air polluters.

c. When air quality is good and cool and below 68°F, the air conditioning units will be directed by the BMS to operate in the economizer mode. The outside air control damper will open to provide 100% OA flow into the building, based on the demand. In this mode, the minimum outside air damper will completely close.

Proposed HVAC Systems:

Central Chiller Plant:

The building size and configuration will require approximately 150 tons of cooling capacity. Due the fact that the facility must have redundancy, we propose the following design concept for the central chiller plant:

Air-Cooled Packaged Outdoor Water-Chiller include (4) four Turbocore compressors modular chillers as manufactured by Multistack Co. or approved equal providing 240-ton nominal capacity intended for the new addition only. The forth 60-ton compressor is redundant and it will assure uninterrupted central plant operation in case of failure or scheduled maintenance of one of the compressors. The chillers will provide 44° F chilled water supply with 12°F - 14°F temperature rise.

Central Boiler Plant:

The hydronic heating system shall be designed for the new addition and should consist of two outdoor mounted advanced thermal hydronic boilers manufactured by ATH, Model KN-6 high efficiency cast iron condensing boilers. The combustion chambers shall be constructed of cast iron and the boilers will be rated for outdoor use. The boilers will provide HeatNet lead lag automated control capability. The burners shall be capable of 99% efficiency without exceeding a NOx reading above 20 ppm. The system will be used to provide heating during cold weather conditions or provide reheat in zones requiring terminal reheat.

VAV Air Handling Units:

(2) Two VAV air handling units will be selected to deliver supply air throughout the new building addition and will be manifolded into a common system in order to assure uninterrupted air conditioning system operation. Each of the air handling units will be double wall construction and equipped with (2) two supply and (2) two return fans, MERVE 13 filters, and economizer in order to utilize "free cooling during the mild weather conditions. Each unit will be provided with isolation damper mounted on supply and return duct mains in order to isolate the unit when the system will operate at the part load conditions and only one unit is needed to deliver air or one of the units is being repaired. Security bars will be provided at all roof and wall duct openings larger than 5 inches. We propose considering air handling units manufactured by Energy Labs and Munters.

The units will deliver supply air to the individual comfort zones controlled by individual room thermostat or temperature sensor.

Each unit outside air intake will be configured as described in the "Air Handling Unit Outside Air Intake" paragraph above.

Split Air Conditioning Cooling Only Units:

IT and electrical rooms will; be fed from the building air conditioning systems and will be individually served by a split air conditioning system to assure uninterrupted temperature control. Split cooling only system is an all-electric system consisting of an indoor fan coil section and the outdoor air cooled condensing unit interconnected via refrigeration tubing. The split air conditioning systems will be on emergency power in order to prevent servers and other electronic systems from failure during power outage or other emergencies.

Air Delivery Methodology:

Air is supplied from either ceiling diffusers or sidewall registers at temperatures ranging from 55 °F in the cooling season to 95 deg. F in the heating season. Air is also returned from high level via hard ducted return registers. This is a conventional air supply system and quite simple to control.

Security grilles will be provided at all inmate accessible areas. Equipment located 10 feet above finished floor is considered inaccessible by inmates. Inmate cells will be provided with ceiling mounted supply and exhaust distribution. The basis of design will be as follows: Titus diffusers.

General Exhaust:

The following rooms will be 100% exhausted:

- Toilets and restrooms
- Janitor closets
- Holding Cells
- Soiled Utility
- Armory
- Locker Rooms

Ductwork System:

General:

Duct systems shall be designed to obtain lowest cost-beneficial pressure loss by limiting certain duct velocities, avoiding dynamic loss components where possible and utilization of low dynamic loss components. High-loss fittings, such as mitered elbows, abrupt transitions, and takeoffs and internal obstructions must be avoided.

Distribution system pressure losses shall be determined by total pressure. The use of the "static regain" is encouraged as design methods. However, other methods are acceptable provided it can be demonstrated that the results are comparable to the above specific procedures.

It is an objective to design the pressure distribution duct (between the air handling units and terminal VAV units) for pressure drops to 3.0-inch WG or less. Long duct runs shall be designed with special consideration of pressure loss since the maximum loss for any run shall be imposed upon the entire fan system.

Horizontal duct distribution shall be routed to maximize long, straight runs without multiple penetrations through fire and/or smoke partitions. Multiple horizontal mains shall be of comparable length and configuration to equalize pressure losses. The overall object is to route ducts that will avoid or minimize architecturally and/or structurally induced dynamic losses.

Sheet metal gages shall be minimum 22 gage and in accordance with SMACNA. Construction of ductwork, except for gage thickness, shall be in accordance with SMACNA 1995-second edition for the appropriate duct pressure classification. Provide variations in duct size, and additional duct fittings as required to clear obstructions and maintain clearances.

Provide drive slip or equivalent flat seams for ducts exposed in the conditioned space or where necessary due to space limitations. Longitudinal seams shall use Pittsburgh lock. Button punch snap lock shall not be used on this project. On ducts over 48" wide, provide standard reinforcing on inside of duct. Run outs to grilles, registers or diffusers on exposed ductwork shall be the same size as the flange outer perimeter on the grille, register, or diffuser.

Return air system shall be ducted.

Friction Losses and Minimum Duct Sizes:

Supply air ducts from cooling unit's discharge up to the end of the main duct shall be sized for friction losses between 0.1 to 0.15 inches WG/100 feet but not exceeding a velocity of 1500 fpm. Note: Constant volume systems shall be designed for the low end of the friction range and variable volume systems to the high end of the range for the full cfm without diversity. Minimum size duct to terminal units shall be eight inches in diameter but not less than terminal inlet size.

Supply air ducts for main duct branches, return air ducts, and general (e.g., toilet) exhaust ducts shall be sized for friction losses between 0.08 and 0.12 inches WG/100 feet but not exceeding 800 fpm and 500 fpm for the branch to diffuser/register connection. If air inlet or outlet neck size is smaller than these minimum requirements the final run out of less than seven feet in length may be equivalent to the diffuser neck size.

Grilles, Registers and Diffusers

The face velocity at the diffusers shall not exceed 400 fpm.

All inlets and outlets shall be selected at least 10 NC levels below the NC level of the room.

All supply outlets shall be provided with a minimum of 6' of flexible ductwork to reduce vibration transmission, provide sound attenuation and assist in locating the diffusers in the ceilings or walls.

Controls:

General

A modular direct digital control (DDC) system shall be provided for the HVAC system. The facility standard control system will be used with no substitutes to provide energy management, schedule maintenance and provide monitoring of all HVAC and plumbing systems. A common data highway shall link the modular controllers. Wall mounted thermostats shall be used in all free of inmates' areas. Areas occupied by inmates shall be provided with ceiling or duct mounted temperature sensors. All control components shall be electronic.

DDC system shall also be used for interlock with fire and security alarms for emergency shutdown.

Insulation:

Chilled water and heating hot water piping, supply air ductwork and return ductwork exposed to unconditioned or concealed spaces and equipment shall be insulated. The insulation thickness as a minimum shall be as listed in the California Energy Code plus 20% additional thickness rounded up to the next nominal thickness.

Sound, Vibration and Seismic Control:

HVAC equipment and systems can generate vibration. Ductwork shall be designed to minimize vibration, conducted noise, and transmitting airborne noise. Supply, return and/or exhaust air fans, and the like should be located away from sensitive areas, and housed in mechanical rooms with walls designed to attenuate noise from the equipment.

The following equipment shall be provided with vibration isolation:

- Fans (all ceiling mounted fans)
- Air Handling Units
- Air cooled condensing units

Sound attenuators (duct silencers) will be provided for air handling units supply, and return. However, duct silencers will only be considered when duct distance is not sufficient to provide adequate acoustical separation between rooms.

Specific areas requiring attention to control noise and vibration may include:

- Fan noise, transmitted either through the structure or through the duct system.
- Noise generated by air flowing past dampers, turning vanes and terminal device and louvers.
- Noise caused by excitation of duct wall resonance, produced by fan noise; by pressure fluctuations caused by fan instability; and by turbulence caused by discontinuance in the duct systems.
- Noise and vibration from out of balance forces from fans.
- The best sound attenuation is the selection of a quiet fan.

Vibrations generated by HVAC systems must be minimized: judicious equipment selection; limitation of fluid flow velocities; and isolation of key mechanical, piping and ducting systems is required.

Vibration isolation systems shall be provided on rotating mechanical equipment greater than 1/2 hp located within the critical area, greater than 5 hp elsewhere in the building, and greater than 10 hp outside the building within 200 feet of the

building. Reciprocating equipment (other than emergency equipment) shall not be used.

Steel frames shall be used for air handling equipment. Flexible pipe connectors (e.g., twin-sphere connectors) shall be used on piping connecting to isolated equipment and where piping and ducting exit the mechanical room. Flexible duct connectors shall be used in a similar manner.

Special design consideration shall have been given to the duct layout reducing noise transfer between rooms, especially noise generated by loud equipment or discussions in adjacent rooms.

System Start-Up, Commissioning, Testing, Adjusting & Balancing:

The work includes system start-up, test, adjust, and balance (TAB) of HVAC heating and cooling systems and equipment, air distribution systems including equipment, ducts, and diffuser/registers and grilles. Include sound testing and vibration recordings for HVAC equipment.

Alternates Not Allowed:

- DX Packaged air handling units.
- Gas fired air handling units.
- Air handling units with housed centrifugal fan.
- Air handling units without double wall insulation and thermal breaks.
- Other than the existing in use BMS systems

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DESIGN CRITERIA:

The following criteria are provided to define the scope of the project and provide guidance to the Design-Builder. The Design-Builder is responsible for ensuring that design and construction of all improvements complies with all laws, codes, and regulations applicable to local detention facilities and that all systems are complete, integrated, cohesive and functional for their intended purposes.

The Design-Builder shall provide detailed calculations and design documentation for all systems prior to construction and submit for review by the applicable Authority Having Jurisdiction (AHJ). Performance criteria identify minimum levels of quality, materials, and workmanship.

Codes & Standards:

The plumbing design of the project shall be based on the following codes and standards:

- 2016 California Building Code (CBC), California Code of Regulation, Title 24, Part 2-Volumes 1 and 2 as amended therein.
- 2016 California Electrical Code (CEC), California Code of Regulation, Title 24, Part 3 as amended therein.
- 2016 California Mechanical Code (CMC), California Code of Regulation, Title 24, Part 4 as amended therein.
- 2016 California Plumbing Code (CPC), California Code of Regulation, Title 24, Part 5 as amended therein.
- 2016 California Energy Code, California Code of Regulation, Title 24, Part 6 as amended therein.
- 2016 California Fire Code (CFC), California Code of Regulation, Title 24, Part 9 as amended therein.
- 2016 California Green Building Standards.
- Items not covered herein and in the above documents shall conform to the applicable provisions of the following codes and standards: American Society of Plumbing Engineers.

BASIS OF DESIGN:

General Design Criteria:

The plumbing design of the project shall be based on the following design standards:

- Provide a Plumbing System complete in place, tested and approved, as specified, and as needed for a complete, usable and proper installation. All equipment shall be installed per the criteria documents and manufacturer's recommendations.
- Provide design, engineering, installation, start-up, testing, adjusting, load balancing and commissioning of complete and operational electrical systems and related distribution.

- Provide detailed engineering calculations for all systems prior to construction to confirm final sizes and equipment configurations and submit for approval by the County. Performance Criteria shall identify minimum levels of quality, materials and workmanship.
- The Design-Build Entity shall provide all commissioning required through completion of construction. A commissioning agent shall be hired by the County to verify the Design-Build Entity commissions the building to meet performance requirements.
- The entire plumbing system design must be based on an overall level of quality and maintainability commensurate with a County owned, long term investment. The design shall incorporate proven technology and equipment.
- The plumbing system shall be designed using the most stringent and latest adopted editions of the codes, standards and guidelines published.
- All plumbing equipment and materials shall be installed to not be damaged or cause damage to other systems during a seismic event.

Utility Incentives – PG&E:

- Design-Build Entity shall provide consulting and construction assistance to the County to obtain Savings by Design energy incentive financing from Pacific Gas & Electric Company (PG&E).
- Refer to Savings by Design Participant Handbook, published by PG&E.
- Create and submit to PG&E Savings by Design application(s).
- Provide energy modeling software and simulations required by the Savings by Design Program.
- Establish the Title 24 baseline.
- Demonstrate to PG&E the energy model and electric energy savings in excess of Title 24 minimums.
- Complete the Savings by Design contract with PG&E for available rebates to the Owner.

Plumbing Utilities:

The plumbing utilities will be located on site. The existing water, sanitary sewage, gas main, and fire protection water utilities will be extended to the facility. Natural gas will be provided to serve as the primary fuel source for the domestic hot water systems. The domestic water and gas services will be metered. Domestic water is provided by the City of Santa Paula.

Due to the water quality being provided, the existing facility is currently contracting a mobile water treatment to travel to the site to provide water softening and water

treatment. An option for a permanent water treatment and softening central plant shall be provided based on a water quality test to be completed.

The facility plumbing systems will include all domestic water, sanitary sewer and vent piping systems to serve all plumbing fixtures including showers, water closets, urinals, lavatories, mop sinks, service sinks, drinking fountains and hose-bibbs. Domestic hot water will be provided from individual water heaters located at each housing unit. Recirculating pumps will be provided for quick response demand.

Per an investigation report provided by the County, the existing vacuum sanitation plant is currently operating at fifty percent (50%) capacity. The new building sanitary sewer will be a vacuum pump system that will tie into the existing vacuum system. Two (2) pumps will exclusively serve the new building to convey the sewage to tie into the existing vacuum sewage mains prior to discharging at the vacuum central plant. The existing vacuum system was provided by Acorn; the new vacuum system serving the new addition will also be Acorn to readily allow tying the systems together and to ensure compatible operation and maintenance.

The vacuum plumbing piping will be located primarily in the plumbing chases behind the cells. A thirty-six inch (36") minimum clearance shall be maintained beyond the piping to ensure adequate space to walk through the chase and perform maintenance.

Cells located in critical inmate areas will be furnished with detention grade combination units equipped with a drinking bubbler, toilet and a lavatory hand wash. Waste and vent stacks will be equipped with anti-clogging controls. Flushable floor drain/sink will be provided in the safety cells. Inmate toilets will be provided with flush control systems and regulators.

Provisions will be made for emergency eyewash stations in critical holding areas.

Localized medical oxygen systems with oxygen masks are to be provided for the Sleeping Rooms. The equipment will be concealed within a secured closet or compartment.

Compressed air shall be provided to serve the dental equipment and dental offices.

Hose bibbs will be provided in security grade lockout boxes in the dayrooms and will also be included in the yard and on the roof for maintenance.

Housing showers will be concrete masonry units with antibacterial growth spray film.

Natural gas will be provided to fuel mechanical heating hot water boilers on the roof.

The facility will also be provided with a wet pipe sprinkler system designed to meet the local codes and NFPA standards. Cells located in critical inmate areas will be furnished with breakaway fire sprinkler heads. A pre-action fire suppression system will be furnished in the MDF/IDF Rooms.

Considerations will be made for potential water reclamation and rain water harvesting systems to serve the green roofs and yards.

The plumbing equipment basis of design will be as follows:

- Acorn: Detention grade combination units, detention grade water closets, detention grade lavatories, detention grade shower devices, detention grade tubs, hose-bibbs, emergency eyewash stations.
- American Standard: Lavatories, urinals, and water closets.
- Elkay: Mop sinks, sinks, service sinks, water coolers.
- Just: Medical sinks.
- Chicago: Faucets.
- Sloan: Flush valves.
- Smith: Floor drains, floor sinks.

ALTERNATE SYSTEMS:

The plumbing and fire protection design of the project shall make provisions for the following alternates to the systems and equipment.

Alternates Allowed:

- Approved manufacturers providing equipment equal to the basis of design in construction and operation.
- Implement a centralized domestic hot water heating system located on the roof. Distribution and recirculation pumps will be used to deliver hot water to all fixtures for quick on demand response.

Alternates Not Allowed:

- Non- detention grade quality combination units in holding cells.
- Other vacuum system manufactures other than Acorn. The existing vacuum system was provided by Acorn and the new building addition must be also served by Acorn to ensure compatible tie-ins and long-term maintenance.

DESIGN CRITERIA:

The facility will also be provided with a wet pipe sprinkler system designed to meet the local codes and NFPA standards.

The following criteria are provided to define the scope of the project and provide guidance to the Design-Builder. The Design-Builder is responsible for ensuring that design and construction of all improvements complies with all laws, codes, and regulations applicable to local detention facilities and that all systems are complete, integrated, cohesive and functional for their intended purposes.

The Design-Builder shall provide detailed calculations and design documentation for all systems prior to construction and submit for review by the applicable Authority Having Jurisdiction (AHJ). Performance criteria identify minimum levels of quality, materials, and workmanship.

Preliminary calculations shall be performed to determine the requirements for a possible fire pump. Provisions for a fire pump have been provided in the criteria drawings for programming planning purposes. However, the criteria documentation shall require the design builder to perform their own calculations and verify the need for a fire pump.

Codes & Standards:

The Fire Protection design of the project shall be based on the following codes and standards:

- 2016 California Building Code (CBC), California Code of Regulation, Title 24, Part 2-Volumes 1 and 2 as amended therein.
- 2016 California Electrical Code (CEC), California Code of Regulation, Title 24, Part 3 as amended therein.
- 2016 California Mechanical Code (CMC), California Code of Regulation, Title 24, Part 4 as amended therein.
- 2016 California Plumbing Code (CPC), California Code of Regulation, Title 24, Part 5 as amended therein.
- 2016 California Building Energy Efficiency Standards for Residential and Nonresidential Buildings, California Code of Regulation, Title 24, Part 6 as amended therein.
- 2016 California Fire Code (CFC), California Code of Regulation, Title 24, Part 9 as amended therein.
- Items not covered herein and in the above documents shall conform to the applicable provisions of the following codes and standards: American Society of Plumbing Engineers.

BASIS OF DESIGN:

General Design Criteria:

The fire protection systems design of the project shall be based on the following design standards:

- Security sprinkler heads shall be provided in all inmate accessible areas and shall be designed to meet the 2016 CPC requirements, NFPA standards, and the minimum requirements set forth in the Space Program & Space Criteria Data Sheet Section of the Design Criteria Package (whichever is more stringent). Design Build team shall submit security sprinkler head locations for review for compliance with the Design Criteria and shall coordinate with the Owner during the design phase. Use Tyco Raven (no substitutions).
- Standard semi-recessed quick response sprinkler heads shall be provided in non-critical staff and public areas, and shall be designed to meet the 2016 CPC requirements, NFPA standards, and the minimum requirements set forth in the Space Program & Space Criteria Data Sheet Section of the Design Criteria Package (whichever is more stringent). The Design Build team shall submit standard sprinkler head locations for review for compliance with the Design Criteria and shall coordinate with the Owner during the design phase.
- At mechanical spaces and other areas without ceilings that are not accessible to inmates, standard pendant or upright sprinkler heads may be used.

A waterless HFC-227ea and FM-200 fire suppression system shall be provided in the Electronic Security Equipment room. Such systems shall comply with NFPA standards and the minimum requirements set forth in the Space Program & Space Criteria Data Sheet Section of the Design Criteria Package (whichever is more stringent).

ALTERNATE SYSTEMS:

Alternates Not Allowed:

Wet pipe sprinkler systems in the Electronic Security Equipment Room.

DESIGN CRITERIA:

The following criteria are provided to define the scope of the project and provide guidance to the Design-Builder. The Design-Builder is responsible for ensuring that design and construction of all improvements complies with all laws, codes, and regulations applicable to local detention facilities and that all systems are complete, integrated, cohesive and functional for their intended purposes.

The Design-Builder shall provide detailed calculations and design documentation for all systems prior to construction and submit for review by the applicable Authority Having Jurisdiction (AHJ). Performance criteria identify minimum levels of quality, materials, and workmanship.

Codes & Standards:

The Electrical design of the project shall be based on the following codes and standards:

- 2016 California Building Code (CBC), California Code of Regulation, Title 24, Part 2-Volumes 1 and 2 as amended therein.
- 2016 California Electrical Code (CEC), California Code of Regulation, Title 24, Part 3 as amended therein.
- 2016 California Mechanical Code (CMC), California Code of Regulation, Title 24, Part 4 as amended therein.
- 2016 California Plumbing Code (CPC), California Code of Regulation, Title 24, Part 5 as amended therein.
- 2016 California Energy Code, California Code of Regulation, Title 24, Part 6 as amended therein.
- 2016 California Fire Code (CFC), California Code of Regulation, Title 24, Part 9 as amended therein.
- 2016 California Green Building Standards.

BASIS OF DESIGN:

General Design Criteria:

The electrical design of the project shall be based on the following design standards:

- Provide an Electrical System complete in place, tested and approved, as specified, and as needed for a complete, usable and proper installation. All equipment shall be installed per the criteria documents and manufacturer's recommendations.
- Provide design, engineering, installation, start-up, testing, adjusting, load balancing and commissioning of complete and operational electrical systems and related distribution.
- Provide detailed engineering calculations for all systems prior to construction to confirm final sizes and equipment configurations and

submit for approval by the County. Performance Criteria shall identify minimum levels of quality, materials and workmanship.

- The Design-Build Entity shall provide all commissioning required through completion of construction. A commissioning agent shall be hired by the County to verify the Design-Build Entity commissions the building to meet performance requirements.
- The entire electrical system design must be based on an overall level of quality and maintainability commensurate with a County owned, long term investment. The design shall incorporate proven technology and equipment.
- The electrical system shall be designed using the most stringent and latest adopted editions of the codes, standards and guidelines published.
- All electrical equipment and materials shall be installed to not be damaged or cause damage to other systems during a seismic event.

Existing Electrical Infrastructure on Campus:

- Existing feeders from and to existing substation shall be traced and the Design Build Entity is responsible to clear existing feeders from new building footing, including coordination of any necessary power shut down required to perform any work.
- Existing 4000A, 480/277V, 3Ph, 4W main switchboard in central plant shall be used for new building power connection as 1230A is the peak load on the service.
- The existing normal power and emergency power system passes thru one (01) breaker only which constitute a single point of failure. Recommend installing a by-pass breaker to enable closing the main breaker for maintenance and or not encounter a power outage in case of main breaker tripping.
- The existing 4000A main breaker has tripped in the pass when load reached 1200A, recommend to test, calibrate this existing breaker. Testing shall be based on NETA requirement.
- Power circuits and security/IT wiring serving the existing entrance gate leading to the central plant shall be traced, intercepted and re-routed to clear new trenching and accommodate new programming and to coordinate necessary downtime if required.
- Remove existing transmission poles located outside the facility in the adjacent farm land (quantity of (08) eight), currently these poles don't serve any facility and the line is not energized. The Design Build Entity shall coordinate with owner and SCE prior to commence work.

Electrical Service:

- Main electrical service feeder shall be tapped from the existing 4000A, 480/277V, 3Ph, 4W main switchboard, located in central plant.
- Provide 1600A/3P breaker at main switchboard, new breaker shall match existing breakers type and AIC rating.
- Run conduit and wire overhead inside the central plant building and stub down at exterior wall and run underground in ducts up to main electrical service point. Design Build Entity shall field verify and coordinate with other trades and existing underground utility.
- The new building service shall be metered. Meter shall be digital type with reporting capability. Meter shall be connected to the Java Application Control Engine (JACE) via BACnet protocol where electrical use can be monitored on a real-time basis. Provide conduit and wire to the JACE.
- Electrical service sizing contained in these criteria documents is based on preliminary calculations. The Design-Build Entity is responsible for confirming the service sizing and making any necessary adjustments based on all applicable codes and standards.
- The new service into building from the main site switchboard shall be via underground ducts. Provide an interior distribution system consisting of insulated conductors in conduit. Provide connections for all equipment, plumbing systems, air conditioning and ventilation systems, fire alarm systems, etc. for a complete installation.
- Provide voltage drop computations for all large feeders 100A and larger). Feeder conductors shall be sized for a maximum voltage drop of 2% at design load. Branch circuit conductors shall be sized for a maximum voltage drop of 3% at design load.

Space Requirements, Equipment Location and Plant Arrangement:

- Step-down transformers and panelboards shall be located within electrical rooms.
- Panels or other electrical equipment shall not be installed in areas such as corridor walls or any walls in occupied spaces.
- Motor control centers, motor controllers and disconnects, distribution boards, panelboards, and step-down transformers serving central plant equipment shall be located within the electrical yard.
- All equipment shall be arranged for maximum service access, while reserving space for future equipment and future uses and in compliance with NEC 110-26-1(A) clearance requirement.
- The electrical distribution system shall consist of main switchboards for both normal and emergency power systems. Along with the main

switchboards, the remainder of the electrical distribution system shall be made up of: an automatic transfer switch, step-down transformers, feeders, distribution switchboards, motor control centers and lighting and power panelboards.

- The emergency power system shall consist of a diesel driven generator 600kW, 480/277V, 3Ph, 4W with a base-mounted fuel tank, batteries and charging system, and generator control inside of an environmental enclosure. Also provide a remote generator monitoring panel located in the MADF. Provide a critical level silencer on the exhaust side of the generator. In addition, provide an automatic transfer switch with bypass isolation. Design Build Entity shall verify and coordinate with AQMD if a diesel particulate filter is required.

Utility Incentives – SCE:

- Design-Build Entity shall provide consulting and construction assistance to the County to obtain Savings by Design energy incentive financing from Southern California Electric (SCE).
- Refer to Savings by Design Participant Handbook, published by SCE.
- Create and submit to SCE Savings by Design application(s).
- Provide energy modeling software and simulations required by the Savings by Design Program.
- Establish the Title 24 baseline.
- Demonstrate to SCE the energy model and electric energy savings in excess of Title 24 minimums.
- Complete the Savings by Design contract with SCE for available rebates to the Owner.

Main Electrical Switchboards:

- Main Switchboards shall be 277/480V, 3-phase, 4-wire. Preliminary load calculations indicate a normal power service of 1600A at 480/277V, 3-phase, 4-wire and a standby power service of 1000A at 480/277V, 3-phase, 4-wire. Provide transient voltage surge suppression on main switchboard. TVSS can be integral or mounted remotely. The switchboards shall be seismically mounted to a raised concrete base and shall be free standing and self-supporting unit.
- The main switchboards for both normal and emergency power shall consist of an underground pull section, meter & main breaker section, and distribution sections. All bus bars shall be electrical grade copper. Aluminum bus bars will not be accepted. Provide space and spare capacity in main switchboards for an additional 20% load capacity and breaker space.

- Circuit breaker types and interrupting capacities shall be selected based on the results of a short circuit and coordination study. Current limiting and series rated devices shall be utilized where identified as appropriate by the short circuit study and must be UL approved as a series rated system. Include an arc-flash study and identify equipment with such hazards accordingly.
- Receive, inspect, handle, store, and install switchboards and accessories according to NECA 407.
- Equipment Mounting: Install switchboards on reinforced concrete base, 4" nominal thickness.
- Normal and emergency services shall be metered. The meter shall have a test switch installed in the switchgear or metering cabinet. Metering equipment should provide at a minimum: volts, amps, KVA, KVAR, power factor, peak KW, and KWHR.
- Label the main switchboard enclosure with engraved metal or laminated-plastic nameplate to indicate:
  - Switchboard tag name
  - Voltage rating
  - Amperage rating
  - Available short current value
  - Date of calculated short current value
  - AIC rating

Interior Distribution Switchboards:

- Interior distribution switchboards rated at 480/277V, 3-phase, 4-wire.

Interior Low Voltage Distribution Transformers:

- Interior Distribution Transformers (less than 1000V) shall be located within designated electrical rooms. Ventilation and cooling shall be required to maintain specific temperature and humidity levels. Refer to Mechanical Narratives for requirements.
- Install wall-mounted transformers level and plumb with wall brackets fabricated by transformer manufacturer.
- Transformers shall be installed a minimum of 20 feet from data racks. K13 rated transformers shall be provided for panels with computer loads.
- Transformers may be ground-mounted or trapeze-mounted.

Electrical Branch Circuit Panelboards:

- Panelboards shall be provided with full-sized neutrals and ground bars, copper bus, with thermal magnetic type molded case main and branch circuit breakers. Provide branch circuit panelboards with bolt-on type breakers only to serve loads as required. Main breakers shall be individually mounted.
- Provide 480/277V, 3-phase, 4-wire panels to serve the lighting and HVAC loads. All panels shall be rated for 225A minimum at 480/277V and contain minimum 25% spare capacity and circuit breaker mounting space. Provide quantities of lighting panels as needed to serve the lighting loads.
- Provide 208/120V, 3-phase, 4-wire power panels to serve the general power loads. All power panels shall be rated for 225A minimum at 208/120V and contain 25% spare capacity and circuit breaker mounting space. Provide quantities of power panels as needed to serve the general power loads.
- Provide 208/120V, 3-phase, 4-wire power to serve the Computer loads. All computer power panels shall be rated for 225A minimum at 208/120V, 3-phase, 4-wire and shall have 200% neutral. All necessary precautions shall be taken to minimize harmonics on the computer power panels. Provide minimum 25% spare capacity, 20% spare 20A-single pole circuit breakers and 20% spare circuit breaker mounting space in all power panels.
- Areas of high electrical load density such as computer rooms with servers, IT and security closets, and other special service areas shall have dedicated panelboards with 200% rated neutral busses. Also provide TVSS unit at panels serving computer loads. Group clean power loads together onto panels, separating them from dirty power loads and motor loads.
    - Electrical panels shall not be located in the telecommunications rooms.
    - Electrical panels serving technical power loads shall have surge protector devices on each panel.
    - Electrical panels serving telecommunications rooms and low-voltage security electronics rooms shall not contain any lighting or motor loads.
- Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- Stub (4) 1" empty conduits from flush mounted panelboards into accessible ceiling space or space designated to be ceiling space in the future. Stub (4) 1" empty conduits into raised floor space or below slab not on grade.

- Arrange conductors in gutters into groups and bundle and wrap with wire ties.
- Create a printed directory to indicate installed circuit loads and incorporating County's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

Enclosed Switches and Circuit Breakers:

- Provide enclosed circuit breakers and switches where required. All interior switches or breakers in dry environments shall be NEMA type 1. Interior switches or breakers subject to damp or wet environments shall be NEMA 4X. All switches and breakers located outdoors shall be NEMA 3R or 4X.
- All enclosed switches or breakers shall be provided with lock-off capability built into the device.
- Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- Label each enclosure with engraved metal or laminated-plastic nameplate.

Branch Circuits, Outlets and Equipment Connections:

- Provide the complete design and installation of all panelboards, feeders, and branch circuits to utilization equipment to include electrical outlets, devices, disconnects, direct electrical connections, conduit, wiring and overcurrent protection devices.
- Quantity of Outlets (Except Cells and Dayrooms):
  - For Offices, provide a duplex outlet for every 12 linear feet of wall or portion thereof with a minimum of three duplex outlets per Office.
  - For storage rooms, mechanical rooms, and electrical rooms provide a minimum of one duplex outlet for every 100 square feet or portion thereof.
  - For other areas, provide a minimum of one duplex outlet for every 20 linear feet of wall or portion thereof.
  - Provide duplex outlets as required for all equipment.
  - Provide a duplex outlet within 12 inches of each telephone/data outlet.
  - Provide a duplex outlet within 12 inches of each TV outlet.

- Provide one duplex outlet in each cell chase, on emergency power.
- Provide one welding receptacle in a lockable security enclosure outside of each Dayroom.
- On the exterior of the building, provide a duplex outlet for every 200 linear feet of wall or portion thereof. Outlets shall be GFI in a weatherproof while in-use enclosure.
- Provide outlets in the corridor outside the Dayrooms for food cart warming.

- Quantity of Outlets (Cells and Dayrooms):
  - There shall be no outlets in the cells with the exception of ADA cells.
  - Provide one switched duplex outlet in a lockable enclosure in each ADA cell.
  - Provide one switched outlet in each Dayroom at the officer's station.
- Provide 120V, duplex general receptacles with no more than six receptacles for each 20-amp circuit.
- For computer circuits, provide 120V, duplex general receptacles with no more than three receptacles for each 20-amp circuit.
- Provide a dedicated circuit from an emergency panel to serve building automation control panels.
- Provide dedicated 24-volt circuits to serve temperature control zone air terminal units. One circuit shall serve a maximum of five terminal units.
- Provide dedicated circuit from emergency bus to serve pre-action or chemical based fire suppression systems.
- All boxes and enclosures shall be metal, except non-metallic boxes and enclosures shall be used in corrosive environments.
- Provide all connections to modular furniture and equipment for a complete installation.
- Provide branch circuiting to all power supplies for all low voltage systems.
- Refer to Telecom, Data, and Security sections for additional electrical requirements.
- Outlets shall not be installed recessed in floors or within floor mounted monuments (Exception: Conference Rooms may have outlets located underneath the location of the conference table).
- Provide shunt trip circuit breakers where required.

Electrical Branch Circuit Wiring:

- All branch wiring shall be insulated conductors in conduit. All branch circuit wiring shall carry an insulated ground conductor along with the phase conductors and required neutrals. Minimum size of conductors for branch circuits shall be #12 AWG and all conduits shall be a minimum of 3/4".
- Keep raceways at least 6" away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which a maximum of two 90-degree bends are allowed.
- Conceal conduit within finished walls, ceilings, and floors, unless otherwise indicated.

Motor Control:

- Provide individual motor starters with disconnect switches in motor control centers as required by mechanical equipment. Provide all circuits and connections for motor.
- Motor starters and variable frequency drives located at individual pieces of mechanical equipment shall be provided by the mechanical Design-Build Entity.
- Motor Control Centers (MCCs) shall be of a freestanding steel cabinet unless otherwise indicated. NEMA Type 1 unless otherwise indicated to comply with environmental conditions at installed location.
- Provide heavy-duty Push Buttons, Pilot Lights, and Selector Switches: Heavy-duty type. Push Buttons: Recessed types; maintained contact unless otherwise indicated. Pilot Lights: LED types; "Red" for stopped, "Green" for running. Selector Switches: Rotary "H-O-A" switch.
- Provide both NC & NO contactor auxiliary contact(s). Control Relays shall be solid-state time-delay relays. Also provide a wall mounted spare-fuse cabinet with hinged lockable door.
- Phase and Neutral-Bus material shall be hard-drawn copper of 98 percent conductivity, tin plated. Neutral Buses shall be rated at 100 percent of the ampacity of phase buses unless otherwise indicated, equipped with mechanical connectors for outgoing circuit neutral cables. Ground Bus shall be rated at 100 percent of the ampacity of phase buses, hard-drawn copper of 98 percent conductivity, equipped

with mechanical connectors for feeder and branch-circuit equipment grounding conductors.

- Install MCCs on 4" nominal thickness reinforced concrete base.
- Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
- Label MCC and each cubicle with engraved nameplate.
- Label each enclosure-mounted control and pilot device.

Raceways:

- All circuits shall be enclosed in raceways.
  - The raceway system shall be conduit or tubing of the appropriate material except in special applications.
  - Conduit systems shall be concealed in all areas accessible to inmates. Conduit 10 feet or more above finished floor (AFF) shall be considered inaccessible.
  - Surface metal raceways may be used in electrical rooms, mechanical rooms, security/data closets, and the Central Plant.
  - Busway, Cablebus, cable tray, and similar systems may be used in buildings devoted to utilities as appropriate to the buildings' use and circuits involved.
- Run conduit larger than 1" trade size parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
- Arrange raceways to cross building expansion joints at right angles with expansion fittings.
- Change from EMT to RNC, Type EPC-40-PVC, or rigid steel conduit before going below the floor.
- Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors.
- Install pull wires in all empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12" of slack at each end of pull wire.
- Install with a maximum of two 90-degree bends or equivalent for each length of raceway. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.
- Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed

raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings where required by NFPA 70.

- Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg. F, and that has straight-run length that exceeds 25 feet.
- Flexible Conduit Connections: Use maximum of 72" of flexible conduit for recessed and semi-recessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
- Use LFMC in damp or wet locations subject to severe physical damage.
- Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.
- Set metal floor boxes level and flush with finished floor surface.
- Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.
- Apply fire-stopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Fire-stopping materials and installation requirements are specified in the Performance Specifications, Section "Fire-stopping."

Corrosion Protection:

- Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture unless moisture is permanently excluded from junction of such materials.
- Use conductors with protective coatings where conditions cause deterioration or corrosion of conductors.

Emergency Power:

- The following Electrical Design Requirements establish the design intent and design criteria for use by the Design-Build Entity in the final design of the project and completion of the construction documents for the emergency power systems.
    - Provide design, engineering, installation, start-up, testing, adjusting, load balancing and commissioning of the emergency electrical power system and related distribution components. Review all of the documents and comply with the requirements.

- Provide detailed engineering calculations for all emergency electrical power systems prior to construction to confirm final sizes and equipment configurations and submit for approval by the County. Performance Criteria identify minimum levels of quality, materials and workmanship.
- The system designs must be based on an overall level of quality and maintainability commensurate with a County owned, long term investment. The designs shall incorporate proven technology and equipment.
- The electrical systems shall be designed using the most stringent and latest adopted editions of the codes, standards and guidelines.

Emergency Load Distribution:

- Emergency loads shall be connected to dedicated emergency panels provided with both normal power and emergency generator power through a dedicated automatic transfer switch. Transfer time from normal to generator power shall not exceed 15 seconds. Emergency loads shall include the following:
  - Emergency egress and exit lighting systems. Also requires integral battery back-up power to bridge the transition time from loss of utility power to availability of emergency power.
  - Fire alarm and fire suppression equipment.
  - Emergency communications equipment.
  - All EMCS equipment loads.
  - Master Control security system equipment loads.
  - Central Control security system equipment loads.
  - Facility power monitoring and control equipment loads.
  - All building security systems equipment.
  - Medication room refrigeration.
  - Misc. medical equipment.
  - Refer to Medical Equipment List for additional loads.
  - DX Split System Units.
  - Exhaust Fans.
  - Refrigerant Monitor and Purge Fan.
  - Building Automation System and Controls (BAS).
  - Refrigeration and cooler boxes.

- Condenser Water Pumps
- Hydronic Heating Boiler
- Primary Hot Water Pumps
- Secondary Hot Water Pumps
- Domestic Hot Water Heat Exchangers and Circulating Pumps
- Propane Storage and Distribution System
- Domestic Water Storage Distribution Pumps
- Fire Pumps
- Miscellaneous loads and convenience receptacles as directed by County. Note: During design and prior to final sizing of the emergency generator, the Design-Build Entity is to meet with the County to determine all loads required to be on the emergency power system.

Emergency Power System Monitoring:

- Alarms:
  - Automatic Transfer Switch (ATS): Normal/emergency position status.

Emergency Automatic Transfer Switch:

- Transfer switch shall be bypass-isolation type.
- Floor-Mounted Switch: Anchor to floor by bolting.
- Concrete Bases: 4" high, reinforced, with chamfered edges. Extend base no more than 4" in all directions beyond the maximum dimensions of switch, unless otherwise indicated or unless required for seismic support.
- Identify components according to the Performance Specifications, Section "Identification for Electrical Systems."
- Set field-adjustable intervals and delays, relays, and engine exerciser clock.
- Ground equipment according to the Performance Specifications, Section "Grounding and Bonding for Electrical Systems."
- Connect wiring according to the Performance Specifications, Section "Low-Voltage Electrical Power Conductors and Cables."

Lighting Systems:

- The following Electrical Design Requirements establish the design intent and design criteria for use by the Design-Build Entity in the final design

of the project and completion of the construction documents for the lighting systems.

- Provide design, engineering, installation, start-up, testing, adjusting, load-balancing and commissioning of a complete and operational lighting system and related components for the project.
- Provide detailed engineering calculations for all lighting systems prior to construction to confirm final illumination values and equipment configurations and submit to the State for approval. Performance Criteria identify minimum levels of quality, materials and workmanship. This project shall be required to conform to and to provide documented proof of compliance with California Title 24 requirements (except in areas type I).
- The Design-Build Entity shall provide the design, layout, furnishing, installation and commissioning of interior lighting equipment and controls for all interior spaces. Lighting power densities shall be lower than the State of California Title 24 allotments by 20% while providing the appropriate illumination levels in accordance with IES recommended standards for each area and task.
- Interior lighting fixtures shall be energy efficient utilizing the most current proven lamp and ballast technologies. Incandescent lamps shall not be used. Lamp sources shall be LED for long life and energy efficiency.
- Interior lighting controls shall comply with the latest enacted edition of the California Energy Code, Title 24 (except for areas type I).
- Interior lighting controls (except Cells) shall include the following:
  - Housing unit dayroom lighting systems shall be provided with the capability of being operated at reduced levels (minimum average ten foot-candles on horizontal plane at 30 inches above the floor).
  - Lighting fixtures in locked utility spaces shall be controlled by local switches.
  - Provide adequate un-switched night lighting for security and egress path lighting. Coordinate the night lighting design with the security systems design to ensure good visibility and picture quality for CCTV monitoring.
  - Provide occupancy sensors in the Administration areas and where security will not be compromised.

Quality Assurance:

- The lighting system designs must be based on an overall level of quality and maintainability commensurate with a County owned, long term investment. The designs shall incorporate proven technology and equipment.
- Provide a lighting system that provides enough light to allow normal functions to occur.
- The lighting systems shall be designed using the most stringent and latest adopted editions of the codes, standards and guidelines.

Emergency, Egress, and Exit Lighting:

- The Design-Build Entity shall provide the design, layout, furnishing, installation, and commissioning of all required emergency, egress, and exit lighting systems and equipment. Emergency, egress, and exit lighting shall comply with the California Building Code requirements and provide for no less than 1 foot-candle of Illumination at the floor level for all emergency egress paths, offices, and electrical equipment rooms.
- All emergency egress and exit lighting shall be provided with generator power. Emergency, egress, and exit lighting shall be uninterrupted in the event of a utility power failure. Battery back-up systems and equipment shall be utilized to provide for uninterruptible emergency, egress, and exit lighting in the event of a utility power failure. The battery systems shall be capable of providing power to the emergency lighting system during the start-up and transfer time for connecting to the emergency generator.
- Provide emergency lighting in areas where inmates are present with staff members. These areas include, but are not limited to, dayrooms, corridors, medical treatment rooms, intake/release, suicide/holding cell, and other areas as determined by the County during design.
- Exit signs shall be the electrically powered, illuminated type.
- Lighting fixtures shall be energy efficient and suitable for the environment in which installed.
- Downlighting shall be energy efficient and suitable for the environment in which installed.

Interior Lighting and Controls (Excluding Cells):

- The Design-Build Entity shall provide the design, layout, furnishing, installation and commissioning of interior lighting equipment and controls for all interior spaces. The minimum maintained lighting level measured in the horizontal plane 30 inches above finished floor shall be:

AREA	FOOT-CANDLES
Dayrooms	30
Sally Ports	10
Vestibules	10
Storage Room /Food cart/Laundry cart staging	30
Mechanical/Electric Equipment Rooms	20
Showers/Lavatory/Toilet	20
Stairway	10
Officer Stations	50
Multipurpose room	50
Nurse station/medical treatment room/dental room	50
Offices	50
Interview room	50
Telephone/data/security rooms	50

- Do not exceed the stated minimum illumination levels by more than 20 percent.
- Lighting levels in areas not covered above shall be in accordance with IES recommendations, but shall not exceed the requirements of Title 24, where it is applicable.
- Lighting in areas of inmate assembly, i.e., dayrooms, visiting, etc., shall be equipped with battery powered, instant on, emergency lighting systems that shall provide not less than three foot-candles lighting average throughout the space.
- All fixtures shall be of high quality and construction. All fluorescent lamps shall be provided with lenses, wire guards, or screen guards. Refer to the Integrated Security Plan for fixture requirements.
- All recessed fixtures installed in suspended ceilings shall have earthquake clips installed (one at each corner) to prevent removal of fixture.
- Interior lighting fixtures shall be energy efficient utilizing the most current proven lamp and ballast technologies. Incandescent lamps shall not be used. Lamp sources shall be appropriate for the area and task served. LED sources shall be provided for long life and energy efficiency.
- Interior lighting controls shall comply with the latest enacted edition of the California Energy Code, Title 24 (where applicable). Interior lighting controls shall include the following:
  - Two-level switching for uniform reduction of lighting with local controls shall be provided for all interior spaces.
  - Lighting controls shall include manual on with dual technology vacancy sensing for automatic lighting shut off.

- Daylight sensors shall be provided for automatic lighting shut off for all areas containing skylights, clearstories, or exterior windows where the day lighting contributions contribute to interior space illumination. Daylighting controls shall comply with California Title 24 requirements for day light harvesting in interior spaces.

Cell Lighting:

- Cells: The minimum lighting level measured at the desk and grooming areas shall be 20 foot-candles maintained.
  - The engineer of record shall submit certified computer graphic printouts from an acceptable testing laboratory or computer simulation program verifying illumination levels.
- Switches:
  - All Dayroom light fixture controls shall be located at the Officer Station.
  - Cell lighting control shall be from the control station.
  - Cell lighting shall be switched so that either all lamps are on or a night light is on. The cells shall never be dark.
- Fixtures:
  - Cell fixture housing shall be a minimum of 14 gage steel with a ½" thick polycarbonate lens. Lenses shall be securely fastened.
  - Lamp access cover shall be continuously hinged.

Exterior and Site Lighting:

- Site lighting shall be limited to wall pack fixtures mounted on the building and a pole-mounted fixtures mounted onsite.
- Luminaire standards shall be designed for appropriate isotach wind zones with all luminaires and other devices to be mounted on standard in place.
- The exterior lighting system shall be controlled by the lighting control system at security desk.
- Exterior lighting fixtures shall be weatherproof and energy efficient utilizing the most current lamp and ballast technologies. Lamp sources shall be appropriate for the area and task served.
- Building-mounted lighting for security shall utilize LED cut-off type luminaries.
- Building exterior soffits and canopies shall be provided with recessed or surface fluorescent fixtures utilizing compact fluorescent lamps.

- Coordinate the design and installation of all exterior security lighting with the security systems design to ensure good CCTV picture quality.
- Provide lighting for flagpoles, monument signs and static displays.

DESIGN CRITERIA:

The Fire Alarm system shall be designed for Life Safety. The fire alarm system shall utilize addressable initiating devices. The existing Notifier Fire Alarm System will remain and the system will be expanded to the new areas of the facility. The system shall meet the applicable requirements for an I-3 occupancy for the following Codes:

- California Building Code
- California Electric Code.
- National Fire Protection Association Standard 72.
- Local Codes and Authorities Having Jurisdiction.
- California Fire Code.
- Approved Fire Protection Plan.
- All equipment shall be UL and CSFM listed for the intended purpose

There will be a smoke control system for inmate living areas. The fire alarm system will monitor fire sprinkler system flow and tamper switches. Fire alarm zones will match sprinkler zones and be further subdivided into smoke zones for interfacing the HVAC control system. A UL listed Firefighter's Override panel will be provided as required by Code.

The system shall be UUKL listed and the design will meet applicable codes and be approved by the local Authority Having Jurisdiction (AHJ).

The Fire Alarm system will consist of the following devices:

- Fire alarm smoke detectors shall be provided in housing units, administration, visitation, storage rooms, mechanical rooms, electrical rooms, & security electronics rooms.
- The fire alarm system shall monitor fire sprinkler system flow and tamper switches furnished and installed by mechanical/sprinkler systems installer.
- In areas with supervising control station in direct control of the area, manual pull stations shall be provided at control stations as allowed by Code instead of at each means of egress. Where stations are provided at each means of egress, they are restricted by key operation. Supervising staff shall have access to operating keys as required by code.
- Audio Visual alarm indicating appliances shall be provided to notify staff and assist with evacuating inmates to safe areas. Audible and visual alarms shall meet ADA requirements.
- Duct smoke detectors shall be installed in Air Handling Units – one if the unit is 2,000 to 15,000 cfm and two if over 15,000 cfm.

The Fire Alarm system shall be configured and programmed to provide the following functions:

- Fire Alarm initiating devices shall be connected to a Class "A" Signaling Line Circuit. The initiating device shall be able to transmit an alarm even with a single open or ground condition on the wiring.
- All alarms shall go back to the Fire Panel in the existing Central Control.
- The Fire Alarm Control System shall activate the evacuation signals only within the building of alarm.
- The Fire Alarm system shall provide smoke management control logic for housing and medical cell areas.
- The Fire Alarm Control Panel shall be powered by a protected emergency circuit as required by the California Electric Code.
- Fire Alarm Control Panel batteries shall power the fire alarm system for four hours of standby operation and five minutes of alarm.
- The Fire Alarm System notifies staff and occupants and does not unlock doors directly. Staff shall monitor the situation and use the door locking control system to provide controlled evacuation.
- There shall be a UUKL listed smoke control system for the inmate residence area. This shall be in the cell housing units, dorms and medical areas. Refer to mechanical section for theory of operation and coordination.
- A UUKL Graphic Smoke Evacuation Fire Fighter Override panel will be provided as approved by the Authority Having Jurisdiction.

Fire Alarm Annunciators shall be furnished and installed to provide information on fire events to allow staff to take appropriate action.

- Fire Alarm Annunciators shall be provided in each control room and shall derive their power from the fire alarm control panels.
- A Fire Alarm Annunciator shall be provided at the Fire Department's entrance.

DESIGN CRITERIA:

The contractor shall provide the communications infrastructure consisting of Category 6A cabling, optic fiber, and patch panels for the telephone and computer networks to be furnished and installed by the owner. The contractor shall also furnish and install the Video Visitation system, Cable Television distribution system, and optic fiber for other systems provided.

For quality control, all communications infrastructure shall be installed in strict conformance to the following requirements and guidelines:

- TIA/EIA – 568 Commercial Building Telecom Wiring Standard current revision and associated addenda:
  - TIA/EIA 568-C.0: Generic Requirements.
  - TIA/EIA 568-C.1: Commercial Cabling Requirements.
  - TIA/EIA 568-C.2: Balanced Twisted Pair Cabling Standard.
  - TIA/EIA 568-C.3: Optical Fiber Cabling Standard
- TIA/EIA – 569 current revision and associated addenda: Commercial Building Standard for Telecommunications Pathway and Spaces
- TIA/EIA 598-C: Color Coding of Optical Fiber Cables and Strands.
- TIA/EIA–606-A Administration Standard for Telecommunications Infrastructure of Commercial Buildings
- TIA/EIA–607-A Commercial Building Grounding and Bonding Requirements for Telecommunications
- TIA/EIA 455: Fiber Optic Test Standards
- TIA/EIA 310-D Racks
- TIA/EIA 472 General Specifications for Fiber Optic Cable current addition and all amendments
- TIA/EIA 492 Generic Specifications for Fiber Optic Cable current addition and all amendments
- TIA/EIA – 526-7: Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
- TIA/EIA – 526-14A: Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
- TIA/EIA – 758 current revision and associated addenda: Customer-Owned Outside Plant Telecommunications Cabling Standard
- IEC/TR3 61000-5-2 Ed. 1.0 and amendments: "Electromagnetic compatibility (EMC) – Part 5: Installation and mitigation guidelines – Section 2: Earthing and cabling"
- ANSI-J-STD 607-A Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications

- BICSI TDMM 13th Edition
- FCC 47 CFR 68 Underwriters Laboratories (UL) listings and ratings, including:
  - UL 444 Communications Cables
  - UL 1651 Optical Fiber Cable
  - UL 1655 Community Antenna Television Cable
  - UL 1963 Communications Circuit Accessories
- Active IEEE 802 Standards for Local and Metropolitan Networks including:
  - IEEE 802.3: 10Base-T Ethernet Standard
  - IEEE 802.12: 100Base-TX Ethernet Standard
  - IEEE 802.3ab: 1000Base-T Ethernet Standard
  - IEEE 802.3ae: 10Gb/s Ethernet Standard
  - IEEE 802.3af: Power Over Ethernet Standard
  - IEEE 802.11: All Wireless Ethernet Standard
- ISO/IEC 11801:2000 Ed1.2 and amendments: "Information Technology – Generic cabling for customer premises"
- CENELEC EN 50173:2000 and amendments: "Information Technology – Generic cabling systems"
- California Electric Code
- ISO – 11801
- BICSI Telecommunications Distribution Methods Manual
- FCC 47 CFR 68
- NEMA – 250
- CEC – Articles 770 and 800
- Contractor must have at least one RCDD on staff responsible for the telecommunications infrastructure design and installation.

Communications Cable:

A communications outlet with three RJ45 jacks shall be provided for each work station. The three jacks shall provide 2 data and one voice connection. All three jacks shall be fully terminated with Category 6A cabling rom the jack at one end to a Category 6A patch panel in the local telephone room. Here the telephone cable will be cross connected to the

Category 3 telephone cable to the main telephone room. The telephone system will be furnished and installed by the Owner.

ESC shall install communications outlets near electrical power outlets to ease connecting staff stations and other staff needed electronics.

After installation and before energizing, all Category 6A cabling shall be tested and documented to confirm the installed system meets all requirements. Any cable not passing the tests shall be replaced and retested. All documentation shall be provided to the owner.

Medical exam rooms will have connections for video conferencing to the desk. This connection shall be in addition to the communications outlet for the Doctor's workstation.

Ceiling outlets shall be installed for Power over Ethernet (PoE) wireless access points (WAPs) to be installed by the owner in various locations on the plans. Wi-Fi range should cover everything but the cells in the new expansion.

Optic Fiber:

An optic fiber infrastructure shall be furnished between all telephone and security electronics rooms. The optic fiber shall be tested to confirm the installed system meets all the requirements of applicable standards. After installation and termination, the contractor shall test all fiber with an Optical Time-Domain Reflectometer and generate a signature trace of each fiber. Any fiber failing a test shall be replaced and retested. Once all fiber passes all tests, the contractor shall provide to the owner copies of all signature traces identified by individual fiber and function.

Dedicated optic fiber strands shall be provided for each of the systems as follows:

- Qty 6, OM3 50 micron multimode - Owner's Local Area Network
- Qty 4, OM3 50 micron multimode - Fire Alarm System
- Qty 4, OM3 50 micron multimode - Security
- Qty 2, OM3 50 micron multimode - IP Video
- Qty 2, OM3 50 micron multimode - HVAC Building Automation
- Qty 2, OS2 125-micron single mode - Cable TV signal
- Qty 2, OM3 50 micron multimode - Video Visitation
- Qty 4, OM3 50 micron multimode - Security
- Qty 6, OM3 50 micron multimode - Spare

Visitation System:

The contractor shall furnish and install an IP based Video Visitation infrastructure for GTL furnished visitation system from the public visitation area to the stations located in the visitation area. GTL or approved vendor will Furnish and install all software for a complete system including scheduling activities and internet connection to offsite visitors. Video Visitations shall be scheduled locally by staff or directly by prescreened visitors through a web browser.

Television Signal Distribution System:

The contractor shall expand the TV signal distribution system to distribute a signal from the source in the existing main telephone room. The signal distribution system will consist of coax cables in the housing units connecting the dayroom televisions to a local amplifier. The signal from the source will be over optic fiber to the local amplifiers.
In each dayroom there will be one television set.
The television system shall also allow facility staff to distribute content on two dedicated channels. The media source will be DVD or a computer signal located in the appropriate office.

Inmate Telephone:

The contractor shall furnish and install a separate cable system from inmate telephones located in the dayrooms to an inmate telephone system furnished and installed by the owner. Provide Category 6A cable from the inmate stations to the local telephone room. These cables shall be terminated separately from other communication cabling. Provide separate Category 6A cabling from each telephone room to the main telephone room.

Volume 2A **SCOPE OF CONSTRUCTION – ELECTRONIC SECURITY SYSTEMS**

GENERAL:

Existing Central Control will be interfaced with the new building controls. The door controls, cameras, and intercoms will allow the facility staff to efficiently and safely control circulation.

Electronic Security Contractor:

The Electronic Security Contractors (ESC's) shall be pre-qualified to bid this scope of work in order to maintain the highest level of quality. Refer to Section 01 35 13 for qualification requirements. Each contractor shall have a proven history of successfully completing major corrections projects of similar size, with trained service technicians. All work shall be completed in accordance with the current requirements of codes, standards, and agencies. The Security System shall be coordinated with the security hardware. ESC shall provide training and demonstration to the Owner/Operator in the operations and maintenance of all security electronics equipment. While a basis of Design may be identified, at least three manufacturers shall be listed by each Design Build Entity to provide the best value to the owner for the money invested. The scope of this work may also include the Fire Alarm and Telecommunications sections, or the General Contractor may subcontract these portions to other qualified firms specializing in these scopes of work.

At a minimum, the scope of the Electronics Security Contractor shall include:

- ❑ Programmable Logic Controller (PLC) to interface with the existing Central Control TCS to control and monitor doors throughout the facility
- ❑ Touchscreen Control Stations (TCS)
- ❑ Card Access
- ❑ IP Video System
- ❑ Video Monitoring Station
- ❑ Intercom System
- ❑ Video Visitation System
- ❑ CATV System
- ❑ Watch Tour System
- ❑ Staff Duress System
- ❑ Uninterruptible Power Supply (UPS)

The primary security electronics system to be utilized in the facility is the Locking Control system. The system is made up of multiple subsystems consisting of TCS's, PLC's, Intercom, and IP Video subsystems. These subsystems are integrated into a single functional system controlled by staff at the control room locations. Logical groups of points can be organized into task groups for transfer between TCS units to maximize operator efficiency. The ESC shall provide

training and demonstration to the Owner for the operation and maintenance of all equipment provided.

Building Security Electronics Monitoring and Control:

Security electronics will be provided to expand the existing Locking Control system to control and monitor detention grade doors installed in the cells and for circulation. A networked PLC system will provide all required logic and programming. A PLC will be located in the Behavioral Health Housing Unit for controlled and monitored doors. Network communications between PLC locations are over optic fiber to provide high bandwidth and electrical isolation. The Security networks shall be physically separate from all other networks with no connection to the internet.

The existing operator interface in Central Control will be modified to indicate the areas to be controlled. Icons will monitor and control doors, duress buttons, and cameras. Utility screens will be provided for miscellaneous functions such as water solenoid, dayroom lights, power outlets, and phones required for a fully operational system. The screen icons will be programmed to automate as many of the tasks as possible to provide for efficient operation.

Operators will navigate through the screens by starting on a site screen and selecting the building area to view. There will be a maximum of three levels of screens to get to an area. Alternately, in response to an alarm, the alarm can be selected from an alarm list and the system will display the screen containing the alarm.

Detention grade doors are monitored for two conditions. A door position switch will monitor that the door is closed. A lock bolt sensor will monitor that the lock bolt is extended. Both conditions must be met for the door to be displayed as secure.

A TCS will be provided at the officer station in each housing unit to monitor emergency calls from the cells and control interior doors. This station will also indicate the secure status of all doors in the housing unit.

The PLC and TCS will be supported by UPS units connected to emergency generator power. The UPS will power the electronics until the emergency generator comes up to speed and takes over the load. This will provide seamless operation during the transfer from normal to emergency power and eventually back to normal power. (This is typical of all security systems.)

Code required Emergency Release is a critical function of the Locking Control system. The Code requires that all locked doors be unlocked and the bolts held back so that the door will not lock back during Emergency Release. Normal operation is that the door is unlocked, and when closed, automatically locks back. Emergency release is activated and deactivated by icons on the Central Control

TCS only. Activation of Emergency Release is determined by the Policies and Procedures of the facility. It can be used during a search and rescue after a major fire event to find missing individuals when head counts come up short.

Conduits will be routed under the slab from the new security electronics room to the devices in the new part of the facility. Fiber will be routed in the second-floor ceiling portion of the new corridor that connects the existing facility and the expansion to tie systems together.

Access Control System:

The proximity card access system will be expanded from the existing facility using the Andover Continuum system. One card reader will be provided to access the administration office area without assistance from Central Control. Proximity card readers will be provided at the exterior staff entry doors. The doors will be free egress. Egress will be activated by a Request to Exit device consisting or an exit switch on the wall. A valid card reader is not required for staff to leave through the staff entry. A door position switch shall be provided on the staff entry door to indicate an open condition to the card reader system.

The PLC shall have priority wherever a door is controlled by both the PLC and the Card Access System.
The access control system will be supported by UPS units connected to emergency generator power.

Staff Duress Systems:

To enhance safety, a system of duress stations will be wired to the PLC and provided in key locations for staff to signal Central Control of an emergency. These duress buttons will be industrial grade, red, mushroom buttons with key reset. They will be monitored by the PLC system. When pressed, they will latch and signal a duress alarm in Central Control. A key reset will be required for the alarm to be cleared. Circular protective guards will be provided where there is a possibility of accidental activation.
Duress stations will be provided at:

- Medical exam rooms
- Staff Control stations
- Interview rooms
- Public visitation rooms

Additionally, Duress buttons at local control stations can shut down the station and transfer control to Central Control preventing unauthorized access during an incident.

Watch Tour Systems:

Furnish and install the Guard1 PIPE tour system so that Ventura County can expand the Watch Tour system to the existing facility. Provide "RFID" buttons around the facility for the officer tour as indicated on the drawings. The buttons will be tamper proof and have individual IDs that will be stored in the PIPE when pressed during a tour. Provide PIPEs and downloaders as needed throughout the facility. After a tour the officer will insert the PIPE into a downloader at an officer station where the downloader will store the data from the PIPE and upload it to a computer via USB or Ethernet. The Watch Tour system will be on its own private local area network.

Building Intercom & Paging Systems:

Intercoms will be provided on both sides of each circulation door to allow staff to communicate to the controlling TCS and request access. The intercom allows the TCS officer to confirm staff by voice before unlocking the door. Doors provided for emergency exiting only, will not have intercoms associated with them since they are not to be used for normal circulation. Each sally port will have at least one intercom station in the sally port so that a call for help can be placed. Each cell will have an intercom station dedicated for emergency call as outlined in the "Building Security Electronics Monitoring and Control" section above.

The intercom system will provide audio communication from each TCS to each door controlled from that TCS. Each TCS will have a dedicated intercom amplifier allowing all TCS stations to communicate with different intercom stations without affecting other TCS communication connections. The switching and selection of the intercoms will be through the PLC. Cells in each housing unit will be controlled and monitored by the TCS in the local control room. Intercoms will not annunciate on open audio path allowing staff to monitor inmates.

The intercom system shall provide paging from each housing TCS to ceiling speakers in corridors, and dayrooms both individually and all at once. Wall mounted paging horns will be provided in recreation yards. Each housing unit can page only into their area of control. The intercom system will also provide paging to ceiling speakers in visitation and the administration areas from their respective TCS.

The intercom system will be supported by UPS units connected to the emergency generator power. All cabling will be installed in strict compliance with California Electric Code requirements.

Closed Circuit Television:

Fixed Internet Protocol (IP) Cameras will be provided to monitor the approach to each controlled circulation door and to monitor critical group areas. All cameras will be recorded and the video actively stored for a minimum of 30 months. Final

camera locations shall be reviewed and approved by the owner. Fixed cameras will be provided throughout the facility for control, monitoring, and evidentiary purposes. All cameras shall be mounted in detention grade housings designed for the area the camera is installed. Cameras shall be recorded at 10 frames per second (fps) and at 1080p quality. Each camera's recording quality and framerate shall be individually adjustable.

Cameras, video management software, workstations, and dedicated Ethernet switches will be provided as a system by a single manufacturer for a standalone system. The entire system will be put into operation, programmed and tested as a complete installation. Cameras will connect by Category 6A cable to a local video switch. The Video switches will be interconnected by optic fiber from the new Security Electronics room building back to the existing Security Electronics room for Central Control. Equipment will be manufactured by one of the following companies:

- Bosch
- Vicon
- Pelco

Circulation door intercoms not in view of the controlling TCS will be provided with camera coverage so that the controlling TCS operator can visually confirm staff before unlocking the door. Cameras will be provided in dayrooms, recreation yards, and corridors to monitor inmate activity and record events for evidence. Dayroom cameras will be a higher resolution. In addition to the cameras indicated on the security plans, furnish and install 10 cameras in locations to be determined by the owner. Each observation & safety cell shall be provided with a corner mounted camera for full coverage of the inmate in the cell. Cells shall be displayed on the general monitor located at the officer station.

New IP cameras will terminate on patch panels in the new Security Electronics room. Fiber will connect back to the existing equipment room where the cameras' signal will be connected to a decoder to convert the new signal from digital to analog for the existing analog cross matrix switches.

Each IP Video Station will be provided with a Video Spot Monitor and a general monitor. Cameras monitoring intercoms or duress stations will be displayed on the Video Spot Monitor. The general monitor will be provided for the operator to monitor multiple cameras for general observation as conditions change in the facility.

If the facility will use body cameras, the contractor must allow for storage of the video in the central video server.

A high-density storage system will be furnished and installed. Storage will be provided for all newly connected cameras for 30. The video storage system shall

be fed with two separate 30 amp 208 VAC power feeds to two separate power units. The power units shall be redundant and hot swappable. The system shall be scalable by adding drives as required. Drives shall be hot swappable.

The ESC will provide to the owner three dimensional renderings of the anticipated view for each camera for approval. These camera views will be generated from the BIM model and include all HVAC duct work, electrical lights, structural components and building elements. These views should be derived from the ESC's active design model. The ESC shall schedule with the owner the timing of these reviews.

Survivability - Uninterruptible Power Supply (UPS):

All security electronics will be backed up by a UPS that is powered by normal power backed up by the emergency generator. The UPS will provide one hour of runtime power with 25% spare capacity to carry the electronics between loss of normal power and the generator reaching full load. The UPS will be monitored for loss of power by the PLC so the officers know they are running on batteries and should make efforts to correct the situation. The Basis of Design will be the Eaton Powerware 9170+ for single phase and 9355+ for three phase units.

Racks, Cabinets, and Conduit:

All IP video, PLC, and door control equipment will be installed in freestanding metal racks with front and back access doors in the appropriate equipment room. Provide seismic restraints for all cabinets and racks for the applicable seismic design parameters.

Conduit will enter the racks from above. All security electronics wiring will be installed in a secure raceway system. Conduits in buildings will be routed underground, concealed in walls, or in interstitial spaces away from inmate access. Surface conduit is only allowed in electrical rooms, security electronics rooms, mechanical rooms, or other similar spaces. All conduit and wire for all security electronic equipment shall be required to meet the California Electric Code and applicable local codes. The security electronics conduit and raceway shall NOT contain any high voltage cabling. All racks and conduit will be installed in strict conformance with seismic requirements for Ventura County. All Class 1, Class 2, Class 3, and other type cabling shall be separated as defined in the California Electric Code.

TABLE OF CONTENTS

SECTION A - SUBSTRUCTURE

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Substructure comprises foundations, floors on grade, and other substructure elements.

B. Foundations: Structures responsible for transferring dead loads, live loads, and environmental loads of completed building to the earth in such a way that the building is supported evenly and without movement.

1. Standard Foundations: Spread footings below columns, linear spread footings below loadbearing walls, foundation walls not part of basements, caisson (pier) caps, and pile caps.

C. Floors on Grade: Structural slabs, individual pavers, and framed flooring systems that are installed over fill or at excavated and compacted grade, including all depressions in the floor, such as trenches, pits, and sumps; also, equipment bases, under floor and perimeter drainage, thermal insulation at floor edge, and moisture barriers installed integrally with floor system.

D. Products: Where specific products are required or allowed, use products complying with the additional requirements specified elsewhere.

1.2 REFERENCE STANDARDS

A. ACI 201.2R - Guide to Durable Concrete; 2008.

B. ACI 302.1R - Guide for Concrete Floor and Slab Construction; 2004 (Errata 2007).

C. ASTM E1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers; 2014.

PART 2 – PRODUCTS AND METHODS

2.1 METHODS OF CONSTRUCTION

A. Use any of the following methods and techniques: Excavation, backfill, and compaction by machine or hand.

2.2 FOUNDATION WALLS

A. Refer to A10

2.3 SLABS ON GRADE

A. Refer to A20

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Provide substructure as required to support the completed and occupied building safely and without uncontrolled subsidence or other movement.

B. Provide floors on grade as required to enclose habitable spaces and support interior functions without subsidence, structural cracking, or other uncontrolled movement.

3.2 STRUCTURAL CRITERIA

A. Capacity: Provide loadbearing substructure members as required by code and designed to distribute dead loads, live loads, and environmental loads so that bearing capacity of soil is not exceeded.

1. Minimum Wall Thickness: Not less than thickness of superstructure walls supported by foundation walls.
2. Minimum Wall Thickness: 8-inch.
3. Minimum Wall Reinforcement: Steel with minimum yield strength not less than 60,000 psi.
4. Spread Footings: Designed not to exceed the allowable soil bearing capacity.
5. Footings: Minimum compressive strength of 3500 psi and minimum thickness of 8 inch.

B. Dead Loads: Accommodate loads from weights of building materials, construction itself, and all fixed service equipment.

C. Live Loads: Accommodate loads from use and occupancy of the building, either uniformly distributed loads as prescribed by code or concentrated loads, whichever are more demanding structurally.

1. Uniformly Distributed Loads: As required by code for building occupancy.
2. Concentrated Loads: As required by project program and building design.

3.3 DURABILITY

A. Expected Service Life Span: Same as building service life without any deterioration.

B. Concrete Durability:

1. Monolithic Concrete Floor Slabs on Grade: Composition and finishing as recommended by ACI 302.1R based on type of anticipated traffic and intended use.

a) Foot Traffic, Exposed Surface: Class 1; minimum 28-day compressive strength of 3500 psi; maximum slump of 5 in; single troweling; nonslip finish where required by Volume C - Interiors.

END OF SECTION A

SECTION A10 – STANDARD FOUNDATIONS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Criteria for standard foundations.

PART 2 – PRODUCTS AND METHODS

2.1 METHODS OF CONSTRUCTION

A. The construction will use the following:

1. Concrete spread and continuous footings interconnected to provide a rigid shallow foundation system as directed by the DBE's Solis Engineer.
2. Concrete floor slabs throughout the project at all habitable spaces as directed by the DBE's Solis Engineer.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Foundation:

1. Provide foundation system as required to support the completed and occupied building safely and without uncontrolled subsidence or other movement.
2. Foundations comprise of the following elements:
   a) Standard Foundations include spread footings below columns and continuous footings below load bearing walls. The spread and continuous footings shall be interconnected to provide a rigid shallow foundation system.
   b) Floors on Grade: Per Section A20.
3. Where foundations are integral with elements defined within another element group, meet requirements of both element groups.

3.2 STRUCTURAL CRITERIA

A. Foundation:

1. Waterproofing: Provide permanent waterproofing at portions of foundation that extend below grade.
2. Drainage: Provide method of collecting and positively draining water from below spaces below grade.
3. Substantiation:
   a) Design Development: Subsurface investigation to identify location of water table and identification of areas requiring water protection systems.
   b) Construction Documents: Product data on specific water protection materials and systems; details of construction to achieve permanent water protection.

B. Structure:

1. Capacity: Provide load bearing foundation members as required:
2. Minimum Wall Thickness: Not less than thickness of superstructure walls supported by foundation walls.
3. Footings: Minimum compressive strength of 3500 psi and minimum thickness of 12 in.

4. Concrete shall have a minimum compressive strength of 3500 psi with a w/c ratio of 0.5 and pozzolan (fly ash or silica fume) to improve durability of concrete in contact with soil.
5. Provide adequate reinforcement for temperature and shrinkage per ACI-318.
6. Provide housekeeping concrete pads and anchor bolts for major equipment. Coordinate with mechanical and electrical drawings.

3.3 DURABILITY

A. Corrosion Prevention: Provide supplementary protection for underground metal elements, sufficient to prevent corrosion completely for the service life of the element without extensive maintenance.

1. Minimum of 3 inches of concrete cover is considered to be permanent protection.
2. Provide cathode protection if any of the following is true; coatings or wrappings will not be considered sufficient protection for elements falling under these criteria:

    a) Metal elements are buried in a soil environment known to cause corrosion on similar nearby structures.
    b) Metal elements are buried in a soil environment in which stray DC electrical currents are present.

3. Substantiations:

    a) Proposal; Identification of major structural materials and systems.
    b) Construction Documents: Design details and specifications for corrosion resistant features.

END OF SECTION A10

SECTION A20 - SLAB ON GRADE

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Design Criteria for slabs on grade.

PART 2 – PRODUCTS

2.1 METHODS OF CONSTRUCTION

A. The construction will use the following: Concrete floor slabs on grade throughout the project at all habitable spaces.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Floors on Grade:

1. Provide floors on grade as required enclosing habitable spaces and supporting interior functions without subsidence, structural cracking, or other uncontrolled movement.
2. Floors on grade comprise structural slabs that are installed over fill or lime treated soil or at excavated and compacted grade, including all depressions in the floor, such as trenches, pits, and sumps. Floors on grade also include equipment bases; under floor and perimeter drainage and moisture barriers installed integrally with floor system.
3. Floor Flatness (FF): Provide floors on grade engineered and constructed to achieve degree of flatness as follows, when measured in accordance with ASTM E 1155 current edition.

    a) Specified Overall Value (SOV) at 35.
    b) Minimum Localized Value (MLV) at 24.

4. Floor Levelness (FL): Provide floors on grade engineered and constructed to achieve degree of levelness as follows, when measured in accordance with ASTM E 1155 current edition.

    a) Specified Overall Value (SOV): 25.
    b) Minimum Localized Value (MLV): 17.

5. Where floors on grade are integral with elements defined within another element group, the construction will meet requirements of both element groups.

3.2 STRUCTURAL CRITERIA

A. Slabs on Grade:

1. Vapor Retardation: Limit vapor transmission through floor construction to maximum rate of 0.1 perms; at locations where impermeable applied interior finishes such as resilient flooring or carpet are used.

    a) Use supplementary vapor retarder if necessary to meet requirements.
    b) Use method of sealing joints between vapor retarder elements that will be effective given available construction practices.
    c) Substantiation:

i) Design criteria and design analysis
ii) Construction Documents: Product data on materials and vapor retarder details.

2. Waterproofing: Provide permanent waterproofing for floors on grade that could potentially come into contact with ground water. Acceptable methods are any of the following:

a) Permanent, waterproof barrier beneath floor construction, protected against damage from floor installation.
b) Permanent, waterproof barrier installed between separate layers of floor construction.
c) Substantiation:

i) Design Development: Subsurface investigation to identify location of water table and identification of areas requiring waterproofing systems.
ii) Construction Documents: Product data on waterproofing and details of construction to achieve permanent waterproofing.

3. Finishing:

a) Exposed slabs to remain unfinished: Hard trowel and use two coats of penetrating hardener/densifier per manufacturer's recommendations such as Ashford Formula.
b) Slabs to receive finish flooring materials: Hard trowel and use a compatible dissipating sealer/curing compound.
c) Slabs to receive ceramic tile: Finish may be floated flat or with slope to drain as may be required.

B. Design Criteria:

1. Capacity: Provide load bearing members as required:

a) Floors On grade: Minimum compressive strength of 3500 psi and minimum thickness of 5 inches with minimum reinforcement of #4 @ 18" each way at mid depth (to be confirmed with soils report).
b) Concrete shall have a minimum compressive strength of 3500 psi with a w/c ratio of 0.5 and pozzolan (fly ash or silica fume) to improve durability of concrete in contact with soil.
c) Provide adequate reinforcement for temperature and shrinkage per ACI-318.
d) Provide housekeeping concrete pads and anchor bolts for major equipment. Coordinate with mechanical and electrical drawings and Owner equipment requirements.

3.3 DURABILITY

A. Floor Classifications: For concrete floors on grade, comply with composition and finishing recommendations of AC1302.1 R current edition for floor classifications based on type of anticipated traffic and intended use.

1. Class 1: Minimum 28-day compressive strength of 3500 psi; maximum slump of 4 in; single troweling; nonslip finish where required.
2. Class 2: Minimum 28-day compressive strength of 3500 psi; maximum slump of 4 in; light steel-troweled finish; curing methods that will not interfere with applied interior finishes.

END OF SECTION A20

SECTION B - SHELL

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. General requirement for the building shell.

PART 2 – PRODUCTS AND METHODS

2.1 MATERIALS

A. Refer to Sub-sections under this section.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Provide permanently enclosed spaces for all functional areas shown in the project program, unless otherwise indicated. The construction will provide a physical enclosure that keeps out weather, unwelcome people, animals, and insects without requiring specific action by occupants, while providing convenient movement of occupants between inside and outside, desirable natural light, and views from inside to outside. The construction will provide level floor areas, comfortable ceiling heights, and essentially vertical walls.

B. The elements forming usable enclosed space and separating that space from the external environment comprise the shell and consist of:

1. Superstructure (B10): All elements forming floors and roofs above grade, and the elements required for their support, insulation, fireproofing and fire stopping.
2. Exterior Enclosure (B20): All essentially vertical elements forming the separation between exterior and interior conditioned space, including exterior skin, components supporting weather barriers, jointing and interfacing components; not including the interior skin unless an integral part of the enclosure.
3. Roofing (B30): All elements forming weather and thermal barriers at horizontal and sloped roofs and decks, and roof fixtures.

C. Where shell elements also function as elements defined within another element group, meet requirements of both groups.

3.2 AMENITY AND COMFORT

A. Thermal Performance: Provide construction that will have thermal resistance as necessary to maintain interior comfort levels specified and in accordance with code and the following:

1. Energy Efficiency: In accordance with the requirements of 2016 California Building Energy Efficiency Standards.
2. Condensation: None on interior surfaces under normal interior temperature and relative humidity conditions.
3. Components That Have Surfaces Facing Both Interior and Exterior Environment: Condensation Resistance Factor (CRF) as required to meet requirement above, when tested in accordance with AAMA 1503.
4. Substantiation:

    a) Proposal: Identification of major thermal resistant materials and systems.

b) Design Development: Detailed listing of design criteria and design analysis, prepared by licensed mechanical engineer.
c) Construction Documents: Product data on thermal materials and details of continuous thermal barrier.

B. Air Infiltration: Maximum of 0.06 cfm per square foot of exterior surface area, measured in accordance with ASTM E 283-04 at differential pressure of 1.57 psf.

1. Use supplementary air barrier if necessary to maintain performance over entire shell.
2. Use method of sealing joints between elements that will be effective given available construction practices.

C. Water Penetration: Use materials to prevent water penetration into the interior of the building, under conditions of rain driven by 35 mph wind.

1. Substantiation:

a) Proposal: Identification of major water-resistant assemblies.
b) Design Development: Details of proven-in-use or proven-by-mock-up design.

D. Natural Light: Provide fenestration in shell to meet requirements for natural light in accordance with code and the following:

1. Substantiation:

a) Proposal: Identification of spaces relying on natural lighting with description of concept and required building elements.
b) Design Development: Drawings showing natural lighting location.

E. Cleanliness of Exterior Surfaces: The shell will be constructed to:

1. Prevent attraction and adherence of dust and air-borne dirt and soot, and minimize appearance of settled dust and dirt.
2. Be washed reasonably clean by normal precipitation.
3. Prevent precipitation from washing settled dust and dirt over surfaces exposed to view.
4. Appearance: Provide exterior appearance with characteristics as follows:

a) Concealing rooftop equipment, mechanical equipment, plumbing equipment, electrical equipment, piping, conduit and ducts from view from the surrounding parking lot and from the street.
b) Substantiation:

i) Proposal: Concept drawings of proposed solution indicating overall building configuration; massing; scale; and relationship to surrounding.
ii) Preliminary Design: Drawings and artist's rendering showing facade treatment for principal elevations, for building entrance elevations and identifying visible materials.
iii) Design Development: Drawings showing all building elements that are part of the shell with sizes and locations to scale.
iv) Construction Documents: Details of building shell, annotated to show compliance with performance requirements.

3.3 HEALTH AND SAFETY

A. Accidental Injury: The construction will protect pedestrians and building occupants in accordance with code.

B. Physical Security: The construction will provide protection as follows:

1. Doors: ASTM F 476-84 or ASTM F 842-12 as appropriate, Grade 40.
2. Windows: Different levels of protection for various locations, see Section B20.
3. Substantiation:

    a) Proposal: Identification of proposed methods of meeting security requirements.
    b) Design Development: Identification of materials to be used, the physical properties that accomplish the security requirements, and details of anchorage to the structure.

C. Structure:

1. Structural Performance: The construction will support all loads without damage due to loads in accordance with code.
2. Special Components: If design method is not specifically prescribed by code, design in accordance with ASCE 7-2010.
3. Design and provide shell elements to resist loosening or detachment in winds equivalent to the code design wind speed.
4. Shell elements engineered by manufacturer or fabricator, rather than by the engineer-of-record, shall comply with the following additional requirements:

    a) Manufacturer/fabricator employs licensed structural engineer to accomplish design of structural elements.
    b) Manufacturer/fabricator has minimum of 5 years' experience in the design and manufacture of similar structures.

5. Elements engineered by manufacturer or fabricator, rather than by the engineer- of-record will not be provided for the superstructure, exterior enclosure or roofing.
6. Substantiation:

    a) Proposal: Identification of major structural materials and systems.
    b) Preliminary Design: Detailed listing of design criteria and preliminary analysis, prepared by a licensed structural engineer.
    c) Construction Documents: Detailed design analysis by licensed structural engineer.
    d) Construction Documents: Detailed design analysis by licensed structural engineer for structures engineered by manufacturer or fabricator.
    e) Construction: For structures engineered by manufacturer or fabricator, detailed design analysis prepared by and shop drawings stamped by a licensed civil/structural engineer, with approval of engineer-of-record.

D. Construction Loads and Erection Stresses: The construction will accommodate temporary construction loads and erection stresses during construction.

3.4 DURABILITY

A. Service Life Span: Same as building service life: 50 years.

1. Load-Bearing Structural Members: Minimum of 50 years.

    a) No anticipated deterioration when protected from weathering
    b) Protective Elements: Minimum 25 years.

2. Wall Primary Weather-Barrier Elements: Minimum 50 years functional and aesthetic service life.
3. Transparent Elements (Glazing): Same as other wall primary weather-barrier elements, except accidental breakage is considered normal wear-and-tear.
4. Joint Sealers: Minimum 20 years before replacement.

5. Surfaces Exposed to View: Minimum 25 years' aesthetic service life; in addition, deterioration includes color fading, crazing, and delamination of applied coatings.
6. Roof Covering Weather-Barriers: Minimum 20 years, fully functional.

B. Water Penetration: Design and select materials to prevent water penetration into the interior of shell assemblies, under conditions of rain driven by 35 mph wind.

1. Exception: Controlled water penetration is allowed if materials will not be damaged by presence of water or freezing and thawing, if continuous drainage paths to the exterior are provided, and water passage to the building interior is prevented.
2. Substantiation:

a) Design Development: In addition to requirements specified for proven-in-use and proven-by-mock-up construction, drawings showing paths of water movement, with attention to changes in direction or orientation and joints between different assemblies.

C. Weather Resistance: The construction will minimize deterioration due to precipitation, sunlight, ozone, normal temperature changes, and atmospheric pollutants:

1. Deterioration includes corrosion, shrinking, cracking, spalling, delamination, abnormal oxidation, decay and rot.
2. Surfaces Exposed to View: Deterioration adversely affecting aesthetic life span includes color fading, crazing, and delamination of applied coatings.

a) Coated Finishes: Minimize use of materials with separate coated finishes.
b) Coating Performance: AAMA 2604, minimum.

3. Joint Components and Penetration Seals: Capable of resisting expected thermal expansion and contraction; use overlapping joints that shed water wherever possible.
4. Transparent Elements (Glazing): No haze, loss of light transmission, or color change, during entire expected service life.

a) Test Criteria: Less than 1 percent change in haze, transmission, and color over 2 years exposure, when tested after natural exposure conditions or accelerated light and water conditions simulating natural exposure at project, in accordance with ASTM D 1003-11 accelerated exposure documented with comparison to natural conditions.

5. Service Temperature: Low temperature equal to historically-recorded low, high temperature equal to that expected due to any combination of air temperature and heat gain from solar and other sources.

a) Freeze-Thaw Resistance: Adequate for climate of project.
b) Corrosion Resistance: In locations exposed to the outdoor air or in potential contact with moisture inside shell assemblies, provide only corrosion-resistant metals.
c) Ozone Resistance: Do not use materials that are adversely affected by ozone.
d) Substantiation:

i) Proposal: Identification of weather-exposed elements and proposed materials.
ii) Design Development: Details of proven-in-use materials and test reports.

D. Impact Resistance: Resist damage due to impact in accordance with code and the following:

1. Minimize damage from windborne debris propelled at up to 35 mph.
2. Resist damage from hail of size up to 1/2 inch.
3. Minimize damage due to potential vandalism.
4. Natural Hazards: Design to resist damage from perching, nesting, and feeding birds and rodents.
5. Minimum performance values for individual shell elements are also specified in other Sections.
6. Substantiation:

    a) Design Development: Identification of building elements required to resist impact damage, quantification of impact criteria, materials to be used, and methods of substantiation.
    b) Construction: Proven-in-use or proven-by-mock-up data.

E. Moisture Vapor Transmission: The construction will prevent deterioration of materials due to condensation of moisture vapor inside assemblies.

1. Use supplementary vapor retarder if necessary to meet requirements.
2. Use method of sealing joints between elements that will be effective given available construction practices.
3. Substantiation:

    a) Proposal: Identification of building elements providing moisture barrier, materials to be used, and data showing performance.
    b) Construction: Proven-in-use or proven-by-mock-up data.

F. Wear Resistance: Design and select materials to provide resistance to normal wear and tear in accordance with code and the following:

1. Elements Within Reach of Pedestrians: Minimize degradation from rubbing and scratching caused by pedestrians.
2. Minimize degradation caused by windblown sand, acid rain, normal operation and maintenance.
3. Substantiation:

    a) Proposal: Identification of building elements required to resist wear, quantification of wear criteria, materials to be used, and methods of substantiation.
    b) Construction: Proven-in-use or proven-by-mock-up data.

END OF SECTION B

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SECTION B10 - SUPERSTRUCTURE

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes general criteria related to the superstructure.

PART 2 – PRODUCTS AND METHODS

2.1 MATERIALS

A. Refer to Sub-sections under this section.

B. Superstructure:

1. Bearing Walls: Where indicated, use load-bearing concrete masonry walls.
2. Post and Beam: Where indicated utilize steel post and beam with cold rolled steel framing.
3. Floor Structure: For elevated slabs utilize steel beams and metal deck with lightweight concrete fill.
4. Roof Structure:

a) Main Roof Structure: Utilize steel beams and metal deck.
b) Stair Tower and Clerestory Roofs: Utilize steel beams and metal deck.

C. Fireproofing:

1. Where applied fireproofing is required, use one of the following:

a) Concealed: Sprayed-on cementitious.
b) Exposed: Intumescent

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION:

A. Provide structural elements, above grade capable of supporting all anticipated loads without failure or damage.

B. The superstructure comprises the elements noted above.:

C. Where superstructure elements also must function as elements defined within another element group, the construction will meet requirements of both element groups.

1. In addition to the requirements of this section, comply with all applicable requirements of Section B - Shell.

3.2 AMENITY AND COMFORT:

A. Water Penetration and weather resistance: Where roof coverings as specified in Section B40 are not used over any building elements, provide supplementary waterproof construction providing equivalent protection.

3.3 HEALTH AND SAFETY:

A. Fire: The superstructure will be constructed of members with combustibility, flame spread, and smoke generation characteristics allowed by code.

B. Fire Resistance: Provide fire resistance in accordance with code.

1. Determine fire resistance rating by testing in accordance with ASTM E 119 - 12a.
2. Determine flame spread index by testing in accordance with ASTM E 84 - 12b.
3. Determine smoke developed index by testing in accordance with ASTM E 84 -12b.
4. Where fire resistance integrity of superstructure assemblies is impaired by subsequent installation of other construction elements, restore fire resistance using identical materials or other materials tested under ASTM E 814 – 11a.
5. Provide fire stopping at openings in fire-rated superstructure elements that is rated at not less than the required fire resistance of the penetrated element.
6. Minimum performance values for individual superstructure elements are specified in other Sections.

C. Structure:

1. Capacity: Provide the superstructure load-bearing structural members of capacities required by the building code.
2. Dead Loads: Design and construct the superstructure to resist loads from weights of building including, but not limited to, construction materials, mechanical-electrical- plumbing systems, equipment; and fire protection.
3. Live Loads:
   a) Floors: Design and construct roof to resist uniformly distributed, concentrated, and impact loads in accordance with the building code.
   b) Roofs: Design and construct roof to resist uniformly distributed, concentrated, and impact loads in accordance with the building code.
4. Environmental Loads:
   a) Wind: Ultimate design wind speed VULT of 115 mph, Importance Factor of 1.0, and Exposure C.
   b) Earthquake: In compliance with provisions of the building code for Risk Category III and an importance factor of 1.25.
   c) Structural Design: In addition to the requirements of the code, design and construct to comply with ASCE 7-10.
   d) Design external (perimeter) components of subsystem either directly or indirectly exposed to weather to resist applicable potential ambient air differential temperature range from 30°F to 120°F with adequate provisions for noiseless movement in expansion and contraction and prevention of binding, buckling, joint- opening, breakage or undue stress in and between members. Control and separation joints should be shown on structural drawings.
   e) Design structure to limit deflections to meet the requirements of the governing code.
5. Steel fabrication shall be done in a shop of an approved fabricator holding a Certificate of Approval from the Ventura County or equal. A Certificate of Fabrication from the shop performing the welding or a report from a Ventura County Certified Special Inspector must be furnished to the job inspector prior to framing approval.
6. All field welding shall be performed by certified welders and continuously inspected.
7. Use load indicator washer or turn of the nut method instead of snug tight for tightening high strength bolts at slip critical connections.
8. All structural steel shall be primed with a rust resistant primer before shipment to the project site. After erection is completed, touch-up all shop priming coats damaged during transportation and erection.

3.4 DURABILITY:

A. Moisture Resistance of Load-Bearing Members: Use materials that are not damaged by contact with water or moisture vapor.

1. Materials that will corrode in the presence of water may be used if protected from water.
2. Materials that will rot or be damaged by fungus may be used if protected from water.

B. Impact Resistance of Load-Bearing Members: Use materials that are not easily damaged by common hand tools.

C. Applied Fireproofing Materials:

1. In Locations Where Concealed by Permanent Construction:

   a) Density: 10lb/cu. ft. minimum.
   b) Impact Strength: Passing ASTM E 760 – 92.

2. Interior Locations, Where Exposed to Air but Out of Reach of Occupants Above 10 ft.:

   a) Density: 14lb/cu. ft. minimum.
   b) Impact Strength: Passing ASTM E 760 – 92.
   c) Bond Strength: 300psf minimum, tested in accordance with ASTM E 736 – 00.

3. Exterior Locations, Where Exposed to Air but Out of Reach of Occupants Above 12 ft.:

   a) Density: 21lb/cu. ft. minimum.
   b) Impact Strength: Passing ASTM E 760 – 92.
   c) Moisture Resistance: Not affected by precipitation or freeze-thaw.

4. Exposed Locations on Exterior and Interior within Reach of Occupants Below 10 ft.:

   a) Density: 39lb/cu. ft. minimum.
   b) Impact Strength: Passing ASTM E 760 – 92.
   c) Moisture Resistance: Not affected by precipitation or freeze-thaw.

5. Portions of Superstructure Exposed on Exterior: Comply with requirements of Section B for water penetration and weather resistance.

END OF SECTION B10

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SECTION B20 - EXTERIOR ENCLOSURE

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes general criteria related to the superstructure.

PART 2 – PRODUCTS

2.1 WALLS

A. Use one or more of the following as indicated:

1. Concrete Masonry Units: Integral color medium weight decorative block in smooth with textured accents with integral water repellant additive. Use matching colored mortar with integral water repellant additive where integrally colored materials are not painted. Materials may be load bearing or in a veneered application.

2.2 CORROSION-RESISTANT METALS

A. Hot-dipped galvanized steel, with minimum zinc coating of 0.90 oz./sq. ft. total both sides.

B. Stainless steel, Type 304 or 316.

C. Aluminum.

D. Coated Finishes: 3 Coat fluoropolymer coating (70 percent Kynar 500(tm) or Hylar 5000(tm)).

2.3 SECURITY MESH

A. Welded Wire Panels at Exterior Recreation Yards: 1/2-inch x 3-inch x 8 gage welded wire panels hot dipped galvanized after fabrication with G60 zinc coating. Secure to structure using 3/8" bolts or studs at 12 inches on center with continuous minimum 3/8-inch x 2-1/2 inch galvanized steel cap bars.

2.4 DOORS

A. Use one or more of the following:

1. Hollow Metal Doors and Frames Including Borrowed Light Frames: Utilize NAAMM/HMMA specification custom hollow metal doors and frames with A60 galvannealed coating. Door face thickness and frames for exterior doors shall not be less than 16 gage. Use 1" tempered insulating glazing with low-e coating. At the secure perimeter and around the control room use ASTM F1915 Grade Level 4 laminated polycarbonate glazing with air gap and 1/4" tempered outer lite with low-e coating.
2. Aluminum Storefront: Utilize heavy duty thermally broken aluminum doors and storefront with clear anodized finish. Use 1" tempered insulating glazing with low-e coating.

2.5 WINDOWS

A. Use the following as appropriate:

1. Fixed windows: Utilize NAAMM/HMMA specification custom hollow metal hollow metal or aluminum storefront with 1" tempered insulated glazing with low-e coating. Where

glazing may be subject to impact from balls or other items, consider increasing the outer lite to 3/8" tempered or the use of laminated glazing. Where fixed glazing faces onto the perimeter of the facility (beyond the secure perimeter line), utilize ASTM F1915 Grade Level 4 laminated polycarbonate glazing with air gap and 1/4" tempered outer lite with low-e coating.

2. Operable Windows: For the Institutional Occupancy (I-3 use condition 3) enhancement, use detention grade hollow metal. Utilize ASTM F1915 Grade level 1 glass clad polycarbonate glazing with air gap and 1/4" tempered outer lite with low-e coating.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Provide an essentially vertical separation between exterior and interior conditioned space, that keeps out weather, uninvited people, and animals and insects, without unusual action by occupants, while providing convenient movement of occupants between inside and outside, desirable natural light, and views from inside to outside.

B. The elements forming the vertical separation comprise the exterior enclosure and consist of:

1. Exterior Walls
2. Exterior Windows and Other Openings
3. Exterior Doors
4. Exterior Wall Fixtures

C. Where exterior enclosure elements also must function as elements defined within another element group, meet requirements of both element groups.

D. In addition to the requirements of this section, comply with all applicable requirements of Section B - Shell.

3.2 HEALTH AND SAFETY

A. Fire Resistance:

1. All Materials of Exterior Enclosure: Non-combustible, with exceptions permitted by code.
2. Elevations: As permitted by code.

3.3 STRUCTURE

A. Structural Performance: No requirements in addition to those specified in Section B.

3.4 DURABILITY

A. Ambient Temperature Change: Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 70 degrees F greater than the most extreme high temperature without causing detrimental effect to components and anchorage.

B. Water Penetration: As specified in Section B.

C. Glass: Type and thickness in accordance with ASTM E 1300-12 combined with other applicable factors minimum thickness 6 mm for each lite.

END OF SECTION B20

SECTION B2010 - EXTERIOR WALLS

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes general criteria related to the superstructure.

PART 2 – PRODUCTS

2.1 EXTERIOR WALLS

A. See B20 Exterior Enclosure

2.2 WALL INSULATION

A. Use rigid or batt insulation with a minimum insulating value of R-19

2.3 EXTERIOR RAILINGS

A. Use one of the following:

1. Painted steel
2. Aluminum
3. Stainless steel

2.4 EXTERIOR CEILINGS AND SOFFITS

A. Cement plaster.

2.5 GLAZING

A. See B20 Exterior Enclosure.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Provide physical separation between exterior and interior conditioned space, that keeps out weather, uninvited people, and animals and insects.

B. The elements forming the physical separation comprise the exterior walls and consist of the supporting structure, the exterior skin, vapor retarders, air barriers, and insulation, the interior skin if an integral part of the wall, exterior screens and railings, balcony walls and parapets, exterior soffits unless they do not form a weather barrier, fire stopping and draft stopping within wall and between wall and floors, and other exterior wall elements.

C. Where exterior wall elements also must function as elements defined within another element group, meet requirements of both element groups.

3.2 AMENITY AND COMFORT

A. Thermal Performance:

1. Meet the minimum or exceed current California Building Energy Standards.

2. Condensation Resistance Factor (CRF): minimal 35 when measured in accordance with AAMA 1503.

B. Exterior Soffits and Ceilings: Same requirements as exterior walls.

1. Exception: If the space between soffit and floor/roof above is not required to be conditioned space, thermal performance requirements do not apply.

C. Appearance:

1. Rhythm: The construction will develop rhythm within building elevations consistent with building scale by varying patterns, placement, and color of finish materials.

3.3 STRUCTURE

A. Wind Design: No damage when tested in accordance with ASTM E 330-02 at 1.5 times positive and negative design wind loads using 10 second duration of maximum load.

1. Deflection: Limits as stipulated by the building code or 1/180 of span, maximum, whichever is more stringent.
2. Members Supporting Glass: Maximum deflection of flexure limit of glass with full recovery of glazing materials.

B. Railing Assemblies: Resistant to required forces in accordance with ASCE 7-10.

3.4 DURABILITY

A. Water Penetration: Drain water, moisture and condensation entering assembly to the exterior.

B. Joint Sealers in Exterior Skin: Life span expectancy equal to that specified for primary weather barriers.

END OF SECTION B2010

SECTION B30 - EXTERIOR COMMERCIAL DOORS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Exterior non-security doors comprise all openings in the exterior wall that function to allow the entrance and exit of people, vehicles, and goods, including exterior doors include doors of all sizes and uses, operable grilles and screens, gates, and other exterior door opening elements that are not part of the security envelope.

B. Other Exterior Door Opening Elements: All components required to complete the openings, including lintels, sills, flashings, and joint sealers, unless an integral part of another element.

C. Products: Where specific products are required or allowed, use products complying with the additional requirements specified elsewhere.

1.2 REFERENCE STANDARDS

A. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.

B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.

C. ASTM C1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus; 2011.

D. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).

E. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

F. ASTM F476 - Standard Test Methods for Security of Swinging Door Assemblies; 2014.

G. ASTM F842 - Standard Test Methods for Measuring the Forced Entry Resistance of Sliding Door Assemblies, Excluding Glazing Impact; 2014.

H. ASTM F1233 - Standard Test Method for Security Glazing Materials and Systems; 2008 (Reapproved 2013).

I. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches; 2011.

J. BHMA A156.3 - American National Standard for Exit Devices; 2014.

K. BHMA A156.5 - American National Standard for Cylinders and Input Devices for Locks; 2014.

L. BHMA A156.13 - American National Standard for Mortise Locks & Latches Series 1000; 2012.

M. NAAMM HMMA 862 - Guide Specifications for Commercial Security Hollow Metal Doors and Frames; 2013.

PART 2 – PRODUCTS

2.1 EXTERIOR DOORS

A. Pedestrian Doors:

1. Provide weather-stripping, thresholds, and ____.
2. Provide removable or fixed mullions at double doors at ____.
3. Use one of the following:

    a) Hollow steel doors.

4. Do not use:

    a) Glazed doors.
    b) Wood doors and frames.
    c) Plastic doors and frames.
    d) Metal framed entrances.
    e) All-glass entrances.

B. Hardware for Swinging Doors:

1. Use satin, chrome or stainless steel finish.
2. Use fire rated hardware on fire rated doors.
3. Hinges: Ball-bearing butt hinges, or continuous hinges.
4. Exit Devices: Unless specifically indicated as one type, mortise type, rim type, exposed vertical rod type, or concealed vertical rod type.
5. Locksets: Unless specifically indicated as one type, mortise.
6. Door Closers: Unless specifically indicated as one type, concealed overhead frame-mounted type or concealed overhead door-mounted type.
7. Door Stops: Unless specifically indicated as one type, floor-mounted type, wall-mounted type, or overhead door/frame mounted type.

C. Glazing in Doors: Glass as indicated or required by code.

D. Door Louvers: Same material as doors.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Secure all openings in the exterior wall that function to allow the entrance and exit of people, vehicles, and goods, so that the entire exterior enclosure functions as specified, using doors as specified, without using components that must be installed at changes of season.

B. Where exterior door elements also must function as elements defined within another element group, meet requirements of both element groups.

3.2 AMENITY AND COMFORT CRITERIA

A. Accessibility and Convenience:

1. Door Handles and Knobs: As required by code; where code and other requirements allow an option, exit devices are preferred.
2. Mode of Operation: Self-closing, with manual hold-open, unless otherwise indicated.

B. Air Infiltration Resistance: Maximum of 0.20 cfm/ft. (1.1 cu m/hr./m) of crack length, measured in accordance with ASTM E283 at differential pressure of 1.57 psf (75 Pa).

1. Substantiation:

    a. Design Development: Details of method of weather sealing; test reports on door/frame assemblies.

C. Water Penetration Resistance: If so desired, provide justification for exemption of door openings from water penetration requirements of Section B20 - Exterior Enclosure Criteria.

1. Substantiation:

    a. Design Development: Details of method of weather sealing; test reports on door/frame assemblies.

3.3 HEALTH AND SAFETY CRITERIA

A. Emergency Egress: Provide exit doors minimum 36 inches wide.

B. Fire Resistance:

1. Doors Required by Code to be Fire Resistive: Fire resistance rating as required by code, for fire resistance rating of exterior wall in which doors occur, tested in accordance with a method acceptable to local authorities.

C. Physical Security: Doors non-removable from outside without use of key.

D. Glazing in Doors: Comply with requirements for safety glazing, security, and forced entry.

3.4 STRUCTURAL CRITERIA

A. Lintels: Constructed to span door openings and support loads imposed by exterior wall with maximum deflection vertically and horizontally of 1/360 of span.

3.5 DURABILITY CRITERIA

A. Service Life Span of Operating Components: Remaining operable for 10 years under normal exposure conditions for the project site.

B. Water Penetration Resistance: Design openings and components of openings to positively drain water to exterior of the building.

1. Top of Openings: If wall construction does not provide its own methods of drainage, use separate flashing to prevent water from entering opening components or the interior of the building.
2. Bottom of Openings: Integral or separate sill or flashing to prevent water running over or draining out of opening components from entering the wall construction below or the interior of the building.

C. Physical Endurance:

1. Doors, Frames, and Hardware: ANSI/SDI A250.4 Level A using hardware specified.
2. Doors, Frames, and Anchors: NAAMM HMMA 862 endurance test requirements.

D. Wear Resistance:

1. Door Handles and Knobs: Highly scratch-resistant and of finish that will minimize appearance changes due to wear; satin or brushed finish.

E. Flexible Seal Materials: Minimize deterioration due to operation of doors and aging.

F. Swinging Doors: Control door swing to prevent damage due to impact, to either door or element impacted.

3.6 OPERATION AND MAINTENANCE CRITERIA

A. Ease of Use and Repair: Provide doors that will be easy to use by occupants, easy to repair or service, and with operating components easy to replace.

END OF SECTION B30

SECTION B35 – EXTERIOR DETENTION DOORS, HARDWARE, AND GLAZING

PART 1 – GENERAL

1.1 DESCRIPTION

A. General: This specification section covers detention hardware, detention doors, detention frames, and detention glazing. Drawings and General Provisions of the Contract, including General and Supplementary Conditions, County Standard Terms and Special Provisions, apply to this section.

B. Under the requirements of this specification, the Detention Equipment Contractor (DEC) is solely responsible for furnishing and installing all detention hollow metal doors, frames, detention hardware, security glass, and door accessories, as specified, in all locations.

1.2 QUALITY ASSURANCE AND CONSTRUCTION STANDARDS

A. All doors, frames and glazing shall carry the Code required fire rating based on the final design of the DBE.

B. American Society for Testing and Materials:

1. ASTM A366/A 366M-97 Standard Specification for Commercial Steel (CS), Carbon (0.15 Maximum Percent), Cold Rolled
2. ASTM A569A 569M-97 Standard Specification for Steel, Carbon, (0.15 Maximum Percent), Hot Rolled Sheet and Strip, Commercial Quality
3. ASTM A1011, Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot Dip Process, Commercial Quality
4. ASTM A653/A, 653M-96, Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot Dip Process, Commercial Quality
5. ASTM A666-96b Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar
6. ASTM B117-95 Standard Practice for Operation Salt Spray (Fog) Apparatus
7. ASTM 143-90a (1990) Standard Test Method for Slump of Hydraulic Cement Concrete
8. ASTM D610-95 Standard Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces
9. ASTM D 714-87 (1994), Standard Test Method for Evaluating Degree of Blistering of Paints
10. ASTM D 1735-92, Standard Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus
11. ASTM E 152-81a Method for Fire Tests of Door Assemblies
12. ASTM F1450-12a, Standard Test Methods for Hollow Metal Swinging Door Assemblies for Detention Facilities
13. ASTM 1577-05, Standard Test Methods for Detention Locks for Swinging Doors
14. ANSI/BHMA A156.13 American National Standard for Mortise Locks
15. ASTM F1592 Test methods for Detention Hollow Metal Vision Systems
16. ASTM C1048 Condition A, Standard Specification for Heat Strengthened and Fully Tempered Flat Glass. In addition to this standard, roller wave distortion on laminated units shall be kept to a minimum of .076mm from peak to valley, and shall not noticeably affect the clarity of images when looking through the glass.
17. ASTM C1036 Class 1, Standard Specification for Chemically Tempered Glass

18. ASTM D635 Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position
19. ASTM 1758 Grade 1A, Test Methods for Detention Hinges used on Detention Grade Swing Doors
20. ASTM E2074 Test Method for Fire Tests of Door Assemblies, Hinged and Pivoted Swinging Door Assemblies
21. ASTM F1643 Test Methods for Detention Sliding Door Locking Device Assembly
22. ASTM F1915-12 Standard Test Methods for Glazing for Detention Facilities.
23. ASTM A167 and A240, Stainless Steel Type 304

C. HMMA 863-14 Guide Specifications for Detention Security Hollow Metal Doors and Frames

D. NAAAM Hollow Metal Manual, all sections.

E. NAAAM HMMA 850-83 Fire-Rated Hollow Metal Doors and Frames, Second Edition

F. ANSI / NFPA 80-2013 Fire Door and Windows

G. ANSI / NFPA 252-2003 Standard Methods for Fire Test of Door Assemblies

H. ANSI / NFPA 257-2007 Methods for Fire Test of Window Assemblies

I. ANSI/UL 10 (B)-97 through 2001, 10 (C)-98 through 2001, Fire Tests of Window Assemblies

J. ANSI / UL 752 Bullet-Resistance Equipment.

K. ANSI Z97.1-2015 Safety Glazing Materials used in Buildings

L. 16 CFR 1201 Safety Standard for Architectural Glazing Materials

1.3 SHOP DRAWINGS & EQUIPMENT SUBMITTAL.

A. Product Data: Include construction details, material descriptions, core descriptions, label compliance, fire-resistance rating, and finishes for each type of detention door, frame and access panel, as specified.

B. Provide performance testing reports which support the testing requirements specified.

C. Shop Drawings: For detention doors and frames. Include conditions at openings, details of construction, dimensions of profiles, and details of joints and connections. Show anchorage and accessories. Include fastener types, sizes and spacing. Identify each detention door and frame using same reference numbers for openings as those on Drawings.

D. It is the DEC's responsibility to coordinate detention/security items in this scope of work, and to answer all manufacturer questions or concerns that are not strictly design related, prior to submitting. The DEC shall redline the manufacturers' individual shop drawings and/or schedules, and note corrections prior to submittal for Architectural/Consultant review. When multiple items are submitted by the manufacturer on a single cut sheet, the DEC shall note with an arrow, circle or note cloud, to show which product on the sheet is submitted for this scope of work. DEC submittals not reviewed and redlined prior to submittal to Architect/Consultant for final review, will be returned rejected. The DEC shall submit Security Glass, Detention Hollow Metal and Detention Hardware together at the same time for coordination.

E. Shop Drawings: For access panels.

1. Door and panel units: Show types, elevations, lock type, thickness of metals, and full-size profiles of door members.

2. General: Show connections of units and hardware to other Work. Include schedules showing location of each type and size of door and panel units.

F. Coordination Drawings: Drawings of each opening, including detention door and frame, drawn to scale and coordinating detention door hardware. Show the following:

1. Locations, dimensions, and profiles of detention door hardware reinforcements.
2. Locations and installation details of detention door hardware.
3. Elevations of each detention door design type showing dimensions, locations of detention door hardware, and preparations for power, signal, and electrified control systems.
4. Details of each detention frame type.
5. Details of mortar boxes in detention frames for hardware and communication devices.

G. Oversize Construction Certification: For detention door assemblies required to be fire rated and exceeding limitations of labeled assemblies, submit certification of a testing agency acceptable to authorities having jurisdiction that each detention door and frame assembly has been constructed to comply with design, materials, and construction equivalent to requirements for labeled construction.

PART 2 – PRODUCTS

2.1 DETENTION DOORS

A. Provide flush-design detention doors, 2 inches thick, of seamless hollow construction, unless otherwise indicated. Construct detention doors with smooth, flush surfaces without visible joints or seams on exposed faces or stile edges. Provide core construction welded to both detention door faces. Doors to be constructed of 12-gauge steel. Cuff ports to be flush, center mounted lock-on-port design. Cell interior pulls to be flush and integral by the hollow metal manufacturer. All hinges and hardware to be detention rated.

2.2 FRAMES

A. Fabricate detention frames of full-welded unit construction, with corners mitered, reinforced, and continuously welded full depth and width of detention frame. Knockdown frames are not acceptable. All frames to be 12-gauge steel. Windows shall comply with ASTM F 1592. Detention contractor shall coordinate with security electronics drawings and furnish back-boxes and preps for frame mounted security electronic items such as, but not limited to, intercoms, dome-lites and key switches.

2.3 LOCKS

A. Wide Jamb Locks: Furnish wide jamb locks for swing doors on circulation doors equal to the Southern Steel 10120 high security lock, with high security mogul cylinders that have past UL 1034 testing requirements. Furnish as indicated on security plans.

B. Narrow Jamb Locks: All cells shall be furnished with RR Brink 3020 24VDC Solenoid locks. These locks shall be provided with Medico cylinders and keyed to the owner's requirements, matching the existing facility.

C. Mortise Lock: Furnish mortise locks for utility and other miscellaneous rooms. Locks shall be mechanical or electrical as required by functional and 2016 CBC requirements. Locks to be equal to Southern Folger 10500 and 10600 locks with appropriate functions, provided with high security mogul cylinders. Furnish as indicated on security plans.

2.4 DETENTION GLAZING

A. Furnish Glass Clad Polycarbonate Glazing with attack ratings as indicated in the narratives and/or on security plans. Limit glass sizes to two different sizes for door glazing and three different sizes for windows to minimize maintenance stock. Larger windows shall be multiple panes of one or more of the three other glass window glass sizes. A mixture of Glass Clad Polycarbonate and Laminated Polycarbonate may be used at the owner's discretion. Utilize air gap units for insulating properties with fully minimum 1/4-inch thick tempered outer lites.

B. Glass shall be installed using 100 percent solids, polyisobutylene-butyl tape with an internal spacer rod. Fire rated openings shall be installed using Kerafix Flexlit tape or Rectorseal BlazeSeal as required by the selected manufacturer.

C. A one-part non-sag tamper resistant elastomeric STPU Security caulk meeting Federal Specifications TT-S-00230C, Type II, Class B and ASTM C-920-98, Type S, Grade NS Class 12.5, shall be used on both sides of all security glass, except at exterior windows. At exterior windows, glass shall be installed using security sealant on the interior side, and a one-part silicone rubber caulking meeting Federal Specification TT-S-00230C, Type S, Grade NS Class 25, on the exterior side.

D. Where laminated Polycarbonates are used, Polycarbonate must be primed prior to installing sealants of any kind.

E. Glass shall be set on TPR (thermoplastic rubber) setting blocks with 70-90 shore "A" durometer hardness, chemically compatible with glazing components.

F. Glass shall be set using a minimum 1-1/4" by 10-gauge removable glass stop.

G. Attic stock shall be provided in quantities of 10 of each size glass provided on this project. This glass shall be crated and clearly marked for size and glass type.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Detention locks shall be a fail-secure slam-lock, which opens when energized and mechanically slam locks to close. Mechanical Detention locks shall mechanically retract by use of a detention grade key, and mechanically slam lock, or manually relock with a key.

B. Refer to the requirements of the Emergency Release function of the door control system. Electronically controlled locks shall be furnished with capabilities of functioning per the requirements set forth in Section D5038 Security Door Control System.

C. Electric locks shall be monitored through the lockbolt and through a door position switch in the frame head.

3.2 HEALTH AND SAFETY CRITERIA

A. Emergency Egress: Provide exit doors minimum 36 inches wide except as noted otherwise.

B. Fire Resistance: Doors Required by 2016 CBC to be Fire Resistive: Fire resistance rating as required by 2016 CBC, for fire resistance rating of exterior wall in which doors occur, tested in accordance with a method acceptable to local authorities.

C. Physical Security: Doors non-removable from outside without use of key.

D. Glazing in Doors: Comply with requirements for safety glazing, security, and forced entry as specified below and in the design narratives.

3.3 DURABILITY CRITERIA

A. Detention Doors and Frames: Detention Grade 1, Doors and Frames shall be required. Detention doors and frames shall be fabricated, and shall comply with ASTM F1450-12a Standard Test Methods for Hollow Metal Swing Door Assemblies for Detention and Correctional Facilities, and NAAMM specification HMMA 863-14 Guide Specifications for Detention Security Hollow Metal Doors and Frames. Complete approved and Passed test reports, shall be required at the time of submittal. Engineering studies will not be accepted. Exterior doors and frames shall be provided with a Galvannealed finish.

B. Detention Hardware: Exterior Detention Locks shall be Detention Grade 1 meeting ASTM F1577 requirements. Exterior hardware shall be provided with rust inhibitive coatings, and finishes. Lock cylinders shall be provided with cylinder shields on the exterior side of the door. Controlled doors with electric locks shall be monitored with a recessed detention grade door position switch installed in the head of the frame, and provided with a bolt position switch in the strike provided by the lock manufacturer. Doors shall be provided with detention grade hospital-tip hinges. Doors shall be provided with weather strip, rain drips and threshold.

C. Detention Glazing shall be Insulated Glass Clad Polycarbonate.

1. High Security: ASTM Grade level 1: 1-5/8" tinted (as selected by Owner) tempered exterior, insulated air-gap unit with heat strengthened interior glass (WMFL level II – 60-minute physical attack, ASTM F1915 Grade 1 – 60-minute containment).
2. Medium Security: ASTM Grade level 2: 1-3/8" tinted (as selected by Owner) tempered exterior, insulated air-gap unit with heat strengthened interior glass (WMFL level III – 30-minute physical attack, ASTM F1915 Grade 2 – 40-minute containment).
3. Low Security: ASTM Grade level 3: 1-7/8" tinted (as selected by Owner) tempered exterior, insulated air-gap unit with heat strengthened interior glass (HPW level II Forced entry, ASTM F1915 Grade 3 – 20-minute containment).
4. Vandal Resistant: ASTM Grade level 4: 1-3/16" tinted (as selected by Owner) tempered exterior, insulated air gap unit with heat strengthened interior glass ((HP White Level I-TP-0500.02, ASTM F1915 Grade 4 – 10-minute containment).

3.4 OPERATION AND MAINTENANCE CRITERIA

A. Operation and Maintenance Manual shall include information for every mechanical item with moving parts and every electrical item submitted in the approved hardware schedule. This is to include all material in the related submittal and is not limited to "detention" equipment. The owner has the right to request an interactive Operation Manual. The interactive manual will utilize the files described above as a basis for an interactive document utilizing a web browser. All manuals, files, and data sheets would be published in a format compatible with Internet Browsers equal to Microsoft Internet Explorer. Hyperlinks would link each item in a master table of contents to individual manuals, shop drawings, and files. The DEC shall clarify with the owner the type of documentation required.

END OF SECTION B35

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SECTION B40 - ROOFING

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Roofing comprises all elements forming weather and thermal barriers at the sloped or essentially flat weather-proof enclosure over the entire "top-side" of building and over exposed floor superstructure, including plaza decks, balconies, and other exposed floors; including roof coverings, closures for roof openings, roof fixtures, and other roof elements, not including the structural supporting elements of the roof.

B. Roof Coverings: All weather-resistive components, including the primary weather barrier, vapor retarders, insulation, wearing surfaces, water collectors and conductors, trim and accessories.

C. Roof Openings: Skylights, ventilation openings, access openings, and other elements necessary to close roof openings, and elements associated with those openings.

D. Roof Appurtenances: All elements attached to the roof, unless equipment or services or specified elsewhere, and mounting brackets or frames for roof mounted services and equipment; roof fixtures required are those required by the program, those made necessary by the design.

E. Products: Where specific products are required or allowed, use products complying with the additional requirements specified elsewhere.

1.2 REFERENCE STANDARDS

A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2008.

B. ASTM C1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus; 2011.

C. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings; 2011.

D. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).

E. ASTM E547 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference; 2000 (Reapproved 2016).

F. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.

G. ASTM F476 - Standard Test Methods for Security of Swinging Door Assemblies; 2014.

H. ASTM F1233 - Standard Test Method for Security Glazing Materials and Systems; 2008 (Reapproved 2013).

I. NFPA 204 - Guide for Smoke and Heat Venting; 2012.

J. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

PART 2 – PRODUCTS

2.1 ROOF COVERINGS

A. Roof Coverings in General:

1. Use one of the following:
    a) Product whose installation method is specified in the code, provided the material complies with specified requirements.
2. Do not use any of the following:
    a) Asphalt roll roofing.
    b) Asphalt shingles.
    c) Mineral-fiber-cement shingles or tiles.
    d) Clay tiles.
    e) Concrete tiles.
    f) Metal shingles or tiles.
    g) Slate shingles.
    h) Wood shingles or shakes.
    i) Built-up asphalt roofing or deck waterproofing.
    j) Built-up coal tar roofing or deck waterproofing.
    k) Cold-applied bituminous roofing or deck waterproofing.
    l) Rubberized asphalt roofing or deck waterproofing.
    m) Metal roof panels.
    n) Fluid-applied roofing membrane.
    o) Sprayed coated foam roofing.

B. Sloped Roofs:
1. Use one of the following:
    a) Standing Seam Metal Roofing: Minimum 20 gage A60 galvalume coated sheet with 3 Coat fluoropolymer coating (70 percent Kynar 500(tm) or Hylar 5000(tm)).
    b) Batten Seam Metal Roofing: Minimum 20 gage A60 galvalume coated sheet with 3 Coat fluoropolymer coating (70 percent Kynar 500(tm) or Hylar 5000(tm)).
2. Do not use:
    a) Asphalt shingles.
    b) Wood shingles.
    c) Metal shingles.
    d) Slate shingles.
    e) Concrete tiles.
    f) Clay tiles.
    g) Mineral fiber-cement tiles.

C. Essentially Flat Roofs:
1. Use one of the following:
    a) Thermoplastic roofing membrane, PVC (Preferred Basis of Design) or TPO. Installed over insulation and fully-adhered.
    b) Modified bituminous roofing membrane installed over insulation and fully adhered.
2. Do not use:
    a) Fleece backed products.
    b) Pitch pans or pockets.
    c) Cold-applied bituminous roofing membrane.
    d) Elastomeric roofing membrane.
    e) EPDM roofing membrane.

f) Rubberized asphalt roofing membrane.
g) Fluid-applied roofing or waterproofing membrane.
h) Loose-laid roofing membrane.
i) Mechanically attached roofing membrane.
j) Inverted roof membrane assembly (insulation over membrane).

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Provide a weather-proof enclosure over the entire "top-side" of building that also excludes unwelcome people, animals, and insects without requiring specific action by occupants, while shedding water and preventing uncontrolled water infiltration, withstanding anticipated loading conditions, providing required access, and permitting the entry of desirable natural light.

B. Substantiation:

1. Post-Construction: Roof inspection conducted in the Spring after completion of roofing, and when chance of snow has also passed.

C. Where roofing elements also must function as elements defined within another element group, meet requirements of both element groups.

3.2 AMENITY AND COMFORT CRITERIA

A. Thermal Performance: As required by Cal Green and Title 24 and the following:

B. Air Infiltration Resistance: If a jointless or completely sealed-seam or welded-seam membrane-type water barrier is not used for roof covering, provide auxiliary method of complying with air infiltration criteria

C. Appearance:

1. Cleanliness: Use surface materials that will conceal dirt.

3.3 HEALTH AND SAFETY CRITERIA

A. Fire Resistance: Class A products.

B. Prevention of Accidental Injury:

1. Ladder Safety: Comply with ANSI A14.3.
2. Roof Worker Safety: Design to provide safe design and safety measures as required by code and the following:

a) Provide permanent access to all areas of the roof in the form of stairs or fixed ladders.
b) Provide permanently installed supports for equipment used for cleaning windows and other glazed areas of the shell.
c) See Section E10 - Equipment Criteria for additional requirements.

C. Physical Security: Consider the roof area and all roof openings unsupervised.

1. Roof Openings and Assemblies: Forced entry resistance of Class 3.0, minimum, in accordance with ASTM F1233 and Grade 10, minimum, in accordance with ASTM F476 adapted to suit assembly.
2. Access Hatches: Forced entry resistance of Class 3.0, minimum, in accordance with ASTM F1233.

3.4 STRUCTURAL CRITERIA

A. Self-Supporting Elements: Same requirements as for superstructure.

B. Rainwater Load: As required by code.

C. Roof Component Wind Resistance:

1. Uplift: Conforming to FM I-90.
2. Wind Uplift: Where roof covering has a lower air transmission rate than the roof superstructure, provide means of preventing blow-off or ballooning due to low negative pressure over roof.
3. Substantiation:

a) Construction Documents: Identifying numbers on the construction drawings.

D. Roof Covering Substrate: Sufficiently rigid or dense to support water barrier in a manner that prevents puncture due to traffic on roof.

E. Roof Fixtures:

1. Mounting Brackets and Frames for Equipment and Services: Complying with design requirements for superstructure.
2. Screens: Complying with design requirements for exterior walls.
3. Anchorage: Design roof fixtures to be supported from building structural frame or structural deck, but not sheet metal deck.

3.5 DURABILITY CRITERIA

A. Expected Service Life Span: Same as for facility , except as follows:

1. Roof Covering Weather-Barriers: Minimum 20 years, fully functional.
2. Aesthetic Life Span: Significant degradation of appearance during the functional life span is not acceptable.
3. Manufacturer Approval of Design: Where roof covering manufacturer recommends or requires certain design features for satisfactory performance or for warranty, with manufacturer's requirements.
4. Manufacturer Warranty: 20 Years full system no limit.

B. Water Penetration Resistance: None, under conditions of rain driven at 90 mph, unless water paths are completely accessible.

1. Roof Fixtures: Maintain integrity of roofing water penetration resistance at points of fixture and mounting attachment to supporting structure.
2. Substantiation:

a. Construction: Water flood tests of roof areas that can accumulate rainwater if primary drains are blocked, up to depth for which structure is designed.

C. Weathering Resistance: Provide weather-exposed roof coverings and other components that comply with weather resistance specified by the following:

1. Minimization of Deterioration Due to Weather: For weather-barrier materials, minimization means no deterioration that adversely affects water penetration resistance at any time during the specified service life span.
2. Roof Fixtures:

a) Surface Finish: Minimum service life of 10 years without color deterioration.
b) Equipment Screens: Complying with durability requirements specified for exterior walls.

c) Mounting Brackets and Frames for Services and Equipment: Complying with durability requirements specified for exterior walls.

3. Substantiation:

a) Design Development: Identification of proven-in-use assemblies; in addition to substantiation items specified for proven-in-use assemblies, provide, for minimum of 3 existing applications, date of installation of roof covering; maintenance, repair, and replacement history; recommended inspection and maintenance program; detailed evaluation of similarities and differences of historical application from proposed application; estimated life span of similar assembly if constructed today.

D. Wear Resistance:

1. Surfaces Subject Only to Maintenance Foot Traffic: Not punctured by ordinary materials or tools when stepped on.
2. Substantiation:

a) Proposal: Product data showing proven-in-use products, or demonstration using tests appropriate to materials used, over same type of substrates as will be used in construction.

3.6 OPERATION AND MAINTENANCE CRITERIA

A. Water Conductor Capacity: As required by code or SMACNA (ASMM), whichever is greater, based on 100 year 1 hour intensity.

1. Substantiation:

a) Design Development: Calculations of capacity.

B. Ease of Maintenance:

1. Water Barrier Subject to Foot Traffic: Easily accessible for repair; if covered, covering must be removable by one person without the use of tools other than shovel and broom, with original covering materials replaceable to the same degree of coverage using the same tools.

END OF SECTION B40

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SECTION C - INTERIORS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Interiors comprise all elements necessary to subdivide and finish space enclosed within the shell, including applied interior surfaces of the exterior enclosure; interior doors, windows, and other openings and coverings; interior fixtures attached to interior construction to add functionality to enclosed spaces, except for elements classified as equipment or services fixtures.

B. Partitions: All types of space dividers, including demountable and operable partitions.

1. Fixed Partitions: Solid, stationary space dividers that are opaque and extend full height.
2. Partial Height Partitions: Fixed, solid, opaque visual barriers, including toilet compartments.
3. Operable Partitions: Movable barriers that form solid, visual and acoustical subdivisions of a space.
4. Fixed, Open Protection and Control Devices: Barriers include interior railings.

C. Interior Openings: Doors, windows, louvers, vents, expansion joint covers.

1. Interior Doors: All interior doors, including hardware and frames, except for elevator doors.
2. Interior Windows: All interior fixed and operable windows, including frames and casings.

a) Fixed windows, but excluding glazed partitions.
b) Window openings without glazing, including finished sills, head, and jambs.

3. Other Interior Openings: Interior utility openings such as hatches and access panels, louvers and vents, expansion joint covers, and elements forming or completing interior openings, including sills, jambs, heads, and operating hardware.

D. Stairs and Ramps: Those interior and exterior stair and ramp elements not a part of superstructure or exterior enclosure, comprising the following elements:

1. Structure supporting stairs, unless an integral part of superstructure.
2. Tread and riser construction, unless an integral part of superstructure.
3. Railings for interior stairs.
4. Integral stair finishes.

E. Interior Fixtures: Functional items that are permanently attached to interior walls, ceilings, and floors, except for elements classified as equipment or services fixtures, comprising the following elements:

1. Toilet, Bath, and Laundry Accessories.
2. Information Fixtures: Identifying devices, visual display surfaces, and communications enclosures.
3. Storage Fixtures: Non-furniture items intended primarily for storing or securing objects, materials, and supplies, such as cabinets, casework, wardrobes, closet specialties, lockers, shelving, and postal boxes.
4. Window Treatment: Non-furnishing accessories for control of view at interior and exterior windows, including blinds.
5. Fixed Seating: Single and multiple seating that is attached to the building.

F. Products: Where specific products are required or allowed, use products complying with the additional requirements specified elsewhere.

1.2 REFERENCED STANDARDS

A. ADA Standards – Title 24 Chapter 11B.

B. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications; 2015.

C. ASTM E72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction; 2015.

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.

E. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).

F. ASTM E336 - Standard Test Method for Measurement of Airborne Sound Attenuation between Rooms in Buildings; 2016.

G. ASTM E413 - Classification for Rating Sound Insulation; 2016.

H. ASTM E1130 - Standard Test Method for Objective Measurement of Speech Privacy in Open Plan Spaces Using Articulation Index; 2008.

I. ASTM F1233 - Standard Test Method for Security Glazing Materials and Systems; 2008 (Reapproved 2013).

J. IES (LH) - Lighting Handbook; 10th edition, 2011.

K. IES RP-5 - Recommended Practice for Daylighting Buildings; 2013.

PART 2 – PRODUCTS

2.1 PARTITIONS

A. Fixed Partitions:

1. Design and construct partitions using the following:

   a) Concrete
   b) Concrete masonry units.
   c) Gypsum board on metal framing

2. Do not use:

   a) Brick.
   b) Clay tile units.
   c) Gypsum plaster on gypsum lath over wood framing and furring.
   d) Solid gypsum plaster on steel framing.
   e) Portland cement plaster on metal lath over metal framing.
   f) Wood paneling on wood framing and furring.

B. Partial Height Partitions:

1. Do not use:

   a) Cast-in-place concrete.
   b) Brick.
   c) Clay tile units.
   d) Gypsum plaster on gypsum lath over wood framing and furring.

e) Solid gypsum plaster on steel framing.
f) Portland cement plaster on metal lath over metal framing.
g) Wood paneling on wood framing and furring.
h) Manufactured plastic laminate or solid plastic toilet compartments and screens.

2.2 INTERIOR WINDOWS

A. Interior Windows (Fixed):

1. Window Operation: Fixed non-operable windows.
2. Glazing: Single pane glazing (Laminated where required by BSCC).
3. Use one of the following: Hollow metal framed windows.
4. Do not use:

a) Wood windows.
b) Aluminum windows
c) Metal-clad wood windows.
d) Plastic-clad wood windows.
e) Tubular plastic windows.
f) Composite windows.

B. Glazing:

1. Inmate Areas: Laminated glazing.
2. Non-inmate areas: Fully tempered glazing.

2.3 OTHER INTERIOR OPENINGS

A. Access Doors: Manufactured metal doors. Provided fire rated doors where required by code.

2.4 STAIRS

A. Use one of the following:

1. Concrete filled metal pan stairs with tube or channel stringers.
2. Checkered plate steel stairs with tube or channel stringers.
3. Galvanized steel grating stairs with tube or channel stringers.

B. Do not use:

1. Steel plate stringers.
2. Precast concrete treads.
3. Tempered glass railing assemblies.
4. Ornamental metal stairs.
5. Metal spiral stairs.
6. Wood stairs.
7. Ornamental wood stairs and railings.

C. Interior Railings:

1. Use painted steel pipe railings or stainless steel tube railings.
2. Do not use:

a) Ornamental metal railings of steel.
b) Ornamental metal railings of stainless steel.
c) Ornamental metal railings of aluminum.
d) Ornamental metal railings of copper alloy.
e) Ornamental metal railings of wrought iron.

f) Glass-supported railings.

2.5 TOILET, BATH, AND LAUNDRY ACCESSORIES

A. Reflective Surfaces of Mirrors:

1. Use one of the following:

a) Tempered glass at public and staff areas.
b) Mirror-polished stainless steel at inmate areas.

B. Toilet, Bath, and Laundry Accessories:

1. Use as necessary at staff and public areas:

a) Stainless steel grab bars.
b) Stainless steel combination paper towel and waste units.
c) Stainless steel or cast aluminum toilet paper dispensers.
d) Plastic or stainless steel wall mounted soap dispensers.
e) Other accessories defined by the Owner.

2. Use in inmate areas:

a) Anti-ligature extruded aluminum or stainless steel grab bars.
b) Recessed stainless steel toilet paper holders.
c) Framed or frameless polished stainless steel mirrors for front installation with tamper resistant fasteners (pinned Torx).

C. Shower Enclosures:

1. Minimum 14 gage stainless steel paneling securely attached to substrate with fully concealed methods for a minimum depth of 36" from rear wall. Seal to floor and ceiling with security sealant.
2. Shower Doors: Use one of the following:

a) 1" thick stainless steel panel with embossed finish, continuous hinge and anti-ligature latching hardware.
b) 1" thick solid HDPE panel with continuous hinge and anti-ligature latching hardware.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Interiors: Provide appropriately finished interiors for all spaces indicated in the program, equipped with interior fixtures as required to function properly for specific occupancies.

B. Interior Partitions: Provide physical separation between spaces, constructed to achieve fire ratings required by code, appropriate security between adjacent spaces, and visual, acoustical, olfactory, and atmospheric isolation as necessary to maintain desirable conditions in each space.

C. Interior Doors: Provide doors between adjacent spaces where required by the program or where proper functioning of adjacent spaces requires movement of people or objects between them.

D. Interior Windows: Provide interior windows between adjacent spaces where required by the program or where proper functioning of adjacent spaces requires limited visual or physical connection between them.

3.2 HEALTH AND SAFETY CRITERIA

A. Flammability: Provide interior fixtures made of materials with flame spread index of 25 or less and smoke developed index of 450 or less when tested in accordance with ASTM E84 at all locations throughout the project.

3.3 STRUCTURAL CRITERIA

A. Structural Performance: Provide interior construction and fixtures to support without damage all loads required by code.

1. Live Loads: Provide suspended interior fixtures or portions of fixtures designed for storage or support of persons or objects that have been engineered and installed to withstand 1.5 times the anticipated live loads without excessive deflection or permanent distortion.

a) Grab Bars: Strength, design, anchorage, and support as required to withstand 250 pounds-force applied vertically at the center between supports and 250 pounds-force tension applied at any support; supports of sufficient rigidity to prevent rotation of bars under load.

B. Seismic Loads:

1. Interior Partitions at Stairs and Elevators: Provide partitions that have been engineered and installed to withstand seismic forces that are 10 percent greater than those required by code.

C. Lintels: Constructed to span openings in partitions and support imposed loads with maximum deflection vertically and horizontally of 1/360 of span.

3.4 DURABILITY CRITERIA

A. Expected Service Life Span: Same as building service life, except as follows:

1. Interior Windows: Minimum 15 years functional and aesthetic service life with normal operation without requiring replacement of any parts.
2. Interior Ceiling Finishes: Minimum 15 years functional and aesthetic service life; including suspended ceilings.
3. Interior Wall and Floor Finishes: Minimum 10 years functional and aesthetic service life.
4. Other Interior Construction: Minimum 15 years functional and aesthetic service life.

B. General Durability: Provide interior construction and fixtures that are suitable in durability for the degree and type of traffic to be anticipated in each space and ordinary cleaning and maintenance operations.

C. Vandal Resistance: In spaces accessible to the public and not subject to continuous surveillance, provide interior construction and fixtures that are inherently vandal resistant or designed to be difficult to access or damage.

3.5 OPERATION AND MAINTENANCE CRITERIA

A. Frequency of Servicing: Owner expects that refilling/emptying will occur at the following intervals; provide capacity appropriate to servicing interval and expected use, based on project occupancy:

1. Paper Towel Dispensers: Daily.
2. Toilet Paper Dispensers: Daily, with sufficient redundancy to prevent running out.

3. Toilet Seat Cover Dispensers: Daily.
4. Hand Soap Dispensers: Daily.
5. Waste Receptacles: Daily.
6. Personal Supplies Vendors: Daily.

B. Ease of Use:

1. Interior Fixtures with Movable Components: Easy to use without special instruction and designed to prevent misuse.
2. Hinges and Latches: Heavy duty hardware, easily adjustable, providing minimum anticipated service life of 20 years.
3. Mechanical Controls: Movable cranks, rotors, pulleys, and levers designed for trouble-free operation over a minimum anticipated service life of 20 years.
4. Substantiation:

   a) Design Development: Product data on hardware and other movable components of interior fixtures.

C. Ease of Cleaning:

1. Waste Receptacles: Disposable liners or bags.

D. Ease of Maintenance: Provide interior fixtures at all locations that are designed to permit repair or replacement of individual components without removal of fixture.

END OF SECTION C

SECTION C10 – INTERIOR DOORS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. The elements comprising interior doors include doors of all sizes and uses, gates, and elements that form or complete the openings, unless an integral part of another element.

B. Products: Where specific products are required or allowed, use products complying with the additional requirements specified elsewhere.

1.2 REFERENCE STANDARDS

A. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).

B. ASTM E413 - Classification for Rating Sound Insulation; 2016.

C. ASTM F476 - Standard Test Methods for Security of Swinging Door Assemblies; 2014.

D. ASTM F842 - Standard Test Methods for Measuring the Forced Entry Resistance of Sliding Door Assemblies, Excluding Glazing Impact; 2014.

E. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches; 2011.

F. BHMA A156.3 - American National Standard for Exit Devices; 2014.

G. BHMA A156.5 - American National Standard for Cylinders and Input Devices for Locks; 2014.

H. BHMA A156.13 - American National Standard for Mortise Locks & Latches Series 1000; 2012.

PART 2 – PRODUCTS

2.1 OTHER INTERIOR DOOR OPENING ELEMENTS

A. Glazing in Doors: Fully tempered or laminated glass.

1. Do not use:

a) Plain float or sheet glass.
b) Acrylic sheet.
c) Wired glass, except in fire-rated doors.

B. Hardware for Swinging Doors:

1. Use satin, chrome or stainless steel finish.
2. Use fire rated hardware on fire rated doors.
3. Hinges: Ball-bearing butt hinges or continuous hinges.
4. Exit Devices: Unless specifically indicated as one type, mortise type, rim type, or concealed vertical rod type.
5. Locksets: Unless specifically indicated as one type, mortise.

a) Do not use rim type auxiliary locks, lock combinations requiring two hands for operation, interconnected locks, or bored (cylindrical locks).

6. Door Closers: Unless specifically indicated as one type, concealed overhead frame-mounted type.

a) Do not use surface-mounted overhead type, floor mounted type, or spring hinges except where concealed closers cannot be incorporated.

7. Door Stops: Unless specifically indicated as one type, floor-mounted type or wall-mounted type.

C. Do not use:

1. Different metals subject to galvanic action in direct contact with each other.
2. Aluminum in direct contact with concrete or cementitious materials.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Equip all openings in partitions that function to allow passage of people, vehicles, and goods, so that openings can be closed and secured when not in use, using components as specified, and in accordance with the Code.

B. Where interior door elements also must function as elements defined within another element group, meet requirements of both element groups; interior doors function as partition elements when doors are closed.

3.2 AMENITY AND COMFORT CRITERIA

A. Accessibility and Convenience:

1. Dimensions: Provide interior doors that are sized appropriately for people, vehicles, and goods likely to move between adjacent spaces.
2. Height: Not less than 84 inches in height.
3. Width: Not less than 36 inches in width except at plumbing chases.
4. Closing Devices: Not required unless specifically indicated or required by code; smooth closing motion, with slower latching speed than closing speed (no slamming).

B. Sound Transmission Resistance:

1. STC Value: Provide doors at noted with minimum 39 STC, as measured in accordance with ASTM E90 and classified in accordance with ASTM E413.

3.3 HEALTH AND SAFETY CRITERIA

A. Fire Safety: Protect door openings in fire-rated walls and partitions in accordance with the code and the following:

1. Hold-Open Function: At locations indicated in program; any method that allows the door to swing freely and that automatically closes door upon detection of local fire or smoke.
2. Closers: Sufficient closing force to close and latch door despite drafts and wind, but not more than that specified by code. Use security closers in inmate areas (Von Duprin – no substitutions).

B. Emergency Egress: Where doors must be latched or locked, comply with the code and the following:

1. Exceptions in the code waiving requirements for panic hardware or egress without the use of a key, under conditions that a sign stating that "This door must remain unlocked during business hours" is posted, are not allowed.
2. Locking Devices Requiring a Key for Egress: Not allowed except at the I-3 perimeter. See Detention hardware.

3. Exit Doors Having Occupant Load of 50 or More (Regardless of Occupancy): Use exit hardware that releases the locking/latching mechanism upon the application of a force in the direction of egress travel.

C. Physical Security:

1. Locks: Secure each room door using a keyed lockset that allows exit from inside using only one motion.

a) Keys: Minimize unauthorized entry.

i) Type as specified in Section B20 - Exterior Enclosure Criteria.
ii) Keying: Key to the existing keying system.
iii) Key making Restrictions: Key blanks and key making restricted to owner.

2. Lock Function Definitions: As described in BHMA A156.2 (F36-F48, F75-F94, F107 F109), BHMA A156.3 ("X" prefix), BHMA A156.5 ("E" prefix), BHMA A156.12 (F95-F106), and BHMA A156.13 (F01-F25); type of lock required may also be governed by other criteria.

a) Always-Locked: F86.
b) Classroom: F84.
c) Deadbolt, Classroom: E017.
d) Deadbolt, Unoccupied: E015 or F17.
e) Exit Only: F13, with no outside trim, no thumb-turn or other unlocking feature inside, no holdback or dogging.
f) Office: F82 Grade 1, operation of key unlocks outside handle.
g) Privacy: F76 Grade 1.

3. Glazing in Doors: Comply with requirements for safety glazing, security, and BSCC requirements.

3.4 STRUCTURAL CRITERIA

A. Door Frames: Constructed to span door opening with maximum deflection vertically and horizontally of 1/360 of span.

3.5 DURABILITY CRITERIA

A. Expected Life Span of Operating Components: Remaining operable for 10 years under normal exposure conditions for the project site.

B. Wear Resistance:

1. Door Surfaces: Scuff-resistant in areas where foot impact is likely; highly scratch-resistant in areas where hand contact is likely; applied protective surfaces for vulnerable areas are acceptable.
2. Door Handles and Knobs: Highly scratch-resistant and of finish that will minimize appearance changes due to wear; satin or brushed finish.

C. Flexible Seal Materials: Minimize deterioration due to operation of doors and aging.

D. Swinging Doors: Control door swing to prevent damage due to impact, to either door or element impacted.

3.6 OPERATION AND MAINTENANCE CRITERIA

A. Ease of Use and Repair: Provide doors that will be easy to use by occupants, easy to repair or service, and with operating components easy to replace.

END OF SECTION C10

SECTION C15 – DETENTION DOORS, HARDWARE, AND GLAZING

PART 1 – GENERAL

1.1 SUMMARY

A. General: This specification section covers detention hardware, detention doors, detention frames, and detention glazing. Drawings and General Provisions of the Contract, including General and Supplementary Conditions, County Standard Terms and Special Provisions, apply to this section.

B. Under the requirements of this specification, the DEC is solely responsible for furnishing and installing all Detention hollow metal doors, frames, detention hardware, security glass, and door accessories, as specified, in all locations.

1.2 PRECEDENCE

A. Obtain, read and comply with General Conditions and applicable sub-sections of the contract specifications.

1.3 QUALITY ASSURANCE AND CONSTRUCTION STANDARDS

A. In accordance with Part 3 – Basis Design of this Scoping Document.

B. All doors, frames and glazing shall carry the Code required fire rating based on the final design of the DBE.

C. America Society for Testing and Materials:

1. ASTM A 167 and A 240, Stainless Steel Type 304
2. ASTM A 366/A 366M-97 Standard Specification for Commercial Steel (CS), Carbon (0.15 Maximum Percent), Cold Rolled
3. ASTM A 569A/569M-97 Standard Specification for Steel, Carbon, (0.15 Maximum Percent), Hot Rolled Sheet and Strip, Commercial Quality
4. ASTM A 653/A 653M-96, Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot Dip Process, Commercial Quality
5. ASTM A 666-96b Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar
6. ASTM A 1011, Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot Dip Process, Commercial Quality
7. ASTM B 117-95 Standard Practice for Operation Salt Spray (Fog) Apparatus
8. ASTM C 1048 Condition A, Standard Specification for Heat Strengthened and Fully Tempered Flat Glass. In addition to this standard, roller wave distortion on laminated units shall be kept to a minimum of .076mm from peak to valley, and shall not noticeably affect the clarity of images when looking through the glass.
9. ASTM C 1036 Class 1, Standard Specification for Chemically Tempered Glass
10. ASTM D 610-95 Standard Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces
11. ASTM D 714-87 (1994), Standard Test Method for Evaluating Degree of Blistering of Paints
12. ASTM D 1735-92, Standard Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus

13. ASTM D 635 Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position
14. ASTM E 152-81a Method for Fire Tests of Door Assemblies
15. ASTM E 2074 Test Method for Fire Tests of Door Assemblies, Hinged and Pivoted Swinging Door Assemblies
16. ASTM F 1450-12a, Standard Test Methods for Hollow Metal Swinging Door Assemblies for Detention Facilities
17. ASTM F 1577-05, Standard Test Methods for Detention Locks for Swinging Doors ASTM F 1592-12 Test methods for Detention Hollow Metal Vision Systems
18. ASTM F 1643 Test Methods for Detention Sliding Door Locking Device Assembly
19. ASTM F 1758 Grade 1A, Test Methods for Detention Hinges used on Detention Grade Swing Doors
20. ASTM F 1915-12 Standard Test Methods for Glazing for Detention Facilities.
21. ASTM 143-90a (1990) Standard Test Method for Slump of Hydraulic Cement Concrete

D. ANSI/BHMA A156.13 American National Standard for Mortise Locks

E. ANSI / NFPA 80-2013 Fire Door and Windows

F. ANSI / NFPA 252-2003 Standard Methods for Fire Test of Door Assemblies

G. ANSI / NFPA 257-2007 Methods for Fire Test of Window Assemblies

H. ANSI/UL 10 (B)-97 through 2001, 10 (C)-98 through 2001, Fire Tests of Window Assemblies

I. ANSI / UL 752 Bullet-Resistance Equipment.

J. ANSI Z97.1-2015 Safety Glazing Materials used in Buildings

K. HMMA 863-14 Guide Specifications for Detention Security Hollow Metal Doors and Frames

L. NAAAM Hollow Metal Manual, all sections.

M. NAAAM HMMA 850-83 Fire-Rated Hollow Metal Doors and Frames, Second Edition

N. 16 CFR 1201 Safety Standard for Architectural Glazing Materials

1.4 SHOP DRAWINGS & EQUIPMENT SUBMITTAL

A. In accordance with the Contract Documents.

B. Product Data: Include construction details, material descriptions, core descriptions, label compliance, fire-resistance rating, and finishes for each type of detention door, frame and access panel, as specified.

C. Provide performance testing reports which support the testing requirements specified.

D. Shop Drawings: For detention doors and frames. Include conditions at openings, details of construction, dimensions of profiles, and details of joints and connections. Show anchorage and accessories. Include fastener types, sizes and spacing. Identify each detention door and frame using same reference numbers for openings as those on Drawings.

E. It is the DEC's responsibility to coordinate detention/security items in this scope of work, and to answer all manufacturer questions or concerns that are not strictly design related, prior to submitting. The DEC shall redline the manufacturers' individual shop drawings and/or schedules, and note corrections prior to submittal for Architectural/Consultant review. When multiple items are submitted by the manufacturer on a single cut sheet, the DEC shall note with an arrow, circle or note cloud, to show which product on the sheet is submitted for this scope of work. DEC submittals not reviewed and redlined prior to submittal to

Architect/Consultant for final review, will be returned rejected. The DEC shall submit Security Glass, Detention Hollow Metal and Detention Hardware together at the same time for coordination.

F. Shop Drawings: For access panels.

1. Door and panel units: Show types, elevations, lock type, thickness of metals, and full-size profiles of door members.
2. General: Show connections of units and hardware to other Work. Include schedules showing location of each type and size of door and panel units.

G. Coordination Drawings: Drawings of each opening, including detention door and frame, drawn to scale and coordinating detention door hardware. Show the following:

1. Locations, dimensions, and profiles of detention door hardware reinforcements.
2. Locations and installation details of detention door hardware.
3. Elevations of each detention door design type showing dimensions, locations of detention door hardware, and preparations for power, signal, and electrified control systems.
4. Details of each detention frame type.
5. Details of mortar boxes in detention frames for hardware and communication devices.

H. Oversize Construction Certification: For detention door assemblies required to be fire rated and exceeding limitations of labeled assemblies, submit certification of a testing agency acceptable to authorities having jurisdiction that each detention door and frame assembly has been constructed to comply with design, materials, and construction equivalent to requirements for labeled construction.

PART 2 – PRODUCTS

2.1 DETENTION PRODUCTS

A. Detention Doors: Provide flush-design detention doors, 2 inches thick, of seamless hollow construction, unless otherwise indicated. Construct detention doors with smooth, flush surfaces without visible joints or seams on exposed faces or stile edges. Provide core construction welded to both detention door faces. Doors to be constructed of 12-gauge steel. Cuff ports to be flush, center mounted lock-on-port design. Cell interior pulls to be flush and integral by the hollow metal manufacturer. All hinges and hardware to be detention rated.

B. Frames: Fabricate detention frames of full-welded unit construction, with corners mitered, reinforced, and continuously welded full depth and width of detention frame. Knockdown frames are not acceptable. All frames to be 12-gauge steel. Windows shall comply with ASTM F 1592. Detention contractor shall coordinate with security electronics drawings and furnish back-boxes and preps for frame mounted security electronic items such as, but not limited to, intercoms, dome-lites and key switches.

C. Wide Jamb Locks: Furnish wide jamb locks for swing doors on circulation doors equal to the Southern Steel 10120 high security lock, with high security mogul cylinders. Furnish as indicated on security plans.

D. Narrow Jamb Locks: All cells shall be furnished with RR Brink 3020 24VDC Solenoid locks. These locks shall be provided with Medico cylinders and keyed to the owner's requirements, matching the existing facility.

E. Mortise Lock: Furnish mortise locks for utility and other miscellaneous rooms. Locks shall be mechanical or electrical as required by Code. Locks to be equal to Southern Steel 10500 and 10600 locks with appropriate functions, provided with high security mogul cylinders. Furnish as indicated on security plans.

F. A mechanical key cabinet equal to Southern Folger 600 series, shall be provided with a capacity to hold all the keys scheduled plus 100 percent for the future.

G. Detention Glazing: Furnish Glass Clad Polycarbonate Glazing with attack ratings as indicated on security plans. Limit glass sizes to two different sizes for door glazing and three different sizes for windows to minimize maintenance stock. Larger windows shall be multiple panes of one or more of the three other glass window glass sizes. A mixture of Glass Clad Polycarbonate and Laminated Polycarbonate may be used at the owner's discretion.

1. Glass shall be installed using 100 percent solids, polyisobutylene-butyl tape with an internal spacer rod. Fire rated openings shall be installed using Kerafix Flexlit tape or Rectorseal BlazeSeal as required by the selected manufacturer.
2. A one-part non-sag tamper resistant elastomeric STPU Security caulk meeting Federal Specifications TT-S-00230C, Type II, Class B and ASTM C-920-98, Type S, Grade NS Class 12.5, shall be used on both sides of all security glass, except at exterior windows. At exterior windows, glass shall be installed using security sealant on the interior side, and a one-part silicone rubber caulking meeting Federal Specification TT-S-00230C, Type S, Grade NS Class 25, on the exterior side.
3. Where laminated Polycarbonates are used, Polycarbonate must be primed prior to installing sealants of any kind.
4. Glass shall be set on TPR (thermoplastic rubber) setting blocks with 70-90 shore "A" durometer hardness, chemically compatible with glazing components.
5. Glass shall be set using a minimum 1-1/4" by 10-gauge removable glass stop.
6. Attic stock shall be provided in quantities of 10 of each size glass provided on this project. This glass shall be crated and clearly marked for size and glass type.

H. Detention Glazing shall be Insulated Glass Clad Polycarbonate.

1. High Security: 1-5/8" tinted (as selected by Owner) tempered exterior, insulated air-gap unit with heat strengthened interior glass (WMFL level II – 60-minute physical attack, ASTM F 1915 Grade 1 – 60-minute containment).
2. Medium Security: 1-3/8" tinted (as selected by Owner) tempered exterior, insulated air-gap unit with heat strengthened interior glass (WMFL level III – 30-minute physical attack, ASTM F 1915 Grade 2 – 40-minute containment).
3. Low Security: 1-7/8" tinted (as selected by Owner) tempered exterior, insulated air-gap unit with heat strengthened interior glass (HPW level II Forced entry, ASTM F 1915 Grade 3 – 20-minute containment).
4. Vandal Resistant: 1-3/16" tinted (as selected by Owner) tempered exterior, insulated air gap unit with heat strengthened interior glass ((HP White Level I-TP-0500.02, ASTM F1915 Grade 4 – 10-minute containment).

I. Fire Rated Detention Glazing: Provide listed and labeled products matching the containment ratings above.

PART 3 – DRESIGN CRITERIA

3.1 DELIVERY, STORAGE, AND HANDLING

A. Deliver detention doors and frames palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.

B. Deliver detention frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions. Loose Glazing Stops shall be delivered installed, with a single temporary set screw for each side.

   1. Where frames are to be cast into precast concrete modules, take additional precautions, including bracing for detention frames, to ensure that detention frames are not deformed or damaged by concrete forces.

C. Inspect detention doors and frames, on delivery, for damage. Minor damage may be repaired provided refinished items match new work and are approved by Architect; otherwise, remove and replace damaged items as directed.

D. Store detention doors and frames under cover at building site. Place units in a vertical position with heads up, spaced by blocking, on minimum 4-inch, high wood blocking. Avoid using non-vented plastic or canvas shelters that could create a humidity chamber.

E. If wrappers on detention doors become wet, remove cartons immediately. Provide minimum 1/4-inch space between each stacked detention door to permit air circulation.

F. Hardware shall be delivered to the site in containers clearly marked with the corresponding door number without opening boxes.

G. Glass shall be cartoned specifically to avoid damage to glass edges and prevent damage from temperature changes, sunlight and moisture.

END OF SECTION C15

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SECTION C20 – INTERIOR FINISHES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Interior finishes comprise the following elements:

1. Wall finishes, including those applied to the interior face of exterior walls and to the vertical faces of superstructure elements.
2. Floor finishes.
3. Suspended ceilings and soffits.
4. Stair finishes, except for integral stair surfaces.
5. Finishes applied to other interior surfaces.

B. Products: Where specific products are required or allowed, use products complying with the additional requirements specified elsewhere.

1.2 REFERENCED STANDARDS

A. AATCC Test Method 134 - Electrostatic Propensity of Carpets; 2011.

B. AATCC Test Method 174 - Antimicrobial Activity Assessment of Carpets; 2011.

C. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

D. America Society for Testing and Materials:

1. ASTM C 423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2009a.
2. ASTM D 2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine; 2011.
3. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.
4. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
5. ASTM E 413 - Classification for Rating Sound Insulation; 2016.
6. ASTM E 648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2014c.
7. ASTM E 662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials; 2015a.
8. ASTM E 1111/E1111M - Standard Test Method for Measuring the Interzone Attenuation of Open Office Components; 2014.
9. ASTM E 1414/E1414M - Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum; 2011a.
10. ASTM E 1477 - Standard Test Method for Luminance Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers; 1998a (Reapproved 2013).

PART 2 – PRODUCTS

2.1 CEILINGS AND CEILING FINISHES

A. Use products defined by the Room Data Sheets including:

1. Gypsum Board

2. Impact resistant Gypsum board.
3. Acoustical lay-in panels.
4. Impact resistant acoustical lay-in panels.
5. Metal Security Ceilings: 24" wide x 14-guage double skin plank ceiling.

B. Do not use:

1. Textured plaster.
2. Painted plaster.
3. Luminous ceilings.
4. Linear wood ceilings.

2.2 WALL FINISHES

A. Use one or more of the following:

1. Glazed wall tile as defined by the Room Data Sheets.
2. Acoustical wall treatment at as defined by the Room Data Sheets.
3. Interior paints as defined by the Room Data Sheets.

B. Do not use:

1. Stone facing.
2. Vinyl-coated fabric wall covering.

2.3 FLOOR FINISHES

A. Use one or more of the following:

1. Ceramic mosaic tile as defined by the Room Data Sheets.
2. Resilient sheet flooring at as defined by the Room Data Sheets
3. Resilient tile flooring at as defined by the Room Data Sheets.
4. Carpet tile as defined by the Room Data Sheets

2.4 SPECIALTY FINISHES AT INMATE SHOWERS

A. Use products noted below as manufactured by PrimeCoat or approved equal.

1. Floor Finish: Aggregate filled 100% solids polyamine epoxy floor coating consisting of PC 310K, PC 399, PCA 322, PC399 PC401 and PC 509S with PC499 anti -microbial additive applied per manufacturer's recommendations for a total coved coating system.
2. Wall Finish: 100% solids, accelerated aliphatic polyamine cured epoxy wall coating consisting of PC 630, PC 339, PC400 and PC 509S with PC499 anti -microbial additive applied per manufacturer's recommendations for a total coating system.
3. Installation: Use factory approved and certified installers only.
4. Warranty: Manufacturer's full 10-year total systems warranty against delamination or other general failure.

PART 3 - DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Provide appropriately finished interiors for all spaces required by the program.

B. Where interior finishes are integral with elements defined within another element group, meet requirements of both element groups.

3.2 AMENITY AND COMFORT CRITERIA

A. Moisture Vapor Transmission Resistance:

1. Interior Wall Finishes at Exterior Walls: Provide vapor permeance of 1 perm (57 ng/Pa/s/sq. m) maximum when tested in accordance with ASTM E96/E96M.

B. Reflectivity:

1. Glare: Provide interior finishes that will not result in discomfort glare due to excessive contrast with light sources.

a) Ceiling Surfaces: Not less than 80 percent reflectivity, when measured in accordance with ASTM E1477.
b) Wall Surfaces: Not less than 50 percent reflectivity.
c) Floor Surfaces: Not less than 30 percent reflectivity.

END OF SECTION C20

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SECTION C31 – FIXTURES AND ACCESSORIES

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Section includes:

1. Toilet Partitions
2. Toilet Accessories
3. Signage.

PART 2 – PRODUCTS

2.1 SHOWER PRIVACY PARTITIONS

A. Shower Privacy Partitions:

1. Product: Manufactured HDPE toilet compartments in inmate areas shall be floor mounted and floor/wall braced units without any ligature elements.
2. Floor Mounting: Manufacturer's standard stainless steel floor shoe.
3. Wall Mounting: Use continuous stainless steel brackets. Use pinned Torx or one-way slotted fasteners.
4. Hinges: Continuous piano hinges. Provide self-closing (spring hinges) at accessible toilet stalls in compliance with Title 24 Chapter 11B.
5. Color: As selected from manufacturer's complete range of colors and textures.

2.2 TOILET ROOM ACCESSORIES

A. Toilet Room Accessories:

1. Construction: Stainless Steel construction with a #4 directional polish.
2. Locks: Minimum 4 pin cylinder cam locks.
3. Fastenings: Where exposed use pinned Torx screws or one-way slotted fasteners.
4. Inmate Mirrors: Continuously framed stainless steel mirror for each lavatory. Provide high/low mirrors in ADA cells.
5. Grab Bars: Wherever required for safety and assistance in use of toilet and bath fixtures, and at toilets designed for the disabled. Grab bars in inmate spaces to have anti-ligature "tray" welded to bottom of grab bar.
6. Waste receptacles:
   a) One for each toilet room. (Bobrick B-38034, typ.)
   b) One for each toilet in visitor's women's restrooms, for sanitary napkin disposal. (Bobrick, B-270, typ.).
7. Staff Toilet Paper: Roll, one dual-roll dispenser per toilet. (Bobrick B-2740, typ.)
8. Inmate Toilet Paper Holder: Recessed stainless steel can (Acorn 1840-FA) if not provided as part of plumbing fixture. Note: ADA cell combi fixtures cannot use recessed toilet paper holder. A unit recessed in the wall is required to meet Title 24 Chapter 11B.
9. Towels: Stainless steel, recessed paper goods in restrooms (Bobrick B- 3944, typ.); Hands-free, one dispenser at kitchen.
10. Staff Clothes Hook: One in each toilet stall and one for each shower. (Bobrick B-7671).
11. Inmate Clothes Hooks: One in each toilet stall and one for each shower. (Bobrick B-983)

12. Toilet Seat Covers: Paper; one dispenser per toilet room. (Bobrick B-221, typ.)
13. Anti-ligature Toilet Seat Cover Dispensers for Inmate Areas (Bradley 5A40)
14. Hand Soap: Liquid, one dispenser for each lavatory. (Bobrick B-4112, typ.)
15. Mops and Brooms: One in each janitor's closet. (Bobrick B-239)

2.3 SIGNAGE

A. Identifying Devices:

1. Use one of the following:

a) Individual, 3-dimensional metal or plastic characters.
b) Framed or frameless metal panel signs with etched or raised characters and graphics.

2. Minimum character height of 3/4 inch and maximum of 2 inch.
3. Components of the sign shall be vandal resistant.

B. Door Number Signs and Cell Numbers: Painted text.

C. Room Label Signs: Complete with text, international graphics, and braille designations as required by code.

D. Directional Signs: Complete with text, international graphics, and braille designations as required by code.

E. Site Signs: Provide signage of sufficient contrast for ease of reading and high visibility.

F. Dedication Plaque: Provide 18" wide x 24" tall by 5/8" deep case bronze or cast aluminum dedication plaque with dark background and satin texture natural metal color borders, images and text to be determined but not let the following:

1. Date of Dedication
2. Project Name
3. County Seal
4. Sheriff's Seal
5. County Supervisors
6. Sheriff
7. Director Public Works
8. Design Builder
9. Architect

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Provide partial height partitions for toilet compartments and screens, toilet room accessory fixtures, and identifying devices as required to accomplish the design as required by code and as indicated in the project program:

B. Manufactured solid plastic toilet compartments and screens: Partitions are to be Phenolic, stalls and urinal screens are to be floor mounted and overhead braced.

C. Reflective Surfaces of Mirrors:

1. Staff and Public Areas: Tempered glass mirrors.
2. Inmate Areas: Stainless steel surface.

D. Identifying devices comprise the following elements:

1. Room or function labels applied to doors or walls immediately adjacent to doorways.
2. Directional Signs: Provide directional signs at all building entrances and public corridors as required by code.
3. Advisory/Warning Signs; By Owner.
4. Site signage: Provide signage for visitor parking, staff parking, ADA parking, one way, stop, do not enter, no parking, fire lane, etc. and similar directional, movement, parking and site directional signage.
5. Provide signage with tactile embossing where required by code.

    a) Where fittings also must function as elements defined within another element group, meet the requirements of both element groups.

3.2 AMENITY AND COMFORT

A. Accessibility:

1. Provide identification devices that comply with CBC Title 24 Chapter 11B.
2. Room Labels: Dual signage for visually handicapped and normally sighted.
3. Function Labels: Graphic and Braille signs for the following building services and functions:

    a) Telephones.
    b) Toilets.

4. Directional Signs: Accessibility graphic and Braille signs as required by code.

B. Visibility:

1. Illumination Levels: Provide ambient lighting or equivalent backlighting of identifying devices adequate to provide clear visibility for normally sighted persons at typical viewing distances.
2. Character Size: Provide signs with characters of adequate size to be seen comfortably by normally sighted persons at typical viewing distances.

    a) Wall-Mounted Corridor Signs or Signs Intended for Viewing at Less Than 5 feet: Minimum character height of 3/4 inch and maximum of 2 inch.
    b) Signs Mounted Above Head Height or Intended for Viewing at More Than 10 feet: Minimum character height of 3 inches.

3. Fonts: Provide one font throughout the project.
4. Reflectivity: Provide signs with matte surface measuring 11-19-degree gloss on 60-degree glossimeter.

    a) Exception: Back-lighted signs may have glossy surfaces.

5. Contrast: Provide signs with contrast between characters and background of not less than 70 percent.

C. Appearance:

1. Provide signage for entire project that is consistent in design with other interior features and coordinated with overall color scheme.
2. Provide consistently designed signage in a different color for each department.
3. Provide consistently designed signage in a different color for each building in the project.
4. Room Label Signs: Unframed panel signs.

5. Site signage: Aluminum frameless signs mounted to posts, fences or wall surfaces to mark/identify site related items.

3.3 STRUCTURE

A. Grab Bars: Strength, design, anchorage, and support as required to withstand 400 pounds-force applied vertically at the center between supports and 400 pounds-force tension applied at any support; supports of sufficient rigidity to prevent rotation of bars under load. Use ligature resistant grab bars in inmate areas.

3.4 DURABILITY

A. Service Life Span:

1. Erasable Surfaces: Minimum of 20 years, including appearance.
2. Operating Components: Minimum of 10 years under normal use conditions.

B. Outdoor Units: Finish and materials complying with specified requirements for exterior enclosure specified in leak proof enclosures, for protection of contents.

C. Indoor Units: Materials and finish complying with specified requirements for equivalent environments specified in Section C.

3.5 THEFT DETERRENCE

A. Toilet Accessories:

1. In Visitor Restrooms: Secure to substrates using concealed or tamper proof fasteners.
2. In inmate restroom areas: Secure to substrates using pinned Torx fasteners and appropriate anchors.

B. Toilet Partitions:

1. In Visitor Restrooms: Secure to substrates using concealed and tamper proof fasteners. Use of overhead braces and standard toilet accessories is acceptable.
2. In Inmate Restroom Areas: Secure to substrates using pinned Torx fasteners and appropriate anchors. Overhead braces or other ligature elements are not allowed. Use of detention type toilet accessories is required.

END OF SECTION C31

SECTION C32 – STORAGE FIXTURES

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Storage fixtures comprise the following elements:

1. Millwork/Casework and countertops.
2. Utility storage shelving.

B. Products: Where specific products are required or allowed, use products complying with the additional requirements specified elsewhere.

1.2 REFERENCE STANDARDS

A. ADA Standards – Comply with Title 24 Chapter 11B.

PART 2 – PRODUCTS

2.1 STORAGE FIXTURES

A. Use the following:

1. Custom cabinetry and casework.
2. Shelving.

B. Built-In Cabinetry and Casework:

1. Use the following:

a) AWI Premium custom-made wood cabinets with plastic laminate faces with solid wood edges.

i) Hinges to be overlay, partial wrap type (European style hinges not allowed).
ii) Pulls to be anti-ligature type.

b) Solid surfacing countertops or stainless steel countertops as defined by room data sheets.

C. Utility Storage Shelving: Metal storage shelving where required by the Room Data Sheets.

1. Size: As designated by the room data sheets.
2. Provide three adjustable shelves per unit in addition to a fixed welded top and bottom shelf.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Provide storage fixtures attached to interior construction that are necessary for proper functioning of spaces required by the project program.

B. Where storage fixtures are integral with elements defined within another element group, meet requirements of both element groups.

3.2 AMENITY AND COMFORT

A. Accessibility:

1. Provide storage fixtures that comply with Title 24 Chapter 11B ADA Standards for accessible design.
2. Countertops: Where work surfaces or countertops over storage fixtures are required, provide wheelchair access to surface at maximum height of 34 inches from the floor.

B. Noise Control: Provide closed storage fixtures equipped with hardware or fittings that minimize the sound generated by door slamming.

C. Stored Item Security:

1. Locks: Provide locking capability at storage fixtures as follows:

a) Cabinets: Keyed locks.
b) Casework: Keyed locks.

D. Appearance:

1. Cabinetry: For closed storage fixtures, provide elements that are designed to complement interior finishes, with concealed hinges and door and drawer pulls integrated into cabinet fronts.
2. Countertops and Work Surfaces: Provide light-colored surfaces that are seamless or tightly jointed.

E. Substantiation:

1. Proposal: Equipment list
2. Construction:

a) Product Data
b) Schedules.

3.3 STRUCTURAL CRITERIA

A. Seismic Loads: Provide storage racks and shelving units that have been engineered and installed to withstand seismic forces as required by 2016 CBC.

END OF SECTION C32

SECTION C33 – WINDOW TREATMENTS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Window Treatment: Fixed, non-furnishing accessories for control of light, solar heat gain, privacy, and view at interior and exterior windows, including blinds, shades, shutters, and curtain tracks.

B. Products: Where specific products are required or allowed, use products complying with the additional requirements specified elsewhere.

1.2 REFERENCE STANDARDS

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2013.

B. AATCC Test Method 16 - Test Method for Colorfastness to Light; 2004.

C. ADA Standards - Comply with Title 24 Chapter 11B.

PART 2 – PRODUCTS

2.1 WINDOW TREATMENTS

A. Use for blinds at staff offices.

B. Window Blinds: Horizontal aluminum mini-blinds.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Provide window treatments attached to interior construction that are necessary for adequate control of light, glare, privacy, and views for spaces with interior and exterior windows.

3.2 AMENITY AND COMFORT CRITERIA

A. Accessibility: Comply with ADA Standards for accessible design and the following:

1. Extent: Provide accessible controls for all window treatments, regardless of location.
2. Location: Where accessible window treatments are required, provide controls that are mounted so they can be reached from a wheelchair and are not more than 54 inches and not less than 15 inches from the floor.
3. Operating Force: Where accessible window treatments are required, provide controls that can be operated without tight grasping or pinching and by a force of not more than 5 lbf.

B. Light and Glare Control: Provide window treatment throughout project that will allow control of light transmitted through window assembly.

C. Substantiation:

1. Proposal: Product Data.
2. Construction:

    a) Product data,
    b) Shop drawings and color charts.
    c) Samples.

3.3 DURABILITY CRITERIA

A. Colorfastness: Provide window treatment throughout project that is resistant to degradation from exposure to ultraviolet light.

1. Painted Aluminum: Maximum of 5 Delta E units (Hunter) color change as calculated in accordance with ASTM D2244 after 5 years of exposure in accordance with AAMA 2604.

END OF SECTION C33

SECTION D21 – PLUMBING FIXTURES

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: Plumbing fixtures and accessories

PART 2 – PRODUCTS

2.1 PLUMBING FIXTURES

A. Water Closets: The construction shall use of the following:

1. External flush valve type.
2. Vitreous china, American Standard See Spec Sheet Model 2257.103.020 White Top spud AFWall. El 1.6 with JR Smith Carriers or approved equal.
3. Wall mounted fixtures.
4. Commercial grade, open front seat.
5. Floor mounted, commercial grade closet carrier. JR. Smith or approved equal.

B. Urinals:

1. The construction shall use of the following:

a) Vitreous china, American Standard or approved equal.
b) Wall mounted fixtures.
c) Low flush type.

C. Lavatories:

1. The construction shall use of the following:

a) Vitreous china – American Standard or approved equal. See Spec. Sheet Model 2257.103.020 White Top spud AFWall. EL 1.6 with JR Smith Carrier or approved equal.
b) Wall-hung fixtures.

D. Faucets and Trim: Chicago Model or approved equal.

1. The construction shall use of the following:

a) Polished chrome-plated finish.

E. Drinking Fountains: HAWS-wall mounted model 1035 or approved equal.

1. The construction shall use one or more of the following:

a) Electric water coolers.
b) Stainless steel finished units.

F. Combination Lavatory and Water Closets: Acorn Engineering or Willoughby or approved equal.

1. The construction shall use one or more of the following:

a) 14-gauge, Type 304 stainless steel, seamless welded construction with satin finish.
b) Toilet Orientation: Left / Right / Center. Verify bowl location with Architectural Floor Plan.

c) Lavatory Bowl Type: Multi-sided, 12-3/4 inches x 8-1/4 inches x 5 inches deep.
d) Mounting and Outlet: Floor mounted, back outlet.
e) Rim Height: 15 inches above finished floor.
f) Toilet Consumption: Low Flow, 1.6 GPF.
g) Wall Thickness: 6-1/2 inches.
h) Wall Type: Concrete, poured in place.
i) Fittings and Accessories: Provide the following compatible components:
j) Flushometer: Sloan Royal Prison603-1.6, low consumption; ESM (solenoid operated with modular plug for use with Sloan PWT System, 24 VAC only)
k) Push Buttons: Water Closet: Sloan 1-1/4 inchesMCR-60A-6. Lavatory: (2), 1-inch diameter "D" style hole, SloanMCR-231D.
l) Toilet Seat: Integral with fixture, standard finish.
m) Filler / Bubbler: Penal Bubbler.
n) Valve Selection: Dual Temperature Electronic.
o) Valve Manifold: MA2 (2 Fixtures).
p) Options - Provide the following:

i) Recessed Tissue Holder: Location of tissue holder must be visible from cell door.
ii) Support: Wall Sleeve with horizontal and vertical 1/2-inch diameter steel rebar, similar to Willoughby Drawing P078000A.
iii) Toilet Waste Connection: 3 inches to 4 inches. No-Hub connection with brass pinned clean-out.
iv) Lavatory Waste Connection: Integral P-Trap.
v) Toilet Flush Extension: TFE.

G. Combination Lavatory and Water Closets (ADA): Acorn Engineering or Willoughby or approved equal.

1. The construction shall use one or more of the following:

a) 14-gauge, Type 304 stainless steel, seamless welded construction with satin finish.
b) Toilet Orientation: Left / Right offset. Verify bowl location with Architectural Floor Plan.
c) Lavatory Bowl Type: Multi-sided, 15-1/4 inches x 12-1/2 inches x 4 inches deep.
d) Mounting and Outlet: Floor mounted, back outlet.
e) Rim Height: Water Closet: 18 inches above finished floor. Lavatory: 33 inches above finished floor.
f) Grab bar: stainless steel mounted behind toilet.
g) Toilet Consumption: Low Flow, 1.6 GPF.
h) Wall Thickness: 6-1/2 inches.
i) Wall Type: Concrete, poured in place.
j) Fittings and Accessories: Provide the following compatible components:
k) Flushometer: Sloan Royal Prison603-1.6, low consumption; ESM (solenoid operated with modular plug for use with Sloan PWT System, 24 VAC only)
l) Push Buttons: Air-Control pneumatically operated, metering, non-hold open pushbutton valve. Valve shall require less than 5 lbs. to activate
m) Toilet Seat: Integral with fixture, standard finish.
n) Filler / Bubbler: Penal Bubbler.
o) Valve Selection: Dual Temperature Electronic.
p) Valve Manifold: MA2 (2 Fixtures).
q) Options - Provide the following:

i) Recessed Tissue Holder: Location of tissue holder must be visible from cell door.
ii) Support: Wall Sleeve with horizontal and vertical 1/2-inch diameter steel rebar, similar to Willoughby Drawing P078000A.
iii) Toilet Waste Connection: 3 inches to 4 inches. No-Hub connection with brass pinned clean-out.
iv) Lavatory Waste Connection: Integral P-Trap.
v) Toilet Flush Extension: TFE.

H. Inmate Shower Devices: Acorn or approved equal.

1. The construction shall use of the following:

a) Wall mounted, 14-gauge, Type 304 stainless steel with satin finish.
b) Control valve push buttons, hemispherical and vandal-resistant, less than 5 pounds to activate.
c) Single temperature, flow control at 1.4 gpm.
d) Dual conical shower heads mounted at heights in compliance with California ADA.
e) Conical shower heads: chrome plated brass, ligature resistant, non-adjustable multi-stream spray.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. The construction shall provide plumbing fixtures necessary for occupancy, use, and sanitation for all new building areas.

B. Fixtures Required: As required by code, the project program, and as follows:

1. Lavatories: At staff toilets.
2. Water closets: At staff toilets.
3. Urinals: At staff toilets.
4. Utility Sinks: One in each janitor's closet.
5. Drinking Fountains: As required by code.
6. Utility Water Supply: At least one in each staff toilets.
7. Outdoor Supplies: Not more than 50 feet apart on building facade and one on each facade of building.
8. Combination Lavatory and Water Closet Units: At Inmate holding, inmate sleeping space, and inmate accessible.
9. Showers: At Inmate shower areas and inmate accessible.
10. Floor Drains: At staff toilets.
11. Inmate holding, inmate sleeping space, and inmate accessible areas shall use penal grade materials for security and wear resistance.

C. Where plumbing fixture elements must also function as elements defined within another element group, the construction shall meet requirements of both element groups.

3.2 AMENITY AND COMFORT

A. Convenience:

1. The construction shall provide comfortable space between and around fixtures.
2. The construction shall provide space between and around fixtures as required by code.
3. Faucets: Non-touch action operation in the following locations. 1). Staff toilets.

4. Flush valves: Non-touch action operation at staff toilets.
5. Fixture Heights: As specified in code.
6. Fixture Configurations: As shown on the drawings.
7. Water Connections: Hot water on the left side of fixtures and cold water on the right side of fixtures.
8. Inmate holding, inmate sleeping space, and inmate accessible areas shall use penal grade materials for security and wear resistance.

B. Appearance:

1. Smooth, corrosion-resistant, non-absorbent, with no crevices to collect dirt. At staff toilets.
2. Aesthetically pleasing and easy and comfortable to use high style appearance is very important. At staff toilets.
3. Color: White, except where metal fixtures are required. At staff toilets.
4. Inmate holding, inmate sleeping space, and inmate accessible areas shall use penal grade materials for security and wear resistance.

3.3 HEALTH AND SAFETY

A. Health: The system shall have potable water from a safe source located within the proposed site.

B. Pressure Control: The system shall be designed to control pressures to protect the building, fixtures, and equipment from harm.

1. Maximum Water Distribution Working Pressure: 80 psi.
2. Pressure Reduction: The construction shall provide pressure reducing valves or regulators.
3. Air Removal: The system shall be designed to eliminate air entrapment in the water distribution system.

C. Burning Hazard: The construction shall protect wheelchair occupants from hot water pipes and drains.

1. Maximum Fixture Discharge Temperature: 110 degrees F.
2. Maximum Exposed Surface Temperature: 105 degrees F.

D. Disease and Infection: All openings and edges around the sides and bottom of each fixture permanently sealed with waterproof material.

E. Hazard Labeling: The construction shall clearly label domestic hot water; domestic cold water; rain water drainage; sanitary waste and vent; sanitary grease waste and vent and fuel gas piping systems indicating the nature of contents and direction of flow.

1. Conform to requirements of ANSI/ASME 13.1(R2002).

3.4 STRUCTURE

A. Fixtures shall be anchored to support weight of fixtures and a minimum of 400 pounds without failure or stress on the connecting pipes.

B. Wall Mounted Fixtures: Carriers concealed inside fixture and in wall or floor.

3.5 DURABILITY

A. Expected Service Life Span of Faucet Valves: 30 years.

1. Substantiation: Manufacturer's unconditional warranty.

B. Expected Service Life Span of Flushing Mechanisms: 30 years Substantiation: Manufacturer's unconditional warranty.

C. Wear Resistance: The construction shall use fixtures, trim and accessories that are resistant to corrosion, breakage, scratching, burning, fading and chipping due to continual contact with water, human usage, and cleaning with abrasive materials. Inmate holding, inmate sleeping space, and inmate accessible areas shall use penal grade materials for security and wear resistance.

D. Acid resistant finish at lavatories; sinks; urinal; water closets.

E. Joint Durability: The construction shall provide watertight joints.

F. Electrical Component Protection:

1. Do not route piping through electrical rooms; switchgear rooms; transformer vaults, communication equipment rooms unless it is absolutely necessary.

a) Where piping must be routed near electrical equipment, shield the electrical equipment with drip pans which drain to the nearest floor drain.

2. Substantiation: See tests specified under Operation and Maintenance.

3.6 OPERATION AND MAINTENANCE

A. Fixture Functions:

1. Lavatories: Cottage: lever style; elsewhere hardwired low voltage sensor faucets.
2. Water closets: Manual flush valves; elsewhere with hardwired low voltage sensor flush valves.
3. Integral overflow.
4. Urinals: Manual flush valves; elsewhere with hardwired low voltage sensor flush valves.
5. Drinking Fountains: With sensor operated drinking bubbler.
6. Utility (Mop or Janitor's) Sinks: With spout designed to support full bucket of water.

B. Water Pressure/Flow at Fixtures: 25 psi minimum, except as otherwise required by code and as follows:

1. Sinks: 25 psi minimum.
2. Lavatories: 25 psi minimum.
3. Flush Valves at Water Closets: 35 psi minimum.

C. Water Consumption:

1. Water Closets: Fixture water consumption shall be determined by the plumbing designer to comply with code. Fixture water consumption shall not be more than 1.6 gallons per flush. Complete fixture waste removal shall be done in one flush.
2. Urinals: Fixture water consumption shall be determined by the plumbing designer to comply with code. Fixture water consumption shall not be more than 1.25 gallons per flush. Complete fixture waste removal shall be done in one flush.
3. Lavatory Faucets in staff toilets: 0.5 gallon per use.
4. Lavatory Faucets in Other Areas: 2.5 gallons per use.
5. Drinking Fountains: 8 gallons per minute.

D. Maintenance Service:

1. Electrically-Powered Fixtures: Battery-power operation not allowed.

E. Ease of Cleaning:

1. The construction shall use wall-mounted fixtures in staff toilets for ease of cleaning floors.
2. The construction shall provide adequate access for cleaning each fixture and the areas around it.

F. Ease of Maintenance and Repair:

1. Faucet valves easily removable and replaceable as a single unit.
2. Each pipe connection to each fixture provided with a stop valve, for easy disconnection from water service.
3. The construction shall include access to all concealed connections, such as floor and wall cleanouts and slip-joint connections.

    a) The system shall provide adequate water flow and pressure to supply peak demand requirements. Comply with requirements specified in the code.

4. Water Flow:

    a) Maximum Velocity: 8 fps for cold water and 5 fps for hot water at the design flow rate.

5. Water Supply Pressures:

    a) Service Main Working Pressure: Requires the design builder to verify at the site with flow test to determine the water supply availability.
    b) Water Distribution Working Pressure: 80 psi.

6. Substantiation:

    a) Preliminary Design: Analysis and documentation of water supply source and flow conditions.
    b) Design Development: Piping design calculations and entrance locations.
    c) Construction: Prior to installation of plumbing fixtures and prior to concealment of piping; air and water tests of piping systems at 150. percent of operating pressure, maintaining pressure for 2 hours to demonstrate system is watertight.
    d) Construction: Functional tests of fixtures and equipment.
    e) Occupancy: Observation of function during full occupancy or simulating extreme conditions.

END OF SECTION D21

SECTION D22 - DOMESTIC WATER DISTRIBUTION

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: Domestic water distribution piping and accessories.

PART 2 – PRODUCTS

2.1 WATER PIPING, BURIED:

A. The construction shall use one of the following:

1. Copper pipe (ASTM B 42-2002), with brazed or soldered cast copper or wrought copper or bronze fittings, or flared cast bronze fittings.
2. Ductile iron water pipe, cement lined, with ductile iron or gray iron fittings and gasketed joints.
3. Polyvinyl chloride (PVC) plastic pipe and fittings, with solvent welded joints.

2.2 WATER PIPING, NOT BURIED:

A. The construction shall use of the following:

1. Copper tube, cast copper, wrought copper, or bronze fittings and soldered joints.

2.3 INSULATING MATERIALS:

A. The construction shall use one of the following:

1. Mineral fiber.
2. Cellular glass.
3. Calcium silicate.
4. Fiberglass.
5. Flexible cellular elastomeric.

2.4 VALVES FOR SHUT-OFF OR ISOLATION OF EQUIPMENT, FIXTURES, AND PARTS OF SYSTEMS:

A. The construction shall use one of the following:

1. Ball valves.
2. Gate valves.
3. Butterfly valves.

B. The construction shall not use:

1. Globe valves.
2. Plug valves.

2.5 VALVES FOR FLOW CONTROL, THROTTLING, OR BYPASS:

A. The construction shall use one of the following:

1. Butterfly valves.
2. Globe valves.
3. Plug valves.

2.6 WATER MANAGEMENT SYSTEMS FOR INMATE PLUMBING FIXTURES

A. The construction shall use one of the following:

1. Acorn Master-Trol.

B. The water management system shall, at a minimum, provide water shut off control and operation management to all showers and inmate combi fixtures. The system shall be controlled from a stand-alone computer at the pod control station to be provided as part of the system.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION:

A. The construction shall provide hot and cold domestic water to plumbing fixtures as required for all new building areas.

B. Domestic water elements comprise the following:

1. Water Distribution: Piping within the building, serving fixtures and equipment.
2. Plumbing Equipment: Pumps, tanks, filters, and treatment equipment.

C. Where domestic water elements must also function as elements defined within another element group, the construction shall meet requirements of both element groups.

D. Water and drainage elements comprise of the following:

1. Water Supply: Water sources.
2. Plumbing Fixtures: All fixtures necessary for sanitation, occupancy, and use, that are connected to water supply, including water heating.
3. Domestic Water: All elements required to distribute water to fixtures, hose bibbs, and equipment including piping and equipment for water heating and storage.
4. Other Water Requirements: Services elements required for trap primer water supply.

E. Capacity: The construction shall size the water supply to exceed code by 20 percent.

3.2 AMENITY AND COMFORT:

A. Location: Water heaters shall be located in mechanical room.

B. Hot Water Supply: The construction shall provide a master (central) thermostatic mixing valve or provide point of use thermostatic mixing valves at fixtures which limit the water temperature to 110 deg F.

C. Noise:

1. The system shall be designed to prevent noise due to water hammer.
2. Provide mechanical water hammer arrestor for each fixture branch to eliminate noise produced by the domestic water fixtures.
3. Water hammer arrestor installation locations and sizes shall conform to PDI standards.
4. The system shall be designed or provided devices to prevent noise due to excessive water velocity, changes in water velocity or air trapped in the piping systems.
5. The construction shall locate risers in dedicated and sound attenuated chases.

3.3 HEALTH AND SAFETY:

A. Excess Pressure Hazard: The construction shall include devices to reduce accidental excess pressure to acceptable level, with maximum overpressure of 10 percent over specified system operating pressure, for the following items:

1. Water heaters.
2. Hot water re-circulating pumps.

B. Water Contaminants: The construction shall include filtration device on water supply to drinking fountains.

3.4 DURABILITY

A. Shock Resistance: The construction shall not use cast iron fittings; valve bodies; materials; components; and where thermal or mechanical shock is expected.

B. Moisture: The construction shall not locate water heaters where leakage would cause damage to surrounding building materials; above ceilings; under counters; inside cabinets unless drip pans piped to floor drains are provided.

C. Condensation: The construction shall include insulation on cold water pipes; fittings; valves; equipment to limit condensation.

D. Temperature Changes: The construction shall provide method of allowing thermal expansion and contraction of domestic water in the hot water system and in the cold-water system.

1. The construction shall provide expansion tanks with bladders.

E. Expected Service Life Span: 30 years.

F. Wear Resistance: Provide shutoff valves that are resistant to corrosion, breakage, and scratching due to continual contact with water, human usage, and cleaning with abrasive materials.

3.5 OPERATION AND MAINTENANCE

A. Pressure Classification: The system shall have pipe, pipe components, and equipment with a pressure classification of 125 psi.

B. Energy Efficiency:

1. Heat Loss: The construction shall include insulation to limit heat loss of domestic hot water to a maximum of 2 degrees F in any 100 feet of pipe, when water is running, and maximum of 2 degrees F per hour, when water is standing.
2. Heat Loss: Provide re-circulating pumps to limit the domestic hot water temperature drop to 2 degrees F within 100 feet of fixtures requiring domestic hot water.
3. Equipment Heat Loss: The construction shall include insulation on the following equipment to limit domestic hot water heat loss to maximum of 2 F per hour, without energy input:

a) Storage type water heaters.
b) Hot water expansion tanks.

C. Method of Removing Air:

1. Provide one of the following:

a) Automatic air vents.
b) Manual air vents

2. The construction shall not use:

a) Eliminating air tanks.

D. Water Heating Method: Gas-fired water heaters.

E. Ease of Service and Maintenance:

1. Fixture Shut-Off: As specified in herein.
2. Equipment isolation: Valves on both supply and discharge sides.

END OF SECTION D22

SECTION D23 - SANITARY WASTE

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: Sanitary waste piping and accessories.

PART 2 – PRODUCTS

2.1 SANITARY WASTE AND VENT PIPING, BURIED:

A. The construction shall use one or more of the following:

1. Cast iron pipe and fittings, hub-and-spigot, with neoprene or lead/oakum joint seals.
2. Copper tubing (DWV), with cast bronze or wrought copper fittings and soldered joints.
3. Copper tubing (ASTM B 88/ASTM B 88M-200S), with cast bronze or wrought copper fittings and soldered joints.
4. Vitrified clay pipe and fittings, bell-and-spigot, with compression gaskets.

2.2 SANITARY WASTE AND VENT PIPING, NOT BURIED:

A. The construction shall use one or more of the following:

1. Cast iron pipe and fittings, hub-and-spigot, with neoprene or lead/oakum joint seals.
2. Cast iron pipe and fittings, hubless, with neoprene gaskets and stainless steel clamps.
3. Copper tubing (DWV), with cast bronze or wrought copper fittings and soldered joints.
4. Galvanized steel pipe, with cast iron fittings, screwed or flanged, or malleable iron fittings with mechanical grooved couplings (for pressure applications only).

2.3 CLEANOUT PLUGS:

A. The construction shall use one or more of the following:

1. Brass.
2. Plastic.
3. Stainless steel.

2.4 CLEANOUT CAPS:

A. The construction shall use one or more of the following:

1. Brass.
2. Plastic.
3. Reinforced neoprene.
4. Cast iron.

2.5 FLOOR DRAINS:

A. The construction shall use one of the following:

1. Cast iron.
2. Copper.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION:

A. The system shall include drainage for disposal of waste as required by the code and for the following for the new building areas:

1. Fixtures and equipment which have a waste connection or a domestic water connection.

   a) Waste connections are not required on icemakers; refrigerators with icemakers; exterior hose bibs; condensate drain and equipment relief piping.

2. Cleaning Drainage: Floor drains located as indicated in program, per code; or in

   a) Toilet rooms.
   b) Janitor room.
   c) Hose-down areas.

3. Indirect Drainage: Floor drains or floor sinks to receive piping from:

   a) Equipment drain pans.
   b) Condensate drains.
   c) Other equipment that produces clear wastes.
   d) Other equipment specified to have indirect drain.
   e) Equipment pressure relief drain tubing.
   f) Where sanitary waste and vent elements must also function as elements defined within another element group, the construction shall meet requirements of both element groups.

B. The construction provides removal of liquid waste.

C. Drainage elements comprise of the following:

1. Plumbing Fixtures: All fixtures necessary for sanitation, occupancy, and use, that are connected to drainage; including water heating and kitchen appliances.
2. Sanitary Waste: All elements required for removal of sanitary waste, including piping, venting, discharge and disposal, and equipment.
3. Other Drainage: Services elements required for drainage of plumbing and mechanical equipment required indirect waste receptors.

3.2 AMENITY AND COMFORT:

A. Convenience:

1. The construction shall not locate floor drains; floor clean outs in doorways or directly in traffic paths.

B. Odors:

1. The system shall not terminate vents within 10 feet horizontally of doors, windows, air intake or exhaust openings, or other openings in the exterior enclosure, unless vent termination is at least 3 feet above the top of the opening.
2. The construction shall not locate vent openings under overhangs.
3. The system shall not locate vent openings closer than 10 feet to lot line.
4. Vent pipes shall be extended at least 6 inches above the surface of roofs.
5. Exception: Where roof areas are to be occupied for normal building functions, extend vent pipes at least 7 feet above the roof surface.

6. Extend vent pipes at least 12 inches above overflow level of the highest fixture served by the vent.

    a) The construction shall provide an automatic means of priming traps which may evaporate enough water to break the trap seal allowing sewer gases to enter the building; on all floor drains or floor sinks.

C. Disease and Infection:

1. Do not locate indirect drains in toilet rooms, unventilated or inaccessible rooms, or in air distribution or return plenums.
2. Provide a backflow prevention device in the sewer discharge to prevent back- up into plumbing fixtures and floor drains.

D. Noise:

1. The system shall be designed or provided devices to prevent noise due to excessive flow velocity.
2. The construction shall locate risers in dedicated and sound attenuated chases.
3. Provide fixtures that produce the minimum noise possible. Siphon jet water closets are to be used instead of blow-out counterparts.

E. Odors:

1. Odor producing elements shall be located in areas separate from human occupancy.
2. The construction shall not locate sanitary waste vent openings where odors are noticeable by occupants or by occupants of adjacent properties or where odor- bearing air may enter building spaces.
3. The construction shall connect fixtures to prevent entry of sewer gases into occupied spaces.

F. Appearance:

1. Vents: Conceal plumbing vents from view; Do not locate plumbing vents on the front side of the roof.

3.3 STRUCTURE

A. Hub-and-Spigot Joint Support: Support joints so they do not separate under weight of pipe or live loads.

B. Insulated Pipes: The construction shall prevent compression of insulation by using pipe shields or saddles or dense insulation inserts.

3.4 DURABILITY

A. Condensation: The construction shall prevent condensation from forming on or dripping from sanitary drain piping; drinking fountain or water cooler waste piping; condensate piping; p-traps. Insulate these where needed to prevent pipe condensation.

B. Joint Durability: The construction shall provide watertight joints.

C. Electrical Component Protection:

1. Do not route piping through electrical rooms; switchgear rooms; transformer vaults, communication equipment rooms unless it is absolutely necessary.

    a) Where piping must be routed near electrical equipment, shield the electrical equipment with drip pans which drain to the nearest floor drain.

D. Maximum Discharge Temperature into Sewer: 120 degrees F.

3.5 HEALTH AND SAFETY:

A. Waste Disposal: Connect each fixture and other plumbing equipment to sanitary drainage system for proper disposal of waste and harmful materials.

B. Prevention of Sewer Gas Leaks:

1. The construction shall provide waste system vents as required by code to avoid trap siphonage or compression.
2. The system design shall prevent entry of sewer gases from the sanitary sewer into building's sewer system.

C. Protection of Potable Water Supply: As required by code.

D. Burn Hazards:

1. Maximum Fixture Discharge Temperature: 110 degrees F.
2. Maximum Exposed Surface Temperature: 105 deg F.

E. Fire Hazards:

1. Do not use combustible piping materials inside the building.
2. Terminate combustible piping entering the building within 5 *feet* of penetration.

F. Hazard Labeling: The construction shall clearly label sanitary waste and vent; sanitary grease waste and vent piping systems indicating the nature of contents and direction of flow.

1. Conform to requirements of ANSI/ASME 13.1(R2002).

3.6 OPERATION AND MAINTENANCE:

A. Maintenance of Drainage:

1. Fittings, Joints, and Offsets: As required to ensure optimal flow through horizontal and vertical piping and at changes of direction.
2. Transitions Between Horizontal Piping and Vertical Risers:

a) Sanitary Waste: Sanitary tees, wyes, or wyes and eighth bends.
b) Vents: Wyes, wyes and eighth bends, and short radius fittings.

B. Ease of Maintenance and Cleaning:

1. Floor Drains: At low points in floor and flush with finish floor surface.
2. Cleanout Plugs: Recessed into floor surface with cover plates.
3. The construction shall include drainage of equipment which produces or collects clear waste, such as condensation from cooling coils. The construction shall provide piping for the clear waste to the nearest floor drain.
4. Indirect Waste Pipes Over 1 inch in diameter: Provide a means to catch and remove solid materials and larger, such as a strainer.

C. Waste Pipe Sizing:

1. The piping shall be sized as required to prevent overflow or backflow into any fixture.
2. Pipes 3 inches in Diameter and Smaller: Sloped at 1/4 inch per foot minimum, downward in the direction of flow.
3. Pipes 4 inches in Diameter and Larger: Sloped at 1/4 inch per foot minimum, downward in the direction of flow.

4. Substantiation:

   a) Preliminary Design: Analysis and documentation of sewer discharge method and locations.
   b) Design Development: Drainage design calculations and documentation of piping outlets.
   c) Construction: Water pressure tests of piping systems; functional tests of drains and equipment under simulated full occupancy loads.
   d) Occupancy: Observation of function during full occupancy or simulating extreme conditions.

5. Provision for Drainage of Water Distribution Piping:

   a) The construction shall provide a system drain at discharge above grade outside of the building.
   b) The construction shall provide an adequately sized drain for the volume of water inside the distribution system.
   c) Provide drain valve located at each low point.

6. Provision for Cleaning of Drainage Piping: Clean outs shall be provided as required by code and as follows:

   a) At the upstream end of each horizontal sanitary drainage pipe, for cleaning in direction of flow.
   b) At the dead end of each dead-end pipe.
   c) Pipe 3 inches and Smaller: At intervals of 50 foot maximum.
   d) Pipe 4 inches to 6 inches: At intervals of 80 foot maximum.
   e) Pipe 8 inches and Larger: At intervals of 100 foot maximum.
   f) Clearance: As required by code to allow for cleaning and rodding of pipe.

END OF SECTION D23

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SECTION D24 - RAIN WATER DRAINAGE

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: Rain water drainage products.

PART 2 – PRODUCTS

2.1 RAIN WATER PIPING, NOT BURIED

A. The construction shall use one or more of the following:

1. Any pipe/fitting/joint combination specified for sanitary sewer piping, not buried.
2. Cast iron pipe, hub and spigot, with neoprene or lead/oakum joint seals.
3. Cast iron pipe, hubless, with neoprene gaskets and stainless steel clamps.
4. Copper tube, cast or wrought copper or bronze fittings, with soldered joints.
5. Galvanized steel pipe, with screwed or flanged cast iron fittings, screwed malleable iron fittings, or malleable iron mechanical grooved couplings.

2.2 RAIN WATER PIPING, BURIED

A. The construction shall use one or more of the following:

1. Any pipe/fitting/joint combination specified for buried sanitary sewer piping.
2. Cast iron pipe, hub and spigot, with neoprene or lead/oakum joint seals.
3. Copper tube (DWV), cast bronze or wrought copper fittings, with soldered joints.

B. The construction shall not use:

1. Plastic piping of any type.
2. Plastic piping inside the building and within 5 feet outside of building.

2.3 ROOF DRAINS AND AREA DRAINS

A. The construction shall use one or more of the following:

1. Bronze.
2. Galvanized cast iron.
3. Stainless steel.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION:

A. The construction shall provide drainage for disposal of rain water and clear wastes, as required by the code and as follows for all new building areas.

1. Drainage of flat roofs must be accomplished with the use of concealed roof drains.
2. Drainage of pitched roofs must be accomplished with the use of gutter and concealed downspouts.
3. Drainage of roof areas that do not drain naturally without ponding, including built-in gutters.
4. Clear wastes include condensate drainage; HVAC cooling water.

5. Drainage for outdoor areas that are completely surrounded by construction that prevents natural drainage (e.g. areaways) or that are so sloped as to result in accumulation of water or ponding.
6. Drainage of interior areas where ground water may accumulate naturally.
7. Rain Water Drainage: All elements required for drainage of rain water from building areas in which it may accumulate and drainage of clear wastes from building services; including gutters and downspout and sub drainage piping system.

B. Where rain water drainage elements must also function as elements defined within another element group, the construction shall meet requirements of both element groups.

3.2 AMENITY AND COMFORT:

A. Condensation: Insulate horizontal and vertical rain water piping, including the underbody of roof drains, using material of sufficient insulating value to prevent condensation.

B. Convenience: Install floor drains flush with the surface on which they are installed, out of pedestrian traffic patterns wherever possible.

C. Odors: Provide traps for all indoor drains connected to rain water drainage system.

D. Appearance: Do not locate rain water leaders or downspouts where they are visible from the outside of the building.

E. Noise:

1. The system shall be designed or provided devices to prevent noise due to excessive flow velocity.
2. The construction shall locate risers in dedicated and sound attenuated chases.

3.3 HEALTH AND SAFETY

A. Vermin Resistance: Provide grated coverings for drains to prevent entry of rodents, insects and birds; rodents, insects, birds, and miscellaneous foliage.

3.4 STRUCTURE

A. Locate drains to avoid ponding loads in excess of structural capacity.

B. The construction shall prevent inadvertent ponding by protecting drain openings from clogging, using raised strainers with minimum height of 4 inches wherever possible and flat gratings in all other locations.

C. Locate and install roof drain leaders to avoid interference with wall and column footings.

3.5 DURABILITY

A. Water Penetration: Provide reinforcement for weather barrier around drains using extremely durable, permanently watertight material; one acceptable method is using 4-pound sheet lead, extending minimum of 10 inches from center of drain.

B. Abuse: The construction shall protect drainage conductors and leaders by placing in dedicated locations; by using protective coverings or shields and by recessing in walls.

C. Electrical Component Protection:

1. Do not route piping through electrical rooms; switchgear rooms; transformer vaults, communication equipment rooms unless it is absolutely necessary.

a) Where piping must be routed near electrical equipment, shield the electrical equipment with drip pans which drain to the nearest floor drain.

D. Operation and Maintenance:

1. Maintenance of Drainage: Pipes sloped at 1/4 inch per foot minimum, downward in direction of flow.
2. Drainage Outlets: As follows:

   a. Secondary Drainage: The system shall drain to completely redundant drain piping system.
   b. Scuppers: Drain; The system shall drain to rain water drainage system.
   c. Areaways and Courtyards: The system shall drain to rain water drainage system.

3. Capacity:

   a. Roof Areas of 10,000sq ft. and Less: Minimum of two roof drains.
   b. Roof Areas of 10,000sq ft. or More: Minimum of four roof drains.
   c. Areaways and Courtyards: Shall not be provided for areas with less than 100 square feet open to the sky.
   d. Design Rainfall Rate: Short storm intensity of 3 inch in 1-hour period.
   e. Secondary Drainage: Where required by code. Provide secondary (overflow) roof drains connected to a secondary drainage system; scuppers in parapets.
   f. Substantiation: Preliminary Design: Analysis and documentation of rain water discharge methods and locations.

      1). Design Development: Drainage design calculations and documentation of piping outlets.
      2). Construction: Water pressure test to verify continuity of piping; functional tests of each drain.
      3). Occupancy: Field observation of performance.

END OF SECTION D24

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SECTION D25 – DOMESTIC WATER HEATERS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Design criteria for domestic water heaters.

PART 2 – PRODUCTS

2.1 WATER HEATER SYSTEM TYPE

A. Manufacturers:

1. A.O. Smith Water Products Co: www.hotwater.com.
2. Rheem Manufacturing Company: www.rheem.com.
3. Other similar products by major manufacturers.

B. Commercial Gas Fired:

1. Type: Automatic, natural gas-fired, vertical storage.
2. Tank: Glass lined welded steel ASME labeled; multiple flue passages, 4-inch diameter inspection port, thermally insulated with minimum 2 inches glass fiber, encased in corrosion-resistant steel jacket; baked-on enamel finish; floor shield and legs.
3. Accessories:
   a) Water Connections: Brass.
   b) Dip Tube: Brass.
   c) Drain valve.
   d) Anode: Magnesium.
   e) Temperature and Pressure Relief Valve: ASME labeled.
4. Controls: Automatic water thermostat with temperature range adjustable from 120 to 180 degrees F, automatic reset high temperature limiting thermostat factory set at 195 degrees F, gas pressure regulator, multi-ribbon or tubular burner, 100 percent safety shut-off pilot and thermocouple, flue baffle and draft hood.
5. Flue Venting: UL Certified as indirect or direct vent with stainless steel, double wall.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Provide temperature control of domestic hot water systems as specified.

B. The Water Heater system consists of the following elements:

1. Energy Supply: Elements which provide energy used to maintain building comfort.
2. Hot Water Recirculation: Elements required to recirculate water to maintain building water temperatures including recirculation pump.
3. Tempering Valves: Tempering valves to modulate temperature in various parts of the system to limit water temperature where excessive temperature might result in scalding, especially where water is controlled by set temperature metering valves.

3.2 AMENITY AND COMFORT

A. Set Point: As specified in the project program and room data sheets or as defined by the Owner.

3.3 OPERATION AND MAINTENANCE

A. Design Criteria:

1. Heating Hot Water Temperature: As required to maintain the required heating water temperatures as indicated in the project program and room data sheets.
2. Substantiation:

a) Design Development: Design calculations and sample manufacturer data showing capacity available.
b) Construction: Manufacturer's data showing performance, certified by independent testing agency.

3.4 ENERGY EFFICIENCY

A. Energy Efficiency: Meet or exceed requirement in Title-24.

END OF SECTION D2050

SECTION D30 – HVAC CRITERIA

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. HVAC: Artificial means of maintaining interior space comfort and air quality, including heating, cooling, ventilation, and energy supply.

B. The HVAC system consists of the following elements used to maintain occupant comfort:

1. Heat Generation: Elements required to heat building.
    a) Heat generation elements comprise boilers.
2. Refrigeration: Elements necessary to generate the cooling required.
    a) Refrigeration elements comprise water chillers.
3. Air Distribution: Elements required to supply, return, and exhaust air associated with heating or cooling the building.
4. Hydronic Distribution: Elements required to distribute water and other liquids for heating or cooling.
    a) System(s) required include high temperature water system and chilled water system.
    b) Configuration - All Systems: Direct return.
5. HVAC Controls: Elements required to monitor and control HVAC equipment and systems.
6. Smoke Control Systems: Elements required to control smoke in the event of a fire and to remove smoke after the fire is extinguished.
7. Other HVAC elements required to maintain occupant comfort.

C. Products: Where specific products are required or allowed, use products complying with the additional requirements specified elsewhere.

1.2 REFERENCE STANDARDS

A. AABC MN-1 - AABC National Standards for Total System Balance; 2002.

B. AHRI 550/590 (I-P) - Performance Rating of Water-Chilling and Heat Pump Water-Heating Packages Using the Vapor Compression Cycle; 2011.

C. AHRI 880 (I-P) - Performance Rating of Air Terminals; 2011 with Addendum 1.

D. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications; 2015.

E. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2013.

F. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size; 2012, with 2015 amendments.

G. ASHRAE Std 55 - Thermal Environmental Conditions for Human Occupancy; 2013, Including All Amendments.

H. ASHRAE Std 62.1 - Ventilation for Acceptable Indoor Air Quality; 2016.

I. ASME BPVC-I - Boiler and Pressure Vessel Code, Section I - Rules for Construction of Power Boilers; 2015.

J. ASME BPVC-IV - Boiler and Pressure Vessel Code, Section IV - Rules for Construction of Heating Boilers; 2015.

K. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1 - Rules for Construction of Pressure Vessels; 2015.

L. ICC (IFGC) - International Fuel Gas Code; 2012.

M. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Rev. 2009).

PART 2 – PRODUCTS

2.1 HVAC SYSTEM TYPES

A. Use one or more of the following:

1. Central HVAC Systems:

2.2 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Energy Labs
2. Scott Springfield
3. Munters
4. Haakon

2.3 UNIT CONSTRUCTION

A. Unit Base:

1. Each unit shall be constructed on a base fabricated from ASTM A36 welded structural steel channel. Tubular or formed metal channel bases are not acceptable. Channel bases shall be sized as a function of air handling length as follows:

A.H. UNIT LENGTH	MINIMUM CHANNEL SIZE	
UP to 10	4" x 1-5/8"	(5.4lbs/Lin. Ft.)
11' to 20'	6" x 2"	(8.2lbs/Lin. Ft.)
21' to 30'	8" x 2-1/2"	(11.5lbs/Lin. Ft.)
31' to 40'	10" x 2 3/5"	(15.3 lbs/Lin. Ft.)
41' to 50'	12" x 3"	(20.7lbs/Lin. Ft.)

B. Unit Cabinet:

1. Housing: The unit housing side and roof panels shall be constructed of 16-gauge galvanized steel, and shall utilize a standing seam modular panel type construction. All floors shall be constructed of 14-gauge galvanized steel. The panels shall be caulked and attached to each other, to the roof, and to the floor using nuts and bolts on no less than 8" on center. Drive screw attachment is not acceptable. All panels shall be removable. All seams shall be sealed with an acrylic latex sealant prior to assembling the panels and after completion of the assembly. All floor openings shall have 12-gauge galvanized steel-framed flange around the entire perimeter of opening for duct connection. Minimum sound transmission loss (STL) through unit panels shall be as follows:

OCTAVE BAND CENTER FREQUENCY					
125	250	500	1K	2K	4K
25	29	36	42	47	48

2. Insulation and Interior Liner: Insulation shall be 2" thick, 3 lbs. per cubic foot density, neoprene coated fiberglass to cover all walls and ceilings. This insulation shall meet NFPA-90A smoke and flame spread requirements. All floors shall be insulated from below using minimum 2" thick foam to ensure that the entire under surface of the floor is insulated. There shall be no raw edges of insulation exposed to the air stream. The entire interior of all units shall be lined with minimum 20-gauge bright galvanized steel liner. The interior liner of the fan sections, inlet plenum sections, and discharge plenum sections shall be perforated and the remaining shall be steel.
3. Drain Pans: Drain pans shall be constructed from 16-gauge, 316 stainless steel. Galvanized steel drain pans are not acceptable. The drain pan shall be insulated with minimum 2.0" thick foam insulation to prevent condensation under the drain pan. Drain pans must be sized such that the entire coil, including headers and return bends, are inside the drain pan. Drain pans must slope in two directions so there is no standing water in drain pan. Stainless steel condensate connection shall be provided on one side of the unit. Coils shall be supported on 10-gauge stainless steel members to prevent immersion of the coil in condensate and allow for complete cleaning of drain pan beneath the coils.
4. Access Doors
    a) All access doors shall be of thermal break construction, hinged, double wall, insulated, man size access doors shall be provided in all sections requiring access for maintenance or service. The frame shall be constructed of extruded aluminum, fully welded at the corners with an anodized finish. The doors shall utilize a dual gasket seal system. All hardware provided shall be non-corrosive and all hinges and latches shall be adjustable with nuts and bolts. Access door must not leak more than 25 CFM @ 6" static pressure.
    b) Door hinges and latches shall be easily adjustable, without the use of shims or special tools, to allow for a tight seal between the door and the doorframe as the gasketing material compresses over time. The door hinge design shall allow for field reversing of door swing and doors shall be easily removable. Provide door detail drawing with submittal package.
    c) Doors entering into any section of the air handler that contains rotating fans or UV lights shall be provided with a door interlock safety switch to de-energize the fan motor or UV lights upon opening. Each fan section and UV light section shall include an 8" x 12" wire reinforced UV protected glass view window in an access door.
5. Paint Finish: After final assembly the unit exterior shall be coated with an industrial grade self-priming semi-gloss high solids 2K polyurethane gray 219GY1 finish. In addition, all fan bases, springs, and structural steel supports shall be coated with the same finish. The paint system shall meet ASTM B117 Salt spray test for a minimum of 5,000 hours.

2.4 INTERNAL COMPONENTS

A. Fan Assembly:

1. Supply and return fans shall be direct drive Arrangement #4 plenum fans. Fan wheel shall be aluminum with aluminum extruded airfoil blades. The fan inlet shall be isolated

from the cabinet by means of a neoprene-coated flexible connection. Plenum fans shall be provided with spring-style thrust restraints.

2. Each fan shall be sized to perform as indicated on the equipment schedule. The wheel diameter shall not be less than that shown on the equipment schedule. Fans shall be tested in accordance with AMCA 210 and AMCA 301 test codes for air moving devices and shall be guaranteed by the manufacturer to deliver rated published performance levels. Fans shall be licensed to bear the AMCA certified ratings seal for both sound and air. Fans shall have a sharply rising pressure characteristic extending through the operating range and continuing to rise beyond the efficiency peak to ensure quiet and stable operation. Fans shall have a non-overloading design with self-limiting horsepower characteristics and shall reach a peak in the normal selection area. All fans shall be capable of operating over the minimum pressure class limits, as specified in AMCA Standard 2408-69.
3. Fan Base, Spring Isolation, and Support Framing: Mount fan and motor on an internal, fully welded, rigid steel base. Base shall be free-floating at all four corners on spring type isolators with earthquake restraints. The fan assembly shall be isolated from the cabinet by steel springs with minimum deflection of 2.0" or as indicated on schedules. The spring isolators shall be mounted to structural steel members. All isolators shall be rated for zone 4 seismic requirements. The spring isolators shall be mounted on a waffle pad for vibration isolation.
4. Balancing: All fans prior to shipment shall be completely assembled and test run as a unit at the specified operating speed or maximum RPM allowed for the particular construction type. Each wheel shall be statically and dynamically balanced in accordance with ANSI/AMCA 204-96 "Balance Quality and Vibration Levels for Fans" to Fan Application Category BV-3, Balance Quality Grade G6.3. Balance readings shall be taken by electronic type equipment in the axial, vertical, and horizontal directions on each of the bearings. Records shall be maintained and a written copy shall be available upon request.

B. Motors:

1. Furnish premium-efficiency TEFC, NEMA frame, ball bearing type motors. TECO, Marathon "XRI", or Reliance "XE" Premium Efficiency are acceptable. The Horsepower values as shown on the schedule are minimum allowable.
2. The fan motors shall be factory wired to an external VFD equipped with manual bypass (one per fan) with flexible conduit of adequate length so that it will not have any effect on the vibration isolation.

C. Fan Airflow Measurement:

1. Manufacturer shall be Ebtron, Fan Inlet Hybrid Series or approved equal.
2. Each fan shall have a sensor face mounted at the inlet cone without affecting fan performance or sound. Each sensor node shall be shall contain two individually wired, hermetically sealed bead-in-glass thermistors. Airflow accuracy shall be ± 2% of reading over the entire operating airflow range of not less than 0 to 5,000 fpm.
3. A single transmitter shall be provided for each bank of fans with an integral, minimum 16-character LCD display capable of simultaneously displaying total airflow and temperature. The LCD display shall also be capable of displaying individual fan airflow and temperature readings of each independent sensor node.
4. Output signal 4-20 mA. DC or 0-5 VDC standard.
5. The transmitter shall be housed in a NEMA 1 enclosure with external signal tubing, power and output signal connections.

D. Coils:

1. Chilled water coils shall be of the plate fin extended surface type. Tubes shall be 5/8" outside diameter seamless copper with a 0.020" minimum wall thickness. Each coil shall have individually replaceable return bends of 0.025 wall thickness on both sides of the coil. Coils incorporating a "hairpin" type design are not acceptable. Tubes shall be expanded into the fin collars to provide a permanent mechanical bond.
2. The secondary surface shall be formed of 0.008" aluminum fins and shall be spaced not closer than 12 fins per inch with integral spacing collars that cover the tube surface. Headers shall be non-ferrous seamless copper, outside the air stream and provided with brazed copper male pipe connections. Drain and vent tubes shall be extended to the exterior of the air handling unit.
3. All coils shall have counter flow construction with connections left or right hand as shown on the drawings. The use of internal restrictive devices to obtain turbulent flow will not be accepted.
4. Cooling coil casings shall be of minimum 16-gauge, 316 stainless steel with double-formed 1-1/4" stacking flanges and 3/4" flanges on the side plates. All other coil casing shall be of 16-gauge galvanized steel. Flanged tube sheets shall have extruded tube holes to prevent raw edges of tube sheets cut into copper tubes because of thermal expansion of tubes in tube holes. Tube holes with raw sheet metal edges are not acceptable. Reinforcing shall be furnished so that the unsupported length is not over 60". All coil assemblies shall be tested under water at 300 psi and rated for 150-psi working pressure. Headers are to be located inside the cabinet casing with only the pipe connections extending through the casing. All sides of coils shall be carefully blanked off with the same materials used for the coil casings, to ensure all air passes through the coil.
5. Intermediate condensate pans are to be furnished on multiple coil units and single coils greater than 48" high. The pans shall be 16Ga. 304 stainless steel and drain to the main drain pan through copper downspouts.
6. All water coils shall be rated in accordance with ARI Standard 410. The air handling unit manufacturer, for the purpose of sole source responsibility, shall manufacture all coils supplied for the air handlers.
7. Hot water coils shall be similar to the chilled water coils.

E. Filters:

1. Filter sections shall be fabricated as part of the air-handling unit. Filters shall be arranged for upstream loading as shown on the drawings. Provide filter-holding frames to accommodate scheduled filters. Filter frames shall be 16 Ga. galvanized steel and shall be fully welded to reduce leakage of air through corners.
2. Factory install at each filter bank a Dwyer Magnehelic "Series 2000 ASF" pressure gauge complete with signal flags, static pressure tips, hardware and fittings. Enclose the gauge in a protective sheet metal box with a hinged inspection door. Paint to match unit.
3. Filter shall be mini-pleat high-efficiency, extended media area, totally rigid and disposable type. Air filters shall be MERV 13 and have average efficiency of not less than 85% when tested in accordance with ASHRAE 52-76 test standard. Filter pressure drop shall not exceed 0.25" at 500 FPM when clean. Filter shall be of the quantities and sizes as indicated on the drawings

F. Economizer Section:

1. Economizer section shall include dampers for return air, fresh air and exhaust air. Dampers shall be opposed blade type. Dampers shall be sized for not greater than 1200 fpm face velocity based upon gross damper area. Dampers shall meet above

specifications. Furnish full height 24" wide access doors for damper and linkage service.

2. Dampers shall be supplied with low leak extruded aluminum airfoil blades. Blades shall be supplied with rubber edge seals and stainless steel arc end seals. Rubber edge seals shall be backed by the damper blade to assure a positive seal in the closed position. Dampers shall be provided with nylon bearings within extruded openings. Damper leakage shall not exceed 6 CFM/ft2 at 5.0" of static pressure. Leakage testing shall be in accordance with AMCA standard 500 figure 5.5. Test results must be from independent testing laboratory.

G. Outside Air Monitoring System:

1. EBTRON, Inc. Model GTC116-PC is basis of design. (ATMD)

   a) All other vendors shall be considered as substitutions only. Substitutions for the basis of design requesting acceptance less than 30 days prior to bid date or products submitted in non-conformance with the requirements of this specification will not be considered.
   b) Any product submitted as an equal shall be expected to comply with all performance, capabilities and functional aspects of this specification.

2. Each ATMD shall consist of one or more sensor probes and a single, remotely mounted, 32-bit microprocessor-based transmitter capable of independently processing up to 16 independently wired sensor nodes contained in one or more probe assemblies per measurement location.
3. Probes shall be constructed of extruded, gold anodized, 6063 aluminum tubes. All internal wires within the tube shall be Kynar coated. PVC insulated conductors are not acceptable.
4. Each sensor node shall contain two individually wired, hermetically sealed bead-in-glass thermistors.
5. Thermistors shall be mounted in the sensor node using a marine-grade, waterproof epoxy. Thermistor leads shall be protected and not exposed to the environment. Thermistors leads shall not be fastened to the thermistor semiconductor substrate by weld or solder connections. Manufacturer shall provide UL listed, FEP jacketed, plenum rated cable(s) between sensor probes and the remote transmitter.
6. The airflow rate at each sensor node shall be equally weighted and arithmetically averaged by the transmitter prior to output. All integrated circuitry shall be temperature rated as 'industrial-grade'. Submissions containing 'commercial-grade' integrated circuitry are not acceptable.
7. Each sensing node shall be individually wind tunnel calibrated at 16 points to NIST traceable airflow standards. Airflow accuracy shall be +/-2% of Reading over the entire operating airflow range of not less than 0 to 5,000 fpm (25.4 m/s).
8. The transmitter shall have an integral LCD display capable of simultaneously displaying airflow and temperature. Individual airflow and temperature readings of each independent sensor node shall be accessible. The transmitter shall be capable of field configuration and diagnostics using an on-board pushbutton interface and LCD display.
9. The ATMD shall be UL 973 and BTL listed
10. The transmitter shall have two isolated and fused analog output signals and one RS-485 network connection. One analog output shall be for velocity and the other for a temperature output or LEED alarm function. All transmitters shall have integral self-diagnostics

11. Other than the thermistor sensors, no other electronic components shall be located at the sensing node. Signal processing circuitry on or in the sensor probe shall not acceptable.
12. Devices using chip-in-glass, epoxy-coated or diode-case chip thermistors are not acceptable.
13. Devices with RJ-45 connections exposed to the environment or having electronic circuitry mounted in or at the sensor node are not acceptable.
14. Pitot tubes and arrays are not acceptable.
15. Vortex shedding devices are not acceptable.

H. Electrical Requirements

1. All AHU and electrical panel wiring shall be performed in a UL 508 listed shop. Provide single source power panels (SSPP's) that are constructed according to NEC regulations and carry a U.L.508 listing and label. The panel shall include a non-fused main disconnect switch covering all fans in each unit, Motor Starters for constant volume units or VFD's for variable volume units, and any necessary transformers, Hand–Off–Auto switches, relays and pilot lights for complete operation of the fans in the unit. The single source power panels shall be factory wired to all factory furnished devices such as motors and interlocks.
2. The air handling unit manufacturer, for the purpose of sole source responsibility, shall manufacture all electrical panel assemblies supplied for the air handlers. The air handling unit manufacturer shall be a U.L. 508 listed panel shop.
3. The main control panel shall have access door(s) for direct access to the controls. The panel shall contain a single externally operated, non-fused disconnect, suitable for copper wire up to and including 3" conduit. The electrical contractor shall bring separate 460/3/60 power to the single source power panel.
4. All wiring shall be run in EMT conduit, (or flexible when connecting to a motor), raceways are not acceptable.
5. Provide fluorescent, marine style lights in each access section wired to a common weatherproof switch with 60-minute timer mounted adjacent to the supply fan access door. 120V GFI duplex service receptacles shall be installed and wired with the lighting circuit and located in each fan compartment.
6. If the unit requires splits, junction boxes shall be furnished on each section to allow the electrical contractor to make final connections in the field. Wiring shall be clearly labeled to allow ease in final interconnections.

I. Variable Frequency Drive: Furnish complete individual variable frequency VFDs with manual bypass for each fan designated on the drawing schedules to be variable speed. VFDs shall be furnished by the HVAC equipment manufacturer.

2.5 SOURCE QUALITY CONTROL

A. All major components used to assemble air handling unit, with the exception of electrical devices, control dampers, drives, bearings, and controls, shall be manufactured by the same air handling unit manufacturer. Primary fans and coils not manufactured by the same air handling unit manufacturer is not considered single source responsibility and shall not be acceptable.

B. Fan Sound-Power Level Ratings: Comply with AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Fans shall bear AMCA-certified sound ratings seal.

C. Fan Performance Rating: Factory test fan performance for airflow, pressure, power, air density, rotation speed, and efficiency. Rate performance according to AMCA 210, "Laboratory Methods of Testing Fans for Aerodynamic Performance Rating."

D. Water Coils: Factory tested to 300 psig according to ARI 410 and ASHRAE 33.

2.6 ENERGY SUPPLY

A. Pipe:

1. Section includes pipe and fitting materials and joining methods for the following:

a) Chilled water piping.
b) Heating hot-water piping.
c) Makeup-water piping.
d) Condensate drain piping.
e) Blowdown-drain piping.
f) Air-vent piping.
g) Safety-valve-inlet and -outlet piping.

2. Use one or more of the following:

a) Copper type L pipe with flared or brazed joints.
b) Sch. 40 steel pipe with welded joints.

B. Fittings:

1. Use one or more of the following:

a) Copper.
b) Steel.

2.7 HEAT GENERATION

A. Boilers:

1. Use one or more of the following:

a) Heating using hot water.
b) Cast iron outdoor sectional condensing boilers.
c) Minimum thermal efficiency of 99% at minimum input.

2.8 REFRIGERATION

A. Water Chillers:

1. Use one or more of the following:

a) Centrifugal chillers to match existing York chiller.

2.9 AIR DISTRIBUTION

A. Ductwork:

1. Use one or more of the following:

a) Galvanized sheet G-90 metal duct.
b) #304 Stainless steel sheet metal duct (for shower exhaust).
c) Flexible duct (7 ft. max per connection).

B. Diffusers, Registers, and Grilles: Steel diffusers.

1. Modular Core Supply Grilles for Non-Security Uses:

    a) Manufacturers: Subject to compliance with requirements, provide products by the following or equal:

        i) Basis of Design: Titus.
        ii) Devices shall be specifically designed for variable-air-volume flows.
        iii) Construction and configuration as Scheduled.

2. Wall Supply and Exhaust Maximum Security Grille:

    a) Manufacturers: Subject to compliance with requirements, provide products by the following or equal:

        i) Basis of Design: Titus.
        ii) Security Level: Maximum and suicide deterrent (Compliant with NIC).
        iii) Material: Steel.
        iv) Material Thickness: 0.19 inch.
        v) 3/16-inch-thick, perforated faceplate with 3/16-inch-diameter holes spaced 7/16-inch o.c., staggered at 60 degrees.

3. Ceiling Supply Maximum Security Grille: Subject to compliance with requirements, provide products by the following or equal:

    a) Basis of Design: Titus.
    b) Security Level: Maximum and suicide deterrent (Compliant with NIC).
    c) Material: Steel.
    d) Material Thickness: 0.19 inch.
    e) Finish: Baked enamel, color selected by Architect.
    f) Face Arrangement:
    g) Shape: Square.
    h) Design: Perforated.
    i) Core: Louvered.
    j) 3/16-inch-thick, perforated faceplate with 3/16-inch-diameter holes spaced 7/16-inch o.c., staggered at 60 degrees.

C. Air Filters: v-style MERV 13, 12" deep high capacity filters as manufactured by Camfil Model Durafil ES with initial pressure drop of 0.25" w.g. at 2000 cfm rated air flow.

D. Centrifugal Roof Ventilators

1. Manufacturers:

    a) Aerovent; a division of Twin City Fan Companies, Ltd.
    b) Central Blower Company.
    c) Loren Cook Company.
    d) PennBarry.
    e) Twin City.
    f) Housing: Removable, spun-aluminum, dome top and outlet baffle; square, one-piece, aluminum base with venturi inlet cone.
    g) Fan Wheels: Aluminum hub and wheel with backward-inclined blades.
    h) Belt Drives:
    i) Resiliently mounted to housing.
    j) Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
    k) Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
    l) Pulleys: Cast-iron, adjustable-pitch motor pulley.

m) Fan and motor isolated from exhaust airstream.

E. Air terminal units

1. Manufacturers:

a) Anemostat Products; a Mestek Company.
b) Carnes.
c) Krueger.
d) METALAIRE, Inc.
e) Nailor Industries Inc.
f) Titus.

2. Configuration: Volume-damper assembly inside unit casing with control components inside a protective metal shroud.
3. Casing: 0.034-inch steel, single wall.

a) Casing Lining: Adhesive attached, 1-inch-thick, coated, fibrous-glass duct liner complying with ASTM C 1071, and having a maximum flame-spread index of 25 and a maximum smoke-developed index of 50, for both insulation and adhesive, when tested according to ASTM E 84.
b) Cover liner with nonporous foil.
c) Cover liner with nonporous foil and perforated metal.

4. Air Inlet: Round stub connection or S-slip and drive connections for duct attachment.
5. Air Outlet: S-slip and drive connections.
6. Access: Removable panels for access to parts requiring service, adjustment, or maintenance; with airtight gasket.
7. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
8. Regulator Assembly: System-air-powered bellows section incorporating polypropylene bellows for volume regulation and thermostatic control. Bellows shall operate at temperatures from 0 to 140 deg F, shall be impervious to moisture and fungus, shall be suitable for 10-inch w.g static pressure, and shall be factory tested for leaks.

F. Volume Damper: Galvanized steel with peripheral gasket and self-lubricating ball bearings.

1. Leakage rates in first subparagraph below vary among manufacturers and with pressure rating.
2. Maximum Damper Leakage: ARI 880 rated, 2 percent of nominal airflow at 3-inch wg inlet static pressure.
3. Damper Position: Normally open.

G. Attenuator Section: 0.034-inch steel sheet.

1. Lining: Adhesive attached, 1-inch-thick, coated, fibrous-glass duct liner complying with ASTM C 1071, and having a maximum flame-spread index of 25 and a maximum smoke-developed index of 50, for both insulation and adhesive, when tested according to ASTM E 84.

a) Cover liner with nonporous foil.
b) Cover liner with nonporous foil and perforated metal.

2. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

H. Hydronic Coils: Copper tube, with mechanically bonded aluminum fins spaced no closer than 0.1 inch, and rated for a minimum working pressure of 200 psig and a maximum entering-water temperature of 220 deg F. Include manual air vent and drain valve.

I. Controls:

1. Direct Digital Controls: Bidirectional damper operators and microprocessor-based controller and room sensor. Control devices shall be compatible with temperature controls and shall have the following features:

a) Damper Actuator: 24 V, powered closed, powered open.
b) 120/24 V transformer.
c) Switch disconnect.
d) Terminal Unit Controller: Pressure-independent, variable-air-volume controller with electronic airflow transducer with multipoint velocity sensor at air inlet, factory calibrated to minimum and maximum air volumes, and having the following features:
e) Occupied and unoccupied operating mode.
f) Remote reset of airflow or temperature set points.
g) Adjusting and monitoring with portable terminal.
h) Communication with temperature-control system.

2. Room Sensor: Wall mounted with temperature set-point adjustment and access for connection of portable operator terminal. Provide vandal proof enclosure for all sensors located in public areas.
3. Control Sequence:

a) Suitable for operation with duct pressures between 0.25- and 3.0-inch wg inlet static pressure.
b) System-powered, wall-mounted thermostat.

2.10 HANGERS AND SUPPORTS

A. Indicate the extent of corrosive environment on Drawings.

B. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

C. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

D. Steel Cables: Galvanized steel complying with ASTM A 603.

E. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

F. Air Terminal Unit Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

G. Trapeze and Riser Supports: Steel shapes and plates for units with steel casings; aluminum for units with aluminum casings.

2.11 SEISMIC-RESTRAINT DEVICES

A. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by an agency acceptable to authorities having jurisdiction.

1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.

B. Channel Support System: Shop- or field-fabricated support assembly made of slotted steel channels rated in tension, compression, and torsion forces and with accessories for attachment to braced component at one end and to building structure at the other end. Include matching components and corrosion-resistant coating.

C. Restraint Cables: ASTM A 603, galvanized-steel cables with end connections made of cadmium-plated steel assemblies with brackets, swivel, and bolts designed for restraining cable service; with an automatic-locking and clamping device or double-cable clips.

D. Retain first paragraph below for strengthening resistance of hanger rods against seismic forces that may cause rods to buckle. Use with either channel- or cable-type bracing assemblies. Detail fabrication and indicate locations on Drawings.

E. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod.

F. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

2.12 SPLIT AIR CONDITIONING SYSTEMS:

A. Wall-Mounted, Evaporator-Fan Components:

1. Cabinet: Enameled steel with removable panels on front and ends in color selected by Architect, and discharge drain pans with drain connection.
2. Electric Coil: Helical, nickel-chrome, resistance-wire heating elements; with refractory ceramic support bushings, automatic-reset thermal cutout, built-in magnetic contactors, manual-reset thermal cutout, airflow proving device, and one-time fuses in terminal box for overcurrent protection.
3. Fan: Direct drive, centrifugal.
4. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and thermal-expansion valve. Comply with ARI 206/110.

B. Air-Cooled, Compressor-Condenser Components:

1. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
2. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation device. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.

a) Compressor Type: Scroll.
b) Two-speed compressor motor with manual-reset high-pressure switch and automatic-reset low-pressure switch.
c) Refrigerant Charge: R-410A.
d) Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and liquid subcooler. Comply with ARI 206/110.

2.13 HYDRONIC DISTRIBUTION

A. Chilled Water Distribution Piping:

1. Use one or more of the following:

a) Pipes 2-1/2 Inches in Diameter and Smaller:

i) Hard copper, Type L with soldered or mechanical pressure wrought copper fittings.

b) Pipes 3 Inches in Diameter and larger:

i) Standard weight, Schedule 40 steel pipe.
ii) Joints and Fittings:

(a) Welded Standard Class wrought steel fittings.
(b) Flanged Class 150 wrought steel fittings.
(c) Grooved ductile iron fittings.

B. Heating Water Distribution Piping:

1. Use one or more of the following:

a) Pipes 2-1/2 Inches in Diameter and Smaller:

i) Hard copper, Type L with soldered or mechanical pressure wrought copper fittings.

b) Pipes 3 Inches in Diameter and larger:

i) Standard weight, electric resistance welded pipe.
ii) Joints and Fittings:

(a) Welded Class Standard wrought steel fittings.
(b) Flanged Class 150 wrought steel fittings.

C. Mineral-Fiber, Preformed Pipe Insulation:

1. Products:

a) Fibrex Insulations Inc.
b) Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
c) Type II, 1200 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type II, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
d) Metal Jacket:
e) Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.
f) Sheet and roll stock ready for shop or field sizing.

2.14 HVAC CONTROLS

A. Communications Protocols:

1. Use one of the following:

a) BACnet.
b) Extension of the existing on-site control system. No substitutes.

B. Control System Types: Direct digital control (DDC) system.

C. Operators and Sensors:

1. Use one or more of the following:

a) Electronic valve actuators.
b) Electronic damper actuators.
c) Electronic thermostats for the staff occupied areas.
d) Temperature sensors for the inmates occupied or inmates frequented areas.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Provide the necessary equipment and infrastructure to deliver heat to the conditioned spaces.

B. Distribute air to maintain the required space conditions.

1. Maximum Air Velocity:

a) For 8 Inches W.G. Duct Pressure Class: 2500 feet per minute.
b) For 6 Inches W.G. Duct Pressure Class: 2500 feet per minute.
c) For 4 Inches W.G. Duct Pressure Class: 2000 feet per minute.
d) For 3 Inches W.G. Duct Pressure Class: 1800 feet per minute.
e) For 2 Inches W.G. Duct Pressure Class: 1500 feet per minute.
f) For 1 Inch W.G. Duct Pressure Class: 1500 feet per minute.
g) For 0.5 Inches W.G. Duct Pressure Class: 1000 feet per minute.

C. Smoke Control: Provide a system for firefighters to control smoke migration while fighting the fire.

D. Distribute heating water and cooling water to maintain the required space conditions.

E. Provide the elements necessary to control the building's indoor environment.

1. Provide a building control system which controls the indoor environment, manages energy consumption, schedules preventative maintenance, controls interior lighting, controls exterior lighting, integrates fire alarm and security functions, monitors fuel consumption, monitors water usage, and monitors packaged equipment controls.
2. Zoning and Space Temperature Control:

a) Dedicated terminal unit and thermostat for each corner space in the staff only occupied rooms.
b) Single thermostat and terminal unit for spaces with similar function, exposure, and location.

i) Zone interior spaces together, separate from exterior spaces.

c) Maximum Interior Zone Size - Cooling Mode: 700 square feet.
d) Maximum Interior Zone Size - Heating Mode: 700 square feet.
e) Maximum Exterior Zone Size - Cooling Mode: 300 square feet.
f) Maximum Exterior Zone Size - Cooling Mode: 300 square feet.
g) Zone each conference room, training room, meeting room, board room, and classroom, separately. Dedicate at least one terminal unit and thermostat to each zone.
h) Provide each computer or IT room with a dedicated comfort zone.

F. Provide monitoring and control of major pieces of HVAC equipment.

G. Monitor the following equipment:

1. Weather station
2. Air terminals.
3. Air handlers.

a) On-off status.
b) Entering air temperature.
c) Leaving air temperature.
d) Entering chilled water temperature.
e) Leaving chilled water temperature.
f) Entering heating water temperature.
g) Leaving heating water temperature.
h) Supply fan airflow.
i) Return fan airflow.
j) Exhaust fan airflow.
k) Outside airflow.
l) Filter static pressure.

4. Chillers.

a) On-off status.
b) Entering chilled water temperature.
c) Leaving chilled water temperature.
d) Percent of full load.
e) Chilled water flow.
f) Safety controls.

5. Boilers.

a) On-off status.
b) Entering heating hot water temperature.
c) Leaving heating hot water temperature.
d) Heating hot water flow.
e) Percent of full load.
f) Safety controls.

H. Control the following equipment:

1. Air terminals.
2. Air handlers.

a) Start-stop.
b) Entering air temperature.
c) Leaving air temperature.
d) Entering chilled water temperature.
e) Leaving chilled water temperature.
f) Entering heating water temperature.
g) Leaving heating water temperature.
h) Supply fan airflow.
i) Return fan airflow.
j) Exhaust fan airflow.
k) Outside airflow.
l) OA intakes
m) Filter static pressure.

3. Fan coil units.

I. Where HVAC elements also must function as elements defined within another element group, meet the requirements of both element groups.

J. Substantiation:

1. Proposal: Description of systems required, sources, input-side capacities, and means of distribution.
2. Preliminary Design: Estimated HVAC loads and design criteria; plans indicating occupancy types with special HVAC requirements shown.
3. Design Development: Design calculations; documents showing zoning, air handlers, air terminals, equipment locations, equipment sizes, and air distribution; sample manufacturer data showing capacity available.
4. Construction Documents: Complete system details.
5. Construction: Manufacturer's data showing performance, certified by independent testing agency.
6. Construction: Testing, adjusting, and balancing report indicating initial airflow, final airflow, initial temperature, and final temperature of each conditioned space. Measurement of parameters during summer when the outside air temperature is within 10 percent of the summer design conditions and during the winter when the outside air temperature is within 10 percent of the winter design conditions.
7. Construction: Report conforming to the requirements of AABC (NSTSB).
8. Construction and Closeout: Functional performance testing.

3.2 AMENITY AND COMFORT CRITERIA

A. Design Set Points:

1. Space Temperature Set Point: As follows:
2. Computer Room: 72 deg F, plus or minus 0.5 deg F.

B. Space Temperature Control: Coordination of air distribution system's design and installation with zoning and space temperature requirements.

1. Maintain winter effective temperature as defined by ASHRAE Std 55 between 68 degrees F and 72 degrees F.
2. Maintain summer effective temperature as defined by ASHRAE Std 55 between 72 degrees F and 75 degrees F.

C. Humidity Control:

1. Maintain relative humidity between 20 and 60 percent in habitable spaces.
2. Substantiation:

    a) Closeout: Measurement of temperature in each occupied space.

D. Air Movement:

1. Provide an air distribution system that limits the air velocity to 50 fpm, maximum.
2. Adjustments: Provide an air distribution system which allows relocating supply diffusers, adjusting direction of airflow from supply diffusers, adjusting dampers, and changing the thermostat set point.
3. Substantiation:

    a) Occupancy: Measure air movement at work station in accordance with ASHRAE Std 55 in areas where more than 10 percent of the occupants are uncomfortable and adjust air distribution system to make occupants comfortable.

E. Acoustical Performance:

1. Air Distribution Background Noise: Provide systems which comply with the acoustical requirements of Section C - Interiors Criteria and the following RC Levels as defined in ASHRAE HVAC Applications Handbook. Do not exceed the sound pressure level for any octave band at the specified RC.

a) Halls, Corridors, and Lobbies: 35-45, neutral.
b) Executive and Private Offices: 25-30, neutral.
c) Conference Rooms: 25-30, neutral.
d) Open Plan Offices: 30-35, neutral.
e) Classrooms: 40, maximum, neutral.
f) Libraries: 30-40, neutral.
g) Cells: 25 -35, neutral.
h) Dayrooms: 30 -40, neutral.
i) Substantiation:

i) Design Development: Equipment product data that predicts sound levels for anticipated use.
ii) Construction: Measurement, record, and report of sound pressure levels in each octave frequency band.

(a) Measurement of room sound levels at the occupants work station area.
(b) Measurement of room sound levels with ANSI/ASA S1.4 PART 3, Type 1 sound level meters.
(c) Calibration of meters and then measure room sound levels.
(d) Result Interpretation:

(1) Acceptable RC Levels: Measured sound pressure levels are below the specified dB levels for the given octave band.
(2) Remedial Action: Reduction of sound pressure levels which exceed specified dB levels for a given octave band.

2. Equipment: Provide equipment with sound ratings which comply with testing and rating requirements of AHRI 880 (I-P).

a) Substantiation:

i) Design Development: Equipment acoustical performance data.
ii) Construction: Tested and rated air terminals.

F. Indoor Air Quality: Provide sufficient ventilation to obtain acceptable indoor quality, determined using the Ventilation Rate Procedure of ASHRAE Std 62.1.

1. Substantiation:

a) Design Development: Engineering analysis.

G. Cleanliness:

1. Filter Efficiency: MERV 13, minimum, in accordance with ASHRAE Std 52.2.

3.3 HEALTH AND SAFETY CRITERIA

A. Life Safety: Provide interconnection and coordination of HVAC controls with other life safety systems.

B. Fire Sources:

1. Provide products which are rated for the specific locations where they are installed.
2. Provide distribution elements constructed from incombustible materials.

C. Fire Spread: Provide interlocks to prevent operation or start-up of air distribution elements when fire or smoke detection systems are in alarm condition.

D. Systems Safety:

1. Natural and LP Gas: Comply with ICC (IFGC).
    a) Natural Gas System Working Pressure: 5 psig, maximum.
2. Boiler Design: Design boilers to conform to construction standards of ASME BPVC-IV or ASME BPVC-I.
3. Chillers: Construct chiller pressure vessels to comply with ASME BPVC-VIII-1, including both coolers and condensers.
4. Air Coils: Provide air coils with pressure ratings of 450 psig and which exceed the pressure rating of the system in which they are installed.
5. Substantiation:
    a) Preliminary Design: Identification of each piece of equipment requiring fuel or operating under pressure.
    b) Design Development: Distribution system and equipment connections indicated on drawings.
    c) Construction: Functional performance testing; proper fuel supply, combustion, and venting.

E. Emergency Power: Provide emergency power in accordance with code plus the following equipment:
1. Air handler serving the computer room.
2. Smoke control system fans.

F. Electrical Shock Prevention:
1. Electrically Operated Equipment: Tested and listed by UL.
2. Provide a means of disconnecting power at each piece of equipment.

G. Smoke Control: Coordinate control of ventilation fans, supply fans, return fans, exhaust fans, and dampers with smoke control system.

H. Refrigerants:
1. Comply with the requirements of ASHRAE Std 15.
2. Substantiation:
    a) Construction: Measurement of refrigerant concentration in mechanical equipment rooms where refrigerants are located.

3.4 DURABILITY CRITERIA

A. Expected Service Life Span:
1. HVAC: Same as service life of building.

B. Underground Piping Corrosion Control: As recommended by the corrosion protection consultant retained by the design-built team.

C. Pipe Stress and Strain Control: Provide pipe loops, bends, expansion joints, and flexible pipe connectors to reduce stress and strain due to expansion and contraction.

3.5 OPERATION AND MAINTENANCE CRITERIA

A. HVAC Reliability:
1. Boilers: Provide multiple boilers to deliver design load capacity.
    a) For 2 Boilers: Size each at 60 percent of design load capacity. Provide each boiler with primary heating hot water pump.

2. Pumps: Provide (2) two secondary chilled water and (2) two secondary heating hot water pumps to deliver design flow requirements. Each pump shall be provided with VFD without manual bypass.

    a) For 2 Pumps: Size each at 100 percent of design flow. Provide stand by pump in the chilled water and heating hot water secondary loop.

3. Substantiation:

    a) Preliminary Design: Identification of design strategies to minimize HVAC disturbances.
    b) Design Documents: Identification of equipment that requires redundancy.
    c) Construction: Functional performance testing.
    d) Occupancy:

        i) If equipment is damaged or malfunctions within one year after completion, reporting of the cause of equipment damage or malfunctions.
        ii) Corrective Action: Provide corrective measures necessary to eliminate equipment damage and malfunctions.
        iii) Corrective Action Report: Identification of corrective measures implemented to protect HVAC equipment. Verify that HVAC equipment is operating properly and without damage.

B. Ease of Use:

1. Design access to and working clearances around heating equipment as recommended by the manufacturer.
2. Air Distribution: In all areas inaccessible for inmates, provide room thermostats, which will be adjustable by the staff.

C. Ease of Service:

1. Provide shut-off valves as required by code.
2. Air Distribution: Provide units which are modular in design.
3. Hydronic Distribution: Provide manholes and valves at branch take-off to each area of the building and all equipment rooms.

D. Ease of Cleaning:

1. Equipment: Provide units with removable access panels to allow cleaning.

E. Allowance for Change and Expansion: Provide a building control system which is expandable to meet future needs.

1. Interchangeability of Parts: Allow for new devices made by a different manufacturer than the original installation.
2. Spare Capacity: Provide sensors and points required to perform as specified and add 20 points more than required.

F. Owner Personnel Training:

1. Operational: Minimum of 8 hours, for 2 persons, for each separate system.
2. Maintenance: Minimum of 8 hours, for 2 persons, for each separate system.

3.6 COMMISSIONING SUBMITTALS

A. Informational Submittals

1. Certificates of readiness.
2. Certificates of completion of installation, prestart, and startup activities.

3.7 CONTRACTOR'S RESPONSIBILITIES

A. Perform commissioning tests at the direction of the CxA.

B. Attend construction phase controls coordination meeting.

C. Attend testing, adjusting, and balancing review and coordination meeting.

D. Participate in HVAC&R systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.

E. Provide information requested by the CxA for final commissioning documentation.

F. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

3.8 CXA'S RESPONSIBILITIES

A. Provide Project-specific construction checklists and commissioning process test procedures for actual HVAC&R systems, assemblies, equipment, and components to be furnished and installed as part of the construction contract.

B. Direct commissioning testing.

C. Verify testing, adjusting, and balancing of Work are complete.

D. Provide test data, inspection reports, and certificates in Systems Manual.

3.9 COMMISSIONING DOCUMENTATION

A. Provide the following information to the CxA for inclusion in the commissioning plan:

1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
3. Process and schedule for completing construction checklists and manufacturer's prestart and startup checklists for HVAC&R systems, assemblies, equipment, and components to be verified and tested.
4. Certificate of completion certifying that installation, prestart checks, and startup procedures have been completed.
5. Certificate of readiness certifying that HVAC&R systems, subsystems, equipment, and associated controls are ready for testing.
6. Test and inspection reports and certificates.
7. Corrective action documents.
8. Verification of testing, adjusting, and balancing reports.

3.10 TESTING PREPARATION

A. Certify that HVAC&R systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.

B. Certify that HVAC&R instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.

C. Certify that testing, adjusting, and balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, and corrective work approved.

D. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).

E. Inspect and verify the position of each device and interlock identified on checklists.

F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.

G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.11 TESTING AND BALANCING VERIFICATION

A. Prior to performance of testing and balancing Work, provide copies of reports, sample forms, checklists, and certificates to the CxA.

B. Notify the CxA at least 10 days in advance of testing and balancing Work, and provide access for the CxA to witness testing and balancing Work.

C. Provide technicians, instrumentation, and tools to verify testing and balancing of HVAC&R systems at the direction of the CxA.

D. The CxA will notify testing and balancing Contractor 10 days in advance of the date of field verification. Notice will not include data points to be verified.

E. The testing and balancing Contractor shall use the same instruments (by model and serial number) that were used when original data were collected.

F. Failure of an item includes, other than sound, a deviation of more than 10 percent. Failure of more than 10 percent of selected items shall result in rejection of final testing, adjusting, and balancing report. For sound pressure readings, a deviation of 3 dB shall result in rejection of final testing. Variations in background noise must be considered.

G. Remedy the deficiency and notify the CxA so verification of failed portions can be performed.

3.12 GENERAL TESTING REQUIREMENTS

A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.

B. Scope of HVAC&R testing shall include entire HVAC&R installation, from central equipment for heat generation and refrigeration through distribution systems to each conditioned space. Testing shall include measuring capacities and effectiveness of operational and control functions.

C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

D. The CxA along with the HVAC&R Contractor, testing and balancing Contractor, and HVAC&R Instrumentation and Control Contractor shall prepare detailed testing plans, procedures, and checklists for HVAC&R systems, subsystems, and equipment.

E. Tests will be performed using design conditions whenever possible.

F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.

G. The CxA may direct that set points be altered when simulating conditions is not practical.

H. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.

I. If tests cannot be completed because of a deficiency outside the scope of the HVAC&R system, document the deficiency and report it to the Owner. After deficiencies are resolved, reschedule tests.

J. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

K. HVAC&R systems, subsystems, and equipment Testing Procedures

1. Boiler Testing and Acceptance Procedures: Testing requirements are specified in HVAC boiler Sections. Provide submittals, test data, inspector record, and boiler certification to the CxA.
2. HVAC&R Instrumentation and Control System Testing: Field testing plans and testing requirements are as specified in AABC Manual. Assist the CxA with preparation of testing plans.
3. Pipe system cleaning, flushing, hydrostatic tests, and chemical treatment requirements are specified in HVAC piping Sections. HVAC&R Contractor shall prepare a pipe system cleaning, flushing, and hydrostatic testing plan. Provide cleaning, flushing, testing, and treating plan and final reports to the CxA. Plan shall include the following:

    a) Sequence of testing and testing procedures for each section of pipe to be tested, identified by pipe zone or sector identification marker. Markers shall be keyed to Drawings for each pipe sector, showing the physical location of each designated pipe test section. Drawings keyed to pipe zones or sectors shall be formatted to allow each section of piping to be physically located and identified when referred to in pipe system cleaning, flushing, hydrostatic testing, and chemical treatment plan.
    b) Description of equipment for flushing operations.
    c) Minimum flushing water velocity.
    d) Tracking checklist for managing and ensuring that all pipe sections have been cleaned, flushed, hydrostatically tested, and chemically treated.

4. Energy Supply System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of oil, gas, steam and hot-water systems and equipment at the direction of the CxA. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.
5. Refrigeration System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of chillers, cooling towers, refrigerant compressors and condensers, heat pumps, and other refrigeration systems. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.
6. HVAC&R Distribution System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of air, steam, and hydronic distribution systems; special exhaust; and other distribution systems, including HVAC&R terminal equipment and unitary equipment.

7. Vibration and Sound Tests: Provide technicians, instrumentation, tools, and equipment to test performance of vibration isolation and seismic controls.

END OF SECTION D30

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SECTION D41 - SPRINKLERS

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes design criteria for Automatic Fire Sprinkler Systems.

PART 2 – PRODUCTS

2.1 PIPE:

A. The construction shall use the following:

1. Steel pipe with grooved joints with seals and couplings.

2.2 FITTINGS:

A. The construction shall use one or more of the following:

1. Materials permitted by code.
2. Steel.
3. Cast iron.

B. The construction shall use one or more of the following:

1. Wet pipe sprinkler system.
2. Fixed wet chemical extinguishing systems.
3. Standpipe and hose system.
4. Fire detection and alarm system.

2.3 METHODS OF CONSTRUCTION

A. The following existing fire protection element shall be preserved:

1. Existing on site fire hydrants and Fire Department Connections except those specifically indicated to be removed or relocated.

PART 3 – DESIGN CRITERA

3.1 BASIC FUNCTION:

A. The construction shall provide a wet pipe fire sprinkler system for new building areas.

1. Fire protection comprises the following elements:

a) Fire Sprinkler and Extinguishing Systems: Elements which automatically extinguish fires.
b) Standpipe and Hose Systems: Elements that deliver adequate supplies of water to locations in the building for manual fire-fighting.

2. Spaces and Areas with Fire Sprinklers:

a) System Type: Wet pipe.
b) General Use:

i) Occupancy: Light Hazard.
ii) Density/Area: 0.10 gpm per sq ft over 1500sq ft.

c) Electrical Equipment Rooms:

i) Occupancy: Ordinary Hazard, Group 1.

ii) Density/Area: 0.15 gpm per sq ft over 1500sq ft.

d) General Storage Areas

i) System Type: Wet pipe.
ii) Occupancy: Ordinary Hazard, Group 2.
iii) Density/Area: 0.20 gpm per sq ft over 1500sq ft.

3. The construction shall provide code-required coverage if the coverage specified above is less than required by code.
4. Fire Sprinklers: Design and construction in accordance with code and NFPA 13 (latest edition).
5. Wet-Chemical Extinguishing Systems: Design and construction in accordance with code and NFPA 17 (latest edition).
6. Water Use:

a) The construction shall provide a permanent water supply for standpipes as required by code.
b) The construction shall provide a water supply to sprinkler systems that is sufficient to extinguish fires inside the structure.

3.2 AMENITY AND COMFORT:

A. Accessibility:

1. The construction shall provide fire department connections as required by code and per NFPA 13 (latest edition).
2. The construction shall provide a hose cabinet at the end of each corridor; at intervals of 100 feet as required by code.
3. Provide clearances around system components for service and use.

B. Appearance:

1. All Inmate holding, inmate sleeping space, and inmate accessible: Institutional head except at ceilings above 12 feet above finish floor where fully concealed sprinklers may be used.
2. All Staff Spaces: Semi recessed.

a) The construction shall provide fire hose cabinets with solid metal door panel and glass window in the door; and space for a manual, dry-chemical fire extinguisher.
b) The construction shall provide valves with brass finish.
c) The construction shall provide fire department connections with brass finish.

C. Convenience: The construction shall provide fire department connections for each standpipe as required by code and on the exterior of the building; near curb.

1. Leakage: Provide systems that are leak-free.

D. Sound: Provide audible alarm system to signal building occupants of fire hazard.

1. Convenience: Provide an automatic system to signal building occupants of fire and fight the fire.

E. Hazards: The construction shall provide systems which minimize risk of injury and damage to property.

1. Substantiation:

a) Preliminary Design: Fire protection areas identified.

b) Design Development: Fire protection zones indicated on the drawings with riser locations identified.
c) Construction: Functional performance testing in accordance with code.

3.3 HEALTH AND SAFETY:

A. Nozzle Performance: As required by code and NFPA 17 (latest edition).

B. Sprinkler Head Performance: As required by code and NFPA 13 (latest edition).

C. Water Demand Requirements:

1. Determine minimum water supply requirements for each sprinkler system using the hydraulic calculation method defined by NFPA 13 (latest edition).
2. Substantiation:

a) Preliminary Design: Identification of water source.
b) Design Development: Water supply for sprinkler systems shown on the drawings.
c) Construction: Tests of each sprinkler system in accordance with the requirements of the design standard.

D. Water Source: Provide water from an existing water piping system serving the facility.

E. Path of Egress: Provide systems which safeguard path of egress.

F. Fire Source: Provide system materials which do not contribute to the spread of the fire; which do not burn or release smoke when in direct contact with the fire.

G. Fire Spread: Provide systems to limit spread of fire from storage area to office area; which control spread of fire throughout facility.

H. Chemical Exposure or Use: Provide systems which limit exposure of occupants to extinguishing agents.

3.4 STRUCTURAL:

A. Seismic Design:

1. The construction shall provide a sprinkler system which allows movement where differential movement is anticipated; with clearances around piping at walls and floors; with valves to stop flow in case of rupture due to a seismic event.
2. The construction shall provide sprinkler system supports capable of supporting four times its installed wet weight.

3.5 DURABILITY:

A. Expected Service Life Span: Provide a sprinkler system which shall be viable for the life of building when maintained as specified in NFPA 25 (latest edition).

B. Substantiation:

1. Preliminary Design: Identification of the system type to be installed.
2. Design Development: Identification of a similar system in use in an existing facility for 25 years and consisting of components from the same manufacturers.

C. Corrosion Resistance: The construction shall use corrosion resistant materials; ferrous metal is not considered corrosion resistant unless it is hot dipped galvanized, chrome plated, or coated with rust inhibitive paint.

D. Vandalism: The construction shall provide systems which are tamper-resistant.

3.6 OPERATION AND MAINTENANCE:

A. Provide sprinkler system maintenance in accordance with NFPA 25 (latest edition).

B. Spare Sprinkler Heads: Provide additional sprinkler heads as required by code to service the system.

C. Ease of Use: The construction shall provide easy access to and working clearances around system components.

D. Unauthorized Use: Provide systems which minimize activation and use by unauthorized persons.

E. Substantiation:

1. Preliminary Design: System layout indicating operator interface locations.
2. Design Development: System equipment locations indicated on the drawings and manufacturer's product data indicating products to be used.

END OF SECTION D41

SECTION D43 - FIRE PROTECTION SPECIALTIES

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes fire extinguishers and cabinets.

PART 2 – PRODUCTS

A. Basis of Design and Quality: Potter Roemer 1500 Series. Subject to compliance with requirements, provide the indicated product, a comparable product by one of the following, or equal approved as a substitution:

1. Fire Extinguishers:

   a) J. L. Industries, div. Activar Construction Products Group.
   b) Larsen's Manufacturing Co.
   c) Potter Roemer, Inc.

2. Fire Protection Cabinets:

   a) J. L. Industries, div. Activar Construction Products Group.
   b) Larsen's Manufacturing Co.
   c) Potter Roemer, Inc.

B. Portable Fire Extinguishers: Provide fire extinguishers in locations indicated or where required by regulations, complying with requirements of governing authorities. Fill and service extinguishers to comply with requirements of governing authorities and manufacturer.

1. Multipurpose Dry Chemical Type: UL rated 2A:10:B:C, 5 lb. nominal capacity, in enameled steel container.
2. Multipurpose Dry Chemical Type: UL rated 4A:60 B:C, 10 lb. nominal capacity, in enameled steel container.
3. Allow minimum of 1 fire extinguisher for each 3,000 square feet or 1 fire extinguisher every 75 feet in the line of travel to comply with CBC fire protection safety requirements and City of Stockton Fire Department approval. Location of fire extinguishers is intended to provide maximum accessibility in the event of a fire.

C. Fire Protection Cabinets: Standard cabinets designed to hold up to 20 lb. of dry chemical extinguisher, or to hold fire hose, valve, rack, and 20 lb. extinguisher. Coordinate cabinet dimensions with size of contents.

1. Cabinet Construction: Provide steel box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style specified. Weld joints and grind smooth. Miter and weld perimeter door frames. The door of each cabinet shall include a wired-glass view panel.

   a) Fire Rated Cabinets: Listed and labeled to meet requirements of ASTM E814 for fire resistance rating of wall where it is installed.

      i) Construct with double walls fabricated from 0.0329-inch-thick (aka 20 gauge) cold rolled steel sheet lined with minimum 5/8 inch thick, fire barrier material. Fabricate door frame of 0.0428 inch thick (aka 18 gauge) steel.
      ii) Provide factory drilled mounting holes.

   b) Cabinet Metal:

i) Interior Locations: Enameled steel sheet.
ii) Exterior Locations: Stainless steel sheet, No. 304.

c) Shelf: Same metal and finish as cabinet.

2. Cabinet Types:

a) Fire extinguisher.
b) Fire hose, rack, valve, and extinguisher.

3. Cabinet Mounting: Suitable for the following mounting conditions:

a) Surface: Cabinet box surface mounted on walls to suit style of trim indicated.
b) Semi-recessed: Cabinet box partially recessed in walls of shallow depth to suit style of trim indicated.
c) Recessed.

4. Cabinet Trim Style: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

a) Trimless: Surface of surrounding wall finishes flush with exterior finished surface of cabinet frame and door, without overlapping trim attached to cabinet.
b) Provide recessed flange, of same material as box, attached to box to act as plaster stop.
c) Cabinet Trim Material: Steel sheet.

5. Door Material: Steel sheet.
6. Door Style: Flush opaque panel, frameless, with no exposed hinges.
7. Door Construction: Fabricate doors according to manufacturer's standards of materials indicated, and coordinated with cabinet types and trim styles selected.

a) Provide minimum 1/2-inch-thick door frames, fabricated with tubular stiles and rails, and hollow metal design.
b) Exterior Cabinets: With factory-installed weather-stripping.

8. Door Hardware: Provide door operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam action latch, or exposed or concealed door pull and friction latch. Provide concealed or continuous type hinge permitting door to open 180 degrees.

D. Brackets: Designed to prevent accidentally dislodging extinguisher, of sizes required for type and capacity of extinguisher indicated, in plated finish.

1. Provide brackets for extinguishers not located in cabinets and for those located in cabinets.

E. Identification: Identify bracket mounted extinguishers with "FIRE EXTINGUISHER" in red letter decals applied to wall surface. Use letter size, style, and location as selected by Engineer.

F. Comply with NAAMM's Metal Finishes Manual for Architectural and Metal Products for recommendations for applying and designating finishes.

G. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

H. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within range of approved samples and are assembled or installed to minimize contrast.

I. Cabinet and Door Finishes: Stainless steel No. 4 finish.

PART 3 - DESIGN CRITERIA

3.1 BASIC FUNCTION:

A. Provide fire protection specialties to protect life and property; the building and its occupants in all new building areas.

B. System Class and Type to meet codes and requirements of the Fire Department having jurisdiction.

C. Fire protection specialties shall include portable fire extinguishers, Fire protection cabinets for portable fire extinguishers, fire hose valves, fire hoses, and racks, and accessories required for a complete installation.

D. Where standpipe and hose system elements also must function as elements defined within another element group, the construction shall meet the requirements of both element groups.

3.2 AMENITY AND COMFORT:

A. Accessibility:

1. Provide fire extinguisher cabinets and accessories as required by code and the local Fire Department Having Jurisdiction.
2. Provide clearances around system components for service and use.
3. Hazards: The construction shall provide systems which minimize risk of injury and damage to property and people.

B. Convenience: The construction shall provide fire department connections for each standpipe as required by code on the exterior of the building; near curb.

C. Substantiation:

1. Preliminary Design: Fire protection areas identified.
2. Design Development: Fire protection zones indicated on the drawings hose cabinet locations identified.
3. Construction: Functional performance testing in accordance with code.

3.3 HEALTH AND SAFETY:

A. Path of Egress: Provide systems which safeguard path of egress.

B. Fire Source: Provide system materials which do not contribute to the spread of the fire; which do not burn or release smoke when in direct contact with the fire.

C. Fire Spread: The construction shall provide fire extinguishing cabinet system to assist firefighters in preventing the spread of fire.

1. Substantiation:

a) Preliminary Design: Identification of locations of each cabinet.
b) Construction: Tests of each extinguishing cabinet.

2. Water Source: The construction shall provide water supply as required by NFPA 14 (latest edition).

a) Substantiation:

i) Preliminary Design: Identification of water source.

D. Structural:

1. Seismic Design: Cabinets shall be seismically supported and anchored.

E. Durability:

1. Ease of Use: The construction shall provide easy access to and working clearances around system components.
2. Unauthorized Use: Provide systems which minimize activation and use by unauthorized persons.

F. Operation and Maintenance:

1. The construction shall provide cabinets and hose system maintenance in accordance with NFPA 25 (latest edition).
2. Unauthorized Use: Provide systems which minimize activation and use by unauthorized persons.

G. Substantiation:

1. Preliminary Design: System layout indicating operator interface locations.

END OF SECTION D4030

SECTION D5010 – ELECTRICAL SERVICE AND DISTRIBUTION

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes design criteria for electrical service and distribution.

PART 2 – PRODUCTS

2.1 PRIMARY FEEDERS

A. Conduits:

1. Below Grade: Schedule 40 PVC conduit.
2. Exterior, Exposed: GRS conduit.

2.2 SECONDARY SERVICE AND DISTRIBUTION FEEDERS

2.3 CONDUITS

A. Use; one of the following:

1. Below Grade: Schedule 80 PVC conduit.
2. Exterior, Exposed: GRS conduit.
3. Interior, Exposed: Only allowed in Electrical Room or Telecom Room; use GRS.
4. Interior, Concealed: GRS conduit or EMT.
5. Flexible conduit allowed for motor and transformer connections, and for lighting whips (sealtite for exterior and standard for interior).

B. Conductors:

1. Use copper conductors.
2. MC cable is not allowed.

2.4 BUILDING SERVICE EQUIPMENT

A. Types of Equipment:

1. Building Switchboard
2. Distribution Boards.
3. Distribution panels.
4. Load Centers.

B. Main Devices: Use molded case circuit breakers. LSIG.

C. Branch Devices: Use Circuit breakers.

D. Busbars: Use Copper.

2.5 BRANCH CIRCUIT PANELBOARDS:

A. Bus bars: Use Copper.

B. Circuit Breakers: Use Molded case circuit breakers.

PART 3 – DESIGN CRITERA

3.1 BASIC FUNCTION

A. Service and Distribution--After determining the electrical load requirements for the new building, provide a distribution system from the new 480-volt, three phase PG&E transformer. The new building service feeder shall be underground. Provide step down transformers as necessary, and provide electric power for all equipment circuits, lighting circuits, receptacle circuits, low voltage systems, and electrical control systems that must operate in the building.

B. Main Electrical Equipment Location—Building Service Switchboard, distribution boards, distribution transformers, and some panelboards shall be located in close proximity in the main electrical room for ease of installation and to provide a centralized location for the main electrical distribution system equipment for ease of operation and future maintenance.

C. Panelboard Location--Panelboards shall be located in electrical rooms.

D. Load Centers – Load Centers shall be located in electrical rooms or Tel/Data/Security rooms.

E. Compliance—Service and Distribution system installation shall be designed in accordance with CEC requirements and installed in accordance with ANSI/NECA installation standards.

3.2 AMENITY AND COMFORT

A. Sound and Noise:

1. Do not locate transformers near sound sensitive areas.
2. Provide transformers with noise generation less than the sound levels listed in IEEE Standard 241, latest edition.
3. Provide generator with acoustically rated enclosure.

B. Appearance:

1. Outside the building—all outdoor conduit and wiring between buildings, pad mount transformers, and equipment must be concealed or buried.
2. Do not locate switchboards; transformers; distribution boards, panelboards, or load centers in corridors, hallways, or public spaces.
3. Conceal electrical conduit in walls and behind ceilings in occupied spaces.

3.3 HEALTH AND SAFETY

A. Protection from Breakage--Locate service and distribution equipment in electrical rooms.

B. Protection from Intrusion--Protect electrical distribution equipment from unauthorized access and vandalism.

3.4 STRUCTURAL

A. Seismic Design--Provide service and distribution elements with flexible joints where differential movement is anticipated.

3.5 DURABILITY

A. Impact Resistance—The equipment designed and installed shall have heavy gage metal housing or industrial grade enclosures.

B. Environmental Protection—Indoor equipment shall have NEMA 1 housing and outdoor equipment shall have NEMA 3R housing.

C. Dry type transformer Insulation shall be rated 115-degree C.

3.6 OPERATION AND MAINTENANCE

A. Capacity:

1. Building Switchboard—Shall be sized to power all building loads plus minimum 25% spare capacity.
2. Interior Distribution Transformer—Shall be sized to power all building 208 volt and 120 volt loads plus minimum 20 percent spare capacity.
3. Branch Circuit Panelboards and Distribution Boards—Shall be sized in accordance with CEC requirements to power all related building loads plus minimum 20 percent spare capacity.
4. Substantiation:

    a) Proposal: Identification of building service voltages, service ampere rating, and major equipment.
    b) Design Development: Provide Single-line diagram showing transformer, feeder and equipment sizes, interrupting ratings, and size circuit breaker protective devices.
    c) Design Development: Confirm required electrical equipment and electrical room sizes, with clearances in accordance with CEC requirements and functionally suitable for operation and maintenance.
    d) Construction Documents: Single Line diagram and calculations.
    e) Construction: Documentation of Equipment characteristics and ratings, and overall installation test reports.
    f) Closeout: For each panelboard, balance current on each phase conductor within 10 percent.

5. Transformer Applications:

    a) Distribution Transformers: Use general purpose; dry-type transformers.

3.7 EASE OF MAINTENANCE AND REPAIR

A. Select electrical equipment which is segmented into modules or standard components, wherever possible and applicable, to ease replacement of failed components.

B. Wherever equipment is located in cabinets or enclosures, provide doors or removable panels sized to allow easy removal and replacement.

C. Power Consumption and Efficiency:

1. The design and installation shall comply with the requirements of IEEE Standard 739.
2. The design will comply with requirements of ASHRAE 90.1.

END OF SECTION D5010

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SECTION D5020 - BRANCH WIRING

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes design criteria for branch wiring.

PART 2 – PRODUCTS

2.1 BRANCH CIRCUIT WIRING

A. Branch circuit wiring shall be Copper conductors type THHN/THWN thermoplastic insulation.

2.2 RECEPTACLE COVER PLATES

A. Use cover plates that are plastic, off-white material.

2.3 METHODS OF CONSTRUCTION

A. Branch circuit wiring and installation shall be in accordance with ANSI/NECA Installation standards.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Power: Provide adequate electrical power to all building equipment, lighting and power outlets from panelboards and load centers through a safe and efficient distribution system.

B. Ensure that the distribution system delivers power to the locations where it is needed for lighting, wiring devices, equipment, and appliances, based on the project facilities program, and Criteria Documents (plans and narratives), designed and constructed in accordance with applicable codes and standards, as follows:

C. Branch circuits comprise the following elements:

1. Branch circuit breakers.
2. Conductors and cable from panel boards to fixtures, wiring devices, and mechanical equipment.
3. Raceways and boxes.
4. Wiring devices, including, but not limited to, receptacles and plates, wall switches, wall dimmers, remote control switching devices, wall plates, etc.
5. Where branch circuits are integral with equipment systems defined by another discipline, the installation will meet the operational requirements of the other discipline in addition to the electrical code and installation requirements.
6. In addition to the requirements of this section, the design and construction will comply with all applicable requirements of Section D5010 — Service and Distribution, and the facility program.

D. Amenity and Comfort:

1. Accessibility: The design and construction will comply with ADA Accessibility Guidelines including the following locations: Where ADA accessibility is required, mount devices no higher than 54 inches or 48 inches, as applicable, and not less than 15 inches, above the finished floor.

2. Convenience: Provide interior convenience receptacles at intervals no greater than 10 feet along the base of all wall areas unless stated otherwise.

3.2 HEALTH AND SAFETY:

A. Tested Materials:

1. Provide branch circuit panelboards, devices, installation materials, boxes, wireways, wiring and plates in compliance with code with UL listing or labeled, and are ULC listed or labeled or are WH listed or labeled, where applicable.
2. Provide equipment and installation materials that have their flame spread and smoke developed ratings printed on them.

3.3 OPERATIONS AND MAINTENANCE:

1. Capacity: Provide branch circuit wiring with sufficient capacity to accommodate future growth and renovation without major rewiring.

   a. All Circuits including lighting circuits, receptacle circuits, appliance circuits, and equipment circuits shall limit design loads to 75 percent of capacity permitted by code.

END OF SECTION D5020

SECTION D5021 - ARTIFICIAL LIGHTING

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes design criteria for artificial lighting.

PART 2 – PRODUCTS

2.1 FIXTURES

A. Utilize energy efficient fixtures with LED type lamps with a lighting control system for optimum energy efficiency and Title 24 requirement compliance.

2.2 METHODS OF CONSTRUCTION

A. Outdoor lighting shall cutoff at property line and interior lighting shall cutoff at windows and walls.

PART 3 PERFORMANCE

3.1 BASIC FUNCTION:

A. Provide artificial means of lighting the building interior and exterior areas around the building.

B. Artificial lighting comprises the following elements:

1. Interior Lighting: General room lighting, emergency lighting, and accent lighting.
2. Exterior Area Lighting: General lighting of exterior spaces including walkways, building perimeter, parking areas, and entrance areas.

C. Lighting will be designed in accordance with IESNA recommendations and the Electrical Systems Design Guidelines.

D. Portable lamps (not permanently attached to the building or other building furnishings) may not be used to accomplish required artificial lighting.

E. Where artificial lighting also functions to facilitate another discipline's work, the lighting design will also satisfy the operational requirements of that discipline in addition to the general lighting requirements, Title 24 and CEC code requirements.

3.2 AMENITY AND COMFORT:

A. Light Levels: As specified in the Electrical Systems Narratives and IESNA Recommendations.

B. Light Quality: Provide luminous environment in each space that is designed to complement the functions and the character of the space.

1. Distribution: In keeping with geometry of space and location of visual tasks.
2. Visual Comfort: Provide lighting systems with the Visual Comfort Probability (VCP) of not less than 80.
3. Color of Light: Appropriate for functions accommodated in space and characteristics of interior finishes.
4. Character of Fixtures: Coordinated with architecture and other building systems and appropriate to finish level.

3.3 HEALTH AND SAFETY:

A. Electrical Hazards: Design in accordance with requirements of all NFPA standards that apply to the occupancy, application, and design.

B. Emergency Systems: Provide backup lighting for egress and exiting during periods of normal power interruption as required by code.

3.4 DURABILITY:

A. Moisture Resistance: Outdoor lighting shall be specified and installed suitable for outdoor environment. Any shower lighting shall be designed for wet location application.

B. Impact Resistance: Sports lighting fixtures shall be designed to withstand high impact service using high impact fixtures and/or protective guards.

C. Fixtures shall be designed to be tamperproof.

3.5 OPERATION AND MAINTENANCE:

A. Capacity: Design the lighting system to deliver required illumination while operating within intended energy efficiency ratings.

B. Power Consumption and Efficiency:

1. Comply with requirements for energy efficient lighting fixtures and control systems to meet Title 24 requirements.
2. Allowance for Change and Expansion: Provide spare capacity in power distribution system for lighting for a minimum 20%.

END OF SECTION D5021

SECTION D5022 - INTERIOR LIGHTING

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes design criteria for interior lighting.

PART 2 – PRODUCTS

2.1 LIGHT FIXTURES

A. Fixtures furnished shall be products of Manufacturers with 10 years minimum history in the industry.

PART 3 DESIGN RITERIA

3.1 BASIC FUNCTION

A. Provide artificial lighting for all interior spaces that is adequate in quality and distribution for the performance of tasks typical for the type of space and the characteristics of the intended population, regardless of the availability of natural light.

B. Interior lighting comprises the following elements:

1. Luminaires for general illumination.
2. Accent lighting.
3. Built-in task lighting.
4. Emergency lighting.
5. Illuminated exit signs.

C. Where artificial lighting also functions to facilitate another discipline's work, the lighting design will also satisfy the operational requirements of that discipline in addition to the general lighting requirements, Title 24 and CEC code requirements.

D. In addition to the requirements of this section, comply with all applicable requirements of Section D5021 - Artificial Lighting.

3.2 AMENITY AND COMFORT:

A. Accessibility: Comply with ADA Accessibility Guidelines.; or ADA Accessibility Guidelines and the following:

1. Extent: Provide accessible lighting controls for all spaces, regardless of location.
2. Location: Where accessible lighting controls are required, provide devices that are mounted so they can be reached from a wheelchair and are not more than 48 inches and not less than 15 inches from the floor.
3. Operating Force: Where accessible lighting controls are required, provide controls that can be operated without tight grasping or pinching and by a force of not more than 5 lbf.

B. Light Levels: Provide maintained average illumination values for all spaces that are based on the primary visual tasks to be accommodated and are not less than those values stated in the Electrical Systems Design Guidelines and Requirements.

1. Task Lighting: In spaces where local task lighting is used to achieve maintained luminance levels, maintain balance with ambient illumination such that general lighting for space provides not less than 25 percent of local lighting level.

1. Substantiation:
   a. Construction Documents: Calculations of illumination levels for representative spaces prepared by a registered electrical engineer.
   b. Construction: Measurements of illumination levels for representative spaces throughout the project, with a report setting forth results after correcting for maintenance factors keyed to luminaire design and lamp types.

C. Light Quality:
1. Spatial Luminance: Provide luminous environments throughout project in which appropriate brightness ratios are maintained.
   a. Color: Provide light sources throughout project with a Color Rendering Index (CRI) of not less than 80.
2. Substantiation:
   c. Construction Documents: Calculations for representative spaces prepared by a registered electrical engineer.
   d. Construction: Measurements of quality of light for representative spaces throughout the project.

3.3 HEALTH AND SAFETY:

A. Emergency Lighting: Provide emergency lighting that complies with code. In addition to signs and means of egress lighting, provide emergency illumination of not less than 1 fc for a minimum of 1.5 hour in primary spaces

B. Fire-Resistant Construction: Provide lighting elements throughout the project that are made of incombustible materials in compliance with code and that are UL listed or labeled, with flame spread and smoke developed ratings printed on product.

3.4 OPERATION AND MAINTENANCE:

A. Power Consumption and Efficiency: Comply with requirements of Section D5021 - Artificial Lighting and the following:
1. Lighting Controls: Provide level of control of lighting appropriate to type of space and Title 24 requirements for energy conservation utilizing a microprocessor based lighting control system.
2. Day lighting Controls: Provide separate lighting circuits for spaces or zones adjacent to fenestration.
3. Occupancy Controls: Provide lighting circuits for private offices, conference rooms; and training that are controlled by devices that do not require action by occupants.
4. Light Sources: Provide lamps with average lamp efficacy in accordance with Energy Policy Act
5. Ballasts: Provide energy efficient electronic ballasts with fluorescent lamps.

B. Ease of Maintenance: Provide luminaires that do not collect dirt rapidly and are readily cleanable.

END OF SECTION D5022

SECTION D5023 - EXTERIOR AREA LIGHTING

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Design Criteria for Exterior Area Lighting.

PART 2 – PRODUCTS

2.1 LIGHT FIXTURES

A. Luminaires: Use direct lighting units.

B. Lamps: Use LED lamps.

C. Lighting Poles: Use Galvanized steel poles.

2.2 METHODS OF CONSTRUCTION

A. Exterior lighting systems shall be installed in accordance with ANSI/NECA Lighting Installation standards.

PART 3 - DESIGN CRITERIA

3.1 BASIC FUNCTION:

A. Provide artificial lighting for exterior spaces, as required by the project program that is adequate in quantity, quality, and distribution for the performance of tasks typical for the type of outdoor space and the characteristics of the intended user population.

B. Exterior area lighting comprises the following elements: Exterior luminaires, poles, standards, or other means of mounting the luminaires, power supply, and controls.

C. Where exterior area lighting is integral with elements defined within another element group, the construction will meet the requirements of both element groups.

D. In addition to the requirements of this section, the construction will comply with all applicable requirements of Section G5021 - Artificial Lighting.

3.2 AMENITY AND COMFORT:

A. Light Levels: Provide maintained average illuminance values for exterior spaces that are based on the primary visual tasks to be accommodated and are not less than those in the Electrical Systems Design Guidelines.

1. Substantiation:

a. Construction Documents: Calculations of illumination levels and uniformity ratios for representative exterior areas, prepared by a registered electrical engineer.

b. Construction: Measurements of illumination levels and uniformity ratios for representative exterior areas, with a report setting forth results after correcting for maintenance factors keyed to luminaire design and lamp types.

B. Light Quality:

1. Glare Minimization: Provide exterior area lighting that minimizes the incidence of discomfort glare and avoids disability glare under all normal conditions of use, in accordance with IESNA recommendations.
    a. Color: Provide light sources throughout project that render automobile colors and human coloring with reasonable accuracy.
    b. Color: Provide light sources throughout project with Color Rendering Index (CRI) of not less than 80.
2. Substantiation:
    a. Construction: Measurement of actual installation in accordance with procedures referenced in ANSI/IESNA.

3.3 APPEARANCE OF LIGHTING INSTALLATION:

A. Provide exterior area lighting that is compatible with overall project appearance and coordinated with site layout and building organization.
    1. Luminaire Mounting:
        a. Installation on poles, wall mounting brackets, pendants, architectural fixtures, etc.
        b. Maximum mounting height of 25 ft. on poles
        c. Style compatible with building design.
        d. Material and finish compatible with exterior building elements.
    2. Luminaire Design:
        a. Light distribution by direct methods.
        b. Optical control by reflectors or refractors. Material and finish of housing to be compatible with mounting.

B. Lighting Cutoff:
    1. Configure exterior area lighting to avoid spill light on adjacent property and streets.
    2. Configure exterior area lighting to minimize illumination of building facade and building windows.

3.4 STRUCTURE:

A. Provide mounting system for exterior area lighting that is capable of withstanding 3-second wind gusts in excess of 115mph.

B. Substantiation
    1. Construction Documents: Manufacturer's standard strength data, as published in product literature.
    2. Construction Documents: Strength calculations for representative installations to be prepared by a registered structural engineer.

3.5 DURABILITY:

A. Expected Service Life Span: Provide a system which will last a minimum of 15 years in service without major repairs and will be viable for the life of building.

B. Vandal Resistance:
    1. Parts not easily removed without the use of special tools.
    2. Luminaires mounted at minimum height of 10 ft. above grade.
    3. Lenses to be made of tempered glass; high impact acrylic; polyacrylate; or polycarbonate.

e. Metal gratings for protection of optical assemblies.

C. Substantiation:

1. Proposal: Identification of proven-in-use assemblies of the same type, for inspection by Owner.
2. Preliminary Design: Identification of proven-in-use assemblies of the same type, for inspection by Owner.
3. Design Development: Identification of actual products to be used.

3.6 OPERATION AND MAINTENANCE:

A. Minimum Outdoor Operating Temperature: Provide lighting systems that operate at temperatures as low as 0 degrees C.

B. Power Consumption and Efficiency: Comply with requirements of the following:

1. Lighting Controls: Level of control of lighting appropriate to exterior area and Owners requirements for energy conservation.
2. Lighting Controls: Provide daylight sensing controls; on-off switches; programmable timing; and lighting control system.

C. Maintenance Efficiency: Provide luminaires that do not collect dirt rapidly and are readily cleanable.

D. Luminaire Categories: Provide luminaires of IESNA Category I; II; V; for minimum dirt accumulation and LDD factors.

1. Provide Pull Box near each light pole.

END OF SECTION D5023

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SECTION D5030 - LOW VOLTAGE GENERAL REQUIREMENTS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Installation requirements for low voltage systems including security electronics, fire alarm, PLC door control, intercom, and cabling infrastructure.

B. Cabling and termination requirements for low voltage systems.

1.2 RELATED REQUIREMENTS

A. Section D5031 - Public Address

B. Section D5032 - Intercom System

C. Section D5033 - Communications Infrastructure

D. Section D5035 - Television System

E. Section D5037 - Fire Alarm System

F. Section D5038 - Security and Door Control System

G. Room Data sheets

1.3 REFERENCE STANDARDS

A. Refer to applicable sections for standards applicable to those systems.

B. Where approval standards have been established by OSHA, Underwriter's Laboratories, ASTM, ASME, AGA, AMCA, ANSI, ARI, State Fire Insurance Regulatory Body, and FM, these standards shall be followed whether indicated or not on the Contract Drawings and Specifications. Include the cost of all work required to comply with the requirements of these authorities in the original proposal.

C. Comply with ANSI C2 where applicable.

D. California Building Code, 2016 edition.

E. Telecommunications equipment must comply with BICSI guidelines.

PART 2 – PRODUCTS AND METHODS

2.1 METHODS OF CONSTRUCTION

A. All cabling shall be installed concealed in walls or interstitial spaces.

B. All cabling shall be rated for the installation. Use wet rated cable for all cabling under slab or underground even if in conduit or raceway.

C. Terminate and label cabling at all terminations. Labels shall be attached to each cable and to the related terminal. All conductors shall be uniquely labeled.

D. Cabling shall be color coded with no splices.

E. All installations shall meet requirements for seismic installations where required.

F. Arrange with local and state authorities and utility companies for permits, fees and service connections, verifying locations and arrangement, and pay all charges including inspections.

G. All security, PLC, communications, video, locks, and card access systems shall be connected to UPS systems powered by the emergency generator. The UPS shall be sized to carry the security systems for at least one hour. The generator will provide power as required by Code.

H. Perform work by workmen skilled in the trade required for the work. Install all materials and equipment in a way that presents a neat appearance when completed. Arrangement of equipment and materials shall be done in accordance with the approved recommendations of the manufacturer and the best practices of the trade and in conformance with the Contract Documents,

I. Follow the manufacturer's directions completely in the delivery, storage, and handling of equipment and materials.

J. Store equipment in a clean, dry place, protected from other construction. While stored, maintain factory wrappings or tightly cover and protect equipment against dirt, water, construction debris, chemical, physical or weather damage, traffic and theft.

K. Adequately brace and package equipment to prevent breakage and distortion while in transit.

L. Provide the services of competent representatives of the manufacturer capable of certifying that the equipment is installed according to the manufacturer's recommendations, is operating properly, and to instruct the County's operating personnel during start-up and operating tests of the complete telecommunication system. Prove the operation of equipment to the satisfaction of Engineer. Give at least seven days' notice to Engineer prior to beginning equipment start-up.

M. Remove all excess material and debris. Place all telecommunication systems in complete working order before request for final review.

N. Test all cabling and correct any cables outside of the manufacturer's recommendations. Clean and polish all fixtures, equipment, and materials thoroughly.

O. Class Mixing: Wiring in the same wireway shall not contain wiring of different classes.

PART 3 - DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Provide cabling as required by each equipment manufacturer to maximize the data handling capability for each system.

B. Provide equipment UL listed for the intended purpose.

C. Conduit and raceways shall protect the cabling and fiber from incidental damage and provide a path for unimpeded cable access.

D. Provide boxes and cabinets for combining multiple conduit runs for an efficient installation.

E. Terminations for all conductors shall be appropriate to the cable installed, Make all non-coaxial connections to screw-type terminal blocks with Phoenix Contact type barrier blocks. Size all terminals properly to assure high electrical integrity. Connect only one (1) wire per terminal screw. All shielded cables shall be insulated. Do not permit shields to contact conduit, raceway, boxes, terminal cabinets or equipment enclosures. Tin terminated shield drain wires and insulate with heat shrinkable tubing.

F. Cables, wires, wiring forms, terminal blocks and terminals shall be identified by labels, tags or other permanent markings. The markings shall clearly indicate the function, source, or destination of all cabling, wiring and terminals. The wire-marking format contained in the shop drawings shall be utilized for all conductors installed under this Specification. All cables and

wires shall be identified, utilizing heat-shrink, machine-printed, polyolefin wire markers. Hand written tags are not acceptable.

G. All panels shall be provided with permanently attached engraved lamacoid labels with identifying names and functions. Labels shall be consistent in form, color, and typeface throughout the system and all must contain the name of the system or subsystem as part of the label textual information. Design, color, font and layout shall be coordinated with, and approved by, the County.

3.2 GROUNDING

A. Grounding Procedures: Provide grounding of all systems and equipment in accordance with manufacturers' recommendations, local electrical codes, and industry standards.

B. Signal Ground: Signal ground shall be derived from the one main electrical panel that serves all equipment herein.

C. Require Grounding: Grounding procedures for wire, equipment and devices shall be in strict accordance with manufacturers' recommendations and standard installation practices. All equipment enclosures of an assembly shall be grounded to the single grounding terminal strip of each assembly.

D. Ground Loops: Contractor shall eliminate or correct all potential ground-loop problems in a manner approved by the County.

E. Enclosure Isolation: Equipment enclosures of this section shall not be permitted to touch each other or any other "grounded device" unless bolted together.

F. Shielding: Shielded cables of this section shall be grounded exclusively to Signal Ground.

1. No shields shall be permitted to carry live currents of any kind. Shields shall be tied to Signal Ground at the signal source end only, unless otherwise noted or required by the manufacturer.

G. Start-Up Responsibility

1. Contractor shall initiate System Operation. Competent start-up personnel shall be provided by Contractor on each consecutive working day until the System is functional and ready to start the acceptance test phase.
2. If in the County's judgment Contractor is not demonstrating progress in solving any technical problems, Contractor shall be required to provide Manufacturer's factory technical representation and diagnostic equipment at no additional cost to County, until resolution of those defined problems. Where appropriate, Contractor will bring the System on-line in its basic state.
3. Use a start-up sequence that incrementally brings each portion of the system on-line in a logical order that incorporates checking individual elements before proceeding to subsequent elements until the entire system is operational.

H. Testing

1. Provide Preliminary Testing, Inspection, Performance Verification Testing, for system and equipment.
2. Develop checklists to document all testing and corrections made. Submit all checklists and testing procedures for approval.
3. Correct all discrepancies found during testing and retest to confirm repair.

I. Final Procedures

1. Portable Equipment: Furnish portable equipment required for testing to the County, along with complete documentation for the materials furnished. All portable equipment

shall be presented in the original manufacturer's packing, complete with manufacturer's instructions, manuals, and documents.

2. Post Acceptance Work: Check, inspect and adjust all systems, equipment, devices and components specified, at the County's convenience, approximately sixty (60) days after Acceptance of the Installation.

J. Notice of Completion

1. When the performance and acceptance requirements described above, including the Final Acceptance Test, have been satisfactorily completed, the County shall issue a Notice of Completion to Contractor indicating the date of such completion. The Notice of Completion shall be recorded by Contractor upon receipt of the County completion letter. This date of record shall be the start of the warranty period.

K. Security Screws: All devices, conduit, and equipment, accessible to inmates shall be installed with security screws.

L. Training:

1. Contractor shall provide training for County training personnel, maintenance personnel, and line staff. Video tape all training and provide owner a separate video of each system training.
2. Contractor shall provide technical support for at least 18 months after initial inmate occupancy.

END OF SECTION D5030

SECTION D5031 – PUBLIC ADDRESS SYSTEM

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. This specification section covers the public address system for the facility. Furnish and install a complete and functioning paging system for the facility. Drawings and General Provisions of the Contract, including General and Supplementary Conditions, County Standard Terms and Special Provisions, apply to this section. Also provide the work in accordance with Electrical General Requirements and Low Voltage General Requirements

1. Furnish and install an amplifier in each area of adequate size to provide paging into inmate areas at a minimum level of 15db above average ambient noise levels. Speakers selected shall be appropriate for the intended installation.
2. The Central Control Touchscreen Computer Station shall be able to page into each zone. In addition, coordinate an interface to the facility provided telephone system. The telephone interface shall occur at one location in the Central Control Security Electronics Room.
3. The controlling officer station will have a desk mounted microphone to page the local housing interior and exterior areas directly for group movement and group announcements.
4. Paging Zones: Furnish equipment, wiring, and programming to page into the individual zones as well as all-call:

    a) Each housing dayroom
    b) Each outdoor recreation
    c) Visitation
    d) Programming room by area

5. Contractor shall furnish and install hardware devices, mounting brackets, power supplies, controls, and other components of the system as specified. Although such work is not specifically shown or specified, all supplementary or miscellaneous items, appurtenances, and devices incidental to or necessary for a sound, secure, complete, compatible and function system shall be furnished and installed as a part of the work. Any case of error, omission, discrepancy, or lack of clarity shall be promptly identified to the Architect and Engineer for clarification prior to the bid due date.
6. Furnish and install outlets, junction boxes, conduit, connectors, wiring, and other accessories necessary to complete the system installation.
7. Amplifier shall have an auxiliary channel to allow music to be played into dayrooms.

B. Precedence: Obtain, read, and comply with General Conditions and applicable sub-sections of the contract specifications

1.2 RELATED REQUIREMENTS

A. In accordance with Section D5030 – Low Voltage General Requirements

B. In accordance with Section D5038 – Security and Detection

C. Refer to Room Data Sheets for additional requirements.

PART 2 – PRODUCTS AND METHODS

2.1 METHODS OF CONSTRUCTION

A. Amplifier Size: The amplifier shall provide the required power to drive the speakers in the zone with 25% spare for future load.

1. Manufacturer: Amplifiers to be manufactured by a company with 10 years of manufacturing experience.
2. Control: Zones to be controlled from Security Touchscreen and facility telephone systems.
3. Quality: Equipment shall have appropriate UL Listed mark on the product and be listed for the intended purpose.

B. Cabling:

1. Base Requirement: Furnish and install all cabling as recommended by the equipment manufacturer.
2. Listing: All cabling shall be UL listed for the environment in which it will be installed. Meet all requirements of the California Electric Code.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. The system shall produce a clear and intelligible reproduction of the input signal into each area with minimum distortion.

B. Design paging system so that at a minimum, there is 25% spare at each paging speaker to allow for final adjustments.

C. System shall be capable of a page from the control station and the telephone system.

END OF SECTION D5031

SECTION D5032 – INTERCOM SYSTEM

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. This specification section covers the intercom system for the facility. Furnish and install a complete and functioning intercom system including intercoms, talk-back amplifiers, cabling, conduit, and power for the facility. Drawings and General Provisions of the Contract, including General and Supplementary Conditions, County Standard Terms and Special Provisions, apply to this section. Also provide the work in accordance with Electrical General Requirements and Low Voltage General Requirements

B. This system shall be an integrated subsystem of the PLC door locking control system providing communication from Central Control to control gates and secure control rooms. Furnish and install a separate talk-back amplifier for each Touchscreen Computer Station. Provide intercoms in each I-3 cell for emergency communication.

C. Where cameras view intercoms, camera video shall automatically be displayed when the intercom icon is selected on the controlling touchscreen.

D. Furnish and install intercoms as indicated in the Room Data Sheets and shown on the plans, generally summarized as follows:

1. Both sides of controlled doors.
2. Both sides of controlled gates.
3. As indicated on Room Data Sheets.
4. Each cell as an emergency call station.
5. Each remote Touchscreen to call Central Control.

E. Furnish visitation stations on both sides of each non-contact visitation window. Route all cabling to a central point for future recording equipment. Provide stations for two individuals on the visitor side. Station shall be self-contained with no exposed cables or cords equal to the JUST-TALK model manufactured by Etech Controls Corporation. Station housing to be wedge shaped with volume control.

F. Intercom system shall page over public-address zones individually and all call.

G. Contractor shall furnish and install hardware, devices, mounting brackets, power supplies, controls, and other components of the system as required for a fully functional system. Although such work is not specifically shown or specified, all supplementary or miscellaneous items, appurtenances, and devices incidental to or necessary for a sound, secure, complete, compatible and function system shall be furnished and installed as a part of the work

H. Furnish and install outlets, junction boxes, conduit, connectors, wiring, and other accessories necessary to complete the system installation.

1.2 RELATED REQUIREMENTS

A. Section D5031 - Public Address

B. Section D5038 - Security and Door Control System

C. Refer to Room Data Sheets for additional requirements.

D. Shop Drawings & Equipment Submittal.

1. Furnish shop drawings for all equipment to be provided including wiring and installation diagram.

2. Provide data sheets on all equipment to be provided.
3. Provide drawings to define integration with PLC and CCTV systems.

E. Operating and Maintenance Manuals

1. Provide complete operation and maintenance manuals on the system as installed and programmed in accordance with the Contract Documents.

PART 2 – PRODUCTS AND METHODS

2.1 METHODS OF CONSTRUCTION

A. Provide intercom components for a complete system. The printed circuit boards shall utilize push-on connectors with set screw terminal connections (Phoenix Contact Type MSTB, screw-type, 24-12AWG, strand or solid) or equal for ease in maintenance and replacement. Push-in wire connections will not be allowed. Components shall be rated for continuous operation.

B. The system shall provide for two-way conversations between a Touchscreen Computer Station (TCS) and the selected intercom station. The system shall allow one (1) two-way conversation to occur for each TCS. Each intercom station may communicate with the TCS to which it is directly connected. A TCS shall be able to connect to any intercom that is in the station's assigned task group.

C. The master intercom station shall consist of a desk handset with keypad to call other administrative stations.

D. Intercom stations shall be Quam CIS2, three-gang devices flush mounted with 11-gauge stainless steel security cover.

E. Pedestals: Furnish and install heavy-duty pedestals for intercom stations at vehicle sally-ports as required for proper communication from driver to controlling TCS. Pedestal shall be height adjustable and shall be anchored to a concrete base. Provide hooded intercom stations with surface boxes. Pedestal shall be constructed of round pipe allowing the housing to spin without breaking if sufficient pressure is applied from the side. Provide intercoms at two levels, one for busses and one for vehicles.

F. Call Button: Furnish and install detention grade Call buttons equal to APEM AV03100. Call Button shall consist of a heavy-duty push button on a single gang plate. Unit shall be constructed of 11-gauge stainless steel and designed for installation in a detention facility.

G. Dome Lamp: Furnish and install security dome lamp above each door in a direct supervision area. Unit shall be made of a high impact molded laminate bubble attached to an 11-gauge stainless steel single gang plate. A single high intensity LED shall be provided.

H. Dome Lamp Reset button: Furnish and install security reset button equal to APEM AV03100. Furnish single gang plate made of 11-gauage stainless steel. Unit shall mount to a standard single gang box.

1. Finish: Brushed stainless steel
2. Pushbutton: detention grade SPST normally open equal to intercom station button.

I. Talk Path: Each TCS shall have an independent talk path allowing communication from each TCS to the stations under their control without impacting other TCS audio connections. Intercom stations can establish a talk path with only one master at a time.

J. Talk Back Amplifier: The amplifier shall provide the required power to drive the intercom stations.

K. Control: Furnish and install switching electronics for each individual intercom and paging zone.

1. Furnish and install optic fiber board and optic fiber to distribute signal to each building with intercoms. Furnish and install optic fiber connections to gate mounted intercoms.
2. Quality: Equipment shall have appropriate UL Listed mark on the product and be listed for the intended purpose.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. The Intercom system shall provide point to point communication between the control station and controlled doors and monitored areas.

B. The system shall operator on the UPS when normal power is lost.

C. Voice signals shall be accurately reproduced.

D. There shall be no audible tone when the control station activates the audio on an intercom.

E. The control station shall have positive control of the voice circuit.

END OF SECTION D5032

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SECTION D5033 – COMMUNICATIONS INFRASTRUCTURE

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. This specification section covers communication cabling for the facility. Furnish and install a complete infrastructure system. Drawings and General Provisions of the Contract, including General and Supplementary Conditions, County Standard Terms and Special Provisions, apply to this section. Also provide the work in accordance with Electrical General Requirements and Low Voltage General Requirements

B. Staff Telephone: Staff telephones are VOIP with equipment to be furnished and installed by the County. Each workstation shall be provided with three jacks on a plate.

C. Inmate Telephone: Inmate telephones are to be furnished and installed by the County's vendor. Fully coordinate infrastructure requirements separate from the staff telephone system.

D. Video Visitation: Video Visitation is a vended system and shall be installed by the County Vendor. The DBE shall furnish and install all cabling and power required for each individual station.

E. Commissary Kiosk: Commissary Kiosks are a vended system and shall be installed by the County Vendor. The DBE shall furnish and install all cabling and power requirements for each individual station.

F. In Segregation and Classification, provide an inmate telephone jack on the cell front to connect a portable phone to the jack and hand it through the cuff port to the inmate for a call,

G. Connect the telephone system to the existing facility or service.

H. Furnish, install, and test outlets, junction boxes, conduit, connectors, wiring, and other accessories necessary to furnish and install a complete communications infrastructure.

I. Data Jacks shall be wired for 568A/B as required by owner.

J. Provide each printer and copier location with three jacks on a communications outlet.

K. Provide each metal detector and X-Ray machine location with two jacks on a communications outlet.

L. Provide each fingerprint station with three jacks on a communications outlet.

M. Room data sheets indicate the minimum number of outlets required based on proposed occupancy. Furnish and install additional outlets where the furniture layout is flexible by design and flexibility is required.

N. Furnish and install a structured cabling system for telephone and data cabling.

O. Provide each conference room location with a data jack in a common floor box with power and auxiliary connections. The auxiliary connections shall provide HDMI and VGA connections to the back for the television on the wall.

1.2 RELATED REQUIREMENTS

A. In accordance with Section D5030 – Low Voltage General Requirements

B. Refer to Room Data Sheets for additional requirements.

1.3 1.03 REFERENCE STANDARDS

A. ANSI/TIA/EIA – 568-C and addenda: "Commercial Building Telecommunications Cabling Standard"

B. ANSI/TIA/EIA – 569-B and addenda: "Commercial Building Standard for Telecommunications Pathway and Spaces"

C. ANSI/TIA/EIA – 606-A and addenda: "Administration Standard for the Telecommunications Infrastructure of Commercial Buildings"

D. ANSI/TIA/EIA – 607-B and addenda: "Commercial Building Grounding and Bonding Requirements for Telecommunications

E. ANSI/TIA/EIA – 526-7: "Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant"

F. ANSI/TIA/EIA – 526-14-A: "Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant"

G. IEC/TR3 61000-5-2 Ed. 1.0 and amendments: "Electromagnetic compatibility (EMC) – Part 5: Installation and mitigation guidelines – Section 2: Earthing and cabling"

H. ISO/IEC 11801:2000 Ed1.2 and amendments: "Information Technology – Generic cabling for customer premises"

I. CENELEC EN 50173:2000 and amendments: "Information Technology – Generic cabling systems"

J. California Electric Code specifically – Articles 770 and 800

K. ISO – 11801

L. BICSI Telecommunications Distribution Methods Manual

M. FCC 47 CFR 68

N. NEMA – 250

O. Contractor must have at least one RCDD on staff responsible for the telecommunications infrastructure on this project.

PART 2 – PRODUCTS AND METHODS

2.1 METHODS OF CONSTRUCTION

A. Conduit: Furnish and install concealed conduit and raceways for routing cables.

B. Quality: Equipment and cabling shall have appropriate UL Listed mark on the product and be listed for the intended purpose and intended installation.

C. MPOE: All services shall enter the building at the MPOE and extend to the MDF and IDF rooms as appropriate. Services shall be furnished and installed so that the existing facility may be demolished at the appropriate time without affecting services to this new building.

D. Listing: All cabling shall be UL listed for the environment in which it will be installed and meet all requirements of the California Electric Code.

E. All telephone and jack cabling shall be Category 6A.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. The communications infrastructure shall provide cabling and optic fiber for full bandwidth required for fully functioning switches, telephones, and computers.

B. Cable Testing: All data cabling and all optic fiber shall be fully terminated at both ends. After installation and before commissioning by the owner, confirm that all Category 6A cable meets the test requirements for the installed cable. Replace cabling that does not provide the required functionality. Retest any cable that is replaced. Document all tests and provide copies of all cabling to the owner.

C. Optic Fiber Testing: Test, replace, confirm, and document that all optic fiber is functioning as intended by the manufacturer. Provide copies of signature traces for each fiber to the owner.

END OF SECTION D5033

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SECTION D5035 - TELEVISION SYSTEM

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. This specification section covers the Television signal distribution for the facility. Furnish and install a complete and functioning Television Signal distribution system including amplifiers, cabling, conduit, and power as required. Connect to the existing TV signal system. Drawings and General Provisions of the Contract, including General and Supplementary Conditions, County Standard Terms and Special Provisions, apply to this section. Also provide the work in accordance with Electrical General Requirements and Low Voltage General Requirements

B. Furnish and install an amplifier in each area of adequate size to provide television signal to each television outlet. The system shall provide a signal strength of approximately 6 db at each television signal outlet. All components shall be appropriate for the intended installation.

C. Each staff station in each housing unit shall have the ability to switch power off to the local television sets.

D. Furnish and install Television outlets as indicated in the room data sheets generally as follows:

1. Dayrooms
2. Training rooms
3. Multi-purpose rooms

E. Furnish and install antennae and related electronics for off-air channels as directed by the owner.

F. Furnish and install three additional agile modulators for owner provided signal sources.

G. Furnish and install outlets, junction boxes, conduit, connectors, wiring, and other accessories necessary to complete the system installation.

1.2 RELATED REQUIREMENTS

A. Section D5033 - Communications Infrastructure

B. Room Data Sheets for additional requirements

PART 2 - PRODUCTS AND METHODS

2.1 METHODS OF CONSTRUCTION

A. Amplifier Size: The amplifier shall provide the required power to drive the identified television outlets with 25% spare for future sets All cabling shall be installed concealed in walls or interstitial spaces.

B. Manufacturer: Amplifiers and equipment shall be equal to that manufactured by Blonder Tongue.

C. Control: Power to the televisions shall be controlled from the security system.

D. Components: Furnish and install splitters, taps, directional couplers and conditioning equipment as required to provide signal distribution. All devices shall be located in climate controlled spaces.

E. Optic Fiber: Furnish and install optic fiber board and optic fiber to distribute signal to each building with television sets.

F. Quality: Equipment shall have appropriate UL Listed mark on the product and be listed for the intended purpose.

G. For classroom television sets, furnish and install a connection at the teacher's desk to connect media directly to ports on the back of the television set. Provide connections for HDMI, component video and VGA devices.

H. Network: Provide a network connection to the educational LAN.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. System shall distribute sufficient signal to each outlet so that a clear video and audio signal is delivered to every television when all outlets are actively connected to a television.

B. Use a signal strength meter to confirm power at each level and provide test report to owner.

END OF SECTION D5035

SECTION D5037 - FIRE ALARM SYSTEM

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This section covers Fire Alarm systems for the project. Furnish and install a complete and functioning Fire Alarm system as required by Code. Fire Alarm system shall be ADA compliant. Drawings and General Provisions of the Contract, including General and Supplementary Conditions, County Standard Terms and Special Provisions, apply to this section. Also provide the work in accordance with Electrical General Requirements and Low Voltage General Requirements

B. Existing Building: Central Control in the existing building will continue to function as Central Control. Expand the existing Notifier Fire Alarm System into the new building. Provide a Fire Alarm Control Panel for the new building and network the new fire alarm system into the existing so that it functions as a single integrated system.

C. All components and systems shall be appropriate for the intended installation and compliant with:

1. Contractor shall furnish and install hardware devices, mounting brackets, power supplies, controls, and other components of the system as required for a complete and fully functioning integrated Fire Alarm system.
2. All fire alarm cabling shall be installed in protective conduit or raceway.

1.2 RELATED REQUIREMENTS

A. In accordance with Section D5030 – Low Voltage General Requirements

B. Refer to Room Data Sheets for additional requirements.

1.3 REFERENCE STANDARDS

A. American Disabilities Act

B. California Building Code

C. Local Code

D. California Electric Code.

E. NFPA 72

F. All systems shall be approved by the Authority Having Jurisdiction.

G. All components shall be CSFM listed.

PART 2 - PRODUCTS AND METHODS

2.1 METHODS OF CONSTRUCTION

A. New Fire Alarm Control Panel: The panel shall provide the required electronics to drive all the devices required for a fully functional Fire Alarm system in the Behavioral Health Housing Unit. Furnish and install a remote annunciator at each officer control station. All components shall be UL land CSFM listed. Components shall be rated for continuous operation.

B. Manufacturer: New Fire Alarm systems shall be as manufactured by Notifier and compatible with the existing system.

C. Smoke Control: Furnish and install UUKL listed smoke control and Firefighter's override panels where required by Code.

D. Smoke detectors: Furnish and install UL listed spot smoke detectors as required by Code.

E. Duct Smoke Detectors: Furnish and install duct mounted smoke detectors as required by Code. Furnish and install one on HVAC units above 2,000 CFM and two if above 15,000 CFM.

F. Manual Station: Furnish and install key operated Manual Stations in inmate accessible areas.

G. Audio Visual: Furnish and install audio visual units in compliance with Code and the American Disabilities Act. System shall be designed to meet public mode audibility requirements.

H. Extinguishing systems: Furnish and install monitoring of all extinguishing systems including fire sprinkler, dry extinguishing, and hood extinguishing systems.

I. Quality: Equipment shall have appropriate UL Listed and CSFM Listed marks on all products. All products shall be listed for the intended purpose.

J. The added control panel: Shall provide a minimum of 25% spare slots for future components. As a minimum, the system shall provide the following:

1. The control panel shall support non-addressable as well as addressable detection devices.
2. The panel annunciator shall provide a back lit alphanumeric display, which shall provide a user definable messages associated with each addressable device or zone.
3. System shall include battery standby power to support 24 hours in standby and 5 minutes in alarm or as required by Code.
4. System shall have a minimum capacity of 2500 points.

K. Supervision: The Fire Alarm system shall provide dynamic supervision of system electronics, wiring, detection devices, and software. System failures shall be indicated on the alphanumeric display. Software and processor operation shall be monitored by an independent hardware watchdog circuit, which will indicate their failure.

L. Status: The Fire Alarm Panel shall indicate status for power, communication, internal operations, ground fault, and troubled conditions for all circuits.

M. Ground fault: The Fire Alarm Panel shall indicate ground fault detection for all circuits. A single ground condition shall result in the annunciation of a trouble signal.

N. Power: The control panel shall operate from a two wire 120 VAC supply with internal 24 VDC backup battery. All panel power connections whether AC or DC shall be separately fused within the panel. The Fire Alarm Control Panel shall furnish low voltage power to all remote fire control relays. Size power supplies with a minimum of 25% spare capacity.

O. Analog Operation: The control panel shall measure and adjust within UL guidelines the sensitivity of analog smoke detectors. An alphanumeric display shall be provided for custom operator messages and for reading detector sensitivity. Each device on an intelligent/analog detecting circuit shall be checked continuously.

P. Device number: The controls shall report, by specific device number, any device removed from an intelligent/analog detection circuit and all other devices shall continue to function.

Q. Printed record: The network fire alarm panel shall have a 24 VDC built-in printer capable of generating hard copy records of all alarms, troubles, and supervisory events. Printer shall be UL listed for the intended purpose.

R. New Alarms: New unacknowledged alarms and troubles shall distinctively display visually differentiated from previous alarms and troubles.

S. System Reset: It shall not be possible to reset the system until all off normal indications have been acknowledged.

T. Logic: Control functions shall be assigned based on system initiation patterns of detection devices such as "anding" zones, counting zones, counting devices, "anding" groups, and "anding" types of detection devices.

U. Addressing: Sprinkler water flow switches, air duct smoke detectors, tamper switches, OS & Y valves, manual stations, and thermal detectors shall be equipped with a unique address.

V. Signal Circuits: Provide notification appliance circuits capable of providing at least 1.5 amp at 24 VDC per circuit as required to power evacuation signals. All notification appliance circuits shall be configured in Class A operation such that a single open shall not prevent devices from operating. Circuit visual alarms separately from audible signals. Provide switches to allow the audible signals to be silenced while the visuals continue to flash.

W. Signal Line Circuit: The addressable Signaling Line Circuit Pathways shall be so constructed that all devices shall continue to communicate even past a single open fault, and the single open fault shall result in the annunciation of a trouble signal. Conditions that affect the intended operation of the path are annunciated as trouble signal. (Class A operation). The facility fire alarm system shall meet the requirements for a Proprietary Fire Alarm System as defined by NFPA.

X. Upon activation of any intelligent/analog device installed on the circuit, the system shall automatically report the status of the device and initiate the sequence of operations specified for that device. Alarms shall have priority over troubles.

Y. All intelligent/analog initiating devices on all circuits may be in alarm at the same time and perform the sequences of operation prescribed by the system configuration. If there are more than 127 alarms, the message "more than 127 alarms" will appear and any alarms after 127 will still have all their required functions performed. The circuits shall detect a line break and provide information to the control panel allowing the user to determine between which two (2) devices the break has occurred.

Z. Additional circuits for operation of DC audible devices, leased line, or city tie, shall be provided by a Signal Module. This module shall be system interconnected by a card edge connector, and shall be operable by the control unit.

1. Upon command by the control unit, the output circuits will respond as configured. The output current shall be at least 1.5 amps per circuit. Each circuit shall be fused separately and supervised.
2. Open circuits shall report trouble only and respond with circuit identification. A shorted circuit shall respond in a similar manner.
3. The module shall contain two programmable open collector outputs capable of sourcing 250 mA at 40 VDC for relay or LED activation.

AA. Provide a controllable relay output module for control of air handling units and other building life safety functions.

1. The module shall be system interconnected by a card edge connector and shall be operable by the control unit or manually controlled.
2. It shall contain two (2) independent relays, fitted with form "C" contacts, rated at 4 Amp 30VDC/120 VAC Resistive.
3. Furnish and install relay module equivalent to Siemens Model CRC-6 and components as required.

BB. Cabinet: Provide a NEMA 1 cabinet to house all controls, power supplies, motherboards, relays, and accessories. Cabinet shall fit in space and allow all required service clearances.

CC. Network: Furnish and install network cards for communication between Fire Alarm Panels. The network shall be so constructed that all devices shall continue to communicate even with isolated copper faults occur. (Class A operation).

DD. Furnish and install Fire Alarm Annunciator or Fire Alarm Control panel with annunciator in each control room and central control. Panels shall provide:

1. Full command keyboard.
2. 6" LCD display up to 8 events and system status.
3. 4 programmable function buttons.

a) One button shall be programmed to ACTIVATE the fire sprinkler shut-off valve in the controlled zones to stop water from flowing when heads are vandalized.
b) One button shall DEACTIVATE the fire sprinkler shut-off valve in the controlled zones to allow water to flow when heads are vandalized.
c) One button shall be programmed to Bypass smoke control during agent release.
d) One button shall be programmed to Activate smoke control after agent release.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. The fire alarm system shall provide continuous monitoring of smoke and fire devices and provide early detection of the products of combustion and notify staff.

B. The system shall also provide notification to occupants for evacuation in a fire incident as well as fire drills as required by the facility policies and procedures.

C. Furnish all permits and AHJ submittals required for the owner to obtain a certificate of occupancy.

D. Provide reprograming of the existing fire alarm graphic terminal to annunciate the fire alarms in the new area.

E. All functions shall be confirmed through adequate testing. Confirm that all initiating devices function properly and activate audible and visual signals in the area of alarm initiation. Confirmation testing and any corrective actions shall be completed before the owner's commissioning agent is called for commissioning. Confirm proper operation with the following interconnected systems:

1. HVAC Shut down controls.
2. Smoke exhaust systems.
3. Fire Sprinkler and Fire Pump Systems.
4. Emergency Generator systems,
5. Miscellaneous extinguishing systems.

END OF SECTION D5037

SECTION D5038 - SECURITY AND DOOR CONTROL SYSTEM

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. This section covers an integrated security system including facility IP video cameras, card access, duress, and locking control systems. Drawings and General Provisions of the Contract, including General and Supplementary Conditions, County Standard Terms and Special Provisions, apply to this section. Also provide the work in accordance with Electrical General Requirements and Low Voltage General Requirements

B. The existing Central Control shall remain as the central location for all overriding controls.

C. Furnish and install card readers for staff entry and as indicated in the documents. Each door indicated shall be provided with a proximity card reader, a door position system, and a request to exit device. All card readers will be networked together to allow cards to be programed from a centralized workstation for access in Central Control or as designated by the owner.

D. Furnish and install Programmable Logic Controllers (PLC's) in each area containing duress buttons, monitored doors, controlled locks, and miscellaneous devices as required. Design the PLC system for reliability and survivability.

E. The primary operator interface will be a Touchscreen Computer Station supplemented by video work stations and master intercoms.

F. Furnish and install Code required Emergency Release activated from Central Control in all occupancies classified as I-3, or where inmates are locked in cells or rooms and do not have free egress. When activated, Emergency Release shall unlock all remotely controlled doors in an area and hold the locks in an unlocked condition until Emergency Release is reset from Central Control. Program system for seven Emergency Release zones, one for each pod and one for medical.

G. All security controls and subsystems shall be powered by emergency generator circuits as defined in the electrical power sections. In addition, security systems shall be provided with UPS power for a minimum of one hour.

1.2 RELATED REQUIREMENTS

A. Section D5031 - Public Address

B. Section D5032 - Intercom System

C. Section D5033 - Communications Infrastructure

D. Section D5038 - Security and Door Control System

E. Room Data sheets

PART 2 – PRODUCTS AND METHODS

2.1 METHODS OF CONSTRUCTION

A. PLC: The PLC shall be equal to Omron. Provide a Hirschmann self-healing ring network. The PLC shall monitor detention doors for two conditions, (a) door closed, and (b) lock bolt secured. The PLC shall monitor doors, duress buttons and other miscellaneous devices as required for a complete and functional system. Components shall be rated for continuous operation.

B. Control: Furnish and install control of the following from Local Housing Control:

1. Dayroom Telephone control.
2. Light circuits by Dayroom, Cells, and Showers.
3. Dayroom Television power
4. Power outlets in accessible cells for CPAP machines and other medical devices.
5. Furnish and install control of the following from the PLC:

    a) Housing Telephone control by dayroom.
    b) Housing Unit Lights by Dayroom, Cells, and Showers.
    c) Housing Unit Television power by dayroom.
    d) Power outlets in accessible cells for CPAP machines and other medical devices by cell.
    e) Shower shut-off by Dayroom

C. Touchscreen: Touch sensitive workstations equal to 27" Elo Touch Solutions model 2740L as a minimum. Provide Surface Acoustic Wave technology. The system will provide graphic displays of all controlled areas and devices. All screens shall be approved by the owner. The operator shall also be able to operate the system through use of a mouse. The Touchscreen Computer Station (TCS) will be secured in a lockable portion of the millwork. Components shall be rated for continuous operation. Program controlled shower doors with a hold unlocked function for flexible operation.

D. CCTV: All CCTV cameras shall be the product of one manufacturer. Cameras shall be POE and with a minimum of 1080p resolution. Cameras in dayrooms and recreation yards shall be a minimum of 5 megapixels.

E. VMS: Provide programming and electronics to expand the existing enterprise level Video Management Software Package and server. The facility is transitioning from the current Genetec software ONSI with dual servers.

F. Video Switch: The contractor will furnish and install required video switches for IP cameras.

G. Coverage: Provide complete camera coverage based on the concept of pixels on target.

1. In inmate common areas, provide camera coverage for a minimum of 50 pixels per foot.
2. Locate cameras at opposite corners of a space so that one camera covers the blind spot under the other.
3. Provide a video workstation connected to the video system next to each Touchscreen Computer Station. The video workstation computer will be secured in a lockable portion of the millwork control by a Schlage Primus cylinder keyed to the facility master.
4. Provide a video review station connected to the video system. The video review stations computer will be secured in a lockable portion of the counter.
5. Camera video storage system will provide 30 months of storage for all cameras at 10 frames per second at 1080p resolution.

H. Card Access: The Card access controllers shall be compatible with the County's current NexWatch system. Each door controlled by a proximity card reader shall be provided with a concealed door position switch. Where readers are provided on both sides, a valid card read is required to pass through the door in either direction. Where the side opposite the reader is free egress, provide a request to exist device to signal the card access system that the event is an authorized exit. Furnish all components for a complete system.

I. Watch tour: Watch tour shall be an extension of the existing Pipe System. Furnish passive tags as indicated on the plans.

J. Perimeter detection: Provide a partial perimeter detection system as indicated on the plans to function similarly to the existing perimeter detection system. The existing detection system is a FPS-2-2M/AP EDAPT ruggedized detection system by Perimeter Products. When an

alarm is detected, lamps at each end of the zone in alarm is activated for visual identification of breach. Camera video is called up by the alarm and displayed in central control.

K. Provide personal alarm system in the new BHHU. These devices are not shown on the criteria plans as the layout will depend on the specific solution proposed.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. The system shall provide for the safe and efficient operation of the facility for inmates and staff. The system shall be integrated to the highest level possible to automate camera call up for intercoms and duress stations.

B. Contractor shall provide prints of expected views at each camera for review by owner during the submittal process. The owner shall approve all camera views after construction and installation is complete. Contractor shall document all approvals and submit to commissioning agent if required by owner.

C. The central control equipment was upgraded recently and the hardware shall be reused. The County is open to reprogramming the existing for a better functioning system. Incorporate a new station, or integrate with existing controls. The addition controls programming shall be an extension of the existing controls.

END OF SECTION D5038

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SECTION D5091 – GROUNDING SYSTEMS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Design criteria for grounding and bonding systems.

PART 2 – PRODUCTS

2.1 ROD ELECTRODE

A. Material: Copper-clad steel.
B. Diameter: ¾".
C. Length: 10 feet.

2.2 GROUND BAR

A. 2" x 24" x ¼" thick solid copper bar.

1. Provide in Main electrical room.
2. Provide in security electronics room and telephone/data room.

2.3 WIRE

A. Material: Stranded bare copper.
B. Foundation Electrodes: #4 AWG minimum.

2.4 GROUNDING WELL COMPONENTS

A. Well Pipe: 11 x 17 x 12-inch square clay tile or concrete pipe with belled end.
B. Well Cover: Cast iron with legend "GROUND" embossed on cover.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Grounding and bonding: provide grounding conductor in all conduits and raceways.

END OF SECTION D5091

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SECTION D5092 – EMERGENCY GENERATOR SYSTEMS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Design criteria for emergency generator system including fuel tank.

1.2 PERMITS

A. Obtain required permits from local air quality management district.

PART 2 – PRODUCTS

2.1 GENERATOR

A. Continuous Standby Rating: 400 kW at 0.8 power factor, 480/277 volts, 3-phase, 4-wire, 60-Hz at 50 degrees C ambient.
B. Diesel, turbocharged and after-cooled, 4-stroke cycle only.

2.2 AUTOMATIC TRANSFER SWITCHES

A. Automatic transfer switch, complete, for connection between emergency power source and normal power source and load as shown.
B. Automatic transfer switch with bypass isolation.

2.3 CONTROL PANEL

A. The engine-generator control panel shall provide full control, protection, and monitoring of the engine-generator equipment in all possible modes of operation.
B. The control panel shall be furnished by the same supplier of the engine-generator system.

2.4 ALARM PANEL

A. Provide alarm panel at MADF Control.
B. Provide a LED indicating light and a nameplate for the following alarm conditions:

1. "Generator Supplying Load"
2. "Generator Derangement"
3. "Ground Fault"

2.5 FUEL TANK

A. Above ground fuel tank to provide 72 hour run time capacity.
B. Pumps.
C. Accessories.

2.6 LEAK DETECTION

A. Provide leak detection monitoring and alarm at MADF.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Provide standby power for loads indicated in the narrative.

3.2 AMENITY AND COMFORT

A. The engine-generator enclosure shall be designed to provide weather protection to the engine-generator equipment and to reduce the full load noise level of the running generator to 80 dba at 10 feet and no more than 73 dba at 23 feet.

3.3 STRUCTURE

A. The enclosure shall be provided with four double doors for access to equipment.

3.4 SOURCE/QUALITY CONTROL

A. Factory Test: The engine-generator unit shall be tested at the manufacturer's plant before shipment. The test shall consist of a steady load run of at least 60 minutes duration at 100 percent full-rated load and power factor. Complete test reports shall be made which shall show the engine fuel consumption and kW output.

3.5 OPERATION AND MAINTENANCE

A. Location: Outdoor in sound attenuating housing.
B. Ambient Temperature: 20 to 110 degrees F.
C. Altitude: 500 feet.
D. Fuel Sulfur Content: Maximum 0.5 percent by weight.

END OF SECTION D5092

SECTION E20 – FURNISHINGS CRITERIA

PART 1 – GENERAL

1.1 1.01 SECTION INCLUDES

A. Furnishings comprise movable (loose) furniture and fittings, without electrical or plumbing connections, comprising the following elements:

1. Detention Furnishings: All other types of furnishings, for any type of occupancy, including furniture and accessories.

PART 2 – PRODUCTS

2.1 DETENTION FURNISHINGS

A. Use one of the following:

1. Steel Wall Mounted Bunk: Minimum 30-inch x76-inch with 24-inch x 24-inch x 12-inch high under bunk shelf for property (no under bunk shelf for ADA cells). Bunk pan to be minimum 10 gage steel. Support with 3/16" steel corbelled brackets where cantilevering from wall. Support with continuous angle bolted to wall where there is a CMU wall adjacent to the bed.
2. Steel Wall Mounted Shelf at ADA Cells: Provide wall mounted steel shelf with angled dust top. Construction to be minimum 10 gage steel
3. Floor Mounted Stool: Floor mounted stool with 14 gage #4 finished stainless steel seat and powder coated steel tube post. (Basis of Design: Norix S561-120).
4. Wall Mounted Swing Stool: Wall mounted swing stool with 14 gage #4 finished stainless steel seat and powder coated angles steel tube support. (Basis of Design: Custom configuration to meet BSCC anti-ligature requirements).
5. Accessible Wall Mounted Stainless Steel Desk: Cell Desks (standard and accessible): 20" x 24" (32" wide at Accessible cells) x 10 gage #4 finish stainless steel wall mounted. (Basis of Design: Norix Special Order).
6. Fixed table at Units 3 and 4: 4 or 6-person table design supported by seat stools rather than center post. 14-guage stainless steel top and seats. Support tubes and framing with manufacturer's standard powder coat finish. (Basis of Design: Norix Max Master.
7. Molded Polymer Armless Seating: Norix Integra Series heavy duty molded polymer chairs.
8. Rotationally Molded Polymer Segmented Lounge Chairs: Norix Hondo-Nuevo Series segmented lounge chairs in armless and armed version to meet Owner's requirements.
9. Rotationally Molded Polymer Cube: Norix Hondo-Nuevo Series segmented cube (backless seating).
10. Television Brackets: Wall mounted brackets as manufactured by Peerless. Select with minimal functional parts that can be removed and utilize security fasteners for installation and adjustment fasteners where required in inmate areas.
11. Television Enclosures: PC Enclosures, Sloped Top LCD Guardian, 9-gauge powder coated steel, minimum 1/4-inch polycarbonate or Lexan front cover. Provide required internal cooling fans and ventilation holes (similar to detention diffusers. Back panel and mounting brackets (for television and enclosure).
12. Dayroom Video Visitation Stations (standard): Nominal 13" deep by 28" tall by 30" wide 14 gage #4 finish stainless steel privacy panel and shelf unit with attached floor mounted seat with 14 gage stainless steel seat. (Basis of Design: Norix InteleStation).
13. Dayroom Video Visitation Stations (accessible): Nominal 13" deep by 28" tall by 32" wide 14 gage #4 finish stainless steel privacy panel and shelf unit with separate wall mounted swing stool. (Basis of Design: Norix InteleStation).

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Design the facility to accommodate the furnishings required by the Owner.

B. Where furnishings elements also must function as elements defined within another element group, meet requirements of both element groups.

3.2 DURABILITY CRITERIA

A. Service Life Span: 10 years minimum.

1. Substantiation:

a) Design Development: Identification of actual products to be used.

B. Vandal Resistance: Parts not easily removed without the use of tools.

3.3 OPERATION AND MAINTENANCE CRITERIA

A. Ease of Maintenance: Not requiring any routine measures to maintain operation or finishes, other than washing with soap and water.

B. Ease of Repair: Serviceable parts and access panels easily removable with common tools.

END OF SECTION E20

SECTION F10 - SITE CLEARING

PART 1 – GENERAL

1.1 SUMMARY

A. This Section Includes:

1. Temporary erosion- and sedimentation-control.
2. Existing Utilities.
3. Stripping and stockpiling topsoil.
4. Field Conditions

1.2 RELATED DOCUMENTS

A. Geotechnical Data Report, Todd Road Jail Health Unit Facility, Project No. 04.62160076_R1, prepared by Fugro USA Land Inc., Dated January 13, 2017.

B. Project SWPPP.

1.3 DEFINITIONS

A. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other oversized objects; and free of weeds, roots, toxic materials, or other non-soil materials.

B. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction.

C. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in the *Geotechnical Data Report, Todd Road Jail Health Unit Facility, Project No. 04.62160076_R1,* prepared by Fugro USA Land Inc., Dated January 13, 2017.

PART 3 – EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed.

C. Protect existing site improvements to remain from damage during construction.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control drawings and requirements of authorities having jurisdiction.

B. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

C. Remove erosion and sedimentation controls upon completion of construction, and restore and stabilize areas disturbed during removal.

3.3 EXISTING UTILITIES

A. Secure all required permits and clearances from the agency having jurisdiction prior to performing utility abandonment.

B. Arrange with utility companies to shut off indicated utilities.

C. Asbestos Cement Pipe: The Contractor is advised that asbestos cement pipe may be encountered on the project and must be cut, handled, and disposed of according to the Contractor's State Licensing Law and all other applicable laws and regulations.

D. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.

E. Existing utilities which are to be abandoned as part of the work should be removed from structural areas (e.g., below building pads or roadways). In non-structural areas, utilities could be abandoned in place provided cement grout completely fills all voids in the utility.

F. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's permission.

G. Excavate for and remove underground utilities indicated to be removed.

H. Record Drawings shall be prepared accurately identifying and showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

3.4 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to depth determined in field in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and non-soil materials from topsoil, including clay lumps, gravel, and other oversized objects; trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

3.5 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed travelled ways if required by Owner or authorities having jurisdiction.
3. Access must be coordinated with the County Representative.

B. Utility Locator Service: Notify Call Underground Service Alert: (800) 642-2444 or 811 two working days before all planned work operations for area where Project is located.

1. Maintain all existing utilities to remain in service and protect them against damage during demolition operations.

C. Do not commence site clearing operations until temporary erosion- and sedimentation-control and tree-protection measures are in place.

D. Environmental Controls: Use water sprinkling, temporary enclosures, and other methods to limit dust and dirt migration. Comply with governing regulations and County Air Pollution Control District pertaining to environmental protection. Do not use water when it may create hazardous or objectionable conditions such as flooding and pollution.

E. Protections: Contractor shall provide temporary barricades and other forms of protection to protect general public from injury due to demolition work.

3.6 DEMOLITION

A. General: Perform demolition work in a systematic manner. Use such methods as required to complete work indicated on drawings in accordance with governing regulations.

B. Provide services for effective air and water pollution controls as required by County Air Pollution Control District regulations.

C. Prior to commencing grading operations, soil containing debris, organics, pavement, or other unsuitable materials, shall be stripped from the foundation and pavement areas. Entire root mat below upper few to several inches of ground surface shall be removed entirely and wasted. Demolition areas shall be cleared of structures, old foundations, slabs, abandoned utilities, tree roots, and soil disturbed during the demolition process. Depressions or disturbed areas left from the removal of such material shall be replaced with compacted fill in accordance with *Geotechnical Engineering Report* recommendations.

D. All environmentally undesirable materials, surficial vegetation, deleterious, organic, inert, and oversized materials (greater than 4-inches in maximum dimension), and demolition debris should be stripped from the development areas and exported or stockpiled away from the work area. Areas to receive fill should be stripped of all dry, loose or soft earth materials and undocumented fill materials to the satisfaction of the Geotechnical Engineer.

E. Concrete sidewalks shall be removed to the nearest construction or expansion joint to the limits of removal as shown on the plans. Exact locations will be determined in the field by the County Representative.

F. Excavations and depressions resulting from foundation and below-grade structure removal shall not be filled in prior to observation by the Geotechnical representative.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove from Project site debris, rubbish, and other materials resulting from demolition operations. Transport and legally dispose of offsite.

B. If hazardous materials are encountered during demolition operations, Contractor shall contact County Representative.

C. Burning of removed materials is not permitted on project site.

3.8 HAZARDOUS MATERIALS

A. Except as otherwise specified, in the event Contractor encounters on the Project site material reasonably believed to be asbestos, polychlorinated biphenyl (PCB), or other hazardous

materials which have not been rendered harmless, Contractor shall immediately stop Work in the area affected and report the condition to the County Representative in writing. The Work in the affected area shall not thereafter be resumed except by written agreement of the Contractor if in fact the material is asbestos, PCB, or other hazardous materials and has not been rendered harmless. The Work in the affected area shall be resumed in the absence of asbestos, PCB, or other hazardous materials, or when such materials have been rendered harmless.

3.9 CLEANUP AND REPAIR

A. Upon completion of demolition work, remove tools, equipment, and materials from site. Repair demolition performed in excess of that required. Return elements of construction and surfaces to existing condition prior to start of operations. Repair adjacent construction or surfaces soiled or damaged by demolition work.

PART 4 MATERIAL OWNERSHIP

A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site and disposed of in accordance with local regulations.

4.2 RECORD DRAWINGS

A. Record Drawings shall be prepared identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

END OF SECTION F10

SECTION F20 - EARTH MOVING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for pavements.
3. Base course for pavements and walkways.
4. Excavating and backfilling trenches for utilities.

1.2 RELATED DOCUMENTS

A. Standard Specifications for Public Works Construction (SSPWC), latest edition.

B. Geotechnical Data Report, Todd Road Jail Health Unit Facility, Project No. 04.62160076_R1, prepared by Fugro USA Land Inc., Dated January 13, 2017.

1.3 QUALITY ASSURANCE

A. Codes and Standards: Perform earthwork in compliance with applicable requirements of governing authorities having jurisdiction.

1. Standard Specifications for Public Works Construction (SSPWC), latest edition.
2. CAL/OSHA Construction Safety Order Requirements.

B. Soil Testing Service

1. The County will engage a soil testing service to include testing soil materials proposed for use in the Work and for quality control testing during grading operations.
2. Samples of materials shall be furnished to the testing service by the Contractor at least one week before their anticipated use.
3. Work of this Section includes smoothing out areas for density tests and otherwise facilitate testing work, as directed.

1.4 DEFINITIONS

A. Base Course: Aggregate layer placed under hot-mix asphalt paving or concrete flatwork.

B. Subgrade: Uppermost surface of an excavation or the top surface of a fill immediately below base.

C. Utilities: On-site underground pipes, conduits, ducts, and cables.

1.5 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed travelled ways if required by Owner or authorities having jurisdiction.

B. Utility Locator Service: Notify Call Underground Service Alert: (800) 642-2444 or 811 two working days before all planned work operations for area where Project is located.

C. Do not commence earth-moving operations until temporary erosion- and sedimentation-control measures are in place.

D. Do not commence earth-moving operations until tree-protection measures are in place.

E. The Contractor shall visit the site and familiarize himself with existing site conditions.

F. Additional test borings and other exploratory operations may be made by the Contractor at no cost or liability to the County.

G. Existing Utilities: Where uncharted or incorrectly charted piping or other utilities are encountered during excavation, consult the County Representative immediately for direction. Cooperate with the County Representative in keeping respective services and facilities in operation. Repair damaged utilities to the satisfaction of the County Representative at no cost to the County

H. Protection of Subgrade: Do not allow equipment to pump, rut, or disturb subgrade, stripped areas, or other areas prepared for Project. If pumping soils are encountered, the Contractor shall be responsible for properly stabilizing the subgrade in accordance with the Geotechnical Report and at the direction of the Geotechnical representative.

I. Contractor shall implement measures to prevent soil erosion, and where possible, sediment shall be retained onsite.

J. Contractor shall implement all necessary recommendations contained in the referenced Geotechnical Report.

PART 2 – PRODUCTS

2.1 MATERIALS

A. General: Refer to the Geotech Report for definitions and requirements for soil fill materials, removal or remediation of Expansive Soils, and recommendations for Lime Treatment.

B. Base Course: Class 2 aggregate base conforming to the current Caltrans Standard Plans and Specifications.

PART 3 – EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.

B. Protect and maintain erosion and sedimentation controls during earth-moving operations.

C. Remove vegetation, improvements, or obstructions interfering with installation of new construction. Transport and legally dispose of offsite. Removal includes stumps and roots. Entire root mat within upper few to several inches of ground surface shall be removed and wasted. Care shall be taken so as not to scar any area of the tree's bark. Contractor shall utilize the best construction method to minimize the erosive effect from the removal of site vegetation.

D. Carefully and cleanly cut roots and branches of trees indicated to be left standing, where such roots and branches obstruct new construction. Paint cuts over one inch in size with tree pruning compound.

E. In order to protect from sediment transfer or contamination from urban run-off during construction, at a minimum, the following grading and erosion control practices shall be followed:

1. If grading occurs during the rainy season (November through April), sediment traps, barriers, covers or other methods shall be used to reduce erosion and sedimentation.
2. Excavated materials shall not be deposited or stored where the material can be washed away by high water or storm run-off.
3. Grading operations on site shall be conducted so as to prevent damaging effects of sediment production and dust on the site and on adjoining properties.
4. When vegetation has to be removed on site, the methods shall be one that minimizes the erosive effects from the removal.
5. Exposure of soil to erosion by removing vegetation shall be limited to the area required for construction operations. The construction area shall be fenced to define the project.
6. Temporary mulching, seeding, or other suitable stabilization shall be used to protect areas during construction or other land disturbance activities on site.
7. Topsoil, removed from the surface in preparation for grading and construction activities on site is to be stored on or near the site and protected from erosion while grading operations are underway, provided that such storage may not be located where it would cause suffocation of root systems of trees to be preserved. After completion of such grading, topsoil is to be restored to exposed cut and fill embankments of building pads so as to provide a suitable base of seeding and planting.
8. Sediment basins, sediment traps, or similar control measures shall be installed before extensive clearing and grading operations begin for site development.
9. Water or dust palliatives shall be applied to exposed earth services as necessary to control dust emissions.
10. Re-vegetation or stabilization of exposed earth surfaces shall take place as soon as possible.

F. Removals:

1. Clear the site of trees, shrubs, and other vegetation, which is indicated to be removed.
2. Completely remove stumps, roots, and other debris to avoid problems with future utilities.
3. Use only hand methods for grubbing inside the drip line of trees indicated to be left standing.
4. Existing fills, soil containing debris, organics, pavement, or other unsuitable materials shall be excavated and removed prior to commencing grading operations.
5. The limits and depths for removal of existing fill materials shall be evaluated by project soils engineer during grading.
6. Re-vegetation or stabilization of exposed earth surface shall take place as soon as possible.
7. Remove vegetation, improvements, or obstructions interfering with installation of new construction. Transport and legally dispose of off-site. Removal includes stumps and roots. Entire root mat within upper few to several inches of ground surface shall be removed and wasted off-site. Care shall be taken so as not to scar any area of the tree's bark. Contractor shall utilize the best construction method to minimize the erosive effect from the removal of site vegetation.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 TRENCHING AND BACKFILL FOR UTILITY TRENCHES

A. Excavate trenches to uniform widths to provide the required clearance on each side of pipe or conduit.

B. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade. Excavate trenches deeper than bottom of pipe and conduit elevations to allow for bedding course.

1. Trench and backfill construction for storm drain pipe shall be in accordance with Caltrans Standard Plans Drawing A62-D for concrete culverts and A62-F for metal and plastic culverts.
2. All sewer and domestic water trenching and backfill shall be in accordance with Ventura County construction standards.
3. Private fire main trenching and backfill shall be in accordance with the current edition of NFPA 24 and as approved by the Ventura County Fire Department.
4. For utilities not listed, contact the utility service provider for their trenching and backfill requirements.
5. All utility trench backfill in building pad and pavement areas shall be in conformance with the Geotech Report.

3.4 SUBGRADE INSPECTION

A. Notify Geotechnical Engineer when excavations have reached required subgrade.

B. If Geotechnical Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted fill material as directed.

C. Proof-roll subgrade to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Geotechnical Engineer, and replace with compacted fill material as directed.

D. Reconstruct subgrades damaged by rain, accumulated water, or construction activities.

3.5 STORAGE OF SOIL MATERIALS

A. Stockpile imported soil materials and excavated materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations.

3.6 EXCAVATION

A. Excavation for Pavements: Cut surface under pavements to comply with cross-sections, elevations and grades as shown, within a tolerance of plus or minus 0.04 foot.

B. Excavation for Planting Areas: Conform to cross-sections, elevations and dimensions shown, within a tolerance of plus or minus 0.10 foot.

3.7 COMPACTION

A. General: Control soil compaction during construction providing minimum percentage of density specified for each area, under the provisions of the Geotechnical Report.

B. Processing and Placement of Fill Materials: Onsite or imported fill soil shall be placed and compacted at a moisture content to at least +3.5 percent of the optimum moisture content for clayey soils and for sandy soils. Each layer should be spread evenly and shall be thoroughly blade-mixed during spreading to provide relative uniformity of material within each layer. Blocky or chunky earth materials shall be broken down to pea-size or finer during processing and prior to application of compactive effort. Where imported soils are placed adjacent to onsite fill material, the soil should be mixed to provide relative uniformity of material within the layer being placed.

C. Fill shall be spread in lifts no thicker than about 6 inches prior to being compacted. Fill and backfill materials may need to be placed in thinner lifts to achieve the recommended compaction with the equipment being used. Loose lift thickness shall not exceed 6 inches when using hand-operated compaction equipment.

D. Fill soil shall be compacted to not less than the relative specified in the Geotechnical Report and in accordance with ASTM D1557 method of compaction.

E. Moisture Control:

1. When moisture content of exposed scarified soil and/or full material is below that sufficient to achieve recommended compaction, water shall be added to the soil and/or fill. While water is being added, soil shall be bladed and mixed to provide relatively uniform moisture content throughout the material.
2. When moisture content of exposed scarified soil and/or fill material is excessive, material shall be aerated by blading or other methods. Fill placed in pavement areas shall be compacted at near optimum moisture content. Jetting is not permitted for compaction.

3.8 FILL

A. In all excavations, use satisfactory excavated or borrow material sampled and tested by the County's Testing Laboratory.

B. Onsite or imported fill material shall be free of organics, debris, or rocks larger than 4 inches.

C. Fill excavations as promptly as Work permits, but not until completion of the following:

1. Acceptance by the County Representative of construction below finish grade including, where applicable, waterproofing, damp-proofing, and drainage pipe.
2. Examination, testing, approval and recording locations of underground utilities.
3. Removal of concrete formwork.
4. Removal of shoring, bracing, and backfilling of voids with satisfactory materials.
5. Removal of trash and debris.
6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
7. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation,
8. Protect excavations by methods required to prevent movements and/or loosening of soils providing lateral or vertical support to existing improvements.
9. Deepen bottom of over-excavations in building areas to limit fill thickness gradient to less than 20 percent.

D. Continual dust control, as required by the County, and in accordance with County Air Pollution Control District's Standards shall be required for the project construction.

3.9 IMPORT

A. Initial sample and testing shall be performed before importing material to the project site. Identify the location of the source site in addition to the address, name of the person and entity responsible for the source site. A geotechnical engineer, retained by the County, shall obtain both the initial and additional samples from the identified site and submit samples for required testing.

B. Soil samples shall be tested by an independent approved testing laboratory that shall perform the required tests. Test results shall be provided noting if the tested materials passed or failed such tests and shall be furnished to the County, IOR, Engineer, and others as required. Report shall state material was tested in accordance with applicable provisions of the Contract Documents and California Building Code. Upon the completion of the Work, the independent testing laboratory shall submit a verified report.

C. Upon completion of the import operations, provide the County a certification statement attesting that the imported material has been obtained from the identified and approved source site.

3.10 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. To provide support for building floor slabs, all existing fill and unsuitable natural soils shall be excavated and replaced as properly compacted fill.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:

1. Turf or Unpaved Areas: Plus or minus 0.1-feet.
2. Pavements: Plus or minus 0.02-feet.

C. Compaction: After grading, compact subgrade surfaces to the depth and percentage of compaction for each area classification.

D. Fill placement and grading operations shall be performed only under the observation of the County's Testing Laboratory.

E. The exterior grades around building areas shall be sloped to drain away from the buildings to prevent ponding of water adjacent to foundations.

F. Grading operation shall be conducted so as to prevent damaging effects of sediment product and dust on the site and adjoining properties.

G. Proposed building areas shall be over excavated to the subgrade as specified in the Geotechnical Report.

H. Areas outside "building area" to receive exterior flatwork shall be over excavated to a minimum depth specified in the Geotechnical Report.

I. Areas to receive pavement shall be over excavated to a depth specified in the Geotechnical Report.

J. Excavation bottoms shall be observed by the Geotechnical representative prior to placement of fill.

K. The Contractor shall protect excavations by methods necessary to prevent movements and/or loosening of soils providing lateral or vertical support to existing improvements.

3.11 SUBGRADE PREPARATION AND COMPACTION OF SOIL BACKFILLS AND FILLS

A. Refer to the Geotech Report for subgrade preparation, compaction and moisture conditioning requirements.

3.12 BASE COURSES UNDER PAVEMENTS AND WALKS

A. On prepared subgrade, place base course under pavements and walks as follows:

1. Shape base course to required crown elevations and cross-slope grades.
2. Place base course 6 inches or less in compacted thickness in a single layer.
3. Compact base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent relative compaction.

3.13 FIELD QUALITY CONTROL

A. The Contractor shall retain the services of a licensed Geotechnical Engineer to provide observation and to evaluate the site earthwork operations to check that subgrade soils are suitable for placement of engineered fill or improvements and to provide testing services to check that engineered fill, aggregate base and asphalt concrete is placed and compacted in accordance with the project drawings and Geotechnical Engineer's recommendations.

B. Test compaction of soils in place according to ASTM D 1557 or as specified by the Geotechnical Engineer. Tests will be performed at locations and frequencies required by the Geotechnical Engineer.

C. When subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; re-compact and re-test until specified compaction is obtained.

D. Upon completion of the Building pad, a pad certification will be prepared by the Engineer

3.14 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, compact to required density and provide other corrective work as specified, with retesting, prior to further construction.

D. Earth materials and improvements constructed thereon shall be supported laterally and vertically, as needed, to prevent movements and deflections of same. Remediation and repair of loosened materials or movements of improvements shall be at the Contractor's expense.

3.15 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus unsatisfactory soil and waste materials, including trash, and debris, and legally dispose of them off Owner's property.

B. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Owner.

END OF SECTION F20

SECTION F30 - TRENCHING AND BACKFILLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Excavating trenches for construction of utilities.
2. Trench backfill materials.
3. Backfilling and compacting requirements.

1.2 related documents

A. Standard Specifications for Public Works Construction (SSPWC), latest edition.

B. Geotechnical Data Report, Todd Road Jail Health Unit Facility, Project No. 04.62160076_R1, prepared by Fugro USA Land Inc., Dated January 13, 2017.

1.3 SUBMITTALS

A. Materials source.

B. Sand equivalent test reports per ASTM D2419.

C. Certificates.

D. Drawings for shoring, bracing, sloping, or other provisions for worker protection for any excavation shall conform to the requirements of the CAL/OSHA Construction Safety Orders Requirements.

1.4 QUALITY ASSURANCE

A. Codes and Standards: Perform earthwork in compliance with applicable requirements of governing authorities having jurisdiction.

1.5 EXISTING UTILITIES

A. Prior to excavation, the Contractor shall notify the County Representative to obtain any additional information which may be applicable to the Work.

B. Any incident of a utility being inadvertently damaged by the Contractor shall be immediately shut-off and then be immediately repaired by the Contractor at no cost to the County.

C. Contractor to pothole all utility connections and verify exact size, location and material prior to beginning construction and notify the County Representative of any discrepancies.

PART 2 - PRODUCTS

2.1 APPROVALS

A. Imported material shall be approved by the County Representative prior to being brought to the site. Provide a sample of the material in sufficient quantity for the County Representative's use in evaluating the material.

2.2 TRENCH BEDDING AND BACKFILL MATERIAL

A. Bedding and pipe zone materials extending from six inches below the bottom of pipe to one foot above top of pipe shall be sand and have a sand equivalent (SE) of 30 or greater.

B. Crushed aggregate for trench stabilization shall be crushed aggregate base per SSPWC Section 200-2.2.

C. Slurry backfill (2 sack) shall conform to the requirements of SSPWC Sections 201-1 and 201-6.

D. On-site native soil for trench backfill shall conform to Section 31 20 00, Earthwork, Subsections 3.04 Fill, and SSPWC Section 306-1.2.1 and 306-1.3.

E. Topsoil shall be Class B topsoil in accordance with Section 212-1.1.3 of the SSPWC. Topsoil removed from trenches shall be stockpiled at locations approved by the County Representative.

2.3 SOURCE QUALITY CONTROL

A. Inspection and testing shall be performed by the County's Testing Laboratory.

PART 3 EXECUTION

3.1 PREPARATION

A. Identify required lines, levels, contours, and datum.

3.2 TRENCH EXCAVATION

A. All saw cutting shall be neat, straight cuts and shall conform to SSPWC Section 300-1.3.2. All cuts shall be square unless otherwise specifically noted on plans.

B. Trench excavation shall conform to the specifications of the Geotechnical Report, SSPWC Section 306-1.1, and the following requirements:

1. The bottom of the trench shall be graded and prepared to provide a firm and uniform bearing throughout the entire length of the pipe barrel. Suitable excavations shall be made to receive the bell of the pipe and the joint shall not bear upon the bottom of the trench. All adjustments to line and grade shall be made by scraping away or filling in with sand under the body of the pipe and not by wedging or blocking.
2. If the trench is excavated below the required grade, correct any part of the trench excavated below the grade, at no additional cost to the County, in accordance with the Geotechnical Report. Place the backfill material over the full width of trench in compacted layers not exceeding 6 inches deep to the established grade with allowance for the pipe base.
3. If shoring is required, the trenches shall be shored and braced in accordance with the Trench Construction Safety Orders of the Division of Industrial Safety.
4. When subgrade is encountered that in the opinion of the County Representative is unsuitable for pipe support, The County Representative may order the excavation to be carried to an approved depth below the bottom of the pipe and backfilled with sand, to the lines and grades shown on the drawings and specified by the County Representative.
5. The minimum width of the trench at the top of the pipe zone shall be as necessary to install the pipe. The utility lines shall be centered in the trench. In the event of (1) actual physical interference between existing crossing subsurface utilities and the proposed utility lines and (2) vertical discrepancy in connecting proposed utility lines to existing utility system, a minimum clearance of 1 foot between the utility line and the crossing, interfering utility shall be provided, unless otherwise indicated on the plans.

6. Where existing utilities or tree roots are to be protected, trench excavation shall be by hand. No mechanical excavating equipment shall be used within 6 inches of any utility or root.
7. Trenching machinery may be used for excavations provided the specified trench width can be maintained.

3.3 TRENCH BACKFILL

A. Pipe bedding and trench backfill materials: Suitable imported pipe bedding for utilities shall consist of material having a sand equivalent of at least 30. The sand backfill material shall be placed within the pipe zone that extends from six inches below the bottom of the pipe to at least 12 inches above the top of the pipe for the full width of the trench. The horizontal distance between the spring line of the pipe and the side walls of the trench shall be such that bedding material can be properly placed and compacted below the haunches of the pipe. Mechanical compaction of bedding and pipe zone materials shall be performed and water consolidation (jetting) methods of compaction shall not be permitted. Placement, processing, and compaction of bedding and pipe zone materials shall be consistent with Section 31 20 00, Earthwork, Subsections 3.03 Compaction and 3.04 Fill, of these specifications and SSPWC Section 306-1.

B. Trench backfill placed above the pipe zone shall consist of suitable onsite or imported soil or cement slurry per plan and trench section. The trench backfill materials shall be compacted to at least 90% relative compaction. Mechanical compaction of trench backfill shall be performed and water consolidation (jetting) methods of compaction shall not be permitted. Trench backfill in landscape areas shall be compacted to a minimum of 90% relative compaction or per landscape specifications, whichever is more stringent.

C. Trench backfill shall be moisture conditioned and processed and compacted consistent with Section 31 20 00, Earthwork, Subsections 3.03 Compaction and 3.04 Fill, of these specifications and SSPWC Section 306-1:

1. During the process of laying pipe in trenches, sufficient material shall be carefully placed and hand tamped about the pipe to hold it firmly to established line and grade. Oversized material, broken rock or shale, if encountered, shall not be used for backfill.
2. No motor driven mechanical compacting equipment shall be used over pipelines until the backfill has been compacted to 12 inches over the crown of the pipe.
3. All backfill material shall be deposited in horizontal layers not exceeding the thickness specified in Section 306-1.3.2 of the SSPWC and not exceeding 8 inches in thickness. The distribution of materials shall be such that all material following compaction and consolidation will form a homogeneous mass free of voids, pockets, streaks or other imperfections. Backfilling shall be done with earth free from lumps, hardpan, chunks, paving material, organic matter or other deleterious substances.
4. Jetting of bedding or backfill material to obtain specific moisture content or for compaction shall not be permitted. If encountered, existing fill in the utility excavation shall be excavated and recompacted or removed and replaced with new fill materials per requirements of Section 2.2 of this section.
5. Appropriate warning detector tape shall be placed over all utilities. Underground detectable warning tape shall be placed over all non-metallic underground utilities.
6. Prior to final cleanup or resurfacing, the County's Testing Laboratory shall take compaction tests in any backfill area and at any depth, with the Contractor providing equipment and operator to assist in such test. If any such compaction test fails, the Contractor shall correct such failure and pay for any retesting that is required. The County's Testing Laboratory shall take as many tests as is required to receive a satisfactory and acceptable job.

3.4 STOCKPILING

A. Stockpiling of imported materials or excavated materials shall direct surface water away from approved stockpile site to prevent erosion.

B. After stockpiles are removed, leave area in a clean and neat condition.

3.5 FIELD QUALITY CONTROL

A. Inspection and testing shall be performed by the County's Testing Laboratory.

B. Samples of materials shall be furnished to the testing service by the Contractor at least one week before their anticipated use.

C. Work of this Section includes smoothing out areas for density tests and otherwise facilitate testing work, as directed.

END OF SECTION F30

SECTION F40 - SITE WATER DISTRIBUTION PIPING

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes water-distribution piping and related components outside the building for domestic water service and fire-service mains.

B. Utility-furnished products include water meters that will be furnished to the site, ready for installation.

C. This section also includes the following:

1. Pipe and fittings for site water lines.
2. Valves.
3. Fire hydrants.
4. Water Meters.
5. Backflow Preventers.

1.2 RELATED DOCUMENTS

A. American Water Works Association Standards (AWWA).

B. Ventura County Waterworks Manual, 2nd Edition.

C. Ventura County Waterworks District No. 1, 16,17, & 19 Water Construction Standards

D. Standard Specifications for Public Works Construction (SSPWC), latest edition.

E. Geotechnical Data Report, Todd Road Jail Health Unit Facility, Project No. 04.62160076_R1, prepared by Fugro USA Land Inc., Dated January 13, 2017.

1.3 SUBMITTALS

A. Submit the following:

1. Product Data: Provide data on pipe materials, pipefittings, valves, fire hydrant and accessories.
2. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.4 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of piping mains, valves, connections, fire hydrant and invert elevations.

B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with requirements of agency or utility company supplying water. Include tapping of water mains and backflow prevention.
2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

C. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.

D. NSF Compliance:

1. Comply with NSF 14 for plastic potable-water-service piping. Include marking "NSF-pw" on piping.
2. Comply with NSF 61 Annex G for materials for water-service piping and specialties for domestic water.

E. Valves: Manufacturer's name and pressure rating marked on valve body.

1.6 COORDINATION

A. Coordinate connection to water main with utility company.

1.7 DELIVERY AND STORAGE

A. Deliver and store valves in shipping containers with labeling in place.

PART 2 – PRODUCTS

2.1 GENERAL

A. All water lines shall be designed for a minimum working pressure of 250 psi. All fittings and appurtenant piping materials shall be designed for a minimum working pressure of 250 psi unless otherwise indicated.

2.2 PIPE AND FITTINGS

A. Copper Tube: Type K.

B. PVC, HDPE or SCH-40 Complying with NSF 14 for plastic potable-water-service piping.

C. Polyvinyl Chloride (PVC) potable water pipe: For pipe size smaller than 4-inch diameter, pipe material shall be polyvinyl chloride (PVC) schedule 80 solvent weld pipe and shall be manufactured in accordance with ASTMD-1785, or type K Copper pipe shall be used as indicated on plans. For pipe size equal or larger than 4-inch diameter, pipe material shall be (Polyvinyl chloride (PVC) pressured pipe and shall be manufactured in accordance with AWWA Standard Specification C-900).

D. Joints: Mechanical joints shall be used for the waterline construction unless otherwise shown on plans and standard details. Gaskets for mechanical joints shall be rubber conforming to ANSI A21.11 and AWWA C111.

E. Fittings: Conform to the Ventura County Waterworks Manual and Water Construction Standards.

2.3 GATE VALVES

A. Conform to AWWA C-509-01.

2.4 FIRE HYDRANT

A. Conform to the Ventura County Waterworks Manual and Water Construction Standards.

2.5 WATER METER

A. Conform to the Ventura County Waterworks Manual and Water Construction Standards.

2.6 BACK FLOW PREVENTER

A. Irrigation and Domestic Water backflow preventer shall conform to the Ventura County Waterworks Manual and Water Construction Standards.

B. Fire water line backflow preventer shall be Double Detector Check Assembly and approved by the Ventura County Water District.

2.7 ACCESSORIES

A. Concrete for Thrust Blocks: Contractor shall construct concrete thrust block per the Ventura County Waterworks Manual and Water Construction Standards.

B. Thrust blocks shall be constructed to bear against undisturbed earth and shall not bear against adjacent pipe, fittings, or valves. Where concrete must be poured around adjacent pipe, a block out or a short pipe length shall be used such that a flexible joint exists within 12 inches of each side of thrust block, unless indicated otherwise on the plans. Concrete shall not be allowed to set in contact with pipe surfaces or to enter or come in contact with any joint.

C. Valve Appurtenances: The Contractor shall furnish and install all valve appurtenances. Provide two galvanized T-handled operating wrenches, 4 feet total length or as required to easily access valve from grade.

D. Valve box body shall be unreinforced concrete 8 ¾ inch inside diameter traffic box with cast iron ring. The valve box cover shall be cast iron. The cover shall be marked "WATER." The cover of each valve box shall be provided with a 2-inch diameter bronze disc and the Contractor shall stamp the valve number on the disc per the County Representative's instructions. The disc shall be mounted to the valve box cover or higher using stainless steel screws. The extension piece shall be 8-inch in diameter, Class 235 P.V.C. water line conforming to the requirements of AWWA C-900.

E. Appropriate warning detector tape shall be placed over all utilities.

1. Underground detectable warning tape shall be placed over all non-metallic underground utilities.
2. 12 gauge copper continuous location wire shall be placed on all water mains.

F. All copper pipe to be encased in plastic sleeve.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify the existing water main sizes, class of pipes, and locations as indicated.

3.2 PREPARATION

A. Remove scale and dirt, on inside and outside, before assembly.

B. Prepare pipe connections to equipment with flanges or unions.

3.3 BEDDING

A. Excavate pipe trench in accordance with Section F30 – Trenching and Backfilling for work of this section. Hand trim excavation for accurate placement of pipe to elevations indicated.

B. Place bedding material at trench bottom, level fill materials in one continuous layer not exceeding 6 inches compacted depth, compact to minimum 90 percent compaction.

C. The compaction of the backfill material along the sides and one foot above the pipe shall be done with hand tampers to protect the pipe. Jetting is not permitted to obtain required compaction.

D. Maintain optimum moisture content of bedding material to attain required compaction density.

3.4 INSTALLATION - PIPE

A. Route pipe in straight line.

B. Install pipe to allow for expansion and contraction without stressing pipe or joints.

C. Install access fittings to permit disinfection of water system.

D. Form and place concrete for thrust blocks at each elbow or change of direction of pipe main.

E. Establish elevations of buried piping to ensure cover conforming to the County Water Construction Standards. The minimum cover from the finish grade to the top of pipe is 42 inches for potable and fire waterline, any shallower cover to clear with the existing utility crossings shall be reviewed and approved by the County Representative.

F. Install 12-gauge copper continuous location wire on all water mains.

G. Backfill trench in accordance with Specification Section 31 23 33 and the County Water Construction Standards.

H. Maintain separation of water main from sewer piping in accordance with the State Department of Health Services, Criteria for the Separation of Water Mains and Sanitary Sewers (Section 64630, Title 22 California Administrative Code), and State Regional Water Quality Control Board.

I. All pipe laid in trench which is to be left for further extension (i.e., end of work day) shall have its open end covered to protect from possible rodent intrusion.

3.5 INSTALLATION - VALVES

A. Set valves on solid bearing.

B. Center and plumb valve box over valve. Set box cover flush with finished grade.

C. Provide concrete collar around valve box.

3.6 PRESSURE TEST OF WATER PIPING SYSTEM

A. Water piping system shall be pressure tested for 2 hours at 200 psi, with no allowable drop in water pressure.

B. All leakage tests shall be completed and approved prior to placing of permanent resurfacing.

C. Pressure test shall be witnessed by District Representative.

3.7 DISINFECTION AND BACTERIA TESTING OF WATER PIPING SYSTEM

A. Water piping system shall be disinfected and flushed per AAWA Section C651.

B. Before pipeline is connected to existing system, or placed in service, employ an approved independent testing laboratory to sample, test and certify water quality.

3.8 TEST RECORDS

A. Records shall be made of each piping system installation during the test. These records shall include:

1. Date of test.
2. Description and identification of piping tested.
3. Test fluid.
4. Test pressure.
5. Remarks to include such items as:
    a) Leaks (type, location).
    b) Repairs made on leaks.
6. Certification by Contractor and signed acknowledgment by Inspector of Record.

3.9 FIELD QUALITY CONTROL

A. Inspection shall be performed by Inspector of Record.

END OF SECTION F40

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SECTION F50 - SITE SANITARY SEWERS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipe and Fittings.
2. Cleanouts.
3. Manholes.

1.2 Related documents

A. Standard Plans for Public Works Construction (SPPWC), latest edition.

B. Ventura County Sewerage Manual.

C. Ventura County Waterworks Manual, 2nd Edition.

D. Geotechnical Data Report, Todd Road Jail Health Unit Facility, Project No. 04.62160076_R1, prepared by Fugro USA Land Inc., Dated January 13, 2017.

1.3 SUBMITTALS

A. Submit:

1. Product Data: Provide data indicating pipe, pipe accessories and appurtenances, and manhole covers.
2. Manufacturer's Installation Instructions: Indicate special procedures required to install products specified.
3. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
4. Manufacturer's Certificate: Certify that installers are certified for installing plastic pipe.

1.4 PROJECT RECORD DOCUMENTS

A. Submit Record Drawings: Record location of pipe runs, connections, manholes, cleanouts, and invert elevations.

B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.5 REGULATORY REQUIREMENTS

A. Conform to California Title 24 (CCR) Part 5, latest edition, for installation of the Work of this section.

B. Minimum separation distance and requirements between water, reclaimed water and sewer pipes per the State of California, Department of Health Services shall be established.

C. On-site sanitary sewers shall designed and constructed in accordance with the current edition of the California Plumbing Code.

PART 2 – PRODUCTS

2.1 DUCTILE IRON PIPE AND FITTINGS

A. If gravity sewer main is installed outside of a paved roadway, ductile iron pipe is required.

B. Ductile iron shall be cement lined and, new pipe conforming to the requirements of ASTM D-2241.

C. Ductile iron pipe shall be encased in polyethylene film conforming to ANSI/AWWA C105/A21.5-99 or most recent issue.

D. Fittings: rubber gasket push on ASTM D3139 and ASTM F-477, or mechanical joints.

2.2 PVC PIPE AND FITTINGS

A. Pipe: Polyvinyl Chloride (PVC) Pipe for Gravity Sewer: ASTM 3034-SDR35 (SDR26 for sewer improvements within City Right-of-Way) Ring-Tite Polyvinyl Chloride (PVC) gravity sewer pipe and fittings; inside nominal diameter as indicated on Drawings. PVC pipe shall use "locked-in" rubber sealing ring conforming to ASTM D-3212. Joints using flexible Elastomeric Seals. Minimum pipe stiffness at 5 percent deflection shall be 46 psi for all sizes when tested in accordance with ASTM Method of Test D2412.

B. Appropriate warning detector tape shall be placed over all utilities.

1. Underground detectable warning tape shall be placed over all non-metallic underground utilities.

C. Fittings: ASTM D 3034, PVC with bell ends with gaskets ASTM F 477, elastomeric seals

2.3 CLEANOUTS

A. Cleanouts and plugs:

1. Riser to extent to 6-inches below finished ground surface.
2. Cleanout box with lid marked sewer.
3. Cleanout plugs shall all be of the same type, and shall be Cherne End of Pipe "Original Gripper" or ETCO "T-Cone" style, or an approved equivalent. Glue on female adapters will not be permitted.
4. Form and cast-in-place, Class 470-B-2500 concrete base pad, with provisions for sewer pipe end section.
5. Frame and cover shall be per the Ventura County Sewerage Manual.

2.4 MANHOLES

A. Standard Precast Concrete Manholes:

1. Diameter: 48 inches minimum unless otherwise indicated.
2. Joint Sealant: ASTM-C-990 bitumen or butyl rubber.
3. Precast manhole base unless poured in place.

B. Concrete for cast in place manhole bases shall be Class A Portland cement concrete and shall be poured full thickness against the sides of the manhole excavation or shall be formed.

C. Manhole Frames and Covers:

1. Description: 24-inch heavy duty frame and cover. Include indented top design with lettering cast into cover, using wording equivalent to "SANITARY SEWER."

D. Form and cast-in-place, Class 560-C-3250 concrete base pad, with provisions for sewer pipe end section in accordance with the Ventura County Sewerage Manual.

E. Frame and cover shall be Alhambra Foundry or equal, lettered "S" per the Ventura County Sewerage Manual.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that trench cut and/or excavation base is ready to receive work and excavations, dimensions, and elevations are as indicated on drawings.

3.2 PREPARATION

A. Hand trim excavations to required elevations. Correct over excavation with granular fill.

B. Remove large stones or other hard matter which could damage pipe or impede consistent backfilling or compaction.

3.3 BEDDING

A. Excavate pipe trench in accordance with Specification Section 31 23 33. Hand trim excavation for accurate placement of pipe to elevations indicated on drawings.

B. Place bedding material at trench bottom, level materials in continuous layer not exceeding 6-inches compacted depth, compact to minimum 90% relative density.

C. Maintain optimum moisture content of bedding material to attain required compaction density.

3.4 INSTALLATION - PIPE

A. Install pipe, fittings and accessories in accordance with manufacturer's instructions.

B. Sewer pipeline shall be placed from downstream to upstream beginning at the downstream connection to the existing sewers.

C. Lay pipe to slope gradients noted on drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

D. Install bedding along sides and over top of pipe to minimum compacted thickness of 12 inches; compacted to 90 percent density.

E. Refer to Specification Section 31 23 33 for Trenching Requirements. Do not displace or damage pipe when compacting.

F. Install continuous trace wire over top of pipe.

G. Connect to building sanitary sewer lateral at 5-foot outside of edge of building.

H. The compaction of the backfill material along the sides and one foot above the pipe shall be done with hand tampers to protect the pipe.

3.5 INSTALLATION – MANHOLES

A. Form bottom of excavation clean and smooth to correct elevation.

B. Establish elevations and pipe inverts for inlets and outlets as indicated on plans.

C. Mount lid and frame level in grout, secured to cone section to elevation indicated on drawings.

3.6 INSTALLATION – CLEANOUTS

A. Form bottom of excavation clean and smooth to correct elevation.

B. Establish elevations and pipe inverts for inlets and outlets as indicated on plans.

C. Mount lid and frame level in grout, secured to cone section to elevation indicated on drawings.

3.7 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed by the County's Testing Laboratory.

B. Request inspection prior to, and immediately after placing bedding.

C. Compaction testing will be performed in accordance with ASTM D1557 by the County's Test Laboratory.

D. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to the County.

3.8 FIELD TESTS ON INSTALLED SEWER PIPE

A. Preliminary Tests: The Contractor may perform any tests desired which are not harmful to the lines before backfilling is completed.

B. Cleaning: Before final tests are performed for acceptance of any sewer pipe, clean the pipe by inflatable rubber ball method.

C. Perform air pressure test per SSPWC Section 306-1.4.4.

D. Repairs, if necessary: If the leakage or infiltration is greater than the amount specified, the pipe shall be overhauled and re-laid if necessary by the Contractor, at its own expense, until the joints will hold satisfactorily.

E. Regardless of the results of the above tests, any visible evidence of individual leaks shall be corrected by the Contractor to the satisfaction of the County Representative.

F. Cleaning Sewer: After all backfilling, compaction testing and paving is completed, sewer lines shall be cleaned by Inflatable Rubber Ball Method, flushed and cleaned, before acceptance by the County Representative and connection to their sewer system is made.

G. The Contractor shall furnish all sewer line plugs necessary for blocking off all lines as required by the County Representative until final acceptance.

3.9 PROTECTION

A. Protect finished installation.

B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

END OF SECTION F50

SECTION F60 – SITE STORM DRAINAGE

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipe and fittings.
2. Drain Inlets.
3. Manholes.
4. Catch basins.
5. Pipe and curb opening outfalls.

1.2 Related documents

A. Standard Specifications for Public Works Construction (SSPWC), latest edition.

B. Standard Plans for Public Works Construction (SPPWC), latest edition.

C. Geotechnical Data Report, Todd Road Jail Health Unit Facility, Project No. 04.62160076_R1, prepared by Fugro USA Land Inc., Dated January 13, 2017.

1.3 SUBMITTALS

A. Submit the following:

1. Product Data: Provide data indicating pipe, pipe accessories and catch basin grates.
2. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.
3. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
4. Layout diagram for storm drain components per plan.

1.4 PROJECT RECORD DOCUMENTS

A. Submit record drawings. Accurately record locations of pipe runs, connections, catch basins, structures, manholes and invert elevations.

B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.5 FIELD MEASUREMENTS

A. Verify that field measurements and elevations are as indicated on drawings.

B. Complete pothole work per plans and notify the District of any discrepancy prior to commencing construction.

1.6 COORDINATION

A. Coordinate the work with connection to existing storm drain mains, and trenching.

PART 2 – PRODUCTS

2.1 ABS PIPE AND FITTINGS

A. ABS Sewer Pipe and Fittings: ASTM D 2751, with bell-and-spigot ends for gasketed joints. Use ABS for storm drainage piping only when less than 6-inch diameter pipes are used.

1. SDR-35 pipe and fittings.

B. Gaskets: ASTM F 477, elastomeric seals.

2.2 PVC PIPE AND FITTINGS

A. PVC PLASTIC PIPE per SSPWC Section 207-17.

2.3 HDPE PIPE AND FITTINGS

A. Dual Wall (smooth interior wall and corrugated exterior wall) HDPE Drainage Pipe and Fittings: ADS N12 or equivalent.

B. HDPE (High Density Poly Ethylene) per SSPWC Section 207-18.

2.4 CONCRETE PIPE AND FITTINGS

A. Class III Reinforced Concrete Sewer Pipe and Fittings.

1. Bell-and-spigot ends and gasketed or sealant joints.

B. Reinforced Concrete Pipe (RCP), per SSPWC Section 207-2.

2.5 PIPE ACCESSORIES

A. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required. Fittings shall be watertight.

B. Solvent cap cement: pipe with solvent cement joints per SSPWC Section 207-17.3.3.

C. Appropriate warning detector tape shall be placed over all utilities.

1. Underground detectable warning tape shall be placed over all non-metallic underground utilities.

2.6 CATCH BASINS

A. Precast catch basins shall include traffic-rated and pedestrian-rated grate, as manufactured by Brooks Products or approved equal.

B. Cast-in-place catch basins shall be per plan.

C. Trench drains shall be NDS DuraSlope or approved equal.

2.7 MANHOLES

A. Precast Concrete Manholes:

1. Diameter: 48 inches minimum unless otherwise indicated.
2. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
3. Precast manhole base unless poured in place.

B. Concrete for cast in place manhole bases shall be Class A Portland cement concrete and shall be poured full thickness against the sides of the manhole excavation or shall be formed.

C. Manhole Frames and Covers:

1. Description: 24-inch heavy duty frame and cover. Include indented top design with lettering cast into cover, using wording equivalent to "STORM DRAIN."

2.8 PIPE AND CURB OPENING OUTFALLS

A. Riprap: Caltrans RSP Backing #2 graded stone with a geotextile fabric below the stone is preferred. Dimensions of RSP outfalls shall be in accordance with County of Sonoma Construction Standard Drawing 402 unless otherwise indicated.

2.9 METAL

A. All exposed metal parts are to be galvanized in accordance with SSPWC Section 210-3 unless otherwise directed.

2.10 CONCRETE

A. Concrete material for pipe collars and beam support, manhole components, and catch basins:

1. Class 560-C-3250 Portland Cement Concrete per SSPWC Section 201-1.

B. Concrete material for pipe encasement, anchors, and thrust blocks:

1. Class 450-C-2000 or 565-E-2000P Portland Cement Concrete per SSPWC Section 201-1

2.11 BEDDING MATERIALS

A. Bedding materials shall be sand with a minimum Sand Equivalent (S.E.) of 30.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that trench cut is ready to receive Work and excavations, dimensions, and elevations are as indicated on Drawings.

3.2 PREPARATION

A. Hand trim excavations to required elevations. Correct over excavation with compacted bedding material.

B. Remove large stones or other hard matter which could damage piping or impede consistent backfilling or compaction.

3.3 BEDDING

A. Excavate pipe trench in accordance with Specification Section 31 23 33. Hand trim excavation for accurate placement of pipe to elevations indicated on the plans.

B. Place sand bedding material in trench bottom, level materials in continuous layer. Bedding shall be 6-inch minimum thickness, compact to 90% density.

C. Maintain optimum moisture content of bedding material to attain required compaction density.

3.4 INSTALLATION - PIPE

A. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Construct tongue-and-groove mortar type of joint on RCP per SSPWC Section 207-2.5.

B. Lay pipe to slope gradients noted on drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

C. Install sand backfill along sides and over top of pipe. Provide sand backfill over top of pipe to minimum compacted thickness of 12 inches, compacted to 90% density.

D. Refer to Specification Section 31 23 33 for Trenching Requirements. Do not displace or damage pipe when compacting.

E. The compaction of the backfill material along the sides and one foot above the pipe shall be done with hand tampers or equal to protect the pipe.

3.5 INSTALLATION - CATCH BASINS, MANHOLES

A. Form bottom of excavation clean and smooth to correct elevation.

B. Form and place cast-in-place concrete base with provisions for storm drainage pipe end sections.

C. Level top surface of concrete base to receive shaft sections.

D. Establish elevations and pipe inverts for inlets and outlets as indicated on drawings.

E. Compact top 12-inch of native materials below the bottom of catch basins and manholes to minimum 90% of relative density.

3.6 FIELD QUALITY CONTROL

A. Inspection and testing shall be performed by the County's Testing Laboratory.

B. Request inspection prior to and immediately after placing backfill cover over pipe.

C. If tests indicate work does not meet specified requirements, remove work, replace and retest at no additional cost to the County.

3.7 PROTECTION

A. Protect pipe and backfill cover from damage or displacement until backfilling operation is in progress.

END OF SECTION F60

SECTION F70 - AGGREGATE BASE COURSES

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes design criteria for aggregate base course for walkways and pavements.

1.2 RELATED DOCUMENTS

A. Standard Specifications for Public Works Construction (SSPWC), latest edition.

B. Geotechnical Data Report, Todd Road Jail Health Unit Facility, Project No. 04.62160076_R1, prepared by Fugro USA Land Inc., Dated January 13, 2017.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Aggregate Base Material shall be Crushed Aggregate Base (CAB) in accordance with SSPWC Section 200-2.2 or Crushed Miscellaneous Base (CMB) in accordance with SSPWC Section 200-2.4. Aggregate Base shall have a minimum sand equivalence of 35 and a minimum R-value of 78 and shall be free of organic materials and other deleterious substances.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify substrate has been inspected; gradients and elevations are correct, and dry.

B. Flatness: Maximum variation of 1/4 inch

C. Scheduled Compacted Thickness shall conform to the provisions of the SSPWC Section 301-2.2.

3.2 AGGREGATE BASE PLACEMENT

A. Aggregate base placement shall conform to the provisions of the SSPWC, Section 301-2.

B. Level and contour surfaces to elevations and gradients indicated.

C. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

D. Where the required aggregate base thickness is 6 inches or less, the watered base may be spread and compacted in one layer. Where the required thickness is more than 6 inches, the aggregate base material shall be spread and compacted in 2 or more layers of approximately equal thickness. The maximum compacted thickness of any one layer shall not exceed 6 inches.

3.3 FIELD QUALITY CONTROL

A. Inspection and testing shall be performed by the County's Testing Laboratory.

B. Compaction testing will be performed in accordance with ASTM D1557, latest edition.

C. If tests indicate work does not meet specified requirements, remove, replace, and retest work at no additional cost to the County.

END OF SECTION F70

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SECTION F80 – ASPHALT PAVING

PART 1 – GENERAL

1.1 SUMMARY

A. The aggregate and asphalt concrete should conform to the most recent version of the Caltrans Standard Specifications and the recommendations of the Geotech Report.

1.2 RELATED DOCUMENTS

A. Standard Specifications for Public Works Construction (SSPWC), latest edition.

B. Geotechnical Data Report, Todd Road Jail Health Unit Facility, Project No. 04.62160076_R1, prepared by Fugro USA Land Inc., Dated January 13, 2017.

1.3 SUBMITTALS

A. Product Data: Submit data on for each product specified. Include technical data and tested physical and performance properties.

B. Design Data: Submit job-mix designs for each job mix proposed for the work.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Conform to applicable standards of authorities having jurisdiction for asphalt paving work on public property.

B. Standards: Comply with Asphalt Institute's "The Asphalt Handbook," except where more stringent requirements are indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.

B. Store pavement-marking materials in a clean, dry, protected location and within temperature range required by manufacturer. Protect stored materials from direct sunlight.

1.6 PROJECT CONDITIONS

A. Environmental Requirements: Do not apply asphalt materials if substrate is wet or excessively damp or if the following conditions are not met:

1. Prime and Tack Coats: Minimum surface temperature of 60 degrees F.
2. Asphalt Base Course: Minimum surface temperature shall be in accordance with SSPWC.
3. Asphalt Surface Course: Minimum surface temperature shall be in accordance with SSPWC at time of placement.
4. Pavement-Marking: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 degrees F for oil-based materials, 50 degrees F for water-based materials, and not exceeding 95 degrees F. Apply pavement marking after seal coat has been applied and cured.

PART 2 – PRODUCTS

2.1 –GENERAL

A. Asphalt binder to be mixed with aggregate for asphalt concrete surface, leveling and base shall be PG64-16 grade paving asphalt.

B. Aggregate: 3/4-inch HMA Type A

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify compacted subgrade is acceptable and ready to support imposed loads.

B. Verify gradients and elevations of subgrade are correct.

C. Notify County Representative in writing of any unsatisfactory conditions. Do not begin paving installation until these conditions have been satisfactorily corrected.

D. Clean existing paving surface of loose and deleterious material immediately before any cold milling operations. Remove existing asphalt pavement, including hot-mix asphalt and, as necessary, unbound-aggregate base course, by cold milling to grades and cross sections indicated.

E. Repair or replace curbs, manholes, and other construction damaged during paving operations.

3.2 PATCHING AND REPAIRS

A. Tack Coat: Apply uniformly to existing surfaces of previously constructed asphalt or Portland cement concrete paving and to surfaces abutting or projecting into new, hot-mix asphalt pavement.

3.3 SURFACE PREPARATION

A. General:

1. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces.
2. Ensure that prepared subgrade is ready to receive paving.
3. Sweep loose granular particles from surface of unbound-aggregate base course.
4. Do not dislodge or disturb aggregate embedded in compacted surface of base course.

3.4 HOT-MIX ASPHALT PLACING

A. Place asphalt concrete pavement in accordance with SSPWC Section 302-5.

3.5 JOINTS

A. Construct joints in accordance with SSPWC Section 302-2.3.

3.6 COMPACTION

A. Install and compact AC paving in accordance with SSPWC Section 306.

3.7 INSTALLATION TOLERANCES

A. Thickness: Compact each course to produce the thickness indicated on the plans.

B. Surface Smoothness: Compact each course to produce a surface smoothness.

3.8 SURFACE TREATMENTS

A. Fog Seals: Apply fog seal to existing asphalt pavement and allow to cure. Lightly dust areas receiving excess fog seal with a fine sand.

3.9 FIELD QUALITY CONTROL

A. Testing Agency:

1. County may engage qualified independent testing agency to perform field inspections and tests and to prepare test reports.
2. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from specified requirements.

B. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.

C. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to SSPWC 302-5.6.2.

D. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

E. In-Place Density: Samples of uncompacted paving mixtures and compacted pavement will be secured by testing agency according to SSPWC.

F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

END OF SECTION F80

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SECTION F90 - CONCRETE PAVING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes concrete paving at:

1. Curbs and gutters.
2. Walkways.
3. Parking Lots.
4. Driveways.

1.2 related documents

A. Standard Specifications for Public Works Construction (SSPWC), 2012.

B. State of California Department of Transportation Standard Specifications (SSS), Caltrans, 2010 Edition.

C. American Concrete Institute (ACI) Standards.

D. Geotechnical Data Report, Todd Road Jail Health Unit Facility, Project No. 04.62160076_R1, prepared by Fugro USA Land Inc., Dated January 13, 2017.

1.3 PERFORMANCE REQUIREMENTS

A. Concrete Pavement: Required compressive strength for pedestrian walkways, curbs, and gutters shall be Ventura County Standards, ACI, and Section 201 of the SSPWC.

B. Cracking: All cracking shall occur within cut or hand tooled control joints.

1.4 SUBMITTALS

A. Product Data: Submit data on joint filler, admixtures, and curing compounds.

B. Concrete Mix Design: Submit current mix design with aggregate gradation, cylinder compression test results, and mix proportioning prior to beginning work. Design shall not be dated prior to three years before start date, which is indicated on the Notice to Proceed.

C. Delivery Tickets: Submit concrete delivery tickets, indicating mix I.D. number, time water was added, elapsed time from when water was added and concrete placed, and amounts of additional water added.

D. Work Schedule: Submit schedule to allow at least 24-hour notice of work to be performed or concrete poured to allow for appropriate schedules for testing and inspection.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI and SSPWC Standards.

B. Maintain one copy of each document on site.

C. Obtain cementitious and aggregate materials from same source throughout.

1.6 QUALIFICATIONS

A. Installer: Company specializing in performing work of this section with documented experience.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Do not place concrete when base surface temperature is less than 40 degrees F unless approved by County Representative, or surface is wet or frozen.

B. Concrete placed in cold weather conditions shall be done in accordance with ACI 306.

C. Conform to ACI 305 when concreting during hot weather.

PART 2 – PRODUCTS

2.1 CONCRETE MATERIALS

A. Cementitious Materials: Use the following cementitious materials, of same type, brand, and source throughout Project:

1. Portland Cement: ASTM C 150, gray Portland cement Type II.
2. Fly Ash or pozollan.

B. Normal-Weight Aggregates: ASTM C 33, uniformly graded.

1. Maximum Coarse-Aggregate Size: 1-inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Air-Entraining Admixture: ASTM C 260.

D. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

E. Water: Potable and complying with ASTM C 94.

2.2 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.

1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.

1. Continue steel reinforcement across construction joints unless otherwise indicated.
2. Butt Joints: Use epoxy-bonding adhesive at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.

1. Locate expansion joints at intervals of 50 feet unless otherwise indicated.
2. Extend joint fillers full width and depth of joint.
3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.

6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

2.3 DETECTABLE WARNING INSTALLATION

A. Detectable Warnings: Install detectable warnings as part of a continuous concrete paving placement and according to stamp-mat manufacturer's written instructions.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify compacted subgrade is acceptable and ready to support imposed loads.

B. Verify gradients and elevations of subgrade are correct.

3.2 PREPARATION

A. Moisten base to minimize absorption of water from fresh concrete. Compact subgrade material to a as specified in the Geotechnical Report.

B. Coat surfaces of manhole, catch basin, and valve box frames with oil to prevent bond with concrete pavement.

C. Notify County Representative minimum 24 hours prior to commencement of concreting operations.

3.3 FORMING

A. Place and secure forms to correct location, dimension, profile, and gradient.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.4 REINFORCEMENT

A. Place reinforcement as indicated on the Plans. Do not deviate from the required position.

B. Place reinforcement to achieve pavement and curb alignment as detailed.

C. Place, support, and secure reinforcement against displacement.

D. Provide doweled joints as indicated at interruptions of concrete (construction joint) at curbs and gutter, and all longitudinal joints.

3.5 PLACING CONCRETE

A. Place concrete in accordance with ACI 301 and 304 and SSPWC Sections 302-6 and 303-5.

B. Place concrete using mechanical screed, slip form or form paving type equipment, which will strike off, consolidate, and finish the pavement to the required cross section. A minimum 10-foot bull float or "bump cutter" shall be used following any paving equipment.

C. Ensure reinforcement, inserts, embedded parts, formed joints, and manhole or valve box lids are not disturbed during concrete placement.

D. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

E. Use of a vibrator or proper speed and size to properly consolidate the concrete when screeding by hand.

F. All curbs shall be poured monolithically.

G. Pre-molded 0.25-inch thick expansion joints conforming to SSPWC Section 303-5.4.2 shall be placed at ends of all curb returns and around utility poles.

H. Construct weakened plane joints conforming to SSPWC Section 303-5.4.3, 1-inch deep, at intervals not exceeding 10-feet.

I. Score lines conforming to SSPWC, Section 303-5.5.3 shall be made in walks.

J. The top edges of curbs shall have 0.5" radius.

3.6 JOINTS

A. Place weakened plane joints at as indicated on the plans but not to exceed recommendations of the Geotechnical Report. Construct expansion joints along walls and buildings. Align curb, gutter, and sidewalk joints when at all possible.

B. Joints shall be constructed by sawing concrete after is has set or by hand forming in the plastic concrete with an appropriate jointing tool. The transverse joints shall be hand tooled before the concrete has set.

C. Sawing shall begin as soon as the concrete has hardened sufficiently as to not allow raveling and before uncontrolled cracking occurs. Sawing shall take place regardless of rim of day or weather conditions to assure proper joints.

D. Saw cut contraction joints to the width and depth indicated.

3.7 FINISHING

A. Portland cement concrete paving shall be finished per Plans.

B. Direction of Texturing: Transverse to pavement direction.

3.8 JOINT SEALING

A. Proper cleaning and preparation of joints shall be completed prior to sealing operations, including but not limited to sandblasting per the sealant manufacturer's instructions. A clean joint shall be dry and have no visible signs of residual sealant or debris on the joint face, and will leave no residual cement powder or dust on your finger after rubbing the joint face.

B. All joints, including between pavement and curb and gutter, shall be sealed with joint sealant and backer rod.

C. Do not install sealant when temperature is below the dew point. If rain or other inclement weather occurs during joint preparation or sealing, all operations should cease and sufficient time must be allowed so that the joints are dry prior to starting or continuing the sealing operation.

D. A field adhesion test must be performed on a test section as follows:

1. Make a knife cut horizontally from one side of the joint to the other.
2. Make two vertical cuts (from horizontal cut) approximately 3-inches long, at both sides of the joint.
3. Place a mark 1-inch from the point where the 3-inch cuts stop.
4. Grasp the 2-inch piece of sealant firmly just beyond the 1-inch mark and pull at a 90-degree angle.
5. If dissimilar substrates are being sealed, check the adhesion of sealant to each substrate separately. This is accomplished by extending the vertical cut along one side of the joint, checking adhesion to the opposite side and then repeating for the other surface.

6. The adhesion test is considered passing when 1-inch of sealant is elongated to 4-inches without bond loss.

3.9 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed in accordance with ACI 301.

B. Provide free access to Work and cooperate with appointed firm.

C. Inspection and testing shall be performed by the County's Testing Laboratory.

D. The County's Testing Laboratory will perform slump and compressive strength tests.

E. Contractor shall maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.10 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, wind, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for a period necessary for hydration of cement and hardening of concrete.

C. Apply curing compound to unformed surfaces immediately after finishing, not to exceed 300 SF per gallon.

D. Remove forms only after concrete has attained sufficient strength to support all dead and live loads.

E. Contractor shall provide barricading or personnel as necessary to protect freshly finished concrete from vandalism or other damage.

F. Do not permit vehicular traffic over pavement for minimum 7 days after finishing.

END OF SECTION F90

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SECTION G1 – SITE FENCING

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Site fencing.

PART 2 – PRODUCTS

2.1 SECURITY FENCING

A. Use the following:

1. Galvanized chain link fencing.

a) Foundations: Class C concrete.
b) Material:

i) Framework: Hot dipped galvanized schedule 40 steel or equivalent high strength steel tubing.
ii) Fence Fabric: 2-inch x 2-inch x minimum 0.1144 inches diameter wire chain link fabric galvanized prior to weaving. Top and bottom selvage to be twisted.

c) Height: 10 feet from grade.
d) Finish: G60 hot dipped galvanizing.
e) Mounting: Post imbedded in concrete as required to resist structural loading.

B. Do not use:

1. Vinyl-coated chain link fencing.
2. Aluminized chain link fencing.
3. Extruded aluminum fencing.
4. Wood board fencing.
5. Wood panel fencing.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Provide a barrier to public approaching the building.

3.2 STRUCTURAL CRITERIA

A. Resist wind and other lateral loads as required by the 2016 CBC.

3.3 DURABILITY CRITERIA

A. Service Life Span:

1. 10-year warranty on materials and installation due to normal use and weather.
2. 20-year warranty on galvanized finish against rusting.

B. Substantiation:

1. Proposal: Product data with proven in-use verification.

END OF SECTION G1

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SECTION G2053 – LANDSCAPE IRRIGATION

PART 1 – GENERAL

A. Definitions:

1. The term "Design Build Entity" shall hereinafter be abbreviated as "DBE.
2. The term "County" shall refer to Sonoma County.

B. Description

1. Installation of New Irrigation System in New Landscape Areas: All products and materials needed to install a fully functioning irrigation system in a new landscape area (to be determined by DBE).
2. Connection to on-site water source for supplemental irrigation water refer Bridging Documents.
3. Related work specified elsewhere.

a) Planting.

PART 2 – PRODUCTS

A. Materials for New Irrigation Systems: Use new materials of the best grade, unless otherwise noted on the Design Build Project Drawings, for each respective item, and of the same manufacturer for all items of one (1) type. All materials shall conform to County standards and approved irrigation products.

1. Plastic pipe and fittings.

a) Upstream of remote control valves (main lines): For pipe sizes up to and including 2-inch pipe use Schedule 40 PVC. For 2-1/2-inch pipe up to and including 4-inch pipe use Class 315 PVC pipe.
b) Downstream of remote control valves (lateral lines): For pipe sizes up to and including 1-1/2-inch pipe use Schedule 40 PVC pipe. For 2-inch size and larger use Class 315 PVC pipe.
c) No bell-end pipes allowed.
d) Extrude from 100% virgin normal impact unplasticized polyvinyl chloride (PVC) Type I, Grade I resin. Threaded nipples to be PVC Type II.
e) Pipe homogeneous throughout, free from visible cracks, holes or foreign materials. The pipe shall be free from blisters, dents, wrinkles or ripples, die and heat marks.
f) Supplier shall be responsible to certify that manufactured pipe meets the stated levels of quality. Continuously and permanently mark pipe with manufacturer's name or trademark, kind and size (IPS) of pipe, material, manufacturer's lot number, schedule or type, ASTM qualifying designation, and NSF seal of approval.
g) Testing of pipe. The DBE shall show written certification by supplier that polyvinyl chloride pipe has successfully passed the following tests:

i) Acetone test. Immerse a sample of pipe in 99% pure anhydrous acetone for 15 minutes; at the end of this time there should be no evidence of flaking or delamination on the inner or outer walls of the pipe. Evidence of softening and swelling shall not constitute failure.
ii) Flattening. Cut a test specimen two inches long from each end of the pipe sample. Flatten each test specimen between parallel plates of a press until the distance between the plates, in inches, is equal to sixty (60) percent of

the pipe O.D., and there shall be no evidence of cracking, splitting or breaking.

h) Plastic pipe fittings and connections.

i) Rigid polyvinyl chloride (PVC) virgin Type I, Schedule 80 with working pressure no lower than that of pipe. Sockets to be tapered conforming to the outside diameter of the pipe, as recommended by ASTM standards. All fittings are to withstand the 15-minute acetone test, as for pipe, and shall be approved.

ii) Molded fittings shall be marked with manufacturer's name or trademark, type PVC, size, ASTM qualifying designation and NSF seal of approval. Extruded couplings to be produced from NSF rated raw materials and meet ASTM Standards. Supplier shall be responsible to certify that extruded fittings and connections meet the stated levels of quality.

i) Plastic pipe primer and solvent cement as recommended by pipe manufacturer. No clear primer may be used.

2. "Detectable" type tracer/warning tape to be 'Blue', 2-inch wide minimum, with the words "Buried Water Line Below" - Refer to main line installations.

3. Gate valves and valve boxes (Including valves for PVB). All valves to be AWWA approved.

a) Gate valves shall be the same size as the pipe lines in which they are installed and shall open "left." All valves shall be packed with an approved brand of graphite braided stem packing.

b) Refer to the Design Build Project Drawings for manufacturer's name and model number. Manufacturer and model shall be compliant with County standards.

c) For sizes 2" and smaller.

i) 150-pound saturated steam rated.
ii) Brass body. ASTM B-62.
iii) Screwed joints.
iv) Non-rising stem.
v) Screwed bonnet.
vi) Solid disc.
vii) Equipped with handwheel.
viii) Lead – Free materials

d) For sizes 2-1/2" and larger.

i) 200-pound O.W.G.
ii) Iron body. ASTM A-126, Class B.
iii) Flanged joints.
iv) Non-rising stem.
v) Bolted bonnet.
vi) Double disc.
vii) Equipped with operating nut.
viii) Lead – Free materials

4. Quick-coupling valves, couplers and hose swivels.

a) Valves shall be of brass or bronze construction with built in flow control and self-closing.

b) Valves shall be:

i) 1" size

ii) Lock lid.
iii) Thermal Plastic Cover.

c) Couplers shall be brass or bronze construction.

5. Automatic control system. (as needed for fully automatic system).

a) Automatic controller. Provide pump start switch if required. Manufacturer and model shall be compliant with County standards and AB1881 Water Ordinance and E.O. B-29-15.

b) Automatic controller to have the following features:

i) Considered a "Smart Controller" and fully functions with all smart controller weather sensing features.

c) Controller enclosure. Vandal and weatherproof enclosure with dimension of enclosure to be of sufficient size to house controller(s).

i) Manufacturer and model shall be compliant with County standards.
ii) Type of enclosure.

(a) Installed in lock-able and tamper-proof pedestal housing.

d) Automatic controller to have the following features:

i) Programmed for various schedules entirely by setting switches and dials, and shall be equipped with the following features:

(a) Each station shall be capable of operating 2 minutes to 60 minutes with incrementally variable timing periods for each station; automatic, semi-automatic and manual operation. Each station to have an "OFF" or "OMIT" switch.
(b) Repeat switch allowing any and all stations to be repeated after completion of the initial watering schedule, or allowing repeat operations for any or all stations to be scheduled throughout a 24-hour day.
(c) "ON-OFF" switch for turning controller "OFF" during rainy weather, while allowing day and hour clocks to continue in operation
(d) Capable of operating 24 volt electric valves.

e) Automatic irrigation control wire.

i) Electric operated.

(a) Twenty-four volt wire to solenoid valves to be direct burial conductor type UF #14 AWG copper, 3/64" thickness, PVC coating, U.L. approved.
(b) Common wires to be white coded and pilot wires to be color coded; using a minimum of eight (8) different colors.
(c) Twenty-four volt valve solenoid shall be corrosion proof stainless steel protected by solid epoxy resin. Coil to operate one valve at 4,000 feet on No. 14 wire. No solenoid valve shall bleed to atmosphere.

f) Solar controller without permanent electrical supplies

g) Automatic controller: Refer to the Design Build Project Drawings for approved manufacturer's name and model number. Manufacturer and model shall be compliant with County standards.

h) Automatic remote control valves.

i) Valves shall be normally closed.

ii) All valves shall be diaphragm actuated, equipped with flow control adjustment and relief pet cocks, so valve may be manually operated. One-piece diaphragms only; no "O" rings allowed.
iii) All valves shall be of the same manufacturer.
iv) Valves shall be completely serviceable from the top without removing the valve body from the mainline system.

6. Valve Boxes.

a) Provide extension at bottom of valve boxes as necessary to adjust height of the boxes per detail.
b) For Remote Control Valves:

i) Concrete box with cast iron hinged lock lid cover, 9-1/2" x 15-1/2" min. Lid shall be marked "RCV".
ii) Epoxy paint controller and station numbers on the cover - letter and numbers to be 3" high.

c) For Gate Valves: Concrete box with cast iron lock lid cover, 8" inside diameter adjustable concrete sleeve. Lid cover shall be marked "GV".
d) For Quick Coupler Valves: Concrete box with cast iron hinged lock lid cover, 9-1/2" x 15-1/2" min. Lid shall be marked "QC".

7. Sprinkler System.

a) Sprinkler heads shall be as shown on the Design Build Project Drawings and install as detailed.
b) Sprinklers, rotors, bubbler heads, and spray nozzles shall be of the types and sizes shown on Drawings, with plastic nozzles unless otherwise indicated.
c) Provide fixed head sprinklers with a one-piece housing and with provisions for interior parts replacement. Pop-up sprinklers to rise 12 inches in shrub areas, 6 inches in turf areas. Sprinklers on fixed riser to be at least 12 inches above grade and 2" for fixed bubblers.

8. Bubbler Assembly.

a) Manufacturer and model shall be compliant with County standards.
b) Bubbler heads must be a current production model, in production for at least one year.
c) Bubbler heads shall be pressure compensating non-adjustable flow rate.
d) Bubbler head assembly for a Tree Root Watering System.

9. Valve Identification Tags: Identification tags for electrical remote control valves shall be manufactured from polyurethane Behr Desopan. Use standard tag hot stamped with black letters on yellow background. The tags shall be numbered to match programming as indicated on the Design Build Project Drawings. Provide one (1) tag of each electric remote control valve.
10. Materials to be furnished. The following items shall be "turned-in" to the County prior to final inspection and acceptance of the irrigation system:

a) Two (2) sets of operation and maintenance manuals.
b) Two (2) controller charts for each controller installed.
c) One (1) 5'-0 valve wrench where 2-1/2" size and larger gate valve is installed.
d) Two key (2) couplers to match quick coupling valves installed.
e) 10% additional of each type check valves installed.
f) Two (2) keys for opening each type lock lid valve box installed.
g) Two (2) keys for each controller installed.
h) Two (2) keys to operate lock lid quick coupling valves.

i) Two (2) sets of wrenches for servicing and adjusting each type irrigation head installed.

B. Winterizing Equipment

1. All existing and new Irrigation Systems shall have Winterizing Blankets for irrigation equipment per County Standards.

C. New water connection for supplemental irrigation water from County domestic water source per Project Engineer's plans and specification. Provide all required equipment needed to utilize the supplemental water source. DBE shall be responsible for all labor and materials to the point of connection. If not shown on Drawings, DBE shall estimate 100 feet to service points.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION

A. Service and Distribution: Provide automatic controlled, fully functional irrigation system.

B. Substantiation:

1. Proposal: Identification of main system routing.
2. Design Development: Product data of all main components.
3. Construction Documents: Full design, specifications and calculations.

3.2 AMENITY AND COMFORT

A. Appearance:

1. Outside the building: Locate Controller in an unobtrusive location not visible to main thoroughfares but easily accessible to maintenance staff.
2. Install devices in a neat and functional manner.

3.3 OPERATION AND MAINTENANCE

A. General: Provide for easily accessible and easy to maintain equipment.

3.4 EASE OF MAINTENANCE AND REPAIR

A. Select electrical equipment for ease of replacement of failed components.

END OF SECTION G2053

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SECTION G2054 – PLANTING

PART 1 – GENERAL

A. Definitions:

1. The term —Design Build Entity‖ shall hereinafter be abbreviated as —DBE.
2. ‖ The term "County" shall refer to Sonoma County.

B. Summary of Work:

1. Landscaping.
2. Related work specified elsewhere: Landscape irrigation.

PART 2 – PRODUCTS

A. Materials:

1. Fertilizer:
   a) Commercial type.
      i) 10-6-4. Standard commercial brand.
      ii) Calcium nitrate, standard commercial brand.
      iii) 21-3-5. Standard commercial brand.
   b) Soil conditioner - fertilizer type.
      i) Soil Conditioner guaranteed analysis 5-3-1, 50% humus, 15% humic acid with bacteria included. No poultry, animal or human waste acceptable. Material will be bagged in 50 lb. bags.
      ii) Soil Conditioner that is a controlled release guaranteed analysis 12-8-8, 25% humus, 5% humic acids with bacteria included. No poultry, animal or human waste acceptable. Material will be bagged in 40 lb. bags.
2. Agricultural gypsum. Minimum consistency of CaSO4H2O - 92% with a typical screen analysis of 85% minus 100 mesh.
3. Soil sulfur: To consist of 99% pure sulfur. 99% of particles passing a 1/8" screen.
4. Activated charcoal:
5. Peat. Free from alkali.
6. Tree supports and root barriers:
   a) Stakes for trees. Lodge Pole pine, made from the entire bole of the tree with bark removed. Completely treat pole in a solution of copper Naphthalate.
      i) 2" or 2-1/2" diameter.
      ii) 10'-11" length minimum for 24" box trees.
      iii) Stakes shall be conically pointed at one end, with 10" long taper point and chamfered at the other end.
   b) Tree ties.
      i) Tree Ties that are rubber.
      ii) Collar length 46'/84' overall length compression spring loaded tree tie that will insure the safe and successful development of the newly transplanted tree.
      iii) The soft poly vinyl 1/2" 0. d. soft polyvinyl metal collar is weather proof and resilient. when left unattended the 3 piece construction of the tree tie will eventually be pushed apart as the tree increases in size and therefore self-release without scaring the bark.

c) Root Barriers for all new trees 5 feet or closer to concrete pavement

i) Linear type root barriers,
ii) Set 5 feet each way from Center of Trunk.

7. Wood Mulch:

a) Wood mulch shall be 1 inch to 2 inches ground or processed wood product derived from fir or cedar, or from the bark of fir or pine, free of stones, sticks, and toxic substances harmful to plants and stabilized with nitrogen.

8. Headers (As needed by DB):

a) Concrete: Minimum 2000 psi concrete. Use pre-molded expansion joint material @ maximum of 30'-0 O.C. and at changes of direction. Trowel finish with 1/2" radius edges.

b) Wood Header:

i) Provide wood header according to Design Build Project Drawings for size and detail. Wood shall be 2" x 4", 1" x 4", or laminated 1/2" x 4" rough, construction heart redwood; free from knots and splits. Wood stakes shall be 2" x 4" x 18" long construction, heart redwood, secured to header with 16 common galvanized nails. Header shall be secured at 5 feet maximum intervals. All stakes shall be placed on ground cover side of header board.

ii) Headers shall be furnished as shown on the drawings and herein specified. They shall be laid true to line and grade and in a workmanlike manner. Care shall be exercised in laying headers to project adjacent improvements, shrubbery and other properties from damage. All stakes shall be placed on ground cover side of headers. Install per details and manufacturers' recommendations.

c) Steel Edging: Standard commercial-steel edging, rolled edge, fabricated in sections of standard lengths, with loops stamped from or welded to face of sections to receive stakes.

i) Edging Type, Manufacturer, and Size: as approved by County.
ii) Stakes: Steel.
iii) Accessories: Standard tapered ends, corners, and splicers.

9. Plant material:

a) Trees and shrubs:

i) Condition: Per American Nursery Standards.
ii) Quality.

(a) Healthy, shapely, well rooted, disease and insect free, not deformed or root bound per American Nursery Standards.
(b) Grown in nurseries inspected by State or County Department of Agriculture. Plants shall be grown under climatic conditions similar to those in the locality of the project.
(c) Free of abrasions, knots, injuries or disfigurations.
(d) All plants not in compliance with the requirements herein specified, will be considered defective and such plants, whether in place or not, shall be marked as rejected and immediately removed from the site of the work and replaced with new plants at the DBE's expense. The plants shall be of the species, variety, size, and conditions specified herein or as shown on the drawings. Under no conditions shall there be any

substitutions of plants or sizes listed on the accompanying plans, except with the express consent of The Owner.

iii) Label or tag one of each variety of plant with proper botanical name identifying genus, species and (if applicable) variety.

b) Inspection and approval:

i) Inspection location: Plants 15 gal. and larger are to be inspected and approved at nursery before delivery.
ii) Plants not approved by the County are to be removed from site immediately, and replaced with plants deemed suitable by the County at the DBE's expense.
iii) The County shall have the right to inspect and reject unsatisfactory or defective plant material at any time during the progress of the Work.

10. Nitrogen stabilized wood shavings fine grade containing 1% nitrogen added to each lb. of shavings.
11. Prepared backfill mix shall consist of:

a) Imported top soil 60%
b) Humus soil amendment; compost, washed steer manure, mushroom compost, composted wood products (not to include redwood or cedar) 40%
c) Ureaformaldehyde (38-0-0) 1/3 lb/cy
d) Potassium sulfate (0-0-50) 1/3 lb/cy
e) Triple superphosphate (0-45-0) 1/4 lb/cy
f) Agricultural gypsum 1 lb/cy

12. Pre-Emergence herbicide to be broad spectrum approved by the County.
13. Post-Emergence herbicide to be broad spectrum approved by the County.

a) Contact weed killer that does not leave a stain or residue.
b) Weed killer which utilizes the biological process of 'Translocation' to destroy all parts of the treated weed ("Roundup" by Monsanto or an approved equal). Post-Emergent shall be safe around ornamental grasses and other strap-like planting.

14. Topsoil:

a) Imported topsoil to conform to Specifications for Class —All topsoil and shall be free of roots, clods, stones larger than 1 inch in the greatest dimension, pockets of coarse sand, noxious weeds, sticks, lumber, brush, and other litter. It shall not be infested with nematodes or other undesirable disease-causing organisms such as insects and plant pathogens. Imported topsoil shall be friable and have sufficient structure in order to give good tilth and aeration to the soil. Continuous, air-filled pore space content on a volume/volume basis shall be at least 15 percent when moisture is present at field capacity. Soil shall have a field capacity of at least 15 percent on a dry weight basis.
b) Prior to delivery of topsoil, DBE shall furnish a physical and chemical soil analysis (Agronomic Soils Test) from a competent soil testing laboratory which shall include compliance as follows:

i) Mechanical analysis and a permeability rate(s). Topsoil shall be a sandy loam, loam, clay loam, or clay. The selection shall be made by the County or else be similar to the site soil. The definition of soil texture shall be the USDA classification scheme. Gravel over 1/4 inch in diameter shall be less than 10 percent by weight. Hydraulic conductivity rate shall be not less than 1 inch per hour nor more than 20 inches per hour when tested in

accordance with the USDA Handbook Number 60, Method 34b, or other approved methods.

ii) Soil Organic Matter Content. Organic matter (loss of ignition) 3% to 5% by weight minimum based on the weight of the sample dried to constant weight at 100 to 110 degrees C. or as determined by the sulfuric acid test. Sufficient soil organic matter shall be present to impart good physical soil properties, but not be excessive to cause toxicity or cause excessive reduction in the volume of soil due to decomposition of organic matter. The carbon/nitrogen ratio should be about 10. A high carbon/nitrogen ratio can indicate the presence of hydrocarbons or non-humified organic matter. When topsoil otherwise complies with the requirements of the Specification but shows a slight deficiency in organic matter content, humus, peat moss or other approved organic matter may be incorporated when and as permitted by the County.

iii) The soil pH range measured in the saturation extract (Method 21a, USDA Handbook Number 60) shall be 6.0 - 7.9.

iv) Electrical conductance; maximum electrical conductivity of 4 milliohms/cm at 25 degrees C.

v) Fertility. The range of the essential elemental concentration in soil shall be as follows:

Ammonium Bicarbonate/DTPA Extraction Parts Per Million (mg/kilogram) Dry Weight Basis	
Phosphorus	2 - 40
Potassium	40 - 220
Iron	2 - 35
Manganese	0.3 - 6
Zinc	0.6 - 8
Copper	0.1 - 5
Boron	0.2 - 1
Magnesium	50 - 150
Sodium	0 - 100
Sulfur	25 - 500
Molybdenum	0.1- 2

vi) Salinity. The salinity range measured in the saturation extract (Method 3a, USDA Handbook Number 60) shall be 0.5-2.0 dS/m. If calcium and if sulfate ions both exceed 20 milliequivalents per liter in the saturation extract, the maximum salinity shall be 2.5 dS/m.

vii) Chloride. The maximum concentration of soluble chloride in the saturation extract (Method 3a, USDA Handbook Number 60) shall be 150 mg/l (parts per million).

viii) Boron. The maximum concentration of soluble boron in the saturation extract (Method 3a, USDA Handbook Number 60) shall be 1 mg/l (parts per million).

ix) Sodium Absorption Ratio (SAR). The maximum SAR shall be 3 measured per Method 20b, USDA Handbook Number 60.

x) Aluminum. Available aluminum measured with the Ammonium Bicarbonate/DTPA Extraction shall be less than 3 parts per million.

xi) Calcium Carbonate Content. Free calcium carbonate (limestone) shall not be present.

xii) Heavy Metals. The maximum permissible elemental concentration in the soil shall not exceed the following:

Ammonium Bicarbonate/DTPA Extraction Parts Per Million (mg/kilogram) Dry Weight Basis	
Arsenic	2
Cadmium	2
Chromium	10
Cobalt	2
Lead	30
Mercury	1
Nickel	5
Selenium	3
Silver	0.5
Vanadium	3

xiii) If the soil pH is between 6 and 7, the maximum permissible elemental concentration shall be reduced 50 percent. If the soil is less than 6.0, the maximum permissible elemental concentration shall be reduced 75 percent. No more than three metals shall be present at 50 percent or more of the above values.

c) Phytotoxic Constituent, Herbicides, Hydrocarbons, etc. of existing and imported topsoil. Germination and growth of monocots and dicots shall not be restricted more than 20 percent compared to the reference soil. Total petroleum hydrocarbons shall not exceed 50 mg/kg dry soil measured per the modified EPA Method No. 8015. Total aromatic volatile organic hydrocarbons (benzene, toluene, xylene, and ethylbenzene) shall not exceed .5 mg/kg dry soil measured per EPA Method No. 8020.

15. Mulch.

a) Mulch shall be a 1" to 2" grind wood by-product or shredded bark and shall be dark in color.
b) Mulch shall be free of all green material, seeds, inorganic material, and fungus.

PART 3 – DESIGN CRITERIA

3.1 BASIC FUNCTION:

A. Provide landscaping that supports the therapeutic mission of the facility including:

1. Plants as a visual backdrop for dayrooms.
2. Raised planters for horticultural programs (secure patio).

B. Provide landscaping that is local to the area (native or regionally established cultivars), easy to maintain, and has low water use requirement.

C. Provide trees that will be suitable for growing courtyards in terms of canopy width, ultimate height and trees which do not have invasive root system (that will heave adjacent sidewalks).

3.2 APPEARANCE

A. Provide landscaping that is lush and soothing in appearance.

3.3 DURABILITY:

A. Provide landscaping that is drought and frost tolerant.

END OF SECTION G2054