

CHILDREN AND FAMILY JUSTICE CENTER

Contract 00863C13

Volume 9 of 14

Request For Proposal

Part B

Facility Performance Standards

December 2014



King County

Department of Executive Services
Facilities Management Division

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CONTRACT C00863C13**

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King County Children and Family Justice Center Project

Part B

Facility Performance Standards

December 13, 2013



King County

Department of Executive Services

Facilities Management Division

500 4th Avenue, Room 800

Seattle, WA 98104

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Interpretation

Where the word "shall" or "must" is used, it is intended to be a mandate; and where the word "should" or "encouraged" is used, it is intended to be a recommendation.

This performance standard emphasizes qualitative rather than quantitative measures.

Part A - General Principles

Section 1 - Flexibility

The Design-Build Entity shall design architectural; structural; heating, ventilating, air conditioning (HVAC); building control system; plumbing; information technology; audio-visual (AV); security; and other building systems to provide optimum flexibility and energy savings to enhance the Children and Family Justice Center's (CFJC) longevity. Whenever possible, plan principal spaces in the building to accommodate future growth and future program changes without increasing the program gross area beyond what is needed to accommodate the current project program requirements. Place vertical and horizontal circulation elements, and plan structural bays and floor-to-floor heights to allow for conversion of office space into courtrooms if necessary.

Design HVAC systems serving housing areas to accommodate varying levels of resident population.

Include standby capacity and redundancy in utility systems that will enable continuous operation of the facilities during the repair or replacement of a failed unit of equipment or component.

Part A - General Principles

Facility Performance Standards

Section 2 - Building Orientation and Wayfinding

Section 2 - Building Orientation and Wayfinding

a. General

Many visitors, both first-time and repeat visitors will likely be unfamiliar with the public functions and spaces in the Courthouse and Detention Facility and will likely need assistance in navigating to where they need to go in the facility and the justice system, beginning at their arrival to the CFJC by public transportation or private vehicle.

Be mindful of King County's diverse population and facility users that may have "Limited English Proficiency" (which refers to limited ability to speak, read, write or understand the English language at a level that enables a person to interact effectively with King County staff or use King County services) and use culturally and linguistically competent wayfinding markers and signage (e.g., languages, messages and images).

Wayfinding is the process of using spatial and environmental information to find one's way in the built environment. A good wayfinding system will give users sufficient information about their present location and sufficient information to allow them to navigate to their destinations.

b. Principles

Wayfinding should utilize the following principles of wayfinding to the greatest extent practicable:

- **Pathways and Sightlines:** Create well-defined routes of travel and circulation that are continuous and have a clear beginning, middle, and end when viewed in each direction. Use sightlines to give users a more extensive view in a particular direction to allow them to make wayfinding decisions on that basis.
- **Location Identity:** Give each location in a navigable space a unique perceptual identity so users can determine their location and recover their position within an immediate setting. Each place should function, to some extent, as a focal point which is a recognizable point of reference in the larger space.
- **Markers:** Use landmarks, focal points, and other markers with distinguishing characteristics, visible from surrounding areas, at major decision-making points to provide orientation cues. Whenever possible, combine markers with tactile and auditory indicators. Such markers and indicators, when associated with intersections and other decision points where the user must choose which path to follow, are especially useful as they make the location and the associated decision memorable and break navigation into manageable parts and can be utilized as a method of "connecting the dots".
- **Regions:** Subdivide large spaces into regions with a distinct set of visual attributes such as some aspect of its visual appearance, a distinction in function or use, or some attribute of its content that is consistently maintained within the region. Clearly communicate the travel paths, circulation systems, and edges to users when they enter a region. Don't give the user too many navigation choices. Clearly distinguish places where the public is welcome and where access is restricted.

Part A - General Principles

Facility Performance Standards

Section 2 - Building Orientation and Wayfinding

- **Signage:** Provide a consistent and comprehensive ADA-compliant signage system of text, graphics, maps, diagrams, and other components as appropriate to furnish quickly-comprehensible identification, orientation, and directional information. Furnish system as one approaches the site, along paths of travel, and at decision points to aid users in their wayfinding decisions. The County has an interest in implementing electronic signage into the total wayfinding system. Unify wayfinding with the digital signage devices (monitors, interactive kiosks, etc.) referenced in the Information Technology/Unified Communications Systems. From such navigation aids, the user can make judgments as to his/her location; what is in the immediate vicinity; what destinations are available; what routes the user can use; size of the space, and how far the user is along his/her chosen path. Comply with City of Seattle and King County security standards for vehicular traffic control devices.

Part A - General Principles
Section 3 - Sustainable Design

Facility Performance Standards

Section 3 - Sustainable Design

a. General

The Design Build entity shall focus on proven design approaches and elements to meet programmatic requirements; promote occupant health and well-being; provide ample connections to natural daylight; provide optimal lighting, acoustics, and indoor air quality; and conserve use of water and energy throughout the entire supply chain and life of the CFJC.

The Design Build entity shall plan for effective waste management including recycling during demolition, construction, and occupancy of the CFJC. Divert at least eighty-five percent (85%) of waste material from disposal in landfills.

Consider conservation strategies such as collection of rainwater, reuse of grey water for nonpotable uses, photo-voltaic panels connected to the public power grid for on-site generation of electricity.

Use non-toxic building materials that have been evaluated for reduced life cycle environmental impact, have low Volatile Organic Compound (VOC) content, are regionally-sourced, and contain high post-consumer recycled content.

Orient building to include considerations for utilizing solar energy for both passive solar design and photovoltaic installations.

The percentage of glazing should be optimized to maximize the benefit of daylighting in the most frequently occupied spaces, by allowing daylighting deeper into the space, minimizing glare and minimizing thermal discomfort due to higher solar gain in summer and heat loss in winter. Thus orientation as well as shading should be considered in addition to views when determining glazing location.

Consider prevailing wind patterns for passive cooling and protection from wind-driven rain.

Utilize an Integrative Design Process as described hereinafter to maximize opportunities for the cost-effective adoption of green design and construction strategies.

To the greatest extent possible, avoid materials either constructed of or containing the following in the construction of the CFJC project: formaldehyde, polyvinyl chloride (PVC), Neoprene, cadmium, flame retardant wood treatment, halogenated flame retardants, Creosote, arsenic, or pentachlorophenol, chlorofluorocarbon (CFC), hydrochlorofluorocarbon (HCFC), petrochemical fertilizers and pesticides, phthalates, mercury, lead, chloroprene (Neoprene), chlorinated polyethylene, chlorosulfonated polyethylene, and asbestos. Some exception may be allowed due to current limitations in the materials economy. After contract award in the design phase, the County will require the Design-Build Entity to identify instances where such materials are proposed to be used, alternatives to such products or materials, and why the materials or products noted above should be used.

Part A - General Principles
Section 3 - Sustainable Design

Facility Performance Standards

b. Integrative Design Process

An Integrative Design Process means an approach to project design that seeks to achieve high performance on a wide variety of well-defined environmental and social goals while staying within budgetary and scheduling constraints. It relies on a multidisciplinary and collaborative team whose members make decisions together based on a shared vision and a holistic understanding of the project. It is an interactive process that follows the design through the entire project life, from predesign through operation.

Utilize Integrative Design Process to maximize opportunities for cost-effective adoption of integrative green design and construction strategies.

Conduct meetings with the Project Team (Design-Build Entity and County) on a regular basis as required to monitor the project status, introduce new team members to project goals, discuss problems, formulate solutions, review responsibilities, and identify necessary steps.

c. LEED® Certification

Comply with King County Ordinance 16147 and King County Code 18.17 Green Building Program as it relates to new capital projects and the latest King County Energy Plan. Plan for a minimum of a Gold rating formally-certified through the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED®) New Construction program, LEED version 4.

The Design-Build Entity shall ensure that energy efficiency is given the highest priority;

Design Build entity shall achieve the requirements of LEED v4 credit "Integrative Process Credit 1". The team shall collaborate throughout the RFP process to implement energy efficiency strategies that correlate throughout the entire building design to maximize opportunities.

Achieve LEED v4 credit EAc2, earning 11 points: Improve energy for new buildings by 26%.

To determine performance target to be met, consider using Energy Utilization Intensity (EUI) metrics. The target performance can be determined by modeling the ASHRAE Baseline building and determining the Proposed target value using minimum energy savings required. Use Energy modeling 'earlier on' in the design process to determine potential for different strategies and systems to meet target performance. Energy model shall be updated at key milestones to determine any change, energy tracking log would capture any changes in EUI as a relation to the changes in input assumptions. Energy tracking log will hold key information with regards to input assumptions and subsequent impact on energy performance. This process shall also feed into the energy life cycle analysis to help the team in selecting the most effective strategies. The Energy tracking log shall be included with each deliverable. Due to the design being in progress the energy model assumptions should be listed and may diverge to some degree from the design documents.

If it is determined that costs are too high to achieve a LEED® Gold rating, or that the CFJC project is unable to achieve that rating for technical reasons, the project shall achieve the highest rating possible with no incremental cost impact to the current expense fund over the life of the

Part A - General Principles
Section 3 - Sustainable Design

Facility Performance Standards

facility and an incremental cost impact of no more than two percent (2%) to other funds over the life of the facility as compared to a project not achieving a LEED[®] rating. However, the CFJC project will be required to achieve LEEDv4 credit EAc2 earning 11 points, Improve energy for new building by 26% regardless of the LEED rating.

There may be extenuating circumstances for some LEED[®] eligible projects that make it cost prohibitive to achieve any level of LEED[®] certification. These projects must submit a written summary to the director of the department managing the project for approval, documenting the reasons why the project is not getting a LEED[®] certification.

d. 2010 King County Energy Plan:

As guiding principles, the Design Build entity shall be aware of and be consistent with the King County Energy Plan, including but not limited to the following:

- New project shall not use more energy than the facility that they replace.
- Place specific emphasis on energy efficiency. Achieve LEED EAc2 earning 11 points, Improve energy for new buildings by 26%•
- Be a leader in early adoption and promotion of innovative technology for buildings.
- Increase production and procurement of renewable energy and development of waste-to-energy applications.

e. Carbon Accounting

Mitigation of greenhouse gas emissions is King County policy as highlighted by the 2010 King County Strategic Plan climate objective and the 2012 King County Comprehensive Plan, specifically directing agencies to reduce operational GHG emissions and to collaborate with others to reduce regional emissions to eighty percent (80%) below 2007 levels by 2050. The CFJC project shall identify building performance provide an accounting of the project lifecycle greenhouse gas emissions reductions that reduce conventional energy use and emissions, quantify those reductions, and report them to a formal tracking program such as the Environmental Protection Agency (EPA) Climate Leaders, USEPA *Energy Star*, or WRI/WBCSD protocols.

f. Greenhouse Gases (GHG)

Account and mitigate for greenhouse gas emissions. Mitigation of GHG emissions is established King County policy, as highlighted by the 2010 King County Strategic Plan climate objective and the 2012 King County Comprehensive Plan - which specifically directs agencies to reduce operational GHG emissions and to collaborate with others to reduce regional emissions to eighty percent (80%) below 2007 levels by 2050. An accounting of CFJC project emissions and implemented mitigation strategies will help provide a baseline and document progress towards emissions reduction targets. More information about King County policy related to assessing and mitigating greenhouse gas emissions is available on the King County Climate Change Policy webpage:

Part A - General Principles
Section 3 - Sustainable Design

Facility Performance Standards

<http://www.kingcounty.gov/environment/climate/king-county/climate-change-policy.aspx>

CFJC project shall complete an accounting of a project's main sources of lifecycle greenhouse gas emissions. Primary sources of emissions from most projects come from operational and transportation sources; however, some projects also generate emissions from construction, landscape disturbance, or use of materials. This effort should include estimates of the emissions reductions that result from mitigation actions, such as energy reduction efforts and alternative transportation credits efforts.

Guidance for how to assess GHG emissions, as well as what mitigation options to consider, is provided below in the following implementation resources:

- GHG emissions calculator tool. This is an Excel spreadsheet that includes several different GHG emissions calculators to accommodate a variety of project types.
- GHG Emissions Calculator and Mitigation Strategies Guidelines (PDF, 1.3MB). This document provides explanation on how to use the GHG Emissions Calculator tool as well as serves as a resource for alternative options to mitigate and reduce greenhouse gas emissions.

Part A - General Principles
Section 4 - Physical Durability
and Functional Usefulness

Facility Performance Standards

Section 4 - Physical Durability and Functional Usefulness

a. Durability

Selection of major facility components, materials, and systems shall consider long-term costs for operations and maintenance.

Life-cycle cost considerations include but are not limited to reducing maintenance issues and costs, improving product durability, and maximizing the long-term appearance retention of products utilized.

The Design Build entity shall develop and provide assemblies components and systems that meet the target functional lifetimes noted in tables A4.1, A4.2, A4.3, and A4.4.

Limiting the number of different products selected can make higher-quality products more affordable while also limiting maintenance procedures.

Special care should be taken in selecting materials for points where routine use would damage, discolor, or soil materials.

b. Life Cycle Cost Analysis

Life Cycle Cost Analysis (LCCA) shall be used to evaluate the return on investment of design alternatives over the useful life of components or systems in this facility. King County will consider life cycle cost analysis, along with other CFJC project-specific factors, in determining acceptability of design alternatives.

- LCCA shall be applied over a 25-year life cycle for non-energy related design alternatives. Refer to Section 8 of this *Facility Performance Standard* for requirements specifically related to energy performance. Target functional lifetimes for components and systems are listed in Tables A4.1 through A4.4.
- Building LCCA shall be prepared, using King County's Life Cycle Cost Analysis tool, or similar tools accepted by King County. Refer to Part B, Section 8 - Energy and Sustainable Life Cycle Analysis of this *Facility Performance Standard* for energy guideline tools to be used for LCCA of energy and sustainability measures.
- At or before the project has reached thirty percent of the design phase, the project team shall conduct an analysis that determines the incremental costs for achieving a LEED Gold rating as compared to a building that is not seeking a LEED rating. The analysis shall include the up-front incremental construction costs, the up-front costs of registration and certification and the present value of operations and maintenance cost savings over the life of the asset. For the purposes of this analysis, operations and maintenance cost savings shall be comprised of projected costs the county will incur over the life of the asset. The costs included in this analysis shall be quantifiable, documented and verifiable by third-party review upon project completion and thereafter.

Part A - General Principles
Section 4 - Physical Durability
and Functional Usefulness

Facility Performance Standards

- The King County’s Life Cycle Cost Analysis (LCCA) tool is available through <http://your.kingcounty.gov/solidwaste/greenbuilding/technical-resources.asp>. Project teams utilizing a different LCCA tool should be prepared to present LCCA results through KC LCCA tool later in the project.

Table A4.1 - Target Functional Lifetimes for Architectural Components	
Component	Target Functional Lifetime (Years)
Shell and Core	
Foundations	100
Exterior Cladding	50
Curtain Wall & Glazing	30
Roofing, low-sloped	20
Roofing, high-sloped	50
Elevators, Hydraulic	20 to 30
Elevators, Geared Traction	20 to 40
Public Restrooms, Stairs	50
Interior Construction	
Permanent/Core Partitions	50
Improvements requiring periodic remodeling (tenant improvements)	20
Casework in courtrooms	35
Stone, terrazzo, ceramic tile flooring	25
Other casework	20
Acoustical tile ceilings	10
Resilient sheet or tile flooring	5 to 10
Carpet and wall coverings	5 to 7

Table A4.2 - Target Functional Lifetime for Plumbing Systems	
Component	Target Functional Lifetime (Years)
Primary equipment, pumps, boilers	20 to 25
Distribution piping	50
Fixtures	50
Valves, faucets, trim	10
Fire protection sprinkler systems	50

Table A4.3 - Target Functional Lifetimes for HVAC Systems
Refer to the most current version of ASHRAE 90.1 for listing of assumed equipment life.

Part A - General Principles
Section 4 - Physical Durability
and Functional Usefulness

Facility Performance Standards

Table A4.4 - Target Functional Lifetimes for Electrical Systems	
Component	Target Functional Lifetime (Years)
Primary equipment (switch gear, transformers)	25
Distribution system	50
Fixtures	25
Low voltage/security/access control	15
Engine-generator set	25

Part A - General Principles
Section 5 - Maintenance

Facility Performance Standards

Section 5 - Maintenance

Building systems, materials, equipment, components, and other items requiring access to satisfy code requirements and necessary for regular and/or periodic maintenance, adjustment, repairs, and replacement (collectively "serviceable items") shall be selected, located, and positioned to facilitate such servicing and upgrading without having to remove or otherwise alter adjacent permanent work.

Adjacent equipment, piping, conduits, service boxes, and other building components shall be positioned to avoid infringement of required working clearances around serviceable items.

Passageways, doors, hatches, louvers, areaways, and other openings shall be designed to allow the passage of removed and replacement serviceable items without requiring alteration.

Equipment may be required to be removed and/or furnished in component parts requiring limited disassembly/assembly for passage into and out of the building.

Locate serviceable items in readily-accessible secured areas dedicated to their usage (mechanical, electrical, communications, security, and the like) to the greatest extent possible. Mechanical items shall be installed on raised housekeeping pads and other items on backing boards. Items shall be positioned to provide adequate working clearances required by applicable codes and manufacturers' recommendations.

Where serviceable items are located above ceilings, pre-engineered finished accessible ceiling assemblies shall be used to the greatest extent possible.

Where serviceable items are located above non-accessible ceiling assemblies or in wall assemblies or chases, flush-mounted/flush face access panels of adequate sizes shall be provided and accurately-positioned to facilitate servicing. Access panels in fire-rated assemblies shall match assembly ratings.

Where serviceable items are located below raised access flooring, raised access flooring panels shall be easily removed and reinstalled to remove and replace the finish.

Conduits and cable trays shall be adequately-sized and installed for maximum flexibility and periodic upgrading of communications, audiovisual, and security systems.

Do not place serviceable items above security ceilings or in security walls in detainee holding and juvenile housing areas. Place such items in secure chases or similar areas with readily available access by maintenance staff. Do not place serviceable items above courtrooms, or judicial chambers.

Part A - General Principles
Section 6 - Accessibility

Facility Performance Standards

Section 6 - Accessibility

a. General

In addition to conforming to applicable federal, state, and local regulatory requirements the Design-Build Entity shall acknowledge the King County Equity and Social Justice Ordinance and King County Strategic Plan as follows:

- Fair and Just Guiding Principle: "King County serves all residents by promoting fairness and opportunity and eliminating inequities"; and
- Justice and Safety: "Support safe communities and accessible justice systems for all."

b. Principles of Universal Design

Design-Build Entity shall also use the following *Principles of Universal Design* to ensure equal access to the CFJC, to simplify life for everyone, and to make the facility usable by as many people as possible regardless of age, ability, or condition. (Reference: *The Principles of Universal Design*, Version 2.0 - 4/1/97, copyright 1997 North Carolina State University, Raleigh, NC, The Center for Universal Design.)

PRINCIPLE ONE: Equitable Use

- The design is useful and marketable to people with diverse abilities.
- Guidelines:
 - 1a. Provide the same means of use for all users: identical whenever possible; equivalent when not.
 - 1b. Avoid segregating or stigmatizing any users.
 - 1c. Provisions for privacy, security, and safety should be equally available to all users.
 - 1d. Make the design appealing to all users.

PRINCIPLE TWO: Flexibility in Use

- The design accommodates a wide range of individual preferences and abilities.
- Guidelines:
 - 2a. Provide choice in methods of use.
 - 2b. Accommodate right- or left-handed access and use.
 - 2c. Facilitate the user's accuracy and precision.
 - 2d. Provide adaptability to the user's pace.

Part A - General Principles
Section 6 - Accessibility

Facility Performance Standards

PRINCIPLE THREE: Simple and Intuitive Use

- Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.
- Guidelines:
 - 3a. Eliminate unnecessary complexity.
 - 3b. Be consistent with user expectations and intuition.
 - 3c. Accommodate a wide range of literacy and language skills.
 - 3d. Arrange information consistent with its importance.
 - 3e. Provide effective prompting and feedback during and after task completion.

PRINCIPLE FOUR: Perceptible Information

- The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.
- Guidelines:
 - 4a. Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.
 - 4b. Provide adequate contrast between essential information and its surroundings.
 - 4c. Maximize "legibility" of essential information.
 - 4d. Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).
 - 4e. Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

PRINCIPLE FIVE: Tolerance for Error

- The design minimizes hazards and the adverse consequences of accidental or unintended actions.
- Guidelines:
 - 5a. Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.
 - 5b. Provide warnings of hazards and errors.
 - 5c. Provide fail safe features.
 - 5d. Discourage unconscious action in tasks that require vigilance.

Part A - General Principles
Section 6 - Accessibility

Facility Performance Standards

PRINCIPLE SIX: Low Physical Effort

- The design can be used efficiently and comfortably and with a minimum of fatigue.
- Guidelines:
 - 6a. Allow user to maintain a neutral body position.
 - 6b. Use reasonable operating forces.
 - 6c. Minimize repetitive actions.
 - 6d. Minimize sustained physical effort.

PRINCIPLE SEVEN: Size and Space for Approach and Use

- Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.
- Guidelines:
 - 7a. Provide a clear line of sight to important elements for any seated or standing user.
 - 7b. Make reach to all components comfortable for any seated or standing user.
 - 7c. Accommodate variations in hand and grip size.
 - 7d. Provide adequate space for the use of assistive devices or personal assistance.

c. Statutory Requirements

The CFJC project shall be designed in accordance with WAC 51-50-005, which adopts by reference the International Building Code requirements for barrier free access design.

In case of a conflict with the local public Authority Having Jurisdiction (AHJ), the more stringent requirement shall govern.

Part A - General Principles

Facility Performance Standards

Section 7 - Computer Aided Design and
Building Information Model Standards

Section 7 - Computer Aided Design (CAD) and Building Information Model (BIM) Standards

Per the National Institute of Building Sciences (NIBS), "a BIM is a digital representation of the physical and functional characteristics of a facility and serves as a shared knowledge resource for information about a facility forming a reliable basis for decisions during its lifecycle from inception onward."

BIM is a multi-disciplinary process in which architectural and engineering models are developed concurrently. BIM goals typically include improved design quality, reduced construction costs, and the reduction of errors and omissions through rigorous building system coordination.

If implemented, nearly every piece of information that an owner needs about a facility throughout its life can be made available electronically.

BIM shall be commenced at least upon the onset of the design development stage.

An industry-leading tool such as the latest version of Autodesk's Revit Architecture should be used as a tool to support the BIM process. While BIM documentation is required to be implemented at the beginning of the design development stage, it may also be used in early conceptual stages for massing studies, space planning, stacking and blocking diagrams, color code plans for communicating departments, areas, program verification, and other uses.

Where practicable, the implementation of BIM processes and documentation should comply with NIBS standards for BIM. The goal of NIBS is to establish, through the NBIMS-US™ Project and the building SMART alliance™, standards needed to foster innovation in processes and infrastructure so end-users can efficiently access the information needed to create and operate optimized facilities.

Section 8 – Security

Successful protection should consider the integration of five principles. These principles should be used to provide a context for planning protection efforts, developing protection strategies, and allocating resources.

1. **Full dimension.** Protection is continuous and asymmetrical; it considers threats and hazards in all directions, at all times, and in all environments. Likewise, security efforts must be designed to deter, detect, delay, and disrupt threats and hazards in all directions, at all times, in all environments.
2. **Layered.** Protection capabilities are layered to provide strength and depth to the overall protection system and reduce the effects of a hazard or threat. Physical security efforts emphasize the concept of defense in depth by placing the asset to be protected in the innermost ring of security. The layers of security are provided at increasing distances from the protected asset. The number of layers, the components that comprise them, and their resistance to penetration depend on the threat and the importance of the asset to be protected.
3. **Redundant.** Redundancy ensures that critical activities, systems, and capabilities have a secondary or backup system of equal or greater capability. Protection efforts are often redundant and overlapping anywhere that vulnerability, weakness, or failure is identified or expected. Security measures are often planned in the same manner with backup capabilities. For example, restricted facilities are typically augmented by alarm systems with assessment capabilities and physically checked by trained security personnel.
4. **Integrated.** Protection is integrated with all other activities, systems, efforts, and capabilities that are associated with operations to provide strength and structure to the overall protection effort. Security planning takes into account the systems, plans, and resources from all tenant agencies.
5. **Enduring.** Protection has an enduring quality that differentiates it from the conduct of defense or specific security operations. Physical security efforts are continuous, and some security measures are more enduring than others. The degrees of protection may increase or decrease, depending on the current threat assessment. However, security personnel and resources must be able to maintain a reasonable level of protection for all periods.

Security design shall follow NFPA 730, Guide For Premises Security and be constructed following NFPA 731, The Standard for Installation of Electronic Security Systems.

Section 9 – 1% For Art

4Culture is King County's designated cultural services provider. Public Art 4Culture oversees the County's 1% for Art program and commissions contemporary art for shared public space, bringing artists' work and thinking to the design and culture of the built environment.

The voter-approved initiative that supports the redevelopment of the King County Children and Family Justice Center (CFJC) is generating 1% for Art revenue that will be applied to commission new architecturally integrated and portable artworks, as well as artist residencies and art experiences that promote engagement with youth and families. Two existing works in the King County Public Art Collection, currently sited at the YSC, will also be relocated as part of this scope.

Best practices employed by the program will ensure that the mission of the CFJC is supported and that commissioned artwork reflects the context of the people and place, promoting a positive, caring, and transformative environment.

a. Schedule and Coordination

Art shall be a meaningful component of the CFJC design. The project will include the commission of multiple artists that require active participation and support of the Design Builder. Although direction concerning the 1% for Art program shall be through the County's Project Manager in consult with 4Culture, the Design Builder will be expected to cooperate with all contractors employed on behalf of King County including those associated with the art program.

Coordination and scheduling of relevant work activities with the County's Project Manager, 4Culture, and the project artists is expected. After award and execution of the Contract, the County and the Design Builder shall coordinate with 4Culture to establish a plan for phasing artists into the project over the life of design, construction, opening and operation to ensure smooth and orderly transition of work, timely placement of items and materials. Every art opportunity will be different and success is dependent on thoughtful, up-front planning and complete cooperation between parties.

The Design Builder's Lead Designer will be expected to participate in all artist selection processes for permanent, site-integrated artworks and attended subsequent 4Culture Public Art Advisory Committee reviews of final concepts for proposed artworks.

Both the Design Builder's Lead Designer and Construction Project Manager or their representative will be expected to participate in collaborative meetings with 4Culture and the selected artists as necessary to insure the successful integration of art and architecture in the completed project.

Preparation and submittal of drawings by the Design Builder and/or the selected artists may be required in instances where close and careful coordination is essential so that all works of art can be properly integrated and installed. Necessary structural support, utilities, ground or building preparation for the artwork's installation should be provided by the Design Builder.

Part A - General Principles
Section 9 - 1% For Art

Facility Performance Standards

b. Approach

The following section envisions a series of innovative artwork opportunities that reflect a diversity of ideas and experiences. It is not expected that all projects recommended herein will be implemented. Rather, select opportunities will be prioritized and funded with adequate budgets to support thoughtful design and the highest quality of materials, fabrication, and finish. Construction credits will be applied on top of the 1% for Art budget to fund integrated projects per established King County policy. Construction crediting is a practice in which an allowance of funds that would otherwise be spent on standard, integral building components is instead applied to alternative, artist-made solutions (i.e. flooring, lighting, railings, etc.)

Although the art program will incorporate a variety of art experiences, the following strategies intersect with the Design Builder scope of work:

Architecturally integrated and site-specific artwork: Artists will be selected to design artwork for specific locations within the facility, sometimes with a very high level of integration into the architecture or landscape.

Portable works collection: Existing studio artworks will be purchased for display throughout the public areas of the facility; adequate wall space and lighting will be important as part of the overall design.

The Design Builder will be expected to consider public art in schematic and final designs. The Design Builder (and possibly multiple sub-contractors) will work closely with the County's Project Manager and 4Culture to coordinate and implement these projects throughout design and construction and, on an as needed basis, make allowances for site-specific projects installed post-construction. Willingness and ability to work with artists, their subcontractors and 4Culture's art project manager is imperative.

To ensure harmony with the 1% for Art Program, the Design Builder shall coordinate and develop aesthetically pleasing, resilient and appropriate wayfinding and finishes that exemplify quality design and execution.

c. Public Art - Guiding Principles:

1. Innovation
2. Engagement
3. Transformation
4. Identity
5. Community

d. Public Art - Secondary Principles:

1. Care & Support
2. Self-Expression
3. Information
4. Orientation
5. Seeing-Being Seen

e. Parameters for Public Art Prioritization:

1. Spread artwork throughout the CFJC: interior, exterior, and landscape;
2. Employ a variety of materials;
3. Represent a diversity of ideas;
4. Create opportunities for engagement with youth and families;
5. Coordinate with overall project schedule, as relevant.

f. Projects (Architecturally Integrated, Site Specific, and Portable Artworks)

The following framework provides a guide for expectations and coordination of permanent architecturally integrated, site-specific, and portable artwork.

Architecturally Integrated Artwork: Artists' work will be integrated into the construction of the CFJC and interface with the Design Builder's work at several locations:

Floor Treatment

A holistic, integrated floor treatment will unify public access areas of the facility including, but not limited to: the public entry/courts security screening zone, lobby/central gathering area and auxiliary waiting areas, hallway thoroughfares to courtrooms, meeting spaces, detention, and other building support functions. This artistic floor treatment will not continue past the entry to secure detention. Terrazzo, hardwood, and carpet are possible materials for consideration, with terrazzo being favored. The design may incorporate a wide range of colors and special inlay work and could serve to enhance LEED and wayfinding goals.

Natural Light

A significant natural light based artwork will occupy the ceiling space in the lobby/central gathering area of the facility. Artistic treatments that enhance architectural daylight strategies will also be employed throughout public access areas. These compositions and components may support the advancement of LEED goals. Skylights, light wells, and curtain walls are opportunities for architecturally-integrated art. Suspended objects that capture and/or refract light are opportunities for site-specific art.

Landscape

The foreground landscape of the facility will be a living artwork with the potential for creative hardscaping and integrated sculptural elements (see the existing artwork recommendation below re: Spirit of Our Youth). The colors and textures of these features will convey a calming and centering presence and help lead visitors to the front entry. Areas for conversation, reflection and restoration will also be incorporated. Living artwork could also be commissioned to enliven the Alder extension pedestrian thoroughfare. These interventions may support LEED goals.

Site Specific Artwork:

Several significant site-specific projects could be somewhat integrated or respond to the built environment and be installed post-construction at the following locations:

Courts

Wall-hung, low-relief sculptural work, surface treatments, and functional components that express the diversity of the youth and families served through the CFJC will be designed specifically for the following Court sites:

- **Lobby/Central Gathering Area**
Artwork will serve as a focal point for the lobby/central gathering area and potentially highlight the Resource Center.
- **Children's Center**
Durable, site-specific artwork for the childcare center will extend color and pattern throughout exterior and interior spaces.
- **Conference/Training Center**
Durable, site-specific artwork for the public conference/training center will inspire thoughtful exchange.

Detention

Wall hung, low-relief sculptural work and surface treatments that express the diversity of the youth and families served through the CFJC will be designed specifically for the following Detention sites:

- **Lobby/Waiting Area**
Nhon Trong's Making Choices mural or new site-specific artwork will welcome visitors in the lobby/waiting area.
- **Visitation**
Durable, site-specific artwork will bring color and inspiration to the visitation room.
- **Health Center**
Durable, site-specific artwork for the health center will lift spirits and inspire hope.
- **Library**
Surface treatments will encourage calm and focused use of library resources.
- **Classrooms + Courtyards + Circulation Corridors**
Surface treatments will extend color and pattern throughout the classroom and courtyard spaces attached to living units. This treatment could also extend into the circulation corridors.

Portable Artwork:

A large collection of portable artworks will be commissioned and displayed in public access areas throughout the facility (including, but not limited to waiting areas, hallways and passages, meeting rooms and courtrooms) and should be considered in space planning and design. Ample open wall space, lighting, and conducive surface finishes are critical to the success of this program component. Exhibition space for youth artwork should also be designated in a prominent public area of the facility (i.e. the lobby/central gathering area).

Existing Artworks:

Two existing site-specific works, Nhon T. Trong's *Making Choices* and Marvin Oliver's *Spirit of Our Youth* will be relocated. Both artists have been contacted and are committed to participating in the re-siting process. Recommendations are detailed below:

Marvin Oliver, *Spirit of Our Youth*, 1999

monumental bronze orca fin with landscaping, 23' x 9.5' x 2'

Description: The Spirit of our Youth concept and design originates in Seattle and represents the rich Salish heritage of Washington as well as the diverse ethnic background of this community. The sculpture is a dedication to our youth. The thunderbird reflects the heavens and is a symbol of hope and prosperity. The salmon represent the power of the individual and the fragility of life.

Spirit of Our Youth should be re-sited in one of two locations: 1) as a welcoming feature in the CFJC entry landscape/hardscape or 2) in the redeveloped public open space.

Nhon T. Trong, *Making Choices*, 2003

porcelain enamel on steel panel mural, 13' x 21'

Description: This mural, one of artist's first public commissions, reflects the true core of the Youth Service Center – providing hope and support to the young people and their families involved in the justice system. Through his research for *Making Choices*, Truong heard people speaking of the themes of family, community, cultural diversity, future and dreams. The artwork is painted in a youthful style but incorporates content that is reflective of the older community, hoping to bridge the gaps between audiences of all ages and cultural backgrounds.

Making Choices should be relocated in one of three locations: 1) In the detention lobby/waiting area, 2) in the main lobby of the facility, or 3) on the exterior 12th Avenue wall.

g. 4Culture Process

During the Design Builder selection process, 4Culture will continue to explore the goals and intentions for CFJC artworks, outline project scopes and budgets, and determine artist selection methodologies for each opportunity (a combination of roster selection, invitational competitions, and open calls/RFQs will be employed).

Selection processes for highly integrated artworks will align with the contracting of the Design Builder to allow the Lead Designer or their representative's participation in panels. Planning for the de-installation, storage, staging, and re-siting of the two existing artworks – Part of the Design Builder's scope - will also take place during the design phase of this contract. Subsequent selection processes will focus on site-specific projects with fewer design impacts and the purchase of portable artworks.

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Facility Performance Standards

Once artists are selected, it is the responsibility of 4Culture to develop and issue contract agreements for artwork designs; coordinate artwork design development and facilitate design review processes; develop and issue contract agreements for commissioned artwork; coordinate artwork implementation, and develop maintenance plans, press information and assist with dedications. Active participation and support of the Design Builder is expected throughout this process.

B. Performance Standards

Section 1 - Architecture

a. General Requirements

Objective

The primary objective of this *Facility Performance Standard* is to establish a general framework for the architectural image of the CFJC.

Comply with City of Seattle land use and zoning ordinances applicable to the site.

Architectural Form

Design Criteria:

Provide an architectural design expression that unifies the massing and components of the structure(s) into a cohesive and consistent stylistic architectural character responsive to the functional requirements.

Develop an architectural design expression that is responsive to the site and the context of the surrounding residential and commercial neighborhoods.

CFJC Vision:

The Children and Family Justice Center (CFJC) is a reflection of King County's commitment to the promotion of fairness and justice. It supports an improved and more complete delivery of programs that have made King County a national leader in reducing juvenile crime and detention rates for the past 20 years. It will allow for greater assistance in finding safe and permanent homes for children involved in child welfare cases.

It is a place for the fair and equitable administration of justice and a safe and secure environment for clients and employees. The exterior is dignified and conveys respect for the law and for the youth and families who are involved in the justice system. It serves as a symbol of justice, hope, and compassion for the users, many of whom are facing significant, life altering challenges.

The CFJC is warm and welcoming, and has a connection to the environment. It is visually distinctive in character expressing clarity of purpose while also being sensitive to the surrounding street scale. The CFJC is a positive focal point in the neighborhood that the community is proud of. The diverse cultural, social, and architectural expression of the surrounding community influences the configuration and design of open spaces and the physical structure of the CFJC. The CFJC shows all those who visit and work in it that King County is committed to environmental stewardship.

Artwork is a critical component of the facility that shows the value of cultural diversity in King County by helping to create a positive, caring and transformative environment. The interior waiting areas and courtrooms evoke feelings of welcoming calm, respect, protection and safety. The interior of the secure detention area instills feelings of safety, hope, healing and fairness.

Part B - Performance Standards
Section 1 - Architecture

Facility Performance Standards

Both the court and detention components of the CFJC emphasize providing solutions beyond courtrooms and confinement spaces. Delivery of the range of CFJC services is transparent and engenders public trust. The building and open space connect to families and the community on a human scale.

Massing:

Use of massing that articulates the internal organization and functions of the courts and juvenile housing areas is appropriate.

Massing and forms that portray a sense of order, visual interest, and achieve a human scale should be used.

Rooftop equipment shall be screened from public view.

Articulation:

Design elements shall display a unifying architectural expression and avoid large blank walls visible from public areas and adjacent properties.

Consider the building to be "four-sided", meaning all façades including side and rear façades should be considered to be visible and treated with architectural composition similar to that on the building's front façade.

Portions of the building façade containing service, truck, and sallyport doors visible from the public street shall be designed to include attractive and durable materials and be integrated into the architectural composition of the larger building façade design to maintain the architectural expression.

Use articulation elements such as vertical and horizontal modulation of planes and masses; a varied palette of forms, materials, textures, and colors; and other methods to make larger expanses appear as an aggregation of smaller units to provide architectural interest.

The main public entrance to the building shall be visually prominent, easy to identify, inviting, human-scaled, and provide visual interest. Entrance should include a weatherproof vestibule and protection from inclement weather for those entering and queuing to enter and those leaving. Entrance and queuing for screening shall be designed to accommodate peak-hour concentrations of building visitors.

Fenestration:

Fenestration shall be used as a design element to articulate the character of the façade and define an architectural style.

Fenestration should be used to enhance visual relief of walls and provide expressions of decoration and craftsmanship. Fenestration should include well-detailed projecting vertical and horizontal modulating features.

Entrances and windows shall bring abundant natural light into the interiors and shall create a visual connection for those inside to the surrounding exterior environment.

Windows shall be varied in size and shape appropriate to the spaces they serve.

Part B - Performance Standards
Section 1 - Architecture

Facility Performance Standards

Glazing shall present a clear and neutral appearance and meet energy performance and security criteria.

Sunshades may be used in selected exterior locations to control glare and solar heat gain into the building interior.

The percentage of glazing should be optimized to maximize the benefit of daylighting in the most frequently occupied spaces, by allowing daylighting deeper into the space, minimizing glare and minimizing thermal discomfort due to higher solar gain in summer and heat loss in winter. Thus orientation as well as shading should be considered in addition to views when determining glazing location

Materials:

Materials shall be of high quality and express permanence.

Materials should be integral with the nature of the architecture and not appear to be surface-applied.

Materials shall be in context of the surrounding urban fabric.

Materials shall be used consistently throughout the exterior. There shall be no perceivable distinction of quality of material between the courts and detention areas.

b. Exterior Construction

General Requirements

Exterior construction materials and systems shall be of institutional quality and have a proven record of successful in-service performance evidenced by independent third-party testing and manufacturer's in-field experience for not less than 10 years.

Exterior materials, systems, fabrication, and installation shall be in compliance with the applicable building code, energy code, accessibility code, and other applicable federal, state, and local codes and regulations.

Take into consideration the *King County Facilities Green Operations and Maintenance Guidelines Handbook* when selecting and detailing building envelope assemblies.

Exterior materials and systems shall be compatible with one another and shall withstand wind and snow loads; seismic (including story drift), structural, and thermally-induced movement; and exposure to weather and other conditions applicable to the project site without leakage and failures due to defective materials, fabrication, installation; unusual deterioration; and or other defects.

Exterior materials and systems shall be designed and arranged to provide for noiseless expansion and contraction of component and adjoining materials caused by an ambient temperature change of 120 degrees Fahrenheit and a surface temperature change of 180 degrees Fahrenheit based on effect of solar heat gain and nighttime-sky heat loss without failure.

Part B - Performance Standards
Section 1 - Architecture

Facility Performance Standards

Materials and systems shall be suitable for regular maintenance such as cleaning and periodic refinishing without deterioration or special products.

Select materials and finishes to control glare that would produce physical discomfort in humans from leaving the project site.

Avoid use of materials that are susceptible to corrosion at areas where de-icing salts and chemicals may be used such as walkways and building entrances.

Exterior Stairs and Ramps

Exterior stairs and ramps serving building entrances shall be open and welcoming in appearance and function and shall be fully-accessible to all persons in accordance with federal, state, and local regulatory requirements.

Stairs and ramps shall accommodate building ingress and egress requirements.

Stairs and ramps walking surfaces shall be well-illuminated, well-drained, and slip-resistant. Stairs shall employ integral nosings with contrasting color and texture.

Stairs and ramps shall be designed to prevent the accumulation of debris.

Handrails shall be solid, continuous, smooth, and properly-sized to facilitate grasping. Include provisions to prevent misuse by skateboarders.

The use of mechanical lifts is not permitted.

Exterior Building Walls

Rainscreen Façade Systems:

Pressure-equalized rainscreen design systems that are pre-engineered in accordance with industry-recognized rain screen principles, employ manufacturer's standard assemblies, and with open joints of the rainscreen façade that allow air to freely pass through internal compartmentalized spaces may be used. Weather-facing surface shall stand off from the moisture-resistant surface of the structural backup wall.

Unrestricted air movement shall:

- eliminate pressure differences that would tend to blow water further in;
- dry moisture with the compartmentalized spaces; and
- act as an insulating barrier by minimizing thermal bridges and preventing heat buildup within the envelope.

The exterior walls shall be protected with a water barrier behind the rainscreen cladding and over the exterior wall construction to prevent water from infiltrating the system. This barrier shall be continuous for the extent of the wall from the foundation to the roofing materials. All penetrations to the membrane from fasteners, damage, etc. shall be sealed from water intrusion. Interior wall surfaces shall be protected with a continuous air barrier on the warm side of the insulation to prevent air vapor from becoming trapped within the insulation layer. All openings shall be protected from water intrusion with adequate drip and sealing at joints.

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Section 1 - Architecture

Facility Performance Standards

Fasteners and battens used as part of the rainscreen system should not use materials or details that create thermal bridging through the insulation of the wall system..

Rainscreen cladding materials may include lightweight stone, aluminum, stainless steel, copper, resin, and terra cotta panels and shall include a pre-engineered structural support system. Panels shall be manufactured to ensure accuracy of shape and size.

Stone and Masonry Veneer Wall Assemblies:

Wall construction consisting of a single, non-structural external wythe of weather-facing stone or unit masonry, a ventilated internal cavity not less than 2-inches wide acting as a drainage plane, and a structural backup wall may be used.

Stone and masonry veneer wall assembly may be constructed as a variant of the pressure-equalized rain screen façade if appropriately ventilated at the top and bottom of the cavity.

Masonry veneer may be brick, concrete unit masonry, or dimension natural stone.

Structural backup wall may be constructed of structural light-gauge metal framing with gypsum sheathing, concrete, or concrete unit masonry. Backup wall shall be covered or coated with an appropriate water-resistant/air barrier membrane to prevent air infiltration and water penetration to the building interior and allow passage of interior water vapor to the exterior.

Masonry veneer shall be anchored to the backup wall to prevent movement under wind and earthquake loads in a manner that does not interrupt or compromise the internal drainage cavity.

Masonry veneer shall be supported with hot-dipped galvanized steel relief angles as required to transfer the weight of the veneer to the building structure.

Windows, doors, louvers, pipes, conduits, and other openings and penetrations through the wall assembly and terminations such as tops and bottoms of walls shall be appropriately flashed to exclude water from the interior. Minimize pipe, conduit, and other such penetrations through wall assemblies.

After installation, brick and concrete unit masonry veneer not to be painted or otherwise coated shall be treated with a clear penetrating, water-soluble, alkyltrialkoxo saline-type water repellent suitable to the veneer. When dry, the water repellent shall not darken, stain, discolor, or change the texture or gloss of the veneer. Film-forming water repellents and compositions of epoxies, urethanes, acrylics, stearates, mineral gum waxes, polyvinyl chloride, polyvinyl acetate, silicone resins, solvent-thinned elastomer solutions, or combinations thereof will not be acceptable.

Single-Wythe Masonry Walls:

Do not use single-wythe masonry walls for enclosing habitable spaces.

Exterior Insulation Finish System (EIFS):

Do not use EIFS in any form.

Glass Fiber Reinforced Concrete Panel Assemblies:

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Wall construction consisting of non-structural, weather-facing Glass Fiber Reinforced Concrete (GFRC) panels and associated secondary metal framing and embedded and loose connection accessories for handling, erection, and attachment of GFRC panels to the building structure may be used. GFRC panels may also be used for column covers, cornices, fasciae, and other applications.

GFRC panels shall be produced and installed in accordance with applicable Precast/Prestressed Concrete Institute (PCI) reference standards in a PCI-certified plant applicable to the type of work involved.

Component materials such as portland cement, aggregates, reinforcing, and admixtures shall be in accordance with industry reference standards.

Panels shall be internally-reinforced for strength and rigidity and for handling and erection loads with glass fibers and steel bars.

Panels shall include mixes for backings and facings. Facing mix shall include an air entraining admixture.

Finishes may include as-formed textures, abrasion-blasting, acid-etching, and surface-retarding to expose aggregate, anchored tile or natural stone veneer, and other decorative finishes.

Secondary steel framing shall be prefabricated light-gauge structural steel framing components not less than 0.053-inch (nominal 16-gauge) base metal thickness of fully-welded construction and finished with shop-applied rust-inhibitive primer.

Windows, doors, louvers, pipes, conduits, and other openings and penetrations through the wall assembly and terminations such as tops and bottoms of walls shall be appropriately flashed to exclude water from the interior.

GFRC panels not to be painted or otherwise coated shall be treated with a penetrating-type water repellent as noted for masonry veneer.

Precast Concrete Panel Assemblies:

Wall construction consisting of non-structural, weather-facing pre-cast concrete panels, an internal cavity not less than 2-inches wide acting as a drainage plane, and a structural backup wall may be used. Wall assembly may be constructed as a variant of the pressure-equalized rain screen façade if appropriately ventilated at the top and bottom of the cavity. Precast concrete panels may also be used for column covers, cornices, fasciae, and other applications. Panels shall include embedded and loose connection devices for handling, erection, and attachment of the panels to the building structure.

Precast concrete panels shall be produced in accordance with applicable PCI reference standards in a PCI-certified plant applicable to the type of work involved.

Component materials such as portland cement, aggregates, reinforcing, and admixtures shall be in accordance with industry reference standards.

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Panels shall be internally reinforced for strength, rigidity, and handling and erection loads with steel reinforcing bars and shall include integral connection devices. Mix shall include an air entraining admixture.

Finishes may include as-formed textures, abrasion-blasting, acid-etching, and surface-retarding to expose aggregate, anchored tile or natural stone veneer, and other decorative finishes.

Panels shall include a secondary drainage system on the panel backs to collect water entering panel joints and drain it to the exterior.

Precast concrete panels shall be anchored directly to the building structure with embedded steel connection devices welded to building structure in a manner that does not interrupt or compromise the internal drainage cavity.

Structural backup wall may be constructed of structural light-gauge metal framing with gypsum sheathing, concrete, or concrete unit masonry. Backup wall shall be covered or coated with an appropriate water-resistant/air barrier membrane to prevent air infiltration and building interior and allow passage of interior water vapor to the exterior.

Windows, doors, louvers, pipes, conduits, and other openings and penetrations through the wall assembly and terminations such as tops and bottoms of walls shall be appropriately flashed to exclude water from the interior.

Precast concrete panels not to be painted or otherwise coated shall be treated with a penetrating-type water repellent as noted for masonry veneer.

Metal Framing Systems (Curtainwalls, Entrances, Storefronts, and Windows):

General Requirements:

Metal framing systems, which include barrier-type curtainwall, entrance, storefront, and window systems, may be used. Systems shall employ manufacturers' standard framing, components, and details and shall be fabricated of extruded aluminum, stainless steel, or other proven durable materials that have been laboratory-tested by independent third party testing agencies in accordance with industry reference standards for structural properties, water penetration, air infiltration, and thermal transmittance and condensation resistance documenting superior performance characteristics and certified and labeled for required energy performance suitable to the project site based on ratings established by National Fenestration Rating Council (NFRC).

Framing systems shall have interior and exterior components separated by an elastomeric material with low-thermal conductance for optimum thermal and acoustic performance and condensation control and shall be designed with internal drainage pathways to return incidental water entering systems to the exterior. Metal framing systems may include swinging entrance doors, revolving entrance doors, sunshades, entrance canopies, column covers, and other components.

Span of structural components shall be limited to those published by the manufacturer. System design shall accommodate building movements and deflections caused by singular or combined forces of wind, seismic activity, and thermal loads; live, impact,

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and concentrated loads including kinetic deflections resulting from the dead loads of materials and live loads of personnel and equipment.

Deflection of any framing member in a direction normal to the plane of the wall, when subjected to required design loads shall not exceed a calculated deflection of 1/180 of its clear span. Deflection of any horizontal member supporting glazing shall not exceed 1/360 of the clear span of the member.

Components may be internally-reinforced to meet performance criteria.

Framing components may need to be strengthened to meet security requirements. Refer to the Part B, Section 10 - Electronic Safety and Security Systems of this *Facility Performance Standard* for further information.

Glass and other glazing panels shall be located at the front of framing members.

Metal framing systems required to be sound attenuation performance-rated shall be laboratory-tested by a qualified independent third party testing agency to determine Outside-Inside Transmission Class (SITC).

Curtainwall Systems:

Curtainwall systems may be unitized, stick, or a combination thereof.

Curtainwall glazing may be conventionally captured by framing members on four sides, retained with continuous elastomeric gaskets, and secured with pressure plates or installed as a two-sided structural-glazed system.

Windows:

Windows may be fixed or operable in accordance with sustainable goals, specific room requirements, and specific security requirements.

If operable windows are proposed, the area (square footage, or square inches) of operable window together with the location of operable windows, shall be optimized using calculations or thermal analysis so required design air flow is achieved.

Naturally ventilated systems should interface with the HVAC system as appropriate to ensure the system is not overworking while windows are open. Such interfaces may include but are not limited to powering off the HVAC system in rooms where windows are open. If users control opening the windows, there should be signals or alarms to educate the user when temperatures or air levels are necessary to have natural ventilation, such as a red light / green light system located in each space. All windows that are operable shall be automatically closed during off hours for security.

Operable windows shall be tested by a qualified independent third party testing agency and certified and labeled for required energy performance suitable to the project site based on ratings established by the NFRC.

Operable windows at ground level shall provide protection against forced and unauthorized entry. All operable windows shall prevent entry of items that could be thrown into the building through them.

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Finishes:

Finish of portions exposed to view in the finished installation shall be Architectural Class I clear or color anodic finish or a shop-applied Powder coating having an American Architectural Manufacturers' Association (AAMA) "superior performance " rating and shall be warranted by the coating manufacturer for retention of color, prevention of chalking, and loss of adhesion for at least 20 years.

Portland Cement Plaster Assemblies (Stucco):

Portland cement plaster assemblies may be used for vertical building wall cladding in locations not visible to the building users or the public and for horizontal soffits in protected locations. Portland cement plaster wall cladding shall function as a modified cavity wall where incidental water that penetrates through the cladding is captured by a secondary concealed water-resistant air barrier and drained to the exterior through a series of weep screeds, drainable control joints, and concealed flashings.

Wall application shall consist of two base layers of cement plaster applied to heavy-weight galvanized expanded metal lath and an acrylic finish coat; total thickness of 7/8-inch. Cement plaster and lath shall be applied over gypsum wall sheathing on light-gauge structural metal framing, solid masonry, or concrete backup wall. Backup wall shall be covered or coated with an appropriate water-resistant/air barrier membrane to prevent air infiltration and water penetration to the building interior and allow passage of interior water vapor to the exterior.

Windows, doors, louvers, pipes, conduits, and other openings and penetrations through the wall assembly and terminations such as tops and bottoms of walls shall be appropriately flashed to exclude water from the interior. Metal lath at corners, openings, and terminations shall be reinforced with additional lath and trimmed with metal accessories.

Soffit application shall consist of two base coats of cement plaster applied to heavy-weight galvanized expanded metal rib lath and an acrylic finish coat, with a total thickness of 5/8-inch. Materials shall be supported by a rigid engineered suspended or framed galvanized steel grillage system.

Cement plaster materials shall be plant-mixed, packaged, and -formulated to reduce cracking and crazing and ensure quality. Acrylic finish coat shall be plant-mixed, packaged, and formulated with integral color with dirt- and mildew-resistant chemistry. Plastering materials shall be from one manufacturer.

Metal accessories shall be manufactured from ninety-nine percent (99%) pure zinc-alloy and shall include control and expansion joints, casing beads, screeds, stops, and other types. Architectural feature accessories such as reveals shall be manufactured of extruded aluminum with an anodic or primed finish. Accessories manufactured of steel or plastic are not acceptable. Cement plaster assemblies shall be divided into areas by control and expansion joints and other components to minimize cracking, as determined by the Design-Build Entity.

Portland cement plaster and its application shall be warranted by the manufacturer to be free from defects in materials and workmanship for a period of at least 10 years.

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Anti-Graffiti Coatings:

All exterior walls within 12 feet of grade shall be treated with anti-graffiti coating

Exterior Façade Mock Ups:

The Design Build entity shall provide a mock up of the entire rain screen façade system including all components, and inclusive of the proposed glazing assembly, and a mock up of the curtain wall system if used. Mock ups shall be built two weeks prior to ordering exterior façade materials. Mock ups shall be a minimum of 8 feet wide by 10 feet high, and be kept intact until Substantial Completion has been achieved.

Thermal Insulation

General Requirements:

Thermal insulation shall be in compliance with applicable codes and meet criteria for superior energy performance.

Insulation for roofs, walls, and raised structural floors shall be continuous and without interruption to provide a complete thermal envelope. Insulation for concrete slabs on grade shall be continuous at the building perimeter.

Insulation, fasteners, and adhesives shall be laboratory tested by a qualified independent third party testing agency to resist wind uplift forces applicable to the project site and labeled accordingly. Metal fasteners shall inherently corrosion-resistant or suitably coated.

Roof insulation shall be tested by a qualified independent third party testing agency and shall be listed and labeled for its use.

Roof insulation shall be tested by a qualified independent third party testing agency and shall be listed for direct-to-steel application without use of a separate thermal barrier.

Insulation for Low-Pitch Membrane Roofs:

Insulation for low-pitch membrane roofs shall be rigid board type, installed in multiple layers on top of the deck with board joints staggered between layers. Insulation may be mechanically attached or fully-adhered to the deck. Additional layers tapered insulation may be used to achieve required slopes. Insulation shall be of same manufacturer as, or recommended by the membrane roofing manufacturer.

Insulation for High-Pitch Metal Roofs:

Insulation for high-pitch metal roofs shall be rigid board type, installed in multiple layers on top of the deck with board joints staggered between layers. Insulation may be mechanically attached or fully-adhered to the deck. Insulation shall be covered with an adhesively-applied rubberized asphalt underlayment/flashing membrane with a slip-resistant surface.

Insulation for Walls:

Wall insulation shall be continuous, installed in single or multiple layers over exterior wall surfaces and may be used with insulation in wall cavities.

Insulation for Raised Structural Floors:

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Insulation for raised structural floors shall be semi-rigid board type.

Insulation for Concrete Slabs on Grade:

Insulation for floors on grade shall be hydrophobic extruded rigid plastic board type applied in accordance with applicable codes. Consider extending insulation over entire slabs, not only at perimeter, if additional cost of insulation can be recouped within a few years by energy savings based on current energy rates.

Testing

Meet code requirements for maximum infiltration. Perform blower door test; if blower door test is not satisfactory, Design Build entity shall be responsible for corrective action and repeat test until it is passed. Identify the responsible party for the required infiltration test per code. Utilize thermal bridging to evaluate any thermal bridging and as a tool to determine potential corrective action if infiltration test threshold is exceeded. Identify party responsible for conducting the thermal image study. The County shall consider or may have under contract a building envelope commissioning agent. Commissioning may include (similar to typical commissioning) fundamental and enhanced commissioning. Refer to ASTM E2813-12 and NIBS guideline 3-2012 for details on building envelope commissioning requirements.

Doors, Frames, and Hardware

Main Building Entrances and Exits:

Main building entrance doors shall be of extra-heavy duty construction and rated for frequent use.

Doors and frames shall be fabricated of aluminum, stainless steel, or other durable material with finish matching metal framing systems with which they are used and equipped with concealed operating hardware to provide smooth, easy, and balanced operation.

Secondary Exits:

Secondary exit doors shall be fabricated of hot-dipped galvanized or galvanized steel not less than 0.053-inch (nominal 16-gauge) base metal thickness with seamless construction, smooth flush faces, closed top and bottom edges, and internal insulation for thermal performance.

Secondary exit frames shall be fabricated of hot-dipped galvanized or galvanized steel not less than 0.053-inch (nominal 16-gauge) base metal thickness, of mitered and full-profile welded construction with exposed-to-view welds ground smooth and flush with adjacent surfaces.

Exterior Door Hardware:

Door hardware shall include mortise lever handle lock and latch sets, butt hinges, surface-mounted and concealed closers, stops, weatherstripping, and other items arranged into appropriate groups for each opening in accordance with Door Hardware Institute (DHI) recommendations. Door hardware may include low-power electric door operators and

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associated controls for accessibility. Door hardware shall include components for security and access control.

Hardware finish shall be BHMA 630 (US 32D) Dull Stainless Steel.

Lock cylinders shall have security keyways and shall be great-grandmaster, grandmaster, and master keyed to meet King County requirements.

Doors and frames shall be shop-prepared for hardware in accordance with templates furnished by hardware manufacturers.

Refer to the Special Detention Construction and Security Requirements narrative and Part B, Section 10 - Electronic Safety and Security Systems of this *Facility Performance Standard* for door hardware requirements.

Exterior Glazing

Exterior glazing shall be designed to allow for high visible light transmittance into the building, restrict the amount of ultraviolet light and to limit the amount of heat transmission under extremes of both summer daytime and winter nighttime temperatures. With passive solar design allow for use of exterior glazing having a Solar Heat Gain Coefficient (SHGC) that will prevent solar heat gain through the glass. Films or tinted glass that provide optimal SHGC shall be balanced with the design intent and visible transmittance of the glass for daylighting.

Framing for exterior glazing shall use materials and systems that prohibit thermal bridging by creating thermal breaks between interior and exterior. Window selection shall be based on the whole window assembly u value.

Exterior glazing shall be in compliance with Insulating Glass Manufacturers Alliance (IGMA) recommendations; and shall be certified by the Insulating Glass Certification Council (IGCC).

Insulating units shall consist of two lites of heat-treated float glass separated by interspace formed by 1/2-inch minimum thick mill finish aluminum spacer bar with silica gel desiccant and filled with dry air or gas, and with twin edge seals of polyisobutylene and silicone. Insulated units shall be selected for optimal light transmission, light reflectance, and shading control qualities and to minimize thermal transmission.

Glass in areas subject to human impact shall be impact-resistant "safety" type (laminated in accordance with ASTM C1172 and/or fully-tempered in accordance with ASTM C1048) and laboratory-tested, listed, and permanently labeled by a qualified independent third party testing agency in compliance with industry trade association and federal glazing standards. Do not use wired glass or glass with applied films or plastic sheet materials on exposed glazing surfaces.

Glazing for certain areas may need to be strengthened to meet security requirements.

Blinds shall be provided at exterior openings for privacy and glare control. For glare control, black out or opaque shades shall not be used to allow views of the sky and exterior. Fabric blinds shall be vinyl free fabric. Typical opacity shall be between 3-5% opening. Shades may be manual where within reach of staff without the use of a ladder or electrically operated where in higher levels or where required to be tied to the building management system. Where blinds shall be used for privacy, black out shades or louver blinds may be used.

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Metal Wall Louvers

Metal wall louvers shall be not less than 4-inches thick and fabricated of continuous extruded aluminum stationary drainable blades, concealed mullions, weatherproof continuous flanged frame, and interior screening. Louvers shall be performance-rated for net free area, water penetration, and air performance and applicable to each use by Air Movement and Control Association International, Inc. (ACMA) standards. Louvers shall be used for mechanical air intake and exhaust ducts and for elevator shaft venting.

Low-Slope Membrane Roof Systems

General Requirements:

Standard roof membrane systems shall include roof membrane, flashings, rigid thermal insulation, and other components for weathertight performance and shall provide for positive drainage of water without intermittent ponding in compliance with the manufacturer's warranty but at not less than 1/4-inch drop per foot of horizontal run. Roof slope may be achieved by sloping the structure or by using layers of tapered rigid board insulation. Roofing systems shall be designed in accordance with recommendations of the National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual and the manufacturer's requirements.

Roofing system shall be listed by Underwriter's Laboratories, Inc. (UL) for Class A external fire resistance.

Roofing systems shall be designed to resist wind loads applicable to the project site in accordance with code requirements.

Roof drainage shall be achieved by use of roof drains and overflow drains. Do not use exposed gutters, scuppers, and downspouts. Roof and overflow drains shall be set below the surface of the roof in a recessed area and shall be of a two-part heavy metal design with a clamping ring to permit roofing membrane to be secured to the drains.

Roofing system shall be warranted by manufacturer against defects in factory materials and workmanship and for weathertightness for a period of at least 20 years.

To facilitate roofing application and its periodic replacement over the life of the building, relatively large uninterrupted roof planes are preferred; rooftop equipment shall be designed to accommodate roofing; curbs and bases shall be raised above the membrane at least 8-inches to allow for membrane termination and flashing.

Utilize weatherhead type penetrations or other weatherproof pathways to facilitate passage of cable runs to communication antennas, closed circuit television cameras, and other outdoor systems into the building.

The Phase II construction of two additional floors over the Phase One roof may be achieved by the use of tapered insulation on a flat Phase I roof structure, or the creation of an interstitial space between the Phase 1 roof and Phase II floor structure, or other methods.

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Exposed Roofing Membrane Systems:

Surface of exposed roofing membrane shall be reflective in a manner to control solar absorption and glare.

Roofing system shall include designated traffic pathways applied to the membrane to facilitate the County's inspection and maintenance of the roofing system, drains, and rooftop equipment.

Insulation shall be polyisocyanurate or extruded polystyrene with a compressive strength of not less than 20 psi. Do not use expanded polystyrene.

Acceptable membranes are:

- Single-ply system such as minimum 0.060-inch thick thermoplastic polyolefin or minimum 0.060-inch thick vulcanized Ethylene Propylene Diene Monomer (EPDM) rubber. Avoid using PVC.
- Nominal two-ply modified bitumen built-up system with a reflective fire-retardant mineral cap sheet.

Inverted Roof Membrane Assembly (IRMA) Systems:

IRMA (protected) roof membrane systems may be used on structural concrete decks where vegetated "green" roofing systems are utilized.

Insulation shall be extruded polystyrene with a compressive strength necessary to support overloads (but not less than 60 psi) and shall be ballasted to prevent wind displacement.

Acceptable membranes are:

- Single-ply system such as minimum 0.060-inch thick thermoplastic polyolefin or minimum 0.060-inch thick vulcanized EPDM rubber. Avoid using PVC.
- Nominal two-ply modified bitumen built-up system.
- Hot fluid-applied rubberized asphalt.

Flashings

Concealed Flashings and Through-Wall Flashings in Multi-Wythe Masonry Walls:

Permanent, non-ferrous sheet materials such as AISI Series 300 stainless steel and coated copper may be used. Materials and finishes shall be highly-resistant to corrosion.

Exposed Flashings:

Exposed flashings shall comply with applicable recommendations of the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) Architectural Sheet Metal Manual.

Permanent, corrosion-resistant, non-ferrous sheet materials such as aluminum, AISI Series 302, 304, and 316 stainless steel, and copper may be used.

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Finish of exposed aluminum flashings may be an Architectural Class I clear or color anodic coating or a shop-applied powered coating having an AAMA "superior" performance rating, and shall be warranted by the coating manufacturer for retention of color, prevention of chalking, and loss of adhesion for at least 20 years.

Flashings at low-slope membrane roofing shall be two-part (permanent reglets and removable counterflashings) to allow removal of counterflashings for future roofing repair and replacement.

Joint Sealants

Joints sizes shall be designed to accommodate expected thermal movements between adjoining materials.

Joint sealants shall be elastomeric types of material, movement capability, grades, and types suitable to adjoining materials and expected movements, of integral colors to harmonize with building colors. Sealants shall be warranted by manufacturer against loss of adhesion, cohesion, and color stability and failure to achieve an airtight/watertight seal for at least 20 years.

Expansion Joint Cover Assemblies

General Requirements:

Expansion joint cover assemblies include exterior and interior covers to permit portions of buildings to move independently of one another resulting from effects of thermal change, seismic force, and wind applicable to the project site.

Assemblies shall permit unrestrained movement of joints without disengagement of covers or seals, and where applicable, maintain watertight and fire-rated protection.

Fire-rated expansion joint cover assemblies shall include fire barriers and have fire ratings not less than that of adjacent construction shall be laboratory-tested and listed by a qualified independent third-party testing agency acceptable to the public AHJ.

Assemblies shall be rated for cyclic movement without failure and shall have contraction/expansion movement capability of at least fifty percent (50%).

Exterior Joint Cover Assemblies:

Exterior assemblies may include assemblies for wall-to-wall, roof-to-roof, roof-to-wall, and other conditions.

Exterior assemblies shall be air- and watertight and shall include concealed secondary sheet rubber water barriers with tubes to collect and drain incidental water that may enter the assembly.

Wall-to-wall assemblies shall include a cover plate fabricated from stainless steel or aluminum plate or a flat seal fabricated of non-hydroscopic thermoplastic rubber with a concealed aluminum or stainless steel frame.

Exposed metal components shall be finished as noted for exterior metal framing/glazing systems.

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Exterior Maintenance Considerations

Roofing:

To facilitate roofing application and its periodic replacement over the life of the building, relatively large uninterrupted roof planes are preferred; rooftop equipment shall be designed to accommodate roofing; and curbs and bases shall be raised above the membrane at least 8-inches to allow for membrane termination and flashing.

Roofing system shall include designated traffic pathways applied to the membrane to facilitate the County's inspection and maintenance of the roofing system, drains, and rooftop equipment. Include 42-inch high parapets and other fall-protection measures in the design for the protection of persons on the roof.

Façade:

Provide anti graffiti coating on all exterior façade surfaces within 12 feet of finished grade.

Façade Access for Window Washing and Other Maintenance:

Design the building structure and façades to facilitate periodic maintenance.

Include provisions to accommodate accessing of building façades for periodic maintenance and window washing from the ground via temporary movable stages or from the building roof via suspended access equipment such as descent-controlled platforms, cages, and bosun's chairs.

Include required fall protection systems such as permanent mountings, tie-backs/lifeline anchors, davit systems, and other devices for the direct rigging anchored to the building structure.

Include provisions for storage of permanent equipment.

Include provisions to maintain the long term watertight integrity of the building.

Suspended maintenance systems shall be furnished and installed under sole responsibility contracts utilizing a strictly-controlled sign-off and certification procedure.

Bird Roosting and Nesting Control:

Include provision in the design to prevent birds from roosting and nesting on the building and site improvements thereby mitigating the soiling and defacement of property and concerns regarding public health and public nuisance.

Provisions shall be specific to the native bird population at the project site and shall be non-lethal, humane, discreet, and have a minimal effect on the design aesthetic.

Building Security Accommodation Considerations:

Include accommodations in exterior construction elements to accommodate security cameras, lighting, alarms, and other necessary equipment to secure the facility in a subtle and unobtrusive manner.

Where portions of ground-level facility elements are accessible to the public and may be subject to vandalism and/or graffiti, carefully select and use materials that promote

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durability, longevity, retention of appearance, ease of maintenance, and reasonable cost of restoration or replacement.

Exterior Building Security Considerations

General Setting:

The new CFJC development includes a courts/detention complex, a parking structure, and public open spaces. The CFJC development is located within a community comprised primarily of residential, commercial, and institutional uses.

The configuration and development of the CFJC shall follow NFPA 730, and embrace the concept of Crime Prevention through Environmental Design (CPTED).

The design of the CFJC shall promote safety for all users through techniques such as use of aesthetic barriers to prevent access to building; landscaping that cannot be used to hide behind or hide items such as guns or drugs; elimination of dark spots; avoiding blind spots; minimizing the approach to the exterior walls of the CFJC; among others. Lawn areas and landscaping should promote safety and allow for casual use by the surrounding public and those visiting the site. Lighting should be of the foot-candle levels necessary to promote a safe feeling for the users and allow for the use of video surveillance.

The security design shall provide proper security while maintaining a non-obtrusive looking building that represents a "good neighbor". Security devices and construction should blend into the facility and neighborhood without compromising function.

Perimeter Security

The perimeter security system is often the first line of defense, and it provides a visual deterrent to crime. Perimeter security should be designed to incorporate the concept of layered defense and integrate security elements such as barriers, lighting, intrusion detection, surveillance systems, and access control equipment.

The design of the perimeter security systems should meet the following requirements:

- Limit or block the line of sight from outside vantage points.
- Provide sufficient room for vehicle and pedestrian access control.
- Maximize the threat ingress/egress time across the exterior site.
- Enhance the ability of security forces to observe threats.

A card access shall provide designated staff access to selected exterior doors integrated with the existing County wide enterprise access system. All other staff and visitors should enter through the Public Lobby screening.

Physical Barriers

Physical barriers are an integral part of the perimeter security system and serve to facilitate the control of pedestrian and vehicle access. Physical barriers define the perimeter and establish a physical and psychological deterrent to those attempting unlawful or

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unauthorized entry. Physical barriers delay channel the flow of personnel and vehicles. Two types of physical barriers should be considered: natural and manmade.

Exterior warning signs

Signs should be erected to assist in controlling authorized entry, deter unauthorized entry, and preclude accidental entry. Signs should be plainly displayed and be legible from any approach to the perimeter from a reasonable distance. The size and coloring of a sign, its letters, and the interval of posting

must be appropriate to the overall site design. Warning signs augment control signs. They warn intruders that the area is restricted and that trespassing may result in arrest. The signs should be posted at intervals of no more than 100 feet. Warning signs should be installed along the physical barriers of the site controlled area and at each entry point where they can be seen readily and understood by anyone approaching the perimeter. The wording on the signs will denote warning of a restricted area.

Parking Security:

There are two primary components to the parking requirement for the CFJC project: public parking and staff parking. Public parking shall have a garage entrance separate from staff that can be secured and monitored after hours. Staff parking shall have a garage entrance separate from the public parking entrance that can be secured and monitored at all times. Both staff and public entries shall be secured to vehicle and pedestrian traffic, and be monitored after hours.

A separate secured area shall be developed to accommodate judicial officer parking. Access to the staff parking shall be by card-activated roll-up speed gates connected to the County wide enterprise access system.. Access to judicial officer parking shall be by remote transmitter/duress device (connected to the County's enterprise access system. Closed circuit television surveillance shall monitor the staff parking area, including the separately-secured area for judicial officer parking. Allow for sixty (60) cameras within the staff parking structure.

Access process for staff parking shall include the following:

- Two separate speed gates - one for entry and one for exit - so there is less time for opening/closing and reduced opening width.
- Vehicle stands with integral access control card readers, intercom stations, and cameras connected to the County's enterprise electronic security system shall be provided to facilitate those who may not have cards with them.
- Inside the parking structure a "code-blue" type duress system, connected to the County's enterprise electronic security system shall be provided for staff safety. Refer to Part B, Section 10 - Electronic Safety and Security Systems of this *Facility Performance Standard* for details of the system.

Other Site Security Requirements:

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Law enforcement entrance gates shall be provided with intercoms and cameras connected to the Detention Security Electronics System. Dual level vehicle stands shall be used to allow users to access the equipment from either car or bus driver heights.

Camera coverage should include the gates, all walkways and elevator landings, stairwells, and at strategic locations along the drive paths.

Loading Dock:

Access to the loading dock shall be via the service drive off of East Spruce Street. This drive also shall serve as access for service and law enforcement traffic. Law enforcement vehicles shall enter the Detention Facility sallyport prior to the loading dock security. The loading dock shall be protected by vehicle barriers and controlled by the off-site EDC. Staging is required for two trucks (40-foot long) prior to entering the loading dock without blocking the access drive or access to the loading dock.

The loading dock shall have dock levelers, a pallet screening x-ray machine with space for movement of pallets.

Other function require space for a waste dumpster, paper recycling dumpster, compactor, compost container, and mixed recycling (bottles/cans) container.

Camera Coverage:

Camera coverage should include the gates, all walkways and elevator landings, stairwells, and at strategic locations along the drive paths.

Security Glazing:

Exterior Security Glass: Monolithic units constructed of multiple laminations of scratch-resistant heat- or chemical-strengthened glass outer layers with polycarbonate cores and heavy plastic interlayers, to meet required security standards. Coordinate with the Room Data Sheets.

Exterior Ballistic Glass: High-security ballistic-rated glazing (Type G6 in *Table B1.1 - Interior and Exterior Glazing Types*) shall be used at exterior windows in courtrooms and judicial chambers. Coordinate with the Room Data Sheets.

Exterior glazing in Detention shall be 15/16-inch Security Glass and Polycarbonate Composite meeting ASTM F1915 testing standards for 60-minute physical attack (GL6 in table B1.1). Glazing in Detention shall be either obscured or placed to prevent views into Detention, or views out. Refer to *Table B1.1 - Interior and Exterior Glazing Types*.

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Table B1.1 - Interior and Exterior Glazing Types	
Type	Description
GL1	Commercial grade tempered
GL2	Clear laminated glass (for sound isolation)
GL3	Frosted glass: tempered or other type as necessary to meet Building Code.
GL4	Low Security - 9/16-inch Security Glazing, Glass and Polycarbonate Composite meeting ASTM F1915 testing standards for 20-minute physical attack.
GL5	Medium Security Glazing - 11/16-inch Security Glass and Polycarbonate Composite meeting ASTM F1915 testing standards for 40-minute physical attack.
GL6	High Security Glazing - 15/16-inch Security Glass and Polycarbonate Composite meeting ASTM F1915 testing standards for 60-minute physical attack.
GL7	High Security Glazing - 1-3/4 inch Security Glass and Polycarbonate Composite w / no-spall interior, two-way coating as required, and .30-06 ballistic rating in accordance with testing for UL 752 Security Level 4.

c. Interior Construction

General Requirements

Interior materials and systems shall be of institutional quality and have a proven record of successful in-service performance evidenced by independent third-party testing and manufacturer's in-field experience for not less than 5 years.

Materials and systems shall be compatible with one another and shall be free from defects in materials, fabrication, and installation.

Materials, systems, fabrication, and installation shall be in compliance with the applicable building, energy, accessibility codes and other applicable federal, state, and local codes and regulations.

Materials and systems shall lend themselves to periodic maintenance such as cleaning and refinishing.

Harvest natural daylight for the illumination of interior spaces. Employ measures to reduce disability and discomfort glare by shading harsh sunlight without impeding views. Employ modeling and other metrics to measure and control glare during the entire year.

Metro Transit Comfort Station

A Metro Transit Comfort Station (toilet room), shall be provided as part of the overall development. The Comfort Station may be freestanding, or part of one of the new structures.

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Required details and specifications relating to architectural finishes for the comfort station may be found in:

- Appendix C, Standard Single Unit Driver's Comfort Station.

Concrete Slabs on Grade

Concrete slabs to be constructed on-grade shall be internally reinforced with steel wire or bars, have a low water-cement ration, and shall be poured directly on a virgin-grade polyethylene or polyolefin resin plastic water vapor retarder membrane not less than 0.015-inch thick meeting industry standard Class A performance. Membrane shall be placed directly on granular fill serving as a capillary break and the membrane and all penetrations shall be sealed to adjoining construction.

Provide membrane at all slabs on grade whether or not they will be covered with finish flooring materials.

Avoid using sand in the assembly.

Walls and Partitions

Interior walls and partitions shall be of solid construction such as concrete, solidly-grouted concrete unit masonry, or of metal-framed lightweight construction.

Metal-framed walls and partitions shall be framed with hot-dip galvanized steel studs spaced 16-inches on center and continuous top and bottom tracks of not less than 0.033-inch (nominal 20-gauge) base metal thickness unless thinner metal is required for acoustic Sound Transmission Class (STC) rated performance.

Metal framing sizes shall be in accordance with the manufacturer's criteria for their span and deflection. Metal framing for fire-rated, and/or smoke-rated, and/or acoustic-rated partitions shall comply with the applicable assembly listing requirements. Framing shall include headers, additional framing members, and thicker framing as necessary to properly frame openings and head assemblies to accommodate structural deflection. Include concealed, permanent, secure, and adequate backings for handrails, grab rails, casework, court seals, and other surface-mounted items. Make framing connections rigid with steel drill pan head screws and/or spot welding.

Framing shall be clad with one or more layers of 5/8-inch thick fire-rated and mold-resistance-rated gypsum finish board in compliance with ASTM C1396, ASTM C1177, and ASTM C1658 and requirements of the applicable fire-rated, and/or smoke-rated, and/or acoustic-rated assembly.

Partitions at public areas such as corridors shall have a harder surface and shall be clad with veneer plaster on 5/8-inch thick fire-rated gypsum veneer lathing board or 5/8-inch thick, fire-rated, high performance impact- and abuse-resistance-rated gypsum board (impact-resistant gypsum board) meeting Level 3 performance for soft body impact, hard body impact, surface abrasion, and indentation resistance per ASTM C1629 to the greatest extent possible in compliance with the applicable assembly listing requirements.

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Gypsum board shall receive a Level 4 Finish throughout the facility with the following exceptions, and unless noted otherwise in these Facility Performance Standards or the Room Data Sheets :

- Courtrooms, judicial chamber and private offices shall receive Level 5 Finish
- Maintenance areas, storage rooms, janitor closets, MDF, IDF, and other similar utility spaces shall receive a Level 3 Finish.

Finish Levels are defined per Gypsum Association Standard GA 214.

At partitions to receive thinset tile or stone, framing shall be clad with 5/8-inch thick cement backer board in compliance with the assembly listing requirements and recommendations of the Tile Council of North America (TCNA) in the *Handbook for Ceramic, Glass, and Stone Tile Installation*.

Fire-rated and/or smoke-rated partitions shall have appropriate fire and smoke resistance ratings and shall be laboratory-tested and listed by a qualified independent third-party testing agency acceptable to the local public AHJ. Such assemblies shall be continuous from the subfloor to the structure above and their heads, flanks, and items penetrating the assemblies shall be appropriately sealed and firestopped.

Acoustic-rated partitions shall be laboratory-tested and listed by a qualified independent third party testing agency for acoustic STC rated performance and shall be continuous from the subfloor to the structure above. Framing voids shall be completely filled with dense mineral wool insulation, heads and flanking paths and penetrations shall be appropriately sealed with acoustical sealant, and backs of utility service boxes, conduits, and other penetrations shall be covered with self-adhering flexible acoustical pads.

In open areas, non-rated partitions shall extend from top of subfloor to bottom of the suspended acoustical ceiling to accommodate future modifications. Non-rated partitions in other areas may extend to the structure above.

Shaft Walls

Shaft walls shall have appropriate fire resistance ratings and shall be laboratory-tested and listed by a qualified independent third-party testing agency acceptable to the local public AHJ.

Shaft walls shall be framed with hot-dip galvanized steel studs and tracks of not less than 0.0329-inch (nominal 20-gauge) base metal thickness of special shapes in compliance with its listing requirements to accommodate gypsum board and gypsum liner panels.

Framing shall be clad on the non-shaft side with one or more layers of 5/8-inch thick fire-rated and mold-resistance-rated gypsum finish board and fitted with 1-inch thick fire-rated and mold-resistance-rated gypsum liner panels. At walls to receive thinset tile or stone, framing shall be clad with 5/8-inch thick cement backer board in compliance with the assembly listing requirements and recommendations of the TCNA in its *Handbook for Ceramic, Glass, and Stone Tile Installation*.

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Shaft walls shall be continuous from the subfloor to the structure above and their heads, flanks, and items penetrating the assemblies shall be appropriately sealed and firestopped.

Ceilings

General Requirements:

Ceilings shall be designed for optimal visual, lighting, and acoustical performance and shall integrate required architectural and technical features with the use of ceiling soffits and coffers as applicable to each room and space.

Ceilings shall meet acoustical requirements and shall accommodate lighting fixtures, air supply diffusers and return grilles, fire suppression system, fire detection and alarm devices, communication devices, security equipment, projectors and concealed projection screens, and other appurtenances applicable to each room and space. Such items shall be arranged in a neat, orderly, and logical manner in each ceiling area.

Hard ceilings shall consist of suspended or framed hot-dip galvanized steel channel framing system directly-suspended from the structure above and clad with 5/8-inch thick fire-rated and mold-resistance-rated gypsum finish board or gypsum lath with hard veneer plaster finish. Hard ceiling assemblies shall be non-fire rated.

Acoustical ceilings shall consist of mineral fiber or fiberglass acoustic panels in accordance with ASTM E1264 and supported by a corrosion-resistant metal framing system directly-suspended from the floor or roof structure above in accordance with ASTM C635 and ASTM C636. Acoustic ceiling assemblies shall be non-fire-rated. Use of adhered, small format (e.g. 12-inch by 12-inch) ceiling tile is not preferred by the County. Refer to the food service narrative for information on kitchen ceilings and the Room Data Sheets for other locations.

Ceiling Minimum Heights:

Ceiling minimum heights are listed in *Table B1.2 - Ceiling Minimum Heights*. Lower value refers to areas of special ceiling features such as lowered soffits, coffering, and other special designs.

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Table B1.2 - Ceiling Minimum Heights	
Space	Minimum Height (feet)
Public Lobbies	12
Public Corridors	9
Private Corridors	9
Open-plan Offices	9
Courtrooms	10
Judicial Chambers	9
Private offices	9
Clerk Public Spaces	9
Ancillary Spaces	8
Secure Corridors	Per American Correctional Association (ACA) standards
Holding Cells	8
architectural ceiling features may be lower than the min. height noted	

Minimum Corridor Widths:

Minimum corridor widths are listed in *Table B1.3 - Minimum Corridors Widths*.

Table B1.3 - Minimum Corridor Widths	
Space	Minimum Width (feet)
Public	8 to 12
Private	6
Detention	8
Note: Ramps in corridors to gain access to judicial benches in courtrooms should be in alcoves and shall not impinge on the minimum corridor width.	

Architectural Woodwork

General Requirements:

King County encourages the use of hardwood sourced from Forest Stewardship Council (FSC) certified sustainable forests. Materials, fabrication, and installation shall be in compliance with Architectural Woodwork Standards (AWS) for required grades.

Woodwork in Courtrooms:

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Wood casework, paneling, and trim shall have a dignified presence and shall not distract from the proceedings. Materials may include solid hardwoods and hardwood veneers in compliance with AWS "premium grade".

Coordination of the court technology with the millwork is one of the critical aspects of the design and construction of the courtroom environment. Much of the technology will interface with the millwork and shall be fully integrated in the design.

Woodwork provided by the Design Builder includes the Courtroom Bench (judge's bench; courtroom clerk, bailiff/court coordinator stations, interpreter station, witness stand); public bench seating; moveable counsel tables, rails, and gates; and moveable accessible (ADA) lectern. Bench seating, counsel tables and lectern may be standard furniture customized to match courtroom finish. Other courtroom desktop work surfaces, whether modular or custom-built, shall be matching hardwood or plastic laminate finish pending County approval.

All workstations within the Courtroom Bench shall be ergonomically adjustable through power push buttons that adjust the height of the work surfaces.

The Courtroom Bench (judge's bench; courtroom clerk and bailiff/court coordinator stations), counsel tables and lectern shall have built in wire management systems to obscure and manage cables and cords. Data and power to the counsel tables and lecterns shall be from in slab floor boxes. Woodwork items noted above shall have easily accessible built in power and data distribution grommets. Each of the individual council tables shall have a minimum of two such grommets. The Judge and clerk workstations shall each have two power and data distribution grommets, the coordinator/bailiff shall have one power and data distribution grommet, and the interpreter one grommet

Woodwork at the judge's bench shall incorporate built-in, concealed ballistics-resistant panels independently-tested and rated for not less than UL 752 Security Level 3.

Systems furniture components may be incorporated into the Courtroom Bench work stations pending County approval. High pressure plastic laminate may be used for systems furniture components that are incorporated into the Courtroom Bench work stations upon the County's approval.

Courtroom Mock up:

The Design Build entity shall provide a Mock-up of the courtrooms. The mock up shall be unfinished (temporary) and be utilized to verify the spatial quality, sight lines, design component relationships and functionality of space(s) so that a review of the design can take place for validation of operations within the space(s).

The Design Build entity shall provide a full scale mock up of the courtroom including all platforms, ramps, doors, photo copy alcove, and the woodwork noted above with the exception of the bench seating (public seating). The mock up area shall be large enough to change square footage and the configuration of the counsel tables and public seating so that the 4 different courtroom layouts can be viewed utilizing one Courtroom Bench mock up. The mock up shall include chairs at the workstations within the well. The

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mock up will include full size representations of video conference screens, large screen display, and computers at all work stations in the well.

See General Requirements for additional information.

Woodwork in Judicial Chambers and Public Corridors:

Solid hardwood woodwork matching that used in courtrooms may be used for base and trim in judicial chambers and public corridors.

Built-in Casework:

Built-in casework shall comply with not less than AWS "custom" grade requirements. Core material shall be medium density fiberboard or lumber core plywood; particleboard core material is not acceptable.

Cores for countertops and splashes with sinks shall be moisture-resistant medium density fiberboard or marine grade plywood.

Doors, Frames, and Hardware

General Requirements:

King County Facilities has established and is working toward consistent standards and defined openings program for the specification, provision and installation of opening products.

Non detention area electrified openings shall use factory prewired concealed door and frame wiring and hardware using ElectroLnyx, or fully compatible equivalent, standard plug in connectors, harnesses and pre installed wiring

Doors, frames, and hardware shall be in compliance with applicable King County Facility Management Division (FMD), Appendix A, King County Opening Standards.

Doors, frames, and hardware shall be fire-rated and/or smoke-rated as required and shall be laboratory-tested, listed, and labeled accordingly by a qualified independent third party testing agency acceptable to the local public AHJ.

Acoustic-rated doors and frame assemblies shall be laboratory-tested, classified, and labeled as an assembly by a qualified independent third party testing agency in compliance with industry reference standards for required acoustic STC rated performance.

Doors and frames shall be shop-prepared for hardware in accordance with templates furnished by hardware manufacturers.

Avoid using louvers in doors. Do not use louvers in doors in rooms requiring sound isolation.

Exterior Overhead Coiling doors shall be fully insulated within the slats by the manufacturer to provide u-value better than code. Exterior doors and frames shall be insulated per Seattle energy code requirements.

Wood Doors:

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Wood doors shall comply with Wood Door Manufacturers Association (WDMA) I.S.1A-11 for "premium" aesthetic and "extra heavy duty" performance grades; 5-ply fully-bonded solid core construction with acceptable hardwood veneer flush faces and matching solid hardwood edges; not less than 1-3/4 inches thick; and factory-finished with a durable premium grade UV cured acrylated polyester/urethane stained/transparent satin sheen finish similar to System TR-8.

King County encourages the use of wood that is sourced from FSC-certified sustainable forests. Materials, fabrication, and installation shall be in compliance with Architectural Woodwork Standards (AWS) for required grades.

Vision panel frames shall consist of beveled hardwood strips matching door faces in non-rated doors, veneer-wrapped metal lite beads in fire-rated doors, and shall be removable for reglazing. Avoid using applied metal vision frames.

Doors shall be factory-prepared to template for hardware.

Metal Doors:

Metal doors shall be not less than 1-3/4 inches thick; comply with Steel Door Institute (STI) or National Association of Architectural Metal Manufacturers (NAAMM) reference standards; meet "extra heavy-duty" physical performance grade requirements; be fabricated and internally-reinforced, fully-welded construction with seamless vertical edges and closed tops and bottoms.

Faces shall be flush and fabricated of seamless stretcher-leveled steel not less than 0.042-inch (nominal 18-gauge) base metal thickness.

Steel for doors in toilet rooms, bathing areas, janitor closets, and other wet/damp areas shall have a heavy hot-dip galvanized or galvanized finish.

Doors shall be factory-prepared to template for hardware.

Frames for Doors and Borrowed Lites in Full-Height Partitions:

Frames for doors and borrowed lites in full-height partitions shall be fabricated of formed rolled commercial steel sheet not less than 0.053-inch (nominal 16-gauge) base metal thickness with full-profile welded construction in compliance with applicable NAAMM reference standards and equipped with galvanized steel frame anchors suitable to adjacent construction. Exposed-to-view welds shall be ground smooth and flush with adjacent surfaces.

Steel for frames in toilet rooms, bathing areas, janitor closets, and other wet or damp areas shall have a heavy hot-dip galvanized or galvanized finish.

Frames for borrowed lites shall have integral fixed glazing stops and removable glazing stops on the secured (non public) side.

Frames shall receive a shop-applied corrosion-resistant shop primer compatible with field-applied finish.

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Frames in solid wall/partition construction of masonry or concrete shall be filled solid with low-slump cementitious grout when erected.

Frames shall be factory-prepared to template for hardware.

Frames for Doors and Borrowed Lites in Ceiling-Height Partitions:

Frames for doors and borrowed lites in full-height partitions shall be fabricated of formed rolled commercial steel sheet not less than 0.053-inch (nominal 16-gauge) base metal thickness with full-profile welded construction in compliance with applicable NAAMM reference standards and equipped with galvanized steel frame anchors suitable to adjacent construction. Exposed-to-view welds shall be ground smooth and flush with adjacent surfaces

Frames may be fabricated of extruded aluminum not less than 0.080-inch thick or rolled steel sheet not less than 0.033-inch (nominal 20-gauge) base metal thickness with butt-joint frames and snap-on mitered corner trim.

Steel frames shall be shop-finished with a corrosion-resistant primer and custom-color semi-gloss baked enamel finish.

Aluminum frames shall be shop-finished with Architectural Class I or II clear or color anodic coating or custom-color semi-gloss baked enamel finish.

Frames shall be factory-prepared to template for hardware.

Interior Door Hardware:

Door hardware shall comply with FMD current hardware standards, Appendix A King County Opening Standards.

Door hardware shall include mortise lever handle lock and latch sets, butt hinges, surface-mounted and concealed closers, stops, sound gaskets, and other items arranged into appropriate groups for each opening in accordance with Door and Hardware Institute's recommendations. Door hardware may include low-power electric door operators and associated controls for accessibility.

Interior metal finish shall be BHMA 630 (US 32D) Dull Stainless Steel.

Lock cylinders shall have security keyways and shall be great-grandmaster, grandmaster, and master keyed to the meet the County's requirements.

Interior Glazing

Interior glazing shall present a clear, neutral appearance except as otherwise required to meet programmatic fire-life-safety requirements.

Glass shall be fire-rated, hose-stream tested, and temperature-rise rated where required in accordance with applicable codes and shall be tested, listed, and labeled accordingly by a qualified independent third party testing agency.

Do not use wired glass, glass with applied films, or plastic sheet materials on exposed glazing surfaces.

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Glass in areas subject to human impact shall be impact-resistant "safety" type (laminated and/or fully-tempered) and laboratory-tested, listed, and permanently labeled by a qualified independent third party testing agency in compliance with industry trade association and federal glazing standards.

Glazing for certain areas may need to be strengthened to meet security requirements. Refer to the Special Detention Construction and Security Requirements narrative for further information.

Interior blinds shall be provided per room data sheets for privacy. Louver blinds or fabric black out shade may be used.

Floor Finishes

General Requirements:

Floor finishes shall be inherently slip-resistant or treated for slip-resistance to meet regulatory and accessibility requirements.

Completed floor finishes shall be smooth, clean, and free from stains, cracks, discoloration, foreign embedded material, and other damage and defects as applicable to specific flooring material.

Prior to application, concrete to receive moisture-sensitive flooring shall be tested for water vapor emission rate, humidity, and alkalinity in accordance with the materials manufacturers' recommendations and non-compliant conditions shall be suitably remedied.

Exposed Concrete:

Stained and Sealed Concrete: Smooth, steel trowelled, chemically hardened and finished with a commercial-grade, water-borne, chemically-reactive stain to create uneven, variegated, and translucent color effects with variations in color and intensity and sealed with multiple-coats of a commercial-grade, single-component, clear acrylic-polyurethane formulated to produce a slip-resistant finish resistant to staining, abrasion, and effects of ultraviolet radiation.

Sealed Concrete: Smooth, steel trowelled, and finished with a dust-proofing/hardening non-yellowing commercial grade concrete sealer formulated to produce a slip-resistant finish.

Tile and Stone:

Materials and installation shall be in compliance with recommendations and installation methods/standards of the TCNA in its *Handbook for Ceramic, Glass, and Stone Tile Installation* and associated industry-standard ANSI and ASTM reference standards.

- Floor tile and stone service rating shall be "Heavy".
- Environmental classification shall be "Commercial" as applicable to the moisture conditions of installation areas.

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Tile shall be factory-made and standard grade in compliance with ANSI A137.1 and shall include all associated bases, caps, stops, returns, trimmers, and other shapes necessary for complete installations.

- Vertical internal corners shall be square.
- External edges and corners shall be bullnosed.
- Transitions between bases shall be coved flush.

Quarry tile shall have a ribbed back, unglazed face with raised pattern or integral abrasive grit for slip resistance and shall be "thickset" in a reinforced mortar bed.

Each floor with a drain that will receive a tile or stone finish shall include a waterproofing membrane within the assembly. Tile may be "thinset" to concrete slab or "thickset" with reinforced mortar bed in a recessed concrete slab, as required by the assembly.

Each wall and partition to receive a tile or stone finish shall be clad with 5/8-inch thick cement backer board for "thinset" application.

Grout:

- Horizontal tile and stone installations shall be grouted with epoxy grout.
- Vertical tile and stone installations shall be grouted with polymer-modified latex grout.

Portland Cement Terrazzo:

Materials and installation shall be in compliance with recommendations and installation methods/standards of the National Terrazzo and Mosaic Association (NTMA) and associated industry-standard reference standards.

Aggregates shall be resistant to abrasion and impact, low-absorptive type with minimum dust content and may include recycled materials.

Flooring shall be bordered divided into areas with white alloy zinc strips or equivalent.

Completed terrazzo flooring shall be coated with a commercial, penetrating type sealer formulated to produce a slip-resistant finish resistant to staining, abrasion, and effects of ultraviolet radiation.

Epoxy-Resin Terrazzo:

Materials and installation shall be in compliance with recommendations and installation methods/standards of the National Terrazzo and Mosaic Association (NTMA) and associated industry-standard reference standards.

Epoxy-resin terrazzo shall be thinset, approximately 3/8-inch thick.

Aggregates shall be resistant to abrasion and impact, low-absorptive type with minimum dust content and may include recycled materials.

Colorants shall be commercially prepared, alkali-resistant, color-stable pigments.

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Flooring shall be bordered and divided into areas with white alloy zinc strips or equivalent.

Carpeting:

General Requirements:

Carpeting shall be appropriate to traffic expected in each space and have long term appearance ratings of not less than 2.5 for moderate traffic levels, 3.0 for heavy traffic, and 3.5 for severe traffic per Carpet and Rug Institute's (CRI) appearance retention rating guidelines.

Carpeting shall comply with CRI's "Green Label Plus" testing and certification program and shall be completely recyclable.

Carpeting shall be certified by a qualified independent third party testing agency to meet NSF/ANSI 140 *Sustainable Carpet Assessment* for minimum "gold performance" using life cycle assessment principles in six key areas: public health and environment; energy and energy efficiency; bio-based, recycled content materials or environmentally-preferred materials; manufacturing; reclamation and end of life management; and innovation.

Yarn shall be premium grade commercially branded Nylon 6-6 with soil-hiding characteristics; solution-dyed; and inherently stain-resistant and anti-microbial; and cleanable using bleach solutions without sustaining damage.

Carpeting shall:

- be laboratory-tested by a qualified independent third party testing agency and meet building code requirements for flame resistance, Class I radiant panel testing, and smoke density testing as applicable to the occupancy;
- have a static propensity of less than 3.0 kilovolts;
- be of a single dye lot in each contiguous area;
- include primary and secondary backings; tuft bind of loop pile carpets shall be not less than 20 pounds for heavy and severe wear areas; for higher acoustic values, use urethane-backed tile or urethane cushion on broadloom;
- be bonded to concrete subfloor with premium grade adhesive; and

Colors and patterns shall be selected from the manufacturer's full range of standards to facilitate maintenance and replacement.

Carpet Tile:

Carpet tile shall be modular commercial-grade, of tufted loop pile construction with primary and secondary backings; with face fiber weighing not less than 26 ounces/square yard; not less than 1/10-gauge; not more than 0.1875-inch thick; and a density factor of not less than 6,000 ounces/cubic yard calculated as follows:

$$\frac{\text{Yarn Face Weight} \times 36}{\text{Face Yarn Height}}$$

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Hybrid carpet tile systems with attached pad may be used where acceptable to the County.

Carpet tile shall be not less than nominal 24-inch square in size, however large format tiles are preferred for their improved tendency to remain in place.

Carpet tile shall be bonded to concrete subfloor with premium-grade releasable adhesive to facilitate replacement.

Broadloom Carpet:

Broadloom carpet shall be commercial-grade, of tufted loop or cut pile construction with primary and secondary backings; with face fiber weighing not less than 28 ounces/square yard; not less than 1/10-gauge; not more than 0.250-inch thick; and a density of not less than 4,000 ounces/cubic yard calculated as for carpet tile.

Carpet shall be furnished in continuous rolls not less than 12-feet wide.

Carpet shall be bonded to concrete subfloor with premium-grade adhesive.

Resilient Flooring and Base:

General Requirements:

Resilient floor finishes may be used in non-public areas such as in employee break rooms.

Resilient Flooring:

General:

- Do not use sheet vinyl or sheet cork.
- Do not use vinyl tile, vinyl composition tile, or other types of resilient tile except where static-dissipative type may be required in electronics areas.

Resilient Sheet Flooring: Homogeneous rubber or linoleum sheet; nominal 0.100-inch thick; furnished in nominal 6-foot wide rolls; and installed with full-spread low-VOC adhesive and heat-welded seams.

Resilient Multi-Use Flooring: High-performance resilient sheet indoor multi-use sports flooring constructed with multiple backing layers with an embossed texture no-wax wear surface; nominal 0.100-inch thick. Nominal 5-foot wide rolls; and installed with full-spread low-VOC adhesive and heat-welded seams. Requirements for shock absorption, ball bounce, coefficient of friction, static load, residual indentation, and other performance criteria for the usage intended will be determined by the County. Flooring shall include applied game lines suitable to its intended use.

Resilient flooring in detention day rooms shall be a minimum of 6 mils thick..

Resilient Base and Transition Strips:

Resilient Base: Thermoset vulcanized rubber, 1/8-inch gauge, 4-inches high, top-set coved style for use with hard flooring and sealed concrete and straight style for use with carpeting. Base shall be supplied and installed in large continuous to minimize

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seams in each area. Furnish with matching factory pre-molded inside and outside corners.

Transition Strips: Moldings of tapered-edge style suitable to rolling traffic, matching color and sheen of resilient base, and FloorScore® certified.

Resinous Flooring:

Seamless, multi-component, 100 percent solids, zero VOC, methyl methacrylate based resinous floor surfacing consisting of an epoxy-based primer; epoxy-based basecoats with embedded multi-colored aggregate; grout coat; and pigmented urethane topcoat; nominal 1/4-inch thick. Flooring shall be impervious to water, UV-stable, and chemical- and slip-resistant. Flooring shall be self-extinguishing per ASTM D635. Provide 6-inch high integrally-coved base of same material.

Courtroom Flooring:

The County wishes to explore a variety of flooring types for the courtrooms as part of the Design Development phase. The gallery area requires a material that resists stains and is easily cleaned (mopped) due to the large amount of food and drink spills that historically have occurred in that area. The well may have a softer material such as carpet.

Of specific interest is the use of Cork Flooring Tiles, The Design Build entity shall research and explore options for the flooring material/finishes within the courtrooms that meet that goals above in the Design Development phase, and submit / discuss the findings of this research/exploration with the County. The research / exploration shall include the comparison of the initial cost, maintenance costs, longevity, resistance to wear and vandalism.

Typical Floor Finish Locations

Typical usage of finish flooring is noted in *Table B1.4 - Finish Flooring Locations*. The table is not a complete list; refer to the Room Data Sheets for further information.

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Table B1.4 - Finish Flooring Locations									
Typical Locations	Flooring Material								
	F1 – Resilient Sheet Flooring	F2 – Carpet or Carpet Tile	F3 – Ceramic Tile	F4 – Stained and Sealed Concrete	F5 – Sealed non slip Concrete	F6 - Quarry Tile	F7 – Decorative Stone Tile, Terrazzo or similar	F8 – Resilient Athletic Flooring	F9 – Resinous Flooring
Public Lobby									
Public Corridor	•	•	•				•		
Public Restroom			•						
Courtroom Waiting	•	•					•		
Courtroom		•					•		
Chambers		•							
Restricted Corridor		•							
Clerk’s Office		•					•		
Child Care Center	•	•	•						
Staff Office/Workstation		•							
Conference/Meeting Room		•							
Employee Break Room	•								
Coffee Counters	•		•						
Staff Restroom			•						
Employee Wellness/Exercise Room								•	
Holding Cells/Sleeping Cells (Dorms)				•	•				
Classrooms and Education Support	•	•							
Laundry Areas	•		•						
Kitchen Areas									•
Outdoor Recreation					•				
Sallyport	•					•			
Gymnasium								•	
Detention Day rooms	•								
Loading Dock				•	•				
Janitor Closets	•				•				
Mechanical Rooms					•				
Shop/Maintenance/Service Areas				•	•				
MDFs, IDFs, electrical rms, mech rms				•	•				

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Paints and Coatings

General Requirements:

- Paints and coatings shall be of one manufacturer and selected from the manufacturer's top-of-line (premium-grade) products.
- Paints and coatings shall be low- and zero-voc waterborne, one-hundred percent (100%) acrylic latex formulations.
- Materials for each paint system shall be compatible with each other.
- Colors shall be custom mixed to required colors.
- To the greatest extent practicable, furnish paints and coatings that meet the Master Painters Institute (MPI) *Green Performance*[®] *Standard GPS-1-12*.

Exterior Paint Systems:

- Concrete: 1 coat of acrylic latex primer and 2 finish coats of satin acrylic latex paint.
- Concrete Unit Masonry: 1 coat of block filler and 2 finish coats of satin acrylic latex paint.
- Shop-Primed Steel Doors and Frames: Touch-up of shop primer and 1 finish coat of hybrid aliphatic semi-gloss polyurethane high-performance paint.
- Galvanized Steel Railings: 1 coat of two-component polyamidoamine epoxy primer and 1 finish coat of hybrid aliphatic gloss polyurethane high performance paint.
- Stainless Steel Flashings: 1 coat of two-component polyamidoamine epoxy primer and 1 finish coat of hybrid aliphatic semi-gloss polyurethane high performance paint.

Interior Paint Systems - Non-Detention:

- Concrete: 1 coat of acrylic latex primer and 2 finish coats of eggshell acrylic latex paint.
- Concrete Unit Masonry: 1 coat of block filler and 2 finish coats of eggshell acrylic latex paint.
- Steel Doors and Frames: 1 coat of rust-inhibitive shop primer and 2 finish coats of semi-gloss acrylic latex enamel paint.
- Hardwood Paneling and Trim: Premium-grade stained conversion varnish finish in accordance with Architectural Woodwork Standards (AWS) consisting of multiple wash coats, seal coats, and satin finish top coats.
- Steel Railings: 1 coat of rust-inhibitive shop primer and 2 finish coats of gloss acrylic latex enamel paint.
- Gypsum Board and Gypsum Plaster Walls: 1 coat of primer/sealer and 2 finish coats of eggshell acrylic latex paint.
- Gypsum Board Ceilings and Soffits: 1 coat of primer/sealer and finish coats of flat acrylic latex paint.

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- Gypsum Board Walls and Ceilings in Toilet Rooms: 1 coat of primer/sealer and 2 finish coats of semi-gloss acrylic latex enamel paint.
- Exposed Concrete Structure: Two coats of flat dryfall-type acrylic latex paint.

Interior Paint Systems - Detention Areas:

- General Requirements:
 - o Paints and coatings shall be of one manufacturer and selected from the manufacturer's top-of-line (premium-grade) products.
 - o Paints and coatings shall be, low- and zero-voc waterborne, one-hundred percent (100%) acrylic latex products formulations.
 - o Materials for each paint system shall be compatible with each other.
 - o Colors shall be custom mixed to required colors.
 - o Paint systems shall have superior bond strength to substrates to resist peeling and unauthorized removal.
- Paint Systems:
 - o Concrete: 1 coat of epoxy primer and 1 coat of semi-gloss waterborne epoxy paint.
 - o Concrete Unit Masonry: 1 coat of epoxy block filler and 1 coat of waterborne semi-gloss epoxy paint.
 - o Steel Doors, Frames, and Railings: 1 coat of rust-inhibitive shop epoxy shop primer and 2 finish coats of waterborne semi-gloss epoxy paint.
 - o Steel Detention Equipment: 1 coat of rust-inhibitive shop epoxy shop primer and 2 finish coats of waterborne semi-gloss epoxy paint.
 - o Gypsum Board: 1 coat of epoxy primer and 1 coat of waterborne semi-gloss epoxy paint.

Interior Expansion Joint Cover Assemblies

Use metal cover-plate type assemblies at floor-to-floor, wall-to-wall, wall-to-ceiling, ceiling-to-ceiling, and other conditions.

At floors, use flush-mounted center plate type that slides over fixed frames on each side of joint. Plate shall be rated for heavy traffic and shall be capable of receiving finish flooring material.

Finish exposed metal components to match adjacent wall, ceiling, and floor finishes to minimize their appearance.

Toilet Compartments and Screens

Toilet compartment and screen layouts shall comply with federal, state, and local accessibility codes and requirements.

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Except as otherwise noted, toilet compartments shall be floor-mounted/overhead-braced or ceiling-hung from concealed steel structure.

Urinal screens shall be wall-hung from solid backings with continuous braces on each side. Panels shall have continuous AISI Series 300 stainless steel braces on each side. Overhead bracing shall be of heavy AISI Series 300 stainless steel or extruded aluminum with anti-grip profile.

Toilet compartments accessed from public lobbies shall be suspended from concealed overhead structures in ceiling assemblies.

Toilet compartments and screens shall be fabricated of AISI Type 302 or 304 stainless steel or solid plastic. Painted metal, phenolic, and plastic laminate-clad compartments and screens are not acceptable.

Stainless steel compartments and screens shall be fabricated with stretcher-leveled embossed stainless steel faces, resin-impregnated vermin-resistant kraft paper honeycomb cores, and welded/ground smooth stainless steel edges and shall be internally-reinforced and shop-prepared for toilet accessories.

Pilasters shall be not less than 1-1/4 inches thick and doors, panels, and screens shall be not less than 1-inch thick. Stainless steel thickness shall be not less than 0.0625-inch (nominal 16-gauge) for pilasters; 0.0375-inch (nominal 20-gauge) for panels, and 0.0312-inch (nominal 22-gauge) for doors.

Solid plastic compartments shall be of solid high-density polyethylene plastic, not less than 1-inch thick for all components.

Fittings and hardware shall be AISI Series 300 stainless steel with satin-finish. Do not use chrome-plating.

Fasteners shall be AISI Series 300 stainless steel with security tamper-resistant pin-Torx heads. Do not use one-way heads.

Wall and Corner Protection

Wall protection shall consist of horizontal surface-mounted horizontal assemblies with a continuous concealed extruded aluminum retainer, snap-on plastic cover, and inside and outside corner trim. Assemblies shall be continuous except where interrupted by door and interior window frames.

Corner guards shall consist of vertical, surface-mounted, angle-shaped assemblies with a continuous concealed extruded aluminum retainer, snap-on plastic cover, and snap-on top and bottom plastic trim.

Provide stainless steel metal corner guards up to 6'-0" at all walls with open corners in corridors, open offices, or areas where equipment will be moved through. Provide a chair rail or wall protection at detention corridors at 48" AFF to protect walls from moving carts. Public lobby spaces or feature spaces may be exempt with Owner approval.

Toilet and Janitorial Accessories

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Toilet and janitorial accessories shall comply with federal, state, and local accessibility codes and requirements.

Accessories shall be fabricated of welded/ground, smooth satin-finish stainless steel and shall be readily serviceable. Dispensing and disposal units shall be lockable.

Dispensing and disposal units shall be capable of accommodating universal-size replacement supplies (e.g. paper towels) from multiple vendors.

Toilet room accessories include grab bars, toilet seat cover dispensers, toilet tissue dispensers, sanitary napkin disposal receptacles, mirrors, soap dispensers, recessed paper towel dispensers and disposal receptacles, high-speed electric hand dryers, diaper-changing stations, and other types.

Janitor room accessories shall include utility shelves, and mop/broom holders.

Public and Private Toilet Rooms

Toilet room layouts and fixtures shall comply with federal, state, and local accessibility codes and requirements.

Public toilet rooms are heavily used and shall be finished with durable, washable, and easily maintained materials. For high-volume public toilet room entries, consider the use of doorless vestibules with integrated sound and visual screening.

Acceptable finishes include unfinished ceramic or porcelain tiled floors with coved bases with epoxy grout; glazed ceramic tile wall wainscoting not less than 4-feet high with polymer-modified cement or epoxy grout; countertops and splashes of monolithic solid-surfacing material or impervious sealed stone; toilet compartments and urinal screens; wall-hung toilets, under deck-mounted lavatories, and floor drain; gender-specific toilet accessories appropriate to each room; full-width wall-mounted frameless mirrors above lavatory countertops; wall-mounted diaper-changing accessory or countertop table.

Tile floors in rooms with floor drains shall be set on a liquid-applied waterproofing membrane. Floors shall be sloped to positively drain or dished at the drain.

Interior Walk-off Mats and Grilles

Utilize permanent recessed walk-off mats and/or grilles, each with a removable pan, on the interior of each major building entrance to facilitate building maintenance and contribute to the quality of indoor air in accordance with LEED[®] requirements.

Mats and grilles shall act as a scouring and drying agent to remove and collect moisture and foreign matter from visitor's shoes as they enter the building and shall be at least 12-feet long in the direction of travel.

Interior Court Security Considerations

General circulation spaces shall have video coverage and paging capability from the County Emergency Dispatch Center (EDC) located off-site. The EDC shall have fire alarm notification, fire alarm initiation capabilities, and card access monitoring to provide a safe place for staff, visitors and juveniles while in the court building.

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Systems Furniture

Systems furniture is not part of the contract at this time. For planning purposes the County Standards for systems furniture is Herman Miller Ethos Space – secondary market.

Planning and layout of systems furniture shall be done by the Design Build entity as part of the design development and construction document phases.

Courthouse Zoning and Building Circulation

General:

Adjacency and circulation among spaces are determined by the movement of people and materials for court activities, security, and public access requirements. To accommodate movement within courthouses, three separate circulation zones must be provided: public, restricted, and secure.

- Public circulation requires a single controlled entry but allows free movement within the public areas of the building.
- Restricted circulation has a controlled interior entry and is limited to judges, court personnel, and official visitors.
- Secure circulation is intended for in-custody youth and adults and is controlled by the detention staff.

Security and alarm systems for the various court-related offices should function as an integral part of the security and alarm systems for the total facility. Doors to all offices, enclosed work areas, and storage rooms should have key locks, except as otherwise noted. Secure storage spaces shall be provided with motion detectors connected to the County's enterprise electronic security system. Doors from public reception/waiting- areas to restricted access areas should have electric strike locks.

Duress initiating devices shall be located in such a manner to prevent unintentional operation by employees and others with access to the equipment. Fixed in place duress alarm initiating devices shall be installed within four feet of the workstation/area and be accessible from the normal work position to the individuals responsible for utilizing the device. Holdup alarm initiating devices shall be mounted at a height that is accessible from their normal work position. Duress alarm initiating device shall be located so that it cannot be observed by the public

Spaces Where Cash is Disbursed:

Doors to the Department of Judicial Administration Clerks office, where cash is disbursed shall be equipped with card access control together with duress alarms and CCTV (closed circuit television) recording shall be provided.

Court Holding Requirements:

A secure perimeter system should surround the central holding area and the courtroom holding areas. All egress points through the secure perimeter should be controlled by

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sallyports with interlocked doors and monitored by Central Control staff. A Detention post located within the Court Holding area may also control the entries points into Court Holding with the Detention Security Electronics system. All horizontal plans comprising the perimeter, including partitions, floors, ceiling systems, and fenestration points, must be designed to thwart unauthorized egress.

Detention construction shall provide a safe and secure environment for holding of juveniles and adults while in the Courthouse Building. Holding areas include holding cells and dedicated secure corridors to courtroom, interview booths, and other secure areas.

Designs shall:

- maximize direct sight lines to minimize reliance on surveillance cameras;
- minimize protrusions into pathways and corridors that produce blind spots; and
- provide equal facilities within the building for all detainees.

Design and construction of spaces where juveniles may be left alone shall be anti-ligature.

Acoustical design and construction shall provide for:

- control of sound and reverberation within holding areas; and
- control sound transmission from holding areas into other areas of the building.

Conference Center:

Currently, the County is planning that all entrants into this space will go through security screening. During weekends and after hours, use of the Conference Center shall require that it be locked off from the Courthouse Building and the Detention Facility. Provide direct exterior access to this space to give the County the option of direct entry without going through the main building screening/lobby. There should be no direct line of sight from the vehicular drop-off area to the front entry doors.

Entrance:

The entrance or entrance vestibule should be clearly visible and recognizable as such from the exterior of the building. The vestibule should be able to handle the flow of traffic at peak times. The entrance should be protected from vehicle approach with various planters, benches or other obstructions.

Security Screening Station:

The security screening station should be designed with a non-secure zone in front of the screening equipment (i.e., metal detectors and X-ray machine). The non-secure zone should be large enough to provide safe and comfortable queuing during peak load periods. An elevated screening security station shall be provided as part of the screening station. Infrastructure shall be provided for future CCTV viewing monitors, duress alarm annunciators, and intercom connection to Detention Central Control.

Building Lobby:

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The main staff and public gathering point is the building lobby on the secure side of the security screening station. The size and shape of the lobby should facilitate the process of understanding the layout, adequate signage and clear movement systems to allow public and staff to circulate within the building. Views into the lobby from the vehicle drop-off should be minimized.

Judicial Chambers:

Judicial chambers are accessed from restricted circulation with convenient access to the courtroom(s).

Bullet and Break Resistant Glazing and Shielding:

Bullet- and break-resistant glazing and shielding are required at specific points throughout the facility to enhance security. For control within the facility, break-resistant glazing should be utilized.

Generally, the following are areas where protective glazing and shielding are required:

- Bullet-resistant shielding is required on vertical surfaces of judicial benches.
- Bullet resistant glazing is required for all exterior windows within Judicial Chambers.
- Bullet resistant glazing is required at the public / employee interface in the Detention Lobby.
- Attack-resistant glazing (Type G3) is required at the public counter, in the Prosecuting Attorney's Office (PAO).

Refer to *Table B1.1 - Interior and Exterior Glazing Types* for descriptions of glazing.

The design of special protective glazing must take into consideration maintenance and replacement. Protective glazing should be installed in standardized sizes to allow for ease of replacement. Counters where glazing is used should have bullet-or break-resistant shielding built into the surfaces below the glazing, and side panels to match the rating of the glazing.

Physical Security Requirements:

Counters installed for public / employee interface (i.e Probation, Court check in counters) shall be constructed with means to physically and visually secure them from the public when not staffed by the County. The design of these counters shall be customer friendly, while inhibiting or preventing physical assault of County Staff without the use of a glazing barrier above the counter.

Doors shall offer substantial resistance to unauthorized entry.

Where more than one door is required for a secured area, single doors or double doors with a removable mullion between them shall be used.

Doors that serve exclusively as exits from a secured area shall not be operable from outside the secured area.

Where primary reliance is placed on doors as physical security barriers, they shall provide a penetration resistance equal to that for adjoining walls, ceilings, and floors.

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Openings in doors shall have the same barrier delay rating as required for the door.

Doors that serve as emergency exits from spaces shall not open into spaces of greater security.

Doors of offices or rooms constituting security area perimeters where sensitive information is discussed shall be acoustically-rated as noted in the Acoustical Requirements narrative.

- Exterior windows, and interior windows where primary reliance is placed on windows as physical security barriers, shall provide a penetration resistance equal to that for adjoining walls, ceilings, and floors. Glazing for exterior windows, and interior windows where primary reliance is placed on windows as physical barriers, shall be shatter-resistant, laminated glass panes not less than 9/32-inch thick or other material providing an equal degree of forced-entry resistance. Glazing shall be installed in fixed frames so that the panes are not removable from outside the area being protected. The frames must be securely anchored in the walls, and windows shall lock from the inside or protected side.

Levels and Floors Labeling:

- Floors will be numbered beginning with the ground level walk in main entrance. This floor corresponds directly to the street address entry for the primary site. This is the floor emergency responders to the primary address arrive at and begins the labeling as floor 1.
- Floors will be numbered sequentially in whole numbers higher for each floor above the ground level main entrance with whole numbers for each floor above beginning with 1,2,3,4 until the last top floor is reached prior to the roof.
- Mechanical floors will be numbered in accordance with all other floors.
- Floors below level 1 will be numbered sequentially in whole numbers higher with the B prefix as you go lower. Beginning below level 1 with B1,B2, B3... sequentially as you proceed lower in the building site.
- Garage levels will be numbered sequentially in whole numbers with the P prefix beginning with the first lowest parking floor available for vehicle parking being P1. Then proceeding upward P2,P3,P4... sequentially as you proceed up the parking levels.
- The roof area of any building will be labeled Roof.

Opening numbering

- In hallways or corridors numbering begins at the main or central public access doors and proceeds to the right or counter clockwise. On floors above or below grade without hall / corridor entries numbering begins at the central public elevator or stairwell and proceeds to the right or counter clockwise.
- Number all openings including but not limited to; doors openings, lockable mechanical chase doors, roll-down doors, and access hatches or doors. Number in accordance with room or area number. If multiple doors for the same room, use letter designation following number with the primary room entrance being first (A) and supplemental doors being (B)-(Z) working from the primary entrance around the room to the right (counter

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clockwise).

- Number all window openings including but not limited to; windows, skylights, fixed framed mirrors. Number in accordance with room or area number. If multiple windows for the same room, use letter designation following number with the first window to the right of the designated main entrance door being (A) and supplemental windows being (B)-(Z) working from the primary entrance around the room to the right (counter clockwise).
- Should numbering beyond letter Z be required follow Z with, AA through ZZ, then AAA through ZZZ and so forth until all items are labeled.

d. Special Detention Construction and Security Requirements

Detention Facility Principles:

This Detention Facility shall have the focus on securing the environment through efforts to maximize direct staff and youth interaction. Barriers and electronic systems shall support the staff/youth interaction, and the following principles should be incorporated:

- Security risk and needs assessment should be based on a youth-specific assessment tool and become the basis for every operational and design choice.
- The external wall of buildings that face the surrounding land uses should provide the complex security. Within the buildings, the provision of security barriers and devices should be appropriate to documented levels of risk.
- The use of normal materials, fixtures, and furnishings appropriate to the security requirements of each space should characterize the design of the building(s). Selection of building materials should consider the reduction of vandalism equal with security requirements. Additionally the ambience of the detention facility is desired to dispel a 'jail like' atmosphere.
- The requirement for any barrier or separation of staff from youth should be based upon documented levels of risk. The design focus throughout all components of the facility is the enhancement of communication through direct contact between staff and youth.
- The aesthetic and environmental aim shall be to create an environment supportive of youth by choosing materials and systems that promote normal communication and are sustainable.

Detention Facility Security and Operations

Detention Lobby:

Security screening in the courts lobby will be in operation from 0700-2300 hours each weekday and until 2100 hours on weekends. These hours of operation are critical since all persons entering the CFJC will be screened per King County policy for court facilities.

Since Detention staff, and a limited number of professional staff and an occasional family member, will require entry to the Detention Section after 2300 hours, a separate entry

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directly into the detention lobby is required. Any person requiring entry into Detention after 2300 hours will use a camera-activated telephone at the front entrance to contact Detention Central Control Room for identification and approval to enter the Detention Lobby (which includes the security screening devices).

Any staff or visitors that are entering the secure area of the Detention Section will be screened by Detention security staff that will be deployed to the Detention Lobby. On very rare occasions, a professional or family visitor may need to access the Visitation Area, but in a rare instance of a youth being released after 2300 hours, this hand-over to a family member will occur in the Detention Lobby.

Layout and design should discourage direct lines of sight from vehicles to the screening staff. The lobby is not made of high security materials, though maintenance of materials chosen is very important.

Visitation:

In keeping with King County's Department of Adult and Juvenile Detention (DAJD) guiding principles, the spaces should be designed for high quality institutional grade furnishings to promote a family-friendly environment. Detention-styled tables and chairs are not required as staff will always be present at the time of visits. One non-contact visitation space shall be provided for the rare instance when a youth's behavior is such that a contact visit is inappropriate. This space shall be designed to promote direct visual contact between the parties separated by security glass. Voice contact shall be through a secure "talk-around" feature.

Central Control Room (CCR):

This 24/7 space has the purpose of monitoring and controlling all remotely-accessed spaces in the detention area. All CCTV, access controls, and life safety monitoring will occur in the CCR. While doors to the rooms in the Living Halls can be controlled from within these spaces or the neighbor pod stations, the CCR shall have the capability of override. Control of all doors leading from the secure detention perimeter to non-secure area of the CFJC shall reside with the CCR.

All external calls shall route through the CCR.

While the monitoring and access control function is the primary responsibility of the CCR, depending upon location, the officer in this secure space may have "casual supervision" responsibility for corridors, visitation spaces, admissions and release, and staff entrance. Location of the CCR will determine if this secondary role is feasible.

After hours access to the Detention Lobby shall reside with the CCR

The staff touch screen space should be laid out per the requirements in the security electronics narrative. Appropriate acoustics, adequately-controlled task lighting, and ergonomics are important elements in this workspace.

All workstations within the CCR shall be built in casework, ergonomically adjustable through power push buttons that adjust the height of the work surfaces.

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The casework shall comply with not less than AWS "custom" grade requirements. Core material shall be medium density fiberboard or lumber core plywood; particleboard core material is not acceptable.

The casework shall have built in wire management systems to obscure and manage cables and cords.

Refer to Part B, Section 10 - Electronic Safety and Security Systems of this *Facility Performance Standard* for further information.

CCR Mock up:

The Design Build entity shall provide a Mock-up of the CCR. The mock up shall be unfinished (temporary) and be utilized to verify the spatial quality, sight lines, design component relationships and functionality of space(s) so that a review of the design can take place for validation of operations within the space(s).

The Design Build entity shall provide a full scale mock up of the CCR including glazing, doors, all work surfaces, touchscreens, keyboards, monitors. See General Requirements for additional information.

Admissions and Release:

All spaces should be as "normative" as feasible meaning the appearance of a 'jail like' atmosphere should be minimized. The focus should be upon fostering communication in appropriate settings. Although lockable holding cells are provided, these will not be used routinely and only to temporarily hold a disruptive youth or if staff presence is required elsewhere for a short term.

Staff Support:

To support staff in their responsibilities, as already noted, all spaces that involve interaction with youth should be designed to promote normal and direct communication. Separate staff areas acoustically from youth detention areas using noise reduction techniques throughout the Detention Facility. Spaces dedicated exclusively to staff should be of office building construction.

Food Service:

Juveniles will not work in the food service program areas and security does not have to be the primary focus of materials.

Medical Services:

Actual examination and treatment occurs in the clinic and infirmary areas. The clinic may be of standard medical office building construction except for spaces that contain large amount of supplies, medication, and records. The infirmary area shall be of secured construction similar to the living units.

Built in upper and lower cabinets are required for the following:

- Medical Laboratory
- Nurse's station

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- Medical exam rooms
- Medical procedures room
- Dental Suite
- Medication Room
- Clean utility /Linen /Storage
- Medical Storage/Equipment

General Services:

The Courthouse Building and Detention Facility portions of the CFJC share selected services including a public lobby, central mechanical areas, loading dock, maintenance shops, and large storage. These spaces are outside security and are developed as standard institutional quality construction.

Programs:

Standard construction similar to an educational setting should be developed in the youth programs areas within detention with the emphasis on maintenance of materials not security barriers.

Living Unit "Neighborhood" Pod Stations:

Living units shall be grouped into three or four units with a pod station located outside these living units within the circulation corridor, but having views of the living unit entries. These pod stations shall have the following security features:

- Open workstation but with stand-up counter heights.
- Lockable electronic control system interface panel that will include opening of living unit entry doors, remote opening of juvenile room doors, intercom connection to each juvenile room, CCTV viewing of the dayrooms, master intercom, and interface with CCR.

Living Units:

Each prototypical Living Unit includes a staff station capable of providing space for two Juvenile Detention Officers (JDO). Generally, staff is expected to be moving about throughout the Living Hall when youth are not in their rooms, class, or out-of-unit. From the staff station staff should be able to see the door leading from the corridor into the Living Hall, all room doors, the two showers, the interview rooms, the classroom, and the outdoor recreation courtyard.

- All surfaces should be vandal resistant and easily maintained.
- Sleeping Rooms will be "wet" and shall have privacy screening at the water closet. Provide power to allow for electronic operation and monitoring of the doors. Ensure suicide prevention standards are applied to all dorm construction.
- Sleeping rooms shall be provided with a built in bed secured to walls and or floor that is enclosed from the sleeping surface to the floor to prevent detainees from crawling

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underneath the bed., Beds will not have sharp edges, breakable parts, or exposed fasteners. Beds will not create places to hide contraband.

Transitional Living Units:

Each Transitional Living Unit shall have a sallyport entry from the Detention Facility and a sallyport entry to the exterior. Each Living Unit shall include a staff station capable of providing space for two JDOs. Staff members are expected to be moving about throughout the Living Hall at times when youth are not in their rooms, class, or out-of-unit, during various times of the day.

From this staff station staff should be able to see the sallyport doors leading from the corridor into the Transitional Living Hall, all room doors, the two showers, the interview rooms, the classroom, and the outdoor recreation courtyard.

- All surfaces should be vandal-resistant and easily maintained.
- Sleeping Rooms will be "wet" but with privacy screening provided around the water closet. Showers will be provided in each of the sleeping rooms in two of the four Transitional Living Units.
- Sleeping rooms shall be provided with a built in bed secured to walls and or floor that is enclosed from the sleeping surface to the floor to prevent detainees from crawling underneath the bed., Beds will not have sharp edges, breakable parts, or exposed fasteners. Beds will not create places to hide contraband.

Support Spaces:

Doors to mechanical, electrical, custodial spaces, storage rooms, maintenance shops and other equipment spaces shall be key-locked. For maintenance reasons, the door hardware for such doors shall match the door hardware in the non-detention areas of the facility.

Security Materials (coordinate materials listed with Room Data Sheets)

Concrete Unit Masonry Walls

Concrete unit masonry (concrete block) walls shall consist of concrete units in compliance with ASTM C90, internally-reinforced with steel for structural and security considerations, and grouted solid with cementitious grout.

Steel Security Doors, Frames, and Windows

Security Grades: Steel detention doors and frames shall comply with the testing and performance requirements of NAAMM/HMMA 863, Grade 1 and ASTM F1450, Grade 1.

Tool-Attack Resistance: Comply with small-tool-attack-resistance rating in accordance with UL 437 and UL 1034.

Doors and frames shall be factory-prepared to template for hardware.

Alternative Detention Flush Doors

The County is interested in the use of alternatives to the 'look' of metal doors within the Detention Secure Perimeter, to minimize a detention 'atmosphere', and foster a "normal",

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age appropriate appearance / ambience. Such doors may or may not have a wood appearance. The Design Build entity shall research and explore options for the doors within the detention perimeter that meet that goal in the Design Development phase, and discuss the the findings of this research/exploration with the County. The research / exploration shall include the comparison of the security, longevity, maintenance and cost of such doors to metal detention doors.

Interior Fire-Rated Security Glazing:

Monolithic units of UL-listed glass suitable to required fire rating, twin-glazed with non-rated glass of required security grades. Do not use wired glass. Provide in fire rated openings that are listed above.

Refer to *Table B1.1 - Interior and Exterior Glazing Types*.

The following is a series of security requirements for construction within areas of the Detention Facility.

Security Wall Construction:

Wall construction types have been identified for each space as part of the Room Data Sheets. Security Levels required range from A to D, the most secure are Type "A" to the least being Type "D". Refer to *Table B1.5 - Security Wall Construction Types* for further information.

Each construction type has been developed to convey basic intent relative to the security, not structural, aspects of each building. Coordinate location with the Room Data Sheets.

The Detention Security Perimeter walls shall be minimum 8 inch concrete or 8 inch CMU with reinforcing per Table B1.5 unless approved by King County.

Walls inside of the Detention Security Perimeter may be 6 or 8 inch concrete, or 6 or 8 inch CMU with reinforcing per Table B1.5. impact resistant GWB over metal lath may also be acceptable in some instances as noted in the Room Data Sheets.

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Table B1.5 - Security Wall Construction Types		
Type	Construction Category	Comments
A High Security Level		
	Walls: W5 & W 7	Concrete unit masonry construction (8-inch minimum), all with #5 bar steel reinforcement at not less than 8-inches on center vertically and horizontally. Cells of the masonry units shall be filled. Walls extend to the structure above, or steel deck and concrete or concrete "caps" the space. Precast and concrete are also acceptable: unit sizes and configuration shall conform to security requirements and constructability
	Opening Protection	Openings in walls, floors, and roofs larger than 8-inches by 10-inches in either direction or 9-inches diameter shall be protected.
B Medium Security Level		
	Walls W5 & W7	Concrete unit masonry construction (6-inch minimum), all with #5 bar steel reinforcement at not less than 16-inches on center vertically and horizontally. Cells of the masonry units shall be filled. Walls extend to the structure above, or steel deck and concrete or concrete "caps" the space. Precast and concrete are also acceptable: unit sizes and configuration shall conform to security requirements and constructability
	Opening Protection	Openings in walls, floors, and roofs larger than 8-inches by 10-inches in either direction or 9-inches diameter shall be protected.
C Minimum Security Level		
	Walls W3	Heavy gauge metal framed partitions with steel security lath and impact-resistant gypsum board. Gypsum wallboard finish shall be Level 4 and painted.
D Vandal Resistant		
	Walls W2	light gauge steel frame construction with impact-resistant gypsum board to a non-accessible height of 8-feet above the finish floor. Gypsum wallboard finish shall be Level 4 and painted.
	Walls W1	Light gauge steel frame construction with gypsum board . Gypsum wallboard finish shall be Level 4 and painted.

Hard Ceilings:

Hard ceilings may include suspended epoxy paint finished portland cement plaster on security lath, epoxy paint finished impact-resistant and mold-resistance-rated gypsum board over expanded metal security lath, and acoustic/perforated metal panels with a durable factory

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powdercoat finish, as suitable to specific areas. In holding rooms and resident rooms a 12-gauge thin wall security metal ceiling panel can be used as approved by the County.

Security lath shall consist of hot-rolled carbon steel sheet expanded into a uniform, rigid diamond-shaped openings and flattened in compliance with ASTM F1267, Type II with Class 1 uncoated finish weighing 140 pounds per 100 square feet with a 0.500-inch SWD by 1.250-inch LWD diamond pattern with a 52 to 57 percent open area unless otherwise directed by the County.

Security Joint and Gap Sealant:

Security joint sealant shall be a two-component, polyurethane-based, pick-resistant elastomeric complying with ASTM C881, ASTM D638, ASTM D648, and ASTM D695.

The following locations are generally where this product should be used:

- Surface-mounted items below 10-feet high on exterior walls, floors, including lights, horns, camera mounts, louvers, grilles, as indicated on or within secure perimeter of the Facility.
- Surface-mounted items below 10-feet to all walls, floors or ceilings on interior walls, floors and ceilings. Including surface mounted lights, grilles, registers, cover plates, enclosures, housings, cell/room mirrors, shelves, wall bumpers, cover plates, speaker covers, sprinkler heads, etc.
- Joints between metal opening frames and walls.
- Gaps between security plumbing fixtures, floors, and walls.

Electro-Mechanical Hardware:

Electro-Mechanical door hardware standard is Southern Steel or Folger Adams: motor driven, half cycle

Swing Doors with Mechanical Hardware:

Where listed, equip swing doors with mechanically-operated mogul (pin tumbler) deadlocks complying with ASTM F1577 Grade 1 as required, lock cases, hinges, push plates, pull loops, concealed closers, stops, and the like, all hardware to meet ADA requirements.

The following locations require this type of hardware:

- Secure Storage Rooms.
- Exterior rooms that contain sensitive equipment.
- Security Electronic Rooms.
- Telephone and Data Rooms (inside secure perimeter).

Swing Doors with Electro-Mechanical Hardware:

Where required, equip doors with electrically-operated 8-inch motorized mogul deadlocks in compliance with ASTM F1577, Grade 1 as required, concealed door position switches, and the like for operation by remote control panel, all hardware to meet ADA requirements.

The use of pneumatic controlled hardware will not be allowed. Hardware at these locations shall allow for manual operation in the event of an emergency or power failure:

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- Movement sallyports.
- Control room sallyports.
- Housing unit entry doors.

Swing Sleeping Room Doors with Electro-Mechanical Hardware:

Equip doors with electrically-operated two-inch deadlocks in compliance with ASTM F1577, Grade 1 as required, concealed door position switches, and the like for operation by remote control panel, all hardware to meet ADA requirements. Hardware shall allow for manual operation in the event of an emergency or power failure.

Sliding Doors with Electro-Mechanical Hardware:

Where required, equip sliding doors with electrically-operated motorized drive mechanisms in compliance with ASTM F1643 as required, concealed door position switches, and the like for operation by remote control panel. Hardware shall allow for "Hip High" manual operation in the event of an emergency or power failure. The use of pneumatic controlled hardware will not be allowed.

The following locations require this type of hardware:

- High traffic openings where cart and delivery traffic is the primary role, size openings for ease of movement of service traffic.

Interior Non-Fire-Rated Security Glazing:

Monolithic units constructed of multiple laminations of scratch-resistant heat- or chemical-strengthened glass outer layers with polycarbonate cores and heavy plastic interlayers, to meet required security standards and as noted in *Table B1.1 - Interior and Exterior Glazing Types*.

Provide different level of glazing based upon rooms listed below:

- Openings in Security Wall Type A or B should be Type G3 or G4 glass as listed in *Table B1.1 - Interior and Exterior Glazing Types*.
- Laminated glass may be used in Type B walls where supervision by staff is constant.))

e. Elevators

General Requirements

Elevators shall comply with all relevant codes including State of Washington codes, City of Seattle codes, and the Americans with Disabilities Act Accessibility Guidelines (ADAAG). Design shall comply with the requirements of ASME A17.1 (latest adopted edition) and as amended by the State of Washington Administrative Code. Where codes are in conflict, the more stringent shall apply. The Design-Build Entity shall obtain written concurrence from the State of Washington Department of Labor and Industries (L&I) and the local jurisdiction of the final design.

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The design of all vertical transportation elements shall take into account the requirements imposed by ridership/passenger flow, movement of staff and materials as well as fire/life safety.

All elevators shall be fully automatic. The rated capacity for each public and judicial passenger elevator shall be based upon patronage with a minimum capacity of 3,500 pounds. The rated capacity for Secure Elevators (Detainee Transport) shall be based upon the number of detainees to be transported, with a minimum capacity of 4,000 pounds. The rated capacity for freight elevators shall be based upon the largest/heaviest piece of equipment to be transported with a minimum capacity of 6,000 pounds. Freight Elevators shall serve all floor levels, inclusive of the loading dock level and roof.

The minimum speed of passenger (public/judicial/secure) elevators shall be 150 feet per minute (fpm) for hydraulic and 350 feet per minute for traction elevators. The minimum speed of freight elevators shall be 100 fpm. In locations where total rise exceeds 40-feet, the elevators shall be high speed traction type, keeping in mind that the total rise includes future floors in Phase 2.

Where the use of borehole hydraulics is found to be impractical due to high water table or soil conditions, it shall be acceptable to use twinpost telescoping hydraulics up to a maximum rise of 28-feet. Telescoping jacks shall not exceed a maximum of two stages.

In building locations with more than four stories above or below grade plane and in locations with group I occupancies on a level other than the level of exit discharge, a minimum of one elevator shall be provided for fire department emergency access to all floors. The elevator car shall be of such a size and arrangement to accommodate a 24-inch by 84-inch ambulance stretcher in the horizontal, open position, as required by code.

All products used shall be non-proprietary in nature and universally maintainable by a trained elevator mechanic without the need to purchase or lease additional tools or software to diagnose problems and/or change operational parameters of the elevator system.

Machine Room Less (MRL) Elevators:

MRL Elevators may be acceptable to the County pending review of a Life Cycle Cost Analysis (LCCA) that compares MRLs to hydraulic elevator appropriate for the purpose used. During the design development phase the Design Build entity shall prepare submit and discuss the LCCA with the County. If MRLs are deemed acceptable by the County and cost difference associated with MRLs will be shifted within the budget to other uses.

Security Requirements

General:

Provide separate elevator hoistways for the judges, public, and in-custody juveniles and in-custody adults (along the custody path). All elevator control panels should have provisions for lock-out of every floor, except the main lobby floor. The lock-out should be reversible by card or key pad access system. All elevators should be equipped with a card reader to allow employees access to their area after hours. The card reader should be part of the cab panel design. All elevators should be provided with an auxiliary car Operating panel such that floor selection buttons are available on both sides of the door.

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Elevator control in all non detention applications, including freight and parking garage elevators, shall be integrated with the Countywide enterprise access control system. All non detention elevators will provide for security recall and call lockout to the primary lobby floor by remote EDC command.

Control of elevators used to transport detained adults or juveniles shall be integrated with the Detention Security Electronics System. Control of the elevators will be from the Court Holding post, and Central Control. Elevators will provide for security recall and call lockout to the primary lobby floor by the Detention Security Electronics System.

While all will have fireman's override, different elevators will have different equipment.

Judges/Staff Elevators:

Camera and access control card reader. The reader should be on the inside of the cab and be required for use to allow dispatch to specific floors.

Public/Staff Elevators:

Camera and access control card reader.

Secure Elevators (Detainee Transport):

Camera and intercom. Cab shall be dispatched from DAJD Central Control. Central Control shall also control the elevator cab door just as if it were any other movement door.

Freight Elevators:

Camera and access control card reader.

Parking Garage Elevators:

Camera and access control card reader.

Materials

Where applicable, the general materials used in the construction of the elevators shall comply with the following:

Steel:

Sheet Steel (Furniture Steel for Exposed Work): Stretcher leveled, cold rolled, commercial quality carbon steel, complying with ASTM A1008, matte finish.

Sheet Steel (for Unexposed Work): Hot rolled, commercial quality carbon steel, pickled and oiled, complying with ASTM A568 and ASTM A1011.

Structural Steel Shapes and Plates: ASTM A36.

Stainless Steel: Type 316 complying with ASTM A167, with standard tempers and hardness required for fabrication, strength and durability. Stainless steel shall have the grain of belting in the direction of the longest dimension. All surfaces shall be smooth and without waves. Bright, mirror-like finish for stainless steel is not acceptable because of the difficulty with cleaning and repair.

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Aluminum:

Extrusions: ASTM B221.

Sheet and Plate: ASTM B209.

Glass:

Laminated safety glass, minimum 9/16-inch thick, conforming to ANSI Z97.1 and CPSC 16 CFR Part 1201.

Screws:

Security tamper-resistant pin-head Torx screws shall be used throughout for all faceplates.

Provisions for Phase 2

Phase 1 design shall account for vertical expansion expected during Phase 2. Overhead machine rooms shall be constructed as a modular building component which can be separated from the existing structure and raised during the vertical expansion. Elevator quantities shall be selected based upon Phase 2 building rise and projected population + ten percent (10%).

Traffic Analysis

A traffic analysis shall be conducted for all public access elevators both within the building and parking structures in order to determine the optimum quantities, capacities and traveling speeds. The systems shall be analyzed based upon projected building occupancies and 5-minute peak traffic intervals during up-peak, two way and outgoing conditions. Refer to the level of service design criteria in the elevator narrative titled Level of Service Design Criteria.

Cars and Entrances

Floors:

Public/Staff and Judges/Staff Elevators shall have a continuous chemical resistant and stain resistant floor finish with integral base over a steel platform subfloor. Ceramic tile or other brittle, non-resilient materials shall not be used. Use of wood construction shall not be acceptable.

Secure Elevators (Detainee Transport) shall have a floor of stainless steel checkered plate, 3/16-inch thick with a turned-up edge to form the base. All joints shall be welded and ground smooth.

Freight Elevators shall have Class A/B/C loading capability as determined necessary based upon equipment and materials to be transported and a floor of stainless steel checkered plate.

Cars:

Shell for all elevators shall be reinforced 0.067-inch thick (nominal 14-gauge) minimum base metal thickness furniture-grade steel with a sound deadening mastic applied to the exterior.

- Public/Staff Elevators: Interior finishes shall be taken from the premium selections (not offered as standard) by the car manufacturer or of equivalent quality specifically required

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by the architectural documents. Cab orientation shall be wider than it is deep. Finishes should be graffiti- and damage-resistant.

- Secure Elevators (Detainee Transport): All interior finishes shall be stainless steel of vandal resistant construction. The cab orientation shall be deeper than it is wide and divided into two separate sections (one for detainees and one for the operator) by manually-operated detention doors with security screen.
- Judges/Staff Elevators: The interior finishes shall be taken from the premium selections (not offered as standard) by the car manufacturer or of equivalent quality specifically required by the architectural documents. The cab orientation shall be wider than it is deep.
- Freight Elevators: Stainless steel interiors. The cab orientation shall be deeper than it is wide.

Car ceiling heights shall be a minimum of 8'-0" to permit ceiling-mounted CCTV cameras. If a suspended ceiling is used, the minimum car canopy height must be adjusted to accommodate the minimum ceiling height requirement. Freight Elevators shall have provisions for transporting overheight items through a ceiling access panel.

Energy efficient light fixtures shall be mounted integral with the ceiling or above a suspended ceiling and not easily accessible by the public.

Entrances:

Car entrances for Public/Staff Elevators, Judges/Staff Elevators, and Secure Elevators (Detainee Transport) shall be provided with horizontal sliding doors hung on sheave hangers with tires running on a track and guided at the bottom by removable phenolic guides which run in the sill with minimum clearance. The car entrance for freight elevators shall be provided with either horizontal sliding or vertical bi-parting doors which maximize the opening. Hoistway doors shall be provided at each landing.

Car and hoistway doors shall operate simultaneously and be controlled by a closed loop door operator. Doors shall be provided with infrared edge protective devices.

Secure Elevators (Detainee Transport) shall be provided with a minimum of one glass vision panel in the doors to allow for sight into and out from the elevators.

Hoistway Door Unlocking Device: Provide unlocking device with locking escutcheon plug in door panel at all floors with finish to match adjacent surface.

Hoistway Access Switches: Mount in entrance frame side jamb at top and bottom floors. Provide fixture with faceplate.

Car Operating Panel and Hall Stations

Car Operating Panel:

One car operating panel at each entrance without faceplates, consisting of a metal box containing vandal-resistant operating fixtures mounted behind the car enclosure swing return panels.

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An auxiliary car operating panel should be provided for all elevators.

Hall Control Stations:

Provide one riser with flush-mounted faceplates. Include pushbuttons for each direction of travel, which illuminate to indicate call registration. Include approved engraved message and pictorial representation prohibiting use of elevator during fire or other emergency situation as part of faceplate. Pushbutton design shall match car operating panel pushbuttons. Provide vandal-resistant pushbutton and light assemblies. Additional hall stations should be provided for grouped elevators to avoid crowding.

Signalization

Hall Lantern:

Provide at each entrance to indicate travel direction of arriving car. Illuminate up or down lights and sound tone twice for down direction travel prior to car arrival at floor. Illuminate light until the car doors start to close. Provide advanced hall lantern notification to comply with ADA hall call notification time. Minimum 2-1/2 inches in the smallest dimension, arrow lenses with faceplates. Provide vandal-resistant lantern and light assemblies consisting of series of dots or lines for maximum visibility.

Car Position Indicator:

Alpha-numeric digital indicator containing floor designations and direction arrows a minimum of 1/2-inch high to indicate floor served and direction of car travel. Locate fixture in each car operating panel. When a car leaves or passes a floor, illuminate indication representing position of car in hoistway. Illuminate proper direction arrow to indicate direction of travel. Provide vandal-resistant indicator and light assemblies.

Lobby Position Indicator:

Alpha-numeric digital indicator containing floor designations and direction arrows a minimum of 1/2-inch high to indicate floor served and direction of car travel. When a car leaves or passes a floor, illuminate indication representing position of car in hoistway. Illuminate proper direction arrow to indicate direction of travel. Provide vandal-resistant indicator and light assemblies.

Floor Passing Tone:

Provide an audible tone to sound as the car stops at a floor served.

Voice Synthesizer:

Provide electronic device with easily re-programmable message and voice to announce car direction, floor, and emergency exiting instructions.

Communication Equipment

Telephone Cabinet:

A security telephone shall be mounted beneath the car operating panel. Necessary wires shall be included in the car traveling cables. Phone shall be flush mounted with a stainless steel face plate. Phone shall be mounted such that it is easily removable for servicing.

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Intercom:

Provide a flush mounted intercom with a stainless face-plate for communication between the car and the Phase 1 fire service recall landing. The intercom shall be provided even when not specifically required by code.

Cameras:

CCTV cameras shall be provided in specified elevators for security. Coordinate requirements with Part B, Section 10 - Electronic Safety and Security Systems of this *Facility Performance Standard*.

Emergency/Standby Power

Not less than one public/employee and all Secure Elevators (Detainee Transport) shall be provided with emergency power.

Where emergency power or standby power to provide elevator operation in the event of normal power supply failure is required, the power system shall meet the requirements of ASME A17.1 and local code. Refer to Part B, Section 7 - Electrical Engineering Systems of this *Facility Performance Standard* for further information.

Provide all elevators that are not on emergency/standby power with battery backup capable of delivering the elevator to the nearest acceptable landing and opening the doors. Coordinate the acceptable landing with King County and the local AHJ.

Operation

Operation shall be "selective-collective" automatic as normal mode, car-switch automatic floor stop mode or functional equivalent selectable by keyswitch.

Where security card readers are provided for Public/Staff Elevators which serve non-public floors, the elevator controls shall not allow access to these floors until initiated by the security card reader.

Secure Elevators (Detainee Transport) shall be operated by Central Control or the Court Holding post thru the Human-Machine Interface (HMI) security electronics system, and have intercoms and cameras similar to doors that are part of detention's secure perimeter.

Car and Hoistway Ventilation

Car ventilation shall be provided by a two-speed exhaust blower mounted to the car top. The ceiling grille shall match the finished ceiling surface.

Provide hoistway venting in compliance with local building codes.

Machine Rooms

Hydraulic: Elevator machine rooms shall be located as near as possible to the hoistways, not to exceed 50-foot maximum pipe length with the minimum elbows possible.

Traction: Elevator machine rooms shall be located above the hoistway unless physical constraints dictate alternate solutions. Traction elevators shall utilize traditional geared traction machines with AC motors and VVVF drives.

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Elevator Pits

Pits shall be constructed to prevent the intrusion of ground water into the pit and the release of fluids from the pit.

An 18-inch by 18-inch by 18-inch minimum sump with grate flush mounted to the pit floor shall be provided. The sump shall be provided with audible alarm and visual indicators for water and oil and shall be located in elevator machine room and connected to the BCS.

Sump pumps are not required. If drains or sump pumps are being considered, the Design-Build Entity shall coordinate all requirements with the AHJ during design. If drains or sump pumps are installed in the hoistway, they must not be directly connected to sewers and/or storm drains, but shall be provided with oil water separators. P-traps and check valves are not allowed. Sump pumps, if installed must be piped and wired permanently. All installations must meet the NEC, all plumbing codes and requirements of the AHJ.

Fire Protection

Fire sprinkler protection shall be provided for elevator hoistways, pits, and machine rooms as required by local code. Where required, installation of fire sprinkler systems shall be in compliance with NFPA 13 and ASME A17.1. Refer to local codes for shunt trip requirements.

Emergency Operation

Emergency operation shall be in conformance with ASME A17.1 and a three-position key-operated switch shall be located at the designated level.

Fire alarm initiating devices located at the elevator hoistway, elevator lobbies, and machine rooms shall initiate Phase 1 recall.

The designated recall floor and alternate floor for phase recall shall be coordinated with the local fire department.

Seismic Operation: Elevators shall be provided with means of seismic motion detection in compliance with ASME A17.1. Upon detection of seismic motion, the elevators shall immediately travel (at a reduced speed) to the nearest landing and open their doors.

Level of Service Design Criteria

Elevator systems shall be designed to meet or exceed the following minimum criteria.

Public/Staff Passenger Elevators:

- 5-Minute Handling Capacity: Seventeen percent (17%).
- Interval:
 - Less than 28 seconds up-peak.
 - Less than 40 seconds two-way.
 - Less than 28 seconds outgoing.

Time to Destination: Less than 60 seconds.

Secure Elevators (Detainee Transport):

Time to Destination: Less than 30 seconds.

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Parking Garage Elevators:

5-Minute Handling Capacity:	Fifteen percent (15%).
Interval:	Less than 50 seconds one way/two way.
Time to Destination:	Less than 60 seconds.

Freight Elevators:

Not applicable.

Warranty/Maintenance

A warranty shall be provided for the completed elevator(s) in accordance with Washington State law and regulation, but in no case less than complete coverage of parts and labor for one (1) year after issue, by the State, of the permanent operating permit.

The Design-Build Entity shall provide maintenance service of the equipment for a period of 12 months after issue of the permanent state operating certificate.

- This service shall include regular systematic examinations of the installation by competent and trained employees of the Design-Build Entity; and shall include all necessary adjustments, lubrication, cleaning, supplies and parts to keep this equipment in operation, except such parts made necessary by misuse, accidents or negligence not caused by the Design-Build Entity.
- Provide written reports of each service call, whether routine or emergency, describing services performed.
- Basic service work shall be performed during regular working hours of regular working days. Emergency callback service shall be available on a 24-hour, 7-day basis. Response time shall be one (1) hour maximum.

Final elevator installation shall be maintainable by a trained elevator mechanic without the need to purchase or lease additional tools or software to diagnose problems and/or change operational parameters of the elevator system.

- All tools and software necessary to diagnose problems and/or change operational parameters of the elevator system shall be retained by the County and shall function for the life of the installed equipment.
- Hardware and software needed for diagnosis and operating parameter modification shall be products offered as standard by the manufacturer of the control system.
- No substitutions of proprietary circuit boards, erasable program read only memory (EPROM), hardware locks, software passwords, or coding shall be allowed.
- As a condition of the installation, the original equipment manufacturer shall guarantee to sell and deliver, on a timely basis, replacement parts and software updates to a third-party elevator maintenance company at a fair market price.

f. Acoustical Requirements

General

This portion of the *Facility Performance Standard* addresses acoustical criteria and best practices for room acoustics (reverberation and echo control), environmental noise reduction, sound isolation, speech privacy, and noise and vibration control of mechanical, electrical, plumbing, and vertical transportation equipment and systems.

Background Noise

The acoustic design goal for HVAC systems is the achievement of a level of background noise that is unobtrusive in quality and low enough in level so it does not interfere with the function of the space being served. Background noise should exhibit no tonal characteristics or noticeable time-varying levels resulting from aerodynamic instability or turbulence. To achieve these goals, the Noise Criteria (NC) family of curves is used as a design tool. These curves define the recommended octave band limits of an acceptable background noise spectrum for a particular space use.

The "Sound and Vibration Control" chapter of the HVAC Applications ASHRAE Handbook lists acceptable NC ratings for various spaces. *Refer to Table B1.6 - Background Noise Criteria* for the recommended HVAC NC ratings for select spaces within the court facility.

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Table B1.6 - Background Noise Criteria	
Noise Criteria (NC)	Space Type Room
NC30	Courtrooms Large conference rooms Training rooms (1000 sf) Judicial conference rooms Enclosed offices Judicial Chambers
NC35	Clerk's offices Medium and small conference rooms Multi-purpose classrooms Interview rooms Training rooms Sleeping rooms (Detention cells in living units) Medical exam rooms Medical offices Dorm rooms Library
NC40	Lobby Open office Corridors Break rooms Holding cells Detention group holding
NC 45	Gymnasium

Room Acoustics

Room acoustics, including reverberation and echo control, defines the quality of sound within a space. Room acoustics is affected by room size, shape, proportions, geometry, and finishes. The standard metric for determining how "live" or "dead" a room acts is called the reverberation time (RT60). Hard surfaces, such as untreated gypsum board, glass, and wood paneling, will cause greater sound reflections and longer reverberation in a space. Soft-surfaced materials, such as acoustical tile, carpet, and fabric-wrapped fiberglass panels, will result in less reverberation.

Reverberation is the effect of sound reflecting and steadily decaying in a room. Conversely, echoes are distinct, late-arriving reflections from discrete wall surface(s). Absorptive materials, as well as proper room shaping or the addition of diffusive panels, also help control any unwanted echoes.

Refer to *Table B1.7 - Room Acoustics, Courts* and *Table B1.8 - Room Acoustics, Detention* for room acoustic considerations for select spaces relative to the court and detention portions of the

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CFJC project. These tables use the term reverberation time, which is the time in seconds for sound to decay 60 dB in a room. High reverberation times indicate a lively room. Low reverberation times indicate a room that is more acoustically dampened.

Table B1.7 - Room Acoustics, Courts	
Space Type	Room Acoustics
Courtrooms/Multipurpose rooms	<p>Reverberation time criteria between 0.6 and 0.8 seconds.</p> <p>Majority of ceiling surface should be sound absorptive to help meet the reverberation time criteria.</p> <p>Wall behind the judge's bench, witness, and clerk should provide good projection of voice.</p> <p>Wall and ceiling around the spectator seating area should be finished with efficient sound absorptive material, $NRC \geq 0.80$. This is especially important for the back wall to alleviate the reflection of sound between the judge's bench and the far end of the courtroom.</p>
Conference rooms (small, medium, large)	<p>Reverberation time criteria between 0.4 and 0.6 seconds.</p> <p>Majority of ceiling surface should be sound absorptive to help meet the reverberation time criteria.</p> <p>Most of one wall should be finished with efficient sound absorptive material, $NRC \geq 0.80$. Same amount of material could be distributed on two or more walls.</p>
Enclosed offices, Judge's chambers, interview room, mail rooms, copy rooms.	<p>Ceiling should be sound-absorptive with a minimum noise reduction coefficient (NRC) of 0.55.</p> <p>Continuous mineral board acoustical ceiling tile is preferred.</p>
Open office areas	<p>Ceiling should be sound-absorptive with a highly absorptive material.</p> <p>Include work station screens to separate one workers station from another.</p> <p>Electronic masking noise.</p>
Lobbies	<p>Ceiling should be sound-absorptive with a minimum noise reduction coefficient (NRC) of 0.55. At least sixty percent (60%) of the ceiling area should be covered.</p>

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Table B1.8 - Room Acoustics, Detention	
Space Type	Room Acoustics
Classroom, Multipurpose Classroom, Training Room, Conference Room (≥ 750 sf), Dayroom/Dining Room	Reverberation time criteria between 0.6 and 0.8 seconds. Majority of ceiling surface should be sound absorptive to help meet the reverberation time criteria. Walls and ceiling around the seating area should be finished with efficient sound absorptive material, $NRC \geq 0.80$. This is especially important for the back wall to alleviate the reflection of sound between the speaker's area and the far end of the room.
Conference Room (< 750 sf). Visiting room	Reverberation time criteria between 0.4 and 0.6 seconds. Majority of ceiling surface should be sound absorptive to help meet the reverberation time criteria. Most of one wall should be finished with efficient sound absorptive material, $NRC \geq 0.80$. Same amount of material could be distributed on two or more walls.
Enclosed Office, small Visiting Rms, Interview Room, Exam Room, Observation Room, Staff Lounge, Mail Room, and Copy Room.	The ceiling of these spaces should be sound-absorptive with a minimum noise reduction coefficient (NRC) of 0.55. Continuous mineral board acoustical ceiling tile is preferred.
Open office area	The ceiling of these spaces should be sound-absorptive with a highly absorptive material. Include work station screens to separate one workers station from another. Electronic masking noise
Gymnasium/Multi Purpose Room	Reverberation time criteria between 0.9 and 1.1 seconds
Lobby	The ceiling of these spaces should be sound-absorptive with a minimum noise reduction coefficient (NRC) of 0.55. At least sixty percent (60%) of the ceiling area should be covered.
Sleeping Room	No acoustical absorption required.

Sound Isolation

Sound isolation is the capacity of a structure to prevent sound from being transmitted from one space to another. Sound isolation is quantified by two numerical ratings, Noise Isolation Class (NIC) and Sound Transmission Class (STC). There are technical differences between these two ratings but both are single number representations of the capability of a wall or floor/ceiling system to reduce sound. STC is used to define the design requirements for acoustical separation.

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NIC is used to measure the performance of a system (often an operable wall) after it has been constructed. Refer to *Table B1.9 - Sound Isolation Requirements, Courts* and *Table B1.10 - Sound Isolation Requirements, Detention* for specific requirements.

Table B1.9 - Sound Isolation Requirements, Courts	
Partition STC	Space Type and Adjacency
STC 65	Courtroom to Holding Cell. Courtroom to Judicial Office(s)/Robing Room(s) Elevator shafts and elevator equipment rooms to NC 30 spaces. Mechanical rooms to NC 30 spaces. Walls of electrical rooms with transformers, to spaces with background noise levels of NC 35 or less.
STC 55	Toilet room walls with plumbing.
STC 50	Courtrooms. Judicial chambers. Conference rooms. Toilet room walls without plumbing.
STC 45	Electrical room walls with no transformers nearby Workroom Private offices requiring normal speech privacy Telecommunications and AV rooms with minimal equipment
STC 40	General office space to general office space
¹ Partitions with doors need only be 10 points greater than the STC rating of the door	

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Table B1.10 - Sound Isolation Requirements, Detention	
Partition STC	Space Type and Adjacency
STC 65	Elevator shafts and elevator equipment rooms to NC 30 spaces Mechanical rooms to NC 30 spaces Walls of electrical rooms with transformers, to spaces with background noise levels of NC 35 or less.
STC 55	Toilet room walls with plumbing. Mail room (with burster or sorter).
STC 50	Exam rooms. Observation room. Conference room. Interview room. Sleeping room. Toilet room walls without plumbing.
STC 45	Visiting room. Mail room or copy room (without burster or sorter). Electrical room walls with no transformers. Workroom. Private offices requiring normal speech privacy. Telecommunications and AV rooms with minimal equipment.
STC 40	General office space to general office space
¹ Partitions with doors need only be 10 points greater than the STC rating of the door	

Courtroom Acoustics:

Coordination of the court technology with the courtroom acoustics is one of the most critical aspects of the design and construction of the courtrooms. It is imperative that the following technology be audible to all persons in the courtroom(s), and that the official court recording system, and the ability of persons in the courtroom to hear the proceedings, is not obscured by ambient noise created by printer, photocopier, or HVAC system.

- Speech reinforcement
- Audio associated with Video Conferencing
- Audio associated with Large Screen Display system

g. Food Service

Functional Considerations

Scope / Operations:

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There are two separate food service operations within the CFJC:

The Detention Food Service is located within the detention secured perimeter and will provide for the day to day preparation of meal service for detained youth and Detention staff. Design shall provide for a 166 bed facility plus staff.

The Café space located in the facility lobby shall provide a 'take out' type food service to the public and employees. This space shall be finished with infrastructure only. A contracted vendor shall provide TI for the space.

Service Times:

Breakfast: 7:00 to 8:30 a.m.
Lunch: 11:30 a.m. to 1:00 p.m.
Dinner: 4:30 to 6:00 p.m.

Meal Service Times (Café):

Daily: 7:00 a.m. - 6:00 p.m.

Performance Standards

Environment/Configuration/Layout Issues:

The new kitchen design shall provide sufficient support and production areas to accommodate meal preparation to serve the youth three hot meals per day along with an evening snack. Detention staff will be provided with one meal per shift.

An efficient operational flow from receiving through meal delivery to warewashing shall streamline the food service operation.

Currently, daily food deliveries are necessary at the detention kitchen loading dock. Approximately ten percent of total deliveries to the kitchen are routed through the Regional Justice Center (RJC) and the remainder comes directly from approved vendors.

Pallet jack access into the kitchen shall be provided for temporary staging. Products should be removed from pallets and hand-trucked into storage rooms.

Kitchen operation will be self-operated by civilian staff. Initially youth shall not be involved in the operation of the kitchen; however in the future youth may work in the kitchen as a part of a culinary arts work training program.

Office within the kitchen to be centrally located for the supervisor and assistant manager and shall have good visibility of receiving and working areas.

Dry, cold and frozen storage rooms shall be sized to support a minimum 7-day supply of food products for a cook to serve meal production schedule. Storage rooms shall utilize traditional welded four tier shelving and dunnage racks.

Hand washing stations shall be provided throughout all work zones to minimize steps and meet current code requirements.

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All kitchen equipment must be selected to support menu requirements from prep to cooking, to holding, and from serving to clean up.

A cook/serve operation will be implemented to provide meal service for the entire facility. Kitchen shall be equipped to prepare all meals from scratch. In addition a blast chiller shall also be utilized to safely chill limited menu items for them. Natural gas is available and preferred for the cooking equipment. Type 1 Grease exhaust hoods shall cover the line-ups. Work tables, preparation sinks, and hand sinks shall support the various work stations.

Meals shall be delivered on insulated trays. The tray assembly area shall be sized to expedite meal delivery and minimize meal holding times. Trays shall be stackable; County shall determine final tray selection. Consideration shall be given to area required for loaded tray transport cart parking.

Temperature-controlled carts shall also be provided to support a family style evening and/or weekend meal. Bulk menu items should be transported to the Living Halls for group dining in the Dayrooms. Dining Hall JDO should be responsible for oversight of the delivery of food trays or the service of food portions from a temperature controlled cart.

At the time for the service of a meal the Living Hall JDO should oversee the distribution of the trays. Youth will eat in the Dayroom. At completion of the meals and the orderly return of trays and utensils to the food cart, food service staff shall collect the carts and return them to the kitchen for cleaning.

A commercial washer and dryer shall be required in the Main Kitchen to process Kitchen aprons and dish towels.

Energy efficient waste collectors (in lieu of disposers) shall be utilized in prep and warewashing areas.

Fryers are not used.

The Café shall be equipped by a vendor to serve staff and visitors. The infrastructure shall provide utilities to support a basic menu to include hot and cold items and beverages. Hot entrée menu should be limited to items viable using ventless cooking technology. Utilities to support equipment for cold sandwiches, soups, salads, and beverages (coffee, tea, fountain drinks) along with support sinks and handwashing shall be provided. In addition utilities to support a small warewash area consisting of a door-type warewasher and pot washing sinks shall be provided.

All commercial equipment shall conform to all local, state, and national codes. All equipment shall be designed to be UL-listed and meet NSF Standards. Working surfaces and cabinet bases shall be stainless steel, polyethylene, or plastic laminate as appropriate to the usage. Kitchen work tables and work surfaces shall be of fully-welded stainless steel construction, of not less than nominal 14-gauge thickness with welds ground smooth and flush, and with a No. 4 satin finish.

Kitchen Finishes:

Kitchen (and spaces ancillary to the kitchen) finishes shall be smooth, no-slip surface, washable, and light in color. If the ceiling is suspended the tiles used shall be Mylar-coated

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for cleaning. Wall finish shall be washable, with impact resistant wainscot material, e.g. stainless steel paneling over impact resistant GWB, 48" minimum above finish floor. Resinous floor and wall systems may be applied when used as a complete finishing system with seamless edges and coved wall base. Resinous material shall go up wall to a minimum of 4'-0" similar to a wainscot material. Product systems include but are not limited to StonHard and Primecoat.. Floors shall slope to multiple drains for ease of cleaning (by hosing down the floor).

Equipment Design/Selection

All food service equipment must be reviewed and selected with the King County's direct involvement. Energy efficient equipment shall be utilized wherever feasible. Refrigeration and hood systems shall be energy efficient to oscillate between peak and low demand periods. Temperature monitoring systems shall be reviewed with King County. All monitoring controls shall be located in the Kitchen office.

Quality Assurance:

Equipment sub-contractor shall have at least 5 years' experience in this type of work and shall provide upon request at least three references for jobs of similar size and content.

Custom-fabricated equipment shall be manufactured by a kitchen equipment fabricator with at least five (5) years' experience in this type of work and who has the plant, personnel, and engineering facilities to properly design, detail, and manufacture high quality kitchen equipment.

Provide commercial grade stainless steel food service equipment with the following certifications where applicable:

NSF Certification Mark or UL Classification Mark certifying compliance with applicable NSF Standards.

Bakery equipment that complies with BISSC/Z50.2.

UL Rated.

Meet all governmental code requirements

1992 ASME Section VIII Division 1, Appendix 19 Code

OSHA

ASHRAE 15

NFPA 54, 70, and 96

Equipment List:

Note: Only primary equipment is listed. Design-Build Entity shall be responsible for providing equipment necessary to meet kitchen performance requirements.

- Walk-in Cooler/Freezer/Refrigeration Systems.
- Walk-in Cooler/Freezer Shelving (Lot).

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- Dry Storage Hi-density Shelving (Lot).
- Front Load Can Rack.
- Prep Tables/Sink Tables.
- Food Cutter.
- Slicer.
- 40-Quart Floor Mixer.
- Baker's Table.
- Blast Chiller 40 lbs capacity
- Ingredient Bins.
- Wall shelves.
- Canopy Hood with Fire Protection System.
- Utility Distribution System.
- Combi-Oven/Steamer (stacked).
- 40-Gallon Tilting Kettle.
- 40-Gallon Tilting Skillet.
- Floor Trough (in front of kettle/skillet).
- Double Stack Convection Ovens (2).
- 60-inch Griddle.
- Mobile Proofer Cabinet.
- Mobile Hot Cabinet.
- Cube Ice Machine with Bin.
- Double-sided Tray Line.
- Hot & Cold Wells.
- Tray Transport Trucks.
- Soiled Dishtable.
- Waste Collector with Removable Scrap Baskets.
- Hose Reel.
- Conveyor Warewasher.
- Clean Dishtable.
- Potwashing sinks (triple).
- Mobile Shelving.

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- Mobile Racks/Carts.
- Shadow Wall Board.
- Washer and Dryer.

Sustainability

Except as otherwise indicated, design and equipment shall take into consideration energy efficiency and minimization of carbon footprint. Strategies may include but are not limited to variable exhaust systems and heat reuse from refrigeration equipment which may be provided to alternate areas of the facility as passive heat or domestic water system.

Select USEPA *Energy Star* equipment as much as possible.

Laws, Ordinances and Standards

Standards:

Except as otherwise indicated, comply with the following standards as applicable to the manufacture, fabrication, and installation of the work of this Paragraph:

- Air Conditioning and Refrigeration Institute (ARI): Comply with the applicable regulations and references of the latest edition of standards for remote refrigeration system(s), components and installation.
- American Gas Association (AGA): Comply with AGA standards for gas heated equipment, and provide equipment with the AGA seal. Automatic safety pilots to be provided on all equipment, where available. (Canadian Gas Association or alternate testing lab's seals may be accepted if acceptable to local code jurisdictions.)
- American National Standards Institute (ANSI): Comply with ANSI Z21-Series standards for gas-burning equipment, and provide labels indicating name of testing agency.
- American National Standards Institute (ANSI): Comply with ANSI B57.1 for compressed gas cylinder connections, and with applicable standards of the Compressed Gas Association for compressed gas piping.
- American National Standards Institute (ANSI): Comply with ANSI A40.4 and A40.6 for water connection air gaps and vacuum breakers.
- American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE): Comply with the applicable regulations and references of the latest edition of standards for remote refrigeration system(s), components and installation.
- American Society of Mechanical Engineers (ASME): Comply with ASME Boiler Code requirements for steam generating and steam heated equipment; provide ASME inspection, stamp and registration with National Board.
- American Society for Testing and Materials (ASTM): Comply with ASTM C1036 for flat glass.
- American Society for Testing and Materials (ASTM): Comply with ASTM C1048 for heat-treated flat glass - Kind HS, Kind FT coated and uncoated glass.
- American Welding Society (AWS): Comply with AWS D1.1 structural welding code.

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- National Electric Code (NEC): Comply with NFPA Volume 5 for electrical wiring and devices included with foodservice equipment, ANSI C2 and C73, and applicable NEMA and NECA standards.
- National Electrical Manufacturers Association (NEMA): Comply with NEMA LD3 for high-pressure decorative laminates.
- National Fire Protection Association (NFPA): Comply with the applicable sections of the NFPA for exhaust hood, ventilators, duct and fan materials, hoods fire suppression systems, construction and installation; as well as, local codes and standards.
- National Sanitation Foundation (NSF): Comply with the latest Standards and Revisions established by NSF for equipment and installation. Provide NSF Seal of Approval on each applicable manufactured item, and on items of custom fabricated work. (UL Sanitation approval and seal may be accepted if acceptable to local code jurisdictions.)
- Sheet Metal and Air Conditioning National Association (SMACNA): Comply with the latest edition of SMACNA guidelines for seismic restraint of kitchen equipment, and the applicable local regulatory agencies requirements.
- Underwriters Laboratories', Inc. (UL): For electrical components and assemblies provide either UL labeled products or, where no labeling service is available, "recognized markings" to indicate listing in the UL "Recognized Component Index". (Canadian Standards Association or alternate testing lab's seals may be accepted if acceptable to local code jurisdictions.)
- UL 300 Standard: Wet chemical fire suppression systems for exhaust hoods/ventilators shall comply with these requirements.
- American with Disabilities Act (ADA): Comply with requirements, as applicable to the CFJC project.
- Refrigeration Service Engineers Society (RSES): Comply with the applicable regulations and references of the latest edition of standards for remote refrigeration system(s), components and installation; and the 1995 requirements of the Montreal Protocol Agreement.
- All refrigerants used for any purpose shall comply with the 1995 requirements of the Montreal Protocol Agreement, and subsequent revisions and amendments. No CFC refrigerants shall be allowed on the CFJC project.
- All refrigeration components installation, repairs, and/or associated work on any refrigeration system, self-contained or remote, shall be performed by a Certified Refrigeration Mechanic.
- Comply with all applicable local codes, standards and regulations, and any special local conditions (example only: City of Los Angeles Testing Lab requirements or seismic standards compliance).
- Subway grating installed in floor drain troughs must meet Seattle Building Code standards for maximum opening sizes in grates.

Confirm all drawings, specifications, and project documentation meet all federal, state, and local codes and regulations.

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Section 2 - Civil and Environmental Engineering

a. General Requirements

The civil and environmental engineering standards for CFJC project shall conform with all Federal, State, and Local jurisdictional requirements. Construction standards for civil engineering site work shall conform to the current version of the City of Seattle Standard Plans and Specifications.

The project requires both on-site improvements and improvements to the public right-of-way. On-site improvements include site preparation, temporary environmental controls, new driveways, plazas, utilities, and drainage improvements. Improvements to the public right-of-way will be required.

b. On-Site Civil Engineering Requirements

Site Contaminant Conditions

The project site has underlying contamination of shallow groundwater by Perchloroethylene (PCE) at concentrations that exceed Ecology cleanup levels and forms a plume in groundwater that traverses the project site. The CFJC project will be built atop and possible penetrate into the plume. The source of the PCE contamination to groundwater is thought to be one or more a former dry cleaners located north of the project site. Cleanup of the source of contamination will not be undertaken by King County as that is the responsibility of others. The currently uncontrolled contaminant conditions will pose a risk of vapor intrusion into the planned YSC structure. In addition to groundwater contamination from PCE, site soils within the general footprint of the planned YSC contain low level detections of certain contaminants, including lead, heavy oil range hydrocarbons, and PCE. Testing to date has shown that none of these soil contaminants are at levels that exceed Ecology cleanup levels but which may render the soil unsuitable for disposal as clean backfill in certain cases.

A full description of site contaminant conditions is described in the Phase 2 report by Herrera Environmental Consultants (see Part E). General groundwater and soil conditions are described in the report by Icicle Creek Engineers (attached)

Hazardous Materials During Construction

Groundwater that is temporarily pumped from the excavation or otherwise handled to facilitate construction shall be carbon-filtered or otherwise treated to remove contamination. Treated groundwater shall meet the limits specified in a sanitary sewer temporary discharge authorization.

Site workers reasonably expected to encounter and manage contaminated materials will need to be appropriately trained for working with hazardous materials. A hazardous materials health and safety plan shall be developed by the design-build contractor and/or applicable subcontractors.

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The selected contractor shall profile for disposal all soil to be exported. Per Division 1 Specification 01 88 25, King County shall review the proposed disposal location and/or facility for all exported soil. A soil management plan shall be prepared identifying the expected volumes of soil to be exported and the testing regime of that soil, and disposal approval authorizations.

Vapor Barrier/Sub Slab Ventilation

The new YSC shall include a system for mitigation of PCE vapors from the underlying groundwater in areas with potential to migrate into habitable spaces. A vapor barrier will be incorporated in the design of the CFJC where applicable to mitigate vapor intrusion from PCE. It is expected that the vapor barrier will be a chemical resistant flexible geomembrane that will have all penetrations booted and sealed. In addition, a passive or active sub slab ventilation system shall be integrated into the design of the geomembrane. Membrane effectiveness shall be determined after installation of an array of vapor monitoring points. Integrated systems that incorporate both a membrane and ventilation system (e.g., Geo-Seal®) may be acceptable.

If portions of the sub-surface structure are built below the water table, the Design Build entity shall advise on what construction systems or combination of systems are recommended to protect the building interior from the PCE that have been found in the groundwater. Such systems may include foundation drainage systems, or waterproofing or other chemical/water resistant systems. The recommendation from the Design Build entity shall include alternatives considered, a discussion of the pros and cons of the systems considered, and a Life Cycle Cost Analysis of the systems considered.

Design/Installation of the Vapor Barrier

A conceptual design for the vapor barrier/ventilation system shall be prepared for review and approval prior to incorporating the vapor barrier into the design of the CFJC. The installation of the vapor barrier/sub slab ventilation system shall be overseen, documented and certified by a professional engineer.

Environmental Engineering Requirement

The design-build entity shall include an environmental engineering firm practiced in mitigation of vapor intrusion into structures as described above. Include within your response to this RFP the name and qualifications of the environmental engineering firm (or individual) anticipated to be on the project design-build team. This engineer must be registered as a civil engineer within Washington State.

Site Preparation and Temporary Erosion and Sedimentation Control

The County will provide a boundary, topographic, and utility survey for the entire site plus the adjacent right-of-way that is consistent with Seattle Department of Transportation's (SDOT) Client Assistance Memo 2212.

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All existing improvements within the footprint of the project shall be deconstructed or demolished. Do not abandon in-place any existing improvement, structure, or utility.

Erosion and sedimentation control shall be designed and implemented in accordance with Chapter 22.80 of the Seattle Municipal code and Volume 2 of the Seattle Stormwater Manual. Obtain King County approval for discharge of construction stormwater to the combined sewer. Provide all activities necessary for conformance with the NPDES permitting for discharge of construction stormwater. Construction stormwater shall not be combined with contaminated groundwater prior to treatment of groundwater.

Layout and Paving

Building Siting:

The overhead utility system along 12th Avenue represents a significant constraint in relation to site development and shall be a consideration when siting the buildings. The conductors are roughly 50-feet above the existing sidewalk grade. Seattle City Light requires a 10-foot setback plus maintenance and construction envelope between the closest conductor and outside the building face. Provide either Alternate 1 or 2 as described below to accommodate the clearance requirements.

- Alternate 1:

Set back the upper floors of the buildings along the 12th Avenue frontage from the property line in order to satisfy this requirement.

Lower floors may abut the property line as long as construction activities happen outside the 10-foot setback and are approved by Seattle City Light.

Seattle City Light may, for a fee, temporarily "wing arm" the conductors to provide additional clearance during construction. However, the conductors will be moved back to their original position after construction is complete, so at a minimum final construction will need to meet the setback requirements. Building shoring system on 12th Avenue shall be compatible with existing overhead utility lines and buried utilities.

- Alternate 2: Underground the existing overhead system prior to building construction so that overhead clearance requirements are not an issue.

Curbs and Sidewalks:

Non-architectural curbs and sidewalk shall conform with City of Seattle Standard Plans 410, and 420. Concrete curb and gutter shall be constructed in conformance with section 8-04.3(1) of the City of Seattle Standard Specifications.

Driveways:

Driveway aprons shall conform with City of Seattle Standard Plan 430. Vehicular access for garage entries shall be made accessible to SU sized delivery trucks.

Vehicular Asphalt Paving:

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Asphalt concrete shall be Class 1/2-inch with aggregate conforming to section 9-03.8 and asphalt PG64-22 conforming to section 9-02.1(4) of the City of Seattle Standard Specifications. Asphalt percentage of the total mixture shall be five percent (5%) to seven and one-half percent (7.5%).

Hot mix asphalt pavement shall be designed for a 20-year life cycle for the anticipated volume of traffic for the site and be able to support HS-20 loading.

Recycled asphalt shingles (RAS) shall be incorporated into the Hot Mix Asphalt (HMA) mix design and shall be a minimum of two percent (2%) of the total weight of the mix. The HMA mix shall be evaluated to ensure the performance grade of the final blended HMA complies with the specified performance grade requirements.

Vehicular Portland Cement Concrete Paving:

Non-architectural concrete paving shall be 8-inches thick, reinforced with #4 bars 16-inches on center and shall conform with the City of Seattle Standard Plans and Specification.

Fire Apparatus Access and Fire Hydrant Coverage:

Fire apparatus access roads shall be provided in accordance with the Seattle Fire Code and shall be designed for HS-20 loading.

Where fire apparatus access roads are not comingled with other vehicular paving, permeable grass pavements systems shall be implemented and shall have the capability to support the design vehicle.

Provide additional hydrants as needed for hydrant coverage in accordance with the Seattle Fire Code.

Utilities

Relocation of Public Utilities:

Relocate the existing 15-inch concrete combined sewer that runs through the site along vacated 13th Avenue that carries combined sewage from streets and parcels to the north of the site. The line upsizes to a 16-inch ductile iron pipe that runs diagonally under the existing Alder Wing building (approximately 16-foot deep) before tying into the main in 14th Avenue. There is a utility easement along the sewer alignment. This combined sewer shall be fully relocated within the public right-of-way to the satisfaction of Seattle Public Utilities.

Sewer Service:

Side sewers shall be constructed per Seattle Director's Rule 4-2011, Requirements for Design and Construction of Side Sewers (Drainage and Wastewater).

Manholes: Manholes shall be precast concrete structures conforming to section 7-05.2 of the City of Seattle Standard Specifications. Metal castings shall conform to the requirements of section 9-05-15 of the City of Seattle Standard Specifications. Provide with traffic weight covers in areas accessible to vehicle traffic.

Pipe Type: Sewer pipe shall have flexible, gasketed, push-on joints. Pipe may be PVC SDR 35 conforming to ASTM D3034 with fittings factory-molded of PVC or vitrified clay pipe

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conforming to ASTM C700 with all joints factory-manufactured in accordance with ASTM C425.

Pipe Sizing: Pipes shall be sized to convey peak flows anticipated from buildings and other sources as required by the mechanical engineer without surcharging any pipes.

Pipe Velocity: Minimum pipe velocity in sewers shall be 2-feet per second in order to achieve self-cleaning velocity.

Domestic Water and Fire Protection Services:

Provide new domestic and fire protection services for the site. The maximum service sizes available are 6-inch domestic and 8-inch fire protection based on connection to East Remington Court. Domestic and fire protection services shall be appropriately sized as needed by the building mechanical and fire protection requirements.

Pipe and Fittings: Pipe and fittings shall conform to the City of Seattle Standard Specifications section 7-09.2 for water mains and section 7-15.2 for service connections.

Valves: Valves shall be gate valves conforming to section 7-12.2 of the City of Seattle Standard Specifications. Valve boxes shall be installed on all valves.

Pipe Sizing: Pipe sizes shall meet minimum requirements provided by the mechanical or fire protection engineer.

Grading and Drainage

General Requirements:

Maximum landscape slopes shall be 3:1, horizontal to vertical.

Grading for ADA paths and parking spaces shall meet all federal, state, and local regulations.

Maximum allowable driveway slope is twenty percent (20%) and slopes greater than ten percent (10%) will only be acceptable at garage entrances. Maximum slope for fire apparatus access is ten percent (10%).

Stormwater Conveyance Systems:

Catchbasins and Manholes: Catch basins and manholes shall be precast concrete structures conforming to section 7-05.2 of the City of Seattle Standard Specifications. Metal castings shall conform to the requirements of section 9-05.15 of the City of Seattle Standard Specifications.

Storm Drain Piping:

- Drainage pipe 12-inches and larger shall conform to section 7-04.2 of the City of Seattle Standard Specifications. LCPE (lined corrugated polyethylene pipe) shall be provided with a smooth interior wall and shall conform to AASHTO M294-S. Couplings shall be gasketed to provide a watertight connection.
- Drainage pipe 8-inches and smaller shall have flexible, gasketed, push-on joints and be PVC SDR 35 conforming to ASTM D3034 with fittings factory-molded of PVC.

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Pipe Sizing: Pipe slopes and sizes shall be based on providing full flow conveyance capacity (mannings) for the 25-year, 24 hour peak flow as calculated by the Rational Method or by the Santa Barbara Urban Hydrograph method as well as containment of the 100-year backwater within all structures.

Minimum Pipe Velocities: Pipe velocities for the design storms shall be designed to achieve a minimum of 2-feet per second to provide self-cleaning velocity.

Stormwater Flow Control:

Provide flow control facilities in accordance with Seattle Drainage Manual Volume 3. The project is required to comply with the peak flow control standard, which is 0.15 cfs/acre for the 2-year storm and 0.40 cfs/acre for the 25-year storm. Provide Green Stormwater Infrastructure, detention facilities, infiltration facilities, or a combination of these to provide the required flow control.

Infiltration may be implemented on the site as there are known to be recessional outwash soils in the vicinity. Infiltrating runoff may reduce or eliminate the need for detention. The County will provide a preliminary geotechnical report, however, the Design-Build Entity shall provide subsurface investigation and recommendations from a geotechnical engineer or hydrogeologist in order to determine the feasibility of implementing infiltration measures and recommendations to ensure basements as well as contaminant migration patterns will not be adversely affected.

Underground water detention facilities such as pipes, chambers, and vaults shall only be provided if sufficient stormwater flow control cannot be achieved through Green Stormwater Infrastructure. Locate these facilities under roads, plazas, sidewalks, garages, or landscape areas. Drainage facilities shall be designed to operate under gravity without the use of pumps to discharge to the public drainage system.

Foundation Drainage: Provide foundation drainage piping for all foundation walls and retaining walls in accordance with the geotechnical recommendations. Deduct anticipated flow rates from the foundation drainage system from the allowable discharge when calculating detention in accordance with Seattle Department of Planning and Development (DPD) Director's Rule 13-2010. Alternately, design building walls and floor slabs to be watertight and to withstand hydrostatic pressure. If foundation drainage pumping systems are used, they shall be designed to allow for removal via activated carbon perchloroethylene prior to discharge to the sanitary sewer.

Green Stormwater Infrastructure

Green Stormwater Infrastructure is required to be implemented to the maximum extent feasible in accordance with the Seattle Drainage Code and with Seattle Director's Rule 15-2012. This includes the following types of facilities:

- Runoff Reduction Methods including retained trees, new trees, downspout or sheet flow dispersion.
- Infiltrating and Reuse Facilities including bioretention (without underdrain), permeable pavements (with subgrades capable of infiltrating), or rainwater harvesting cisterns.

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- Impervious Surface Reduction Methods including permeable pavements and green roofs.
- Non-infiltrating Facilities including bioretention planters (with underdrain), bioretention cells with detention, or detention cisterns with harvesting capacity.

Implement Green Stormwater Infrastructure to the maximum extent feasible, specifically:

- Retained and new trees.
- Dispersion where there are courtyards, open space, and in the park.
- Infiltration and bioretention facilities could occupy virtually any of the open spaces. Bioretention facilities located closer than 15-feet to building need to be lined with an impervious barrier to protect building foundations.
- Permeable pavements in areas such as the driveways and site sidewalks pending geotechnical recommendations.
- Green roofs for large flat rooftops and green walls (vertical planting systems) for vertical surfaces.
- Cisterns in any area that intercepts a significant amount of runoff for use in supplying grey water systems or irrigation.

Storm Water Quality Treatment

The project drains to a combined sewer, therefore water quality treatment is not required.

c. Right-Of-Way Civil Engineering Improvements

Redevelopment

Re-development of the site triggers the requirement for providing frontage improvements within the right-of-way. Provide improvements to the frontage in accordance with the Seattle Department of Transportation Right-Of-Way Improvements Manual.

Transit

Right of Way improvements will include a bus zone (stop) and bus layover area. A Metro comfort station shall also be part of the Project but may not be located in the ROW.

The bus zone will be located on 12th Avenue between Spruce Street. and Remington Court, ideally in close proximity to the CFJC site entry path. The layover area will most probably be located on 12th Avenue also, however the Design Build entity shall explore locating the layover area on another street close to the bus zone. King County and SDOT shall approve the location of the bus zone and layover area.

Bus Zone:

The bus zone shall be 130 feet long. The width of the zone should not obstruct bike lane and vehicle travel lane, however such obstructions may be acceptable per SDOT requirements; it is the Design Builder's responsibility to confirm the acceptability of such obstructions with SDOT.

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80 feet of sidewalk within the 130 foot bus zone shall be unobstructed by landscaping to facilitate passengers boarding and de-boarding.

Pull in and pull out and sight distance requirements are described in Appendix B RapidRide Zone Placement.

A Metro Transit Standard Shelter Footing shall be part of the sidewalk work. See the following link for required details and specifications:

<http://your.kingcounty.gov/kcdot/transit/dcs/standards/passfac/Construction/D103.PDF>.

The bus zone may have weather protection in the form of an awning supported by the building façade 20 feet long by 8 feet deep, or 30 feet long by 6 feet deep.

- If an awning is provided it shall be designed and constructed by the Design Builder.
- If an awning is provided the Shelter Footing noted above is still a requirement.
- If an awning is not provided Metro Transit may install a Bus Shelter utilizing the Shelter Footing.

Leaning rails shall be provided along 75% of the awning length.

Lighting of the awning area and 80 foot boarding/ de-boarding area shall be between 3 and 5 foot-candles.

A footing for a Metro Transit sign shall also be provided s part of the sidewalk construction.

Required Details can be found at

(<http://your.kingcounty.gov/kcdot/transit/dcs/standards/passfac/Construction/D104A.PDF>). Metro Transit will install the sign.

Benches shall be installed by Metro Transit.

Conduit: two 2 inch conduits for power and communications shall be run below ground from the electrical meter (see below) to a junction box located at the eastern edge of the sidewalk, approximately 40 feet back from the head of the bus zone.

Bus Layover Area:

The bus layover area shall be 130 feet long. The width of the zone shall not obstruct bike lane and vehicle travel lane per SDOT requirements.

Pull in and pull out and sight distance requirements are described in Appendix B RapidRide Zone Placement.

Comfort Station

A comfort station (toilet room), shall be provided as part of the overall development. The comfort station may be freestanding, or within the new parking garage.

Required details and specifications for the comfort station are in:

- Appendix C, Standard Single Unit Driver's Comfort Station,

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Separate utility meters (water, electricity, other if necessary) shall be installed for separate billing of the utilities.

Street and Sidewalk Pavement Opening and Restoration

Utility connections to public mains and demolition of existing driveways will require demolition and restoration of streets and sidewalks. Pavement restoration shall be in conformance with SDOT Director's Rule 5-2009, Street and Sidewalk Pavement Opening and Restoration.

Sidewalk Improvements

The City Arborist requires that existing street trees be retained. This limits the grading work that can be conducted in the sidewalk or planting strip.

Replace all sidewalks per City of Seattle Standard Plan 420. Provide companion curb ramps and detectable warning strips across the street at all intersections.

Remove all existing driveway curb cuts adjacent to the frontage. Replace with new driveways or City of Seattle Type 410C curb.

Reconstructing, relocating, and installing new driveways will trigger the need to do work in the street. The current City pavement opening policy requires a full lane overlay if the amount of work on a given frontage exceeds 100-feet. Assume that full lane width restoration is required adjacent to new and replaced curbs.

Drainage Improvements:

Provide Green Stormwater Infrastructure to the maximum extent feasible in the right-of-way.

If sidewalk improvements are in excess of 10,000 square feet, then, in addition to Green Stormwater Infrastructure, provide detention in the right-of-way if not fully mitigated by Green Stormwater Infrastructure.

Section 3 - Landscape Architecture

a. Design Requirements

General

Landscape Architecture includes site planning and design in coordination with building design and site engineering. In coordination with General Principles identified above, and given the site context, community concerns, and the programmatic needs of the facility, these additional Site Principles and Task Requirements are necessary criteria for considering site design and landscape architecture.

Civic Design

Task Requirement: Communicate the need for civic behavior using urban design tools and materials, providing clear cues through site layout and quality of materials that the user is arriving at and entering into a civic space.

Urban Fabric

Task Requirement: Identify design approaches to develop site to be functionally and physically integrated into the surrounding urban fabric and established street grid, to increase community integration and vitality, and maximize multiple community activities that foster appropriate use of site and community open space.

Circulation

Task Requirement: Ensure vehicular and pedestrian circulation should have a clear relationship with and support the established street grid, ensure pedestrian circulation should be given safe, preferential treatment.

Security

Task Requirement: Implement Crime Prevention through Environmental Design (CPTED) principles through natural surveillance, access control, and understanding of public, semi-public and private spaces; incorporate security requirements in an integrated manner that will provide a normal civic environment; security elements, if needed, should be located to address requirements, but not impede desired site function or mark site as "fortress."

Sustainability

Task Requirement: Develop a design approach that supports a cohesive, sustainable justice campus. Integrate sustainable materials and systems. Provide educational experience through the overt use of sustainable site and building features.

b. Site Design Guidelines

The new CFJC development should integrate with the surrounding urban fabric. This exercise will require anticipating future development trends along 12th Avenue and thoughtful transitions to the residential zones along East Remington Court, 14th Avenue, and East Spruce Street.

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Site design will need to prepare a positive interface with the neighborhood in the community open space provided at the northeast corner of the site.

Site design will need to establish a strong, secure municipal campus core that feels civic in character to visitors, King County staff, and the surrounding community.

Within the site, design should include outdoor spaces for staff and visitors that will allow decompression and "time out" from the court environment.

Landscape architecture should address the following areas based on the above guidelines:

Streetscape, Pedestrian, and Vehicular Corridor

12th Avenue should uniformly be scaled to establish a clear pedestrian corridor, implement the Pedestrian Street Overlay, and define the civic scale and function of the CFJC.

14th Avenue edges should be scaled to establish a clear pedestrian corridor on a major neighborhood transportation route.

General interior site streets with width between back of curb and face of building should allow for 6-foot - 8-foot sidewalk, street trees, and site furnishings, and possible gathering spaces. Coordinate tree preservation requirements with Civil and SDOT.

Northeast Open Space Accessible to the Public

In the spectrum of public open space, the open space is intended to be more urban and formal in composition, and designed to maximize opportunities of re-engaging with other users with an open welcoming character.

Physical attributes should include furnishings supporting seating and gathering. Planting should maintain sight lines and views into the space.

The space should provide open exterior edges with access from multiple directions and support multiple uses to activate the space throughout the day and year.

The design should maximize multiple 'eyes' on the public environment from adjacent uses to increase natural surveillance and increase sense of safety, and provide multiple exits and access route to increase function as a defensible environment. Care should be taken to incorporate existing mature vegetation, particularly trees. Coordinate tree preservation requirements with Civil.

Alder Connection: Points of Entry into the Project Site

The 12th Avenue entry should be the most civic. Dimensions should provide for clear sight lines into the site; generous pedestrian areas; gathering spaces for groups of 1-8; vehicular access; parking; load-unload; and a sidewalk comprised of a dismount zone with street trees, a minimum 8- to 12-foot wide thru-zone, and a furnishing zone with an additional alignment of trees.

Alder connection will not be a through street for vehicular traffic; installation of bollards will be required.

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The 14th Avenue entry should be part of the continuum of the 12th Avenue entry but is a transition from the residential community to the site. The size and scale of all components should be less formal with the exception of elements of continuity including trees and paving.

Entry location and orientation should support the established street grid and provide a clear arrival point to the site.

Site features and design give psychological cues that an individual is entering a civic space and should adjust behavior accordingly.

Landscape, furnishings, and spaces should provide a psychologically comfortable transition from neighborhood into site.

Interior Node: Internal street intersections in Justice Core

The proximity to the courts, parking and the intersecting streets and pedestrian routes creates the site's important civic node, developed as an iconic civic space as the center of the site and intersection of access routes.

Design for unobstructed, but strongly framed views out of the site including views of regional icons such as Mount Rainier to the greatest extent possible.

Drop-off locations should allow users to safely exit vehicles and cross to building entries. This 'internal street' shall not be a through vehicular street to 14th Avenue, but should function as a pedestrian street. Locate Parking Garage pedestrian access to the Courthouse Building entry to provide safe pedestrian crossing.

Materials and site layout provide clear cues that user is in a public, yet secure area.

Public Entry into CFJC Facilities

Design shall provide a generous entry sequence and areas for group gathering that are scaled to communicate the civic function of the site and entry.

Provide for limited seating and other amenities to identify the entry as a welcoming but formal environment.

The public entry to the CFJC Facilities shall be located along the Alder connection across from the public parking garage. Visual cues should be incorporated into the entry plaza area in order to provide pedestrians on 12th Avenue clear wayfinding to the main entry. In order to enhance security at the entry it is not desirable to have the entry doors visible from 12th Avenue or from the vehicular drop-off.

Locate and design access to detention, lobby, and loading area for civic character, security and clear function.

Materials and site layout provide clear cues that user is in a semipublic, secure area.

c. Landscape and Hardscape Requirements

Specific landscape design requirements address both pedestrian hardscape and landscape (planting, irrigation) onsite and in the public right-of-way.

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Facility Performance Standards

On-site work includes planning, design and construction for walks, plazas, courtyards, site lighting, planting areas and coordination with Civil for drainage improvements. Required improvements to the public right-of-way include new sidewalks, street trees and streetscape plantings.

Landscape requirements shall conform to the City of Seattle Landscape Use Code, and the particular requirements Seattle Director's Rule 10-2011, Clarifying Landscape Standards, including the Seattle Green Factor. The site includes NC- and L- zoning, and will be required to meet the Seattle Green Factor.

Seattle Green Factor is a score-based code requirement that increases the amount and improves the quality of landscaping in new developments. Minimum scores are based on the area of the NC- and L- zones. The website for additional information / requirements is <https://www.seattle.gov/dpd/cityplanning/completeprojectslist/greenfactor/whatwhy/>.

Views of the exterior walls necessary for security of the Detention Facility shall be coordinated with landscape placement.

Landscaping shall not provide places for people to hide contraband (weapons, drugs, etc.).

Landscaping should be used to impede persons from walking up to the north and east exterior walls of the Detention Facility.

Building perimeter must be viewable by walking security patrols.

Selection and placement of trees shall not impede sightlines or security cameras.

Hardscaping

Pavement finishes for the at-grade paving shall be coordinated in the specification and shown on the landscape architectural set. All paving work within the right-of-way shall be coordinated directly with the civil engineer and submitted to the City of Seattle for approval.

Provide pedestrian walks within the designated site area and connect to existing sidewalks, where applicable. Sidewalks shall be a minimum of 6 feet wide.

Site Furniture

Site Walls: CIP concrete walls, sandblast finish, footings / anchoring per structural.

Handrails: single tube, stainless steel.

Miscellaneous: Bike racks, trash, recycling and ash receptacles as required.

Planting Medium

All soils provided for the project are expected to be imported soils and are subject to soil analysis and testing prior to delivery to the site. Project requirements for planting medium:

Lawn Areas: Ninety percent (90%) sand mix for free-draining conditions above structural slab.

Shrub and Groundcover Areas: Sandy loam meeting nutrient and organic matter requirements for proper shrub growth.

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Green Roof and Structural Slab Areas: Lightweight soil mix including pumice, Perlite, peat or other soil amendments to reduce volumetric weight.

Tree Pits: Structural soil mix below paved surfaces to increase soil volume and growth zone for street trees on grade.

Planting Design and Plant Selection:

Planting design presents an opportunity to introduce visual cohesiveness and a sense of place to the site. The following guidelines use planting palettes, simple design approach, spacing, and alignment to contribute to site cohesion at a civic level, to enrich individual open spaces at a smaller scale, and to reinforce the strength and legibility of corridors and open space at the urban grid level.

Plant selection should give careful consideration to presence throughout the year. Seasonal color, branching pattern, bark texture and color, flowering period and color, fragrance, evergreen over deciduous and leaf out time in spring enhance the visitor, staff and resident experience throughout the year.

Plantings shall be designed with an institutional scale characterized by simple palettes of plants arranged in broad layers of massed plantings.

New plant materials shall meet the following criteria:

Plant selection shall be compatible with the natural limitations of climate, weather, and soil conditions of the Puget Sound region. At a minimum, twenty-five percent (25%) of all plantings must be drought-tolerant. Refer to the Seattle Director's Rule 10-2011 Green Factor Plant List for further recommendations on plant selection.

- Plant materials should be selected for ease of maintenance so as not to require substantial pruning, leaf and litter collection or pest control. Plants with peculiar horticultural or excessive maintenance requirements are not allowed.
- Plant sizes should be chosen to ensure long-term adaptability to specific site locations. Locate trees and shrubs in locations that will avoid contact with buildings, lighting and utilities when mature. Large shrubs and trees shall be selected and sited around buildings in a way compatible with accepted standards of solar access and energy efficient design. Plants shall not block or cover building security lighting or inhibit a clear line of vision for users. Plant materials at vehicular and pedestrian entrances to the site and buildings shall be selected to be maintained at a height that allows clear visibility for persons or vehicles entering or leaving the area.
- The following plant types shall be avoided: plants having invasive surface root systems near underground utilities, building foundations, and lawn areas; plants unduly prone to disease or pests; plants incompatible with water requirements of existing plant life, i.e. mixing drought-tolerant with water-loving species; plants known to be particularly active in fruit, pollen, or leaf fall.
- Trees shall be located appropriately to avoid conflict with overhead wires, underground utilities or building overhangs. The landscape plan and utilities plan shall be coordinated

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as early as possible in the design phase of the project, to prevent locating new trees within 5-feet of underground utilities and 10-feet of buildings or overhead wires. SDOT will provide direction for tree locations with the right-of-way.

- Existing street trees are assumed to remain unless removal is required by project development. Street tree selection, layout and planting must be consistent with SDOT standards and approved by SDOT Arborist.
- Shrub beds, street plants, and similar features shall be suited for stormwater runoff management as coordinated with Civil Engineer.
- Do not use decomposed granite or gravel at paths within developed areas adjacent to buildings where such materials can contaminate or migrate onto lawn or building entry systems.
- Minimize the use of turf areas except at active use areas. When lawn areas are required, provide a few larger areas of lawn, as opposed to many small individual patches of lawn, in order to minimize maintenance costs. In layout of lawn areas and other specialized landscape areas, consider the ease of lawn mower or other maintenance equipment access to such areas.
- Guarantee furnished plant material to be in a vigorous growing condition for a period of 24 months from substantial completion regardless of the contract time period. Replace a plant one time under this guarantee.
- Plant sizes and conditions in accordance with the latest edition of ANSI Z60.1 American Standards for Nursery Stock. Minimum plant sizes are as follows:
 - Deciduous Trees: 2-inch caliper.
 - Coniferous Trees: 6- to 8-feet tall.
 - Large Shrubs: 3 to 5 gallon containers.
 - Small Shrubs: 1 to 3 gallon containers.
 - Perennials and Ornamental Grasses: 1 gallon container.
 - Groundcovers: 1 gallon container.

Irrigation Design

A permanent, automatic, underground irrigation system for plant establishment and maintenance is required.

Provide irrigation supply for the project from domestic water with separate deduct meter and backflow preventer per City of Seattle. No additional filter or treatment requirements are anticipated. Additional irrigation components that may be considered: fertilizer injection (requiring additional backflow prevention), rain sensors, and central control.

Irrigation design shall incorporate water conservation measures. Coordinate irrigation design with plant selection requirements. Irrigate plants in hydrozones grouped by different water needs to support water conservation. Design shall consider the soil type, slope, and other site

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characteristics to minimize water waste. Consider use of captured rainwater or recycled site water to reduce potable water consumption for irrigation. Where non-potable systems are used, irrigation system components shall be color-coded purple for reclaimed water. Except where precluded by other project requirements, use EPA *WaterSense* labeled products and irrigation contractors that are certified through a *WaterSense* labeled program where available.

Irrigation control shall be automatic, easily programmable for weekly adjustment, and capable of providing separate frequency, time and duration settings for each zone. Locate all controllers in facility electrical rooms in a common wall area.

Design irrigation systems to minimize the risk of damage from freezing. Provide connections at the head end of systems to accommodate seasonal evacuation of water using air pressure.

Provide manual drain valves to gravel basins as required for drainage. Design the system to minimize free flow conditions in the event of main line damage or other mechanical failures.

Underground irrigation piping shall be PVC Schedule 40 plastic pipe or polyethylene plastic pipe for drip systems.

Sleeve all pipes when crossing hard surfaces or where there is vehicular traffic. Sleeve material shall be PVC Schedule 40 for walk or drive crossings for light to medium weight vehicles and Schedule 80 for heavy truck crossings.

Use overhead spray (gear, rotor or rotator) heads at lawn areas and drip emitters, integral dripper lines or overhead spray heads at tree, shrub, and groundcover beds. Drip tube irrigation may be used in small or narrow planting areas (hedgerows, raised planters, tree pits).

Irrigation plans and specifications shall identify the materials to be used and the construction methods. The irrigation plans and specifications shall require the system installer to conduct final system testing and adjustments to achieve design specifications prior to final acceptance of the system.

Provide post construction documentation (such as as-built drawings and recommended maintenance activities and schedules). Provide the operation schedule, designed precipitation rates, water shut off methods, operational guide for irrigation equipment installed, and required adjustment keys and tools.

Site Lighting

The primary goals for site lighting are safety, security and aesthetics. Only light areas where exterior lighting is clearly required for safety and security. Lighting used solely for aesthetic effects shall be used only to achieve site-wide way-finding goals. Site lighting should not spill over beyond the property.

Safety involves minimizing conflicts with pedestrians and vehicles through channeling traffic to the safest paths and providing adequate sight lines and lighting levels.

Security minimizes personal harm or property loss by achieving good visibility and by removing shadows along paths.

Aesthetics in lighting refers to the appearance and place making qualities of the lighting design, both during the day and night.

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Lighting shall be included and coordinated with the electrical engineer and lighting designer. Fixture types and locations shall be coordinated with the landscape architect and lighting designer and dimensioned on the electrical drawing set.

Lighting improvements in the right-of-way shall be coordinated by Civil.

Site Structures

Dumpster Area: If Dumpsters are potentially visible by the public, locate, design, and construct the dumpster enclosure area(s) and screening to be aesthetically and architecturally compatible with the building it serves and shall be designed in accordance with the installation's guidelines.

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Section 4 - Structural Engineering

a. Design Criteria Documents

International Building Code, as revised by the City of Seattle (Seattle Building Code), edition that is in effect at time of building permit application.

ASCE/SEI 7-10, Design Minimum Loads for Buildings and Other Structures

b. Minimum Loading

Roof Live/Snow Loads

25 psf Snow load.

Drifted snow per ASCE 7-10.

175 psf Mechanical penthouse, or use actual equipment pad housekeeping pad weights plus 50 psf at open areas around equipment.

Floor Live Loads

100 psf Offices.

100 psf Corridors, stairs.

80 psf Courtrooms.

150 psf Libraries.

150 psf High density filing areas or actual filing system weights, if less.

40 psf Detention units, plus 15 psf partition load.

125 psf Light storage.

150 psf Mechanical rooms, or use actual equipment pad housekeeping pad weights plus 50 psf at open areas around equipment.

40 psf Parking floor - passenger vehicles.

c. Occupancy Risk Categories

Detention Facility Risk Category III (Group I-3 Occupancy).

Courthouse Building Risk Category II (Group A-3 Occupancy).

Parking Garage Risk Category II.

d. Seismic Loads

Site Class C

$S_s = 1.36g$.

$S_1 = 0.53g$.

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$I_e = 1.25$ Juvenile Detention Facility.

$I_e = 1.0$ Courthouse Building, Parking Garage.

$I_p = 1.5$ Nonstructural components required to function for life-safety purposes after an earthquake, including fire protection sprinkler systems and egress stairways.

$I_p = 1.0$ All other nonstructural components.

e. Wind Loads

Exposure B

Wind Speed = 115 mph Detention Facility.

Wind Speed = 110 mph Courthouse Building, Parking Garage.

$K_{zt} = 1.38$.

f. Vibration Criteria (footfall vibration peak velocities)

Offices $\leq 16,000$ micro-in/sec.

Courtrooms $\leq 16,000$ micro-in/sec.

Detention Units $\leq 16,000$ micro-in/sec.

Section 5 - Fire Protection Systems

a. Introduction and General Objections of the Fire Protection Systems Standard

Performance

Fire protection systems protect life and property from fire through standardization of design, installation, and testing requirements for sprinkler systems, based upon sound engineering principles, applicable state fire code, and field experience. The following criteria set minimum acceptable standards for design and installation of automatic fire sprinkler systems. New technology and alternate arrangements may be applied with written AHJ approval and reviewed by the Design-Build Entity, but they shall not reduce safety levels prescribed by these criteria or by state fire and building codes.

b. Fire Protection Performance Criteria

Design Conditions

Objectives:

Fire protection engineer shall use specified criteria to develop fire protection systems.

Fire Protection Criteria

Automatic Sprinkler Systems:

- All sprinkler systems must be wet-pipe sprinkler systems, unless installed in areas subject to freezing.
- Automatic sprinkler system zones shall be established by the installation of floor control assemblies for all floors in multistory buildings, including basements.
- Automatic sprinkler system designs (wet pipe) shall achieve the minimum design criteria listed in *Table B5.1 - Automatic Sprinklers Minimum Design Criteria*.
- Hydraulic designs of sprinkler systems shall incorporate a safety factor of ten percent (10%) of the available water supply pressure at the system demand flow rate. High pressure systems shall be limited to a maximum working pressure of 300 psi.
- All piping shall be labeled.
- Automatic sprinkler designs shall be prepared and sealed by a licensed engineer. Subsequently, the required shop drawings, including hydraulic calculations, for construction approval may be done by licensed / certified fire protection contractors.
- Pressure seal or set screw type fittings or methods of joining pipes shall not be permitted.
- Sprinkler system control valves must be located in accessible spaces. Avoid locating valves in limited access areas. Sprinkler system control valves are not permitted in judicial chambers, courtrooms, and in above-ceiling spaces.

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Table B5.1 - Automatic Sprinkler Systems Minimum Design Criteria				
Occupancy Classification	Design Density (GPM/FT ²)	Design Area (FT ²)	Hose Stream Allowance (GPM) *	Duration of Supply (Minutes)
Light Hazard	0.10	3,000	100	60
Ordinary Hazard Group 1	0.15	3,000	250	60
Ordinary Hazard Group 2	0.20	3,000	250	90
Extra Hazard Group 1	0.30	3,000	500	120
Extra Hazard Group 2	0.40	3,000	500	120
* Combined inside/outside				

Non-fire-protection connections shall not be permitted to the fire sprinkler system.

- On-site water storage, where required, shall be designed and installed per NFPA Standard 22.
- For fire sprinkler systems in mechanical rooms, provide sprinkler system per NFPA requirements using corrosion-resistant, standard response sprinkler heads rated for 200°F.
- Coordinate location of each sprinkler head with reflected ceiling plan, including lighting, diffuser, and grille layout. Sprinklers shall be installed in center-of-tile locations for suspended ceilings, based on the dimension of the ceiling tiles. Use flexible connectors in suspended ceilings. Do not use oversized escutcheons.
- Coordinate the location, signage, keying, and access of fire sprinkler shutoff and zone valves with the local fire authorities. Access and signage shall be obvious. Visibility shall not be blocked by equipment.
- Coordinate sprinkler drain locations with plumbing drawings.
- Specify sprinkler head guards to be installed on any heads subject to possible damage. Sprinkler head guards shall be UL-listed.

Sprinkler guards must be provided in the following locations:

- Sprinklers installed within elevator machine rooms and elevator pits.
- Sprinklers installed within electrical closets.
- Sprinklers installed within electrical equipment rooms.
- Sprinklers installed less than 7'-6" above the floor.
- Sprinkler guards to provide protection from mechanical damage shall be provided for all

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sprinklers in MDF, IDF, and security electronics rooms, unless concealed type sprinklers are installed.

Fire Pump Requirements:

Evaluate fire pump requirements based on building size, number of floors, occupancy, and available city water pressure. Specify fire pump, jockey pump, and associated control system in accordance with NFPA requirements.

- Specify that a single vendor furnish pumps, motors, transfer switches, and all controls, and that equipment be UL-listed.
- Require the pump manufacturer/representative to provide the services of a qualified engineer for startup and acceptance test, in the presence of local fire and authorities having jurisdiction (AHJ).

A fire pump must start automatically at 10 psi below pressure maintenance pump (jockey pump) start pressure. The fire pump must be manually shut down, except that operation by automatic periodic exercise timers used for the required maintenance run times shall be incorporated. The fire pump installation must include a test header and a flow meter.

- Where an emergency generator is required, coordinate electric fire pump starter type with generator for adequate starting capacity. Initiate emergency start within 20 seconds.

Fire Sprinkler Piping Requirements:

All aboveground sprinkler piping to be Schedule 40, black steel, ASTM A135 for branch lines. All underground sprinkler piping to be ductile iron, class 50, AWWA C151, with cement mortar lining conforming to AWWA C104, with 1-mil thick exterior petroleum asphalt coating. For corrosive soil areas, the underground piping shall be encased in polyethylene encasement in accordance with AWWA C105 and with cathodic protection. Dry sprinkler systems shall use galvanized schedule 40 piping.

- Black steel piping shall be used for all aboveground sprinkler piping.
- Steel piping having a corrosion-resistant ratio less than 1 is not permitted to be installed. Provide anti-bacteria coating on steel pipe interiors.
- Plain-end fittings are not permitted to be installed.
- The sprinkler system drainage piping shall be specified as galvanized steel pipe with galvanized threaded malleable iron fittings.
- Specify corrosion protection for buried ductile iron pressure piping and supports. All wrapping shall be site installed. Specify cathodic protection as necessary for local conditions.
- Installation: Install aboveground pipe, fittings, and hangers in accordance with NFPA 13 and local code requirements, including seismic sway and uplift bracing. Additional requirements per earthquake bracing shall be in accordance with NFPA 13, or a structural engineer shall sign the sway bracing details.

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- Reducers: Make reductions in pipe sizes with one-piece reducing fitting. Bushings will not be acceptable, except when standard fittings of proper size are not manufactured.
- Provide next to sprinkler main risers a framed, printed sheet protected by transparent plastic, safety glass, or Plexiglass cover with brief instructions regarding all necessary aspects of sprinkler controls and emergency procedure.
- Piping shall have internal anti-bacterial corrosion protection.
- Drains: Install main drain at riser and auxiliary drains at all low points in the system on each floor. Install inspector's test drains on sprinkler system at main riser assembly. Five or fewer trapped heads may be drained through a plugged fitting. Route the drain pipes for each sprinkler riser and test connections to the building sanitary sewer system. Sewer system has to accommodate full flow for main drain.
- Exposed piping supplying chrome-plated hose valves or fire department connections shall be painted (color to be approved by architect). Chrome-plated wall or floor escutcheons shall be provided at point of concealment.
- Install a hinged chrome-plated escutcheon at all visible wall, floor, and ceiling pipe penetrations in finished areas.
 - o Do not run piping through elevator hoistways, machine rooms, machinery spaces, or enclosures unless piping is serving these spaces. Branch sprinkler piping serving those spaces shall be provided with a supervised branch shutoff valve located at an accessible location outside these spaces. Furnish supervisory switch at these valves. Provide labeling on the branch shutoff valve per Section 6, b. Plumbing Systems, Labeling.
 - o Do not run piping into electrical rooms, MDF rooms, teledata rooms, IDF rooms, or security electronic equipment rooms unless piping is serving these spaces. Coordinate piping layouts to prevent installation directly over electrical equipment. If pipe routing over equipment is unavoidable, provide drain pans under piping to prevent leaking pipe drips from damaging equipment while maintaining sprinkler coverage. Provide leak detection with remote alarm in pan to building DDC System.
 - o Local water purveyor or fire department/building department requirements for corrosion protection, if any, shall be incorporated into the project requirements.
 - o Continuous detectable warning tape shall be installed directly above all underground fire service line piping, approximately 1-foot below the finished grade surface.
 - o Provide double detector backflow preventers on the incoming service. Provide a test connection downstream of all backflow prevention valves for flow tests at system demand.
 - o Carefully coordinate roof manifold test to avoid damage to roofing.
 - o Provide temporary standpipe with signage during construction.

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- o Provide valves in underground water distribution lines to isolate leaks and to allow water to supply the remainder of the loop. Locate isolation valves so that not more than four discharge points (sprinkler systems or standpipe systems) will be taken out of service by any one break in the line.

Valve Requirements:

- Valves shall be UL- and Factory Mutual (FM)- listed for the application and pressure classification and manufactured by companies with a full line of fire protection system components.
- Valves shall be accessible to staff members.
- Provide solenoid valves to segregate each Living Hall together with its associated rooms, from other fire sprinkler zones so the individual Living Halls can be shut off. Provide with touchscreen operation from the Central Control Room.
- Piping Specialties:
 - o Piping specialties shall be UL-listed and made by a single manufacturer.
 - o pressure gauges shall be 3-1/2 inch dial with dial range twice the system working pressure, 1/4-inch bottom connection, and shutoff valve.
 - o Flow switches shall have adjustable time delays, UL-listed. Each must have two contacts for local and remote alarms, DPDT.
 - o Inspector's test and drain valve assembly shall be in accordance with NFPA 13.
 - o The valve supervisory switch shall be UL-listed, 120VAC/30 V DC, with DPDT
 - o Other specialty items shall be as required by NFPA 13 or local conditions and codes.

Sprinkler Heads:

- Sprinkler heads shall be UL-listed automatic sprinklers in accordance with the following:
 - o Temperature rating shall be 155°F to 165°F, except when application requires higher rating.
 - o Sprinkler heads shall have 200°F temperature rating for sprinkler heads in all switchgear rooms, electrical rooms, elevator machine rooms, mechanical rooms, skylights, and where required by NFPA.
 - o For holding cells, and detention sleeping rooms/cells, sprinkler heads shall be institutional type quick-response. Tyco Raven or approved equal.
 - o Specify standard response type sprinkler heads, either upright, sidewall, or pendant, in open ceiling areas and for switchgear rooms, electrical rooms, elevator machine rooms, mechanical rooms, and other service areas.

Fire Department Connections:

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The fire department connections (FDC) shall be provided in accordance with NFPA, International Fire Code, and local fire department requirements. Threads shall conform to standards of all responding fire departments.

The FDC shall be cast brass or ductile iron body with drop clappers. Provide chrome-plated brass plate with lettering as required by the local fire authorities. Provide chrome-plated brass female snoots with rigid pin lug hose thread swivels, pin lugs, and chains. All hose inlets and threads, (National Standard Thread - NST), shall conform to local fire department requirements.

Sprinkler Control Valves:

Sprinkler control valves shall be UL-listed, all with supervisory switches.

Double Check Detector Valve Assembly:

Double check detector valve (DCDV) assembly shall be UL-listed.

Post Indicator Valve Assembly:

When required by the local authorities, specify UL-listed post indicator valve (PIV) assembly. PIVs shall be monitored by the building fire alarm system.

MDF/IDF and Security Equipment Room Fire Protection:

Omit sprinklers where permitted by code. If fire suppression is required in these rooms, provide pre-action sprinkler system. Sprinkler heads shall be provided with sprinkler guards. The sprinkler system for the room can have a separate, dedicated, manually operated, isolation valve with a supervisory switch and a separate flow switch located outside the protected area in an accessible location. Both the supervisory switch and the flow switch shall be connected to the building fire alarm system.

Detection system shall be cross-zoned or counting zone photoelectric detectors. Minimum two-detector activation is required before discharge sequence can begin. Quantity of detectors shall be determined by airflow within hazard area but not exceeding 250 sq. ft. per detector. Minimum detection to be provided for each room shall be three counting zone detectors or four cross-zoned detectors.

Living Pod "A" Orientation Sleeping Rooms Fire Protection:

A historic issue within detainee sleeping cells is a detainee breaking sprinkler head causing flooding of the cell, and consequently the dayroom.

In 2 of the 6 Single Sleeping Rooms within The Orientation Housing Unit, if acceptable to the AHJ, provide pre-action sprinkler system as described for the MDF/IDF rooms above.

If a pre action system is not acceptable to the AHJ, design a system that eliminates the possibility of the youth breaking the sprinkler heads and causing the flooding described above in the 2 sleeping rooms noted above.

Coordination:

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- Fire protection systems shall be coordinated with other portions of the project, such as earthwork, architectural, site utilities, concrete, plumbing, structural, electrical, sheet metal, and mechanical.
- All electrical equipment provided under fire protection systems shall be specified with wiring diagrams for interfacing with electrical work.
- Coordinate with the building fire alarm system for transmitting all flow and tamper alarms.

Guarantee:

Specify that fire protection work shall be free from defects of workmanship and materials for 2 years after Substantial Completion, and remedy any defects developing during this period, free of charge. Manufacturers whose equipment has a longer guarantee period shall provide a written guarantee.

Installation Contractor Certification:

Specify that the fire protection system shall require the installation contractor to submit all certificates in triplicate indicating approval of work, approval or performance of tests, and final inspection issued by fire marshal before final acceptance of sprinkler system.

Cleaning:

Specify that the sprinkler heads placed prior to painting be covered with paper or plastic bags, which shall be removed only after painting is completed.

Labeling:

Label all fire protection piping per NFPA.

Provide riser placards with hydraulic information at each valve assembly.

Section 6 - Mechanical Engineering Systems

a. Introduction and General Objectives of the Mechanical Standard

Introduction

This Section identifies the mandatory criteria that must be used to program and design mechanical systems, which are defined here as including heating, ventilating, and air conditioning (HVAC) systems, humidification and HVAV water treatment systems, primary heating systems, primary cooling systems, pumping and piping systems, and building automation systems.

Integrative Design Process

An Integrative Design Process must be used, beginning with the pre-concept design phase of the project, to ensure that the mechanical systems and other building components function together and result in a building that meets the project's program requirements. Mechanical systems must be designed to support all performance objectives defined for the project's program requirements.

Early energy modeling will provide more accurately sized and functional systems. The integrative design process provides the opportunity for this collaboration and confirmation to occur earlier and provide the accurate inputs for the model. The following systems that should be included, but are not limited to: envelope values, reflectance for interior finishes, light fixture types, plug load requirements, HVAC systems and component requirements, etc. Refer to Part A, Section 3 - Sustainable Design of this *Facility Performance Standard* for further information.

Sustainability and Energy

King County is committed to reducing the County's carbon footprint. The 2010 King County Energy Plan requires a minimum ten percent (10%) reduction in overall County resource consumption. County Ordinance 16927 (Sept. 13, 2010) requires that all major County construction projects include consideration of all practical energy reduction strategies using a net present value life cycle analysis based on a 15 year period of analysis.

Refer to Part A, Chapter 3 - Sustainable Design, and Part B, Section 8, Energy and Sustainability Life Cycle Analysis of this *Facility Performance Standard* for further information.

Maintenance and Reliability

Maintainability and reliability are requirements for King County buildings. The design and installation of all mechanical systems and equipment must allow for their removal and replacement, including major components such as boilers, chillers, cooling towers, pumps, and air-handling equipment.

HVAC systems shall be designed so that equipment failures and normal maintenance have minimal impact on the tenants. Failure of one piece of equipment shall not shut down large portions of the building. Install piping and valves so that equipment can be easily isolated for repair and so that different combinations of equipment can be used during replacement and overhaul.

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Equipment components, spare parts, and materials shall be readily available and the equipment shall be repairable by crafts people available in the local area.

Flexibility

Design must provide sufficient flexibility to permit major program spaces to be scheduled independently of one another and to be reconfigured simply and cost effectively in the event of future renovation.

Redundancy and Standby Capacity

The standard defines where specific redundancy or standby capacity requirements must be provided over and above that estimated simply to meet the peak loads in the project.

Codes and Standards

Design must meet the most stringent of all applicable codes and standards.

Preferred Mechanical and Plumbing Equipment

List of preferred mechanical and plumbing equipment is included in Appendix D at the end of this *Facility Performance Standard*.

b. Plumbing Systems

Introduction and General Objectives of the Standard

Performance:

Plumbing fixtures, piping and appurtenances shall be of commercial grade and manufactured for long service life. Fixture and equipment selected must be readily available in the area to facilitate repair or replacement. Coordinate with security electronics narrative for utility controls.

Sustainability:

Plumbing system design and material selection shall take into account the latest in green technologies. Fixtures shall meet at least a thirty percent (30%) water use reduction over Environmental Policy ACT requirements. Water conservation is a requirement of all plumbing systems. Consideration should be made for inclusion of solar hot water, sewer heat recovery, rainwater reuse and grey or blackwater treatment systems.

Refer to Part A, Section 3 - Sustainable Design of this *Facility Performance Standard* for further information.

Flexibility:

Plumbing systems shall be designed and laid out to provide flexibility for future changes. Water systems shall be zoned by area and banks of fixtures to allow for modifications in the future with minimal interruption of service.

Redundancy and Standby Capacity:

Provide thirty percent (30%) additional capacity in water, waste and hot water systems for

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future development. The Sanitary Waste invert elevation shall also have extra capacity (depth) to account for future plumbing fixture addition. Provide capped water, waste and vent connections every 50-feet in unfinished areas.

Labeling:

Label all plumbing piping with service and flow arrows. Provide valve tags with numbers corresponding to Record Document valve charts. The valve tags shall include area/or zone served.

Maintenance Identification and Access:

All equipment and piping shall be fully labeled and be accessible for required maintenance. Equipment requiring periodic service in chases shall be accessible through full-size chase doors.

Plumbing Criteria

Cold Water Service:

Domestic water supply equipment and components must include, but not be limited to, the following equipment: water meters, water heaters, water filtration, water softening, pressure booster systems, pressure regulating valves, circulating pumps, backflow preventers, circuit setters/balancing valves, thermostatic mixing valves, expansion tanks, isolation valves, hangers and supports, and thermal insulation.

- Domestic cold water service must consist of a pressurized piping distribution system incorporating two independent (separate) service pipes from taps at the exterior utility service water mains to the water meters and backflow preventer equipment inside the building. A duplex self-cleaning filter system shall be provided on each incoming service.
- Copper (minimum Type L) piping shall be used in areas not subject to pin holing. Polypropylene piping with heat fused joints shall be used in areas with a history of copper pipe degradation. Galvanized, chlorinated polyvinyl chloride (CPVC) piping, and any piping with mechanical joints are not permitted.
- Provide separate meter for water serving detention areas. Report water consumption to the BCS system.
- In compliance with the Uniform Plumbing Code and the water purveyor requirements, the two water services must have duplex backflow prevention devices located immediately downstream of the service water meters and upstream of all other connections and branches. Access and service clearances for meters and backflow preventers must be provided in accordance with the requirements of the manufacturer and the water purveyor.
- Internal distribution must consist of a piping system that supplies domestic potable cold water to all plumbing fixtures, plumbing equipment, water heaters, mechanical makeup, and cold water equipment/system demands.

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- The distribution water pressure must provide the outlet pressures required by fixtures or equipment, at the hydraulically most demanding (generally the topmost/highest and most remote) outlet. The required outlet pressure must be determined as the minimum requirements of the Uniform Plumbing Code or by the higher requirements of the fixture or equipment, as required by the manufacturer.
- Distribution water pressures must not exceed 80 pounds per square inch, (psi), as required by the Uniform Plumbing Code. The Design-Build Entity must schedule and specify duplex pressure regulating valves or valve stations where pressures exceed the code maximum. Pressure reducing valves must be specified to operate at peak flow within the entire range of low rates required for operation of the fixtures.
- A packaged and third-party-tested triplex (three-pump) booster pumping system or duplex (two-pump) with variable frequency drives and a hydropneumatic storage pressure tank sized for a minimum pump run time of 90 seconds at full load must be used where water flow test and water purveyor low hydraulic grade line (low HGL) water pressures do not provide required pressure demands at peak draw. Water pressure boosting must generally be provided only to those areas or floor elevations where insufficient water pressures may be experienced/expected utilizing the low HGL. Outlets on floor elevations or areas that can be served with the required pressures provided at low HGL must not be pumped. The entire water service must not be pressure boosted if only portions of the building systems require pressure maintenance boosting. Multi pumps with variable frequency drives shall be provided on a skid mounted package with integral control panel.
- The distribution system shall be sized to maintain a maximum friction loss of 2.5 feet for every 100-feet of pipe per ASHRAE Fundamentals Handbook, Hydronic System Piping. The maximum velocity shall be 8-feet per second except for runs over conference rooms and other sound sensitive areas where the maximum velocity shall be 6-feet per second.
- The distribution system shall be zoned by providing accessible shut of valves for each toilet room, bank of fixtures and equipment. Avoid locating valves in high security rooms, judicial chambers, courtrooms, and any areas with limited access.
- Piping routed to detention fixtures shall be zoned by area and individual day rooms. Shutting off the detention area valves shall not interfere with the operation of non-detention fixtures. Remotely-controlled solenoid valves are required in some high security areas. Integrate control with Electronic Detection Control System. Provide each with a water hammer arrestor. Provide shut off valves for each cell in addition to zone valves. Provide shut off valves for each cell inside cell chase in addition to zone valves.
- Water hammer arrestors must be provided at each elevation change of every horizontal branch to fixture batteries, at all quick-closing automatic valves (mechanical makeup, drinking fountains, flush valves, single lever control faucets, temperature regulating valves, dishwashers, return pumps, and similar), and at each floor on each horizontal main for branches with/without individual fixture or battery water hammer arrestors, for both hot and cold water. Water hammer arrestors must be compliant with the Plumbing

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and Drainage Institute (PDI) Standard, or as required by the Uniform Plumbing Code, and as recommended/required by the fixture and equipment manufacturer or warranty.

- Meters with remote capability must be provided to collect water use data for each water supply source (e.g., domestic potable water, reclaimed water, rainwater). Utility company service entrance/interval meters are allowed to be used but must report to the BCS.
- Provide sub-metering with remote metering to collect water use data for the following three separate areas:
 - Within the secured detention perimeter.
 - Within the court and non-secured detention program areas.
 - Exterior/Site and Parking Garage.
- All building meters and sub-meters must be configured to communicate water consumption data to a data management system capable of electronically calculating hourly, daily, monthly, and annual water consumption for each meter and sub-meter.
- All water piping shall be insulated.

Hot Water Service:

Domestic potable hot water must be generated by water heaters utilizing heat exchangers where heating water is available year round. Natural gas and electricity as the primary energy source should be considered for areas without heating hot water or small remote loads. Remote sinks or lavatories further than 75-feet from a circulated line can be provided with a small instantaneous electric water heater.

Load calculations, storage capacities, insulation requirements, system types, and performance requirements of the water heating equipment must comply with the mandatory requirements in ASHRAE Standard 90.

Cold (or solar preheated) water supply to water heaters must include a service valve, check valve, expansion tank (sized for expansion of storage capacity only), heat trap, mixing valve, and hot water return connection at a minimum.

Consider systems utilizing rejected heat from heating sources.

Cold water temperatures supplied from the utility source vary in temperature by season and location. The Design-Build Entity must obtain, from the water utility purveyor, seasonal cold water service temperatures supplied by the water utility purveyor (past 3 year minimum preferred). Low temperature (lowest of the past 3 years) seasonal cold water service temperatures must be used in the calculation and application of water heating, water heating energy source (steam, heating hot water, gas), and for makeup to the water heating energy source. Preheating of domestic cold water supply to the domestic water heater and cold water makeup to water heating energy source must be considered, utilizing a solar hot water system.

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Instantaneous water heaters are not permitted as a primary source of potable hot water. For incidental use, sporadic equipment demands, or remote individual fixtures (e.g., lavatory, sink, shower, service sink), the use of instantaneous water heaters is permitted. Point-of-use instantaneous water heaters are permitted for use at emergency fixtures to supply tepid water immediately at the emergency fixture or group of emergency fixtures.

Domestic hot water supply temperatures must be generated and stored at a minimum of 140°F, and tempered to deliver 120°F to outlets, where permitted by the Uniform Plumbing Code and consistent with ASHRAE Guideline. Provide high/low type thermostatic mixing valve mounted on wall. Detention fixtures, hand washing, lavatories and similar fixtures accessible to the disabled, elderly, or children must be tempered to deliver 110°F water temperatures at the fixture or group of battery fixtures. Bathing and showering fixtures (except emergency showering) must be tempered to deliver water 120°F water temperatures at the fixture or group of battery fixtures, in accordance with procedures in ASHRAE Guidelines. Hot water supply to commercial dishwashers must be at 140°F, and the temperature must be boosted from 140°F to 180°F for the final sanitizing rinse.

Rubber fittings and device components are not permitted within the potable domestic hot water or return systems. Emergency eyewash and shower equipment shall be provided with emergency type mixing valves set at 80°F. Mixing valve shall revert to cold water in the event of a hot water supply failure.

The domestic hot water distribution system must consist of a piping system that connects water heaters to all fixtures, equipment, and outlet demands requiring potable domestic hot water. Circulation return systems with circuit setters/balancing valves or temperature maintenance systems must be provided for all branches in excess of 25-feet from the water heater or circulated distribution main. Domestic hot water must be available at each hot water outlet within 20 seconds of the time of operation.

Domestic hot water return circuits of substantially varying pressures, as a result of pressure zoning or static head, cannot successfully be joined to a single pressure zone water heater. Locate individual pressure zone water heaters within the pressure zones, where return pressures would vary substantially, causing deadhead on the lower pressure return circuits. Hot water return systems must have circuit setters (balancing valves) and test plugs at each return circuit, and systems must be balanced. Provide a separate circulation pump for each temperature.

System shall be zoned by valves similar to the cold water system.

Sanitary Waste and Vent Systems:

Piping and Fittings:

- A complete sanitary building drainage system must be provided for all plumbing fixtures, sanitary floor drains, kitchen equipment, and equipment with sanitary, soil, or waste drainage/discharge. The sanitary waste and vent system must be designed in compliance with the Uniform Plumbing Code. Piping must be service weight cast iron soil pipe with no hub fittings and joints with heavy duty couplings for below-grade piping.

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Aboveground piping must have no-hub fittings and joints with standard couplings and pipe support compliant with no-hub pipe standard, compliant with code (generally within 12-inches of each side of each joint). Avoid the use of sewage grinders in secure areas. Design detention area drainage systems with a minimum amount of bends and provide cleanouts every 50-feet and every 90 degrees.

- Slope all piping at two percent (2%) unless structural conditions prohibit. Only run piping at 4-inch and larger at one percent (1%) where two percent (2%) is unattainable. Slope vent piping at one percent (1%).
- Use silicon iron for kitchen waste.
- Coordinate sewer connection with civil work.

General:

- Piping below grade must be service weight cast iron soil pipe with no hub fittings and joints with heavy duty couplings.
- Aboveground piping shall be no-hub fittings and joints with standard couplings.

Floor Drains:

- Sanitary floor drains must be provided in multi-fixture restrooms, kitchen areas, mechanical equipment rooms, secure area plumbing chases, and locations where interior floor drainage accumulates wastes. Single fixture toilet rooms do not require floor drains. Provide drains outside of every other cell. Provide trench drains for commercial kitchens.
- Floor drains must be cast iron body type with 6-inch diameter nickel-bronze strainers for public toilets, kitchen areas, and other public areas. Receptors, open-site drains, hub drains, trench drains, and similar drains must have a dome bottom strainer (in addition to pedestrian/vehicle grate strainers where required) to reduce splashing, increase free area, and prevent debris blockage. Drain body, frame, and grate strainers must be rated for expected wheel loading and must include drain adapters, extensions, receivers, deck clamps, and similar, as required by building construction. The drain strainer free area must be equal to or greater than the free area of the calculated outlet pipe size area. Drain strainers in pedestrian areas must be heel-proof type. Every drain and system opening must have 1/4-inch maximum strainer openings.
- Receptor drain outlets must be two times the area of combined inlet pipe areas. Equipment room areas require large diameter cast iron strainers and parking garages require large diameter tractor grates rated for expected wheel loading. Drainage for ramps requires either trench drains or roadway inlets, if exposed to rainfall. Each drain shall be provided with vandal-proof screws and a trap primer connection; screws for use in the secured perimeter shall have security pin-head Torx heads. Provide listed non-pressure type primer.

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Trap primer connection shall be provided for all floor drains. Trap primer valves shall be automatic, UPC/IAPMO listed and ASSE certified and non-electronic. County prefers non-electric type
Test Drain: Provide 6-inch hub drain for sprinkler test.

Specialized Equipment:

- Interceptors, drains, and fixtures discharging fat, oil, or grease-laden waste; within 10-feet of the cooking battery, mop and service sinks in kitchen areas; and as required by the State health department and local authorities, must discharge to an IAPMO approved grease interceptor before connecting into the sanitary sewer.
- Grease interceptors must be sized for compliance with the requirements of the local public AHJ. Where permitted by the local public AHJ, grease interceptors must comply with the PDI guidelines. Drains, fixtures, and equipment must discharge to the grease interceptor, as required by the State health department and the local public AHJ. Soil producing or clearwater wastes (such as condensate drains are usually excluded by the local public AHJ from extending to the grease interceptor. Outdoor gravity type interceptors shall be used where sufficient truck accessible space exists. Local hydro mechanical type interceptors are permitted for very small or remotely located kitchens. Grease interceptor covers shall be traffic grade
- Floor drains and/or trench drains in vehicle repair garages must discharge to a sand/oil separator before discharging to the sanitary sewer.

Sewage Ejectors:

Automatic Sewage Ejectors: Sewage ejectors must be used only where gravity drainage is not possible. Only sanitary drainage from fixtures located below the sewer invert can be connected to the sewage ejector; fixtures on upper floors must use gravity flow to the public sewer. Sewage ejectors must be nonclog, screenless, alternating duplex pumps, capable of passing a 2-inch solid, with each discharge not less than 4-inches in diameter. They must be connected to the emergency power system, monitored via BMS and properly vented. Provide with traffic weight covers in areas accessible to vehicle traffic.

Rainwater Drainage, Collection, and Treatment

A complete rainwater (storm) building drainage system must be provided for all rainwater (storm) drainage for roofs, plazas, balconies, decks, area wells, parking structures, parking garages, and similar structures. A separate and independent secondary roof drainage system must be provided in compliance with applicable codes and standards. System must be connected to BCS for monitoring and controls.

Where practical, rain water drainage should be recovered and reused for cooling tower makeup, irrigation, or for similar makeup purposes. Provide a pre filter or roof washer to pretreat rainwater before storage in a cistern. Recovered rain water for irrigation use can then be pumped to the irrigation piping system. Rain water for toilet flushing or cooling tower use shall be further treated using additional filters and an ultra violet light system. Otherwise, clearwater drainage must discharge to the rainwater (storm) drainage system and not to the sanitary drainage system. Clearwater drainage without chemical, vegetable, human, animal, protein, fecal, oil,

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grease, or similar pollutants may be discharged to the rainwater (storm) drainage system where approved by code, State, local public AHJ, and the Environmental Protection Agency. Rainwater must be drained away only as a last option. All rainwater should be used for irrigation, toilet flushing, or mechanical use.

Rainwater (storm) system must be designed in compliance with applicable codes and standards. P-traps and house traps must be provided only on storm systems where required by code, State, or local public AHJ.

Rainwater Drainage (Storm) Piping and Fittings:

Piping must be service weight cast iron soil pipe with no hub fittings and joints with elastomeric gasket and heavy duty couplings. Aboveground piping to have no-hub fittings and joints with standard couplings, and pipe support installed with no-hub pipe standards (generally within 12-inches of each side of each joint).

Storm Drains:

- Rainwater (storm) drains include domed roof drains, secondary roof drains, hub and receptor drains (that do not receive floor drainage), deck drains, parking garage drains, trench drains, area well drains, and similar. Roof drains and planter drains in non-pedestrian/vehicle areas must have high dome strainers. Receptors, hub drains, trench drains, and similar drains must have a dome bottom strainer (in addition to pedestrian/vehicle grate strainers where required to reduce splashing, increase free area, and prevent debris blockage).
- Drain body, frame, and grate strainers must be rated for expected wheel loading and must include drain adapters, extensions, receivers, deck clamps, gravel stops, and similar, as required by building construction. The drain strainer free area must be twice the free area of the calculated outlet pipe size area. Drain strainers in pedestrian areas must be a heel-proof type. In general, drains must be cast iron body type, with nickel-bronze strainers for finished pedestrian areas, aluminum domes for roof drains, ductile iron or bronze finish for unfinished pedestrian areas. Rainwater drains and equipment room areas must require large diameter strainers. Drainage for ramps must require either trench drains or roadway inlets, if exposed to rainfall. Trap primers must be provided for P-traps in municipal combined systems.
- Drains in parking structures and garages must discharge to a sand/oil separator before discharging to the storm sewer, when required by code, State, or local public AHJ.
- Provide drain with removable cover in generator area.
- Sump pumps must be used only where gravity drainage is not possible. Only rainwater, storm, and clear water drainage from the lowest floors of the building must be connected to the sump pump; drainage from upper floors must use gravity flow to the public storm drain system. Sump pumps must be alternating duplex pumps. Sump pumps must be connected to the emergency power system and BMS for monitoring and controls.
- If the soils report indicates ground water and the structure is not sealed water tight, a foundation and subsoil drainage system must be provided with an emergency power source, backwater prevention, perforated drain tile piping in a washed gravel bed with filter fabric, which must extend to the duplex sump pumping system as required by the applicable codes.

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The requirements of the foundation and subsoil drainage system must be identified, capacity calculated, and materials identified by the geotechnical soils engineer and identified in the geotechnical report. The layout and installation details and materials (identified by the geotechnical report) must be specified and identified in the structural foundation drawings and indicated on the architectural drawing sections and details. The extension from the system end to the sump pump or daylight termination must be identified on the plumbing drawings.

- Provide secondary (overflow) roof drainage using sidewall scuppers, scupper drains, or a secondary (overflow) roof drainage system. Secondary (overflow) roof drains must be the same as roof drains, except with integral standpipe or damming weir extension 2-inches above the waterproofing membrane and located adjacent to the primary roof drain, and extended to discharge 12-inches above grade. Termination above grade must include a decorative finished spout.

Plumbing Fixtures - Detention

- Fixtures serving detention areas shall be 14-gauge stainless steel institutional grade. Combination lavatory water closets, (combi), shall be provided in individual and group cells. Units shall be floor mounted and back outlet mounted against an accessible chase. Fixture shall be able to withstand 5,000 pound force. Provide electronic valve control with connection to County control system capable of limiting the number of flushes per hour. Lavatory waste shall be dumped into bowl where allowed by code. Provide a pinned clean out and anti-flood device. Provide hot and cold metered supply to the bubbler faucet at each bowl. ADA fixtures shall be provided with anti-suicide bars. All fixtures shall be of anti-suicide design.
- Water closets in secure transition areas shall be floor-mounted rear outlet of similar construction and controls as the combi units. Provide 60 psi minimum at all flush valves.
- Lavatories shall be wall mounted stainless steel security type with trap and supply security covers. Unit shall be capable of withstanding 5,000 pounds of force. Provide with two temperature bubbler faucet.
- All combi and water closets shall be flushometer type.
- Showers shall be stainless steel secure cabinet type with anti-suicide controls and shower head. Shower controls shall be premixed single temperature type and each bank shall have its own mixing valve. ADA showers to have bubblers mounted high and low.
- All fixtures shall be sealed with pick-proof grout.

Plumbing Fixtures - Non-Detention

- Plumbing fixtures must comply with the Uniform Plumbing Code and local building codes. All plumbing fixtures, valves, stops in contact with potable water shall contain no more than one-quarter percent (0.25%) lead. All fixtures in public areas shall be vandal-proofed.
- Plumbing fixture accessibility clearances, installation, and accessories must be compliant with ADA inclusive of insulation of exposed piping.

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- All plumbing fixtures must be water-conserving/saving-type fixtures, faucets, and valves. Low-flow water fixtures must be provided.
- Water closets (toilets) shall have flushometer type valves.
- Water closets shall be commercial grade wall hung with open front seat and no cover.
- 25 psi minimum for flush valve fixtures.
- Provide with hard-wired, hands-free flushometer with 1.28 gallon per flush.
- Tank-type water closets must comply with the performance criteria of the U.S. EPA Water Sense Tank-Type High-Efficiency Toilet Specification.
- Urinals shall be wall hung commercial grade low-flow, hard-wired, hands-free flushometer-type fixtures. Maximum flush volume shall be 0.125 gallons per flush
- Use hard-wired, hands-free metered-type faucets for public lavatories. Maximum water use 0.25 gallon per cycle.
- Kitchen sinks shall be 18-gauge stainless steel self rimming type with a single lever swing spout. Provide with 1.5 gallon per minute aerator. In break room areas provide with disposal and water connection for coffee and ice makers.
- Emergency eyewash and showers must be provided with tempered water immediately at the fixture or group of fixtures within 7.6-meters (25-feet) to deliver tepid water between 85°F and 100°F, at 30 psi, within 10 seconds, for a minimum period of 15 minutes.
- Showers: High gloss acrylic surface, wall mounted direct-to-stud, nailing flange type install, high density inner core, built in screw guides, texted bottom, soap dish and centered drain, IAPMO/ANSI certified. Acceptable manufacturers: Aqua-glass, Lasco, or Florestone or approved equal
- Showers (ADA): High gloss acrylic surface, wall mounted direct-to-stud, nailing flange type install, high density inner core, special care ADA compliant for roll-in accessible with a threshold flushed with the floor or a curb of ½” or less for wheel chair transfer to shower stall, textured bottom, fold down seat, soap dish, stainless steel grab bars vertical and horizontal and centered drain, IAPMO/ANSI certified. Acceptable manufacturers: Aqua-glass, Lasco, or Florestone or approved equal
- Shower Valves (ADA): Commercial series pressure-balancing mixing valve with lever handle, integral service stops and adjustable stop screw to limit handle turn. Levertrol diverter. Cast brass adjustable spray shower head with arm and flange. Wall/hand shower with flexible metal hose, in-line vacuum breaker, wall connection and flange. 30” slide bar for hand shower mounting.
- Shower Valves: Commercial series pressure-balancing mixing valve with lever handle, integral service stops and adjustable stop screw to limit handle turn. Cast brass adjustable spray shower head with arm and flange.
- Shower Drains: No caulk compression style shower drain, solid brass body for acrylic shower receptor, brass ring with lugs, perforated strainer, rubber gasket/bushing, stainless

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steel pressure ring, stainless steel bolts. Davke or Kohler or approved equal.

- Janitor closets shall be equipped with a mop sink such as a terrazzo floor-set receptor or a cast-iron service sink. Provide a washer and dryer in one janitor closet.

Also see Appendix D Current Standards: Mechanical, Electrical And Plumbing Equipment

- Commercial Food Service Operations: Commercial food service operations (e.g., restaurants, cafeterias, and food preparation kitchens) must include the following where applicable:
 - High-efficiency pre-rinse spray vales (i.e., valves that function at 1.3 gpm or less and comply with performance requirement when tested in accordance with ASTM)
 - Dishwashers that comply with the requirements of the USEPA *Energy Star* Program for Commercial Dishwashers.
 - Air-cooled ice machines that comply with the requirements of the USEPA *Energy Star* Program for Commercial Ice Machines.
 - Hands-free faucet controllers (foot controllers, sensor-activated, or other) for all faucet fittings within the food preparation area of the kitchen and the dish room, including pot sinks and washing sinks.
 - Hot and cold water at the cart wash area
 - Mop and hand-washing sinks.

Metro Transit Comfort Station

A Metro Transit Comfort Station (toilet room), shall be provided as part of the overall development and located inside or adjacent to the new parking garage.

Required details and specifications inclusive of plumbing fixtures for the comfort station are in:

- Appendix C, Standard Single Unit Driver's Comfort Station.

Fuel Piping and Fuel Storage

- Gas piping must be installed in accordance with the International Fuel Gas Code (IFGC) and International Building Code (IBC).
- Natural gas service utility piping entering the building must be protected from accidental damage by vehicles, foundation settlement, or vibration. Wall penetrations must be above grade and provided with a self-tightening swing joint located upstream of the building and wall penetration. A seismic valve shall be provided at the service entrance. Where wall penetration above grade is not possible, the gas pipe must be within a Schedule 80 black steel, corrosion-protected, sealed and vented, gas pipe sleeve that extends from 3-meters (10-feet.) upstream of the building wall penetration exterior (or excavation shoring limits if greater) to a minimum of 12-inches downstream of the building wall penetration.
- Gas piping must not be placed in unventilated spaces, such as trenches or unventilated shafts. Gas piping 2-1/2 inches and larger and any size located in a plenum or shaft shall be routed

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in welded black steel schedule 40 pipe. Smaller piping can be routed in threaded steel pipe.

- Gas must not be piped through confined spaces, such as trenches or unventilated shafts. All spaces containing gas fired equipment, such as boilers, chillers, water heaters, and generators, must be mechanically ventilated and must include CO monitoring and alarms. Vertical shafts carrying gas piping must be ventilated. Gas meters located indoors must be located in a ventilated mechanical room, thus avoiding leakage concerns and providing access to the local gas utility. All gas piping inside ceiling spaces must have plenum rated fittings. Diaphragms and regulators in gas piping must be vented to the outdoors.
- Route gas at 2 psi to vented regulators at each piece of equipment.

Fuel Oil:

- Fuel oil piping must be installed in accordance with IFGC and IBC.
- Fuel oil piping systems must be double-wall containment pipe (pipe-in-pipe) when buried, and they must be Schedule 40 black steel or black iron piping inside fiberglass containment piping. Piping above grade shall be routed in black steel pipe with welded fittings. Fittings must be of the same metal grade as the pipe material. Transition boxes with leak detection shall be provided where underground piping connects to above ground piping. Valves must be bronze, steel, or iron and must be screwed, welded, flanged. Duplex fuel-oil pumps with basket strainers and exterior enclosures must be used for pumping fuel oil to fuel burning equipment. All enclosures including fill box shall be lockable.
- Above ground tanks shall be used and shall meet be double walled steel construction meeting UL 2085 fire resistive requirements. Tanks must be sized for actual storage volume (eighty percent[80%] of rated capacity) with sufficient capacity to provide a minimum of 72 hours of system operation under emergency conditions at one-hundred percent (100%) load. A monitored and alarmed liquid and vapor leak detection system must be provided in interstitial space of underground tanks, aboveground tanks, and piping. The installation must comply with local, State, and Federal requirements, as well as with EPA regulations.

Propane:

- The use of propane and synthetic natural gas should be analyzed as a backup fuel source.

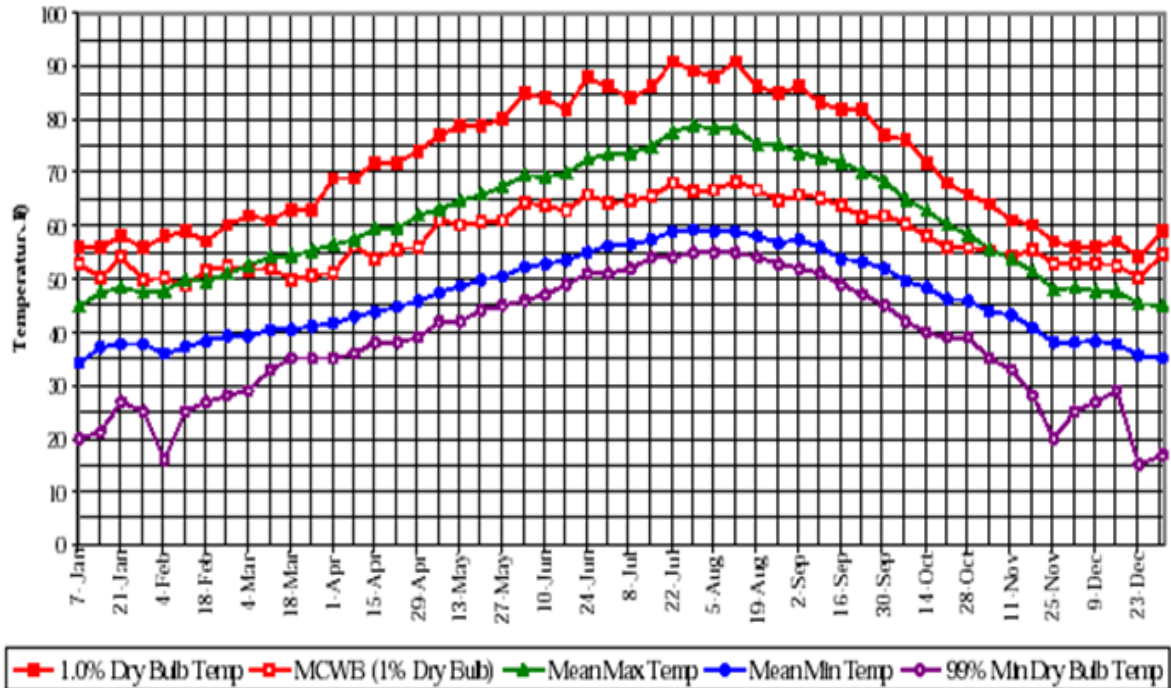
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c. Heating, Ventilating, and Air Conditioning (HVAC) Systems Design Criteria

Table B6.1 - HVAC Site Design Criteria	
Site Location	Seattle, Washington
Summer Design Conditions	ASHRAE 0.4% design condition
Winter Design Conditions	24°F
Cooling Towers	66°F WB
Elevation	200-feet
Longitude/Latitude	122.30°W / 47.45°N

Table B6.2 - Seattle, Washington Annual Summary of Temperatures



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Table B6.3 - Indoor HVAC Design Criteria					
Room Type	Design Air Temperature Setpoint °F		Population Density ft ² /person	Lighting Load W/ft ²	Electrical Plug Load W/ft ²
	Cooling	Heating			
Open and Closed Offices	75±2	72±2	100	0.88	1.2
Core Circulation	75±5	72±2	0 people	0.72	0.75
Storage	85±2	65±2	0 people	0.50	0.75
Judicial Chambers	75±2	72±2	15	0.90	1.5
Lobby	75±5	72±2	100	0.72	1.5
24/7 Tenant Cooling Loads	72±2	72±2	100	0.72	1.5
Holding Cells	75±2	72±2	40 people	0.88	0.9
Conference Rooms	75±2	72±2	15	0.98	1.2
Toilets /Janitor	75±2	72±2	0 people	0.78	0.75
Copy Rooms	75±2	72±2	200	0.78	1.1
Day Care	75±2	72±2	40	0.78	1.1
Public Toilet Rms.	75±2	72±2	200	0.78	1.1
Waiting Areas	75±2	72±2	33	0.72	1.4
Break Rooms	75±2	72±2	20	0.72	1.1
Hearing Rooms	75±2	72±2	26		1.1
Courtroom	75±2	72±2	18 (or #fixed seats)		1.6
Detention Cells	75±2	72±2	40	0.88	
Detention Dayrooms	75±2	72±2	33	0.75	
Secure Areas	75±2	72±2	66	0.72	
Notes:					
<ul style="list-style-type: none"> Lighting and plug load values are provided as allowances for preparation of load estimates not as an indication of the actual desired lighting and power density. Indoor setpoints for spaces that are proposed for natural ventilation may use the ASHRAE 55 Adaptive Thermal Comfort values as permitted by ASHRAE 55. 					

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Ventilation Design Criteria

Provide ventilation to meet the higher of either SMC 403.3.2 or ASHRAE 62.1-2010. In addition size all mechanical equipment to permit the delivery of one-hundred thirty percent (130%) ventilation to all areas based on the use of the ASHRAE ventilation rate procedure. Carbon dioxide (CO₂) sensors shall be used in all high occupancy spaces to ensure ventilation requirements are met and in conjunction with demand control ventilation.

Toilets and janitor closets shall be exhausted at a minimum rate of 75 cfm per water closet or urinal.

The mechanical and electrical rooms shall be mechanically ventilated to maintain an internal temperature of 85°F in the summer and 60°F in winter.

Ventilation systems for specialized areas including clinical spaces and isolation rooms shall be designed per Seattle Mechanical/Energy/WAC Code requirements:

- Detention cells.
- Isolation and decontamination areas.
- Toilet rooms.
- Showers.
- Locker rooms.
- Custodial.
- Mail sorting rooms.
- Battery charging rooms.
- Kitchens.

The following spaces shall be maintained at negative pressure relative to surrounding building areas and shall be provided all ventilation air from fresh air with no recirculation:

- Detention cells.
- Holding cells.
- Isolation and decontamination areas.
- Mail sorting rooms.
- Battery charging rooms. (Design shall meet code requirement for hydrogen exhaust.)
- Kitchens.

The following spaces shall be maintained at negative pressure relative to surrounding building areas. They may be provided ventilation air transferred from adjacent areas.

- Toilet rooms.
- Showers.
- Locker rooms.
- Custodial.

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- Detention property storage.
- Copy machine rooms.

The design of the HVAC system must prevent occupant exposure to the following levels of contaminants during full-load and part-load conditions.

- Carbon dioxide (CO₂): Not to exceed 1200 ppm.
- Carbon monoxide (CO): Not to exceed 9 ppm.
- Formaldehyde (HCHO): Not to exceed 0.05 ppm.
- Ozone (O₃): Not to exceed 0.05 ppm.
- Particulate matter: Not to exceed 15 µg/m³ for particles less than 2.5 µm (PM_{2.5}), and not to exceed 50 µg/m³ for particles less than 10 µm (PM₁₀).
- Radon (Rn): Not to exceed 4 picocuries/liter.

Temperature Control Zoning Criteria

Interior temperature control zones must not exceed 1,500 sq. ft. per zone for open office areas, or a maximum of three offices per zone for closed office areas.

Perimeter thermostatic control zones must not exceed 300 sq. ft. or one column bay width, and must be no more than 15-feet from an outdoor wall along a common exposure.

At a minimum, independent temperature control zones shall be separated into the following zones which include these larger rooms and the rooms serving them::

- Courtrooms.
- Judicial chambers.
- Lobbies.
- Mail rooms.
- Staff lounges.
- Conference rooms.
- Corner offices.
- Detention dayrooms.
- Training rooms.
- Library.
- Gymnasium.
- Admissions release.
- Visitation.
- Detention kitchen.

HVAC Design Submittal Requirements

Provide HVAC load calculations. The HVAC load calculations report must include all input and output used in the heating and cooling calculation program. The report must also include zone peak heating and cooling loads results and whole-building simultaneous peak load, air-handling

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unit coil selections, and psychometric charts that show the complete cycle of all of the processes in the HVAC system.

Prescriptive HVAC System Requirements

24/7 Spaces

24/7 electronic equipment rooms including security electronics, command centers, security electronics equipment rooms, elevator machine rooms, telecommunication MDF and IDF rooms serving Detention, Detention areas, and other areas designated by programming information.

General Requirements:

- 24-hour/7day HVAC service is required.
- HVAC systems must be supported by emergency power.
- During normal operating hours, the use of the building central heating and cooling system is permitted. If the building's 24-hour peak load, including the dedicated outdoor air ventilation systems, exceeds 176 kW (50 tons), a dedicated chiller must be combined with the central system in which a dedicated central chilled water supply loop is provided.
- The energy requirements for these special areas may be significant and must be included in the building energy analyses.

County AC Criteria for 24/7 Spaces:

- Air conditioning for the Large Site MDF/IDFs and security electronic equipment rooms shall be supplied from units separate from the general building HVAC.
- The HVAC requirements of the MDF shall be pre-approved by Network King County IT Network Services for each individual room.
- The HVAC requirements of the IDF shall be pre-approved by Network King County IT Network Services for each individual room.
- The HVAC systems for Large Site MDF/IDF room(s) shall be required to operate 7 x 24 x 365.
- Relative humidity shall be between forty-five percent (45%) and fifty-one percent (51%). The recommended set-point is forty-eight percent (48%), plus or minus three percent (3%), with hi/lo alarms set at twenty percent (20%) and seventy percent (70%) respectively.
- The temperature shall be between 64 and 75 degrees Fahrenheit (18 and 24 degrees Celsius) year round.

24/7 Space System Selection:

- For rooms with a cooling load of 5 tons or less, provide self-contained commercial split system or mini-split system cooling.

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- For rooms with cooling loads from 6 tons to 80 tons, provide self-contained units specifically for 24/7 service. Units must be sized to allow for a minimum of fifty percent (50%) redundancy, either two units at seventy five (75%) load or three units at fifty percent (50%) load. If the nature of the room is critical (as determined in the project's program requirements), three units sized at fifty percent (50%) of the design load must be used. Heat rejection from these self-contained units must be by air-cooled condensers or recirculating water-cooled condensers connected to a cooling tower or evaporative cooled condenser. Waterside economizers must be used as defined by Seattle Energy Code.
- For cooling loads greater than 80 tons, chilled water air-handling systems must be provided. A dedicated chiller is required. A means of redundant backup must be provided for the dedicated chiller, either by multiple machines or through connection to the facility's chilled water plant. Heat recovery and economizer must be evaluated.
- Coordinate with King County IT and with program information for specialized server rack based cooling.

To the extent possible, avoid any plumbing, piping, sanitary or storm piping in these areas.

In large information technology equipment rooms of 5,000 sq. ft. or larger, cooling of the sensible load (computer load) and control of the outdoor air ventilation and space relative humidity must be provided by separate air-handling systems.

If a computer room houses critical components, as defined in the project's program, the HVAC systems must be connected to the emergency generators.

Other Areas with Prescriptive HVAC Requirements

Lobbies, Atriums, and Entrance Vestibules:

Lobbies and atriums must be maintained at positive pressure with respect to the outdoors, but negative with respect to adjacent spaces.

Courtrooms:

Each courtroom must have its own dedicated air-handling unit, and each courtroom must be provided with a minimum of two thermostatic zones; one for the judge and attorney area in the front of the courtroom and a second for the spectator area in the rear of the courtroom.

Multipurpose Gymnasium:

A dedicated air handler is recommended for large multipurpose rooms.

Detention and Corrections Areas:

The detentions areas HVAC system must be designed and powered for continuous operation and must be independently controlled and zoned. All ductwork, grilles and air circulation openings that penetrate the secure area, including youth circulation areas and youth holding areas, must be provided with security bars, detention grade grilles, and detention grade louvers that are both suicide resistant and meet the security level of the surface that they are located within.

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Youth holding areas must be negatively pressurized with regard to adjacent spaces and exhausted directly to the outdoors. The design for detention housing units shall provide a local switch in a supervised location to place each unit into one-hundred percent (100%) OSA mode for evacuation of contamination. Coordinate with smoke removal system purge fans if required by a rational life safety analysis.

Equipment requiring periodic service shall not be placed above security ceilings or in security walls of detainee holding or housing areas. All such equipment shall be located in secure chases or other accessible areas.

Mail Rooms:

A separate dedicated air-handling system must be provided for each mail room. Airflow must maintain negative pressure in the room relative to adjacent spaces.

Kitchens and Dishwashing Areas:

Kitchens with cooking ranges, steam kettles, ovens, and dishwashers must be provided with dedicated makeup air and exhaust hoods or exhaust systems in accordance with the SMC and ASHRAE Applications Handbook. The operation of the kitchen exhaust systems must not affect the pressure relation between the kitchen and surrounding spaces.

Kitchen hoods must extract air for exhaust from the surrounding areas to maintain the kitchen at negative pressure relative to the dining and adjacent areas. A separate AHU must be provided for the kitchen hood whenever makeup air from adjacent spaces is inadequate to meet the exhaust and pressurization requirements. Design consideration shall be given to inclusion of variable flow hood options.

Mechanical Rooms:

All mechanical rooms must be mechanically ventilated to maintain room space conditions as indicated in the most recent editions of ASHRAE Standard 62.1 and ASHRAE Standard 15. Unit heaters must be provided to maintain thermal conditions. Water lines must not be located above motor control centers or disconnect switches and must comply with the requirements of NFPA 70. Mechanical rooms must have floor drains in proximity to the equipment they serve to reduce water streaks or drain lines extending into aisles. Mechanical rooms must not be used as return air, outdoor air, or mixing plenums.

Combustion Equipment Rooms:

All rooms that contain combustion equipment must comply with the requirements in the Seattle Mechanical Code criteria. At a minimum, combustion equipment rooms must provide the required amounts of outdoor air for the combustion equipment through motorized dampers that are interlocked with the combustion equipment control system, and the room must be ventilated with a minimum of eight outdoor air changes per hour.

Unit heaters must be provided to maintain thermal conditions in the combustion equipment room. All valves above 8 feet from the floor must have chain-operated devices for ease of operation.

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Chiller Equipment Rooms:

All rooms for refrigerant units must be constructed and equipped to comply with the latest edition of ASHRAE Standard 15 Safety Code for Mechanical Refrigeration. Chiller staging controls must be capable of DDC communication to the central building energy management system. All valves 8-feet above the floor line must have chain-operated devices for ease of operation.

Emergency and Standby Generator Rooms:

The environmental systems must meet the combustion air requirements of the equipment. Rooms must be ventilated sufficiently to remove heat gain from equipment operation.

Ventilation for Generator Heat Exchanger: The supply and exhaust louvers must be located to prevent short circuiting with a clearance of not less than 10-feet edge-to-edge between louvers and the rooms must be maintained under negative pressure. The location of the air intakes and exhausts must be in compliance with Seattle Mechanical Code criteria.

Engine Exhaust: Generator combustion exhaust must be discharged at a minimum of 3-feet above the roof level or well above the public way and at a location that will not result in reintroduction of exhaust into building air intake per Seattle Mechanical Code.

UPS Battery Rooms:

Exhaust Air Requirements: The battery rooms must be maintained at a negative pressure with respect to adjacent spaces and must be exhausted directly to the outdoors at a rate calculated to be in compliance with Seattle Mechanical Code requirements and manufacturer's recommendations. Fans must be spark resistant and explosion proof, with motors out of the air stream. A dedicated exhaust air system must be provided to maintain negative pressure in the ductwork. The ductwork and accessories must be noncorrosive.

The exhaust air must be discharged directly outdoors. Acoustical enclosures must be provided to maintain a maximum NC level of 35 in the room. The exhaust fans must be connected to the emergency power distribution system.

Safety Requirements: Battery rooms must be equipped with emergency eyewash and shower equipment (ANSI Standard Z358.1). Floor drains required at the emergency shower (within the battery room acid containment curb) must extend with acid waste piping to an acid neutralization tank before discharge to the sanitary sewer or building drain.

Loading Docks:

Loading docks, garbage dumpster areas, and service entrances must be maintained at negative pressure relative to adjacent spaces. Overhead radiant heating or unit heaters must be provided.

HVAC System Selection

General:

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Where systems are not prescribed by this Standard, the Design-Build Entity must select and design HVAC systems for the project that

- Meet the performance criteria listed in the standard and in programming documents.
- Meet requirements unique to specific occupancy and program needs.
- Are the most cost effective based on ELCCA described elsewhere in this *Facility Performance Standard*.
- Meet the prescriptive requirements listed in this *Facility Performance Standard*.

System Options:

Except where noted, the Standard does not prescribe the selection of system type. The following systems may be considered for use on the project. Where proposed, they are recommended to be evaluated as part of the ELCCA process.

- Mixed Air Systems including variable constant volume and variable volume systems with hw reheat.
- Dual Path All Air Systems.
- Dual Path HVAC with Radiant Heating/Cooling.
- Dual Path HVAC with Passive Chilled Beam and Perimeter Radiant Heat.
- Active Chilled Beam System.
- Raised Underfloor Air Distribution.
- Variable Flow Refrigerant (VRF).

Air Handlers

General:

AHU Capacity: Air-handling units shall be sized not to exceed 25,000 cfm. Sizing to provide an air volume of ten percent (10%) in excess of peak cooling cfm.

Minimum Turndown Capacity: AHU design to facilitate operation at the minimum anticipated occupancy turndown.

Heat Recovery provisions shall be based on run-a-round, fixed plate, or heat pipe technology. Heat wheels are excluded.

Air Flow Measurement:

- Outside Air Intake: Outside air intakes shall be divided into minimum and economizer damper sections with airflow measurement of minimum outside air section.
- Supply and return fans shall be provided with airflow measurement.
- Output of flow measurements shall be read by the BCS and data shall be available or accessible through the web by means of a csv file for analysis.

Service Access:

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Roof mounted air handlers larger than 20,000 cfm shall be provided with a service corridor to permit access to the air handler compartments in a protected enclosed corridor equipped with 120/1/60, 20 amp service outlet. The service outlet shall not be connected to the load side of the equipment disconnecting means.

AHU Housing and Accessories:

All AHUs except Dedicated Outside Air Units and One-Hundred Percent (100%) Outside Air Units must be provided with factory fabricated mixing boxes on the return side of the AHU.

The AHU housing must consist of formed and reinforced, insulated panels, fabricated to allow for access to internal parts and components.

Use of a lining exposed to the air stream, including perforated inner wall, is not permitted. All AHUs must be double wall construction.

All joints between sections and all penetrations must be sealed water- and air-tight in accordance with SMACNA seal Class A. Penetrations must be covered with escutcheons, gaskets, or filled with suitable compound so there is no exposed insulation. Shaft seals must be provided where fan shafts penetrate the housing.

Access panels and doors must be provided with the same materials and finishes as the housing, and must be complete with hinges, latches, handles, and gaskets. Water- and air-tightness of the access panels and doors must be in accordance with SMACNA Class A. Inspection and access panels and doors must be sized and located to allow periodic maintenance and inspections.

AHU casing finish shall meet ASTM B117, 500 hour salt spray test, using 20 percent sodium chloride solution. Immediately after completion of test the coating shall show no sign of blistering, wrinkling or cracking, no loss of adhesion, and the specimen shall show no sign of rust creepage beyond 1/8" on either side of scratch mark.

Outdoor Air Intake Locations:

The placement and location of outdoor air intakes are critical to the health and safety of the occupants and must be in compliance with the Seattle Mechanical Code criteria.

On buildings more than 40-feet tall, intakes must be located a minimum of 40-feet above grade. On buildings less than 40-feet, the intakes must be located as high as practical on the roof or on a wall. Requirements for minimum separation distances between ventilation air intakes and other building features are provided below.

Outdoor air intakes must be ducted directly to the AHU cabinet; the equipment room must not be used as an outdoor air intake plenum.

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Table B6.4 - Air Intake Minimum Distance	
Object	Minimum Distance (feet)
Garage entry, loading dock	25
Driveway, street, or public way	10
Limited-access highway	25
Cooling tower or evaporative condensers	25
Exhaust fans and plumbing vents	15
Kitchen supply and exhaust air	25

Temperature and Airflow Control:

Psychrometric process charts must be prepared for each air-handling unit application, characterizing full-load and part-load operating conditions for all processes in the system. Air-handling unit/coil designs must ensure that conditioned space temperatures and humidity levels are within an acceptable range, per programmed requirements and per code and industry standards.

Limitation of Supply Air Temperature: HVAC systems with supply air temperatures below 50° F (i.e., low temperature systems) are not permitted. Supply air must be no lower than 50° F dew point temperature and 52° F dry bulb temperature to prevent condensation on the duct surfaces.

Supply, Return, and Relief Air Fans:

Fans must be selected on the basis of the system power and sound power requirements for full-load and part-load conditions. Fan motors must be sized so they do not run at overload anywhere on their fan operating curves. Fan operating characteristics must be checked for the entire range of flow conditions. Fan drives must be selected for a 1.15 service factor, fan shafts must be selected to operate below the first critical speed, and bearings must be selected for a minimum rating of 120,000 hours. A variable frequency drive (VFD) must be provided for each fan motor and located within the mechanical equipment room for the AHU. VFDs must be designed for low electrical noise, automatically adjust output voltage to the motor load, and shall be redundant or provided with bypass starter for failure operation. Metering devices for determining energy consumption data for each fan motor must be provided that transmit the data to the BCS.

Cooling and Heating Coils:

Individual finned-tube cooling coils must be between six and eight rows with at no more than 10 fins per inch, to ensure that the coils can be effectively and efficiently cleaned.

Dehumidifying coils must be selected for no more than negligible water droplet carryover beyond the drain pan at design conditions. Equipment and other obstructions in the air

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stream must be located sufficiently downstream of the coil so that it not come in contact with the water droplet carryover. Cooling coils must be selected at or below 500 fpm face velocity to minimize moisture carryover. Heating coils must be selected at or below 750 fpm face velocity. Coil tube water velocity shall be limited to no more than 3.0 feet/second.

Drains and Drain Pans:

Drain pans must be made of stainless steel, insulated, and adequately sloped and trapped to ensure drainage. Overflow connections must be provided and connected to the sanitary or storm line in accordance with the prevailing code. Drains in draw-through configurations must have traps with a depth and height differential between inlet and outlet equal to the design static pressure plus 1-inch minimum.

Filters and Filter Sections:

Air filtration must be provided in every air-handling system. Air-handling units must have a pre-filter and a final filter, each located upstream of the cooling and heating coils. The filter media must be fabricated so that fibrous shedding does not exceed levels prescribed by the latest edition of ASHRAE Standard 52.2. The prefilters must have a MERV of 8, and the final filters must have a MERV of 13, as defined in the most recent edition of ASHRAE Standard 52.2.

Filter racks must be designed for a maximum bypass leakage air around the filter media of one-half percent (0.5%) of the design supply airflow rate. Filters must be sized at 500 fpm maximum face velocity.

The filter housing and all air-handling components downstream of the filter housing must not be internally lined with fibrous insulation. Double-wall construction or an externally-insulated sheet metal housing is permitted. Any internal insulation must be injected with CFC free closed cell polyurethane foam encased in double-wall casing between exterior and interior panels. Casing insulation and adhesive shall comply with NFPA 90A/or NFPA 90B and ASTM standards for foam insulation products. Foam insulation shall be minimum 2 inch thick. Space between double wall panels filled with foam insulation shall be sealed moisture tight such that no insulation can erode to the air stream.

The filter change out pressure drop, not the initial clean filter rating, must be used in determining fan pressure requirements. Differential pressure gauges and sensors must be placed across each filter bank to allow quick and accurate assessment of filter loading as reflected by air pressure loss through the filter, and the sensors must be connected to the BCS.

Where occupancy requirements or building functions are likely to generate airborne particles, vapors, or gases that result in concentrations exceeding those described above, special air filtration or air cleaning components must be provided for the supply and return air, or dedicated and localized exhaust systems must be used to contain these contaminants.

Controls:

Refer to Building Control Systems (BCS) Paragraph.

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Special Requirements:

Smoke detectors shall be circuited separately from AHU on standby power.

Air Distribution

VAV Terminal Units:

VAV terminal units must be certified under the ARI Standard 880 Certification Program and must carry the ARI Seal. If fan-powered, the terminal units must be designed, built, and tested as a single unit including motor and fan assembly, primary air damper assembly, and any accessories. VAV terminals must be pressure-independent type units. Air leakage from the casing of a VAV box/terminal must not exceed two percent (2%) of its rated capacity. VAV terminal units must be selected to provide the airflow rate required for the full-load thermal capacity of the zone, for the noise requirements for the space, and be no larger than 3,000 cfm capacity.

Fan-Powered Terminal Units:

Series only fan-powered terminal units are acceptable. They must have electrically communicated motors (ECM) for speed control to allow continuous fan speed adjustment from maximum to minimum, as a means of setting the fan airflow.

Fan-powered terminal units must have a filter/filter rack assembly with the filters having a MERV of 8 as defined in the latest edition of ASHRAE Standard 52.2. The filter media must be fabricated so that fibrous shedding does not exceed levels prescribed by ASHRAE Standard 52.2.

- Filter racks must be designed to minimize the bypass of air around the filter media with a maximum bypass leakage of one-half percent (0.5%) of the rated airflow rate of the terminal unit.
- Filters must be sized at 2.5 m/s (500 fpm) maximum face velocity.

The return plenum box for fan-powered terminal units must be a minimum of 24-inches in length and must be double wall with insulation in between or contain at least one elbow where space allows. Fan-powered terminal units may have hot water heating coils used for maintaining temperature conditions in the space under partial-load conditions. Where fan powered terminals are used to condition acoustically sensitive spaces, the design shall include attenuation as necessary to meet space noise criteria.

Controls:

Refer to the Building Control System (BCS) Paragraph.

Fan Coil Units:

Fan coil units must be certified under the ARI Standard 880 Certification Program and must carry the ARI seal. For perimeter spaces, four-pipe fan coil units must be equipped with cooling and heating coils with copper fins and tubes, MERV 8 filters, internal condensate drain, and overflow drain pan. For interior spaces, two-pipe fan coil units (cooling) are permitted. Installation of fan coil units above hard ceilings is not permitted. Fan coil

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controls must use three-speed motors. Two-way control valves must be used wherever variable-speed water flow devices are used in the system.

Controls: Refer to the Building Control System (BCS) Paragraph.

Air Delivery Devices:

Supply air is distributed to occupied zones through various types of air delivery devices, including ceiling diffusers, and grilles mounted in sidewalls, sills, and floors. Air is supplied to these devices from variable air volume (VAV) terminal units or constant air volume (CAV) terminal units, including series-type fan-powered VAV terminal units. Ceiling diffusers or booted-plenum slots must be specifically designed for VAV air distribution. Booted plenum slots must not exceed 4-feet in length unless more than one source of supply air is provided. Minimize the use of large capacity diffusers exceeding 400 cfm per diffuser as much as possible.

The locations of the air delivery devices and the ranges of their outlet airflow rates must be selected to ensure that the air diffusion performance index (ADPI) values remain above eighty percent (80%) during all full-load and part-load conditions, and below the specified noise level to achieve the background noise criteria, in accordance with the test procedures specified in Appendix A of the latest edition of ASHRAE Standard 113.

Adequate space ventilation requires that the selected diffusers effectively mix the total air in the room with the supplied conditioned air that contains adequate ventilation air.

Air shall be returned or exhausted from occupied zones through grilles, slots and other openings located in sidewalls and ceilings.

Detention Provisions:

- Provide cleanout capability outside of the cell for accessing detention diffusers serving individual cells.
- No OBD permitted in airflow vents into inmate cells. Locate dampers away from inmate reach for all cell grilles and diffusers.
- All inmate cells shall be served by air diffusers and grilles designed for anti-suicide using 3/16-inch diameter staggered center holes with 1-inch border. Layout diffusers to minimize drafts in cells, and meet the OSHA requirements for noise levels (dB), or table B 1.6 in these Facility Performance Standards, whichever is more stringent.

Sizing of Ductwork:

Constant-volume supply, return, and exhaust ductwork must be sized using the equal friction method. Pressure drops must not exceed 0.08-inch w.c. for every 100-feet.

Supply air ductwork for variable-volume systems must be sized using the static regain method.

Supply, return, and exhaust air ductwork must be sized to limit the design static pressure to values that will minimize fan power, consistent with the functional requirements of the zones being served.

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Main vertical supply and return risers shall be sized with sufficient capacity to take into consideration likely future revisions requiring reallocation of airflow to different floors and areas served by the risers.

Design air velocities must not exceed the values shown in *Table B6.5 - Recommended Air Velocities for Supply, Ducted Return, Exhaust, and Relief*. when noise generation is a controlling factor.

Table B6.5 - Recommended Air Velocities for Supply, Ducted Return, Exhaust, and Relief		
Application	Controlling Factor – Noise Generation	
	Main Ducts fpm	Branch Ducts fpm
Private offices conference rooms libraries	1,200	800
Multipurpose Rooms, Courtrooms	800	400
General offices	1,500	1,000
Cafeterias	1,800	1,200
Medium pressure ducts	2,000	1,800
Transfer ducts	400 or 0.04-inch/100 feet	400

Energy consumption, security, and sound attenuation must be major considerations in the routing, sizing, and material selection for the air distribution ductwork.

In mechanical equipment rooms a minimum 7-foot clearance must be maintained under ductwork for maintenance purposes.

Sizes and pressure classification of all ductwork must be identified, labeled, and specified in the final documents.

Plenum and Ducted Return Air Distribution:

To ensure that air drawn through the most remote zone actually reaches the horizontally zoned air-handling unit (AHU), the horizontal distance from the return air register in the farthest zone in a plenum to a return duct inlet must not exceed 50-feet. For areas where special conditions or noise criteria are required to be met, such as multipurpose rooms, judicial chambers and courtrooms, return air must be ducted from each return air register. No more than 2,000 cfm must be collected at any one return register. Sound-lined 90 degree plenum return elbows the same size as the grille may be used to attenuate noise in less noise sensitive areas. All multi-floor type return air risers must be ducted. Where fully ducted return systems are used, consider placing return grilles low in walls or on columns to complement ceiling supply air.

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Materials:

Ductwork must be fabricated from G60 or G90 galvanized steel, black iron, copper, aluminum, or stainless steel sheet metal, depending on applications and code requirements. Fabric ductwork systems may be considered for appropriate applications.

Metal thickness, configurations of ducts and fittings, methods of ductwork reinforcement, and duct construction methods must comply with the SMACNA HVAC Duct Construction Standards - Metal and Flexible. Sheet metal materials must be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

Insulated flexible duct (flex duct) may be used for ductwork downstream of the terminal units where static pressures are less than 1-inch w.c. The length of the flex duct must not exceed the distance between the low-pressure supply air duct and the diffuser plus twenty percent (20%), to permit relocation of diffusers in the future, while minimizing replacement or modification of the hard ductwork distribution system. Flex duct runs must not exceed 5-feet, must not contain more than two bends, and must be installed in accordance with manufacturers' guidelines. Flexible ductwork is prohibited from use in exposed ductwork applications.

Pressure loss in ductwork must be designed to comply with the criteria stated above. This can be accomplished by using smooth transitions and elbows with a radius of at least 1.5 times the radius of the duct. Where mitered elbows are used, double foil sound-attenuating turning vanes must be provided. Mitered elbows are not permitted where duct velocity exceeds 2,000 fpm.

Joints and Connections:

All supply, return and exhaust ductwork construction must be specified to meet Seal Class A in accordance with the latest edition of ANSI/SMACNA 006 HVAC Duct Construction Standards Metal And Flexible. All ductwork joints and all connections to air-handling units and air distribution devices must be sealed with mastic - including all supply and return ducts, any ceiling plenums used as ducts, and all exhaust ducts. If using tape, the joint sealing tape for all connections must be of reinforced fiberglass backed material with field-applied mastic and hardcast coating. Use of pressure sensitive tape (e.g., duct tape or metal tape) is not permitted.

Return air plenums must be sealed airtight with respect to the exterior wall and roof slab or ceiling deck to avoid creating negative air pressure in exterior wall cavities that would allow an intrusion of untreated outdoor air.

Testing of Air Distribution Systems:

Air distribution systems must be tested for leakage twice during the construction process: a) before insulation or field installation; and b) after connections to terminal units, air delivery and return devices, and return air and exhaust air fans have been made.

Procedures shall coordinate with duct pressure classifications shown in *Table B6.6 - Duct Pressure Classifications*.

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Table B6.6 - Duct Pressure Classifications			
Duct working pressure class	Low pressure less than +/- 0.5"wc	+/-0.5" to +/-2.99"	+/-3" to +/-10" wc
SMACNA Seal Class	C	B	A
Sealing Applicable	Transverse joints only	Transverse and longitudinal Joints	Joints, seams, and all wall penetrations
Rectangular sheet metal SMACNA Leakage Class	24	12	6
Round sheet metal SMACNA Leakage Class	12	6	3

Before Field Installation:

- A random selection of individual duct sections shall be tested to validate fabrication procedures and the tightness of longitudinal joints. Each air supply, return, and exhaust duct section to be tested must have a minimum of a 20-foot straight run, and a minimum of two elbows. For these tests, the duct sections shall be positively or negatively pressurized to the values that represent the pressures exerted on the duct system at the intended locations of the tested sections (i.e., supply, return, exhaust), and not the total static pressure developed by the supply, return, or exhaust fan. The maximum leakage rate of each duct section must not exceed 7 cfm/100 ft² of duct surface area. If the failure rate is more than one out of ten tests, all sections must be tested.

After Connections to Terminal Units and Air Delivery Devices:

- Air leakage in the supply air and return/exhaust air distribution systems must be conducted separately.

After field installation and connections of the supply air ductwork are made to the AHU, the terminal units, and the air delivery devices, the ends of the ducts shall be blanked off (airtight) and the supply air distribution system pressurized with calibrated fans to values that represent the upstream pressures at the terminal units at full flow conditions. At least three contiguous measures at 10-minute intervals shall be obtained with repeated values to within plus or minus five percent (5%) of the test pressure. The maximum leakage rate of the supply air distribution system from fan discharge to air delivery devices must not exceed five percent (5%) of the design airflow rate for the AHU. For systems greater than 25,000 cfm, the supply air distribution system may be tested in sections with plastic sheeting separating the sections. After the test, the plastic shall be cut away through access doors installed for

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that purpose. The maximum leakage rate of the sections combined must not exceed five percent (5%) of the design airflow rate for the AHU.

For return and exhaust air distribution systems, the test procedure is similar, except the tests shall be conducted under negative pressures. After field installation and connections of the return and exhaust air ductwork are made to the return air fan, AHU, and the exhaust air fan, the ends of the ducts shall be blanked off (airtight) and the return and exhaust air distribution system negatively pressurized with calibrated fans to values that represent the upstream pressures at the return air fan, AHU and exhaust fans at full flow conditions. At least three contiguous measures at 10-minute intervals shall be obtained with repeated values to within plus or minus five percent (5%) of the test pressure. The maximum leakage rate of the return and exhaust air distribution system from the return or exhaust air grilles to the return air fan, AHU or exhaust fan must not exceed five percent (5%) of the design return airflow rate for the return air fan, AHU, or the exhaust airflow rate of the exhaust fan. For large systems (approaching the 25,000 cfm limitation), the return and exhaust air distribution system may be tested in sections with plastic sheeting separating the sections. After the test, the plastic shall be cut away through access doors installed for that purpose. The maximum leakage rate of the sections combined must not exceed five percent (5%) of the design return airflow rate for the return air fan, AHU or exhaust air fan.

Central Cooling and Heating Systems

General Requirements:

Except where self-contained HVAC is specifically required in this Standard all cooling and heating shall be provided from a central chilled and heating water plant.

All central plant mechanical and electrical equipment within the building or on the property must be located 5-feet above the 100-year flood plain.

All central system equipment must have Direct Digital Control (DDC) self-contained controllers using listed BTL tested BACnet protocol controllers connected to the Building Control System (BCS). All equipment such as chillers, boilers, and motors for pumps and air-handling units, and other auxiliary equipment with motors must have metering devices for determining energy consumption data, and must be capable of transmitting the data to the BCS. The DDC controller must meet or exceed the building control DDC system parameters and performance (i.e. bandwidth, communication speed, signal requirements).

Chiller Plant Configuration:

If the whole building or property simultaneous peak cooling load is 500 Tons or more, a minimum of three chillers must be provided. The three units must have a combined capacity of one-hundred twenty percent (120%) of the total peak cooling load, with load split percentages 40-40-40 or 50-50-20.

If the whole-building simultaneous peak cooling load is less than 500 tons, a minimum of two equally sized chillers at sixty-seven percent (67%) of the peak capacity must be provided. All units must have adequate valving to isolate the offline unit without interruption of service.

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Chillers:

Chiller efficiencies for full-load and part-load operations (i.e., COP and IPLV) must not be less than those listed in section 6.4.1.1 of the latest edition of ASHRAE Standard 90.1.

For chilled water systems of 500 tons and larger, centrifugal chillers must be used. Below 500 tons, reciprocating compressor, scroll, and rotary screw-chillers are permitted. Below 65 tons, air cooled chillers are permitted. Variable speed compressors or head pressure control, if used, must be demonstrated on a life-cycle cost basis. Selection and design of chilled water systems should evaluate selection using temperature differentials larger than conventional 10°F to optimize the total plant energy comprised of chiller, cooling tower, and pump energy.

Multiple chillers must be piped to a common chilled water header with motorized isolation valve provisions with proof of position to sequence chillers to match the load requirements. All required auxiliaries for the chiller systems must be provided, such as expansion tanks, heat exchangers, water treatment, and air separators, as required. Each chiller must have an automatic shutoff valve.

Chiller condenser piping must be equipped means to control incoming condenser water temperature and chiller condenser head pressure within the chiller manufacturer's recommended minimum set point.

CFC refrigerants are not permitted in new chillers. Commonly used refrigerants such as HCFC-123, HFC-134a, and HFC-410a are acceptable.

Refrigeration machines must be equipped with isolation valves, fittings, and service apertures, as appropriate for refrigerant recovery during servicing and repair, as required by section 608 of the Clean Air Act, Title VI. Chillers must also be easily accessible for internal inspections and cleaning.

BACnet microprocessor-based controls must be used. The local control panel must have self-diagnostic capability; integral safety control and setpoint display, such as run time; operating parameters; electrical low voltage and loss of phase protection; current and demand limit control; and output/input-COP [input/output (kW/Ton)] information. Chiller staging controls shall communicate to the County central existing BCS. The existing County BCS is a Siemens Apogee system. Each chiller must have a metering device for transmitting energy consumption data to the central BCS. The BCS shall include chiller plant optimization software.

Cooling Towers:

Each chiller must have its own matching cooling tower or cell, and condenser and chilled water pump. Multiple cooling towers must have equalizing lines and the necessary automatic control valves for individual chiller/cooling tower operation.

Multiple cell towers are required to facilitate operations, maintenance, and redundancy. The number and capacity of cells must match the number and capacity of chillers. Supply piping must be connected to a manifold to allow for any combination of equipment use. Cooling tower basins and housing must be constructed of stainless steel. Wind and seismic design must be in conformity with the Seattle Building Code.

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Cooling towers must be equipped with makeup and blowdown meters, conductivity controllers and overflow alarms. Cooling towers must be equipped with efficient drift eliminators that achieve drift reduction to a maximum of two-thousandth percent (0.002%) of the recirculated water volume for counterflow towers and five-thousandth percent (0.005) of the recirculated water flow for cross-flow towers.

Where economically feasible, capture and use condensed water from the cooling coils of Outside Air Ventilation Systems with cooling capacities greater than 65,000 Btu/h (19kW) as a supplemental source for cooling tower makeup water.

Induced draft cooling towers with variable-speed condenser fan controls must be provided. Induced draft towers must have a clear distance equal to the height of the tower on the air intake side to comply with the air velocity requirements of the manufacturer.

Multiple towers must have equalization piping between cell basins. Equalization piping must include automatic isolation valves and shutoff valves between each cell to control water flow only over those towers that are in use. The piping arrangement, and strainer and filter placement must be provided for removal of accumulated solids and sediments from the system. Cleanouts for sediment removal and flushing from basin and piping must be provided.

Cooling towers must have ladders and platforms for ease of inspections and replacement of components. Variable speed pumps for multiple cooling towers must not operate below thirty percent (30%) of rated capacity.

If the cooling tower is located on the building structure, vibration and sound isolation must be provided. Cooling towers must be elevated to maintain required net positive suction head on condenser water pumps and to provide 4-foot minimum clear space beneath the bottom of the lowest structural member, piping, or sump, to allow reroofing beneath the tower.

Special consideration must be given to de-icing cooling tower fills if they are to operate in subfreezing weather, such as chilled water systems designed with a waterside economizer. A manual shutdown for the fan must be provided. If cooling towers operate intermittently during subfreezing weather, provisions must be made for draining all piping during periods of shutdown. For this purpose, indoor drain-down basins are required. Cooling towers with waterside economizers that are designed for year round operation must be equipped with basin heaters. Condenser water piping located above grade and down to 3-feet below grade must have heat tracing.

Controls: Tower fan energy shall be metered and reported by the BCS. Tower water consumption shall be metered and reported by the BCS. Where applicable, provide tower with BACnet-listed controls.

Boiler Plant:

The central boiler plant within the building or on the property must be provided with modular boilers. For boiler plants greater than 2,700 MBH, a minimum of three boilers must be provided, each sized at fifty percent (50%) of peak heat load for a total of one-hundred fifty percent (150%) capacity. If peak capacity requirements require more than three boilers,

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provide equal-sized boilers to meet one-hundred percent (100%) of capacity plus one boiler. For buildings less than 2,700 MBH demand, two equally sized modular boilers sized at one-hundred percent (100%) of peak demand must be provided. Boilers shall be capable of high turndown ratios of greater than 15:1.

Boilers for hydronic heating applications must be modular condensing units, with efficiencies that exceed Table 6.8.1F, Chapter 6 of the most recent revision of ASHRAE Standard 90.1. Boilers must be installed in a dedicated mechanical room with all provisions made for breaching, flue stack, and combustion air. Copper fin condensing boilers are excluded from consideration.

The modular units must be packaged, with all components and controls factory preassembled. Controls and relief valves to limit pressure and temperature must be specified separately.

Boilers must be piped to a common heating water header with provisions to sequence boilers online to match the load requirements. All units must have control valves to provide isolation of offline units without interruption of service. Boiler systems must be provided with expansion tanks, heat exchangers, water treatment, and air separators, as required.

Dual Fuel Provisions: The heating plant shall provide dual fuel capability, either by providing dual fuel boilers or by providing a conventional efficiency oil fired boiler with one-hundred percent (100%) redundancy.

Gas and Fuel Oil Trains: Boiler gas trains and fuel oil supply trains must be in accordance with International Risk Insurance (IRI) standards.

Controls: Each boiler must have a DDC (BACnet) self-contained controller that shall be connected to the existing County BCS network. The controller must have a current-sensing device that transmits information to the BCS for calculating the energy usage (natural gas, fuel oil, electricity), and the energy consumption of the fan and fuel-pump motors. As an option, the plant may be designed with a BACnet-compatible boiler management system provided by the boiler manufacturer and interfaced to the BCS.

Hot Water Piping and Pumps:

- Pumps must be of a centrifugal type and must generally be selected to operate at 1,750 RPM and at eighty percent (80%) to eighty-five percent (85%) pumping efficiency. Both partial-load and full-load performance must be shown on the pump curve.
- The number of primary hot water pumps must correspond to the number of boilers, and a standby pump must be designed to supply any of the circuits.
- Variable volume pumping systems are required for all secondary piping systems. The specified pump motors must not overload throughout the entire range of the pump curve.
- Pumps for each boiler group must be arranged with piping, valves, and controls to allow each boiler group to operate independently of the other boiler groups.

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Alternative Cooling and Heating Sources:

Ground-Coupled Water-to-water Heat Pump Systems: Include as a measure for ELCCA analysis, review of central chilled and heating water provided from a central ground-coupled heat pump plant making use of manifolded water to water heat pump or modular heat recovery chillers. If preliminary analysis indicates life cycle payback in 15 years or less, provide a geotechnical survey and test well to establish the feasibility of the system.

Combined Heat and Power Plant (CHP):

Based on an analysis of the potential for coincidental power and thermal loads, an on-site CHP system is permitted if the CHP efficiency is at least seventy-five percent (75%) at full load capacity. The LCC analysis must include all expected service and overhaul costs.

District Steam System:

Providing heat to the building from a district steam system may be considered but only if a life-cycle cost analysis demonstrates lower life cycle cost for the system compared to other alternatives. If district steam is selected as an energy source, the Design-Build Entity must provide space for future hot water boilers in the building to allow alternatives in the event that the district system becomes unreliable or not economical.

If steam is furnished to the building, it must be used to heat hot water with a heat exchanger in the mechanical room near the utility entrance into the building. The Design-Build Entity must investigate the use of district steam condensate for preheating domestic hot water. Steam heating is not permitted inside the building, other than the conversion of steam to hot water in the mechanical room.

Hydronic Distribution Systems

General:

Except where noted above and to meet small remote heating loads, all heating and cooling shall be provided using the central chilled and heating water distribution systems.

Install isolation valves on all hydronic units so that they can be easily maintained or replaced.

If piping is installed under raised floors, provide moisture/leak-detecting sensors connected to the BCS and self-priming floor drains, to prevent flooding and excessive loading of the raised floor cavity.

Pipe size selection must satisfy the following limiting parameters, maximum water velocities, maximum fluid pressure drop.

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Table 6.7 Pipe Sizing Criteria		
Pipe Type and Size	Maximum Fluid Velocity	Maximum Pressure
Chilled Water Hot Water Hot Glycol Water 2” and below	6.0 fps	2.0 ft WG/100 ft
Chilled Water Hot Water Hot Glycol Water 2” and above	8.0 fps	2.0 ft WG/100 ft
Condenser Water any size	8.0 fps	2.0 ft WG/100 ft
High Pressure Steam any size	8,000 to 10,000 fpm	2.0 psig/100 ft
Low Pressure Steam any size	5,000 fpm	0.5 psig/100 ft
Pumped Condensate any size	10.0 fps	4.0 ft WG/100 ft

Chilled Water and Condenser Water Piping and Pumps:

Pumps must be centrifugal type and must generally be selected to operate at 1,750 RPM and eighty percent (80%) or greater pumping efficiency. Both partial-load and full-load performance must be shown on the pump curve. The number of primary chilled water and condenser water pumps must correspond to the number of chillers, and a standby pump must be provided for each chilled water and condenser water circuit. Variable-volume pumping with variable-speed drives is permitted. The specified pump motors must not overload throughout the entire range of the pump curve.

Controls: Each pump or combination of pumps must be controlled and monitored by the BCS and equipped with current-sensing devices that transmit information to the BCS for calculating the energy consumption of the pump motor or motors.

Water Treatment:

A licensed water treatment specialist must design the water treatment for closed and open hydronic systems with consideration of the operational and maintenance needs of all system equipment including such components as boilers, chillers, cooling towers, other heat exchangers, pumps, and piping. The design must address four aspects of water treatment: biological growth, dissolved solids and scaling, corrosion protection, and environmental discharge regulations. Subject to the specific requirements of the components, the performance of water treatment for closed and open systems must include:

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The methods used to treat the systems' makeup water must have demonstrated prior success in existing facilities on the same municipal water supply and must follow the guidelines outlined in ASHRAE Applications Handbook. Where practical, non-chemical treatment methods may be considered.

The chemical feed system must be interfaced via BACnet self-contained controls.

Hydronic Distribution Piping Materials

General:

All HVAC piping systems must be designed and sized in accordance with the latest editions of the ASHRAE Fundamentals Handbook and the ASHRAE HVAC Systems and Equipment Handbooks.

Hot water and chilled water systems must use a four pipe main distribution system. Dual temperature piping systems are not permitted. Loop piping for terminal or branch circuits must be equipped with automatic flow control valves. Each terminal unit or coil must be provided with isolation valves on both the supply and return, a two-way pressure independent control valve, and either variable primary pumping or constant primary/variable secondary pumping. Isolation valves must be provided on all major pipe branches, such as at each floor level, building wing, or mechanical room.

Piping Material:

Materials acceptable for piping systems are black steel, cast iron, copper. Polypropylene (Aquatherm) piping may be considered where temperature and pressure ratings meet system conditions.

Pipe Fittings:

For closed loop piping, copper piping, brazed and soldered fittings are acceptable; press type, grooved or mechanically formed T type fittings are not acceptable. Steel piping may be threaded, flanged, or welded. Grooved type fittings are acceptable for use in open mechanical spaces.

Air Control:

Pressurized diaphragm expansion tanks must be appropriately sized for closed piping systems. Air separators and vents must be provided on closed hydronic systems to remove accumulated air within the system. Automatic bleed valves must only be used in accessible spaces in mechanical rooms, where maintenance personnel can observe them, and they must be piped directly to open drains. Manual bleed valves must be used at terminal units and other less accessible high points in the system. Air vents must be provided at all localized high points of the piping systems and at each heating coil. Likewise, system drains must be provided at all localized low points of the heating system and at each heating coil.

Cathodic Protection:

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The need for corrosion protection for underground metallic piping must be evaluated by a soils resistivity test. Cathodic protection or another means of preventing pipe corrosion must be provided, if required by the geotechnical report.

Isolation of Piping at Equipment:

Isolation valves, shutoff valves, bypass circuits, drain valves, flanges, and unions must be provided for piping at equipment to facilitate equipment repair and replacement. Equipment requiring isolation includes boilers, chillers, pumps, coils, terminal units, and heat exchangers. Valves must also be provided for zones off vertical risers, including drain valves.

Flexible Pipe Connectors:

Flexible pipe connectors must be fabricated from annular close pitched corrugated and braided stainless steel. All pumps, chillers, cooling towers, and other rotating equipment must have flexible connectors. All flexible piping must be sized one size larger than the piping connected size.

Piping System and Equipment Identification:

All pipes, valves, and equipment in mechanical rooms, shafts, ceilings, and other spaces accessible to maintenance personnel must be identified with color coated piping or color-coded bands, and permanent tags indicating the system type and direction of flow for piping systems or type and number for equipment, in accordance with the ASHRAE handbooks. The identification system must also tag all valves and other operable fittings in accordance with ASTM A13.1-1961(R-1965).

Special County Requirements:

- Minimum pipe size for individual takeoffs shall not be less than 3/4-inch pipe size.
- Minimum coil flow shall not be less than 0.5 gpm.

Vibration and Acoustics

General:

Noise and Vibration Isolation:

All rotating equipment in the building must be isolated.

All piping and ductwork must be isolated as it penetrates shafts and chases to prevent propagation of vibration to the building structure. All openings for ducts and piping must be sealed.

Isolators:

Isolators must be specified by type and by deflection, not by isolation efficiency. Refer to *ASHRAE Guide for Selection of Vibration Isolators* and *ASHRAE Application Handbook* for types and minimum deflections. Specifications must be worded so that isolation performance becomes the responsibility of the equipment supplier.

Concrete Inertia Bases:

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Inertia bases must be provided for reciprocating and centrifugal chillers, air compressors, pumps, axial fans, and centrifugal fans installed where structural born vibration is likely to be transmitted beyond the mechanical spaces.

Ductwork:

Use acoustical coating or external wrapping on the ductwork to impede fan-generated noise immediately outside of any mechanical room wall. The ductwork design must address airborne equipment noise, equipment vibration, duct-borne fan noise, duct breakout noise, airflow-generated noise, and duct borne crosstalk noise.

All ductwork connections to equipment having motors or rotating components must be made with a 6-inch length of flexible connectors. All ductwork within the mechanical room or serving courtrooms must be supported with isolation hangers.

Piping Hangers and Isolation:

Isolation hangers must be used for all piping in mechanical rooms and adjacent spaces, up to a 50-foot distance from vibrating equipment. The pipe hangers closest to the equipment must have the same deflection characteristics as the equipment isolators. Other hangers must be spring hangers with 0.75-inch deflection. Positioning hangers must be specified for all piping 8-inch and larger throughout the building. Spring and rubber isolators are required for piping 2-inch and larger that is hung below noise-sensitive spaces.

Floor supports for piping must be designed with spring mounts or rubber pad mounts.

Anchors and guides for vertical pipe risers must be attached rigidly to the structure to control pipe movement. Flexible pipe connectors must be designed into the piping before it reaches the riser.

Channel supports for multiple pipes and heavy-duty steel trapezes must be provided to support multiple pipes. Hanger and support schedules must have the manufacturer's number, type, and location.

Mechanical Equipment, Piping and Ductwork in Seismic Zones:

Refer to Part B, Section 4 - Structural Engineering of this *Facility Performance Standard*; *SMACNA Seismic Restraint Manual*; and *ASHRAE Application Handbook*.

Noise Control in Duct Systems:

System sound levels at maximum airflow must ensure the acoustic levels required in programmed spaces are met. Duct noise control must be achieved by controlling air velocity, by the use of sound attenuators, by the use of double-wall ductwork with insulation in between, and by not over sizing terminal units. Duct liners are not permitted as a means of sound attenuation in supply air ductwork. Acoustic lining in the return air ductwork in courtrooms, judicial chambers, conference rooms and similar spaces is permitted provided that fibrous materials are not exposed to the airstream. Volume dampers in terminal units must be located at least 6 feet from the closest diffuser.

Noise Transmission Attenuation:

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Noise transmission to and from courtrooms, judicial chambers, and youth consulting rooms and from detention areas must be attenuated to meet the acoustic requirements of the program.

Humidification

Where humidification is necessary, atomized hot water, clean steam, or ultrasound must be used and must be generated by electronic or steam-to-steam generators; chemically treated water must not be used for humidification.

Makeup water for direct evaporation humidifiers must originate directly from a potable source. Humidifiers must be designed so that microbiocidal chemicals and water treatment additives are not emitted in ventilation air. All components of humidification equipment must be stainless steel. Air washer systems are not permitted for cooling.

When steam is required during summer seasons for humidification or sterilization, a separate clean steam generator must be provided and sized for the seasonal load. Humidifiers must be centered on the air stream to prevent stratification of the moist air. All associated equipment and piping must be stainless steel.

Mechanical Equipment Locations and Maintenance Access

Space Requirements:

A minimum of four percent (4%) of each floor's gross floor area must be provided for air-handling equipment. Where additional equipment is required, additional space on that floor must be provided as needed. A minimum of one percent (1%) of the building's gross area must be provided for the central heating and cooling plant (location to be agreed upon during the preparation of concept submission). All major mechanical equipment rooms must be a minimum of 12-feet in height. Space requirements of mechanical and electrical equipment rooms must be based on the layout of required equipment drawn to scale within each room. All mechanical rooms above or below occupied spaces, including central plant equipment rooms, must have concrete enclosures or a double drywall system for minimizing noise transmission. Refer to the Paragraph titled Noise Control in Duct Systems in this Section for additional noise control requirements.

Service Access:

Freight Elevators: To facilitate equipment access, maintenance, removal and replacement, a freight elevator stop must be provided to serve each floor and penthouse level housing HVAC equipment.

Stairways: Where stairs are required, they must allow for safe transport of equipment and components. Ship's ladders for access to the roof are not permitted.

Access Doors and Panels:

Space must be provided around all HVAC system equipment as recommended by the manufacturer and for routine maintenance. Access doors or panels must be provided in ventilation equipment, ductwork, and plenums as required for on-site inspection and

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cleaning. Equipment access doors or panels must be readily operable and sized to allow full access for replacement or repair. Large central equipment must be situated to facilitate its replacement. The HVAC design engineer must ensure that provisions are made for removal and replacement of the largest and heaviest component that cannot be further broken down, without damage to the structure.

Where mechanical chases are provided for accessible equipment, chase doors shall be full-size.

Equipment Access:

Adequate methods of access must be included for items such as chillers, boilers, air-handling units, heat exchangers, cooling towers, reheat coils, VAV terminals in ceiling spaces and in equipment rooms, pumps, water heaters, and all devices that have maintenance service requirements.

Vertical Clearances:

Central plant mechanical equipment rooms must have clear ceiling heights of not less than 12-feet. Catwalks with stairways must be provided for all equipment (including cooling towers) that cannot be maintained from floor level. Where maintenance requires the lifting of heavy parts 100 pounds or more, hoists must be installed. Design of service areas must preclude the need for hatchways.

Horizontal Clearances:

Mechanical equipment rooms must be configured with clear circulation aisles and adequate access to all equipment. The arrangement must consider the future removal and replacement of all equipment. The mechanical rooms must have adequate doorways or areaways and staging areas to permit the replacement and removal of equipment without the need to demolish walls or relocate other equipment. Sufficient space areas for maintenance and removal of coils, filters, motors, and similar devices must be provided. Chillers must be placed to permit the pulling of tubes from all units. The clearance must equal the length of the tubes plus 2-feet. Air-handling units require a minimum clearance of 2'-6" on all sides, except on the sides where filters and coils are accessed, where clearance must be equal to the length of the coils plus 2-feet.

Roof-Mounted Equipment:

Roof mounted ductwork and piping is prohibited. Access to roof mounted mechanical equipment including air handlers, package units, condensing units, and exhaust fans must be by stairs or Freight Elevator serving the roof; ship's ladders are not permitted.

Housekeeping Pads:

Housekeeping pads must be at least 6-inches wider on all sides than the equipment they support and must be 6-inches thick.

Vertical Chases and Shafts:

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All pipes in vertical chases and shafts must have drain valves at the bottom of the risers for ease of maintenance. A floor drain must be provided in each chase or shaft. Access to the valves and floor drains must be provided.

Chase and shaft layout shall be coordinated to place most commonly accessed services to the front and least commonly accessed services to the rear of the shaft or chase.

d. Building Control Systems (BCS)

BCS Performance Criteria

General Requirements for Building Control System:

The BCS must be a Direct Digital Control System (DDC). The BCS must be capable of scheduling operations and maintenance, and adjusting building systems to optimize their performance to minimize overall power and fuel consumption of the facility. Coordinate with security electronics narrative for utility controls.

The BCS must consist of a series of direct digital controllers interconnected by a local area network. The BCS must be accessible through a graphical user interface and must provide trending, scheduling, downloading memory to field devices, real-time "live" graphic programs, parameter changes of properties, setpoint adjustments, alarm/event information, confirmation of operators, and execution of global commands.

Open Protocol and Integration:

The BCS must use BACnet communication protocols to provide integration and interoperability between building systems and control vendors. All system controllers shall be BACnet Testing Laboratory (BTL) listed. The control system manufacturer shall be a member of the BACnet Manufacturer's Association (BMA). In addition, all BACnet devices and products utilized in the system shall be BTL-listed and shall carry the BTL logo. The Design-Build Entity must specify and include a functional design manual, a hardware manual, a software manual, an operation manual, and a maintenance manual.

Integration:

- IT Integration: The County Ethernet LAN accommodates BCS communication traffic and strictly controls the interface with the LAN.
- Existing King County BCS Workstation: The County central facility department maintains a centralized BCS Siemens Apogee workstation at the RCECC Facility. The CFJC shall be equipped with a local operators graphic user interface workstation installed as a client to the County central server. The project shall provide for modification of the existing central facility database and graphic interface to incorporate the new facility control.
- Lighting systems controlled by a BCS must have independent control panels and networks. The BCS must monitor the status and energy consumption of the lighting systems.

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- Fire alarm systems, security systems, and elevator systems must not be controlled by a BCS. These systems must have independent control panels and networks. The BCS system must monitor the status of these systems only, in order to prompt emergency operating modes of HVAC and lighting systems.
- The Detention Security Electronics System shall have override capability for the detention area lighting circuits and power receptacles. In addition there shall be master water control solenoids that allow the Detention Security Electronics System to shut off water to individual housing units. Also provide an override switch to place each dayroom into purge mode with 100% outside air. Provide integration with the Detention Security Electronics System as necessary to provide control of BCS-controlled systems as required.
- The following packaged equipment shall be specified with self-contained BACnet controllers for integration to the BCS.
 - o Chillers.
 - o Boilers.
 - o Terminal units.
 - o Packaged Air Conditioning systems.
 - o Variable Frequency Drives.

Minimum General System Requirements:

- Temperature Controls:
 - o Provide appropriate zoning and controls to ensure reduction or elimination of any possibility for the simultaneous heating and cooling to reduce energy consumption.'
 - o Preprogrammed standalone single or multiple loop microprocessor PID controllers must be provided to control all HVAC and plumbing subsystems.
 - o Control the heating and cooling in each zone by a thermostat or temperature sensor located in that zone. Perimeter systems must have at least one thermostat or temperature sensor for each perimeter zone.
 - o A 5°F adjustable dead band must be used between independent heating and cooling operations within the same zone.
 - o Night setback and setup controls must be provided for all comfort conditioned spaces, even if initial building occupancy plans are for 24-hour operation. Morning warm-up or cool-down options must be part of the control system. Controls for the various operating conditions must maintain pressurization requirements during occupied and unoccupied periods.
- Humidity Controls: Indoor and outdoor humidity sensors must be calibrated in-place during system startup and at least annually thereafter. Dew point control provides more stable humidity levels. However, RH sensors are permitted, provided they have been

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calibrated in-place and collocated with dry bulb sensors so that the BCS can convert these two signals to a dew point value for control purposes.

- IAQ Controls: Instrumentation and controls must be provided to ensure outdoor air intake rates are maintained during occupied and unoccupied hours.
- HVAC control algorithms must include optimized start/stop for chillers, boilers, air-handling units, exhaust fans, VAV and fan coil units, and all associated equipment and feed forward controls based on predicted weather patterns. A condenser water optimization control is required to optimize the chiller, tower, and pump energy consumption.
- The BCS must be capable of receiving current sensor digital signals from all field-installed controllers and calculating the energy and water consumption by using appropriate voltages and phases.
- The central BCS must provide for standalone operation of subordinate components. The primary operator workstation must have a graphical user interface. Standalone control panels and terminal unit controllers can have text-based user interface panels which are hand-held or fixed.
- The BCS monitoring capability must include logs of data created by user-selectable features. In new buildings the BCS must have approximately twenty percent (20%) spare capacity for future expansion.
- Maintenance Scheduling: The central BCS must include programs for scheduling maintenance of the mechanical and electrical equipment, including information on what parts and tools are needed to perform each task.
- Setpoint Reset Controls:
 - Air Systems: Systems supplying heated or cooled air to multiple zones must include controls that automatically reset supply air temperature required by building loads or by outdoor air temperature.
 - Hydronic Systems: Systems supplying heated and/or chilled water to comfort conditioning systems must include controls that automatically reset supply water temperatures required by temperature changes responding to changes in building loads (including return water temperature) or by outdoor air temperature.
- Extent of Equipment Control by BCS:
 - All equipment except small standalone systems shall be controlled and monitored by the BCS.
 - Equipment not required to be controlled includes local heaters and exhaust fans necessary for utility spaces such as mechanical or electrical rooms.
- Energy Metering Data Collection and Energy Management:
 - The BCS must be specified to provide building staff metering information for energy and water consumption. Electrical values, such as V, A, kW, KVAR, KVA, PF,

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- kWh, KVARH, frequency, and percent THD, must be measured. System metering shall be specified that segregates lighting, HVAC, receptacle, and other loads and permits the separate accounting of consumption for the courts and detention facilities.
- o The design team shall provide the meters and data acquisition system to be able to break down the energy consumption by end use under the categories of HVAC, lighting, plug loads. Break down of HVAC shall be made possible through the trend log data from the data acquisition system - heating, cooling, fans, pumps etc.
 - o Where electrical metering is specified and provided by Division 26 electrical design, these systems shall be specified to integrate fully with the BCS.
 - o Energy management measurements must be totalized and trended in both instantaneous and time-based numbers. Energy monitoring data must be automatically converted to standard database and spreadsheet format and transmitted to a designated workstation. The measured energy data must be capable of being analyzed and compared with the calculated energy consumption estimated during design.
 - o The BCS must record and archive all collected energy consumption data.
 - Training:
When planning a BCS, the necessary training must be identified and specified for the operating staff but in no case less than 80 hours or as requested by the County.

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Section 7 - Electrical Engineering Systems

a. Introduction and General Objectives of the Electrical Standard

Performance

This Section defines the general and technical criteria for the projects normal power systems and the emergency and standby power systems. The project shall provide separate utility metering of the electrical services into the Detention Facility and into the Courthouse Building. Coordinate with Section 10, c. Electronic Detention Control System narrative for controls.

This Section encompasses recommendations and minimum acceptable performance criteria for the normal power distribution system and the emergency and standby power systems.

The Design-Build Entity shall interface and provide a design that seamlessly incorporates the design, power and lighting requirements for all other trades.

Sustainability

The Design Build entity shall obtain the LEED credit in the Energy and Atmosphere category, under the Optimize Energy Performance heading, of “Improve by 26% for New Buildings” (E&A Credit 2 earning 11 points) utilizing LEED v4.

King County Strategic Climate Action Plan:

- Apply renewable energy applications to County's new construction.
- Ensure that design, construction, maintenance and operation of any capital project owned or leased by King County is consistent with the latest green building and sustainable development practices.

Design-Build Entity shall obtain a copy of the above-referenced documents and integrate these materials into the design and design discussions with the stakeholders involved with the CFJC project.

Maintenance and Reliability

All materials, devices and equipment shall be commercial grade, new and Underwriters Laboratories (UL) listed.

The electrical power system design shall provide for the safe installation and operation of the electrical power supply and distribution through standardization of design, installation and testing requirements, based upon sound engineering principles, applicable building codes and field experience.

- The electrical system design shall be in conformance with all applicable codes and standards and the requirements of these criteria.
- Certain materials, equipment, apparatus or other products may be specified by manufacturer's brand name, type, or catalog number. In such case, the designated product shall meet the established standards for quality, style, utility and performance.

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The main switchboard, distribution panels, transformers, disconnects and branch circuit panelboards shall be manufactured by a recognized manufacturer with minimum of 10 years' experience in the manufacture of such equipment and shall be manufactured to commercial-grade specifications.

The design shall provide normal maintenance schedule for each system provided. These schedules shall be based upon the NFPA 70, National Electrical Code (NEC); the National Fire Protective Association (NFPA) 72 & 110; International Fire Code; International Building Code; and/or best engineering practices.

Each device which is the basis of design or installed shall provide a warranty but not less than:

- 5 years from date of substantial completion - Switchgear, panel boards, breakers, fused switches, TVSS devices, transformers and digital meters.
- 10 years from date of substantial completion - Uninterruptible Power System (UPS); Engine Generator and Automatic Transfer Switches (ATS).
- 5 years from date of substantial completion - software (operating system updates/upgrades) required for systems/devices listed above.
- 5 years from date of substantial completion - lighting controls and relay devices.
- 5 years from date of substantial completion - lighting fixtures.
- 13 years from date of substantial completion - LED lighting sources and LED drivers and related devices.

Flexibility

These criteria set the minimum acceptable requirements for design and installation of the electrical power system. While new technologies or alternative arrangements may be used, they shall not lower the level of safety prescribed by these criteria and the applicable state building codes.

Redundancy and Standby Capacity

These criteria set the minimum acceptable requirements for redundancy and standby capacity. The Design-Build Entity shall provide systems that meet the design parameters of these criteria, but may provide a design which may provide a better system and also satisfy the applicable building codes and exceed these criteria.

Metro Transit Comfort Station

A Metro Transit Comfort Station (toilet room), shall be provided as part of the overall development. The Comfort Station may be freestanding, or part of one of the new structures.

Required details and specifications inclusive of electrical requirements for the comfort station are in:

- Appendix C, Standard Single Unit Driver's Comfort Station.

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b. Electrical Power Performance Criteria

Basic Guidelines

Table B7.1 - Minimum Load Power Requirements for the Courthouse Building and Table B7.2 - Minimum Load Power Requirements for the Detention Facility are intended to provide the design professional with a starting point for the design of the electrical system distribution equipment using the following minimum load power densities.

Table B7.1 - Minimum Load Power Requirements for the Courthouse Building		
Area	Lighting (W/SF)*	Receptacles (W/SF)
Courtrooms	1.38	2.0
Holding Detention	0.88	1.0
Offices (enclosed)	0.88	4.0
Offices (open)	0.78	6.0
Conference Rooms	0.98	2.0
Public Circulation (Main Lobby)	0.72	4.0
Public Circulation	0.53	0.25
Toilet Rooms/Locker Rooms	0.78	1.0
Storage/File Rooms	0.50	0.5
Loading Dock	0.40	1.0
Food Service -Cafe	0.80	10.0
Dining	0.71	0.5
MDF Rooms	0.76	100.0
IDF Rooms	0.76	75.0
Support/utility type rooms	0.50	0.5
Parking (garage)	0.15	0.25
Parking (Uncovered)	0.08	0.10
Judicial Chambers	0.90	2.0
Security Control Centers	0.72	50.0

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Table B7.2 - Minimum Load Power Requirements for the Detention Facility		
Area	Lighting (W/SF)*	Receptacles (W/SF)
Offices (enclosed)	0.78	4.0
Confinement cells	0.88	0.0
Kitchen	0.80	12.0
Dining	0.86	10.0
Detainee Circulation	0.75	5.0
Control Posts		50.0
Detention Classrooms	1.1	5.0
Public Circulation	0.72	2.0
Detention Interstitial Spaces	0.76	2.0
Detention Activity Rms.	0.58	2.0
Armory	0.72	3.0
Chapel	0.72	2.0
Detention Intake/Release	0.72	10.0
Security Screening Rms.	0.72	10.0
Identification Processing	0.72	10.0
Property Room	0.72	5.0
Waiting Rooms	0.72	2.0
Medical Rooms	0.72	5.0
*Maximum W/SF if meeting twenty percent (20%) below the energy code.		

Uniformity of Manufactured Equipment:

Reference the list of preferred electrical equipment included in Appendix D at the end of this *Facility Performance Standard*.

All switchboards, distribution panels, transformers, disconnects and branch circuit panel-boards shall be of commercial grade and manufactured by one manufacturer throughout the project. All panel-boards shall include do-in-door trim. All outdoor equipment enclosures shall be NEMA -3R or 4X depending on the application.

Minimum breaker size shall be 20 amps.

Provide input to stakeholders of manufacturers of equipment that will provide the same operating results but require reduced working clearances and thus provide for a more efficient electrical room size.

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Spare Capacity:

All service feeders, Main Switchboards, Distribution Panelboards, branch feeders and Branch Circuit Panels shall be adequately sized to power all the building loads, in addition to providing the capacity as listed in *Table B7.3 - Spare Capacity Requirements*.

Table B7.3 - Spare Capacity Requirements			
Equipment	Spare Load Capacity	Breaker Spares	Breaker Spaces
Main Switchboards	Fifteen percent (15%) based upon eighty percent (80%) breaker capacity [sixty-five percent (65%) of breaker + fifteen percent (15%) spare = eighty percent (80%) max]	One for each frame size installed	Twenty-five percent (25%)
Distribution Panelboards & Motor Control Centers	Fifteen percent (15%) based upon eighty percent (80%) breaker capacity [sixty-five percent (65%) of breaker + fifteen percent (15%) spare = eighty percent (80%) max]	One for each frame size installed	Twenty-five percent (25%)
Lighting (Branch Circuit) Panelboards	Twenty percent (20%) based upon eighty percent (80%) breaker capacity [sixty percent (60%) of breaker + twenty percent (20%) spare = eighty percent (80%) max]	Ten percent (10%)	Fifteen percent (15%)

Spare positions shall be complete with full-length copper bus and hardware for future breaker installation. Design-Build Entity shall demonstrate at the turnover of final documents that the required spare capacity and spaces have been preserved.

The spare capacity shall also be provided at each of the following system elements:

- Distribution transformers.
- Distribution bus risers.
- Distribution feeders and breakers.

Where panel-boards are mounted recessed flush in wall, maintain fire integrity of wall.

- Provide one empty 3/4-inch EMT conduit stubbed up into nearest accessible ceiling location for every three spare or space positions.

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Basic Design and Installation Requirements

Electrical Room Sizing:

- Provide space in the electrical room layouts for future addition of equipment.
- For each switchboard lineup in a new facility and for switchboards rated 800 amps and higher, include space for one additional switchboard section. All switchboards shall have full-sized horizontal bussing to allow for additional sections(s) to be added.
- For every three (3) panel-boards of 480/277V and 120/208V provide a wall space for one (1) additional 480/277V and one (1) additional 120/208V panel. At minimum the electrical room shall provide space for at least one additional 480/277V panel and one additional 120/208V panel.

Transformers:

- Distribution transformers feeding receptacle power for office areas shall be K-13 rated to allow for harmonics generated by office equipment.
- The distribution transformers feeding MDF, IDF, security electronics rooms, and the Central Control Room shall have K ratings appropriate for the proposed equipment loads.
- The neutral conductors on the secondary of K-rated transformers shall be sized at two-hundred percent (200%) of phase conductor rated ampacity.
- All transformers shall meet the Seattle Energy Code requirements.

Routing of Conduit and Wiring:

- For the Courthouse Building the ceiling space shall be typically used for the distribution of power, data, and communications systems.
 - The distribution drops shall be contained in columns and walls to work spaces and workstation spines.
 - Fire-rated poke-through floor outlets may be used where ceiling below are accessible and the occupancies below are not compromised by their installation. In such cases, route the branch circuit conduits to the closest wall to route up the ceiling of the floor served in order to limit the amount of conduit in the ceiling below.
 - In-slab floor boxes may be used for limited areas where layouts are not subject to change such as main lobbies and courtrooms.
 - The courtroom(s) well shall have in slab floor boxes as necessary to provide electrical power and data cabling to council tables, lectern(s). Raised access flooring may be used in the courtrooms to support flexibility for the distribution in the courtroom well.
 - Large conference/meeting rooms shall have in slab floor boxes for data and power as necessary to provide flexibility of use.

Motors:

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- All electrical motors above 1/2 HP shall be 460 volts, 3-phase. This requirement shall be coordinated across the project with other disciplines.
- All motors shall meet the energy code requirements for motors.

Devices:

- All materials, devices and equipment shall be commercial grade, new and Underwriters Laboratories (UL) listed.
- All receptacles shall be a minimum of 20A rated device.
- "True" RMS meters shall be used wherever meters are specified on switchgear and distribution panels, and connected to Building Control System (BCS).
- Lighting controls shall be connected to the BCS
- All electrical equipment and systems shall be specified to include a manufacturer's representative to provide start-up, testing, acceptance and training of County's personnel. Additionally the manufacturer's representative, Design-Build Entity, and electrical contractor shall provide commissioning (prefunctional and functional) of the following:
 - Lighting controls shall include master controls, astronomical time-clock, low voltage controls and overrides, occupancy sensors, photo-cells and daylighting controls.
 - Egress lighting operation and confirmation of foot-candle levels.
 - Generator operation and ATS operation shall be installed and tested per NFPA 110. This includes load bank and non-load bank testing. Test with operation of required fire pump(s), exhaust fans, elevator operation, fire alarm and fire sprinkler systems and security systems operations.
 - UPS operation shall be operated and tested under load-bank and in conjunction with emergency generator testing.
 - Metering, software and display of all metering outputs to final display (computer access or flat-screen or both).
- All power receptacles and switches for general purpose circuits shall be NEMA specification grade, manufactured by one manufacturer and rated for specific environment and application. Outlets served from an emergency power system shall be red.
- All indoor floor-mounted equipment, MCC and panels shall be installed on minimum of 4-inch high concrete housekeeping pads.
- All outdoor locations shall be installed on a minimum of 6-inch high concrete housekeeping pads.

Conductors:

- Full-sized neutral conductors shall be utilized throughout the project for three-phase, four-wire service, power and lighting feeders.
- The following types of conductors shall be specified based on each one's application:

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- o All wire, cables and equipment shall be new.
- o All wire #8 and larger shall be stranded copper. Wire used in fire alarms shall be solid copper per NEC.
- o All wire and cable for secondary power distribution shall be 600 volt insulated type THHN or THWN for #8 and smaller. Type THW, THHN and XHHW for #6 and larger for wet, underground, and exterior locations. Type RHH or THHN 90°C standard used for fixture wire and circuit runs within fixtures.
- o All wire #10 and smaller shall be color-coded throughout. The system conductors shall be identified as to phase connections by means of color-impregnated insulation or approved colored marking tape.
- o Power and lighting branch circuits shall be specified not less than #12 wire gauge (AWG).
- o Signal and control circuits shall be specified not less than #14 AWG.
- o For areas where high-speed computer and digital equipment are used in the project, specify the following requirements:
 - For branch circuits supplied for these equipment areas, the neutral and ground conductors shall not be shared between phases A, B, and C. A separate neutral conductor and ground conductor shall be specified for each phase, feeding computer, electronic office equipment and digital controls/systems within the project.
 - For three-phase feeder, specify double the size of the neutral conductor.

The design shall include equal distribution of load on each phase for the feeders, balanced within fifteen percent (15%) between phases, documented with the final documents submission.

The cabling for fire alarm, security, digital lighting controls, building management system controls, telecommunications and audiovisual system shall be specified in accordance with the respective system requirements.

Cable ducts for power shall not be shared with data and communications systems.

Comply with the current edition of the NEC, chapters 1 through 4, for all telecommunications, MDF, IDF, and Service Entrance rooms. The intent is to eliminate the requirement for an Emergency Power Off (EPO) disconnect switch in all cases.

Conduits:

The following shall be specified as minimum requirements for the conduits:

- Minimum acceptable EMT conduit size shall be 3/4-inch diameter. Exceptions: Short runs to a single outlet, or a single fixture may be 1/2-inch diameter.
- Indoor locations subject to physical damage shall use rigid steel or intermediate metallic conduit (IMC) with zinc coating inside and out with hot-dipped galvanizing and shall

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conform to ANSI c80.1 and UL. Couplings and unions shall be electroplated steel, threaded type.

- Interior spaces in dry locations shall install Electrical Metal Tubing (EMT), cold-rolled steel tubing, with enamel coating inside and zinc coating outside and galvanized steel fitting. Steel armored metal-clad (MC) cable shall be permitted for distribution of branch circuits where routed in concealed locations and installed with hangers and support specifically approved for MC cable systems. NC cable shall be independently supported and shall not rely on ceiling or wall framing for support. MC cable shall not be used in exposed locations. MC cable is not permitted for circuit homeruns.
- Underground electrical service and underground distribution shall be PVC-coated galvanized rigid steel, concrete encased. Elbows shall be PVC-coated rigid steel. All underground feeders shall be installed with spacers for proper support. Where installed under building slabs, concrete slurry shall be permitted in lieu of concrete duct banks. In all cases the underground electrical feeders shall be installed in accordance with Seattle City Lights installation guidelines.
- In wet and outdoor locations shall specify cadmium-plated cast malleable iron liquid-tight fittings with insulated throat.
- Flexible metallic conduits of limited lengths may be used at power terminations to equipment in indoor and dry locations. For outdoor and wet locations shall specify liquid-tight with plastic jacket extruded over the outer zinc coating.

Identification:

Electrical system shall be specified to include identification and signage in accordance with ANSI standards. Specify identification at all power service switchboards, power distribution panels, transformers, conduits, branch circuits, pull-boxes, outlet covers and J-boxes using industry standard materials and methods.

Electrical light fixtures and convenience outlets on emergency power circuits shall be identified with a unique identification system. The identification tags shall be applied on location and be easily identifiable and uniformly applied throughout the project.

Power Distribution System:

- General:
 - The design and construction shall incorporate energy efficient lighting, heating and cooling, and water heating technologies.
 - The County requires that this Project obtain the LEED credits in the Energy and Atmosphere category, under credit 2, Optimize Energy Performance heading, “Improve by 26% for New Buildings” utilizing LEED v4
- Power Receptacles:

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- Power receptacles shall not be designed for more than 4 workstations/computers per circuit. Each office/workstation shall be designed for one computer and one convenience receptacle at minimum.
- Areas that require dedicated power receptacles:
 - Each courtroom shall not share power with other areas of the project nor with other courtrooms.
 - Security equipment rooms and command centers shall not share power with other areas of the project nor with other security and command centers.
 - IDF and MDF rooms and closets shall not share power with other IDF or MDF rooms or other areas of the project.
- Devices that require dedicated power:
 - Court recording equipment including but not limited to computer, cameras (video & still), voice and video recording devices.
 - Incoming data and telephone services.
 - Microwaves.
 - Coffee machines.
 - Printers and copiers.
 - Building Control System
- Courthouse Building = approximately 138,000 ft² plus Phase 2 = approximately 85,000 ft² for a total of 195,000 ft², of which 138,000 will be constructed in this phase. Estimated service size for the Courthouse Building is 2,500A, 480/277V, 3PH, 4W.
- Detention Facility = approximately 98,000 ft². Estimated service size for the Detention Facility is 1,200A, 480/277V, 3PH, 4W.
- Parking Garage = approximately 145,000 ft². Estimated service size for the Parking garage is 200A, 480/277V, 3PH, 4W.
- The project power service will be taken from a 480/277V, 3PH, 4W distribution system via transformer in a transformer vault. The location of the utility transformer vault and access to this location by the serving utility shall be properly coordinated with the local utility company. The designer shall confirm the service sizes with the utility company to confirm proper sizing of the service (with fifteen percent [15%] spare capacity).
 - It is anticipated that the one utility transformer location shall serve all three portions of the project: the Courthouse, the Detention Facility, and the Parking Garage. Each shall have its' own electrical distribution system, being served from the common electrical utility service.
 - The Courthouse Building, Detention Facility, and Parking Garage shall be provided with a 480/277V, 3PH, 4W distribution system.

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- Provide full energy code compliance for sub-metering as per the Seattle Energy Code.
- The 480V panels in all occupancies shall be fed from breakers in each occupancies main switchboard or from distribution panel-boards. The branch circuit panel-boards shall be located throughout each occupancy. The K-13 (harmonics rated) dry-type step-down transformers shall be provided where required, which shall in turn feed 120/208V, 3PH, 4W distribution type panel-boards or via distribution panels. The 120/208V branch panel-boards located throughout the two occupancies shall be fed from breakers in these distribution panels. Large air-conditioning and motor loads shall be supplied at 480V, 3 PH from each occupancies distribution boards.
- Lighting fixtures shall be connected to 20A1P circuit breakers in 480/277V, 3 PH, 4W branch circuit boards.
- Convenience and special power receptacles shall be provided as required throughout the facility. Convenience receptacle and miscellaneous loads shall be connected to 120/208V, 3PH, and 4W branch circuit panelboards.
- Where a centralized UPS (uninterruptable power supply) is not provided, computer and other sensitive electronic loads shall be fed through point-of-use, localized UPS units as required to meet the standards.
- For equipment supplied by K-rated transformers, neutral bussing and conductors for distribution equipment feeding panelboards shall be sized to two-hundred percent (200%) of feeders to accommodate harmonic currents generated by electronic power supplies.
- For Surge Protection Devices (SPD's), a TVSS (transient Voltage Surge Suppressor) shall be provided either at the main switchboard and/or at distribution boards. The TVSS shall comply with UL 1449. TVSS units shall also be provided at the 120/208V panelboards served by K-4rated transformers throughout the project.
- The electrical work shall be coordinated with the work of all other divisions to interface power and control requirements to equipment, devices, lighting, control systems and other systems specified under respective divisions.

Grounding:

- A complete grounding system shall be provided per the National Electric Code (NEC). The electrical system shall be grounded to a common building grounding system for each structure with in the project. This common building ground shall utilize building steel, building cold water pipe, and concrete-encased electrode. Grounding to cold water pipes shall only be to continuous metallic main pipe. Where the cold water pipe has insulated joints or plastic pipe connectors, properly sized jumper cables shall be specified to maintain the continuity of the pipe grounding.
 - The grounding system for utility service transformers shall be provided per the SCL (Seattle City Light) criteria.
 - The project emergency generator shall be grounded per code.

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- Provide a copper Main ground Bus (MGB) in the main switchboard rooms and connect to that buildings grounding electrode system. Provide a building grounding riser with ground bus located at each electrical room. Transformers and other separately derived systems shall be bonded to this ground bus system in addition to bonding to the other code-required connections.
- Telecommunications and data equipment rooms shall be grounded per the requirements of Part B, Section 9 - Information Technology/Unified Communications Systems of this *Facility Performance Standard*. The telecommunications grounding system shall be connected to the main ground bus.
- Specify grounding grid for raised floor computer rooms. Within the room, bond all metallic pipes, conduits and steel equipment housing to the grounding grid.

Emergency and Standby Power:

Minimum Service:

The Design-Build Entity shall coordinate the hierarchy of load shedding with the stakeholder of the project with regards to the following electrical loads. These loads include but may not be limited to:

- A. LIFE SAFETY REQUIRED STANDBY: The system shall provide power for the Life Safety requirements and Standby System for the Courthouse Building, Detention Facility, and the Parking Garage. These systems include but are not limited to:
 - Emergency Lighting.
 - Fire alarm system (design to include battery backup to meet code).
 - Exit signs.
 - Automatic fire detection equipment.
 - Emergency voice/alarm communications systems.
 - Smoke control systems.
 - Exit stairway pressurization systems.
 - Elevators. (one per bank for the public and one Secure Elevator (Detainee Transport) in the Courthouse Building and the Detention Facility). Refer to elevators narrative in Part B, Section 1 - Architecture of this *Facility Performance Standard*.
- B. LEGALLY-REQUIRED STANDBY: The system shall provide power for the Legally-Required Standby System for the Courthouse Building, Detention Facility, and the Parking Garage. These systems include but are not limited to:
 - Power and lighting for Main Distribution Frame (MDF), Intermediate Distribution Frame (IDF), and Communications Rooms. (Refer to the UPS narrative).

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- Power and lighting for security command centers (Central Control Room and the security electronic equipment rooms that are in the Detention Facility and Courthouse Building). (Refer to the UPS narrative.)
 - All electronic safety and security system. (Refer to Part B, Section 10 - Electronic Safety and Security Systems of this *Facility Performance Standard*.)
 - Minimal heating of building and refrigeration systems (Freezers/Coolers/Medical Refrigeration) as required to maintain operations of the Detention Facility.
- C. OPTIONAL STANDBY: The system shall provide power for the Optional Standby System within the Detention Facility and Parking Garage. These systems include but are not limited to:
- Detention areas, custody areas and sally-port. (Refer to the UPS narrative.)
 - Visitor screening equipment.
 - Security systems (to include CCTV and access control. (Refer to the UPS narrative.)
 - Mechanical control systems.
 - Lighting control systems. (Refer the UPS narrative.)
 - Cells and secure areas for the Courthouse Building and the Detention Facility. (Refer to the UPS narrative.)
 - Sump pumps.
 - Sewage ejection pumps.
 - HVAC systems serving technology/server rooms, UPS rooms, communications rooms, and elevator machine rooms. (Refer to the UPS narrative.)
 - Exhaust fan in UPS battery rooms.
 - General areas of the Detention Facility.
 - Access control and lighting for Parking Garage.
 - Data processing and communications systems for Detention Facility.
 - Boiler (controls) and hot water pumps for Detention Facility.
 - Kitchen and dining facilities within the Detention Facility.
 - Medical support rooms and equipment within the Detention Facility.
 - Receptacles and emergency lighting in large conference rooms within the Detention Facility to provide additional space for command and control operations during an emergency.

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Generator Set:

The automatic emergency power system shall consist of a 277/480V, 3PH, 4W diesel engine generator set, water-cooled radiator type, complete with day tank. This day tank may be standalone or integral to the base of the gen set. Do not mount standalone base tank in excess of 12-feet from generator set. (Base tanks add height to the generator set and may not be appropriate in all locations.) The engine generator set shall be located indoors, on the roof, within the Parking Garage, or at grade. Exterior generators sets shall be provided with weatherproof, sound-attenuating enclosure to meet or exceed the acoustical requirements of the site.

Bypass/isolation automatic transfer switches shall be provided. Provide open transition between normal and emergency positions. To conserve space within the emergency electrical rooms, review options for bypass/isolation access from the front only, to reduce working clearances. The Automatic Transfer Switch (ATS) shall be a break before make operating switches. Design shall incorporate delayed transition with pre-transfer signal for the elevators loads on the generator.

Specify engine-mounted critical-type exhaust muffler and acoustically treated Tier III weatherproof enclosure.

Coordinate fuel storage with plumbing/boiler consultant. There is a desire to provide 72 continuous hours at full load and additional storage may be required to provide alternate fuel as a backup to the boilers, for hot water heating. The fuel capacity is required to provide the full 72 hours of operation plus what ever shall be required for boiler hot water heating.

- The fuel storage tank may be above or below-grade, with proper filling, monitoring and containment systems.
- The day tank shall be of the manufacturer's standard size, based on the generator capacity.

The project shall be provided with a loadbank for the generator sized to fifty percent (50%) of the generator capacity. The loadbank may be shared with a centralized UPS, provided the loadbank is stationary, not generator mounted. The loadbank shall be controllable to add load or remove.

OR

Provide a permanent connection from the generator to a portable loadbank that is fifty percent (50%) of the generator capacity. Provide a location for the portable loadbank to be parked for the monthly loadbank testing. Provide cables for the connection of the generator to the loadbank. At the location of the permanent connection point also provide an enclosure that will store the cables between loadbank testing.

There shall be provided load-shedding of the Optional Standby Emergency system electrical loads:

- After the Courthouse Building has been evacuated the emergency power to the building will be removed from the generator power.

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- Coordinate with King County as to what loads within the Parking Garage may be removed from the generator power.
- Coordinate with King County to determine the hierarchy of the Optional Standby system loads. This should provide the load shedding from the lowest need to the highest need.
- As part of the design these loads that are shed should be automatically transferred "On" under resumption of normal utility power.

UPS:

Systems where a power outage of 10 seconds (to transfer from normal to emergency power) could damage essential equipment or impair safety shall be on UPS power which is also connected to the generator power.

These areas shall include but not be limited to:

- All MDF and IDF. (Refer to Part B, Section 10 - Electronic Safety and Security Systems of this *Facility Performance Standard*.)
- All electronic Safety and Security System. (Refer to Part B, Section 10 - Electronic Safety and Security Systems of this *Facility Performance Standard*.)

The Uninterruptible Power Systems (UPS) may be small, localized, rack-mounted units to serve individual racks or equipment; or one or more centralized UPS. There could also be a combination of both local and centralized within the project. In all cases the Design-Build Entity shall provide all UPS devices. During the project Schematic Phase, a review shall be provided of the projected UPS loads along with their locations and supporting functions in order to determine the optimal UPS system solution. The study shall confirm the required battery backup time shall be confirmed, taking into consideration outage scenarios and the onsite generator.

UPS for the data processing equipment shall include rectifier/battery charger, solid-state inverter, static bypass transfer switch, maintenance-free batteries sized for 15 minutes and synchronized circuitry. The systems shall be provided with external maintenance bypass switches.

Coordination shall be included for the UPS and generator system to address capacity and compatibility requirements.

Centralized UPS systems shall include a loadbank for testing. The loadbank may be shared with the generator system, provided the loadbank is not generator mounted.

- Coordinate permanent or portable connections with generator connections.

Installation Contractor Certification:

The electrical system specifications shall require the installing contractor to certify that the work is installed in accordance with the applicable codes and standards. The system shall be tested, adjusted, and fully functional; and all necessary inspections and certificates of occupancy have been obtained.

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The specifications shall require the installing contractor to perform and actively participate in the start-up, prefunctional and functional testing of the electrical system. This shall include but not be limited to:

- Lighting and lighting controls.
- Generator and UPS testing under NFPA 110 testing procedures.
- Metering and metering system testing per the Energy Code.
- Provide a written report documenting the performance criteria for each system. This report shall document the performance of each device within each system, devices that do not perform as required, and a description of the resolution of the issue. Then perform retesting of the system and written documentation showing performance without any issues.

Interface With Building Control Systems:

Design-Build Entity's electrical design professional shall coordinate and document within the scope of the electrical drawings and specification how and where the electrical systems will be integrated with the Building Management System (BMS) or Building Controls System (BCS); typically a mechanical controls system. The electrical system shall provide a seamless interface for the control, monitor, alarm and data log of the following as a minimum:

- Building normal and emergency power consumption and demand.
- Building derived energy sources, i.e. PV or solar hot water
- Load types by system as required to meet the energy code and project LEED[®] requirements for Measurement and Verification.

Coordinate with BMS/BCS to provide system monitoring for the following electrical systems:

- Emergency generator alarms, including but not limited to engine trouble, low fuel, fuel leak alarm, low voltage and loss of phase.
- UPS alarms, including but not limited to low on battery, load on bypass, high temperature alarm and UPS emergency power off.
- Fire alarms-Supervisory and trouble signals.
- Lighting and lighting controls both interior and exterior.

c. Lighting

Introduction and General Objectives of the Lighting Standard

This Paragraph defines the general and technical criteria for lighting and encompasses recommendations for best practices, energy efficiency, sustainability, and creating productive

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work environments that emphasize the dignity and importance of activities conducted in the facility. Coordinate with security electronics narrative for controls.

Lighting design in the court facility shall be functional, appropriate for users, energy efficient, and easy to maintain, and shall maximize use of appropriate technology. Daylight in occupied spaces is desirable, but must be carefully controlled to avoid glare, minimize heat gain, and, in some security sensitive spaces, minimize views into the space from outside the building.

Lighting Practitioner Qualifications

Lighting design must be performed or supervised by a lighting practitioner with a minimum of 10 years full-time experience in lighting design with at least two of the three following qualifications of LC, IESNA member, or IALD member, and that devotes the majority of his/her professional time to the design of architectural lighting.

Lighting Criteria

Reflectance:

Indirect or direct/indirect lighting systems shall be the preferred system for illumination. Because the indirect component of the system is key to helping bounce light off room surfaces to evenly distribute the illumination the reflectance of surrounding surfaces greatly impacts the quality of the lighting system. Surrounding surfaces shall comply with criteria noted in *Table B7.4 - Surface Reflectance* in order to maximize this spread of light and minimize the number of fixtures and amount of energy needed.

Table B7.4 - Surface Reflectance	
Room Surface	Recommended Reflectance
Ceilings	Minimum reflectance shall not be below eighty-five percent (85%).
Walls, systems furniture partitions	Generally, walls should not be below sixty percent (60%) reflective, but occasional accent walls that are between forty percent (40%) and sixty percent (60%) reflective will be acceptable. The interior finish schedule shall have a column indicating light reflectance of materials used in courtrooms, Circulation spaces, lobbies, offices, conference rooms, dayrooms, sleeping rooms, visitation, training rooms, and the library.
Floors	Approximately twenty percent (20%) or higher.

Lamp Selection

Interior lighting systems shall be primarily linear fluorescent and LED, with some metal halide accent lamps in public spaces if needed, to maximize energy efficiency and minimize

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maintenance across the entire facility. Metal halide shall not to be used in spaces where periodic switching control is needed because of warm-up and cool-down times.

Minimize the number of lamp types throughout the facility for ease of maintenance. A target of not more than five lamps types including differences in length, color and wattage shall be the project goal. These include 2-foot and 4-foot T8, T5, and T5HO, LED, and ceramic metal halide in wattages from 20 to 70. Using both T5 and T5HO lamps in the same length shall be avoided in order to reduce the chance of confusion by maintenance personnel. Select long-life sources to minimize replacement and landfill contributions. Linear fluorescent sources with at least a projected life of 40,000 hours, metal halide with 25,000 hours, and 50,000 hours for LED should be used. Design documents shall clearly state intended life ratings for all sources and preference will be given to those manufacturers who exceed these targets.

No incandescent lamps, including tungsten halogen or quartz, shall be used within the building lighting scheme.

Utilize high-efficacy (lumens per watt) light sources with low mercury content to maximize energy efficiency and sustainability. Each light source on the project shall have a minimum efficacy of 50 lumens per watt.

All fluorescent lamps and metal halide lamps shall use electronic ballasts. Fluorescent ballasts shall be program start where connected to occupancy sensors or where the average use is less than three hours per start. Verify compatibility of selected electronic ballasts with assisted listening systems where programmed.

Fluorescent lamps shall be 80+ CRI and 3500K. Metal halide lamps shall be 80+ CRI and 3000K. LED shall be 80+ CRI and 3500K.

For exterior lighting, LED light sources with a high CRI shall be used. Fluorescent technologies may be used in low level areas within sealed fixtures. High and low pressure sodium, mercury vapor and induction sources shall not be used.

For public art or other displays, the type of art and location shall be identified during design development, to ensure adequate, appropriate lighting.

Linear fluorescent T8 lamps shall have an initial light output of 3100 lumens and shall be paired with high-efficiency electronic ballasts as a strategy to maximize energy efficiency and light output while minimizing maintenance.

Illuminance Levels

Interior:

For interior lighting power allowances refer to *Table B7.1 - Minimum Load Power Requirements for Courthouse Building* and *Table B7.2 - Minimum Load Power Requirements for Detention Facility* or the Illuminating Engineering Society of North America 10th edition handbook for areas not listed. The designer should consider that recommended illuminance levels do not necessarily have to be generated solely from permanently installed ceiling or wall mounted systems. In fact, task/ambient lighting systems often lead to more energy-

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efficient solutions and provide individual occupant control.

Typical enlarged plans showing photometric calculations for key spaces shall be provided as part of the final lighting drawings prepared by the lighting designer. Pay special attention to courtrooms to ensure all courtrooms meet the lighting requirements. Typical courtrooms should be calculated at the task height of the judge's bench, clerk desk, litigants' table, podium, and witness areas, as well as surrounding seating areas. Other spaces that should be calculated are typical private offices, open offices, dayrooms, sleeping units, medical exam rooms, a section of secure corridors, a section of public corridors, sallyports, and other areas both interior and exterior as necessary to confirm conformance to the performance requirements. Computer-based calculation points should be placed on 2-foot centers with grid heights measured at the task surface as prescribed by the Illuminating Engineering Society of North America. A calculation summary should be located next to each calculated enlarged plan to show average light level, minimum and maximum light levels, uniformity ratio, grid height, and room reflectances used for the calculation.

Refer to *Table B7.5 - Recommended Interior Illuminance Levels* for recommended average interior illuminance levels measured at the task surface which is either at floor level or at 30-inches above the floor.

Table B7.5 - Recommended Interior Illuminance Levels		
Space Description	Horizontal Illumination Level (LUX)	Vertical Illumination Level (LUX)
Courtrooms		
Judge's Bench	350-550	100
Clerk	350-550	100
Spectator Seating	150-250	30
Litigant's Table	350-550	100
Podium	350-550	100
Witness Chair	300-400	50
Offices		
Intensive visual display terminals (VDTs)	300-400	-
Intermittent VDTs	450-550	-
Other Areas		
Conference Rooms	300-400	50
Dayrooms	200-300	50
Sleeping Units (day)	200-300	
Sleeping Units (amber night light)	2-5	
Admissions Release	300	50

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Table B7.5 - Recommended Interior Illuminance Levels		
Space Description	Horizontal Illumination Level (LUX)	Vertical Illumination Level (LUX)
Visitation	300	50
Training	300	50
Library	300	50
Medical Exam Rooms (Examination level)	600	200
Medical Exam Rooms (normal level)	300	50
Vehicle Sallyport Interior	200	50
Kitchen Prep	500-600	150
Loading Dock	150	50
Waiting Areas/Lounge/Cafe	100	-
High-Density Files	250-350	250-350
Public, Detention, and Secure Circulation	150-250	-
Staff Circulation	50-100	-
Public Lobbies	150-250	-
Screening Areas	200	50
Holding Areas/Holding Cells	250-350	50
Restrooms	100-200	30
Mechanical/Plumbing Rooms	100	-
Electrical/AV/Telecom Rooms	500	-
Parking Garage	10-20 (0.1 MIN)	0.25-0.5

Exterior:

Exterior lighting provides safety and security for those entering and exiting the building outside of daylight hours, and enhances the building's civic presence within the community. As a design element, exterior lighting can highlight the architectural elements and character of the building, while controlling glare. Exterior lighting shall be compatible with security cameras used on the site. Typically, a high uniformity ratio, of 3:1 or 4:1, shall be used, with well-shielded fixtures. Lighting levels do not need to be high if the light source is of good color quality, uniformity is high, and glare is minimized. Exterior lighting shall not contribute to light pollution by throwing light beyond the property, causing glare and unwanted light for neighbors, or up into the sky, contributing to sky glow and obscuring nighttime vistas.

Exterior Security lighting:

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Security lighting requirements should be identified separately from operational lighting requirements. High-quality lighting depends on the following factors:

- Lighting function.
- Luminance.
- Uniformity.
- Glare.
- Light trespass.
- Color rendition.
- Energy efficiency.

When planning for security lighting, remember the direction that the light is coming from (horizontally or vertically) must be considered. Lighting should comply with recommendations of the Illuminating Engineering Society of North America (IESNA) standards for similar areas and facilities; however, they are merely general guidelines. Lighting levels above those indicated in table below may be appropriate where practical and desired. For example, it may be necessary to provide additional task lighting in the identification and inspection areas to support adequate identification of vehicle occupants and contents. Standards should be established based on the particular needs of the CFJC site facility

Lux and foot-candle values

Areas	Foot -Candles	Lux
Approach zone	3	32
Parking and roadways	3	32
Access control zone	5	53
Search areas (vehicle and ID checking)	10	107
Vital locations or structures	5	53
Building surrounds	1	10

Buildings

Floodlighted Bright surroundings

Light surfaces	15	161
Medium-light surfaces	20	215
Medium-dark surfaces	30	322
Dark surfaces	50	538

Dark surroundings

Light surfaces	5	53
Medium-light surfaces	10	107
Medium-dark surfaces	15	161
Dark surfaces	20	215
Gates and doors	2	21
Office space	50	538

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Parking Areas

Self-parking	1	10
Attendant parking	2	21
Covered parking	5	53

Lighting Uniformity

Lighting uniformity means that light is provided in areas that are traveled by security personnel in such a way that they can see ahead and to the sides with an absence of dark areas caused by shadows. The lighting should be brightest in the secure area, with the light gradually less in the areas adjacent to the high-illumination areas.

Color Rendition

Because different light sources radiate more in one area of the color spectrum than others (chromaticity or whiteness of light), certain colors will be emphasized more than others when they illuminate a neutral surface. This color shift can cause problems with identifying persons and objects in the lighted area. It is therefore important, when planning the site lighting, that the type of light elements be matched to the required task.

Entrances

Entrances for pedestrians should have two or more lighting units that provide adequate illumination for recognition. Vehicle access points should have two lighting units located to facilitate the complete inspection of passenger cars and trucks as well as their contents and passengers. Semiactive and inactive entrances should have the same degree of continuous lighting as the remainder of the perimeter, with standby lighting to be used when the entrance becomes active.

Wiring Systems

Both parallel and series circuits may be used to advantage in protective lighting systems, depending on the type of luminary used and other design features of the system. The circuit should be arranged so that failure of any one lamp shall not leave a large portion of the perimeter line or a major segment of a critical or vulnerable position in darkness. Connection should be such that normal interruptions caused by overloads and building fires shall not interrupt the protective system.

Power Sources

Critical security lighting and other security equipment shall be connected to the emergency generator.

CCTV Lighting

When CCTV is used in the lighted area part of the lighted area, it is important to coordinate the lighting and CCTV system. The security lighting system for CCTV must be designed so that, under normal operating conditions, the lighting is balanced to provide the best image contrast possible. Standard CCTV can provide images from normal daylight to twilight conditions. Under

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other operating conditions, artificial lighting must be provided. When an area is being lighted and under CCTV surveillance the range of foot-candles should not exceed 6 and not be less than 2.

USGBC's *LEED v4 for New Construction* (Sustainable Sites Credit 6) shall be used as a guideline for developing the exterior lighting plan, as shall the local code-required light pollution reduction measures. Lighting level targets may change based on camera technology and site requirements but the recommended exterior illuminance levels in *Table B7.6 - Recommended Exterior Illuminance Levels* are intended to set the standard.

Table B7.6 - Recommended Exterior Illuminance Levels			
Area	Horizontal Illumination Level (LUX)	Vertical Illumination Level (LUX)	Uniformity Ratio
Open Parking	10-20 (0.1 MIN)	0.25-0.5	8:1
Parking Garage	50	10	8:1
Primary Walkways	22	10	4:1
Secondary Walkways	5-10	5	6:1
Stairs and Ramps	10	5	6:1
Perimeter Wall or Fence	11	5	6:1
Building Primary Entrance	50-100	25	8:1
Building Service Entrance	50-100	25	8:1
Site Main Entrance	22-55	22	4:1
Site Service Entrance	22-55	22	4:1

Fixture Selection

Lighting fixtures shall be selected on the basis of maintaining a 25-year life cycle within the facility. Fixtures shall be evaluated on the basis of effectiveness and long-term life cycle costs, especially characteristics and components that ensure longevity and quality, not only lowest first costs.

Fixtures shall be selected and located to minimize direct or reflected glare. When several fixtures are specified as equally acceptable, the specifier shall ensure that they meet equivalent performance standards.

Energy Efficiency Criteria

Efficient light sources can be optimized with high performance fixtures that are designed for specific light sources, further enhancing system efficiency. The most efficient fixtures that provide visual comfort necessary for the activity shall be used. The project target for the general lighting shall have a luminaire efficiency of eighty percent (80%) + and shall be specifically called out in the luminaire schedules.

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Maintenance Requirements

Lighting maintenance (including but not limited to relamping) is a significant portion of the ongoing court building operating cost; the limited resources available for operation and maintenance must be conserved. Therefore lighting designs shall, at a minimum, provide:

- Readily apparent access to all fixtures for relamping and ballast replacement.
- Removable shielding devices with cables or chains to hold the device to the fixture during relamping.
- The target of a maximum of five distinct lamp types within the facility with sockets that are unique from each other to reduce relamping errors.
- A thorough Operations and Maintenance manual outlining all project fixtures, lamps and ballasts shall be provided at the end of construction.

Security Requirements

Determine security lighting requirements for each space within the facility to ensure the correct grade of luminaire is used where needed. Three primary grades shall be utilized within the facility.

- High performance and quality architectural fixtures shall be used in all spaces where the need for high vandal resistance is not needed. Areas that need vandal resistance but have ceilings that allow fixtures to be 12-feet or higher can also utilize architectural grade fixtures if deemed appropriate.
- Vandal-resistant luminaires shall be used in areas where direct contact can be made with the fixture by low risk detainees for short periods of time. These fixtures may also be used in areas for high risk detainees but only in areas with higher ceilings and/or proper supervision.
- Detention grade luminaires shall be used in areas where high risk detainees come in direct contact with the fixtures. These spaces include holding cells, sleeping units, and may include some dayrooms and corridors.

Emergency Lighting

To maximize energy savings a means for turning off emergency lighting afterhours via transfer relay or similar means should be used. Include stairwells and corridors where feasible. Coordinate emergency illumination switching with security requirements.

Provide connection to an uninterruptible power source for select lights in the vicinity of the generator, within the generator enclosure, at the electrical service equipment, within the security control center and at the main emergency electrical distribution equipment to maintain operability during a power outage. Security control access points such as sallyports may also be connected to the UPS if desired. Individual fixture emergency battery packs shall not be used due to their poor performance, issues with sustainability and their difficulty in maintaining. Central or local inverters are preferred to allow for multiple fixtures to share one inverter source.

The general emergency lighting shall be feed by the central generator backup power source as

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described within the emergency power narrative.

Coordinate all emergency egress lighting with current State and City requirements, especially in egress stairwells.

Specialty Lighting

Courtrooms:

Facial feature modeling is very important in the courtroom, except in the spectator area.

- Use a combination of direct and indirect lighting.
- Avoid harsh shadows, whether from electric light or daylight.
- Minimize direct and reflected glare.

Ensure that fixture quality and appearance reflect the dignity of courtroom activities.

- Audiovisual presentations are common in courtrooms and lighting must be flexible enough to allow for dimmed ambient light levels, with sufficient light for note taking. For courtrooms with flat-screen monitors, ensure that light sources do not obscure the screen image. Provide multiple levels of switched controls or continuous dimming in all courtrooms.
- Videoconferencing and video recording are becoming more and more common in courtrooms and even for distance visitation. Good uniformity, low glare, and vertical light levels are key considerations for ensuring a quality video environment.
- Diffuse daylight, without direct sunlight penetration, is desirable, but will not be possible in all spaces. Where daylight is available, provide shading devices capable of darkening but not blacking out the room. In spaces where a direct view into the courtroom is a security concern, provide daylight by clerestories or skylights, or provide fixed louvers or baffles that prevent unwanted angles of view. Do not use diffusing glass below 8'-0" above finished floor for any glazing that can receive direct sunlight during any hours of courtroom occupancy.

Open Offices and Private Offices:

Office ceilings shall be suitable for both direct and indirect lighting. As with other spaces, minimizing glare and maximizing fixture efficiency are key considerations. Where the energy code requires additional controls for daylight zones or for areas where greater control is desired, dimming is preferred to multilevel switching or stepped dimming.

Judicial Chambers:

Judicial chambers have the same general illumination requirements as other offices but must often have a bit more flexibility because they can typically have several task areas. Provide supplementary task lighting as follows:

- Bookshelf wallwashers sufficient to light the books from the top shelf to the bottom.

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- Overhead task lighting at the conference table.

Lobbies:

Lobby shape, size, finishes, and lamp types vary but the lighting shall complement the materials and architectural features through the use of different lighting techniques such as downlights, wallwashers, cove lights, and decorative fixtures such as sconces and pendants. Select the most efficient source with good shielding to reduce glare. Public art in the lobby shall be identified during early design phases so that appropriate lighting can be specified.

Circulation:

Circulation areas shall have even, diffuse illumination for wayfinding. Fixture selection and location shall be coordinated with directional signage and artwork. Limited accent lighting may be used to assist in wayfinding.

Exit stair lighting shall incorporate the use of occupancy-sensed light fixtures for energy savings.

Holding Areas/Cells:

Select security rated lighting fixtures for these areas that are resistant to penetration, distortion, and contraband concealment. Characteristics may include but are not limited to continuously seam-welded and smooth corners, completely concealed hinges, hardened security screws, and inner and outer lenses rated for the level of security required per space.

Detention Housing:

All fixtures within the housing areas should have the appearance of educational housing fixtures with security features similar to those used within the holding areas depending on the level of security needed. Lower security housing areas with fixtures mounted above 12-feet above finished floor may be proposed as high-grade commercial fixtures as an alternate to vandal-proof or detention grades fixtures. Refer to *Table B10.2 - Lighting Security Levels* for further clarification.

All luminaires placed within the sleeping units and corridors if visible from sleeping units should be provided with integral amber LED night lights. Amber, or colors between amber and red in the spectrum, is preferred because they do not negatively affect the sleep/wake cycle of inmates. Night lights in the wrong part of the spectrum can cause a chemical imbalance within the body that causes serotonin and melatonin production to occur at undesirable times and in unwanted quantities. This imbalance can lead to a number of issues that can greatly affect those within this type of facility but one of the most prominent is the effect on inmate irritability.

Transaction Counters:

A glass or acrylic security barrier typically separates the public from staff in areas where public transactions occur. This barrier can create reflections from light fixtures that reduce visibility and the ability to view facial expressions. Reflections cannot be eliminated, but they can be minimized by limiting light output to horizontal work surfaces and using fixtures with a low surface brightness. Lighting layouts that are identical on both sides and that take

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into account the angle of the light reflecting off the glazed material will help to minimize reflections. Indirect or direct/indirect lighting shall be avoided under these conditions, as the bright ceiling will be a source of reflected glare in the glazing.

Restrooms

Lighting at mirrors shall be adequate to see without creating facial shadows. Lighting shall be evenly distributed within the stall areas preferably with fixtures providing an indirect lighting component onto the ceiling. Light-color wall and ceiling surfaces are preferred over darker values.

Service Areas

Lighting for electrical and mechanical rooms, janitor closets, and related areas shall consist of fluorescent striplights and wireguards using 1 or 2 T8 lamps depending on the room size. Chain hang, surface or wall mount fixtures around obstacles as needed.

Parking

At judges' parking, staff parking, public parking, loading, receiving, and central holding areas, uniform lighting with minimal shadows shall provide visibility and coverage if security cameras are used. LED sources are preferred in these locations and where on and off cycles are frequent, where fixtures will be dimmed afterhours, or where emergency lighting is required.

Control

Occupancy/Vacancy Controls:

It is intended that this facility utilize occupancy- and vacancy-sensing devices over and above the code minimum areas. Occupancy sensors shall be employed in spaces without access to daylight and shall automatically turn the lighting on when motion is detected and off automatically once no motion is detected for a given period of time. Areas with access to natural light shall utilize vacancy sensors that must have the lighting manually turned on if needed but then will automatically turn them off again once no motion is detected. All spaces are affected except areas where security cameras are needed for constant surveillance or in areas that need constant visual inspection.

Building:

In facilities where a centralized lighting control system and an Intelligent Building System (IBS) are provided, an interface between the two systems shall be provided. Connection to a central security system will also be required. It may be possible that not all spaces will need to be tied to a centralized lighting control system. Spaces such as offices and other areas that are low security, have little need for surveillance and are physically independent from one another could employ simple, low cost standalone lighting control systems.

Daylighting:

In spaces with natural light, luminaries located in the day lit area shall be zoned separately from other luminaries. All luminaries in courtrooms or offices connected to the daylight

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harvesting system shall utilize continuous dimming ballasts or drivers. Lobbies, corridors, and other nonwork spaces may consider multiple level switching or step-dim ballasts if continuous dimming is too costly.

Photosensors shall be filtered or calibrated to respond only to light in the visual range (no UV or IR), and adjusted for the human sensitivity spectral curve. Continuous dimming controls shall utilize a sliding set point algorithm. The design set point for daylight dimming shall be 1.2 times the nighttime designed light level. For example, if the electric lights alone provide 30 fc, the luminaries shall not start to dim until the combined daylight and electric light reaches or exceeds 36 fc (30 x 1.2). The set point for daylight switching shall be 2.0 times the nighttime designed light level.

Lighting Study:

Lighting design shall include a lighting study to be performed using computer aided software, AGi32, Visual, or similar. At a minimum, the modeling shall be provided for a typical courtroom, a typical judicial chamber, public lobbies, and detention intake/release.

d. Fire Alarm System

Design Conditions

Objectives:

Design-Build Entity shall provide a design that incorporates the requirements of the fire protection sprinkler contractor, NFPA 72, and the Fire Marshal for the City of Seattle.

System shall meet the seismic requirements that the unit remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event.

Design shall incorporate County requirements for each portion of the project and future expansion of the Courthouse Building and Detention Facility. It is anticipated that the Courthouse Building and the Detention Facilities will have separate Fire Alarm Systems. This may be revised as discussions with the County proceed and the system design is defined.

Locate the Fire Alarm Control Panel per AHJ and local codes: it is anticipated this will be in a separate incident command post room adjacent to the main entrance to the facility. Provide space for fire fighter phones and building fire alarm drawings.

The system(s) shall include but not be limited to:

- Fire Alarm Control Unit that is field programmable, microprocessor-based, nodular, power limited design with electronic modules, complying with UL 864 and listed and labeled by an NRTL.

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- Software and programs shall be held in flash electrically erasable programmable read-only memory, retaining the information through failure of primary and secondary power supplies.
- Include a real time clock for time annotation of events on the event recorder and printer.
- Alpha numeric Display and System Controls: Arranged for interface between human operator at fire alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory and component status messages, and the programming and control menu.
- Annunciator and Display: Liquid-crystal type, 3 lines of 80 characters minimum.
- Keypad: Arranged to permit entry and execution of programming, display and control commands and to indicate control commands to be entered into the system for control of smoke detector sensitivity and other parameters.
- Elevator recall.
- Door controls, for code-required free-exiting openings in the court and detention.
- Transmission to Central Station Alarm Station: Automatically transmits alarm, supervisory and trouble signals to a remote alarm station.
- Supplementary alarm, supervisory and trouble annunciation and remote paging at remote County EDC monitoring location
- Primary Power: 24-Vdc obtained from 120V as service.
- Secondary Power: 24-Vdc supply system with batteries, automatic battery charger and automatic transfer switch.
 - Batteries shall be sealed lead calcium.
 - Provide sufficient battery capacity to provide for one-hundred thirty percent (130%) of the calculated 90 minutes of operation without power normal power operation.
 - Notification appliance circuits shall not be loaded more than sixty percent (60%) of the design load for the circuit.
- Manual fire alarm boxes.
- System smoke detectors.
- Non-system detectors as required.
- Integral addressable:
 - Photoelectric smoke detectors.
 - Duct smoke detectors.
 - Fire and Smoke Dampers
- Heat Detectors:

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- Comply with UL 521.
- Fixed temperature.
- Rate of rise.
- Integral addressable.
- Notification Appliance as required:
- Chimes - Low Level Output - 75 dBA minimum rated output.
- Horns - Electric-vibrating-polarized type, 90dBA measured 10-feet from horn.
- Visible Notification Appliances Xenon Strobe Lights:
 - Rated Light Output - Maximum 75cd.
 - Flashing shall be in a temporal pattern, synchronized with other units.
- Magnetic Door Holders:
 - Requires no more than 3W to develop 25-lbf holding force.
 - Rating 24-Vdc.
- Remote annunciator on site at the Incident Command Post
- Supplementary annunciation through integration with the County enterprise electronic security system for primary event annunciation and recording. Including a minimum of single point integration of site Fire Alarm, Supervisory, Trouble, Primary Monitoring Comm Fail, AC Pwr Loss and DC /Low Battery Failure alarms
- The Fire Alarm System public address system shall have paging capabilities within the ICP and the County's remote EDC for emergency paging system use. This paging system is separate from the Public Address system noted elsewhere in this document..
- Digital alarm communicator transmitter.

Section 8 - Energy and Sustainability Life Cycle Analysis

Sustainability:

The Performance Standards require that all aspects of sustainable design be considered in the design of new projects. The primary requirement for new projects is a statutory requirement to use the LEED Standard for new construction. King County Ordinance 16147 and King County Code 18.17 define the County's requirement that all major projects set a target of LEED[®] Gold certification.

Measurement and verification of project sustainable goals is a requirement both of County, State statutes, and 2012 Washington State Energy Code which will be in effect when the CFJC project is permitted. The standard includes numerous citations describing the metering, monitoring, and reporting requirements for water and energy consuming systems by system.

The Design Build entity shall provide a Measurement and Verification Plan (MV) to quantify and compare the anticipated savings to the actual savings achieved.

Renewable Energy Commitment: The County requires that the project evaluates the incorporation of renewable energy features into the design including:

- Solar Thermal Heating for domestic water heating.
- Solar Photovoltaic Power: At a minimum the electrical design shall provide conduit pathways to make the building ready for future photovoltaic systems.
- Earth Coupled energy systems.

Energy:

Introduction:

While local and national energy codes have evolved to produce significant energy performance gains compared to the historic building stock of even 5 years ago, cost benefit analysis can identify further measures which exceed code performance to effectively identify reduced life cycle costs for new County buildings. This Section is intended to outline the criteria to be used in preparing energy life cycle analysis which meets the requirements of King County Ordinance 16927. This law recommends that all major County funded construction projects include consideration of all practical energy reduction strategies which have a net present value within a 15 year life cycle analysis. The Washington State Life Cycle Analysis requires that energy measures be evaluated over a 30 year period of analysis.

The County will evaluate the 2 different required time periods (15 years and 30 years); the Design Build entity shall provide Energy Life Cycle Cost Analysis (ELCCA) using both time periods.

Minimum Energy Reduction Target:

King County Statutes require that the project be designed to achieve energy savings of twenty percent (20%) over Seattle Energy Codes in effect at the time of project permitting. The County believes this requirement will be exceeded when LEED EAc2, Improve energy

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for new buildings by 26% under LEED v4. If this is not the case the Design Build entity shall notify the County.

Energy Life Cycle Analysis (ELCCA):

The Revised Code of Washington (RCW) 39.35 and the Washington Administrative Code (WAC) 180-27-075 with relevant sections in Appendix B of the code require the preparation of an Energy Life Cycle Cost Analysis for all publicly owned or leased facilities.

The County is requiring the ELCCA be performed based on ASHRE 90.1 utilizing one of the following energy modeling tools:

- HAP
- Trane Trace
- Energy Plus
- (IESVE) Integrated Environmental Solutions Virtual Environment
- eQuest

In addition to the results of the analysis from the energy modeling tools, the ELCCA shall be submitted using the King County Life Cycle Analysis Calculator available through <http://your.kingcounty.gov/solidwaste/greenbuilding/technical-resources.asp>. King County major projects shall adhere to the ELCCA guideline for life cycle and energy modeling methodology including:

- Development of an ELCCA Work Plan at the start of the schematic design phase complete with a list of alternatives for analysis of envelope, lighting, HVAC, domestic water heating savings and alternative energy system options developed in collaboration with the Design-Build entity and the County.
- In addition to individual energy efficiency measure analysis, provide multiple integrated design packages that each include envelope, lighting, and HVAC, designed to achieve LEED EAc2 earning 11 points: Improve energy for new buildings by 26% under LEED v4.
- In addition to the total cost comparison between different integrated design packages, provide the cost breakdown for the different system components within the integrated packages, including but not limited to: lighting, controls, HVAC -plant side, HVAC, air side, envelope including walls, roof, glazing, etc.
- Provide a project tracking log of project Energy Use Indices (EUI) evaluated during the course of the ELCCA. The tracking log shall include the energy consumption breakdown for each end use, and the energy model assumptions.
- ELCCA Report and Updates: Submit an ELCCA Report describing the results of the analysis with the first design deliverable package to the County. With each subsequent milestone submittal in the design phase, include an updated ELCCA report inclusive of the tracking log noted above. The tracking log shall include a comparison with the previous log and an explanation of any changes in the results.

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King County requires the following specific energy measures be evaluated as part of the ELCCA:

- o Continuous underslab insulation.
- o Alternative energy measures including solar domestic water heating and photovoltaic electrical systems.

Report on Alternatives for Heating and Cooling the CFJC:

In addition to the ELCCA report(s) above, the Design Build Entity shall submit a separate report meeting the requirements of 2012 King County Ordinance 17304 with the first design submittal (100% Schematic Design).

The ordinance requires a report on alternatives for heating and cooling the CFJC the King County requires the following discussion points be included.

- Options considered for heating and cooling the building
- A discussion of the operating, maintenance and equipment replacement costs for the various options.
- A discussion of the greenhouse gas contributes of the various options
- A discussion of how each option achieves the goals establish by the Seattle 2030 district, of which King County is a participating member.
- A discussion of any approved city of Seattle district energy project that might encompass the children and family justice center.

The report shall also include an introduction, executive summary, methodology, findings, conclusions and recommendations, and necessary appendices.

The ordinance in its entirety is available on the King County web page

Measurement and Verification Plan:

The measurement and verification plan (M&V) shall be consistent with option D calibrated simulation as specific in the International Performance Measurement and Verification Protocol Volume III.

The M&V period must cover at least a three year period of post construction occupancy as defined in the Contract Agreement.

The measurement and verification plan shall detail the data required for the verification as well as the responsible parties.

The equipment including meters, sub meters, and data acquisition system shall be incorporated into the Work by the Design Build entity so that the County can access the data remotely to verify energy consumption, and as a tool to achieve future energy savings. The data acquisition system shall used by the Design Build entity to compare projected and actual energy usage to determine consistency or in-consistency between the estimated and actual savings for different end uses. The Design Build entity is to provide, in addition to the M&V plan, a report on the completion of the measurement and verification process that

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Section 8 - Energy and Sustainability Life Cycle Analysis

highlights the results, including but not limited to the estimated, calibrated as well as actual monthly energy consumption and energy by end use, and corrective action recommended. The data acquisition system shall be a tool to identify any corrective action that may be required.

Utility and other Energy Efficiency Incentives:

Design-Build Entity shall research and identify available federal, state, and local utility incentive rebate opportunities suitable to the project and provide a cost-benefit analysis of such to the County for consideration, including, but not limited to:

- alternative energy measures such as solar domestic water heating;
- alternative energy measures such as photovoltaic electrical systems; and
- other available energy efficiency incentive rebate programs.

For incentives selected by the County, Design-Build Entity shall make all required applications and complete all necessary documentation.

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a. Introduction

Purpose of System

These Facility Performance Standards primarily contain design process requirements; i.e., a description of methods by which the design is achieved, and components of the Design-Build Entity's scope of work.

Information Technology (IT) / Telecommunications integrates several technologies to provide communications services throughout the facility. System design standards, construction specifications, and other related information are included herein.

These systems work together to provide a functioning IT / Telecommunications system which meets the needs of the facility users.

This section does not include those systems used for the County enterprise electronic security systems communication infrastructure.

System Performance Criteria

Properly designed and implemented, these integrated systems meet the telecommunications needs of the following environments and user categories:

- Courtrooms:
 - o Judicial officer.
 - o Digital court recording systems. Similar to "For The Record" (FTR).
 - o Clerks.
 - o Coordinators/Bailiffs.
- Attorney workspaces.
- Public spaces.
- General facility office spaces requiring Network and Voice capabilities.
- Building Management Systems (BMS).
- Detention Areas with audio / visual; note: Detention Security Electronics is not part of this Section..
- Conference Room Infrastructure.
- Distributed Antenna Systems (DAS)
- Wireless Local Area Network.
 - o Secure and non-secure (guest or family internet access).

All systems shall be engineered and designed in accordance with manufacturer's warranties and shall comply with the manufacturer's approved installation procedures and practices.

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Installation must be warranted by the installer and manufacturer to cover parts, materials, and labor for a minimum of one year from the date of acceptance or as specified in the manufacturer's warranty. All warranties must be assigned and/or revert to the County at project completion.

The Design-Build Entity shall take into consideration that the structured cabling system included in the CFJC project is for a building that is slated for occupancy in 2016 to 2017, that there is the possibility of three or more network technology changes over a period of 10 years, and this building may be occupied over the next 50 years. Designer is required to partner with the King County Representative team to develop an infrastructure plan and design that will ensure support of the IT needs of the occupying agencies.

System Design Criteria

These systems shall be engineered and designed to meet or exceed all applicable federal, state, and local codes. In the event of a conflict between these system design standards or the King County IT standards and the above-mentioned codes, the codes shall take precedence. The Design-Build Entity must notify King County immediately of any such discrepancies.

Systems shall be designed to fully support both Phase 1 and Phase 2 of the project plus a minimum of fifty percent (50%) growth including, but not limited to: MDF/IDF room planning and sizing, backbone, network architecture as defined by Physical Infrastructure Standard draft 2.5, wireless, DAS.

The Design-Build Entity shall provide engineering and design personnel who are qualified for the work they will be performing. Evidence of past work that is of a scope and quality similar to the systems to be developed for the CFJC project shall be provided when requested by the County:

- Cabling and Infrastructure designers shall be Building Industry Consulting Services International (BICSI) Registered Communications Distribution Designers (RCDD). Project design RCDD must be on Design-Build Entity's team.
- Audio/Visual system designers shall have a working knowledge of the electronic fundamentals of AC, DC, and logic circuits with troubleshooting skills in remote control programming. Additionally personnel shall have attended sound, video, and control engineering courses by manufacturers of Audio/Visual and associated test equipment to be used on project. If no such training is available, provide statement to that effect prior to bid award.

Coordination is essential to the successful integration of these subsystems. The Design-Build Entity shall work in a close and cooperative manner with all parties involved in the completion of these systems. This should include attendance at required meetings and during system test and acceptance. Other parties involved may include, but are not limited to:

- King County Project Representative
- Construction Manager.

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- Subcontractors.
- County's technical experts (network engineers, other technical engineers, telecom/DAS/radio engineers, audiovisual engineers, technicians, etc.).
- Other disciplines (Electrical, HVAC, Security, and Architectural).
- Technical tenant representatives.

b. Cable Infrastructure Specifications and Guidelines

Overview

The structured cabling system is the physical cabling system in which the buildings voice, data, and video networks are enabled to communicate. The system shall provide a reliable pathway of transmission for all communication systems.

Using this Document

This document is not intended to restate or replace industry standard practices or documents but rather highlight specific design requirements of the King County Children and Family Justice Center Network and Telecommunications System needs. Special attention to all applicable AHJ codes and standards shall be referenced in the specific design whether or not mentioned in the document. It is required that the designer has specific qualifications and knowledge of these codes and standards and will apply them where applicable.

Planning

This Section provides installation details for Main Distribution Frame (MDF) and Intermediate Distribution Frame(s) at all locations. Specific spaces and their relations are discussed in this Section. Spaces required to be addressed include:

- Building Entrance Facility (BEF): Room for incoming service provider circuits. May be located within the MDF.
- Main Distribution Frame (MDF): Main equipment room. Typically located between the BEF and the IDFs.
- Intermediate Distribution Frame (IDF): Smaller room between the MDF and the horizontal work stations.

Distribution Frames and Spaces

The telecommunication rooms are the anchor of the cabling system. Careful attention to their design and functionality must be taken into consideration. All communication rooms shall be electronically secured by the building security system.

These spaces shall be dedicated only to those systems which they serve. Do not locate electrical power panels serving areas outside of the telecom room in which they are located, HVAC service ducts not associated with IT infrastructure, or other systems not related within the space.

Adequate overhead space shall be provided to handle all incoming and outgoing cable pathway,

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lighting, and HVAC ducting all of which serve the space. Specific areas of each sub-system may be allocated either on the wall or in the racks. These may include:

Typical Wall Mounted Systems:

- Service Provider Terminations.
- Building Management Systems.
- Security Control Panels.
- HVAC Control Panels.
- Environmental Monitoring Panels.
- UPS Electrical Distribution Panels.
- Audiovisual Equipment.
- DAS Control Equipment.
- Vertical Cabling Pathway.
- Cable Termination, Splice, & Protector Panels.

Typical Rack or Cabinet Mounted Systems:

-
- IP Networking Components.
- VoIP Networking Components.
- Centex.
- Fiber and Copper Termination Equipment.
- DAS Equipment.
- Audiovisual Equipment.

Building Entrance Facility (BEF)

The Building Entrance Facility is where all incoming circuits and lines come in from the Service Providers (Frontier, Comcast, Century Link, I-Net) vaults and associated pathways. This is often referred to as the "demarcation point" for the building. The BEF shall be located within the MDF to enable efficiencies in space, energy, security, and other building services throughout the life of the building. Specific coordination with each services provider shall be done at the very beginning of the project design to help define space requirements. This space shall be the main splice point for all hand-off cables to serve the building.

The Building Entrance Facility consists of the telecommunications service entrance to the building and backbone pathways between buildings. For the CFJC project, the design should plan for three diverse building entrance locations at ground level and one entrance room on the top floor to support roof top antenna entrance.

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- Manhole and handhole design shall be included to facilitate service providers' access into the building from their street demarcation/provider owned manholes and pathways into King County owned vaults. Designer shall include intersection of both service provider and King County owned Other Service Provider pathways.
- Each of the 3 ground level manhole building entrance points shall provide a minimum of twelve each 4-inch conduits. Design-Build Entity shall plan vaults large enough to accommodate a minimum of twelve each 4-inch conduits. All unused conduits shall be stubbed out and capped.
- Each of the 4-inch conduits designated for fiber optic cable usage shall have multiple 3 cell fabric weaved type innerducts with pull strings in each cell.
- Vault and manhole design considerations include the following:
 - City, county, state, and federal requirements.
 - Locations shall coincide with County-owned duct banks and existing pathways and vaults.
 - Surface water drainage into vault or manhole.
 - Water tables.
 - Future street widening.
 - Public and worker safety when manhole is open.
 - Other underground utilities.
 - Overhead power lines, if applicable.
 - Sized to accommodate 12 four inch conduits
- Conduits from roof top into upper floor building entrance shall be sized based on applications and required bend radius of entry cable (e.g., a 1.5-inch Heliac type cable may require 1 each 8-inch conduit.) Refer to manufacture recommended installation practices.
- Roof top building entrances shall be designed to eliminate any penetration leakages.

Main Distribution Frame (MDF)

The Main Distribution Frame is the location within a facility that houses the core of the buildings network computer equipment. MDFs may also act as the distribution frame for those workstations located on the same floor or the same wing of the building where your users are located. The facility shall have one dedicated MDF. All incoming/outgoing phone and data lines terminate in this room, as well as, all other cables systems going to other distribution frames.

This space shall be located on the first floor of the building if possible. If located in the basement, specific attention shall be brought to protect the space from water intrusion and to provide adequate physical security. Other location considerations that should be taken into consideration are as follows:

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- Relation to incoming outside plant building entrance pathway.
- Sharing load-bearing walls.
- MDF shall be located above grade
- Above manhole grade
- Water intrusion. Must include floor drainage.
- Relation to building main power sources (EMI considerations).
- Ceiling height.
- Ease of outgoing pathway, both horizontal and riser paths.
- Security.
- The MDF must not be placed on an exterior building wall.
- Relites and or vision panels are not acceptable
- Future growth potential.
- Loading dock access.

The MDF is not a server room or data center, therefore all non-supporting servers and associated equipment shall not be placed within the MDF. The MDF will also have special environmental considerations, details as described in this Section under the paragraph titled Communication Room Design.

Main Distribution Frame (MDF) is the central landing spot for campus and wide area network equipment fed from Building Entrance Facility. MDFs are also the primary connection point for the IDFs on upper floors or remote areas of a facility and the campus or wide area network.

MDFs also act as the IDF for the floor with which they are located and shall interface with those IDFs co-located within that building. MDFs and IDFs must be placed so that no horizontal copper cable exceeds the 328-foot maximum length from the room to the telecom outlet as defined by TIA 568c or latest revision.

The Design Build entity shall provide a diamond study of the floor layout to verify the number and locations of IDF(s) necessary to maintain the 328-foot limitation for horizontal copper cabling.

Intermediate Distribution Frame (IDF)

Intermediate Distribution Frames (IDFs) are the smaller communication rooms usually located on floors adjacent to the one where the MDF/BEF is situated. Each floor should contain at least one IDF, 150 square feet in size depending on the floor area served. Each IDF may serve up to 50,000 square feet of floor space and each is dedicated to the Unified Communications system. All telecommunications rooms are intended to distribute all telecommunications signals (e.g. voice, data, video) to the area they serve. IDFs can also be located within the facility on the same floor as the MDF when cable runs from the MDF to the workstations exceed the standard 328-foot limit. All IDFs shall be vertically stacked to allow for vertical cable paths

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There shall be no electrical distribution equipment located in any IDF.

Do not run piping through IDFs unless piping is serving the rooms.

Communication Room Design

Physical Space Considerations:

Space planning of all the Communications Rooms is crucial to the building's overall ability to meet the demands of the network infrastructure now and into the future. MDF shall be a minimum of 1000 square feet. An additional 150 net square foot storage room shall be located within the MDF, or as close as possible.

All MDFs and IDFs must be stacked vertically between floors where possible to allow for vertical cable chases between rooms. Chases shall be either 4-inch conduit sleeves or slots. All slots and sleeves shall be fire stopped between floors per local fire codes defined by local AHJ.

All cables runs shall be home run floor to floor directly with no "daisy chaining".

- Example floor 1 to 2, floor 1 to 3, floor 1 to 4 as applicable.

When planning the facility, ensure that adequate space, power, and cooling are included in the design. It is imperative that Design-Build Entity has direct and efficient communications between disciplines (e.g. mechanical, electrical, and IT) and with King County.

Design Criteria:

Vertical floor-to-obstruction clearance shall be a minimum of 8'-6" from the floor to any obstruction above, including pipes, conduits, ducts as occurring. Doors have a minimum 8 foot height requirement. The wall supporting the Equipment Room frame itself must be structured to support the weight of the backboards and the frame itself.

Floors should have a loading factor of at least 200 pounds/square feet. The designer shall coordinate the room's requirements with the structural engineer. The flooring shall be non slip sealed concrete.

Ceilings shall be left open to structure. No hard ceilings or suspended ceilings shall be permitted.

Walls shall be fire-resistant as required by the AHJ, codes, and regulations and shall have all walls lined with APA A/C grade or better, void-free plywood, 8-feet high with a minimum thickness of 3/4-inch. Two coats of fire-retardant paint shall be applied (while leaving the grade stamp exposed for inspection.)

For all IDFs, provide a door at least 3-feet wide with key-lock, KC access control locks, and biometrics controls as defined elsewhere in these Facility Performance Standards by King County standards. When possible, this door should open away from the room.

MDF, shall have double door opening at least 6-feet wide by 9-feet high (with no center mullion) to allow easier access for equipment. Doors shall be key locked with KC access control and biometrics controls as defined elsewhere in these Facility Performance Standards.

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MDFs and IDF(s), doors shall open directly into unobstructed hallways or corridors; doors shall not open into intervening rooms.

Efficient and uniform lighting is also an important factor. The recommended lighting is Lighting = 50 footcandles at 3-feet above finished floor. Emergency lighting for at least 1/2 hour is required.

Approved portable fire extinguishers shall be located near the door in all IT communications rooms.

All rooms and associated equipment (racks, trays, conduits, protection blocks, etc.) shall be bonded to the Telecommunication Main Grounding Busbar (TMGB) or the Telecommunication Grounding Busbar (TGB). The grounding system shall conform to ANSI-J-STD-607A and all NEC and local applicable jurisdiction codes.

Optimum room temperature range of the all IT equipment rooms should be from 65°F to 75°F (20°C to 27°C) as well as thirty percent (30%) to fifty percent (50%) humidity. A separate thermostat and venting will be necessary to control the operating temperature within this room.

All distribution frames should be strictly reserved for data, voice or video applications. No mechanical or electrical equipment shall be co located in these distribution frames.

Do not allow piping into MDF rooms unless the piping serves the rooms. Do not allow piping to be placed above cable trays.

Racks, Frames and Cabinets Characteristics

The rack and frames specified shall be a TIA or EIA compliant Chatsworth or equal, 19-inch (48.3-cm) wide rack with the following characteristics:

- A minimum of (3) three 19-inch wide and 7-feet tall computer equipment racks are required for each BEF, MDF, and the IDF depending upon their size and requirements; grounded per codes and ANSI/TIA-607 standards. Rack shall adhere to Building Code seismic requirements.
- A minimum of 3-feet of space behind and 4-feet in front must be maintained in room layout unless specifically agreed to by King County.
- Rails with a 10x24 ANSI standard hold pattern with mounting screws, no clip nuts.

All equipment cabinets, shall have leveling feet, perforated tops, open bottoms and solid side panels. Follow manufactures' requirements for specific support requirements. Designer to coordinate with King County Representative on cabinet and rack preferences prior to issue of any construction documents.

- Vertical and horizontal wire management shall be utilized for cable path within the racks & cabinets.
- A fifty percent (50%) minimum growth factor shall be used when designing for future growth of rack space required.

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- All racks and associated support must be connected to the building ground system via a TMGB or TGB depending on the room. Designer shall coordinate with electrical designer, BICSI best practices, TIA 607, and all local codes.
- For more information, refer to Appendix E, KCIT Physical Infrastructure Standards.

Communication Room and Main Pathway Characteristics

Pathways are the physical manner in which cable are supported throughout the building. Special attention to the size, quantity and construction type of the cable must all be taken into account when designing the sub-system. This can be accomplished by incorporating the following systems into the design:

- Conduit - both EMT for indoor and PVC schedule 40 or outdoor
- Ladder racking, also called Telco-style tray.
- Cable tray.
- Fiber Trunking (within the MDF).
- Firestopping sleeves.

Note: When a building entrance facility is not co-located within the MDF, the following infrastructure is required. :

- A minimum of twelve (12) 4-inch EMT metal conduits should be placed from the building entrance facility or demarcation point to the MDF. Ensure that there are no more than two (2) 90 degree bends and 100 feet between pull/junction boxes. All conduits shall include nylon mesh type innerducts as defined hereinafter.
- A minimum of two (2) 4-inch EMT metal conduits or a single 12-inch wide by 2-inch deep cable tray should be placed from between the MDF and each IDF. Ensure that there are no more than two (2) 90 degree bends and 100 feet between pull/junction boxes for conduit installations.
- Place a minimum of three 3-cell nylon mesh-type inner-ducts within each 4-inch conduit for future cabling needs.
- Tray, conduits, sleeves, slots shall penetrate closets a minimum 1-inch.
- A minimum of 12-inch wide Telco-style overhead cable tray is mandatory in all distribution frames in non-raised environments. Two or more cable trays may be located side by side or one above the other to provide unique copper and fiber optic paths above racks and cabinets in all MDFs and IDFs. Seismic supports must be considered in the design.
- Penetrations through floor and fire-rated walls shall utilize Intermediate Metallic Conduit (IMC) or Galvanized Rigid Conduit (GRC) sleeves and shall be fire stopped after installation and testing, utilizing a fire stopping assembly approved for that application. A minimum of one sleeve shall be left un-used after initial construction for spare.

The horizontal system pathway must take possible future installations into account.

Backbone Cabling Subsystem

Topology:

Backbone cabling shown in *Figure B9.1 - Star Topology Backbone* provides interconnections between the telecommunications rooms, equipment rooms and entrance facilities. Backbone cabling consists of cables, main and intermediate cross-connects, mechanical terminations and patch cords or jumper wires. Backbone cabling can be within buildings (intra-building) or between buildings (inter-building) via coax, copper and fiber cables however fiber cables, both multi-mode and single-mode cables are the primary utilized media. While other topologies exist in the standard, a star topology shall be used wherever possible. Quantity of pairs and copper and fiber needed in individual backbone runs depend on the area served and shall be coordinated with the King County.

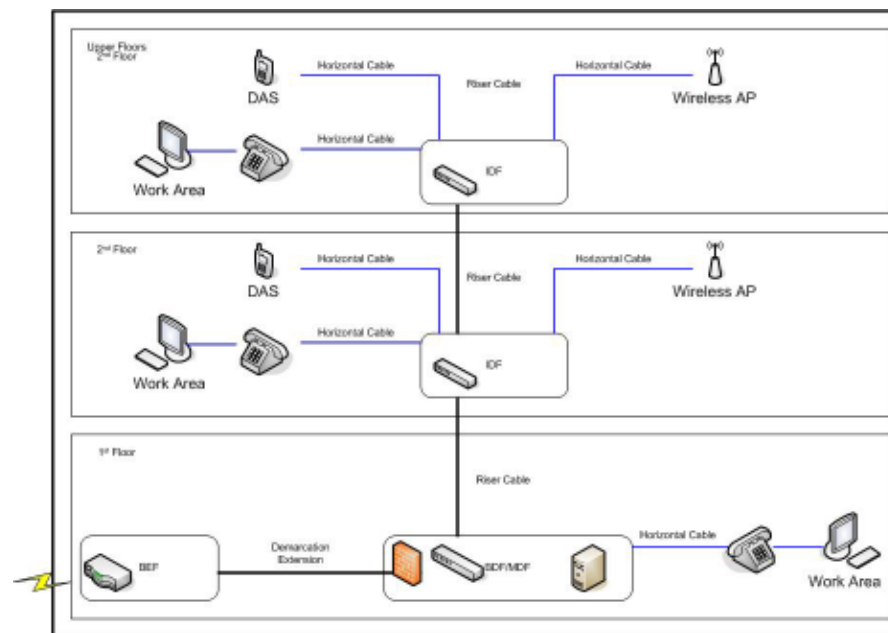


Figure B9.1 - Star Topology Backbone

Cross Connections:

Each horizontal cross-connect is connected directly to a main cross-connect or to an intermediate cross-connect, then to a main cross-connect. The backbone is limited to no more than two hierarchical levels of cross-connects (main and intermediate). No more than one cross-connect may exist between a main and a horizontal cross-connect and no more than three cross-connects may exist between any two horizontal cross-connects.

Recognized media may be used individually or in combination, as required by the installation. All fiber connections shall be made via LC type connectors and be placed in fiber termination units either on the wall (as in a BEP only) or in a rack in the MDF and IDF rooms.

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Distance Limitations:

Special attention to the most current distance performance relationship shall be recognized during the design phase. At a minimum, both 50um laser optimized-OM4 multi-mode and OM single mode fiber shall be installed between all communication rooms. Design-Build Entity shall pay special attention to current distance limits in relation to required bandwidth. See Appendix E KCIT Physical Infrastructure Standards.

Pathway:

Backbone cable shall be installed between all MDF and IDF rooms. All fiber cable shall be placed in either innerduct or have an armored sheath for protection and be placed in either the conduit or tray system.

Horizontal Cable Channel Infrastructure

A channel is the end-to-end transmission path connecting any two pieces of application specific equipment. The channel includes the Patch Cord from the Customer Workstation (or other equipment) to the Data/Voice Outlet, the Horizontal cable, the patch panel, and the patch cord (or jumper) that connects to the CPE within the telecommunications room. Refer to *Figure B9.2 - Example of Typical Horizontal Connectivity*.

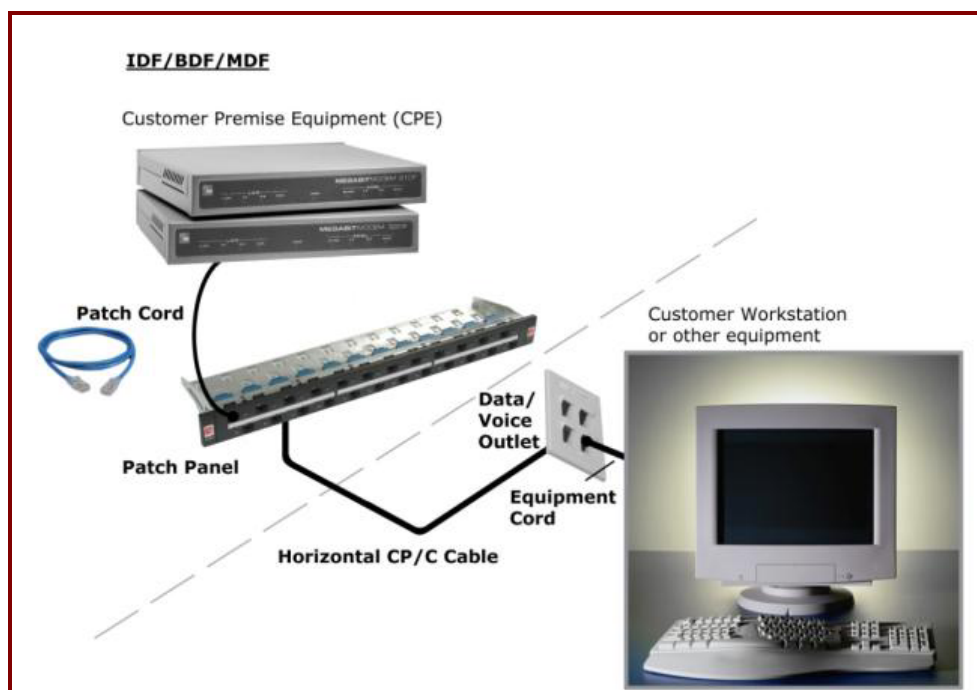


Figure B9.2 - Example of Typical Horizontal Connectivity

Design-Build Entity shall pay special attention to the unique layout of court rooms, conferencing rooms and spaces, detention areas, and other non-office type locations when calculating the 328-foot maximum cable lengths. Many of the spaces possibly may need exceeding long patch

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cables due to telecom outlet location and actual equipment connection points so the 90-meter + 10-meter rule may not apply.

Recognized Horizontal Cables

The categories of transmission performance specified for cables, connecting hardware, and links are shown in *Table B9.1 - Cable Categories*.

Table B9.1 - Cable Categories		
Category	Transmission Characteristics	Description
Augmented Category 6	Transmission characteristics are specified up to 500 MHz Standard IDC type 8P8C termination method.	Supports currently 10 Gigabit Ethernet out to 100-meters, HD video. VoIP, WLAN Access Points.
Category 7 4 Individual shld pairs + overall Shielded	Transmission characteristics are specified up to 600 MHz. Standard IDC type 8P8C and proprietary "TERA" termination methods.	Meets applicable Category 7 and Class F requirements. Requirements are specified to an upper frequency limit of 600 MHz. Supports currently 10 Gigabit Ethernet out to 100 meters, HD video. VoIP, WLAN Access Points.

Work Stations:

Refer to Appendix E, KCIT Physical infrastructure standard 2.5 paragraph 5.7.3 for current KCIT preferred configurations for project layout and design.

Cabling Criteria:

- Work Station Cables shall be terminated on dedicated modular jacks in a single-gang faceplate at each work station (568B termination configuration). Additional outlets may be required.
- Each cable shall also be terminated at the telecommunications room feeding that area on a Visi-Patch 360 style patch panel located within the equipment termination rack.
- Application specific components (e.g. Splitters, media convertors) shall not be installed as part of channel. When needed, they must be placed external to the data/voice outlet or horizontal cross-connect.
- All four cable pairs shall be terminated at the Data/Voice Outlet and at the Patch Panel in the termination closets on dedicated modular termination modules and uniquely labeled for ease of identification purposes.
- The proximity of horizontal cabling to any source of Electromagnetic Interference (EMI) shall be taken into account. (6-inches or more with no metal separation or 6-inches or less

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when metal separation is present, as in cable channels utilized in modular furniture or vertical power poles found in open office environments.)

- All cable sheathing shall be suited for the environment in which it is installed. Special attention to plenum area shall be taken.

Documentation

The final design of the installation and documentation shall follow the BICSI and existing KCIT Infrastructure Standard.

The specific system elements of the administration and labeling system are:

- Pathways and Spaces.
- Firestopping.
- Cabling & Termination.
- Bonding and Grounding.
- Equipment.

Verified accurate as-built documentation that includes all system spaces and systems shall be submitted to the County as part of Substantial Completion process. Provide the most recent version of AutoCad as-built documentation for each MDF or IDF showing the specific areas served from the room and associated outlet number along with IDF patch patching identification data. Both a hard copy map, posted on the wall of each room under clear plastic holder, and soft copy of all test reports and map shall be turned over to King County as part of the Substantial Completion process. .

In addition, include physical labeling in the IDF and at wall jacks of all cable runs from wall jack to termination IDF.

Verification and Testing

Performance testing shall be a component of the overall design of the telecommunications system. Testing of the telecommunications system shall include::

- All cable (fiber and copper for both backbone & horizontal systems).
- Patch cords.
- Grounding and Bonding conductors.

Make complete test results available to the County throughout and upon completion of the CFJC project. This documentation shall be handed over in electronic format in their original form. At a minimum, furnish the following documents:

- OSP cable routes, splice and termination points, performance tests and associated designation.
- ISP cable routes, splice and termination points, performance tests and associated designation.
- Site and building floor plans showing all routing, termination designations and locations.

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- Telecommunication room overhead and elevation as-built drawings reflecting changes during construction.
- DAS and other building systems full documentation and floor plan as-built locations with designations.

Only trained and qualified personnel shall perform testing. All testing shall be done by a manufacture-certified installer as to obtain the longest manufacture warranty available per U.S. industry standards. Manufacture testing of patch cords or pre-terminated components shall be acceptable. Current calibration certification of all installer test equipment shall be made available upon request by King County.

Tests shall be performed per industry standards and manufactures' suggested procedures. All tests shall be organized and match as-built documentation.

Power and Uninterruptable Power Supply (UPS) Systems

Specific power loads for all IT communication rooms shall be separately designed in conjunction with an electrical engineer. All telecommunication rooms should have adequate power supplies with "ON-LINE" UPS systems are required for those systems that are critical to the business.

General Power Guidelines:

- All electrical service for all IT rooms shall be separate from all other building services.
- All circuits located for racks and equipment shall be dedicated and isolated ground marked with orange receptacles and labeled as such.
- All circuits shall be minimum 20amp/120VAC circuits and be on generator or emergency power.
- A minimum of four 20amp circuits shall be placed on the backboard of any telecommunication room and be no closer than 12-inches from any copper telecommunications cable or termination.
- A dedicated/isolated ground 30amp/208VAC and a 20amp/120VAC circuits shall be installed above each equipment rack/cabinet.

Distributed Antenna Systems (DAS)

A DAS is a network of antennas and various types of network switching equipment that facilitates both cellular and radio wireless services throughout the facility. This network is not part of an IT network wireless Local Area Network (LAN) or WI-FI and uses its own unique and diverse design and equipment.

It is understood that the DAS technology of today will have matured and will have advanced when this building is ready for occupation, it is required that a skilled DAS designer be engaged by the Design/Building Team the DAS design. The DAS system should be flexible in design to allow for future changes, upgrades, and/or additions of frequencies.

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The system design shall provide for one-hundred percent (100%) coverage of all facility spaces for all of the selected service providers' signals, Partial coverage will not be acceptable.

Coverage of the Public Safety application of the DAS shall comply with the latest version International Fire Code 501.1, or the latest version of the National Fire Protection Agency.

The DAS system must support the local and national code for emergency services communication frequency spectrum. Local codes and AHJ supersede all. This shall accommodate provisioning for the various frequencies that will support emergency services and first responders.

The DAS shall provide amplified cellular service from multiple service providers via a vendor neutral chassis based system. The designer shall to identify the specific cellular providers who provide service to the geographical area whose services must be accommodated.

Designer shall also coordinate with the local facility radio system owners to define what if any needs are required by the DAS. All signals provided by portable radios should pass though the repeaters on any floor and be rebroadcast to all of the receiving radios.

Availability: The DAS system is expected to be up and available 7x24x365, including during power outages. The system is critical to emergency services and site radio communication, so power for all racks with DAS head-end equipment and DAS distribution electronics shall be on Critical Power System (CPS) electrical (UPS powered with generator backup). Any exception request must be documented and approved by King County Facility Management Division (FMD) and the local public AHJ for code compliance.

Network Architecture

Design Considerations:

The integrated IP network design goal shall be to develop an intelligent, converged network that provides a responsive, effective, and supportive environment. The King County Justice Center project will include a multitude of IP based systems, IT related and non- IT such as BCS and the Network Architecture will be critical to a successful enterprise.

The Network needs to provide:

- Scalability.
- Resiliency or Fault Tolerance.
- Redundancy.
- The ability for different IP based networks to co-exist without impact.
- Be manageable for operations continuity and troubleshooting.

The following courthouse technology systems are typically supported by the facility's converged IP network:

- Typical data for office applications.

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- Judicial-specific applications.
- Case management systems.
- Internet/Web access.
- VoIP telephony system.
- WLAN communications (Wi-Fi).
- Network management and network control traffic.
- Building Control System (BCS).
- Lighting control systems.
- Digital signage system.
- Video and streaming media.
- Audiovisual systems. (
- Queuing system.
- Master clock system.
- IPTV systems.

The Design-Build Entity will not be responsible for actual Network Architecture planning.

It is important for Design-Build Entity to provide robust infrastructure to minimize the need to re-cable the building in 5 to 6 years or being unable to migrate to the next generation of technology. During the Design Development phase The Design Build entity will describe what steps they are implementing to meet these future needs.

Wireless Local Area Network (WLAN)

The designer shall plan for one-hundred percent (100%) facility wireless network coverage with zero gaps with extremely high density of users. System shall be designed to support one-hundred percent (100%) coverage for both a publicly accessible Wireless/WI-FI network and a distinct and separate business wireless network.

Designer shall have a minimum of 2 years of wireless network design background and be experienced in utilizing the wireless access point heat mapping system for Wireless Access Point (WAP) counts and positions on floor plans. Designer shall also be experienced in the design of multiple overlapping but isolated or firewalled wireless networks.

Designer shall also engage with King County for understanding of growth and any technology migration plans.

Provide a minimum of two each 4-pair cat6 or better to each wireless access point (WAP) location or leave a 10- to 15-foot coil for ease of relocation and expansion of additional APs.

Reference Standards

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King County Information Technology Governance Standards - Physical Infrastructure Standards Rev 2.5, 03-14-2013, or latest version.

ANSI/TIA 568-C-1: Commercial Building Telecommunications Cabling Standard Part 1: General Requirements - 2012.

ANSI/TIA 568-C-2: Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components - 2010.

ANSI/TIA 568-C.3: Commercial Building Telecommunications Cabling Standard, Part 3 Optical Fiber Cabling Components - 2011.

ANSI/TIA 569-B: Commercial Building Standard for Telecommunications Pathways and Spaces - 2013.

ANSI/TIA 598-C: Optical Fiber Color Coding - 2005.

ANSI/TIA 606-B: Administration Standard for Commercial Telecommunication Infrastructure - 2012.

ANSI/J-STD-607-A: Commercial Building Grounding and Bonding Requirements for Telecommunication - 2002.

ANSI/TIA/EIA-758-A: Customer-owned Outside Plant Telecommunications Infrastructure Standard - 2004.

ANSI/IEEE 802.3ae 10Gb/s Ethernet Standard - 2002.

ANSI/IEEE 802.3af & at Power Over Ethernet Standards.

ANSI/IEEE 802.11 - Wireless Ethernet Standards, including 802.11a, 802.11b, 802.11g, 802.11n, and 802.11ac.

BICSI Telecommunications Distribution Methods Manual (TDMM) - 12th Edition.

BICSI Information Transport Systems Installation Manual (ITSIM) - 5th Edition.

BICSI Outside Plant Design Reference Manual (OSPDRM) - 5th Edition.

BICSI Wireless Design Reference Manual (WDRM) - 3rd Edition.

ANSI/EIA-310-D: Cabinets, Racks, Panels and Associated Equipment Standard.1992

ANSI/TIA-492.AAAC-B: Detail specification for 850 nm Laser-Optimized, 50-mm Core Diameter/125-mm Cladding Diameter Class Ia Graded-Index.

c. Audiovisual Systems Design Guide

Document Intent

The intent of this *Facility Performance Standard* is to provide a summary and description of the audiovisual criteria as a tool to assist in the development of an effective AV systems design. Each of the system types will be described in terms of its capabilities, the type of equipment required to support these capabilities, and general suggested equipment locations.

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The report will discuss the following general areas of AV technology support:

- Video display technologies.
- Audio systems and distribution.
- Control systems.
- Video conferencing systems.
- Court Proceeding recording systems, currently audio potentially video in the future. Networked media distribution & digital signage systems.
- Hardware and mounting systems.
- MATV/CATV distribution.

Introduction

This section includes the audiovisual design criteria for the new King County CFJC building.

This section of these Facility Performance Standards is intended to provide high level audiovisual systems design requirements and is not intended to provide extensive detail or product specifications for the systems described.

The audiovisual system shall be a part of the technology design package and shall be specified in CSI MasterFormat Division 27.

This document does not specifically address related design issues such as acoustics, lighting design, or network connectivity which are covered in other Sections of this *Facility Performance Standard* document.

This section does not include Audiovisual systems associated with Detention Security Electronics, however does apply to Audio visual systems located within detention that are not part of the Detention Security Electronics. This section does not include audio visual systems that are component of the County wide enterprise electronic security systems.

Design Background and Goals

Each of the system designs for the CFJC project shall support the intended use of the space; shall be simple to operate, cost effective, reasonable to service, while utilizing the latest technologies available at the time of construction.

General design criteria for the individual types of systems include:

Video:

Analog and digital video connections shall be used in all user laptop connection panels. The displays utilized for presentations shall be sized appropriately for the use of computer generated displays. Where practical, the distance from the farthest viewer should be no more than six times the height of the display. If there is a need for image magnification, or camera images only, the image height vs. viewing distance may be increased. All displays shall be capable of being reliably controlled from a secondary control system. At the minimum, all displays must be natively capable of the highest

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resolution required by any system connected to the display. Camera systems must be selected that yield images that will be useful and appropriate for the viewers, and will be easy for users to operate.

Audio:

Audio systems must have an appropriate fidelity for their application. Speaker systems must be designed to provide reasonable volume and even coverage throughout the listening areas. Digital processing must be utilized whenever feasible to efficiently control the complexities of the audio signal management.

Control:

- Control devices used to operate the AV systems must have simple to understand user interfaces. Touch panels must leverage icon oriented touch control leveraging familiar web browser style formats. Control systems must be capable of controlling the local devices with only one user interface.
- User interfaces shall have similar nomenclature and a consistent theme throughout the facility to lessen the need for training from room to room. Similar room types must have identical control methods throughout the building.
- All control systems must be capable of residing on, and being managed via the network. The overall design must provide the capability for all of the separate systems to be controlled locally through a user interface such as a touch panel or wireless tablet and remotely through a networked help desk scenario.

Video Conference Systems

Video conference systems must be standards based and any existing video conference platforms that are already utilized by the County must be taken into consideration in the selection of new devices. The systems must be able to display a camera image, content (computer images typically) and the systems must support multi-site connectivity capabilities. The high quality standards of the court need to be met to support critical applications, high security, and best in class image and sound quality. Support of non-standards based video conference systems and mobile endpoints should also be considered in the design of the systems. The networked video conference systems shall be required to interface with existing video conferencing network infrastructure. At the time of this writing Superior Court uses a Cisco product(s). Other County entities use Lync.

Types of AV systems are shown in *Table B9.2 - AV Systems Matrix*.

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Table B9.2 - AV Systems Matrix											
ROOM TYPE	Speech Reinforcement	Video Conference	Large Monitor(s)	Large Screen Display System	Control System	Court Recording	Program Audio	Digital Signage(interactive)	Digital Signage	Assisted Listening System	Local Computers
Courtrooms	•	•	•	•	•	•	•	•	•	•	•
Small Conference Rooms		•	•		•		•		•		•
Large and Medium Conference Rooms	•	•	•	•	•		•	•	•	•	•
Training/Briefing Rooms	•	•	•	•	•		•		•	•	•
Lobbies and Waiting Area			•				•	•	•	•	
Lobby Kiosks								•			
Multipurpose Rooms	•	•	•	•	•		•			•	•
Chapels	•				•						
Gyms	•				•						
Judicial Conference Rooms	•	•	•							•	
Day Rooms		•	•					•	•		•
Detention Classrooms		•	•						•		•
Medical Interview Rooms		•	•	•							•
Medical Exam Rooms		•	•								•
Library		•	•					•	•		•

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AV Systems -Global Control

All non security AV systems must have the capability of being connected together via the building network. A global method of management should be considered to enable centralized management of the systems. This level of management must include capabilities for day to day help desk type of support, such as allowing a support technician in a different location to remotely operate a projection system. It must also be capable of shutting down all of the monitors and projectors at a particular time each day to ensure that they are not left powered on. The goal of networked control is to lessen the support requirements, increase the user satisfaction through fewer support issues, and decrease the down time of rooms due to better managed maintenance support.

Through an authentication log in, a support person should be able to access the control of the AV system in a particular room with a 'virtual' touch panel accessed with a web browser on a personal computer or tablet. This must support a help desk type of application where a user may contact the help desk, and the remote technician will then be able to operate the system, diagnose issues, etc. This help desk can be located in the building but the system should be designed such that it is not required to physically be located in the building and can be accessed with mobile devices by qualified personnel.

Systems – Digital Signage

General:

The digital signage system shall consist of permanently mounted monitors located in strategic locations throughout the building to display specific preprogrammed information. The locations at a minimum should include one per courtroom waiting area and one per each primary vertical circulation lobby and one at the public entry screening area. These monitors should display images reproduced by a networked computer system (media players). The information displayed typically consists of schedules of events, maps, reminders, weather, announcements etc. and must be capable of being preprogrammed remotely via the network. Any sound system for a digital signage display must be carefully planned to keep the sound isolated to the area that will be used by local viewers.

Media Players and Software:

All media players must be capable of network control and programming via a common software platform. The software platform should be carefully selected based on the complexity of the content to be developed, emergency messaging needs, matching system management complexity with staff capabilities, network usage and scalability.

Media players should be selected based on the software performance requirements, memory storage, local control requirements, monitor video requirements, live video or CATV input requirements.

Kiosks:

Kiosks will be required in the lobby areas for check in and wayfinding and must be consistent with the other wayfinding planned for the building. The monitors shall be

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required to be touch-sensitive, and the media player shall be required to have interactive capabilities. The check-in functions shall be coordinated with King County's technical staff. The wayfinding shall be graphical and easy to understand. The Kiosk itself must be designed to be durable, capable of housing the media player and monitor, accommodate ventilation if required, and requires power and network connections. The Kiosk system must be integrated with other County Systems such as the existing case management system. The current requirement is for a minimum of 4 Kiosks to be strategically placed in the lobbies to maximize the public's interaction.

AV Systems - Conference Rooms

General:

Conference rooms shall be designed to support efficient office meetings that involve staff in the room and connected remotely. The conference rooms shall include a large display to enable the participants to easily view computer generated images or images from video conference units. The display shall be a wall mounted wide screen HD monitor or a wide screen projection system depending on the size of the room. The bottom of the image should be no lower than 40- to 48-inches above the finished floor.

Wired laptop connections shall be easily accessible and shall include digital and analog connections. Wireless connections for laptops, tablets, or other mobile devices should be considered for all conference rooms on all floors.

Sound system shall include a speaker system appropriate for the size of room; at the minimum, the speakers from the monitor, but may require larger speakers if the room is large enough.

A teleconference system shall be provided for audio-only conference calls. This system may include ceiling or table microphones or may include a table top conference phone.

Video Conference Systems:

Video conference systems shall include wall-mounted cameras, microphones, and a hardware-based codec.

Control:

A control system shall be required for conference rooms, and shall be included with any room that has video or teleconference capabilities, dividable rooms, or rooms with microphones. A conference room shall have a network interface to allow global control and monitoring of the local system. Touch panels, remote control, tablets, or button panels shall be used to control any system that includes a control system.

Hardware and Mounting:

A back box should be provided behind monitors to allow cabling, power, and connections managed in a discrete manner. Ceiling-mounted projectors shall have power and low voltage ceiling boxes located in the ceiling next to the projector mounting system.

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A lockable cabinet shall be provided for local equipment such as amplifiers, controllers, etc. as occurring. Proper size, service access, and ventilation shall be required of any equipment cabinet. Power and network shall be located in an equipment cabinet.

Paging Systems

This system provides for one way audio communication from multiple initiating stations to:

- specific areas/zones,
- multiple areas/zones,
- or the entire building.

In practice an announcement may emanate from a courtroom to the courtroom’s immediate waiting area, attorney meeting rooms, and local bathrooms.

Each courtroom would have this capability.

The areas to receive the page could be increased by staff through user programming to include other courtroom waiting areas, or the entire floor, or the entire building as needed by the staff initiating the page.

Table B9.3 – Paging Functions describes the various intercom functions; locations are addressed in the Room Data Sheets.

Table B9.3 - Paging Functions	
Type	Description
COM 1	Area Paging Only
COM 2	Local Paging Only Zoned as Desired by the County
COM 4	Video Only.

AV Systems - Courtrooms

General:

The courtrooms AV systems will need to accommodate multiple permanently mounted flatpanel monitors to support display of numerous laptop connections, for video conference sessions, and computer connections. The monitors shall be easily viewed by participants in the room.

The sound system will need to incorporate microphones to capture the participants who speak for recording purposes and for sound reinforcement if necessary. A ceiling speaker system shall reproduce the microphone audio and any audio from media with audio that is being displayed on the monitors.

A networked digital recorder shall capture the audio and video from the microphone and camera system and digitally archive the recording. Users of the voice enhancement system and court recording system must have the capability to push to mute their microphones. This

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recording system must be computer-based and operated in the room by a Clerk's Office staff member.

Microphone audio and camera video should be reproduced on monitors in overflow rooms, if required.

Courtroom Video Conference Systems:

Video conference capabilities shall be included in design for the courtrooms to support scenarios such as video arraignments remote call in for witnesses. This includes two wall mounted cameras, microphones, and a hardware-based codec.

Control:

A control system should be designed into the system to provide simple to operate control over the sound and video equipment. Two touch panels shall be provided per courtroom and each touch panel shall have wireless capabilities.

Hardware and Mounting:

A back box should be provided behind wall mounted monitors to allow cabling, power and connections managed in a discrete manner. Ceiling-mounted monitors shall have power and low voltage ceiling boxes located in the ceiling next to the monitor mounting system.

A lockable cabinet shall be provided if there is local equipment such as amplifiers, controllers etc. Proper size, service access and ventilation concerns shall be considered during the design of any equipment cabinet. Power and network shall be located in an equipment cabinet.

Floorboxes should be provided to allow for flexible arrangement of furniture with connections in the floorboxes to support power, network and display needs of laptops or other electronic equipment with video outputs.

AV Systems – Sound Reinforcement Systems

General:

Sound reinforcement systems shall be provided for spaces that will occasionally require an individual to address a group of people. These systems shall typically be installed in areas such as chapels, gymnasiums, cafeterias etc. The systems shall be simple to operate, have wired and wireless microphones and include the capability for playing background music through the system.

Video:

Video projection shall be provided in larger spaces. A permanent projection screen and portable projector shall be provided per space. Power shall be conveniently located for the portable projector.

Control:

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A simple volume control should be provided in an area that is accessible by staff or in a locking wall box if the access is in a public area.

Hardware and Mounting:

An equipment rack shall be located in a nearby service room to house equipment such as amplifiers, processors, microphone receivers etc. Power and network shall be located in the equipment rack.

Master Antenna/Cable Television (MATV/CATV) Distribution System

General:

A distributed MATV/CATV system shall be provided for spaces that will require broadcast cable, satellite, or off-air broadcast television programming. The distribution systems shall provide signal distribution from the point of demarcation or antenna origin to wall panels at specific television locations. This distribution system will include the necessary cabling, signal amplification, processing and splitting systems as required for the system and channels requested.

Locations:

At a minimum, two locations in each housing unit should be planned for. The MATV system will require careful coordination between the digital signage systems, AV systems, and the data cabling systems to ensure that all potential device and drop locations are properly captured and accommodated.

Hardware and Mounting:

Cabling shall be routed through cable trays and telecommunication closets to provide pathway between equipment and television drop locations. Amplification and distribution equipment should be located in telecommunication closets.

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Section 10 - Electronic Safety and Security Systems

Section 10 - Electronic Safety and Security Systems

a. General

The County owns and operates state-of-the-art security electronics equipment at its facilities which include courthouses, district courts, office buildings, public health buildings, Sheriff's offices and training facilities, garages, vehicle maintenance facilities, storage warehouses and other types of facilities. The primary benefits associated with use of electronic safety and security equipment at these facilities is to help to ensure a state of preparedness and readiness against possible and real security threats and the ability to record any incidences with video and/or audio information.

The Design-Build Entity shall be responsible for reviewing and verifying equipment with the most current King County standards.

County intends that the Design-Build Entity provide two (2) separate electronic control systems, one for the Detention Facility and all detention spaces and the second for the Courthouse Building, Parking Garage, site security and other non-detention spaces. The Security Electronics Equipment for each of these systems may or may not be collocated. If collocated each systems equipment shall be separated by secure barriers (walls/fence) each with its own secured door. If co-located the equipment may share HVAC cooling system. UPS systems will be separate. The system provided for the courts and other functions listed above shall also have the capability to be monitored and operated at the County's Off-Site Emergency Dispatch Center (EDC) through integration with the County enterprise electronic security system

Main Security Electronics Equipment Room(s):

General:

The security/communications room houses the backboards and equipment racks and cabinets that enclose the security/communications system head-end equipment.

Power panels may be located in this room only if they are to be used for the specific purpose of supplying power to the security/communications equipment.

Telephone and data backboards, data switches, etc. should not be located in this room; exception: a detainee telephone backboard may be located in the Detention Security Electronics Equipment room to facilitate touch screen control of detainee telephones.

Layout:

All racks will be free standing racks and be required in this space to support the above listed systems.

Each rack occupies approximately 25-inches wide by 36-inches deep of floor space and stands 6-feet tall.

The racks will be situated side by side to accommodate maintenance staff access to the front and rear of the electronics equipment and will be equipped with a 4-inch wire-way between adjacent racks. Each rack requires 3-feet of clearance (front and back) minimum as per NEC. An additional 12-inches is necessary to facilitate wall mounted equipment on all walls.

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Location:

To minimize cable and conduit runs, this space should be located as near to the highest density of field devices as is practicable. The Detention Security Electronic Equipment room shall have direct access from the Detention secure perimeter, and from the an area outside of the Detention Secure Perimeter. If co-located with the non-detention Security Electronics Equipment Room that serves the rest of the facility each area shall be separated by secure barriers (walls/fence) each with its own secured door. Access and construction materials for the space(s) should be equal to those used for the Central Control Room. The room should ideally be located within 250-feet of all or most other security electronics rooms.

Power, Emergency:

Each security/communications rack and each pair of wall mounted cabinets should be provided with a dedicated 120VAC, 20A circuit. Additionally, one dedicated 20A circuit should be shared between the EIA standard 19" racks for rack mounted convenience outlets to support drop-lights and metering equipment. All power to racks and cabinets should be on the same phase.

Power:

The PLC processor cabinet and the CCTV system rack should share a 120VAC UPS circuit to bridge the delay between loss of normal power and emergency generator power-up. Additionally, the UPS will allow the PLC processor and CCTV switcher to consistently receive clean power even during periods when the emergency generator, which is inherently electrically noisy, is operating. The UPS and all power and (class 1) cable and conduit and all boxes and outlets shall be provided by the CSI MasterFormat Division 26 electrical contractor and need to be shown on the electrical drawings.

Cable Trays:

Cable trays shall be confined to within the security electronics room and shall be used to facilitate cable access to the racks and cabinets from above.

Gutters:

The gutters should be routed around the perimeter of the room beneath the wall cabinets. Gutters should be confined to within the security electronics room and should be used to facilitate cable access to the cabinets from below.

Telephone:

A wall mounted telephone should be located adjacent to the entry door. Also telephone outlets should be mounted in selected equipment racks and cabinets for off-site system troubleshooting. To minimize the possibility of outside parties hacking into the system, equipment provided with modems will either be "call back" or require the on-staff maintenance personnel to physically plug in the modem for use when needed.

Piping:

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Do not allow piping in the Main Security Electronics Room unless the piping serves the room. Do not allow piping to be placed above cable trays.

Wall mounted equipment:

Wall mounted equipment such as controller panels, enclosures, and power supplies shall not be located above ceilings or in difficult to access locations. Wall mounted equipment shall be mounted on finished ¾" fire retardant plywood backboards installed vertically with fire brand showing. Equipment shall be mounted between two (2) and seven (7) feet above the finished floor.

b. Electronic Court Control System (non Detention)

System shall be designed, installed, and tested in accordance with NFPA 730 and 731

Control System

Security systems and equipment shall be designed so that it is capable of performing its intended functions under the following conditions:

- At eighty-five percent (85%) and at one-hundred ten percent (110%) of the nameplate primary (main) and secondary (standby) input voltage(s).
- At ambient temperatures of 0°C (32°F) and 49°C (120°F).
- At a relative humidity of eighty-five percent (85%) and an ambient temperature of (30°C) 86°F.

All Court Electronic Security System additions shall be compatible with and an extension of the existing King County Integrated Enterprise Electronic Security Control System. Communication connections from new panels to the existing Control System shall be provided using one of the following technologies:

- King County Electronic Security System WAN/LAN (KCESS) or
- Direct connection to KC Primary Server Security Local Security LAN in the King County downtown buildings complex.

Whenever possible, one discrete zone, input, output, reader, etc., shall be dedicated to each device. If more than one device resides on a loop/zone, the area covered by all zoned devices, it shall not exceed the area that one person can maintain under surveillance from a single location by either CCTV observation or direct observation.

Wire and Cable

A separate centrally located Access/Security/CCTV contiguous wire/cable riser shall be provided between all floors with dedicated terminal/routing cabinets on each floor. The following are a series of quality assurance requirements:

- Conduits shall be of 2-inch diameter or greater. A maximum of fifty percent (50%) of riser rated wire fill capacity shall be used.

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- Data cable shall be Category 6. Category 6 cables shall be plenum rated.
- The shield of the coaxial cable shall be braided, one-hundred percent (100%) copper material with an Efficiency Rating (ER) of ninety-five percent (95%) or better. Reverse foil over copper braid with a one-hundred percent (100%) ER shall also be acceptable. The dielectric shall have an impedance of 75Ω. The center core shall be one-hundred percent (100%) copper with an outer diameter that matches the inner diameter of the center tip of the BNC connector to be installed. In installations where the coaxial cable will flex (i.e.; pole to pole) a stranded center core shall be used. In installations where the coaxial cable will be fixed (i.e. inside conduit), a solid center core shall be used. All connections shall be made with three-piece, crimp BNC connectors only. The only acceptable connector shall be a three piece, crimp connector consisting of a separate center tip, jacket sleeve and main body that snaps onto the center tip and under the crimp sleeve and cable shield.
- Conduit runs shall not contain more than 275-degrees of bends, and not exceed 100-feet in length between junction boxes.
- All conduits for the security communication shall be 1-inch minimum in diameter with no looping between outlets.

Intermediate Distribution Frame (IDF) Rooms:

It is anticipated that some Security Electronics equipment may be located in IDF rooms together with other Information Technology (IT) equipment.

Wall mounted security electronics equipment such as controller panels, enclosures, and power supplies shall not be located above ceilings or in difficult to access locations. Wall mounted equipment shall be mounted on finished ¾" fire retardant plywood backboards installed vertically with fire brand showing. Equipment shall be mounted between two (2) and seven (7) feet above the finished floor.

Electronic Access Control

System Requirements:

King County utilizes a county-wide access control system to maintain employee access control, maintenance and levels of access/assignments for all County staff in all County owned buildings.

The new CFJC will be a component building within the County wide access control system, and compatibility of all new equipment and software with the existing County wide access control system is required.

King County shall be responsible for systems function programming and for entering all employee-specific information regarding door access and hours of access.

The following is a listing of specific software and equipment the Standards the County believes are essential to make the new CFJC component building within the County wide access control system,

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- Software: Tyco Inc. SoftwareHouse C CURE.
- Controllers - Access Control: Software House.
 - o iStar Pro.
 - o iStar Edge.
 - o iStar Ex.
 - o DCM-2 RM4e door controller.
- Controller Add on boards / cards - Software house:
 - o i-8 8 input card.
 - o r-8 8 output card.
 - o i-32 (end of life, repair only).
- r-48 (end of life, repair only).

The following list of equipment are existing components utilized by the County in the County Wide Access Control System as of Fall 2013. This list is provided to give a complete picture of the existing County Wide Access Control System. It is anticipated the Design Builder will provide similar system components that are state of the art at the time (approximately 2018) of installation.

- Hardware: Computers – Network Servers: Dell Power Edge.
- Workstations: Dell Optiplex or Dell Precision.
- Media Converters / Connectors: Allied Telesis AT-MC converters.
 - o Netgear HUB FS108 8 port.
 - o Netgear HUB FS524 24 port rack mount.
 - o Lantronix Terminal Servers.
- Managed Switches/Routers: Dell Power Connect.
 - KVM Switch: Belkin Omniview 8 port KVM or Belkin Omniview16 port KVM.
 - Network Patch Cord: Lcom RJ45-RJ45 Category 6 Black - TRD855BLK-xx or Lcom RJ45-RJ45 Category 6 Blue - TRD855-BL-xx.
 - DB-9 Patch Cable: Lcom Dsub DB-9 CS2N9MM-xx.
 - Power Supplies - Provides power for Fail-Safe and/or Fail-Secure locking devices.
 - o Software House APS power supply - SWH controllers.
 - o Altronix Access Control 24vdc, FACP interface, PTC protection.
 - Readers/Transmitters:
 - o Linear ACP00727 WOR Wireless reader 318Mhz.

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- o Linear ACT22 - 3 channel wireless transmitter.
- o Transcore eGo RFID tag reader 915 Mhz.
- o Bioscrypt V-Smart Biometric Reader.
- o IDTECH WCR3297-600 Barcode Reader.
- o RP40 multiCLASS Wall_mount, Blk.
- o RP15 multiCLASS Mullion_mount Reader, Blk.
- Door Monitoring / Control:
 - o Bosch DS 150i Request to Exit Sensor.
 - o Sentrol wired Door Contacts.
 - o Ademco wired Door Contacts.
 - o Air Products and Controls MR101-MR201 UL Interface relay.
 - o Alarm Controls MCK-6 series keyswitch w/alternate action.
 - o Alarm Controls TS-2-2T push to exit button DPDT/30sec,
 - o Alarm Control rack mount R-3 / R-6 Control panel.
 - o Rutherford Controls 909 (S and F) remote door unlock switch.
 - o Alarm Controls TS-32 Emergency Door Release Button.

The following list of equipment are components to be provided by the Design Build entity that will need to be integrated into the County Wide Access Control System. It is anticipated the Design Builder will provide components of similar or better quality that are state of the art at the time (approximately 2018) of installation. Integration with the C CURE software is required.

- Weapons lockers: current standard, RFID Company proxSafe: automatic content identification, fail-safe opening with built in power supply and backup battery, service compartment for installation and emergency release.
- Key Locker: current standard, RFID Company proxSafe: built in power supply and battery backup. Electronic control of all connectable components. Emergency opening of the appropriate prox cylinders.
- Security Turnstile: current standard, Boon Edam Inc. Maxim Security Level, 72 inch tempered clear glass barrier panels that retract into the cabinet, optical sensors shall allow for operation in direct sunlight, and prevent activation by flashlights. Electro-mechanical drive system, designed for 'normally closed' operation. Fire alarm activation or power outage situations shall cause barrier panels to retract mechanically into cabinets. Controls to be Microprocessor-based with the following characteristics: Microsoft Windows based software package,

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LCD user interface display with graphics, Technical Configuration Interface for field adjustments/tuning.

Locations:

The following is a partial listing of access control locations, final locations will depend on the design layout of the facility:

- Inbound card readers shall be provided at the following locations:
 - o Each public and each staff entrance.
 - o Each primary office/tenant suite entrance.
 - o Each garage vehicle control access gate.
 - o Each elevator with individual floor clearance control.
 - o Data network (MDF/IDF) rooms.
 - o Each HIPPA compliance required space.
- Outbound card readers will be provided at:
 - o Each garage vehicle control access gate.
 - o Each designated staff entrance/exit.
 - o Each exterior door lock with access to the common building interior shall be electrically locked from the access control system with free exit door operation.
- All exterior doors not part of the detention security perimeter, shall be monitored from the access control system using a door position monitor or each operating door panel and shall be equipped with "request to exit" device from the access control system shunting the door position switch on free exit.
- All critical building interior and exterior spaces including, but not limited to the roof, emergency power, telecommunication , utility shut off and control, shall be automatically monitored for unauthorized access and/or electronically access controlled.
- Each entrance and exit to the courtrooms shall be electronically access controlled. Required egress opening shall be provided with delayed egress hardware.
- Locking hardware shall be appropriate for the application. Use of magnetic door locks (mag locks) pose significant security concerns. Mag locks shall be used only when other locking methods are not practical as approved by the County.

Non Detention Closed Circuit Television Surveillance Systems (CCTV)

General:

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King County has established Pelco Endura as the Network Video Management system for the non detention security CCTV surveillance and recording system . The security video surveillance and recording systems installed in non-detention areas of the CFJC shall be an extension of the existing King County Electronic Security System (KCESS) enterprise video surveillance and recording system.

The Design Build entity shall provide a complete networked digital video security system including but not limited to: all security video cameras, pan/tilt/zoom (PTZ) cameras, mounts, housings, power supply systems, cable, connectors, equipment racks, monitors and consoles, computer controlled network switchers, work stations, network storage managers , video encoders, video decoders, video console displays and keyboards, and all other hardware and software to provide a fully operational system.

The Endura system shall be installed by an Endura certified dealer/integrator. Certification for installation shall be conducted by the manufacturer and shall provide all necessary knowledge to fulfill the systemization and deployment across diverse networks and infrastructures, as well as provide commissioning abilities at the integrator level.

CCTV systems shall provide full digital video recording for each camera in the system. Recording shall be site based local security network storage configured to ensure real-time recording of all cameras without porting camera video offsite or out of the site Security LAN for raw video storage.

The CCTV Surveillance/ recording system manager shall allow for connection to an intelligent uninterruptible power supply (UPS), and it shall allow for the initiation of a graceful shutdown should the UPS deplete its stored charge

Locations:

Camera locations shall be developed during design, the Proposers shall provide an allowance for one-hundred fifty (150) cameras for the non Detention facility interior and site. An additional 60 camera allowance shall be provided for employee / judicial parking areas; assume fifteen percent (15%) of the cameras will be pan-tilt-zoom (PTZ)

Camera coverage should be provided in all circulation areas, within the courtrooms and at all locations where money changes hands including vending machines, inside elevators.

Court Holding areas, and circulation areas dedicated to transporting in custody persons such as corridors, hallways, holding cells, stairways, and elevators shall be part Detention Security Electronics System, inclusive of camera monitoring and recording.

The following is a partial listing of locations for CCTV surveillance monitoring:

- All exterior doors, gates, transit waiting areas, plazas, patios and sidewalks will be under CCTV video surveillance using pan tilt zoom cameras. No more than six door panels or two gates will be monitored from each pan-tilt-zoom camera.
- All interior common building spaces will be under CCTV video surveillance using either pan tilt zoom cameras or fixed mount cameras. No more than six door panels will be

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monitored from one pan-tilt-zoom camera and no more than two door panels will be monitored from one fixed camera.

- Common spaces, including alcoves/ lobbies, entrance halls, elevators, elevator lobbies, interior connecting corridors, exterior/ground floor stairwell access and staffed public reception locations, will be under CCTV video surveillance.
- Courtrooms:
 - At least one fixed 360 degree coverage camera shall be provided in each courtroom center area and one Pan/Tilt/Zoom camera shall be provided for security operator assessment.
- Each money/cash handling location will be under fixed CCTV video surveillance.
- Each security intercom station shall be provided with dedicated fixed camera.
- Each publicly accessible panic alarm call unit shall be provided with dedicated fixed camera.
- Each screening station including magnetometer, x-ray tail piece, and hand wand station.
- All parking garage / lot entries will be under CCTV surveillance.

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System Requirements:

- All Video from all cameras shall be digitally recorded at for a minimum period of 30 calendar days.
- Maximum distances for coaxial cable are:
 - o RG59/U: 750 feet.
 - o RG6/U: 1,200 feet.
 - o RG11/U: 2,000 feet.
 - o Beyond 2,000 feet, shall use fiber conversion or video over IP.

Camera numbering

- Number cameras in accordance with room or area number. If multiple cameras for the same room, use letter designation following number with the first (A) and supplemental cameras being (B)-(Z) working from the primary entrance around the room to the right (counter clockwise). If remodeling an existing building, consult with Owner's Technical Representative to obtain existing room / door numbers.
- Should numbering beyond letter Z be required follow Z with, AA through ZZ, then AAA through ZZZ and so forth until all items are labeled.

Design Submittals:

During the design development and construction document phases the County requires the following submittals to facilitate communication between the Design Build entity and the County.

Written statements from manufacturers certifying that the Design Builder's installer is fully trained and qualified to install each type of equipment specified and provide service repairs to the equipment.

Catalog cuts of for all equipment

The complete itemized video equipment hardware schedule including manufacturer's name and product number for every item for the project. The schedule shall also:

- List groups in proper sequence.
- Completely describe each device.
- Provide the name of the manufacturer,
- the name of the product and the catalog number.

Shop drawings: detailed dimensioned plans, elevations, location and installation details for each device.

Testing plan a written testing plan in compliance with applicable standards describing proposed duration and schedule for performing pre-functional performance test and functional performance test in MS Excel spreadsheet format listing each and every device to be tested

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Duress Alarm System

Employee Parking:

The employee parking within the parking garage shall be equipped with free standing or wall mounted duress alarm stations.

The units shall be a vandal-resistant, high quality, intercom and paging devices with advanced protocol support. The enclosure shall be vandal-resistant, comprised of all electronics with serviceable speaker, microphone, button .

Garage duress stations will call off-site to the County EDC.

Duress - Covert:

Discretely located duress pushbutton switches, (typically under counter pull down switches with keyed reset) shall be provided at each reception desk, select interview rooms, and all other areas that are used for communicating between the staff and the public.

Covert, discretely-located duress pushbutton switches should be provided at the judge's bench, court clerk's desk, and court coordinator/bailiff's desk.

Distress - Overt:

Outside of Detention areas, wall-mounted red mushroom type duress pushbuttons shall only be used at the public entry security screening station

c. Detention Security Electronic System

General

The electronic security system shall be an integration of a number of subsystems. Subsystems include the CCTV Surveillance Television System, the Duress Alarm System, the Intercommunication and Paging System, and remote control of utilities such as power, lighting, domestic water, Heating, Ventilating, Air Conditioning (HVAC) fan exhaust, etc.

The subsystems that are controlled through the PLC should be controlled by the Operator at the Human-Machine-Interface (HMI) by use of touch screen computers. The subsystems are integrated through the use of a Programmable Logic Controller (PLC) system which is a computer based system originally designed for manufacturing that has high tolerances for vibration, temperature extremes, temperature swings, and power fluctuations. In addition, this system should be configured with redundant processing and redundant power supplies. Design-Build Entity's system developer shall propose whether redundant means "hot" or "warm" redundant.

The County desires the necessary equipment to provide for a "hot cut-over" for Central Control and "cold cut-over" for other control stations.

Design

County representatives will be involved in the development of the touch screen system. Numerous minor programming changes may be requested by the County throughout the design

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and construction process.

Mock ups of all major system components are required to demonstrate the system to the County and to obtain the County's input on changes.

System Integration

Interface to the Surveillance Television System, Intercommunication System and Duress System shall be through the use of an Ethernet connection. Interface to the HVAC system for exhaust fan control and youth telephone system for telephone control shall be through the use of discrete I/O.

Interface to the electrical low voltage control panel for control of the dayroom lights, sleeping room lights, dayroom power circuits, dayroom TV power, and domestic water control shall be through the use of either an Ethernet connection or an RS 485 connection as applicable to the lighting control system selected.

Touch Screen System

The Touch Screen System shall be the main HMI to allow the operator to control and monitor the sub systems. The touch screen shall facilitate both the use of the touch screen and a mouse for icon selection. The touch screen monitor shall be sized to minimize the number of screens necessary for control of the facility. Where a screen is used for first floor sleeping room control and has a mezzanine, using the same screen for mezzanine control would reduce the number of screens that staff needs to access. Similarly, where multiple floors are serviced by a controlled elevator, all elevator controls can be on a single screen.

An administrative level computer shall be provided with the ability to define authorization levels of individuals, groups, specific stations and generate reports. All recording of activity of all touch screens shall be maintained on the administration level touch screen computer. The Design Build entity shall work with the County to create/define specific pre defined reports that will be called up by the County when needed.

The following statements relate to the touchscreen functions:

- Icon displays shall not be visible unless usable, i.e. the door control icons shall not be displayed unless a door has been selected for control; push-to-talk icon shall not be displayed unless an intercom or paging zone has been selected.
- Icons shall always be displayed in the same location on each screen.
- A keymap shall be provided on the screen to allow the user to navigate between screens without going to an intermediate screen.
- Event Queue's shall be provided to allow users to take calls and alarms out of chronological sequence.
- Call requests shall be displayed on the even screen as yellow, while alarms shall be described in red text.
- Events in the queue shall flash until acknowledged and remain visible in the queue solid until reset.

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- A "BACK" and "FORWARD" icon shall be provided to expedite screen manipulation by the user.
- The system shall provide report generation. At least 3 pre-defined reports shall be available including the history of any given door between a start and stop time/date, and the number of times a specific interlock was over-ridden and by which operator.
- Cameras shall be selectable from the touch screen and it shall be able to select a specific monitor quadrant for display. By reselecting the quadrant, the camera shall be displayed full screen.
- Duress alarm indication shall graphically be represented as a man-down stick figure. Lighting controls shall be displayed as a light bulb, power controls shall be displayed as a power outlet, HVAC fan control shall be displayed as a fan, domestic water solenoid control shall be displayed as a faucet, etc.
- Alarm and call request tones shall all be distinctly different and confirmed with the County.
- A Door Parameters screen shall be provided to allow staff to define issues such as the amount of time, on a door by door bases, a door can be opened prior to automatically relocking, and how long that the door can be unlocked prior to initiation of a door ajar alarm being initiated; and if a door alarm is to be shunted so as to not initiate an alarm during specific periods of the day or day of week.

Other detention staff's station shall be equipped with:

- A CCTV keypad to allow the operator to manually select cameras to monitors without the use of the touch screen.
- An Intercom Master Station to allow the user to manually call up any remote intercom station and any other officer's station without use of the touch screen.

Central Control Room (CCR)

The Central Control Room houses the HMI equipment necessary for the operators to control and monitor the facility. Minimum recommended area for single staff operation utilizing a touch screen computer, an access control system, and a CCTV system is 10- by 12-feet. Minimum recommended area for dual staff operation utilizing two touch screen computers, an access control system, and a CCTV system is 10- by 18 feet.

- Touch Screen: A total of one computer keyboard, mouse, and 22-inch flat screen, LCD touch screen monitor per work station is required. The computer itself shall be located in a security electronics room or in a lockable cabinet in close proximity to the touch screen it serves. The intent is to protect the computer from inadvertent damage and/or unauthorized use.
- CCTV Event Monitors: A keyboard, mouse and a total of two 22-inch flat screen, 1080p, wide screen monitors shall be provided to facilitate quad monitoring of events for each staff workstation. These screen shall be located adjacent and flanking the touch screen monitor. The computer itself shall be located in a security electronics room to keep the computer in a secured, climate controlled, dust free environment.

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- CCTV General Surveillance Monitors - A keyboard, mouse and a total of two 26-inch flat screen, 1080p, wide screen monitors shall be provided to facilitate multiple simultaneous viewing of cameras for general surveillance at each of the officers stations. These screens shall be located adjacent and flanking the event monitors. The computer itself shall be located in a security electronics room to keep the computer in a secured, climate controlled, dust free environment. A USB Keyboard shall be provided at each of the staff workstations to allow pan/tilt/zoom of the imagery displayed on the monitors.

Intercom:

A 1/2-inch stainless steel gooseneck microphone with on-board speaker and volume control shall be provided at each staff workstation for use with the intercom and paging systems. To eliminate the potential for a single point failure resulting in multiple systems being lost, the unit shall not be interfaced with the telephone or radio systems.

Communication:

A handset type master station shall be provided to support communications between staff stations and CCR, intake, etc. Unit shall have a liquid crystal display and 10 key keypad.

Power, Normal:

Wall mounted 120VAC, 20A convenience outlets may be on normal power. Four-plex outlets, 8-feet on center is recommended around the room. Equipment to be powered on normal power shall be limited to printers and other non-critical elements.

Power, Emergency:

Wire-mold type, 120VAC, 20A outlets shall be distributed around the room to support CCTV monitors, computers, etc. All CCTV monitor power shall be on the same phase. The security / communications equipment requires two dedicated circuits. Additional circuits will be necessary to support other systems (i.e. fire alarm annunciator panels, printers, battery chargers, convenience outlets, etc.). Uninterruptable Power Supply (UPS):

A UPS shall be provided to bridge the gap between loss of normal power and the time when the emergency power generator comes on line and stabilizes. The UPS will allow these devices to consistently receive clean power. The UPS shall be a "True UPS" with external bypass switch.

Do not allow piping into the CCR unless the piping serves the room. Do not allow piping to be placed above cable trays.

Living Unit Neighborhood "Pod" Stations

Neighborhood Pod Stations house the HMI equipment necessary for the operator to control and monitor the local living units, either 3 or 4. Equipment at this workstation shall be lockable since this is not always manned.

- Touch Screen: A total of one computer keyboard, mouse, and 22-inch flat screen, LCD touch screen monitor per work station is required. The computer itself shall be located in a secure

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room to keep the computer in a secured, climate controlled, dust free environment.

- CCTV General Surveillance Monitors: A keyboard, mouse and one 26-inch flat screen, 1080p, wide screen monitors shall be provided to facilitate multiple simultaneous viewing of cameras for general surveillance. A USB Keyboard shall be provided to allow pan/tilt/zoom of the imagery displayed on the monitors.

Communication:

A handset type master station shall be provided to support communications between other stations and CCR, intake, etc. Unit shall have a liquid crystal display and 10 key keypad.

A UPS shall be provided to bridge the gap between loss of normal power and the time when the emergency power generator comes on line and stabilizes. The UPS will allow these devices to consistently receive clean power. The UPS shall be a "True UPS" with external by-pass switch.

Living Unit Staff Workstations

A touch screen shall be placed at each Living Unit workstation with controls for the sleeping rooms and dayroom within the Living Unit. The touch screen shall control door, lights, water, television, have an intercom for communication with the sleeping rooms and other posts, and the ability to listen in to the cells as a group or individually, Other necessary control features as may be required during security control discussions as the design is developed.

The County is interested in technology that may provide portable control for the living unit staff rather than a touch screen workstation at the workstation.

Admissions Release

A touch screen shall be placed within the Intake Officer Workstations with controls for the holding cells within Admissions Release. The touch screen shall control door, lights, water, have an intercom for communication with the sleeping rooms other posts, the salley port into Admissions Release, and the ability to listen in to the cells as a group or individually. Other necessary control features as may be required during security control discussions as the design is developed.

Communication:

A handset type master station shall be provided to support communications between other stations and CCR, intake, etc. Unit shall have a liquid crystal display and 10 key keypad.

A UPS shall be provided to bridge the gap between loss of normal power and the time when the emergency power generator comes on line and stabilizes. The UPS will allow these devices to consistently receive clean power. The UPS shall be a "True UPS" with external by-pass switch.

In addition the County requires the Admissions Release workstation to be able to perform all of the Detention Security Electronic duties of the CCR.

Court Holding

A touch screen shall be placed at a workstation with controls for the holding cells within Court

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Holding, the doors into the courtrooms, the attorney room, . The touch screen shall control door, lights, water, have an intercom for communication with the holding cells, other posts, the salley port into Admissions Release, and the ability to listen in to the cells as a group or individually. Other necessary control features as may be required during security control discussions as the design is developed.

Monitors for viewing the sally port cameras and elevators shall also be located for viewing at this workstation.

Communication:

A handset type master station shall be provided to support communications between other stations and CCR, intake, etc. Unit shall have a liquid crystal display and 10 key keypad.

A UPS shall be provided to bridge the gap between loss of normal power and the time when the emergency power generator comes on line and stabilizes. The UPS will allow these devices to consistently receive clean power. The UPS shall be a "True UPS" with external by-pass switch

Medical Clinic

A touch screen shall be placed at a workstation with controls for the infirmary rooms, observation room, isolation room, and the door into the waiting area., The touch screen shall control door, lights, water, have an intercom for communication with the holding cells, other posts, the salley port into Admissions Release, and the ability to listen in to the cells as a group or individually. Other necessary control features as may be required during security control discussions as the design is developed.

Monitor for viewing the Observation Room shall also be located for viewing at this workstation.

Communication:

A handset type master station shall be provided to support communications between other stations and CCR, intake, etc. Unit shall have a liquid crystal display and 10 key keypad.

A UPS shall be provided to bridge the gap between loss of normal power and the time when the emergency power generator comes on line and stabilizes. The UPS will allow these devices to consistently receive clean power. The UPS shall be a "True UPS" with external by-pass switch

Conference Room/Crisis Center (1.302):

The County requires a HMI station capable of either taking over the function of the CCR, or to have the functions of CCR be passed to this HMI station . to be part of the Conference Room/Crises center.

Equipment at this station shall be in secured (lockable) casework, with additional security provided by passwords and or other security measures.

The equipment and functions noted in this section under the Central Control Room (CCR) heading shall be duplicated in the Conference Crises Room/Crisis Center.

Control Components

The following are brief descriptions of the various control components required within the

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detention center.

Door Systems:

Individual and Sallyport Doors: Each operable door opening has a group of control devices comprised of control icons and indicators which show the status of the door at all times and shall be located at the control point determined during design. Below are a few key components of the design:

- All sallyport configurations shall be designed under interlocked condition.
- Door control from the touch screen shall be through selection and then by touching the open icon thereby requiring two distinct operations.
- Opening a perimeter door at the Detention Facility shall bring up an "ARE YOU SURE" banner allowing the user to reconsider opening the door prior to its opening.

Sleeping Room Door System:

These rooms will have electrically controlled locks for emergency release, each lock has a mechanical key cylinder for lock operation. The Design-Build Entity shall present the options of hollow metal doors and wood doors (with hinge reinforcing) for the review by the County. Door control from the touch screen shall be through selection and then by touching the open icon thereby requiring two distinct operations.

Each sleeping room door shall be able to be included in a selection set of a Lock-Out function such that toggling the door in or out of the Lock-Out selection set allows the door to be Locked-Out thereby eliminating its inclusion in a Group Release. Inclusion of a sleeping room door in the Lock-Out shall also cause the touch screen to bring up an "ARE YOU SURE" banner allowing the user to reconsider opening the door prior to its opening.

Emergency Group Release:

Utilizing an Emergency Group Release to open a group of sleeping room doors shall bring up an "ARE YOU SURE" banner allowing the user to reconsider opening the doors prior to its opening.

Security Door Status Alarms:

Doors located on the high security and some cases medium security line shall be monitored at CCR and in some cases at other workstations. Door status shall be indicated on the touch screen for door open, closed and ajar. Door alarms shall remain indicated on the graphics screen until reset regardless of the door status, i.e. if a door goes into alarm and is closed before the alarm is reset the door status indication shall be indicated with an alarm symbol indicating that the alarm is still active and not yet reset. Exterior entrances to mechanical rooms, electrical rooms, and other support spaces, be monitored for position and automatically alarm on door ajar, and door forced open.

Local Intercom:

This system provides for audio communication in the immediate area of responsibility of the staff. The intercom component provides for "station select" and in some cases "all call". Development of the entire local intercom system will occur along with design layouts. The following are some

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key points in the selection of products:

- The system shall be based on a microprocessor based intercom system such as Harding Instruments.
- Public stations shall be equipped with ADA "Message Sent" and "Message Received" visual indication.
- Master handset stations at the officer's station shall be 10-key equipped with handset, speakerphone, and LCD display. Features shall be typical of a PBX telephone system.

Detention Closed Circuit Television Surveillance Systems (CCTV):

Provide a CCTV system with the following minimum features:

- CCTV systems shall provide full digital video recording for each camera in the system.
- Provide a dedicated workstation for use as an archive retrieval workstation.
- Camera locations shall be developed during design; the Design-Build Entity shall provide an allowance of two-hundred (200) cameras; assume fifteen percent (15%) of the cameras will be pan-tilt-zoom (PTZ).
- The system shall be laid out to facilitate not more than one NVR server for every forty (40) cameras. Fiber optic loops shall be provided to facilitate not more than two-hundred (200) cameras on any one loop. The County utilizes a "DVTEL" system.
- CCTV recordings will be conducted at an off-site location via a Virtual Local Area Network (VLAN) at a rate of not less than 15 frames/sec at 1080p and will be retained for 60 calendar days. VLAN design is the responsibility of the County. Contractor to provide all infrastructure, equipment and programming to a VLAN switch that will be located in either the Detention Security Electronics room, or the building MDF.

CCTV will be used to monitor corridors, housing dayrooms, recreation, and other areas where groups of youth may be. Digital recording shall be planned for the facility to allow staff the ability to review previous activity.

Camera coverage of ingress/egress points shall facilitate facial recognition (i.e. 40 pixels per foot of horizontal field of view at the location of the door or gate). All video shall be IP (1080p) except as noted elsewhere or as required to achieve the necessary resolution. All cameras shall be equipped with remotely controllable vari-focal lenses.

Outdoor cameras shall be day/night (infrared illuminators shall not be used) with auto-iris and heater/blower with thermostat. Due to the amount of moisture and salt in the air, all outdoor cameras shall be equipped with NEMA 4X enclosures.

Specific camera location will be determined by an iterative process of submittals and meetings that includes but is not limited to.

- Submittal computer models of camera views and locations to the County for review and comments
- Screen shots of camera views (after the structure is built, prior to camera installation)

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submitted to the County for review and input prior to actual installation.

- Final review of camera placement, views, focusing etc. after cameras are installed.

Personal Duress Alarm Systems:

The Personal Duress Alarm system shall be provided with the following minimum features:

- Personnel Duress Alarm system shall cover all youth/staff/adult detainee accessible areas within the secure perimeter of the facility.
- System shall annunciate duress location via a map on a graphical user interface that identifies individual rooms in which alarm occurs.
- System shall incorporate both a man-down feature and duress alarm.
- All staff will wear their personal duress transmission unit, either on their belt (via a belt clip), utility belt (via a utility belt holster), or from a break away lanyard hanging from their clothes or around their neck.
- Units shall initiate an alarm by any staff through the following means:
 - Pushing a button on the device.
 - Pulling the unit off the person's belt or lanyard away from the staff member.
 - Automatically through the unit being turned 45 degrees off the vertical for 15 seconds for automatic initiation of a man-down alarm. It shall be possible for the users to disable this feature by a switch on or in the device.
- Initiation shall be through a repeating series of 2 dissimilar tones repeating in the ultrasonic audio spectrum. The system shall be able to discriminate between alarm initiation and accidental ultrasonic noise generated from dropping tools and silverware onto hard surfaces.
- The system shall facilitate the automatic alarming of devices approaching eighty percent (80%) of the battery life.
- The system transmitters shall have an effective range of not less than 60-feet in open areas with no reverberation from walls, floors, or ceilings.
- All alarms shall be annunciated on the touch screen with a red man-down symbol on the graphic screen at the location of the duress system receiver initiating the alarm.
- All acoustical receivers shall be zoned separately except where they are in a common space.
- Receivers shall be distributed so as to provide one-hundred percent (100%) coverage of all indoor spaces where detainees may be present except holding rooms, cells, chases, and closets.
- Use ceiling mounted units in all locations except outdoors.
- Use wall mounted, outdoor, whether resistant units, at 18-inches above paving in all outdoor recreation areas.

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Duress Alarms

Duress alarm buttons shall be strategically located throughout the detention areas, and may be of the following types depending on location

- Covert: discretely located duress pushbutton switches, (typically under counter pull down switches with keyed reset) shall be provided at select interview rooms, and other areas that are used for communicating between the staff and the public.
- Overt:, wall-mounted red mushroom type duress pushbuttons

All alarms shall be annunciated on the touch screen with a symbol on the graphic screen at the location of the duress system receiver initiating the alarm

Lighting Control:

Lighting controls shall include two types:

- Room light override; and
- Common area lighting control.

Lighting security levels shall be as listed in *Table B10.1 - Lighting Security Levels* and defined in the Room Data Sheets.

Table B10.1 - Lighting Security Levels	
Level	Description
V1	Recreation Yard Lighting: 3 Foot-candles minimum.
V2	Commercial Interior Lighting: Surface-mounted, suspended, or recessed in suspended acoustical ceiling or suspended gypsum board.
V3	Lowest Security Lighting - Vandal-Resistant: Surface-mounted or recessed.
V4	Middle Security Lighting - Vandal-Resistant and Shatter-Resistant. Secured to ceiling damage-resistant installation, recessed or surface-mounted.
V5	High Security Lighting - Vandal-Proof, Shatter-Proof, and Concealed Anchors to prevent access. Surface-mounted or suspended.

Tour System:

The access control system shall be extended into the living units and used at strategic point adjacent sleeping rooms so staff can use an access card and register that safety and welfare check are being completed. This shall be logged as part of the access control system and retrieved as an event later should an issue arise.

Telephone Shutdown:

Housing staff shall have the ability to turn on/off telephones as required.

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Master Antenna TV Distribution System:

A TV distribution system shall be incorporated into the facility. At a minimum, assume one location within each housing unit.

Utility Controls:

Controls may either toggle between day lights and night lights, or by leaving night lights on constantly and only controlling day lights, but the area shall never be dark.

The following are key design and equipment selection criteria:

- Controls for sleeping room lighting shall be provided on by sleeping room basis: each sleeping room can be toggled on or off without affecting any other sleeping room
- Controls for dayroom lighting shall be provided on a dayroom basis.
- Controls for dayroom power receptacles shall be provided on a dayroom basis.
- Controls for domestic water control shall be provided on a dayroom basis, and for each individual sleeping room
- Controls for HVAC fan exhaust shall be provided on a dayroom basis.
- Controls for youth telephones shall be provided on a dayroom basis.

Licenses:

The Design Builder shall provide to the County all licenses, passwords, and access codes for all software provided in the various control systems.

All software shall be provided with back up copies on CD disks, including all data files.

Training:

Provide 40 hours of training to instruct the County personnel to adjust, operate and maintain systems and sub systems. Training will be divided at the County's discretion into 2 to 4 hour increments for Juvenile Detention Officers (users) Building Services staff (maintenance personnel) train for software administrators.

Warranty Service

The installing contractor shall provide a field service technician to receive and respond by phone within two hours to emergency warranty requests communicated by telephone at any time (24 hours per day, 365 days per year).

If the issue cannot be resolved by phone or internet, the installing contractor shall have a trained service technician on site within 8 hours of the initial emergency warranty request.

Upon the County's request, each system shall be reprogrammed by the installing contractor one time during the warranty period at no additional cost.

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Section 11 – Parking Garage

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Section 11 - Parking Garage

Institutional Standard

All structured parking facilities within the CFJC project shall be designed and constructed to institutional standards of function, quality, and durability.

Institutional standards for parking facilities are defined as a building which:

- Has a high level of service for patrons in vehicles.
- Has a high level of safety for patrons on foot.
- Is constructed of durable materials and finishes.
- Has a low total cost of ownership.
- Requires little annual maintenance.
- Does not required restoration/replacement of primary building systems for 50 years.
- Is built with systems that are less susceptible to construction defects.
- Is designed with finishes and materials that are not prone to discoloration, corrosion, or staining of surfaces.

Attributes which provide institutional quality for structure, architecture, layout, and systems include, but are not limited to, the following.

Structure:

- Structure shall be cast-in-place post-tensioned concrete.
- Stand-alone parking structures shall utilize long span structural systems which do not have columns between parking stalls.
- Parking areas under other buildings may utilize long span or short span structural systems.
- Top deck of parking structures and all structural concrete slabs exposed to weather shall utilize hydrophobic concrete. Concrete used in these locations shall have a performance guarantee against leakage.
- Structure shall utilize minimum slab thickness of 6-inches to 7-inches except for slabs on grade.
- Slab precompression shall be 200 psi minimum at slabs exposed to direct rainfall and 150 psi at all other slabs.
- Structure shall utilize encapsulated post tension tendons.
- Structure shall provide larger than code minimum concrete cover above slab reinforcing top bars (1-1/2 inches).
- Structure shall utilize reinforced slabs on grade with 5-inch minimum thickness.

Vehicle Access and Egress Control:

All vehicle entry points shall have overhead or horizontal gates to secure the garage from vehicle and pedestrian entry during closed hours.

It is anticipated that the County will not be charging for public parking in the new garage. To prevent persons who do not have business at the CJFC from parking in the garage a parking access and revenue control system shall be provided. Vehicle entry shall have:

Barrier lift arm gate

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Ticket dispenser with intercom connected to the County EDC
Camera connected to the County enterprise electronic security system
Bollards as necessary to protect the equipment

Vehicle exit shall have

Barrier lift arm gate
Ticket reader with intercom connected to the County EDC
Camera connected to the County enterprise electronic security system
Bollards as necessary to protect the equipment

A ticket validation station controlled by County Staff located in the courts lobby area shall also be provided.

Tickets shall be magnetic stripe

Equipment located in un-conditioned spaces or outside shall be heavy construction: 14 gauge steel, weather gasketing, with lockable access.

Architecture shall:

- Be consistent with NFPA730, and visibly exhibit features which follow Crime Prevention Through Environmental Design (CPTED) principals.
- Provide clear and obvious patron (on foot) wayfinding (signage, striping, level designation system).
- Be constructed of materials which have ability to resist abuse by public both intentional and unintentional.
- Vehicle vertical clearance shall be not less than 7-feet on all floors except where required to be higher to accommodate accessibility code and program requirements (see facility program documents).
- Use of graffiti resistant coating systems on surfaces accessible to the public.

Functional layout shall:

- Provide parking stalls, aisles, and bay widths that are in conformance with City of Seattle standards.
- Utilize the minimum acceptable number of compact stalls per governing jurisdiction.
- Provide clear, unobstructed sight lines for vehicles.
- Provide clear and obvious patron (in vehicle) wayfinding (entry, exit paths, circulation routes).
- Provide internal vehicular circulation and access to exits that will minimize queuing within the structure.
- Allow for installation of parking control/revenue control systems as required for security and access control.
- Allow for independent and secure parking for different user groups.

Systems shall:

- Provide higher than code minimum lighting levels to improve security and pedestrian safety.
- Include lighting fixtures with full cutoff to prohibit glare from leaving parking facility.

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- Slope to drain on all floors, including around stairs, elevators, and other points of pedestrian travel.
- Provide sufficient elevator access/service should one be out for maintenance or repair.
- Provide code compliant vehicle restraint that is coordinated with the architectural façade and perimeter security functional requirements.

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Section 12 – Removal of Existing Structures

Facility Performance Standards

Section 12 – Removal of Existing Structures

a. General

Demolish, haul, and dispose of all existing buildings and structures on the site. Historic items, relics, antiques, artwork and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to the County that may be uncovered during demolition remain the property of the County. Demolition waste becomes property of Contractor. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level. Remove below-grade construction, including basements, foundation walls, and footings, completely and in their entirety. Demolish existing utilities and below-grade utility structures that are within 10 feet outside footprint of new construction, abandon utilities outside this area by cutting utilities flush with grade where acceptable by utility company and King County. Remove, haul and dispose of all hardscape, asphalt and concrete surface structures in their entirety within the site property boundary. Care shall be taken to not disturb any buildings or utilities outside the site property boundary.

b. Hazardous Materials

Multiple assessments of hazardous building materials and subsurface environmental conditions have been performed at the YSC site. Hazardous materials identified in site buildings have included but are not limited to asbestos, lead, mercury, and polychlorinated biphenyls (PCBs). Tetrachloroethylene and related substances have been identified in groundwater beneath the site, and petroleum hydrocarbons and other contaminants are present in soil at certain locations. Findings and observations were documented in various reports herein referred to as “Reference Documents”, copies of which are included in Part E of this RFP.

Special mention is made herein to the report “Removal Action Completion Report” (Herrera, 2012), which documents removal of PCB containing caulk from window frames at the Alder Tower in 2011 and 2012, and the associated abatement of effected building materials. While the County removed PCB containing caulk from the tower’s approximately 300 windows to the extent practicable, PCBs were detected and remain in the concrete adjacent to the window frames to an unknown depth. Test results from destructive concrete samples collected at five window jamb locations indicated PCBs at levels ranging from 700 parts per million (ppm) to 22,000 ppm in the concrete dust collected from 1/8” holes, and from 740 to 12,000 ppm in the concrete dust collected from 1/4 “ depth holes. PCB-containing concrete surrounding the Alder tower windows will need to be removed and disposed on in accordance with applicable sections of Title 40, Code of Federal Regulations, Parts 761 and 762.

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Facility Performance Standards

Appendix A – King County Opening Standards

Appendix A – King County Opening Standards

Part I

1.01 Standards

1. Doors and Frames in this section must meet all standards as established by the following listing.
2. Door and Hardware Preparation ANSI 115.
3. Life Safety Codes NFPA-101 (Latest edition).
4. Fire Doors and Windows NFPA-80 (Latest edition).
5. Steel Door Institute ANSI/SDI-100 (Latest edition)
6. UL10B Fire test of Door Assemblies and UL10C Standard for Positive Pressure Fire Tests of Door Assemblies

1.02 Submittals

Submittals to be provided with the 50% Construction Document submittal:

1. Manufacturer's technical data information for each type of proposed equipment including manufacturer's name, product name and UL listings.
2. Written statements from manufacturers certifying that the installer is fully trained and qualified to install each type of equipment specified and provide service repairs to the equipment.
3. Service repair information, including the nearest service center with address and telephone number.
4. One electronic, in MS Excel format, and two printed copies of the complete itemized hardware schedule including manufacturer's name and product number for every item of hardware including finish hardware for the project.
 - a. List groups in proper sequence.
 - b. Completely describe door and list door number.
 - c. Provide the name of the manufacturer, the name of the product and the catalog number.
 - d. State the size, function, type, style and finish of hardware.
 - e. Determine mounting heights.
5. Submit one copy of catalog cuts of each hardware item with the hardware schedule.
6. Submit a testing plan and obtain Owner approval. Provide a written testing plan in compliance with applicable standards and the Owner's testing standards describing proposed duration and schedule for performing pre-functional performance test and functional performance test in MS Excel spreadsheet format listing each and every device to be tested.

1.03 Substitutions

1. King County Facilities has established and is working toward consistent standards and a defined openings program for the specification, provision, and installation of openings products.
2. All materials and equipment shall conform to these specifications. Materials substitution requests shall be by manufacturers normally engaged in the type of work specified herein.

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3. Substitution requests shall include manufacturer's name, equipment part numbers and equipment or systems' descriptions to establish performance, quality, type and parameters.

1.04 Quality Assurance

1. Specify factory preparation for door hardware and factory finishing.
2. Contractor shall possess all applicable Contractors' licenses.
3. Division specifications contain a combination of prescriptive and performance requirements. The Design Build entity is responsible for fully implementing the functions described in the specifications. This will require the Design Builder to perform substantial work selecting components, integrating functions, and integrating the various systems with each other and with equipment provided and installed by other sections.
4. Equipment and materials shall conform to the referenced industry standards specified in each Section, as applicable.
5. All equipment and accessories to be the product of a manufacturer regularly engaged in its manufacture.
6. All items of a given type shall be the products of the same manufacturer.
7. All items shall be of the latest design and manufacture technology. No discontinued or near end of life products are acceptable.
8. Qualifications of installer, installer shall normally engaged in installation of specified equipment and systems and approved by manufacturer to install type of system specified.
9. Manufacturers Qualifications: Prospective firms shall have five (5) years of experience in the fabrication and distribution of commercial hardware with a national representation of qualified, well-established distribution/supply network.
10. Distributor Qualifications: Prospective firms shall have five (5) years of experience in the distribution of commercial hardware, employ well-qualified personnel and actively support the manufacturers that they represent.
11. Full and complete door hardware schedules for each opening are required as part of the Design Builder's design submittal(s) to the County. If directed by the Owner the Design Builder shall retain the services of an AHC consultant to prepare the hardware schedules. The AHC shall prepare and sign the hardware schedule.

1.05 Reference Standards

ADA	Americans with Disabilities Act
ASTM	American Society for Testing and Materials
AHC	Accredited Hardware Consultant
NEMA	National Electrical Manufacturers' Association
NFPA	National Fire Protection Association
OSHA Standard 29 CFR 1910.268	Occupational Safety and Health Administration
UL	Underwriters Laboratories, Inc.

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WAC

Washington Administrative Code

1.06 Warranty

1. Provide any extended manufacturers' warranties to Owner.
2. Defective items covered by warranty shall be corrected immediately. Warranty remains in effect until all defective items have been corrected.
3. Warranty repairs shall begin following notification that a repair is needed as determined by the Owners.
4. Interior and exterior wood doors shall be covered by a warranty.
5. All interior wood doors shall have a warranty against warpage and delamination which shall cover costs of replacement, installation and finishing. The contractor must sign the warranty, as well as agree to repair or replace doors that have warped, have telegraphed core construction in face veneers or have not conformed to tolerance limitations of referenced quality standards. All such interior wood door repair and replacement shall be done at no cost to the County for the life of the installation. Exterior wood doors shall be covered by the same warranty for five (5) years.
6. All door closers shall be from one manufacturer and carry a five (5) year warranty.
7. The contractor/installer shall sign and furnish the County with a 10-year written warranty for window systems from the date of Substantial Completion. The warranty shall state that the contractor/installer shall correct all deficiencies during the warranty period. The warranty shall cover removal and replacement of window systems, as well as labor for leaks, glass defects, hardware malfunctions, deterioration of finishes, and other deficiencies from defective materials and faulty workmanship, at no cost to the County.
8. Glazing: A manufacturer's signed warranty is required for insulating units. The warranty shall cover replacement of units that are found defective within 10 years of the date of Substantial Completion. Defects shall include failure of the hermetic seal, deterioration of internal glass coatings and other indications of seal failure or nonperformance, except where caused by breakage. Appearance of dirt, moisture, fogging or internal condensation at temperatures above -20 degrees F shall be considered conclusive evidence of defect. Replacement units shall be delivered to the project site without cost to the owner.
9. In some cases differential air pressure can cause the door closure function on doors to not function correctly. The General Contractor shall warrant proper door function in all building operational modes including all heating, cooling, emergency, occupied and unoccupied modes for a period of three (3) years following final acceptance. Warranty remains in effect until all defective items have been corrected.

1.07 Coordination

1. In some cases, the differential air pressure can cause the door closure function on doors to not function correctly. The Owner, Technical Representative, AHC and / or mechanical engineer shall coordinate the design elements to ensure proper door function in all anticipated building operational modes including all heating, cooling, emergency, occupied and unoccupied modes.

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Appendix A – King County Opening Standards

Part II Products

2.01 Acceptable Manufacturers

1. Except where specified in the hardware schedule, furnish products of only one manufacturer for each type of hardware.
2. Doors and Door Hardware: Any manufacturer whose products meet all other contract division requirements and specifications and in addition must be able to provide the following:
3. Provides factory prewired concealed door and frame wiring using an ElectroLynx®, or fully compatible equivalent, standard plug-in connectors, harnesses and preinstalled wiring. for openings which require no further on site electrification preparation including drilling holes in the openings frames or doors.
4. Electrified openings and door hardware manufacturer : preassembled and prewired concealed using an ElectroLynx®, or fully compatible equivalent, standard plug-in connectors, harnesses and preinstalled wiring. for openings which require no further on site electrification preparation including drilling holes in the openings frames or doors.
5. Acceptable Door manufacturers
 - a. CECO DOOR
 - b. CURRIES
 - c. FLEMING
 - d. GRAHAM
6. Acceptable Door Hardware manufacturer:
 - a. Yale
 - b. Corbin Russwin
 - c. Sargent
 - d. Folger Adams
 - e. McKINNEY
 - f. RIXSON
 - g. Door lock cylinders must be fully compatible with King County standard patented keyway system .
7. Prohibited Hardware:
 - a. Standard (non-ball bearing) hinges.
 - b. Pivot hinges.
 - c. Residential (light) duty locks.
 - d. Automatic flush bolts or concealed rod panic devices on wood doors.
 - e. Floor-mounted door stops.
 - f. Double-cylinder deadbolt locks.
 - g. Locks located at head or sill of door.
 - h. Concealed overhead or floor mounted door closers.
 - i. Mixing of finishes of hardware on the same door, or not matching finishes.
 - j. Knob handles on locksets or latchsets.

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k. Pin and barrel type continuous hinges.

2.02 Recommended Materials as of December 2013

1. Hinges - Electrified: Electro Lynx compatible. McKinney electroLynx QCx Series
2. Mortise Locksets: Manual: Corbin Ruswin ML2000
3. Electrified: Electro Lynx compatible: Corbin Ruswin ML20900 ECL w/ M91 (Latch), M92 (REX) - 24vdc 390ma
4. Panic Devices: Electrified: Electro Lynx compatible. ED4000, ED5000
5. Lock cores: KC Master key system compatible.
6. Opener: Norton 5900 series wired.
7. Electrified Locking ADA Door: Preassembled Door compatible w/ Norton 5900 series
8. Weather-stripping & Thresholds:
9. Fire Door Hold-Open Devices: 24vdc.
10. Automatic Flush Bolts: Prohibited

2.03 Hardware Locations and General Requirements

1. Locate doors, windows, hardware and frames in accordance with KC FMD Building Standards, standard locations, FMD BSS Door and Window Type Specification Schedule.
2. The doors and hardware at County Facilities are subject to an inordinate level of high frequency use. Hence, all openings are considered heavy use.
3. All products and installations shall comply with federal, state, local Fire Safety, NFPA and County LAHJ. The regulations which are more restrictive shall govern.
4. Specify heavy duty, finish for stops, door holders and other accessories for new work. Match existing finishes as directed by Technical Representative for small projects within existing buildings.
5. **Prohibited:** Plate glass and "balanced" doors.
6. **Prohibited:** Ventilating louvers in doors that can be removed.

2.04 Doors

1. Exterior and interior single doors shall be 1-3/4 inch thick, 3 feet wide and 7 feet high, minimum where required for maintenance purposes, the width may be enlarged to 4'-0" wide; however the 7'-0" height shall not be modified except for doors into MDF or IDF rooms.
2. Frequently used doors shall have a vision panel except where privacy, security, or fire safety

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- requirements preclude installation. Where permitted by code, vision panels shall be provided in stair doors and doors serving as corridor separations that are normally closed.
3. Doors shall offer substantial resistance to unauthorized entry.
 4. Where more than one door is required for a security area, single doors or double doors with a removable mullion between them shall be used.
 5. Doors that serve exclusively as exits from security area shall not be operable from outside the security area.
 6. Where primary reliance is placed on doors as physical security barriers, they shall provide a penetration resistance equal to that specified in the security plan for adjoining walls, ceilings, and floors.
 7. Doors that serve as exits from secure areas (areas where the public does not have free access to) shall comply with NFPA 101, Chapter 5. The use of panic hardware on doors from secure areas shall be limited to assembly, educational and hazardous occupancy classifications of Seattle Building Code and as determined by the local authority.
 8. Openings in doors shall be covered to provide the necessary barrier delay rating required by the site-specific security plan for that door. Various materials and configurations may be used, if they are approved by the LAHJ safeguards and FMD Security Technical Project Representative.
 9. Doors that serve as emergency exits from spaces shall not open into spaces of greater security.
 10. Doors of offices or rooms constituting security area perimeters where sensitive information is discussed on a recurring or routine basis shall be constructed of materials of low sound conductivity, or shall otherwise be soundproof to prevent a person outside the room with reasonable access to the wall from overhearing a conversation at normal voice level within the room without the use of hearing instruments or equipment.
 11. When visual access is a factor, a sight baffle shall be used when a door is open and should also block the view of the area when the door is closed.
 12. When doors are used in pairs, an overlap molding is required where the doors meet. Door jambs shall be reinforced when necessary to make it more difficult to open by use of a wedge, jimmy, or similar tool.
 13. Provide wide / oversized openings for dock areas and for utility or other similar areas to accommodate moving of oversize equipment. Wide openings may be accomplished by:
 - a. A pair of doors both 3' wide with a keyed removable/lockable mullion.
 - b. A pair of doors with minimum 3'-0" wide active leaf and minimum 1'-0" wide inactive leaf.
 - c. A single door to maximum 3'-6" wide unless otherwise approved by Owner.

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- d. Overhead sectional or rolling door.
 - e. Where a pair of doors serves a storage or equipment room, manually operated edge- or surface-mounted bolts are permitted on the inactive leaf if approved by AHJ.
14. Single-leaf double-acting doors shall not be used.
 15. The locks on at least one door of any room shall be equipped to prevent personnel from being locked inside, except as otherwise required to satisfy special Security safeguards or security standards.
 16. Provide a swinging exit door at all loading docks.
 17. Where Dutch doors are specified, two separate locksets must be provided, one for the top and one for the bottom leaf. If Dutch doors are required to be fire rated, the upper leaf must have a hold-open device connected to a smoke and have a carry bar to ensure that the lower leaf closes at the same time.
 18. Deadbolt lock or locks shall be key-operated from the exterior side of the door and engaged or disengaged from the interior side of the door by a device not requiring a key, tool or excessive force.
 19. Sliding glass doors shall be equipped with locking devices and have a forced-entry resistance label.
 20. Metal or wooden overhead and sliding doors shall be secured with a deadbolt lock, padlock with a hardened steel shackle, or equivalent when not otherwise locked by electric power operation. When door width exceeds 9-ft., both jambs shall be secured by locking device or restrained by a guide/retainer, cylinder guards...
 21. Metal accordion grate or grille-type doors shall be equipped with metal guides at top and bottom, and a cylinder lock or padlock and hardened steel shackle shall be provided. Cylinder guards...
 22. Wooden hatchways of less than 1-3/4-in.-thick solid wood shall be covered on the inside with 16 gauge sheet metal attached with screws at 6-in maximum centers around the perimeter.
 23. Hatchway and scuttles shall be secured from the inside with a slide bar, slide bolt, and/or padlock with a hardened steel shackle.
 24. Outside pin-type hinges shall be provided with non-removable pins or a means by which the door cannot be opened through removal of hinge pins while the door is in the closed position.
 25. Provide fire doors rated without astragals to avoid the use of coordinators.
 26. Doors located in potentially corrosive environments, such as in close proximity to saltwater shall be corrosion resistant or protected against corrosion.

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Appendix A – King County Opening Standards

2.03 Windows

1. All facilities shall have inoperable windows below 18' above finish grade to the bottom of the window. Exceptions to this may be granted if such windows are part of the HVAC design, and are provided with security elements to prohibit un authorized entry.
2. Windows within 40-in. of a required locking device on a door when in the closed and locked position and operable from the inside without the use of a key, shall be fully tempered glass, laminated glass of at least 1/4-in. thick, approved burglary-resistant material, or guarded by metal bars, screens or grilles in an approved manner.
3. Windows and Skylights with a least dimension greater than 6-in. but less than 48-in. shall be fully tempered glass, laminated glass of at least 1/4-in. thickness, approved burglary-resistant material, or guarded by metal bars, screens or grilles in an approved manner.
4. Sliding glass windows shall be provided with locking devices. Movable panels shall not be rendered easily operable or removable from the frame.
5. Openable windows (including skylights) below 18-ft. shall be provided with substantial locking devices which render the building as secure as the walls and other openings.
6. Window materials and curtain wall system materials shall be aluminum because of its minimal maintenance.
7. Window and curtain wall systems shall meet the performance requirements of the American Architectural Manufacturers Association (AAMA) GS-001, "Voluntary Guide Specifications for Aluminum Architectural Windows," and the following:
 - a. Thermal transfer: AAMA Class U70
 - b. Condensation resistance: AAMA CRF Class 50
 - c. Deflection test pressure: minimum of 40 psf
 - d. Deflection: Shall not exceed 1/175 of span or 3/4 inch, whichever is smaller.
 - e. Thermally broken construction: Systems that isolate exterior aluminum from interior aluminum with a material of low thermal conductance
 - f. Comply with AAMA/ANSI 101-88, "Voluntary Specifications for Aluminum Prime Windows & Sliding Glass Doors," performance class HC50.
8. All operating sashes shall have continuous-field, replaceable weather-stripping around the perimeter of windows.
9. Hardware shall be provided for all operable sashes. Provide only key operable windows to facilitate window washing.
10. On all exterior windows and where primary reliance is placed on windows as physical security barriers, they shall provide a penetration resistance equal to that specified in the FMD Security plan for adjoining walls, ceilings, and floors.

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Facility Performance Standards

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11. On all exterior windows and where primary reliance is placed on windows as physical barriers, they shall be constructed of shatter-resistant, laminated glass panes of 9/32-inch minimum thickness or other material providing an equal degree of resistance, and installed in unopenable frames so that the panes are not removable from outside the area being protected. The frames must be securely anchored in the walls, and windows should lock from the inside.
12. Where mesh may not be used unless approved by the County. If approved to increase penetration resistance, wire mesh shall be 2-inch square or smaller mesh of No. 11 AWG or heavier steel wire or expanded metal.
13. Operable outside windows and operable windows at air shafts, atriums, and courtyards shall have guards conforming to NFPA 101, Chapter 5.
14. Operable windows used for ventilation shall have insect screens.
15. Operating mechanisms, parts, and equipment in operable windows shall have a history of reliability and readily available replacement parts, and shall not be made of zinc.
16. Where double or triple glazing is required, insulating glass units shall be used, not multiple glazing.
17. Include provisions in accordance with OSHA requirements and ANSI A39.1 for cleaning windows.
18. Where insect screens are used, they shall not require seasonal removal and storage, and they shall not interfere with normal window operations.
19. Screen frames of aluminum may be used with wood, aluminum, or steel windows. Screen frames of wood shall be used only with wood windows. Screen frames of steel shall be used only with wood or steel windows. Screen frames of bronze shall be used only with bronze windows.
20. Aluminum and plastic coated or impregnated fibrous glass insect screen shall be used with wood, aluminum, bronze or steel screen frames. Aluminum insect screen shall not be used where it is exposed to a saltwater atmosphere.
21. Bronze insect screen shall be used only with wood, bronze, or steel screen frames. Glass fabric insect screening shall comply with ASTM D3656.
22. Energy Performance Standards: In addition to other window specifications all windows must meet the following energy performance standards.
 - a. Condensation Resistance Factor (CRF).As determined in general accordance with AAHA specification 1502.6-1976, shall not be less than 45.
 - b. Overall Effective Thermal Transmittance Coefficient. As determined in general accordance with ANSI/ASTM C256 - 66; tested at 15 mph dynamic wind speed, shall not exceed .75 BTU per sq. ft. per hour per °F.

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- c. Air Infiltration. As determined in general accordance with ASTM E 785 tested at a wind speed of 25 mph (1.56 psf), an air infiltration rate of .20 cfm per foot of sash crack shall not be exceeded for windows. On-site tests of installed units shall not exceed 1.5 times the above allowable air infiltration.

23. Window assemblies shall satisfy wind loading requirements of applicable codes pertaining to their location above grade.

2.06 Labeled Doors and Frames

1. Construct and install doors and frames to comply with current issue of National Fire Protection Association (NFPA) Standard Number 80, as herein specified.

2.07 Prime Finish

1. Doors and frames are to be cleaned, and chemically treated to insure maximum finish paint adhesion. All surfaces of the door and frame exposed to view shall at a minimum receive a factory applied coat of rust inhibiting primer. The finish to meet the requirements for acceptance stated in ANSI A224.1 “Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces.” The prime finish is not intended to be the final layer of protection from the elements. Field painting using a good grade of paint to be provided in accordance with the recommendations of the door and frame manufacturer. For specialty types of finished coatings, the paint supplier should also be consulted.

Part III Execution

3.03 Adjust and Clean

1. Perform functional performance test which ensures that all equipment and systems operate in accordance with design intent. These are dynamic tests which test the systems through all possible modes of operation.
2. Perform a functional test of all opening equipment in the presence of the Owner Technical Representative and Project Representative. Test shall include performance tests of each operable device and other opening equipment and materials.
3. Owner shall provide services of a competent person to make a final inspection of the entire finish hardware installation after such work has been completed. The Owner shall report to the Contractor in writing findings of this inspection.
4. After final inspection, this Contractor shall make all required adjustments, and repairs. All finish hardware shall be left in perfect operating order.
5. Triplicate sets of special tools (wrenches, valve keys, etc.) for adjusting finish hardware, including special tools used during construction, shall be given to the Owner.
6. All special tools shall be properly identified and the Owner given a complete instruction and

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- demonstration on use and function of these tools.
7. Doors to swing freely and easily without racking or binding; they shall sit tightly into frames and weather-stripping shall uniformly be in contact with adjacent surfaces.
 8. At a minimum, perform and document and tests to demonstrate that:
 - a. All devices are free from operational defects.
 - b. Each device consistently functions as specified.
 - c. Devices operate properly during an emergency.
 - d. Provide to Owner prior to substantial completion.
 - e. Test reports of all devices and equipment.
 - f. Testers name, company and dates of test.
 9. Doors, Glass and all hardware shall be left clean.

Existing County Door Hardware Packages as of December 2013

The following tables represent the County’s organization of current door hardware components into door hardware packages. These tables are for information purposes only and do not alleviate the need for the Design Builder to ensure compatibility of door hardware components, and the formulization of the door hardware schedule and packages for the project.

Exit Hardware Manual

EM-1	ED5600A 1-1/2 Hr. 4' x 9' Mortised in door; single-point latching. Yale 7130F/7130F-2 1-1/2 Hr. 4' x 9' Mortised in door; single-point latching.
EM-2	ED5600A 3 Hr. 4' x 8' Yale 7130F/7130F-2 4' x 8' 3 Hr

Exit Hardware Electrified

EE-1	<p>Corbin Ruswin ED5600 (A) Mortise Exit Device + 781N Controller The McKinney QC8 <i>ElectroLynx</i> Hinge is recommended for the 9903 function, the 9905 function and all options with the exception of M61 and M93. The McKinney QC12 <i>ElectroLynx</i> Hinge is recommended for the M61 and M93 options</p> <p>M61 Alarm Option M91 Bolt Monitor M92 Touchbar Monitor M93 Trim Monitor M94 Latch Retraction M97 Electric Dogging SAF Fail Safe Operation SEC Fail Secure Operation D* Delayed Egress2 9903 Fail Safe Electrified Trim 9905 Fail Secure Electrified Tr</p> <p>Note 1: The following options cannot be ordered together on the same device: a) M94 or M97 & D b) M94 x M97 c) M52 x M97</p>
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	<p>d) M97 x M107 e) M61 or M92 & D f) M61 x M92 g) M61x M52 h) M52 & D i) ED5600 x M91 & M93 j) ED5600 SAF or SEC x M91 or M93 k) Surface vertical rod exit devices with M61 x M91, M92 or M93.</p> <p>Yale 7130 Mortised exit device + 781N Controller A - Alarm Kit B - Bar Monitor or Signaling D - Delayed Egress G - Electric Dogging H* - Security Package (DPS) O - Outside Trim Monitor or Signaling P - Latch Pullback S - Latchbolt Status Monitor or Signaling Safe - Mortise Device Trim Control (lever only) Secure - Mortise Device Trim Control (lever only) 690F Fail Safe Electrified Trim 691F Fail Secure Electrified Trim</p> <p>Note: Any combination of the following options cannot be ordered together: 1) P, G, or D 2) B or A 3) D, B or A *Only available for rim and SquareBolt® Devices when used with Delayed Egress option.</p>

Lock: Thumbturn Indicator

Inside

TT -1	M19N — Secure/Unsecure
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Outside

Inside

TT-2	M19SN Secure/Unsecure	Secure/Unsecure
TT-3	M19VN Vacant/Occupied	Secure/Unsecure

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Type (ANSI)	Manuf.	Model	Function
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Manual Lock Set

<p>M1</p> <p>Typical Low / Mod. Security Classroom Key function</p>	<p>Corbin Russwin</p>	<p>1. ML2002 Classroom Intruder 2. Yale 8818-2</p>	<p>1-</p> <ul style="list-style-type: none"> • Latchbolt by grip either side unless outside grip is locked • Outside grip locked or unlocked by cylinder either side • Auxiliary latch deadlocks latchbolt • Inside grip always free <p>2-</p> <p>Latchbolt retracted by knob/lever unless outside knob/ lever is locked by key.</p> <ul style="list-style-type: none"> • Deadbolt operated by key either side. • When deadbolt is projected, outside knob/lever is automatically locked. • Key retraction of latchbolt by either side unlocks outside knob/lever. • Anti-panic operation. Operating inside knob/lever retracts the latchbolt and deadbolt simultaneously, with outside knob/lever remaining locked. • Deadlocking latchbolt.
<p>M4 (F01)</p> <p>Typical Passage / Closet</p>	<p>Corbin Russwin</p>	<p>1. ML2010 Passage or Closet 2. Yale 8801</p>	<p>1-</p> <ul style="list-style-type: none"> • Latchbolt by grip either side. • Both grips always free. <p>2-</p> <ul style="list-style-type: none"> • For doors that do not require locking. • Latchbolt retracted by knob/lever either side at all times.
<p>M6 (F16)</p>	<p>Corbin Russwin</p>	<p>1. ML2012 Deadlock</p>	<ul style="list-style-type: none"> • Deadbolt by key either side.

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Type (ANSI)	Manuf.	Model	Function
Typical Dead Bolt		2. Yale 8814-2	<ul style="list-style-type: none"> • Deadbolt operated by key outside only. • No inside operation. • NOT UL listed.
M12 (F15) Typical Safe Room Always Locked	Corbin Russwin	1. ML2029 Hotel or Motel 2. Yale 8820	1- <ul style="list-style-type: none"> • Latchbolt by grip inside and by guest key or master key outside. • Outside grip always rigid. • Deadbolt by thumb turn grip inside or by emergency key outside. • Inside grip simultaneously retracts latchbolt and deadbolt. • Emergency key shuts out all other keys. • Auxiliary latch deadlocks latchbolt. Note: Indicator shows deadbolt position only 2- <ul style="list-style-type: none"> • Latchbolt retracted by key outside, knob/lever inside. • Latchbolt retracted by master keys and change keys only when deadbolt is NOT projected. • Deadbolt operated by emergency/shut-out or display key outside and thumb turn inside. • When deadbolt is projected, the indicator button projects out (indicating room is occupied). Access from outside can be gained only with an emergency/shut-out or display key. • Outside knob/lever rigid at all times. • Anti-panic operation. Operating inside knob/lever retracts the latchbolt and

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Appendix A – King County Opening Standards

Type (ANSI)	Manuf.	Model	Function
			deadbolt simultaneously. • Deadlocking latchbolt. • Master key system must be 7-pin.

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Type (ANSI)	Manuf.	Model	Function
M14 (F19) Typical Bathroom Function	Corbin Russwin	<ol style="list-style-type: none"> 1. ML2030 Privacy Bedroom or Bathroom 2. Yale 8802 	<p>1-</p> <ul style="list-style-type: none"> • Latchbolt by grip either side unless outside grip locked by thumb turn • Deadbolt by thumb turn grip inside or by emergency release tool outside. • Inside grip simultaneously retracts latchbolt and deadbolt and unlocks outside grip. <p>2-</p> <ul style="list-style-type: none"> • Latchbolt retracted by knob/lever either side. • Deadbolt operated by thumb turn inside. • When the deadbolt is projected, outside knob/lever is Automatically locked. • Anti-panic operation. Operating inside knob/lever retracts the latchbolt and deadbolt simultaneously, automatically unlocking outside knob/lever. • In emergency, deadbolt may be unlocked from outside by E203 emergency key, supplied.
M18	Corbin Russwin	ML2050 Half Dummy Trim	• Grip acts as pull only; no operation.
M21 Typical Class room Thumb Turn	Corbin Russwin	<ol style="list-style-type: none"> 1. ML2053 Entrance or Office 2. Yale 8809 	<p>1-</p> <ul style="list-style-type: none"> • Latchbolt by grip either side unless outside grip is locked or unlocked by key or thumb turn. • Unlocked by key or thumb turn. • Outside grip locked or unlocked by key or thumb

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Type (ANSI)	Manuf.	Model	Function
			turn. • Latchbolt by key when outside grip locked. • Auxiliary latch deadlocks latchbolt. • Inside grip always free. 2- • Latchbolt retracted by knob/lever either side unless outside knob/lever is locked by key outside or thumb turn inside. • Latchbolt retracted by thumb turn inside or key outside. • Inside knob/lever always active. • Deadlocking latchbolt.
M25(F07) Typical Storeroom Closet Function	Corbin Russwin	1. ML2057 Storeroom or Closet 2. Yale 8805	1- • Latchbolt by grip inside or by key outside. • Outside grip always rigid. • Auxiliary latch deadlocks latchbolt. • Inside grip always free. 2- • For use on storeroom, utility, exit doors. • Latchbolt retracted by key outside, knob/lever inside. • Outside knob/lever rigid at all times. • Inside knob/lever always active. • Deadlocking latchbolt.
M27 Typical High Security Closet	Corbin Russwin	1. ML2059 Security Storeroom or Closet\ 2. Yale 8805	• Latchbolt and deadbolt by grip inside or by key outside • Inside grip simultaneously retracts deadbolt & latchbolt • Outside grip always rigid • Auxiliary latch deadlocks latchbolt • Inside grip always free Note: Indicator shows

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Type (ANSI)	Manuf.	Model	Function
			deadbolt position only 2- <ul style="list-style-type: none"> • For use on storeroom, utility, exit doors. • Latchbolt retracted by key outside, knob/lever inside. • Outside knob/lever rigid at all times. • Inside knob/lever always active. • Deadlocking latchbolt.
M30 (F13) Typical Safe Room Always Unlocked	Corbin Russwin	1. ML2065 Dormitory or Entrance 2. Yale 8822	1- <ul style="list-style-type: none"> • Latchbolt by grip either side unless outside grip locked by projection of deadbolt. • Deadbolt thrown or retracted by key outside or by thumb turn grip inside. • Inside grip simultaneously retracts latchbolt and deadbolt and unlocks outside grip. • Inside grip always free. 2- <ul style="list-style-type: none"> • Latchbolt retracted by knob/lever either side. • Deadbolt operated by key outside and thumb turn inside. • When the deadbolt is projected, outside knob/lever is Automatically locked. • Anti-panic operation. Operating inside knob/lever retracts the latchbolt and deadbolt simultaneously, automatically unlocking outside knob/lever.
M34 Typical High	Corbin Russwin	1. ML2072 Classroom Intruder 2. Yale 8808-2	1- <ul style="list-style-type: none"> • Latchbolt by grip from either side unless outside grip is locked by projection

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Type (ANSI)	Manuf.	Model	Function
<p>Security Class Room</p>			<p>of deadbolt.</p> <ul style="list-style-type: none"> • Deadbolt thrown or retracted by key from either side. • Inside grip simultaneously retracts latchbolt and deadbolt; outside grip remains locked. • Retracting latchbolt by key unlocks outside grip. • Auxiliary latch deadlocks latchbolt. <p>Note: Indicator shows deadbolt position only</p> <p>2-</p> <ul style="list-style-type: none"> • Latchbolt retracted by knob/lever either side unless outside knob/lever is locked by key. • Either cylinder locks or unlocks outside knob/lever. • Latchbolt can be retracted by key when outside knob/lever is locked. • Operating inside knob/lever retracts latchbolt, but outside knob/lever remains locked. • Deadlocking latchbolt.
<p>M36</p> <p>Typical High Security Office</p>	<p>Corbin Russwin</p>	<ol style="list-style-type: none"> 1. ML2075 Security Entrance or Office 2. Yale 8807 	<p>1-</p> <ul style="list-style-type: none"> • Latchbolt by grip from either side unless outside grip is locked by projection of deadbolt. • Deadbolt thrown or retracted by outside key or inside thumb turn. • Inside grip simultaneously retracts latchbolt and deadbolt; outside grip remains locked. • Retracting latchbolt by key unlocks outside grip. • Auxiliary latch deadlocks

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Type (ANSI)	Manuf.	Model	Function
			latchbolt. Note: Indicator shows deadbolt position only 2- <ul style="list-style-type: none"> • For office doors where locking is required. • Latchbolt retracted by knob/lever either side, except when outside knob/lever is locked by stop work activator. • When outside knob/lever is locked, latchbolt is operated by key outside and knob/lever inside. • Deadlocking latchbolt.

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Electrified Lock Set:

Note all Electrified Locksets require REX and Latch bolt monitoring if available

Fail Safe

<p>E1</p> <p>Electric Monitor Options:</p> <p>Latchbolt Monitor M91 Request to Exit M92 Security Monitor M105</p> <p>REX: REX Latch Bolt LBM Deadbolt DBM Integrated ITS Secure Door STS</p>	<p>1. ML20910 2. Yale 8880</p>	<p>1-</p> <ul style="list-style-type: none"> • Latchbolt by grip either side unless outside grip is locked by energizing solenoid. • Inside grip always free. • Auxiliary latch deadlocks latchbolt.\ <p>No key</p> <p>2-</p> <p>Power off – outside lever active</p> <ul style="list-style-type: none"> • Power on – outside lever locked • Auxiliary latch deadlocks latchbolt • Inside lever always free
<p>E2</p> <p>Latchbolt Monitor M91 Request to Exit M92 Security Monitor M105</p> <p>REX: REX Latch Bolt LBM Deadbolt DBM Integrated ITS Secure Door STS</p>	<p>1. ML20901 2. Yale 8894-2</p>	<p>1</p> <ul style="list-style-type: none"> • Latchbolt by grip either side unless both grips are locked by energizing solenoid. • Latchbolt by key outside when solenoid is energized. • Auxiliary latch deadlocks latchbolt. <p>Key outside</p> <p>2-</p> <p>Power off – both levers active</p> <ul style="list-style-type: none"> • Power on – both levers locked • Auxiliary latch deadlocks latchbolt • Mechanical key override by both sides

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		when locked
<p>E3</p> <p>Latchbolt Monitor M91 Request to Exit M92 Security Monitor M105</p> <p>REX: REX Latch Bolt LBM Deadbolt DBM Integrated ITS Secure Door STS</p>	<p>1. ML20902 2. Yale 8894-2</p>	<p>1-</p> <ul style="list-style-type: none"> • Latchbolt by grip either side unless both grips are locked by energizing solenoid. • Latchbolt by key inside or outside when solenoid is energized. • Auxiliary latch deadlocks latchbolt. Key both sides <p>2-</p> <p>Power off – both levers active</p> <ul style="list-style-type: none"> • Power on – both levers locked • Auxiliary latch deadlocks latchbolt • Mechanical key override by both sides when locked
<p>E4</p> <p>Latchbolt Monitor M91 (1) Request to Exit M92 (1&2) Security Monitor M105(1)</p> <p>Typical Fail Safe Egress</p>	<p>1. ML20903 2. CL33903 3. Yale 8890</p>	<p>1-</p> <ul style="list-style-type: none"> • Latchbolt by grip either side unless outside grip is locked by energizing solenoid. • Latchbolt by key outside when solenoid is energized. • Inside grip always free. • Auxiliary latch deadlocks latchbolt. Key outside <p>2-</p> <ul style="list-style-type: none"> • Dead locking latchbolt by lever both sides except when power on

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<p>REX: REX Latch Bolt LBM Deadbolt DBM Integrated ITS Secure Door STS</p>		<p>locks outside lever.</p> <ul style="list-style-type: none">• Power off/Unlocks outside lever.• Inside lever always free.• Latchbolt retracted by key when locked electrically. <p>3- Power off – outside lever active</p> <ul style="list-style-type: none">• Power on – outside lever locked• Auxiliary latch deadlocks latchbolt• Inside lever always free• Mechanical key override by outside when locked
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<p>E5 Latchbolt Monitor M91 Request to Exit M92 Security Monitor M105</p> <p>REX: REX Latch Bolt LBM Deadbolt DBM Integrated ITS Secure Door STS</p>	<p>1. ML20920 2. Yale 8884</p>	<p>1- • Latchbolt by grip either side unless both grips are locked by energizing solenoid. • Auxiliary latch deadlocks latchbolt.</p> <p>2- • Power off – both levers active • Power on – both levers locked • Auxiliary latch deadlocks latchbolt • No key override</p>
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Fail Secure

<p>E6 Latchbolt Monitor M91 Request to Exit M92 Security Monitor M105</p> <p>REX: REX Latch Bolt LBM Deadbolt DBM Integrated ITS Secure Door STS</p>	<p>1. ML20930 2. Yale 8881</p>	<p>1- • Latchbolt by grip either side only when solenoid is energized. • Outside grip locked when solenoid is not energized. • Inside grip always free. • Auxiliary latch deadlocks latchbolt.</p> <p>2- • Power off – outside lever locked • Power on – outside lever active • Auxiliary latch deadlocks latchbolt • Inside lever always free • No key override</p>
<p>E7 Latchbolt Monitor M91 Request to Exit M92 Security Monitor M105</p>	<p>1. ML20904 2. Yale 8895-2</p>	<p>1- • Latchbolt by grip either side only when solenoid is energized. • Both grips locked when solenoid is not energized. • Latchbolt by key outside when solenoid is not</p>

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<p>REX: REX Latch Bolt LBM Deadbolt DBM Integrated ITS Secure Door STS</p>		<p>energized. • Auxiliary latch deadlocks latchbolt.</p> <p>2- • Power off – both levers locked • Power on – both levers active • Auxiliary latch deadlocks latchbolt • Mechanical key override by both sides when locked</p>
<p>E8 Latchbolt Monitor M91 (1) Request to Exit M92 (1&2) Security Monitor M105 (1) Typical Fail Secure Egress</p> <p>REX: REX Latch Bolt LBM Deadbolt DBM Integrated ITS Secure Door STS</p>	<p>1. ML20905 2. CL33905 3. Yale 8891</p>	<p>1- • Latchbolt by grip either side only when solenoid is energized. • Outside grip locked when solenoid is not energized. • Latchbolt by key outside when solenoid is not energized. • Inside grip always free. • Auxiliary latch deadlocks latchbolt</p> <p>2- • Dead locking latchbolt by lever either side except when power off locks outside lever. • Power on/Unlocks outside lever. • Inside lever always free. • Latchbolt retracted by key when power is off.</p> <p>3- • Power off – outside lever locked • Power on – outside lever active • Auxiliary latch deadlocks latchbolt • Inside lever always free • Mechanical key override by outside when locked</p>

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<p>E9</p> <p>Latchbolt Monitor M91 Request to Exit M92 Security Monitor M105</p> <p>REX: REX Latch Bolt LBM Deadbolt DBM Integrated ITS Secure Door STS</p>	<p>1. ML20912 2. Yale 8895-2</p>	<p>1-</p> <ul style="list-style-type: none"> • Latchbolt by grip either side only when solenoid is energized. • Both grips locked when solenoid is not energized. • Latchbolt by key inside or outside when solenoid is not energized. • Auxiliary latch deadlocks latchbolt <p>2-</p> <ul style="list-style-type: none"> • Power off – both levers locked • Power on – both levers active • Auxiliary latch deadlocks latchbolt • Mechanical key override by both sides when locked
<p>E10</p> <p>Latchbolt Monitor M91 Request to Exit M92 Security Monitor M105</p> <p>REX: REX Latch Bolt</p>	<p>1. ML20940 2. Yale 8885</p>	<p>1-</p> <ul style="list-style-type: none"> • Latchbolt by grip either side only when solenoid is energized. • Both grips locked when solenoid is not energized. • Auxiliary latch deadlocks latchbolt. <p>2-</p> <ul style="list-style-type: none"> • Power off – both levers locked • Power on – both levers active

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LBM Deadbolt DBM Integrated ITS Secure Door STS		<ul style="list-style-type: none"> • Auxiliary latch deadlocks latchbolt • No key override
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Door Closer

CLM1	Norton Closer
CLE1	Norton 5900 series Closer

Hinge

H1	McKinny	
H2	McKinny QC-12	ElectroLynx 12 Conductor
H3	McKinney QC12 MM	ElectroLynx Mag. switch Monitor

Card Reader

CR 1	HID MultiClass RP40		
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General Definitions of Risk.

The table below is provided as general information on risk categories pertaining to the County’s Opening Standards.

Some or all of items listed in a category may apply.

Category	Low Risk	Moderate Risk	High Risk
R1 Financial/Monetary/ Value.	< \$10,000	\$10,000- \$100,000	> \$100,000
R2 Information/Data Loss or release.	Loss results in little customer impact. Data can be recovered from alternate source. Small risk of litigation if released. Little or no public relations impact.	Loss results in customer impact resulting in delay of service. Data may be recovered from alternate source with difficulty. Litigation probable if released. Sort term Public relations issue.	Loss results in customer impact resulting in inability to support service over time. Data cannot be recovered from alternate source. Litigation certain if released. Significant ongoing negative impact on public’s perception of organization.
R3 Physical / Structural	Damage or loss causes superficial impact on facility operation. Alternate facility available. Little impact on core service. Corrected in days.	Damage or loss impacts facility operation. Alternate facility available at significant cost. Core service impacted or not available during repair/move. Corrected in weeks.	Damage or Loss eliminates facilities ability to function. No alternate facility available. Core service not available until reconstruction / repair of facility. Corrected in months.

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<p>R4 Human / Personnel</p>	<p>Core services continue to function. Little risk of criminal activity or injury to personnel. Replacement with necessary skills available in days.</p>	<p>Core services disrupted with some significant service impact. Some risk of criminal activity or injury to personnel. Replacement with necessary skills available in weeks.</p>	<p>Core services difficult or impossible until replacement. Risk of criminal activity or injury to personnel. (VIP). Replacement with necessary skills available in months.</p>
<p>R5 Materials/Equipment</p>	<p>Loss results in little impact on customer service. Material is not hazardous. Replaced in days.</p>	<p>Loss results in delay of customer service. Item may be somewhat hazardous. Replaced in weeks.</p>	<p>Loss results in inability to serve core customer needs. Material is hazardous. Replaced in months.</p>

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ROOM TYPE/DOOR HARDWARE PACKAGES

The following table reflects current County approach to room types and associated door hardware packages.

This table is for information only and does not alleviate the need for the Design Builder to formulate the final hardware packages for the CFJC project

Room Type	Risk	Use	Impact	Thickness	Special Condition	Type	
Bathrooms	R4L	Low	Low	1-3/4"	D1	Door	
						TT-3	Indicator
						M14 / E8	Lock
Bathrooms	R4M	Low	Low	1-3/4"	D1	Door	
						TT-3	Indicator
						M14 / E8	Lock
Bathrooms	R4H	Low	Low	1-3/4"	D4	Door	
						TT-3	Indicator
						M14 / E8	Lock
Bedrooms	R4L	Low	Low	1-3/4"	D10	Door	
						TT-1	Indicator
						M12 / E8	Lock
Bedrooms	R4M	Low	Low	1-3/4"	D10	Door	

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ROOM TYPE/DOOR HARDWARE PACKAGES

The following table reflects current County approach to room types and associated door hardware packages.

This table is for information only and does not alleviate the need for the Design Builder to formulate the final hardware packages for the CFJC project

Room Type	Risk	Use	Impact	Thickness		Special Condition	Type
						TT-1	Indicator
						M12 / E8	Lock
Bedrooms	R4H	Low	Low	1-3/4"		D4	Door
						TT-1	Indicator
						M12 / E8	Lock
Cafeteria	R4L	High	High	1-3/4"	Two-way vision	D4 / D11	Door
						M1 / E8	Lock
						EE1	Exit
						CL1 / CL2	Closer
Cafeteria	R4M	High	High	1-3/4"	Two-way vision	D4 / D11	Door
						M1 / E8	Lock
						EE1	Exit
						CL1 / CL 2	Closer

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ROOM TYPE/DOOR HARDWARE PACKAGES

The following table reflects current County approach to room types and associated door hardware packages.

This table is for information only and does not alleviate the need for the Design Builder to formulate the final hardware packages for the CFJC project

Room Type	Risk	Use	Impact	Thickness		Special Condition	Type
Cafeteria	R4H	High	High	1- 3/4 "	Two- way vision	D15 / D14 / D15	Door
						M1 / E8	Lock
						EE1-VR	Exit
						CL 1 / CL2	Closer
Central Duplication	R2L					D1	Door
						M25 / E8	Lock
Central Duplication	R2M					D1	Door
						M25 / E8	Lock
Central Duplication	R2H					D4	Door
						M25 / E8	Lock
Central Storage	R5L					D4	Door
						M25 / E8	Lock
Central Storage	R5M					D4	Door

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ROOM TYPE/DOOR HARDWARE PACKAGES

The following table reflects current County approach to room types and associated door hardware packages.

This table is for information only and does not alleviate the need for the Design Builder to formulate the final hardware packages for the CFJC project

Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
					M25 / E8	Lock
Central Storage	R5H				D4	Door
					M25 / E8	Lock
Mechanical Space	R3L				D7 / D5	Door
					M25 / E8	Lock
Mechanical Space	R3M				D7 / D5	Door
					M25 / E8	Lock
Mechanical Space	R3H	Moderate	Moderate	1-3/4"	D7 / D5	Door
					M25 / E8	Lock
Classrooms	R4L	Moderate	Moderate	1-3/4"	Two-way vision & acoustics	D1
					TT-1	Indicator
					M1 (CHILD) / M21 (ADULT)	Lock
					EE1	Exit

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ROOM TYPE/DOOR HARDWARE PACKAGES

The following table reflects current County approach to room types and associated door hardware packages.

This table is for information only and does not alleviate the need for the Design Builder to formulate the final hardware packages for the CFJC project

Room Type	Risk	Use	Impact	Thickness		Special Condition	Type
						CL1 / CL2	Closer
Classrooms	R4M	Moderate	Moderate	1-3/4"	Two-way vision & acoustics	D4	Door
						TT-1	Indicator
						M1 (CHILD) / M21 (ADULT) / E8	Lock
						EE1	Exit
						CL1 / CL2	Closer
Classrooms	R4H	Moderate	Moderate	1-3/4"	Two-way vision & acoustics	D11	Door
						TT-1	Indicator
						M34 / E8	Lock
						EE1-VR	Exit

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ROOM TYPE/DOOR HARDWARE PACKAGES

The following table reflects current County approach to room types and associated door hardware packages.

This table is for information only and does not alleviate the need for the Design Builder to formulate the final hardware packages for the CFJC project

Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
					CL1 / CL2	Closer
Clinical Administration	R4L				D1	Door
					M1 / E8	Lock
Clinical Administration	R4M				D1	Door
					M1 / E8	Lock
Clinical Administration	R4H				D4	Door
					M34 / E8	Lock
Closets	R5L	Low	Low	1-3/4"	D1	Door
					M25 / E8	Lock
Closets	R5M	Low	Low	1-3/4"	D4	Door
					M25 / E8	Lock
Closets	R5H	Low	Low	1-3/4"	D4	Door
					M27 / E8	Lock

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ROOM TYPE/DOOR HARDWARE PACKAGES

The following table reflects current County approach to room types and associated door hardware packages.

This table is for information only and does not alleviate the need for the Design Builder to formulate the final hardware packages for the CFJC project

Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
Computer Lab	R5L				D4	Door
					M1 (CHILD) / M21 (ADULT) / E8	Lock
Computer Lab	R5M				D4	Door
					M1 (CHILD) / M21 (ADULT) / E8	Lock
					EE1	Exit
					CL1 / CL2	Closer
Computer Lab	R5H				D12	Door
					M34 / E8	Lock
					EE1	Exit
					CL1 / CL2	Closer
Computer Storage	R5L				D4	Door
					M25 / E8	Lock

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ROOM TYPE/DOOR HARDWARE PACKAGES

The following table reflects current County approach to room types and associated door hardware packages.

This table is for information only and does not alleviate the need for the Design Builder to formulate the final hardware packages for the CFJC project

Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
					EE1	Exit
					CL1 / CL2	Closer
Computer Storage	R5M				D4	Door
					M27 / E8	Lock
Computer Storage	R5H				D12	Door
					M27 / E8	Lock
Conference Meeting Room	R4L				D1 / D6	Door
					M1 / E8	Lock
					EE1	Exit
					CL1 / CL2	Closer
Conference Meeting Room	R4M				D1 / D6	Door
					M1 / E8	Lock

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ROOM TYPE/DOOR HARDWARE PACKAGES

The following table reflects current County approach to room types and associated door hardware packages.

This table is for information only and does not alleviate the need for the Design Builder to formulate the final hardware packages for the CFJC project

Room Type	Risk	Use	Impact	Thickness	Special Condition	Type	
						EE1	Exit
						CL1 / CL2	Closer
Conference Meeting Room	R4H	Moderate	Low	1-3/4"	D1 / D6	Door	
						M34 / E8	Lock
						EE1	Exit
						CL1 / CL2	Closer
						CL1 / CL2	
Consulting Room	R2L				D1 / D6	Door	
						TT-3	Indicator
						M14 / E8	Lock
Consulting Room	R2M				D4 / D6	Door	
						TT-3	Indicator

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ROOM TYPE/DOOR HARDWARE PACKAGES

The following table reflects current County approach to room types and associated door hardware packages.

This table is for information only and does not alleviate the need for the Design Builder to formulate the final hardware packages for the CFJC project

Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
					M14 / E8	Lock
Consulting Room	R2H				D6 / D12	Door
					TT-3	Indicator
					M14 / E8	Lock
Control Room	R3L				D4	Door
					M27 / E8	Lock
Control Room	R3M				D12	Door
					M27 / E8	Lock
Control Room	R3H				D15 / D16	Door
					M27 / E8	Lock
Copy / Duplicating Room	R2L				D1	Door
					M1 / E8	Lock
Copy / Duplicating Room	R2M				D1	Door
					M1 / E8	Lock
Copy / Duplicating Room	R2H				D4	Door

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The following table reflects current County approach to room types and associated door hardware packages.

This table is for information only and does not alleviate the need for the Design Builder to formulate the final hardware packages for the CFJC project

Room Type	Risk	Use	Impact	Thickness	Special Condition	Type	
					M25 / E8	Lock	
Corridor / Hall Fire	R3L	Low	Low		Fire	D5	Door
					M4 / E4	Lock	
					EE2	Exit	
					CL1 / CL2	Closer	
Corridor / Hall Fire	R3M	Low	Low		Fire	D5	Door
					M4 / E4	Lock	
					EE2	Exit	
					CL1 / CL2	Closer	
Corridor / Hall Fire	R3H	Low	Low		Fire	D5	Door
					M4 / E4	Lock	
					EE2	Exit	
					CL1 / CL2	Closer	

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
Court Room / Entrance	R4L	High			D4	Door
					M1 / E8	Lock
					EE1	Exit
					CL1	Closer
Court Room / Entrance	R4M	High			D12	Door
					M34 / E8	Lock
					EE1	Exit
					CL1	Closer
Court Room / Entrance	R4H	High			D15 / D16	Door
					M34 / E8	Lock
					EE1	Exit
Court Room Staff / Judge Exit	R4L	Low		1-3/4"	D4	Door
					M21 / E8	Lock
Court Room Staff / Judge Exit	R4M	Low		1-3/4"	D12	Door

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
					M21 / E8	Lock
Court Room Staff / Judge Exit	R4H	Low		1-3/4"	D15 / D16	Door
					M36 / E8	Lock
Department / Unit Administration	R4L				D4	Door
					M1 / E8	Lock
Department / Unit Administration	R4M				D4	Door
					M1 / E8	Lock
Department / Unit Administration	R4H				D4	Door
					M34 / E8	Lock
Diagnostic Lab	R2L				D1	Door
					M1 / E8	Lock
Diagnostic Lab	R2M				D1	Door
					M1 / E8	Lock
Diagnostic Lab	R2H				D4	Door
					M34 / E8	Lock

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
Dining Room	R4L				D1	Door
					M1 / E8	Lock
Dining Room	R4M				D1	Door
					M1 / E8	Lock
Dining Room	R4H				D4	Door
					M34 / E8	Lock
Dispensary	R5L				D4	Door
					M25 / E8	Lock
Dispensary	R5M				D4	Door
					M27 / E8	Lock
Dispensary	R5H				D11	Door
					M27 / E8	Lock
Dressing Room	R4L				D1	Door
					TT-3	Indicator
					M14	Lock

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type	
Dressing Room	R4M				D1	Door	
						M14	Lock
						TT-3	Indicator
Dressing Room	R4H				D4	Door	
						TT-3	Lock
						M14	Indicator
Elevator / Vestibule	R4L				Fire	D5	Door
						M4 / E4	Lock
Elevator / Vestibule	R4M				Fire	D5	Door
						M4 / E4	Lock
Elevator / Vestibule	R4H				Fire	D5	Door
						M4 / E4	Lock
Entrance	R4L					D13	Door
						M36 / E8	Lock
Entrance	R4M					D13	Door

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
					M36 / E8	Lock
Entrance	R4H				D13	Door
					M36 / E8	Lock
Entry Vestibule	R3L			Fire	D5	Door
					M4	Lock
Entry Vestibule	R3M			Fire	D5	Door
					M4	Lock
Entry Vestibule	R3H			Fire	D5	Door
					M4	Lock
Environmental Control (Janitor)	R5L				D1	Door
					M25	Lock
Environmental Control (Janitor)	R5M				D1	Door
					M25	Lock
Environmental Control (Janitor)	R5H				D1	Door
					M27	Lock

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Room Type	Risk	Use	Impact	Thickness		Special Condition	Type
Equipment Rooms	R5L	Moderate	Moderate	1-3/4"		D4 / D5 / D6	Door
						M25 / E8	Lock
Equipment Rooms	R5M	Moderate	Moderate	1-3/4"		D4 / D5 / D6	Door
						M25 / E8	Lock
Equipment Rooms	R5H	Moderate	Moderate	1-3/4"		D4 / D5 / D6	Door
						M27 / E8	Lock
Evidence Storage	R5L	Low	High		Security / Fire	D12	Door
						M27 / E8	Lock
Evidence Storage	R5M					D12	Door
						M27 / E8	Lock
Evidence Storage	R5H					D16	Door
						M27 / E8	Lock
Examination Rooms	R4L					D1 / D14	Door
						TT-3	Indicator

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Room Type	Risk	Use	Impact	Thickness		Special Condition	Type
						M1 / M4 / E8	Lock
Examination Rooms	R4M					D1 / D14	Door
						TT-3	Indicator
						M1 / M4 / E8	Lock
Examination Rooms	R4H	High	High	1-3/4"	Sanitation	D1 / D14	Door
						TT-3	Indicator
						M34 / E8	Lock
Exterior Emergency. Exit only.	R4L	Low	High	1-3/4"	Security	D5 / D11 / D12	Door
						M27 - NO EXTERIOR GRIP	Lock
Exterior Emergency. Exit only.	R4M					D5 / D11 / D12	Door
						M27 - NO EXTERIOR GRIP	Lock
Exterior Emergency. Exit only.	R4H					D5 / D11 / D12	Door
						M27 - NO EXTERIOR GRIP	Lock
Field Building	R5L					D4	Door

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
					M27 / E8	Lock
Field Building	R5M				D11	Door
					M27 / E8	Lock
Field Building	R5H				D12	Door
					M27 / E8	Lock
File Room	R2L				D1	Door
					M25 / E8	Lock
File Room	R2M				D4	Door
					M25 / E8	Lock
File Room	R2H				D12	Door
					M27 / E8	Lock
Food Facilities	R4L				D14	Door
					M1 / M4 / M21	Lock
Food Prep Room	R4M				D14	Door
					M1 / M4 / M21 / E8	Lock

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
Food Prep Room	R4H				D14	Door
					M1 / M4 / M21 / E8	Lock
Food Prep Room	R4L				D14	Door
					M27 / M34 / M36 / E8	Lock
Garbage Room	R5L				D4 / D14	Door
					M25 / E8	Lock
Garbage Room	R5M				D4 / D14	Door
					M25 / E8	Lock
Garbage Room	R5M=H				D4 / D14	Door
					M27 / E8	Lock
Generator Room	R3L				D4 / D5 / D7	Door
					M25 / E8	Lock
Generator Room	R3M				D4 / D5 / D7	Door
					M25 / E8	Lock
Generator Room	R3H				D4 / D5 / D7	Door

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
					M27 / E8	Lock
Generic Exterior	R3L				D13	Door
					M36 / E8	Lock
Generic Exterior	R3M				D13	Door
					M36 / E8	Lock
Generic Exterior	R3H				D13	Door
					M36 / E8	Lock
Generic Interior	R3L				D4	Door
					M1 / E8	Lock
Generic Interior	R3M				D4	Door
					M1 / E8	Lock
Generic Interior	R3H				D4	Door
					M34 / E8	Lock
Group Study Room	R4L				D1	Door
					M1 / E8	Lock

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Room Type	Risk	Use	Impact	Thickness		Special Condition	Type
Group Study Room	R4M					D1	Door
						M1 / E8	Lock
Group Study Room	R4H					D1	Door
						M1 / E8	Lock
Gym / workout room	R4L					D4	Door
						M1 / E8	Lock
Gym / workout room	R4M					D4	Door
						M1 / E8	Lock
Gym / workout room	R4H	Moderate	High	1-3/4"	Impact & two-way vision	D4	Door
						M34	Lock
Hall - Public	R3L					D1 / E4	Door
						M4	Lock
Hall - Public	R3M					D1	Door
						M4 / E4	Lock

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
Hall - Public	R3H	High			D1	Door
					M4 / E4	Lock
Hall - Secure	R4L				D4	Door
					M4 / E4	Lock
Hall - Secure	R4M				D4	Door
					M4 / E4	Lock
Hall - Secure	R4H				D4	Door
					M4 / E4	Lock
Hazardous Materials storage	R5L				D4	Door
					M25 / E8	Lock
Hazardous Materials storage	R5M				D5 / D11	Door
					M27 / E8	Lock
Hazardous Materials storage	R5H				D5 / D11	Door
					M27 / E8	Lock
Health Supplies	R5L				D4	Door

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
					M25 / E8	Lock
Health Supplies	R5M				D4	Door
					M25 / E8	Lock
Health Supplies	R5H				D12	Door
					M27 / E8	Lock
Heating Plant	R3L				D4 / D5 / D7	Door
					M25 / E8	Lock
Heating Plant	R3M				D4 / D5 / D7	Door
					M25 / E8	Lock
Heating Plant	R3H				D4 / D5 / D7	Door
					M27 / E8	Lock
IDF	R3L				D4	Door
					M25 / E8	Lock
IDF	R3M				D4	Door
					M27 / E8	Lock

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Room Type	Risk	Use	Impact	Thickness		Special Condition	Type
IDF	R3H	Low	Low	1 - 3/4"		D12	Door
						M27 / E8	Lock
Isolation Room	R4L					D4 / D7 / D14	Door
						M1 / E8	Lock
Isolation Room	R4M					D7 / D12 / D14	Door
						M34 / E8	Lock
Isolation Room	R4H					D7 / D14 / D16	Door
						M34 / E8	Lock
Judge Chambers	R4L					D10	Door
						M12 / M30 / E8	Lock
Judge Chambers	R4M					D10	Door
						M12 / M30 / E8	Lock
Judge Chambers	R4H	Low	High	1- 3/4"	Bullet resistant Lv3	D15	Door
						M36 / E8	Lock

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Room Type	Risk	Use	Impact	Thickness		Special Condition	Type
Kitchen	R4L					D1 / D14	Door
						M1 / M4 / M21 / M25 / E8	Lock
Kitchen	R4M					D1 / D14	Door
						M1 / M21 / M25 / E8	Lock
Kitchen	R4H	Moderate	Moderate	1-3/4"	Two-way vision	D1 / D14	Door
						M27 / M34 / M36 / E8	Lock
Laboratory	R2L					D1	Door
						M1 / E8	Lock
Laboratory	R2M					D4	Door
						M1 / E8	Lock
Laboratory	R2H					D11	Door
						M34 / E8	Lock
Laundry Room	R2L					D4	Door
						M1 / M4 / M21 / M25 / E8	Lock
Laundry Room	R2M					D4	Door

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
					M1 / M21 / M25 / E8	Lock
Laundry Room	R2H				D16	Door
					M27 / M34 / M36 / E8	Lock
Library	R2L				D1 / D10	Door
					M1 / E8	Lock
Library	R4M				D1 / D10	Door
					M1 / E8	Lock
Library	R4H				D12	Door
					M34 / E8	Lock
Listening Room	R4L				D8	Door
					M14 / E8	Lock
Listening Room	R4M				D8	Door
					M14 / E8	Lock
Listening Room	R4H				D8 / D11	Door
					M14 / E8	Lock

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type	
Lobby	R4L				D1 / D10 / D13	Door	
						M1 / M4 / E8	Lock
Lobby	R4M				D4 / D10 / D13	Door	
						M1 / M21 / M25 / E8	Lock
Lobby	R4H				D11 / D15 / D16	Door	
						M27 / M34 / M36 / E8	Lock
Locker / Change Room	R4L				D1	Door	
						TT-3	Indicator
						M14 / E8	Lock
Locker / Change Room	R4M	Moderate	Low	1-3/4"	D1	Door	
						TT-3	Indicator
						M14 / E8	Lock
Locker / Change Room	R4H				D4	Door	
						TT-3	Indicator
						M12 / M30 / E8	Lock

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
Lounge	R4L				D1	Door
					M1 / M4 / E8	Lock
Lounge	R4M				D1	Door
					M1 /M4 / E8	Lock
Lounge	R4H				D4	Door
					M1 / M34 / E8	Lock
Mail Room	R2L				D4	Door
					M25 / E8	Lock
Mail Room	R2M				D11	Door
					M25 / E8	Lock
Mail Room	R2H				D16	Door
					M27 / E8	Lock
Main Entrance	R3L				D13	Door
					M34 / E8	Lock
Main Entrance	R3M				D13	Door

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Room Type	Risk	Use	Impact	Thickness		Special Condition	Type
						M34 / E8	Lock
Main Entrance	R3H	High	High	1-3/4"	Two-way vision	D13	Door
						M34 / E8	Lock
Main Suite Entry Secure	R4L					D4 / D10	Door
						M1 / E8	Lock
Main Suite Entry Secure	R4M					D4 / D10	Door
						M34 / E8	Lock
Main Suite Entry Secure	R4H	Moderate	High			D11 / D15 / D16	Door
						M34 / E8	Lock
Mainframe Computer	R3L					D4	Door
						M25 / E8	Lock
Mainframe Computer	R3M					D11	Door
						M27 / E8	Lock
Mainframe Computer	R3H	Low	Low	1 - 3/4"	Security	D15 / D16	Door

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Room Type	Risk	Use	Impact	Thickness		Special Condition	Type
						M27 / E8	Lock
Master Suite Entrance	R4L					D4 / D10	Door
						M1 / E8	Lock
Master Suite Entrance	R4M					D4 / D10	Door
						M1 / E8	Lock
Master Suite Entrance	R4H	Moderate	Moderate	1-3/4"	Security &	D11 / D15 / D16	Door
						M34 / E8	Lock
MDF	R3L					D4	Door
						M27 / E8	Lock
MDF	R3M					D11	Door
						M27 / E8	Lock
MDF	R3H	Low	Low	1 - 3/4"	Security	D11 / D15 / D16	Door
						M27 / E8	Lock
Mechanical Room	R3L					D4 / D5 /D7	Door

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Room Type	Risk	Use	Impact	Thickness		Special Condition	Type
						M25 / E8	Lock
Mechanical Room	R3M					D4 / D5 /D7	Door
						M25 / E8	Lock
Mechanical Room	R3H	Moderate	Moderate	1-3/4"	Fire label / Sound	D5 / D6 / D11	Door
						M27 / E8	Lock
Media Production	R5L					D6	Door
						M1 / E8	Lock
Media Production	R5M					D6	Door
						M1 / E8	Lock
Media Production	R5H					D6	Door
						M34 / E8	Lock
Meditation/Quiet Room	R4L					D8	Door
						TT-3	Indicator
						M1 / M4 / M21 / E8	Lock
Meditation/Quiet Room	R4M					D8	Door

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
					TT-3	Indicator
					M1 / M4 / M21 / E8	Lock
Meditation/Quiet Room	R4H				D8	Door
					TT-3	Indicator
					M27 / M34 / M36 / E8	Lock
Meeting Room	R4L				D1 / D6 / D10	Door
					M1 / M4 / E8	Lock
Meeting Room	R4M				D1 / D6 / D10	Door
					M1 / E8	Lock
Meeting Room	R4H				D1 / D6 / D10	Door
					M34 / E8	Lock
Monitoring / Dispatch Centers	R3L				D4	Door
					M25 / E8	Lock
Monitoring / Dispatch Centers	R3M				D11	Door
					M27 / E8	Lock

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Room Type	Risk	Use	Impact	Thickness		Special Condition	Type
Monitoring / Dispatch Centers	R3H	Low	High	1-3/4"	Bullet resistant	D15 / D16	Door
						M27 / E8	Lock
Multi-Purpose Room	R4L					D1 / D4 / D10	Door
						M1 / M4 / E8	Lock
Multi-Purpose Room	R4M					D4 / D10	Door
						M1 / E8	Lock
Multi-Purpose Room	R4H					D4 / D10	Door
						M34 / E8	Lock
Observation Room	R4L					D4	Door
						M1 / E8	Lock
Observation Room	R4M					D4	Door
						M1 / E8	Lock
Observation Room	R4H					D4 / D15	Door
						M34 / E8	Lock
Office Private	R4L	Low	Low	1-3/4"	Privacy	D1 / D10	Door

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ROOM TYPE/DOOR HARDWARE PACKAGES

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This table is for information only and does not alleviate the need for the Design Builder to formulate the final hardware packages for the CFJC project

Room Type	Risk	Use	Impact	Thickness	Special Condition	Type	
				"			
						TT-1	Indicator
						M1 / M4 / M12 / M21 / M25	Lock
Office Private	R4M	Low	Low	1-3/4"	Privacy & acoustics	D4 / D10	Door
						TT-1	Indicator
						M1 / M12 / M21 / M25 / M36 / E8	Lock
Office Private	R4H					D11 / D15	Door
						TT-1	Indicator
						M36 / E8	Lock
Office -Shared	R4L					D1 / D10	Door
						M1 / M4 / M12 / M21 / M25 / E8	Lock
Office -Shared	R4M					D4 / D10	Door
						M1 / M12 / M21 / M25 / M36 / E8	Lock
Office -Shared	R4H					D11 / D15	Door

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
					M36 / E8	Lock
Operating Room	R3L				D14	Door
					M4 / M6	Lock
Operating Room	R3M				D14	Door
					M4 / M6	Lock
Operating Room	R3H				D11	Door
					M4 / M6	Lock
Parking Structure Personnel Entry	R4L				D11	Door
					M36 / E8	Lock
Parking Structure Personnel Entry	R4M				D11	Door
					M36 / E8	Lock
Parking Structure Personnel Entry	R4H				D11	Door
					M36 / E8	Lock
Patient / Client private conference	R2L				D1 / D6 / D10	Door
					TT-1	Indicator

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Room Type	Risk	Use	Impact	Thickness		Special Condition	Type
						M1 / M21 / E8	Lock
Patient / Client private conference	R2M					D1 / D6 /D10	Door
						TT-1	Indicator
						M36 / E8	Lock
Patient / Client private conference	R2H	Low	Moderate	1-3/4"	Acoustic	D4 / D6 /D10	Door
						TT-1	Indicator
						M36 / E8	Lock
Client/Patient Day Room	R4L					D1 / D10	Door
						M1 / M4 / E8	Lock
Client/Patient Day Room	R4M					D1 / D10	Door
						M1 / M4 / E8	Lock
Client/Patient Day Room	R4H					D1 / D10	Door
						M34 / E8	Lock
Pharmacy	R5L					D4	Door
						M25 / E8	Lock

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type	
Pharmacy	R5M				D11	Door	
						M27 / E8	Lock
Pharmacy	R5H			Security	D11 / D15 / D16	Door	
						M27	Lock
Physical Plant- Shop	R1L				D4	Door	
						M1 / M25 / E8	Lock
Physical Plant- Shop	R1M				D4	Door	
						M1 / M25 / E8	Lock
Physical Plant- Shop	R1H				D11	Door	
						M34 / E8	Lock
Presentation / Hall Theater	R4L				D6	Door	
						M1 / M4 / E8	Lock
Presentation / Hall Theater	R4M				D6	Door	
						M1 / E8	Lock
Presentation / Hall Theater	R4H	High	Moderate	1-3/4"	Amplified Sound	Door	

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
					M34 / E8	Lock
Procedure Room	R4L				D4 / D14	Door
					M1 / M4 / E8	Lock
Procedure Room	R4M				D4 / D14	Door
					M1 / M4 / E8	Lock
Procedure Room	R4H			Security	D11 / D14	Door
					M34 / E8	Lock
Quarantine Room	R4L				D4 / D7 / D14/	Door
					M1 / E8	Lock
Quarantine Room	R4M				D7 / D12 / D14	Door
					M27 / E8	Lock
Quarantine Room	R4H				D7 / D14 / D16	Door
					M27 / E8	Lock
Recovery Room	R4L				D14	Door
					M4 / M6	Lock

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Room Type	Risk	Use	Impact	Thickness		Special Condition	Type
Recovery Room	R4M					D14	Door
						M4 / M6	Lock
Recovery Room	R4H					D14	Door
						M4 / M6	Lock
Recreation Rooms	R4L					D4 / D10	Door
						M1 / M4 / E8	Lock
Recreation Rooms	R4M					D4 / D10	Door
						M1 / E8	Lock
Recreation Rooms	R4H	Moderate	Moderate	1-3/4"	Acoustics	D11	Door
						M34 / E8	Lock
Restroom	R4L					D1 / D10 / D14	Door
						TT-3	Indicator
						M4 / M6 / M14	Lock
Restroom	R4M					D1 / D10 / D14	Door
						TT-3	Indicator

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
					M6 / M14	Lock
Restroom	R4H				D4 / D10 / D14	Door
					TT-3	Indicator
					M6 / M12 / M14	Lock
Safe Rooms	R4L				D11	Door
					TT-1	Indicator
					M12 / M30 / E8	Lock
Safe Rooms	R4M				D11	Door
					TT-1	Indicator
					M12 / M30 / E8	Lock
Safe Rooms	R4H	Low	High		Aggression	D15 / D16
					TT-1	Indicator
					M12 / E8	Lock
Seminar Room	R4L				D1	Door
					M1 / M4 / E8	Lock

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
Seminar Room	R4M				D4	Door
					M4 / E8	Indicator
Seminar Room	R4H				D11	Lock
					M36 / E8	Door
Service Tunnel	R4L				D4 / D14	Indicator
					M1 / M4 / M25 / E8	Lock
Service Tunnel	R4M				D4 / D14	Door
					M1 / M25 / E8	Lock
Service Tunnel	R4H				D11 / D14	Door
					M27 / E8	Indicator
Shipping \ Receiving	R1L				D4 / D14	Lock
					M6 / M25 / E8	Door
Shipping \ Receiving	R1M				D4 / D14	Indicator
					M6 / M27 / E8	Lock
Shipping \ Receiving	R1H				D11 / D14	Door

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
					M6 / M27 / E8	Lock
Shower/Toilet Room	R4L				D1 / D10 /D14	Door
					TT-3	Indicator
					M14 / E8	Lock
Shower/Toilet Room	R4M				D1 / D10 /D14	Door
					TT-3	Indicator
					M14 / E8	Lock
Shower/Toilet Room	R4H				D1 / D10 /D14	Door
					TT-3	Indicator
					M12 / E8	Lock
Sound Chamber	R4L				D6	Door
Sound Chamber	R4M				D6	Door
Sound Chamber	R4H				D6	Door
Staff 24hr On-Call room	R4L				D4 / D10	Door
					TT-3	Indicator

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type	
					M30 / E8	Lock	
Staff 24hr On-Call room	R4M				D4 / D10	Door	
					TT-3	Indicator	
					M30 / E8	Lock	
Staff 24hr On-Call room	R4H				D11 / D15	Door	
					TT-3	Indicator	
					M30 / E8	Lock	
Staff Supplemental Entry / Exit	R4L				D11	Door	
					M27 / E8	Lock	
Staff Supplemental Entry / Exit	R4M				D11	Door	
					M27 / E8	Lock	
Staff Supplemental Entry / Exit	R4H	Moderate	High	1-3/4"	Security	D11 / D16	Door
					M27 / E8	Lock	
Stair - Public	R4L				D4 / D10	Door	
					M4 / M5 / E4	Lock	

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Room Type	Risk	Use	Impact	Thickness		Special Condition	Type
Stair - Public	R4M					D4 / D10	Door
						M4 / M5 / E4	Lock
Stair - Public	R4H					D4 / D10	Door
						M4 / M5 / E4	Lock
Stairwells -Secure	R4L					D4 / D10	Door
						M25 / E8	Lock
Stairwells -Secure	R4M					D11	Door
						M25 / E8	Lock
Stairwells -Secure	R4H	Moderate	Moderate	1-3/4"	Two-way vision & fire label	D11 / D15 / D16	Door
						M25 / E8	Lock
Storage	R4L					D1	Door
						M25 / E8	Lock
Storage	R5M					D1	Door
						M25 / E8	Lock

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
Storage	R5H				D1	Door
					M27 / E8	Lock
Storage & Utility (wet)	R3L				D1 / D14	Door
					M1 / M25 / E8	Lock
Storage & Utility (wet)	R3M				D1 / D14	Door
					M1 / M27 / E8	Lock
Storage & Utility (wet)	R3H	Moderate	High	1-3/4"	D1 / D14	Door
					M1 / M27 / E8	Lock
Support Services	R3L				D4	Door
					M1 / E8	Lock
Support Services	R3M				D4	Door
					M1 / E8	Lock
Support Services	R3H				D4	Door
					M34 / E8	Lock
Telecom Closet	R3L				D4	Door

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
					M25 / E8	Lock
Telecom Closet	R3M				D4	Door
					M25 / E8	Lock
Telecom Closet	R3H				D12	Door
					M25 / E8	Lock
Telephone Room	R3L				D4	Door
					M25 / E8	Lock
Telephone Room	R3M				D4	Door
					M25 / E8	Lock
Telephone Room	R3H				D12	Door
					M25 / E8	Lock
Therapeutic/Treatment	R4L				D4 / D14	Door
					M14	Lock
Therapeutic/Treatment	R4M				D4 / D14	Door
					M14	Lock

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
Therapeutic/Treatment	R4H				D4 / D14	Door
					M21	Lock
Toilet Rooms	R4L				D1 /D10 /D14	Door
					TT-3	Indicator
					M14	Lock
Toilet Rooms	R4M				D1 /D10 /D14	Door
					TT-3	Indicator
					M14	Lock
Toilet Rooms	R4H	High	High	1-3/4"	D1 /D10 /D14	Door
					TT-3	Indicator
					M21	Lock
Utility Room, Clean	R3L				D4 /D14	Door
					M1 / M25 / E8	Lock
Utility Room, Clean	R3M				D4 /D14	Door
					M1 / M25 / E8	Lock

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
Utility Room, Clean	R3H				D4 /D14	Door
					M27 /M34 / E8	Lock
Utility Room, Dirty	R3L				D4 /D14	Door
					M1 / M25 / E8	Lock
Utility Room, Dirty	R3M				D4 /D14	Door
					M1 / M25 / E8	Lock
Utility Room, Dirty	R3H				D4 /D14	Door
					M27 / M34 / E8	Lock
Vault	R1L				D12	Door
					M27 / E8	Lock
Vault	R1M				D12	Door
					M27 / E8	Lock
Vault	R1H				D16	Door
					M27 / E8	Lock
Vehicle Storage	R1L				D4	Door

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
					M27 / E8	Lock
Vehicle Storage	R1M				D4	Door
					M27 / E8	Lock
Vehicle Storage	R1H				D4	Door
					M27 / E8	Lock
VIP Office	R4L				D4 / D10	Door
					M1 / E8	Lock
VIP Office	R4M				D10 / D11	Door
					M36 / E8	Lock
VIP Office	R4H	Low	Moderate	1-3/4"	D11 / D15	Door
					M36 / E8	Lock
Waiting Reception General	R4L				D1 / D10 / D13	Door
					M1 / M4 / E4	Lock
Waiting Reception General	R4M				D4 / D10 / D13	Door
					M1 / M4 / E4	Lock

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type	
Waiting Reception General	R4H				D11/ D13 / D16	Door	
						M34 / E8	Lock
Waiting Reception - Health	R2L				D4 / D10 /D13 / D14	Door	
						M1 / M4 / E4	Lock
Waiting Reception - Health	R2M				D4 / D10 /D13 / D14	Door	
						M1 / M4 / E4	Lock
Waiting Reception - Health	R2H				D4 / D10 /D13 / D14	Door	
						M34 / E8	Lock
Weapons storage	R5L				D15	Door	
						M27 / E8	Lock
Weapons storage	R5M				D15	Door	
						M27 / E8	Lock
Weapons storage	R5H	Low	High	2"	Bullet resista nt	D15 / D16	Door
						M27 / E8	Lock
Workroom	R3L				D4	Door	

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Room Type	Risk	Use	Impact	Thickness	Special Condition	Type
					M1 / M4 / E8	Lock
Workroom	R3M				D4	Door
					M1 / M4 / E8	Lock
Workroom	R3H				D4	Door
					M1 / M4 / E8	Lock

RapidRide Zone Placement

Initial zone placement for each of the zones on both lines is based primarily on the location of the existing bus zones to be replaced. The project team will work with KCMT staff to adjust the location of zones using guidelines both by KCMT and the Federal Transit Administration’s (FTA) Transit Cooperative Research Program (TCRP).

In some cases, zones have been relocated to the opposite side of an intersection. In others, development around the bus zone has driven the need to shift the zone location relative to adjacent residential driveways, business entrances, and parking lots. Efforts shall be made to locate all bus zones away from driveways. KCMT will approve exceptions on a case-by-case basis if it is determined that a zone provides a reasonable level of safety for passengers, even when located at or blocking a driveway. (Design Guidelines, pp. 5-6)

Intersections

Bus zones are classified either as a “near-side stop” or a “far-side stop”, depending on whether the bus stops immediately before or immediately after an intersection. A zone located more than 300’ from an intersection is classified as a “mid-block stop”. (Design Guidelines, pp. 5-4) The figure below illustrates each of the zone placement types and the lengths required.

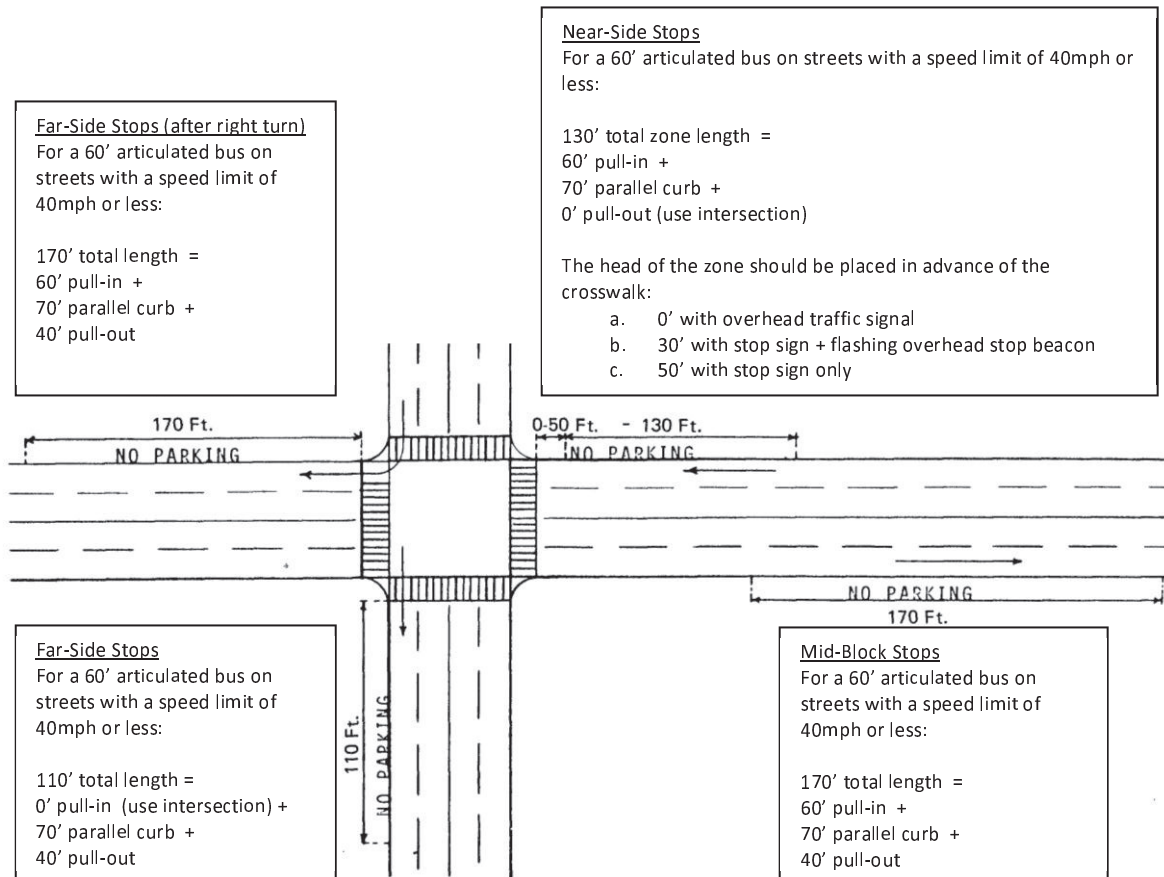


Figure 7: Bus Stop Lengths
 (Design Guidelines, pp. 5-10)

Layover Space

A layover is a stretch of time when an individual passenger coach is not in service between two stops on its normal route. While this normally occurs at the end of an outbound route and the beginning of the inbound return trip, it can actually occur at any location along the route. (Design Guidelines, pp. 1-8)

The layover schedule affects zone placement. At designated layover zones, the zone must include an additional 60-foot segment of roadway surface to park the passenger coach when not in service. Each of the zone length requirements described in the section on intersections must still be met at designated layover zones, including pull-in and pull-out. (Design Guidelines, pp. 1-9)

On the RapidRide E and F Line project, most of the designated layover zones are located at transit centers, which have been designed and constructed by KCMT for exclusive use by passenger coaches. At least one layover on the F-Line is proposed as an extension of an individual bus zone. The project team will evaluate only this zone for compliance with layover space requirements.

Sight Distance

Within the bus zone itself, shelters and other upright amenities must be arranged to provide an unobstructed view between motorists on both primary and intersecting roadways, as well as residential driveways, business entrances, and parking lots.

The figure at the right establishes sight distance triangles for use on both roads and driveways. The appropriate sight triangle or triangles will be applied to each bus zone location to determine proper placement of the downstream end, or “head” of the zone.

The project team will initially locate the head of the zone at the point where the sight distance triangle intersects an 8-foot offset from the existing face of curb. Placing the head of the zone at this location will alleviate potential blockages to a motorist’s line of sight by waiting transit passengers, stopped coaches, bus zone shelters, and other amenities.

The project team will also check the sight distance triangle at the upstream end, or “tail” of the zone using the same procedure. The tail of the bus zone is less important from a passenger standpoint because most, if not all, of the amenities are located at or near the head of the zone. However, it is critical to provide motorists with a clear line of sight for right-hand turns in the direction of the zone, so this sight triangle should also remain free of any upright amenities.

At locations with existing footings to remain in place, the footing location will be evaluated relative to the sight triangles in order to provide Metro with feedback on possible disadvantages at the existing zone location.

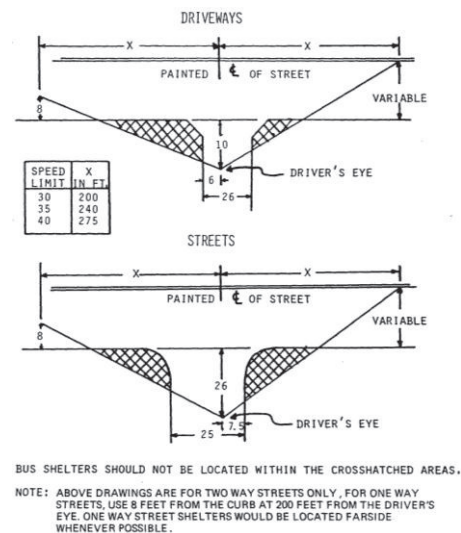
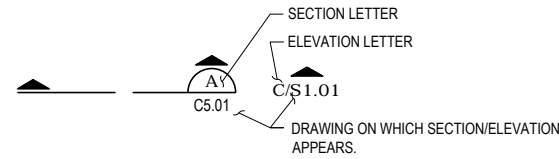


Figure 8: Bus Shelter Sight Distance Standards
 (Design Guidelines, pp. 5-23)

TYPICAL SECTION AND DETAIL REFERENCING SYSTEM

(1) THE SECTION IS CUT ON DRAWING A1.01:



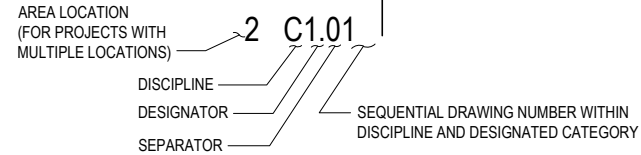
(2) ON DRAWING A105 THIS SECTION IS IDENTIFIED:



STANDARD SINGLE UNIT DRIVER'S COMFORT STATION FACILITY FOR CONSTRUCTION WITHIN A NEW BUILDING

DRAWING NUMBERING SYSTEM KEY

DISCIPLINE	DESIGNATED CATEGORY	GENERAL
G	0	GENERAL
C	1	PLANS
L	2	ELEVATIONS
A	3	SECTIONS
S	4	ENLARGED PLANS
M	5	DETAILS
FP	6	SCHEDULES & DIAGRAMS
E	7	USER DEFINED
T	8	USER DEFINED
	9	3D VIEWS



ABBREVIATIONS:

ACI	AMERICAN CONCRETE INSTITUTE
AFF	ABOVE FINISHED FLOOR
APA	AMERICAN PLYWOOD ASSOCIATION
CND	CONDUIT
CFM	CUBIC FEET PER MINUTE
CW	COLD WATER
DIA	DIAMETER
EW	EACH WAY
FRP	FIBERGLASS REINFORCED PLASTIC
GFCI	GROUND FAULT CURRENT INTERRUPT
GFI	GROUND FAULT INDICATOR
GPM	GALLONS PER MINUTE
IBC	INTERNATIONAL BUILDING CODE
MAX	MAXIMUM
NTS	NOT TO SCALE
OC	ON CENTER
PSI	POUNDS PER SQUARE INCH
REQ'D	REQUIRED
RFP	REINFORCED FIBERGLASS PANEL
SCL	SEATTLE CITY LIGHT
SS	SANITARY SEWER
TP	TRAP PRIMER
TYP	TYPICAL
W	WATER
W/	WITH

WASHINGTON ENERGY CODE INFORMATION

FOUNDATION:	POLYISOCYANURATE INSULATION - R11.5
WALLS:	BATT OR POLYISOCYANURATE INSULATION - R19.0
ROOF:	BATT OR POLYISOCYANURATE INSULATION - R38.0

STRUCTURAL & ARCHITECTURAL CONSTRUCTION NOTES:

- CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CURRENT INTERNATIONAL BUILDING CODE, THE CURRENT UNIFORM PLUMBING CODE, AND LATEST EDITION OF THE APPLICABLE JURISDICTION'S BUILDING CODE AND AMENDMENTS.
- A COPY OF THE APPROVED PLAN MUST BE ON SITE WHENEVER CONSTRUCTION IS IN PROGRESS.
- CODE - LATEST EDITION OF IBC AS ADOPTED BY LOCAL JURISDICTION. SEISMIC REQUIREMENTS PER ASCE 7 AND USGS:
Ss
SI
SITE CLASS
SDS
SDI
I
ROOF SNOW LOAD = 25 PSF
BASIC WIND SPEED = PER ASCE 7
SOIL BEARING = 1000 PSF OR SOILS REPORT
- CONCRETE (ACI 318-05): f_c = 3000 PSI, 7 DAY, 6 SACK, 3" SLUMP, 5% AIR ENTRAINMENT, REBAR f_y = 60,000 PSI
- FIELD VERIFY ALL DIMENSIONS PRIOR TO START OF WORK.
- ALL WATER SERVICE PIPING MUST BE INSPECTED PRIOR TO BACKFILLING TRENCH.
- INSTALL FOUNDATION PERIMETER INSULATION AND CLOSURE PER **DRAWING S5.01**.
- PROVIDE MINIMUM 6x6 HEADER AT DOORS. PROVIDE BLOCKING AS REQUIRED FOR ALL FIXTURES AND EQUIPMENT.
- ALL TIMBER SHALL BE DOUGLAS FIR/LARCH NUMBER 2 OR BETTER GRADE. PLYWOOD SHALL BE C-D, EXTERIOR GLUE, STRUCTURAL I OR STRUCTURAL II.
- MINIMUM FASTENING SHALL BE PER IBC TABLE 2304.9.1
- SEE **DRAWING M1.01** FOR PLUMBING RISER DIAGRAM.
- INSPECTIONS PER IBC SECTION 109.
- FINISHED COMFORT STATION INTERIOR SHALL COMPLY WITH ANSI AND ADA ACCESSIBILITY REQUIREMENTS. SEE **BARRIER FREE ACCESS DETAIL, DRAWING A1.01**.

GENERAL NOTES:

- ALL LOCATIONS OF EXISTING UTILITIES HAVE BEEN ESTABLISHED BY FIELD SURVEY OR OBTAINED FROM AVAILABLE RECORDS, ARE APPROXIMATE ONLY AND NOT NECESSARILY COMPLETE. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO INDEPENDENTLY VERIFY THE ACCURACY OF ALL UTILITY LOCATIONS SHOWN AND TO FURTHER DISCOVER AND AVOID ANY OTHER UTILITIES NOT SHOWN HEREON WHICH MAY BE AFFECTED BY THE IMPLEMENTATION OF THIS PLAN.
- THE CONTRACTOR SHALL LOCATE AND PROTECT ALL CASTINGS AND UTILITIES DURING CONSTRUCTION AND SHALL CONTACT THE UNDERGROUND UTILITIES LOCATOR SERVICE (1-800-424-5555) AT LEAST 48 HOURS PRIOR TO CONSTRUCTION.
- THE CONTRACTOR SHALL COORDINATE WITH THE APPROPRIATE POWER, WATER, SEWER AUTHORITIES AND KC METRO PRIOR TO THE START OF WORK.
- THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND LOCATIONS PRIOR TO START OF WORK.
- ALL WATER SERVICE PIPING MUST BE INSPECTED PRIOR TO BACKFILLING TRENCH.
- ALL DEMOLITION DEBRIS MUST BE DISPOSED OF LEGALLY, OFF SITE.

INDEX OF COMFORT STATION DRAWINGS

SHEET NUMBER	DRAWING NUMBER	DRAWING TITLE
ARCHITECTURAL		
1	A0/01	CONSTRUCTION NOTES AND GENERAL INFORMATION
2	A1.01	ROOM CONSTRUCTION PLANS & WASHROOM ACCESSORIES SCHEDULE
3	A2.01	ROOM ELEVATIONS, METAL DOOR & WASHROOM ACCESSORIES SPECIFICATIONS
4	A7.01	CAST-IN-PLACE CONCRETE SPECIFICATION
5	A7.02	ROUGH CARPENTRY & SHEATHING SPECIFICATIONS
6	A7.03	THERMAL INSULATION & EXTERIOR FINISH CARPENTRY SPECIFICATIONS
7	A7.04	METAL ROOF PANELS SPECIFICATION
8	A7.05	SHEET METAL FLASHING & TRIM SPECIFICATION
9	A7.06	DOOR HARDWARE SPECIFICATION
10	A7.07	FIBERGLASS REINFORCED PLASTIC PANELS & PAINTING SPECIFICATIONS
STRUCTURAL		
11	S5.01	CONSTRUCTION DETAILS
MECHANICAL		
12	M1.01	PLUMBING PLANS
13	M5.01	SECTION & PLUMBING RISER DIAGRAM
ELECTRICAL		
14	E1.01	ELECTRICAL PLAN AND PANEL SCHEDULE

DRAWING SPECIFICATIONS INDEX

NUMBER	MATERIAL	DRAWING
DIVISION 03		
033000	CAST-IN-PLACE CONCRETE	A7.01
DIVISION 06		
061000	ROUGH CARPENTRY	A7.02
061600	SHEATHING	A7.02
062013	EXTERIOR FINISH CARPENTRY	A7.03
DIVISION 07		
072100	THERMAL INSULATION	A7.03
074113	METAL ROOF PANELS	A7.04
076200	SHEET METAL FLASHING & TRIM	A7.05
DIVISION 08		
081113	METAL DOORS & FRAMES	A2.01
087100	DOOR HARDWARE	A7.06
DIVISION 09		
097700	FIBERGLASS REINFORCED PLASTIC PANELS	A7.07
099100	PAINTING	A7.07
DIVISION 10		
102800	WASHROOM ACCESSORIES	A2.01

PROJECT DESCRIPTION

OWNER:	KING COUNTY
AGENT:	
BUILDING USE:	63 SF COMFORT STATION
PROPERTY ZONING:	
OCCUPANCY GROUP:	U (UTILITY/MISCELLANEOUS)
CONSTRUCTION TYPE:	V
REFERENCE:	2009 INTERNATIONAL BUILDING CODE

No.	REVISION	BY	APPD	DATE

DESIGNED: J DAVIS	PROJECT MANAGER:	SCALE: NONE
DRAWN: B FARISS-BATEMAN	APPROVED:	SITE LOCATION NO:
CHECKED: J DAVIS	PROJECT NO:	ONE INCH AT FULL SIZE
RECOMMENDED: D CRIPPEN	WORK REQUEST: CONTRACT NO:	1" SCALE IF NOT ONE INCH, SCALE ACCORDINGLY

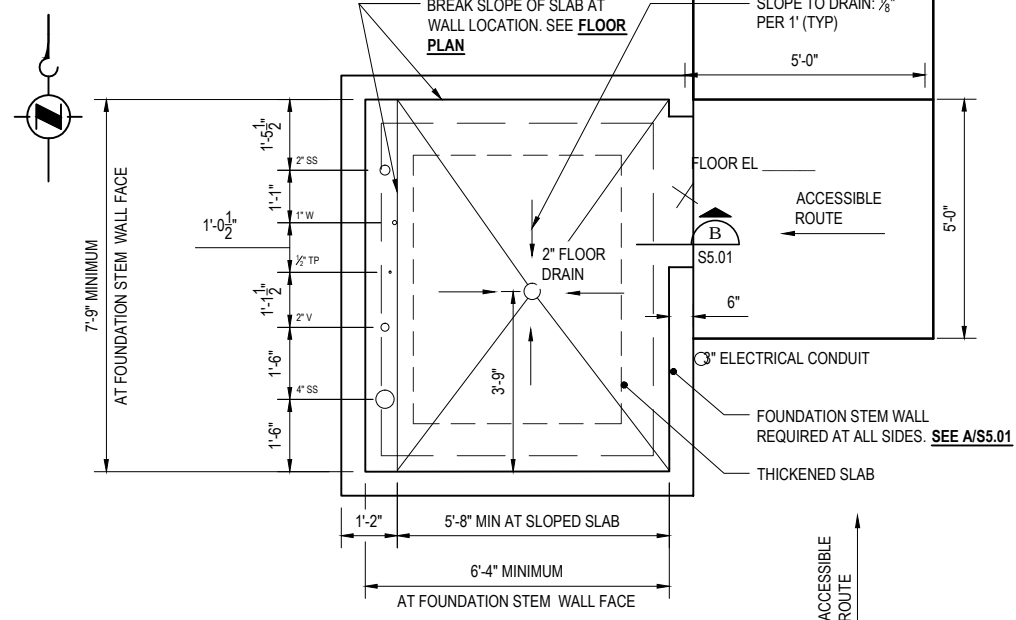


METRO TRANSIT DIVISION
STANDARD SINGLE UNIT DRIVER'S COMFORT STATION
FOR CONSTRUCTION WITHIN A NEW BUILDING

CONSTRUCTION NOTES & GENERAL INFORMATION

DATE: SEPTEMBER 2013
DRAWING NO: A0.01
SHEET NO. OF 1 14

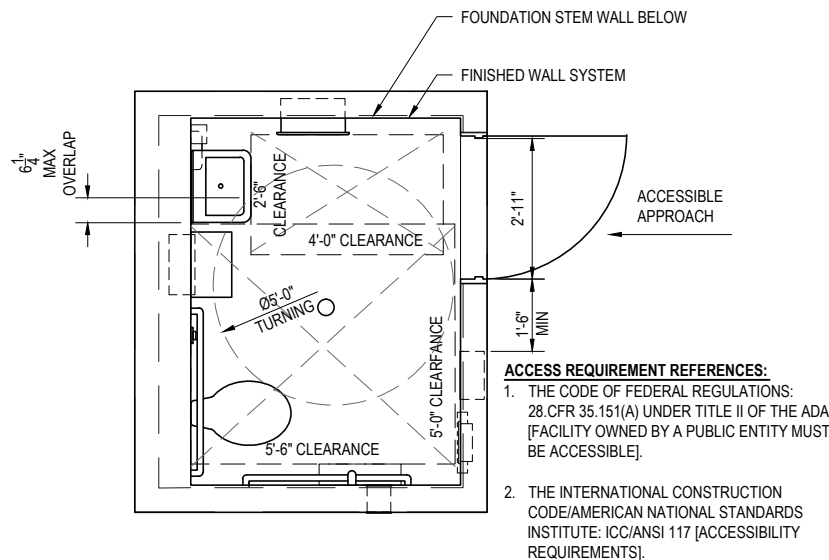
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FOUNDATION & SLAB

PLAN
SCALE: 1/2" = 1'-0"

NOTE: 6" CONCRETE SLAB ON GRADE W/ SMOOTH TROWEL FINISH OVER 4" GRAVEL. SLOPE SLAB 1/8":1 FT TOWARD DRAIN (TYPICAL AS SHOWN)



BARRIER FREE ACCESS REQUIREMENTS

PLAN
SCALE: 1/2" = 1'-0"

ACCESS REQUIREMENT REFERENCES:
1. THE CODE OF FEDERAL REGULATIONS: 28.CFR 35.151(A) UNDER TITLE II OF THE ADA [FACILITY OWNED BY A PUBLIC ENTITY MUST BE ACCESSIBLE].
2. THE INTERNATIONAL CONSTRUCTION CODE/AMERICAN NATIONAL STANDARDS INSTITUTE: ICC/ANSI 117 [ACCESSIBILITY REQUIREMENTS].

CONSTRUCTION NOTES:

- REFER TO DRAWING A0.01 FOR GENERAL NOTES AND STRUCTURAL & ARCHITECTURAL CONSTRUCTION NOTES.
- PIPE LOCATIONS SHOWN PER PLUMBING SCHEMATIC. SEE DRAWING M1.01.
- SEE DRAWING M5.01 FOR PLUMBING RISER DIAGRAM AND PLUMBING EQUIPMENT SCHEDULE.
- CLEAR FLOOR SPACE AT LAVATORY AND AT WATER CLOSET SHALL BE AS SHOWN IN BARRIER FREE ACCESS DETAIL, THIS DRAWING.
- SEE DRAWING A7.01 FOR CAST-IN-PLACE CONCRETE SPECIFICATION; DRAWING S5.01 FOR DETAILS.
- SEE DRAWING A7.02 FOR ROUGH LUMBER AND SHEATHING SPECIFICATIONS (WHERE APPLICABLE); DRAWINGS S5.01 & S3.02 FOR ADDITIONAL NOTES AND DETAILS.
- PROVIDE BLOCKING AS REQUIRED FOR ALL RESTROOM FIXTURES. PROVIDE ADDITIONAL HORIZONTAL WOOD BLOCKING THROUGHOUT AT 12" OC VERTICAL SPACING.
- INSTALL FOUNDATION PERIMETER INSULATION AND CLOSURE PER DRAWING S5.01. WA ENERGY CODE COMPLIANCE PER DRAWING A1.01 IS REQUIRED

WASHROOM ACCESSORIES SCHEDULE

	ITEM	MANUFACTURER	MODEL NUMBER	DIMENSIONS
A1	** PAPER HAND TOWEL DISPENSER	KIMBERLY CLARK PERFORMANCE CRITERIA: MUST ACCEPT KIMBERLY-CLARK MODEL 01000 HAND TOWEL ROLLS	IN SIGHT SANITOUCH® MODEL 09990 COLOR: SMOKE GREY	12.6" X 16.3" X 10.2"
A2	** RECESSED TOILET SEAT COVER DISPENSER	BOBRICK	B-301	15.1875" X 12.75" X 2.5625" DEPTH
A3	** WALL MOUNT TOILET PAPER HOLDER	KIMBERLY-CLARK PERFORMANCE CRITERIA: MUST ACCEPT SCOTT TYPE 07202 JUMBO ROLL TISSUE	IN-SIGHT CORED JRT® MODEL 09551, COLOR: SMOKE GREY, STYLE: COMBO UNIT	13.12" X 20.43" X 5.8"
A4	** SURFACE-MOUNTED SOAP DISPENSER	BOBRICK	B-2111	4 3/4" X 8 1/8" X 3 1/2"
A5	SEMI-RECESSED TRASH RECEPTACLE	BOBRICK	B-3644, FINISH: SATIN-FINISH STAINLESS STEEL, STYLE: SEMI-RECESSED	17.2" X 30.6" X (4.1" X 23" PROJECTION)
A6	WALL MIRROR W/ STAINLESS STEEL CHANNEL FRAME	BOBRICK	B-165 1824	18" X 24"
A7	1 1/2" DIAMETER GRAB BARS	BOBRICK	6806 X 42 6806 X 6 6806 X 12	42" LENGTH x 1 1/2" DIAMETER 36" LENGTH x 1 1/2" DIAMETER 12" LENGTH x 1 1/2" DIAMETER
A8	WALL-MOUNTED VITREOUS CHINA SINK, WHITE	AMERICAN STANDARD	COMRADE 0124.024	20"W X 18.25"D WITH 4" FAUCET CENTERS
A9	WALL-HUNG TOILET, WHITE	KOHLER	KINGSTON K-4330	16.75" X 25.625" X 15" ABOVE FINISH FLOOR (W/O SEAT) WASTE EXIT CENTER = 5" ABOVE FINISHED FLOOR
A10	TOILET SEAT, WHITE	KOHLER	K-4679-CA LUSTRA WITH 1" HEIGHT BUMPERS	DEPTH 2" - 4" PER ADA 4.16.3
A11	UNDERLAVATORY GUARDS	PLUMBEREX SPECIALTY PRODUCTS, INC. TCI PRODUCTS. TRUEBRO, INC.	ANTIMICROBIAL, MOLDED-PLASTIC, WHITE	

EQUIPMENT LEGEND:

ARCHITECTURAL EQUIPMENT PROVIDED BY KING COUNTY METRO TRANSIT, TO BE INSTALLED BY CONTRACTOR. SEE DRAWING A2.02:

- A1 HAND TOWEL DISPENSER
- A2 TOILET PAPER DISPENSER
- A3 SEAT COVER DISPENSER
- A4 SOAP DISPENSER

ARCHITECTURAL EQUIPMENT & FIXTURES PROVIDED AND INSTALLED BY CONTRACTOR. SEE DRAWING A2.02:

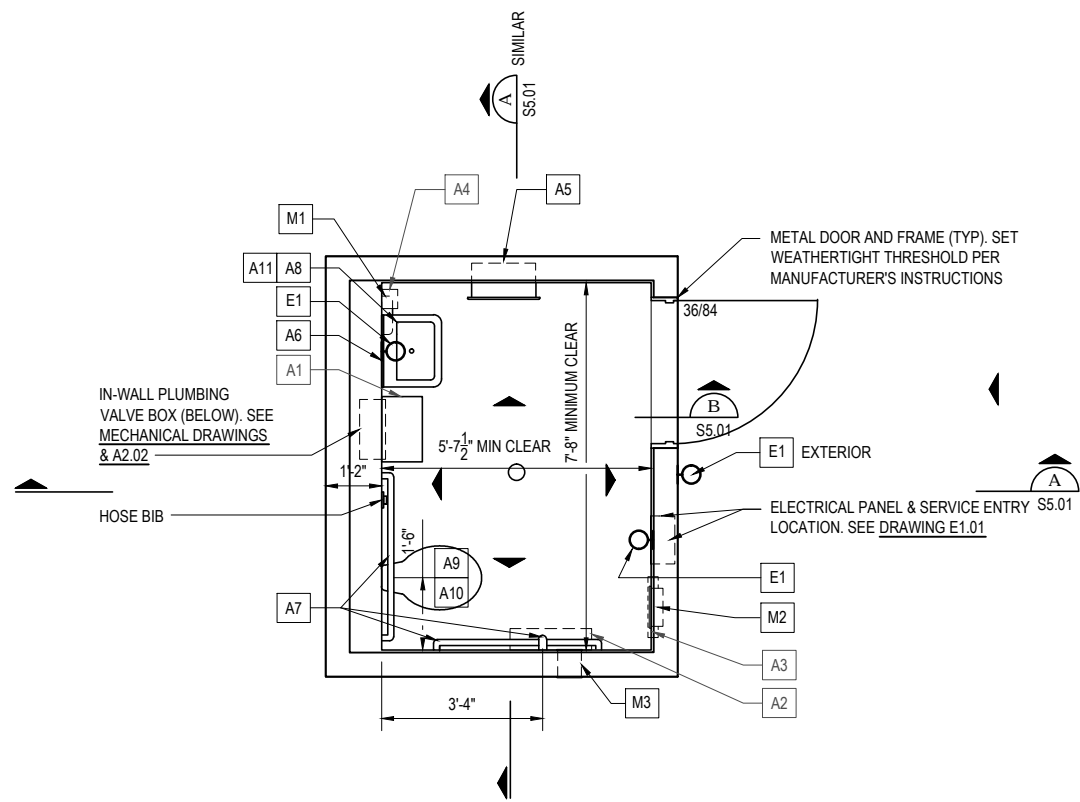
- A5 WASTE RECEPTACLE
- A6 WALL MIRROR
- A7 GRAB BARS
- A8 SINK
- A9 TOILET
- A10 TOILET SEAT
- A11 UNDERLAVATORY GUARDS

ELECTRICAL EQUIPMENT PROVIDED AND INSTALLED BY CONTRACTOR. SEE DRAWING E1.01:

- E1 WALL LIGHT
- M1 IN-LINE WATER HEATER (BELOW)
- M2 IN-WALL ELECTRIC FORCE AIR HEATER W/ TIMER
- M3 EXHAUST FAN

MECHANICAL EQUIPMENT PROVIDED AND INSTALLED BY CONTRACTOR. SEE DRAWING M1.01:

- M1 IN-LINE WATER HEATER (BELOW)
- M2 IN-WALL ELECTRIC FORCE AIR HEATER W/ TIMER
- M3 EXHAUST FAN



FLOOR PLAN
SCALE: 1/2" = 1'-0"

No.	REVISION	BY	APPD	DATE

DESIGNED: J DAVIS	PROJECT MANAGER:	SCALE: AS NOTED
DRAWN: B FARISS-BATEMAN	APPROVED:	SITE LOCATION NO.:
CHECKED: J DAVIS	PROJECT NO.:	ONE INCH AT FULL SCALE
RECOMMENDED: D CRIPPEN	WORK REQUEST: CONTRACT NO.:	1" SCALE IF NOT ONE INCH, SCALE ACCORDINGLY

METRO TRANSIT DIVISION
STANDARD SINGLE-UNIT DRIVER'S COMFORT STATION
FOR CONSTRUCTION WITHIN A NEW BUILDING

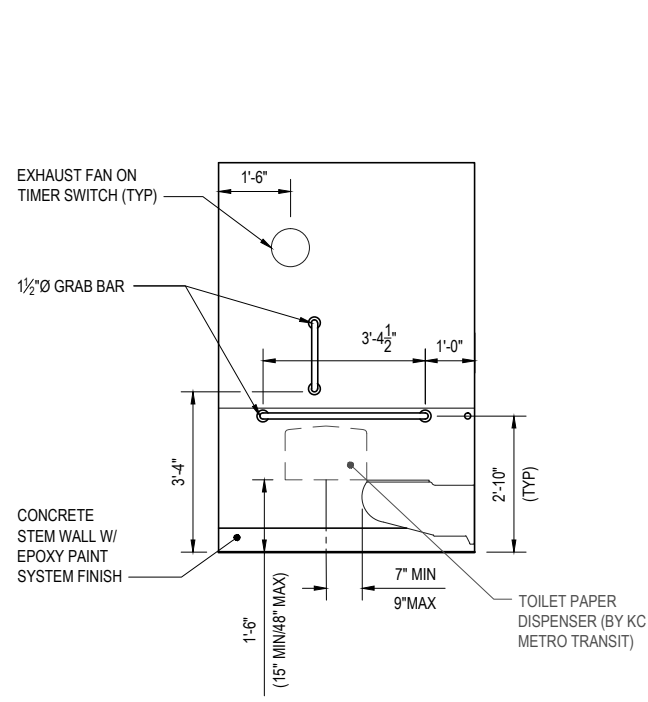
**ROOM CONSTRUCTION
PLANS & WASHROOM
ACCESSORIES SCHEDULE**

DATE:
SEPTEMBER 2013

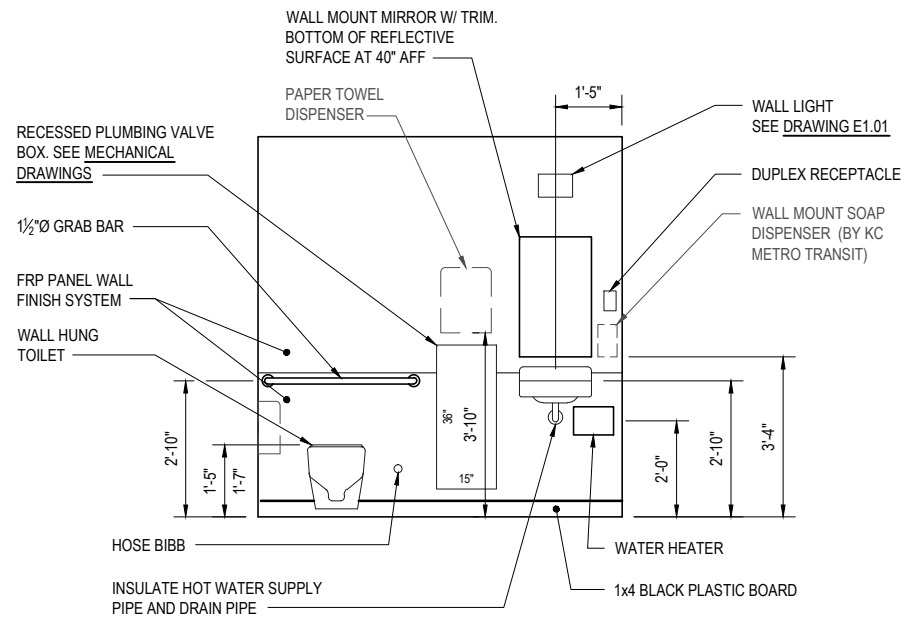
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A1.01

SHEET NO. OF
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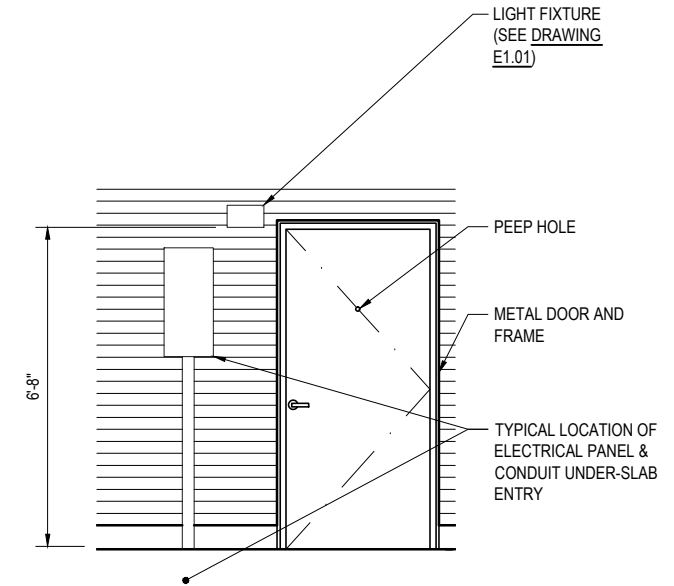
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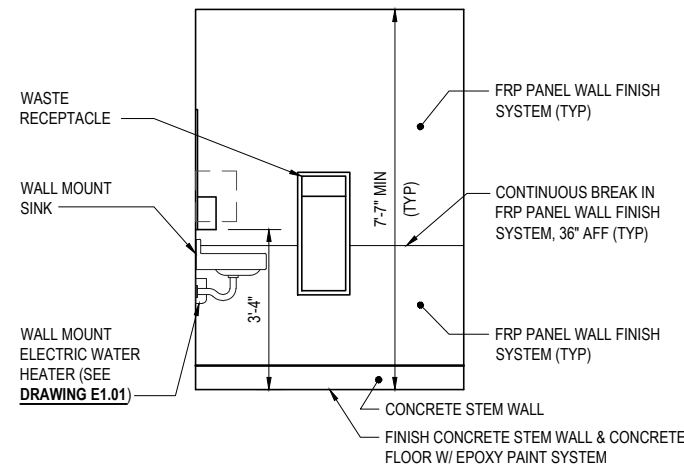
INTERIOR
 ELEVATION A
 SCALE: 1/2" = 1'-0" A1.01



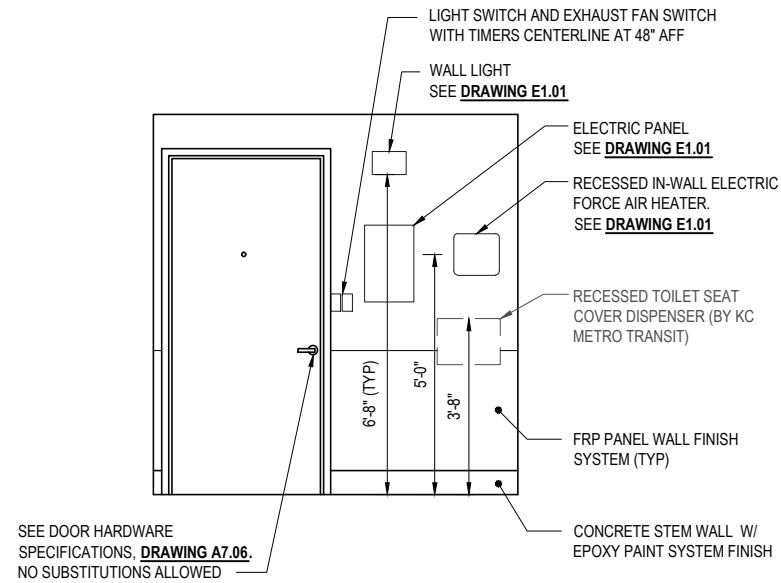
INTERIOR
 ELEVATION B
 SCALE: 1/2" = 1'-0" A1.01



EXTERIOR
 ELEVATION E
 SCALE: 1/2" = 1'-0" A1.01



INTERIOR
 ELEVATION C
 SCALE: 1/2" = 1'-0" A1.01



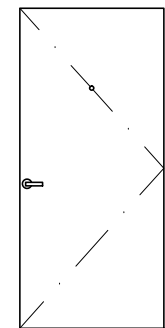
INTERIOR
 ELEVATION D
 SCALE: 1/2" = 1'-0" A1.01

WASHROOM ACCESSORIES SPECIFICATION 102800

- FABRICATION OF EQUIPMENT KEYS: PROVIDE UNIVERSAL KEYS FOR INTERNAL ACCESS TO ACCESSORIES FOR SERVICING AND RESUPPLYING. PROVIDE MINIMUM OF SIX KEYS TO KING COUNTY PROJECT REPRESENTATIVE.
- INSTALL ACCESSORIES ACCORDING TO MANUFACTURERS' WRITTEN INSTRUCTIONS, USING FASTENERS APPROPRIATE TO SUBSTRATE INDICATED AND RECOMMENDED BY UNIT MANUFACTURER. INSTALL UNITS LEVEL, PLUMB, AND FIRMLY ANCHORED IN LOCATIONS AND AT HEIGHTS INDICATED.

METAL DOOR AND FRAME SPECIFICATION 081113

- ACCEPTABLE MANUFACTURERS INCLUDE THE FOLLOWING:
 - CECO DOOR PRODUCTS; AN ASSA ABLOY GROUP COMPANY.
 - CURRIES COMPANY; AN ASSA ABLOY GROUP COMPANY.
 - KEWANEE CORPORATION (THE).
- INSTALL PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
- SEE DRAWING A7.06 FOR DOOR HARDWARE SPECIFICATION.



DOOR TYPE
 SCALE: 1/2" = 1'-0"

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No.	REVISION	BY	APPD	DATE
1	WALL BASE, DISPENSER HT, EQUIPMENT BY METRO, FRP PANEL	BFB	JD	12/2012
2	REVISIONS PER ICC/ANSI 177 REQUIREMENTS	BFB	RM	06/2012

DESIGNED: B FARISS-BATEMAN	PROJECT MANAGER:	SCALE: AS NOTED
DRAWN: B FARISS-BATEMAN	APPROVED:	SITE LOCATION NO.:
CHECKED: J DAVIS	PROJECT NO.:	ONE INCH AT FULL SIZE
RECOMMENDED: D CRIPPEN	WORK REQUEST: CONTRACT NO.:	1" SCALE IF NOT ONE INCH, SCALE ACCORDINGLY



METRO TRANSIT DIVISION
 STANDARD SINGLE-UNIT DRIVER'S COMFORT STATION
 FOR CONSTRUCTION WITHIN A NEW BUILDING
**ROOM ELEVATIONS,
 METAL DOOR & WASHROOM
 ACCESSORIES SPECIFICATIONS**


DATE: SEPTEMBER 2013
DRAWING NO: A2.01
SHEET NO. OF 3 14


CAST-IN-PLACE CONCRETE SPECIFICATION 033000

1. THIS SECTION INCLUDES THE FOLLOWING:
 - A. CAST-IN PLACE CONCRETE.
 - B. FORMWORK.
 - C. REINFORCEMENT.
 - D. CONCRETE MATERIALS.
 - E. MIXTURE DESIGN.
 - F. PLACEMENT PROCEDURES.
 - G. FINISHES.
2. QUALITY ASSURANCE
 - A. MANUFACTURER QUALIFICATIONS: A FIRM EXPERIENCED IN MANUFACTURING READY-MIXED CONCRETE PRODUCTS AND THAT COMPLIES WITH ASTM C 94/C 94M REQUIREMENTS FOR PRODUCTION FACILITIES AND EQUIPMENT.
 - B. ACI PUBLICATIONS: COMPLY WITH THE FOLLOWING UNLESS MODIFIED BY REQUIREMENTS IN THE CONTRACT DOCUMENTS:
 - ACI 301, "SPECIFICATION FOR STRUCTURAL CONCRETE," SECTIONS 1 THROUGH 5.
 - ACI 117, "SPECIFICATIONS FOR TOLERANCES FOR CONCRETE CONSTRUCTION AND MATERIALS."
3. FORM-FACING MATERIALS
 - A. SMOOTH-FORMED FINISHED CONCRETE: FORM-FACING PANELS THAT WILL PROVIDE CONTINUOUS, TRUE, AND SMOOTH CONCRETE SURFACES. FURNISH IN LARGEST PRACTICABLE SIZES TO MINIMIZE NUMBER OF JOINTS.
4. STEEL REINFORCEMENT
 - A. REINFORCING BARS: ASTM A 615/A 615M, GRADE 60, DEFORMED.
 - B. BAR SUPPORTS: BOLSTERS, CHAIRS, SPACERS, AND OTHER DEVICES FOR SPACING, SUPPORTING, AND FASTENING REINFORCING BARS AND WELDED WIRE REINFORCEMENT IN PLACE. MANUFACTURE BAR SUPPORTS FROM STEEL WIRE, PLASTIC, OR PRECAST CONCRETE ACCORDING TO CRSI'S "MANUAL OF STANDARD PRACTICE."
5. CONCRETE MATERIALS
 - A. CEMENTITIOUS MATERIAL: USE THE FOLLOWING CEMENTITIOUS MATERIALS, OF THE SAME TYPE, BRAND, AND SOURCE, THROUGHOUT PROJECT: PORTLAND CEMENT: ASTM C 150, TYPE II.
 - B. NORMAL-WEIGHT AGGREGATES: ASTM C 33, GRADED, 1-1/2-INCH NOMINAL MAXIMUM COARSE-AGGREGATE SIZE.
 - C. WATER: ASTM C 94/C 94M.
 - D. AIR-ENTRAINING ADMIXTURE: ASTM C 260.
 - E. CHEMICAL ADMIXTURES: PROVIDE ADMIXTURES CERTIFIED BY MANUFACTURER TO BE COMPATIBLE WITH OTHER ADMIXTURES AND THAT WILL NOT CONTRIBUTE WATER-SOLUBLE CHLORIDE IONS EXCEEDING THOSE PERMITTED IN HARDENED CONCRETE. DO NOT USE CALCIUM CHLORIDE OR ADMIXTURES CONTAINING CALCIUM CHLORIDE.
 - WATER-REDUCING ADMIXTURE: ASTM C 494/C 494M, TYPE A.
 - RETARDING ADMIXTURE: ASTM C 494/C 494M, TYPE B.
 - WATER-REDUCING AND RETARDING ADMIXTURE: ASTM C 494/C 494M, TYPE D.
 - HIGH-RANGE, WATER-REDUCING ADMIXTURE: ASTM C 494/C 494M, TYPE F.
 - HIGH-RANGE, WATER-REDUCING AND RETARDING ADMIXTURE: ASTM C 494/C 494M, TYPE G.
 - PLASTICIZING AND RETARDING ADMIXTURE: ASTM C 1017/C 1017M, TYPE II.
6. VAPOR RETARDERS
 - A. PLASTIC VAPOR RETARDER: ASTM E 1745, CLASS C, OR POLYETHYLENE SHEET, ASTM D 4397, NOT LESS THAN 10 MILS THICK. INCLUDE MANUFACTURER'S RECOMMENDED ADHESIVE OR PRESSURE-SENSITIVE JOINT TAPE.
7. CURING MATERIALS
 - A. ABSORPTIVE COVER: AASHTO M 182, CLASS 2, BURLAP CLOTH MADE FROM JUTE OR KENAF, WEIGHING APPROXIMATELY 9 OZ./SQ. YD. WHEN DRY.
 - B. MOISTURE-RETAINING COVER: ASTM C 171, POLYETHYLENE FILM OR WHITE BURLAP-POLYETHYLENE SHEET.
8. RELATED MATERIALS
 - A. EXPANSION- AND ISOLATION-JOINT-FILLER STRIPS: ASTM D 1751, ASPHALT-SATURATED CELLULOSIC FIBER OR ASTM D 1752, CORK OR SELF-EXPANDING CORK.
9. CONCRETE MIXTURES
 - A. PREPARE DESIGN MIXTURES FOR EACH TYPE AND STRENGTH OF CONCRETE, PROPORTIONED ON THE BASIS OF LABORATORY TRIAL MIXTURE OR FIELD TEST DATA, OR BOTH, ACCORDING TO ACI 301.
 - B. PROPORTION NORMAL-WEIGHT CONCRETE MIXTURE AS FOLLOWS:
 - MINIMUM COMPRESSIVE STRENGTH: 3000 PSI AT 7 DAYS.
 - MAXIMUM WATER-CEMENTITIOUS MATERIALS RATIO: 0.50.
 - SLUMP LIMIT: 4 INCHES MAXIMUM.
 - AIR CONTENT: 5 PERCENT, PLUS OR MINUS 1.5 PERCENT AT POINT OF DELIVERY FOR 1-1/2-INCH NOMINAL MAXIMUM AGGREGATE SIZE.
 - AIR CONTENT: DO NOT ALLOW AIR CONTENT OF TROWELED FINISHED FLOORS TO EXCEED 3 PERCENT.
10. FABRICATING REINFORCEMENT
 - A. FABRICATE STEEL REINFORCEMENT ACCORDING TO CRSI'S "MANUAL OF STANDARD PRACTICE."
11. CONCRETE MIXING
 - A. READY-MIXED CONCRETE: MEASURE, BATCH, MIX, AND DELIVER CONCRETE ACCORDING TO ASTM C 94/C 94M AND ASTM C 1116, AND FURNISH BATCH TICKET INFORMATION.
 - WHEN AIR TEMPERATURE IS BETWEEN 85 AND 90 DEG F, REDUCE MIXING AND DELIVERY TIME FROM 1-1/2 HOURS TO 75 MINUTES; WHEN AIR TEMPERATURE IS ABOVE 90 DEG F, REDUCE MIXING AND DELIVERY TIME TO 60 MINUTES.
12. FORMWORK
 - A. DESIGN, ERECT, SHORE, BRACE, AND MAINTAIN FORMWORK ACCORDING TO ACI 301 TO SUPPORT VERTICAL, LATERAL, STATIC, AND DYNAMIC LOADS, AND CONSTRUCTION LOADS THAT MIGHT BE APPLIED, UNTIL STRUCTURE CAN SUPPORT SUCH LOADS.
 - B. CONSTRUCT FORMWORK SO CONCRETE MEMBERS AND STRUCTURES ARE OF SIZE, SHAPE, ALIGNMENT, ELEVATION, AND POSITION INDICATED, WITHIN TOLERANCE LIMITS OF ACI 117.
 - C. CHAMFER EXTERIOR CORNERS AND EDGES OF PERMANENTLY EXPOSED CONCRETE.
13. EMBEDDED ITEMS INSTALLATION
 - A. PLACE AND SECURE ANCHORAGE DEVICES AND OTHER EMBEDDED ITEMS REQUIRED FOR ADJOINING WORK THAT IS ATTACHED TO OR SUPPORTED BY CAST-IN-PLACE CONCRETE. USE SETTING DRAWINGS, TEMPLATES, DIAGRAMS, INSTRUCTIONS, AND DIRECTIONS FURNISHED WITH ITEMS TO BE EMBEDDED.
14. VAPOR RETARDER INSTALLATION
 - A. PLASTIC VAPOR RETARDERS: PLACE, PROTECT, AND REPAIR VAPOR RETARDERS ACCORDING TO ASTM E 1643 AND MANUFACTURER'S WRITTEN INSTRUCTIONS.
 - LAP JOINTS 6 INCHES AND SEAL WITH MANUFACTURER'S RECOMMENDED TAPE.
15. STEEL REINFORCEMENT INSTALLATION
 - A. GENERAL: COMPLY WITH CRSI'S "MANUAL OF STANDARD PRACTICE" FOR PLACING REINFORCEMENT.
 - DO NOT CUT OR PUNCTURE VAPOR RETARDER. REPAIR DAMAGE AND RESEAL VAPOR RETARDER BEFORE PLACING CONCRETE.
16. JOINTS
 - A. GENERAL: CONSTRUCT JOINTS TRUE TO LINE WITH FACES PERPENDICULAR TO SURFACE PLANE OF CONCRETE.
17. CONCRETE PLACEMENT
 - A. BEFORE PLACING CONCRETE, VERIFY THAT INSTALLATION OF FORMWORK, REINFORCEMENT, AND EMBEDDED ITEMS IS COMPLETE AND THAT REQUIRED INSPECTIONS HAVE BEEN PERFORMED.
 - B. DEPOSIT CONCRETE CONTINUOUSLY IN ONE LAYER OR IN HORIZONTAL LAYERS OF SUCH THICKNESS THAT NO NEW CONCRETE WILL BE PLACED ON CONCRETE THAT HAS HARDENED ENOUGH TO CAUSE SEAMS OR PLANES OF WEAKNESS. CONSOLIDATE PLACED CONCRETE WITH MECHANICAL VIBRATING EQUIPMENT ACCORDING TO ACI 301.
 - C. COLD-WEATHER PLACEMENT: COMPLY WITH ACI 306.1.
 - D. HOT-WEATHER PLACEMENT: COMPLY WITH ACI 301.
18. FINISHING FORMED SURFACES
 - A. SMOOTH-FORMED FINISH: AS-CAST CONCRETE TEXTURE IMPARTED BY FORM-FACING MATERIAL, ARRANGED IN AN ORDERLY AND SYMMETRICAL MANNER WITH A MINIMUM OF SEAMS. REPAIR AND PATCH TIE HOLES AND DEFECTS. REMOVE FINS AND OTHER PROJECTIONS THAT EXCEED SPECIFIED LIMITS ON FORMED-SURFACE IRREGULARITIES.
 - APPLY TO CONCRETE SURFACES EXPOSED TO PUBLIC VIEW: FLOOR AND STEM WALL.
 - B. RELATED UNFORMED SURFACES: AT TOPS OF WALLS, HORIZONTAL OFFSETS, AND SIMILAR UNFORMED SURFACES ADJACENT TO FORMED SURFACES, STRIKE OFF SMOOTH AND FINISH WITH A TEXTURE MATCHING ADJACENT FORMED SURFACES. CONTINUE FINAL SURFACE TREATMENT OF FORMED SURFACES UNIFORMLY ACROSS ADJACENT UNFORMED SURFACES, UNLESS OTHERWISE INDICATED.
19. FINISHING FLOORS AND SLABS
 - A. GENERAL: COMPLY WITH ACI 302.1R RECOMMENDATIONS FOR SCREEDING, RESTRAIGHTENING, AND FINISHING OPERATIONS FOR CONCRETE SURFACES. DO NOT WET CONCRETE SURFACES.
 - B. FLOAT FINISH: CONSOLIDATE SURFACE WITH POWER-DRIVEN FLOATS OR BY HAND FLOATING IF AREA IS SMALL OR INACCESSIBLE TO POWER DRIVEN FLOATS. RESTRAIGHTEN, CUT DOWN HIGH SPOTS, AND FILL LOW SPOTS. REPEAT FLOAT PASSES AND RESTRAIGHTENING UNTIL SURFACE IS LEFT WITH A UNIFORM, SMOOTH, GRANULAR TEXTURE.
 - APPLY FLOAT FINISH TO FLOOR SLAB SURFACES EXPOSED TO VIEW.
 - C. TROWEL FINISH: AFTER APPLYING FLOAT FINISH, APPLY FIRST TROWELING AND CONSOLIDATE CONCRETE BY HAND OR POWER-DRIVEN TROWEL. CONTINUE TROWELING PASSES AND RESTRAIGHTEN UNTIL SURFACE IS FREE OF TROWEL MARKS AND UNIFORM IN TEXTURE AND APPEARANCE. GRIND SMOOTH ANY SURFACE DEFECTS THAT WOULD TELEGRAPH THROUGH APPLIED COATINGS OR FLOOR COVERINGS.
 - APPLY A TROWEL FINISH TO FLOOR SLAB SURFACES EXPOSED TO VIEW.
 - FINISH AND MEASURE SURFACE PER DRAWINGS SO FINISH SLOPES ARE UNIFORM AND DO NOT DEVIATE FROM SPECIFIED SPOT GRADE ELEVATIONS MORE THAN 1/4" IN 10 FEET.
20. CONCRETE PROTECTING AND CURING
 - A. GENERAL: PROTECT FRESHLY PLACED CONCRETE FROM PREMATURE DRYING AND EXCESSIVE COLD OR HOT TEMPERATURES. COMPLY WITH ACI 306.1 FOR COLD-WEATHER PROTECTION AND ACI 301 FOR HOT-WEATHER PROTECTION DURING CURING.
 - B. EVAPORATION RETARDER: APPLY EVAPORATION RETARDER TO UNFORMED CONCRETE SURFACES IF HOT, DRY, OR WINDY CONDITIONS CAUSE MOISTURE LOSS APPROACHING 0.2 LB/SQ. FT. X H BEFORE AND DURING FINISHING OPERATIONS. APPLY ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS AFTER PLACING, SCREEDING, AND BULL FLOATING OR DARBYING CONCRETE, BUT BEFORE FLOAT FINISHING.
 - C. CURE CONCRETE ACCORDING TO ACI 308.1, BY ONE OR A COMBINATION OF THE FOLLOWING METHODS:
 - MOISTURE CURING: KEEP SURFACES CONTINUOUSLY MOIST FOR NOT LESS THAN SEVEN DAYS.
 - MOISTURE-RETAINING-COVER CURING: COVER CONCRETE SURFACES WITH MOISTURE-RETAINING COVER FOR CURING CONCRETE, PLACED IN WIDEST PRACTICABLE WIDTH, WITH SIDES AND ENDS LAPPED AT LEAST 12 INCHES, AND SEALED BY WATERPROOF TAPE OR ADHESIVE. CURE FOR NOT LESS THAN SEVEN DAYS. IMMEDIATELY REPAIR ANY HOLES OR TEARS DURING CURING PERIOD USING COVER MATERIAL AND WATERPROOF TAPE.
 - CURING COMPOUND: APPLY UNIFORMLY IN CONTINUOUS OPERATION BY POWER SPRAY OR ROLLER ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS. RECOAT AREAS SUBJECTED TO HEAVY RAINFALL WITHIN THREE HOURS AFTER INITIAL APPLICATION. MAINTAIN CONTINUITY OF COATING AND REPAIR DAMAGE DURING CURING PERIOD.
21. CONCRETE SURFACE REPAIRS
 - A. DEFECTIVE CONCRETE: REPAIR AND PATCH DEFECTIVE AREAS WHEN APPROVED BY KING COUNTY PROJECT REPRESENTATIVE. REMOVE AND REPLACE CONCRETE THAT CANNOT BE REPAIRED AND PATCHED TO ARCHITECT'S APPROVAL.
22. FIELD QUALITY CONTROL
 - A. TESTING AND INSPECTING: OWNER WILL ENGAGE A QUALIFIED INDEPENDENT TESTING AND INSPECTING AGENCY TO PERFORM FIELD TESTS AND INSPECTIONS AND PREPARE TEST REPORTS.
 - TESTING SERVICES: TESTS SHALL BE PERFORMED ACCORDING TO ACI 301.

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King County
Department of
Transportation

METRO TRANSIT DIVISION
STANDARD SINGLE-UNIT DRIVER'S COMFORT STATION
FOR CONSTRUCTION WITHIN A NEW BUILDING

**CAST-IN-PLACE
CONCRETE SPECIFICATION**

DATE:
SEPTEMBER 2013

DRAWING NO:
A7.01

SHEET NO. OF
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ROUGH CARPENTRY SPECIFICATION 061000

1. THIS SECTION INCLUDES THE FOLLOWING:
 - A. FRAMING WITH DIMENSION LUMBER.
 - B. WOOD BLOCKING, CANTS, AND NAILERS.
2. WOOD PRODUCTS, GENERAL
 - A. LUMBER: DOC PS 20 AND APPLICABLE RULES OF GRADING AGENCIES INDICATED. IF NO GRADING AGENCY IS INDICATED, PROVIDE LUMBER THAT COMPLIES WITH THE APPLICABLE RULES OF ANY RULES-WRITING AGENCY CERTIFIED BY THE ALSC BOARD OF REVIEW. PROVIDE LUMBER GRADED BY AN AGENCY CERTIFIED BY THE ALSC BOARD OF REVIEW TO INSPECT AND GRADE LUMBER UNDER THE RULES INDICATED.
 - FACTORY MARK EACH PIECE OF LUMBER WITH GRADE STAMP OF GRADING AGENCY.
 - PROVIDE DRESSED LUMBER, S4S, UNLESS OTHERWISE INDICATED.
3. WOOD-PRESERVATIVE-TREATED LUMBER
 - A. PRESERVATIVE TREATMENT BY PRESSURE PROCESS: AWPA C2, EXCEPT THAT LUMBER THAT IS NOT IN CONTACT WITH THE GROUND AND IS CONTINUOUSLY PROTECTED FROM LIQUID WATER MAY BE TREATED ACCORDING TO AWPA C31 WITH INORGANIC BORON (SBX).
 - PRESERVATIVE CHEMICALS: ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION AND CONTAINING NO ARSENIC OR CHROMIUM.
 - B. KILN-DRY LUMBER AFTER TREATMENT TO A MAXIMUM MOISTURE CONTENT OF 19 PERCENT.
 - C. MARK LUMBER WITH TREATMENT QUALITY MARK OF AN INSPECTION AGENCY APPROVED BY THE ALSC BOARD OF REVIEW.
 - D. APPLICATION: TREAT ITEMS INDICATED ON DRAWINGS, AND THE FOLLOWING:
 - WOOD SILLS, SLEEPERS, BLOCKING, AND SIMILAR CONCEALED MEMBERS IN CONTACT WITH MASONRY OR CONCRETE.
5. DIMENSION LUMBER FRAMING
 - A. MAXIMUM MOISTURE CONTENT: 19 PERCENT.
 - B. FRAMING OTHER THAN NON-LOAD-BEARING INTERIOR PARTITIONS: CONSTRUCTION OR NO. 2 GRADE AND ANY OF THE FOLLOWING SPECIES:
 - HEM-FIR (NORTH); NLGA.
 - DOUGLAS FIR-LARCH; WCLIB OR WWPA.
6. MISCELLANEOUS LUMBER
 - A. GENERAL: PROVIDE MISCELLANEOUS LUMBER INDICATED AND LUMBER FOR SUPPORT OR ATTACHMENT OF OTHER CONSTRUCTION, INCLUDING THE FOLLOWING:
 - BLOCKING.
 - NAILERS.
 - B. FOR ITEMS OF DIMENSION LUMBER SIZE, PROVIDE CONSTRUCTION OR NO. 2 GRADE LUMBER WITH 19 PERCENT MAXIMUM MOISTURE CONTENT OF ANY SPECIES.
 - C. FOR CONCEALED BOARDS, PROVIDE LUMBER WITH 19 PERCENT MAXIMUM MOISTURE CONTENT AND THE FOLLOWING SPECIES AND GRADES:
 - WESTERN WOODS, CONSTRUCTION OR NO. 2 COMMON GRADE; WCLIB OR WWPA.
7. FASTENERS
 - A. GENERAL: PROVIDE FASTENERS OF SIZE AND TYPE INDICATED THAT COMPLY WITH REQUIREMENTS SPECIFIED.
 - WHERE ROUGH CARPENTRY IS EXPOSED TO WEATHER, IN GROUND CONTACT, PRESSURE-PRESERVATIVE TREATED, OR IN AREA OF HIGH RELATIVE HUMIDITY, PROVIDE FASTENERS WITH HOT-DIP ZINC COATING COMPLYING WITH ASTM A 153/A 153M.
 - B. POWER-DRIVEN FASTENERS: NES NER-272.
 - C. BOLTS: STEEL BOLTS COMPLYING WITH ASTM A 307, GRADE A WITH ASTM A 563 HEX NUTS AND, WHERE INDICATED, FLAT WASHERS.
8. METAL FRAMING ANCHORS
 - A. BASIS-OF-DESIGN PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS INDICATED ON DRAWINGS OR COMPARABLE PRODUCTS BY ONE OF THE FOLLOWING:
 - ALPINE ENGINEERED PRODUCTS, INC.
 - KC METALS PRODUCTS, INC.
 - SIMPSON STRONG-TIE CO., INC.
 - USP STRUCTURAL CONNECTORS.

SHEATHING SPECIFICATION 061600

1. THIS SECTION INCLUDES THE FOLLOWING:
 - A. WALL SHEATHING.
 - B. ROOF SHEATHING.
 - C. BUILDING PAPER.
 - D. FLEXIBLE FLASHING AT OPENINGS IN SHEATHING.
2. DELIVERY, STORAGE, AND HANDLING
 - A. STACK PLYWOOD AND OTHER PANELS FLAT WITH SPACERS BETWEEN EACH BUNDLE TO PROVIDE AIR CIRCULATION. PROVIDE FOR AIR CIRCULATION AROUND STACKS AND UNDER COVERINGS.
4. WOOD PANEL PRODUCTS, GENERAL
 - A. PLYWOOD: DOC PS OR DOC PS 2.
5. WALL SHEATHING
 - A. PLYWOOD WALL SHEATHING: EXTERIOR, STRUCTURAL I SHEATHING.
6. ROOF SHEATHING
 - A. PLYWOOD ROOF SHEATHING: EXTERIOR, STRUCTURAL I SHEATHING.
7. FASTENERS
 - A. GENERAL: PROVIDE FASTENERS OF SIZE AND TYPE INDICATED.
 - FOR WALL AND ROOF SHEATHING PANELS, PROVIDE FASTENERS WITH CORROSION-PROTECTIVE COATING HAVING A SALT-SPRAY RESISTANCE OF MORE THAN 800 HOURS ACCORDING TO ASTM B 117.
8. WEATHER-RESISTANT SHEATHING PAPER
 - A. BUILDING PAPER: ASTM D 226, TYPE 1 (NO. 15 ASPHALT-SATURATED ORGANIC FELT), UNPERFORATED.
9. MISCELLANEOUS MATERIALS
 - A. ADHESIVES FOR FIELD GLUING PANELS TO FRAMING: FORMULATION COMPLYING WITH ASTM D 3498 THAT IS APPROVED FOR USE INDICATED BY MANUFACTURERS OF BOTH ADHESIVES AND PANELS.
 - USE ADHESIVES THAT HAVE A VOC CONTENT OF 50 G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).
 - B. FLEXIBLE FLASHING: SELF-ADHESIVE, RUBBERIZED-ASPHALT COMPOUND, BONDED TO A HIGH-DENSITY, POLYETHYLENE FILM TO PRODUCE AN OVERALL THICKNESS OF NOT LESS THAN 0.025 INCH.
10. INSTALLATION, GENERAL
 - A. SECURELY ATTACH TO SUBSTRATE BY FASTENING AS INDICATED, COMPLYING WITH THE FOLLOWING:
 - NES NER-272 FOR POWER-DRIVEN FASTENERS.
 - TABLE 2304.9.1, "FASTENING SCHEDULE," IN ICC'S "INTERNATIONAL BUILDING CODE."
 - B. COORDINATE SHEATHING INSTALLATION WITH FLASHING AND JOINT-SEALANT INSTALLATION SO THESE MATERIALS ARE INSTALLED IN SEQUENCE AND MANNER THAT EXCLUDE EXTERIOR MOISTURE.
11. WEATHER-RESISTANT SHEATHING-PAPER INSTALLATION
 - A. GENERAL: COVER SHEATHING WITH WEATHER-RESISTANT SHEATHING PAPER AS FOLLOWS:
 - CUT BACK BARRIER 1/2 INCH ON EACH SIDE OF THE BREAK IN SUPPORTING MEMBERS AT EXPANSION- OR CONTROL-JOINT LOCATIONS.
 - APPLY BARRIER TO COVER VERTICAL FLASHING WITH A MINIMUM 4-INCH OVERLAP, UNLESS OTHERWISE INDICATED.
 - B. BUILDING PAPER: APPLY HORIZONTALLY WITH A 2-INCH OVERLAP AND A 6-INCH

END LAP; FASTEN TO SHEATHING WITH GALVANIZED STAPLES OR ROOFING NAILS.

12. FLASHING INSTALLATION

- A. APPLY FLEXIBLE FLASHING WHERE INDICATED TO COMPLY WITH MANUFACTURERS WRITTEN INSTRUCTIONS.

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METRO TRANSIT DIVISION
 STANDARD SINGLE-UNIT DRIVER'S COMFORT STATION
 FOR CONSTRUCTION WITHIN A NEW BUILDING

**ROUGH CARPENTRY &
 SHEATHING SPECIFICATIONS**

DATE: SEPTEMBER 2013
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THERMAL INSULATION SPECIFICATION 072100

1. THIS SECTION INCLUDES THE FOLLOWING:
 - A. PERIMETER WALL INSULATION (SUPPORTING BACKFILL).
 - B. CONCEALED BUILDING INSULATION.
2. QUALITY ASSURANCE
 - A. FIRE-TEST-RESPONSE CHARACTERISTICS: PROVIDE INSULATION AND RELATED MATERIALS WITH THE FIRE-TEST-RESPONSE CHARACTERISTICS INDICATED, AS DETERMINED BY TESTING IDENTICAL PRODUCTS PER ASTM E 84 FOR SURFACE-BURNING CHARACTERISTICS AND OTHER METHODS INDICATED WITH PRODUCT, BY UL OR ANOTHER TESTING AND INSPECTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION. IDENTIFY MATERIALS WITH APPROPRIATE MARKINGS OF APPLICABLE TESTING AND INSPECTING AGENCY.
4. MANUFACTURERS
 - A. ACCEPTABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, MANUFACTURERS SPECIFIED.
5. FOAM-PLASTIC BOARD INSULATION
 - A. EXTRUDED-POLYSTYRENE BOARD INSULATION (FOUNDATION PERIMETER): ASTM C 578, TYPE IV, 1.60 LB/CU. FT., WITH MAXIMUM FLAME-SPREAD AND SMOKE-DEVELOPED INDEXES OF 75 AND 450, RESPECTIVELY:
 - MANUFACTURERS:
 - DIVERSIFOAM PRODUCTS.
 - DOW CHEMICAL COMPANY.
 - OWENS CORNING.
 - PACTIV BUILDING PRODUCTS DIVISION.
 - B. FOIL-FACED, POLYISOCYANURATE BOARD INSULATION (WALLS AND ROOF): ASTM C 1289, TYPE I, CLASS 1 OR 2, WITH MAXIMUM FLAME-SPREAD AND SMOKE-DEVELOPED INDEXES OF 75 AND 450, RESPECTIVELY, BASED ON TESTS PERFORMED ON UNFACED CORE ON THICKNESSES UP TO 4 INCHES.
 - MATERIAL TYPE: HCFC-FREE.
 - MANUFACTURERS:
 - a. ATLAS ROOFING CORPORATION.
 - b. DOW CHEMICAL COMPANY.
 - c. RMAX, INC.
6. GLASS-FIBER BLANKET INSULATION
 - A. AVAILABLE MANUFACTURERS:
 - CERTAINTEED CORPORATION.
 - GUARDIAN FIBERGLASS, INC.
 - JOHNS MANVILLE.
 - KNAUF FIBER GLASS.
 - OWENS CORNING.
 - APPROVED EQUAL.
 - B. FACED, GLASS-FIBER BLANKET INSULATION: ASTM C 665, TYPE III (BLANKETS WITH REFLECTIVE MEMBRANE FACING), CLASS A (MEMBRANE-FACED SURFACE WITH A FLAME-SPREAD INDEX OF 25 OR LESS); CATEGORY 1 (MEMBRANE IS A VAPOR BARRIER), FACED WITH FOIL-SCRIM-KRAFT, FOIL-SCRIM, OR FOIL-SCRIM-POLYETHYLENE VAPOR-RETARDER MEMBRANE ON 1 FACE.
 - C. WHERE GLASS-FIBER BLANKET INSULATION IS INDICATED BY THE FOLLOWING THICKNESSES, PROVIDE BLANKETS IN BATT OR ROLL FORM WITH THERMAL RESISTANCES INDICATED:
 - 5-1/2 INCHES THICK WITH A THERMAL RESISTANCE OF 19 DEG F X H X SQ. FT./BTU AT 75 DEG F (3.3 K X SQ. MW AT 24 DEG C).
 - 6-1/2 INCHES THICK WITH A THERMAL RESISTANCE OF 21 DEG F X H X SQ. FT./BTU AT 75 DEG F (3.7 K X SQ. MW AT 24 DEG C).
7. AUXILIARY INSULATING MATERIALS
 - A. ADHESIVE FOR BONDING INSULATION: PRODUCT WITH DEMONSTRATED CAPABILITY TO BOND INSULATION SECURELY TO SUBSTRATES INDICATED WITHOUT DAMAGING INSULATION AND SUBSTRATES.
8. INSULATION FASTENERS
 - A. ADHESIVELY ATTACHED, SPINDLE-TYPE ANCHORS: PLATE OR ANGLE FORMED FROM PERFORATED GALVANIZED CARBON-STEEL SHEET, 0.030 INCH THICK BY 2 INCHES SQUARE, WELDED TO PROJECTING COPPER-COATED STEEL SPINDLE 0.105 INCH IN DIAMETER AND OF LENGTH CAPABLE OF HOLDING INSULATION OF THICKNESS INDICATED SECURELY IN POSITION WITH 1-1/2-INCH-SQUARE OR DIAMETER SELF-LOCKING WASHERS COMPLYING WITH THE FOLLOWING REQUIREMENTS:
 - INSULATION-RETAINING WASHERS: SELF-LOCKING WASHERS FORMED FROM 0.016-INCH- THICK GALVANIZED STEEL SHEET, WITH BEVELED EDGE FOR INCREASED STIFFNESS.

EXTERIOR FINISH CARPENTRY SPECIFICATION 062013

1. THIS SECTION INCLUDES THE FOLLOWING:
 - A. HARDBOARD SIDING AND TRIM.
2. MATERIALS, GENERAL
 - A. LUMBER: DOC PS 20 AND APPLICABLE GRADING RULES OF INSPECTION AGENCIES CERTIFIED BY ALS-C'S BOARD OF REVIEW.
 - B. SOFTWOOD PLYWOOD: DOC PS 1.
 - C. HARDBOARD: AHA A135.4.
3. CEMENT BOARD SIDING
 - A. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
 - COLLINS PRODUCTS LLC; COLLINS COMPANIES, INC. (THE).
 - GEORGIA-PACIFIC CORP.
 - JAMES HARDIE
 - LOUISIANA-PACIFIC CORPORATION.
 - TEMPLE-INLAND INC.
 - B. CEMENT BOARD SIDING: AHA A135.6, PRIMED WITH MANUFACTURER'S STANDARD EXTERIOR PRIMER.
 - TYPE: LAP SIDING.
 - TEXTURE: SMOOTH.
 - C. TRIM
 - TYPE: SQUARE-EDGE FLAT PANELS; WITHOUT GROOVES.
4. MISCELLANEOUS MATERIALS
 - A. FASTENERS FOR EXTERIOR FINISH CARPENTRY: PROVIDE NAILS OR SCREWS, IN SUFFICIENT LENGTH TO PENETRATE NOT LESS THAN 1-1/2 INCHES INTO WOOD SUBSTRATE.
 - FOR PREFINISHED ITEMS, PROVIDE MATCHING PREFINISHED ALUMINUM FASTENERS WHERE FACE FASTENING IS REQUIRED.
 - FOR APPLICATIONS NOT OTHERWISE INDICATED, PROVIDE HOT-DIP GALVANIZED STEEL FASTENERS.
 - B. INSECT SCREENING FOR SOFFIT VENTS: AS SHOWN ON THE DRAWINGS.
 - C. SEALANTS: LATEX, COMPLYING WITH ASTM C 834, TYPE P, GRADE NF AND WITH APPLICABLE REQUIREMENTS IN DIVISION 07 SECTION "JOINT SEALANTS," RECOMMENDED BY SEALANT MANUFACTURER AND MANUFACTURER OF SUBSTRATES FOR INTENDED APPLICATION.
6. PREPARATION
 - A. PRIME LUMBER TO BE PAINTED, INCLUDING BOTH FACES AND EDGES. CUT TO REQUIRED LENGTHS AND PRIME ENDS. COMPLY WITH REQUIREMENTS IN DIVISION 09 SECTION "EXTERIOR PAINTING."
7. INSTALLATION, GENERAL
 - A. INSTALL EXTERIOR FINISH CARPENTRY LEVEL, PLUMB, TRUE, AND ALIGNED WITH ADJACENT MATERIALS. USE CONCEALED SHIMS WHERE NECESSARY FOR ALIGNMENT.
 - SCRIBE AND CUT EXTERIOR FINISH CARPENTRY TO FIT ADJOINING WORK. REFINISH AND SEAL CUTS AS RECOMMENDED BY MANUFACTURER.
8. STANDING AND RUNNING TRIM INSTALLATION
 - A. INSTALL TRIM WITH MINIMUM NUMBER OF JOINTS PRACTICAL, USING FULL-LENGTH PIECES FROM MAXIMUM LENGTHS OF LUMBER AVAILABLE. DO NOT USE PIECES LESS THAN 24 INCHES LONG EXCEPT WHERE NECESSARY.
 - USE SCARF JOINTS FOR END-TO-END JOINTS.
 - STAGGER END JOINTS IN ADJACENT AND RELATED MEMBERS.
9. SIDING INSTALLATION
 - A. INSTALL SIDING TO COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.
 - B. HARDBOARD SIDING: INSTALL HARDBOARD SIDING COMPLYING WITH AHA'S "RECOMMENDED BASIC APPLICATION AND PAINTING INSTRUCTIONS FOR HARDBOARD SIDING." INSTALL PANELS WITH EDGES OVER FRAMING OR BLOCKING. LEAVE 3/16-INCH GAP AT PERIMETER, OPENINGS, AND HORIZONTAL PANEL JOINTS UNLESS OTHERWISE RECOMMENDED BY PANEL MANUFACTURER.
 - SEAL BUTT JOINTS AT INSIDE AND OUTSIDE CORNERS AND AT TRIM LOCATIONS.
 - CONCEAL FASTENERS TO GREATEST PRACTICAL EXTENT BY PLACING IN GROOVES OF SIDING PATTERN OR BY CONCEALING WITH APPLIED TRIM OR BATTENS AS DETAILED.
- B. FIT EXTERIOR JOINTS TO EXCLUDE WATER. COPE AT RETURNS AND MITER AT CORNERS.

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CHECKED: J DAVIS	PROJECT NO:	ONE INCH AT FULL SIZE
RECOMMENDED: D CRIPPEN	WORK REQUEST: CONTRACT NO:	1" SCALE IF NOT ONE INCH, SCALE ACCORDINGLY



METRO TRANSIT DIVISION
 STANDARD SINGLE-UNIT DRIVER'S COMFORT STATION
 FOR CONSTRUCTION WITHIN A NEW BUILDING
**THERMAL INSULATION &
 EXTERIOR FINISH
 CARPENTRY SPECIFICATIONS**

DATE: SEPTEMBER 2013
DRAWING NO: A7.03
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METAL ROOF PANELS SPECIFICATION 074113

1. **PERFORMANCE REQUIREMENTS**
 - A. WIND-UPLIFT RESISTANCE: PROVIDE METAL ROOF PANEL ASSEMBLIES THAT COMPLY WITH UL 580 FOR WIND-UPLIFT-RESISTANCE CLASS INDICATED.
 - B. UPLIFT RATING: UL 90.
 - C. FMG LISTING: PROVIDE METAL ROOF PANELS AND COMPONENT MATERIALS THAT COMPLY WITH REQUIREMENTS IN FMG 4471 AS PART OF A PANEL ROOFING SYSTEM AND THAT ARE LISTED IN FMG'S "APPROVAL GUIDE" FOR CLASS 1 OR NONCOMBUSTIBLE CONSTRUCTION, AS APPLICABLE. IDENTIFY MATERIALS WITH FMG MARKINGS.
 - D. FIRE/WINDSTORM CLASSIFICATION: CLASS 1A-90.
 - E. STRUCTURAL PERFORMANCE: PROVIDE METAL ROOF PANEL ASSEMBLIES CAPABLE OF WITHSTANDING THE EFFECTS OF GRAVITY LOADS AND THE FOLLOWING LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS INDICATED, BASED ON TESTING ACCORDING TO ASTM E 1592, AS INDICATED ON THE DRAWINGS.
 - F. ENERGY PERFORMANCE: PROVIDE ROOF PANELS THAT ARE LISTED ON THE U.S. DEPARTMENT OF ENERGY'S ENERGY STAR ROOF PRODUCTS QUALIFIED PRODUCT LIST FOR STEEP-SLOPE ROOF PRODUCTS.
2. **QUALITY ASSURANCE**
 - A. FIRE-RESISTANCE RATINGS: WHERE INDICATED, PROVIDE METAL ROOF PANELS IDENTICAL TO THOSE OF ASSEMBLIES TESTED FOR FIRE RESISTANCE PER ASTM E 119 BY A QUALIFIED TESTING AGENCY. IDENTIFY PRODUCTS WITH APPROPRIATE MARKINGS OF APPLICABLE TESTING AGENCY.
 - COMBUSTION CHARACTERISTICS: ASTM E 136.
3. **WARRANTY**
 - A. SPECIAL WARRANTY: MANUFACTURER'S STANDARD FORM IN WHICH MANUFACTURER AGREES TO REPAIR OR REPLACE METAL ROOF PANEL ASSEMBLIES THAT FAIL IN MATERIALS OR WORKMANSHIP WITHIN SPECIFIED WARRANTY PERIOD: 15 YEARS FROM DATE OF SUBSTANTIAL COMPLETION.
 - B. SPECIAL WARRANTY ON PANEL FINISHES: MANUFACTURER'S STANDARD FORM IN WHICH MANUFACTURER AGREES TO REPAIR FINISH OR REPLACE METAL ROOF PANELS THAT SHOW EVIDENCE OF DETERIORATION OF FACTORY-APPLIED FINISHES WITHIN SPECIFIED FINISH WARRANTY PERIOD: 20 YEARS FROM DATE OF SUBSTANTIAL COMPLETION.
4. **PANEL MATERIALS**
 - A. METALLIC-COATED STEEL SHEET: RESTRICTED FLATNESS STEEL SHEET METALLIC COATED BY THE HOT-DIP PROCESS AND PREPAINTED BY THE COIL-COATING PROCESS TO COMPLY WITH ASTM A 755/A 755M.
 - B. ALUMINUM-ZINC ALLOY-COATED STEEL SHEET: ASTM A 792/A 792M, CLASS AZ50 COATING DESIGNATION, GRADE 40; STRUCTURAL QUALITY.
 - C. SURFACE: SMOOTH, FLAT FINISH.
 - D. EXPOSED COIL-COATED FINISH: 2-COAT FLUOROPOLYMER: AAMA 621. FLUOROPOLYMER FINISH CONTAINING NOT LESS THAN 70 PERCENT PVDF RESIN BY WEIGHT IN COLOR COAT.
 - E. CONCEALED FINISH: MANUFACTURER'S STANDARD WHITE OR LIGHT-COLORED ACRYLIC OR POLYESTER BACKER FINISH.
 - F. PANEL SEALANT TAPE: PRESSURE-SENSITIVE, 100 PERCENT SOLIDS, GRAY POLYISOBUTYLENE COMPOUND SEALANT TAPE WITH RELEASE-PAPER BACKING; 1/2 INCH WIDE AND 1/8 INCH THICK.
 - JOINT SEALANT: ASTM C 920; AS RECOMMENDED IN WRITING BY METAL ROOF PANEL MANUFACTURER.
 - BUTYL-RUBBER-BASED, SOLVENT-RELEASE SEALANT: ASTM C 1311.
5. **FIELD-INSTALLED THERMAL INSULATION**
 - A. INSULATION RETAINER STRIPS: 0.019-INCH THICK, FORMED, GALVANIZED-STEEL OR PVC RETAINER CLIPS COLORED TO MATCH INSULATION FACING.
 - B. THERMAL SPACER BLOCKS: FABRICATED FROM EXTRUDED POLYSTYRENE, 1 INCH THICK.
6. **UNDERLAYMENT MATERIALS**
 - A. SELF-ADHERING, HIGH-TEMPERATURE SHEET: 30 TO 40 MILS THICK MINIMUM, CONSISTING OF SLIP-RESISTING, POLYETHYLENE-FILM TOP SURFACE LAMINATED TO LAYER OF BUTYL OR SBS-MODIFIED ASPHALT ADHESIVE, WITH RELEASE-PAPER BACKING; COLD APPLIED. PROVIDE PRIMER WHEN RECOMMENDED BY UNDERLAYMENT MANUFACTURER.
 - B. THERMAL STABILITY: STABLE AFTER TESTING AT 240 DEG F; ASTM D 1970.
7. **MISCELLANEOUS MATERIALS**
 - A. PANEL FASTENERS: SELF-TAPPING SCREWS, BOLTS, NUTS, SELF-LOCKING RIVETS AND BOLTS, END-WELDED STUDS, AND OTHER SUITABLE FASTENERS DESIGNED TO WITHSTAND DESIGN LOADS. PROVIDE EXPOSED FASTENERS WITH HEADS MATCHING COLOR OF METAL ROOF PANELS BY MEANS OF PLASTIC CAPS OR FACTORY-APPLIED COATING. PROVIDE EPDM, PVC, OR NEOPRENE SEALING WASHERS.
 - B. BITUMINOUS COATING: COLD-APPLIED ASPHALT MASTIC, SSPC-PAINT 12, COMPOUNDED FOR 15-MIL DRY FILM THICKNESS PER COAT. PROVIDE INERT-TYPE NONCORROSIVE COMPOUND FREE OF ASBESTOS FIBERS, SULFUR COMPONENTS, AND OTHER DELETERIOUS IMPURITIES.
8. **STANDING-SEAM METAL ROOF PANELS**
 - A. GENERAL: PROVIDE FACTORY-FORMED METAL ROOF PANELS DESIGNED TO BE INSTALLED BY LAPPING AND INTERCONNECTING RAISED SIDE EDGES OF ADJACENT PANELS WITH JOINT TYPE INDICATED AND MECHANICALLY ATTACHING PANELS TO SUPPORTS USING CONCEALED CLIPS IN SIDE LAPS. INCLUDE CLIPS, CLEATS, PRESSURE PLATES, AND ACCESSORIES REQUIRED FOR WEATHERTIGHT INSTALLATION.
 - B. STEEL PANEL SYSTEMS: UNLESS MORE STRINGENT REQUIREMENTS ARE INDICATED, COMPLY WITH ASTM E 1514.
 - C. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
 - AEP-SPAN.
 - ARCHITECTURAL BUILDING COMPONENTS.
 - ARCHITECTURAL METAL SYSTEMS.
 - ATAS INTERNATIONAL, INC.
 - CENTRIA ARCHITECTURAL SYSTEMS.
 - DIMENSIONAL METALS, INC.
 - METAL-FAB MANUFACTURING, LLC.
 - METAL SALES MANUFACTURING CORPORATION.
 - MODERN METAL SYSTEMS, INC.
 - D. PROFILE: VERTICAL-RIB, SEAMED JOINT, AS INDICATED ON DRAWINGS.
 - E. MATERIAL: ZINC-COATED (GALVANIZED) STEEL SHEET OR ALUMINUM-ZINC ALLOY-COATED STEEL SHEET, 0.040-INCH NOMINAL THICKNESS.
 - EXTERIOR FINISH: 3-COAT FLUOROPOLYMER.
 - COLOR: MATCH METRO RAPIDRIDE BUS SHELTER.
 - F. CLIPS: FLOATING TO ACCOMMODATE THERMAL MOVEMENT.
 - MATERIAL: METALLIC COATED STEEL.
 - I. JOINT TYPE: DOUBLE FOLDED.
 - J. PANEL COVERAGE: 16".
 - K. PANEL HEIGHT: 2".
9. **ACCESSORIES**
 - A. ROOF PANEL ACCESSORIES: PROVIDE COMPONENTS APPROVED BY ROOF PANEL MANUFACTURER AND AS REQUIRED FOR A COMPLETE METAL ROOF PANEL ASSEMBLY INCLUDING TRIM, COPINGS, FASCIAE, CORNER UNITS, RIDGE CLOSURES, CLIPS, FLASHINGS, SEALANTS, GASKETS, FILLERS, CLOSURE STRIPS, AND SIMILAR ITEMS. MATCH MATERIAL AND FINISH OF METAL ROOF PANELS UNLESS OTHERWISE INDICATED.
 - CLOSURES: PROVIDE CLOSURES AT EAVES AND RIDGES, FABRICATED OF SAME METAL AS METAL ROOF PANELS.
 - CLOSURE STRIPS: CLOSED-CELL, EXPANDED, CELLULAR, RUBBER OR CROSSLINKED, POLYOLEFIN-FOAM OR CLOSED-CELL LAMINATED POLYETHYLENE; MINIMUM 1-INCH- THICK, FLEXIBLE CLOSURE STRIPS; CUT OR PREMOLDED TO MATCH METAL ROOF PANEL PROFILE. PROVIDE CLOSURE STRIPS WHERE INDICATED OR NECESSARY TO ENSURE WEATHERTIGHT CONSTRUCTION.
 - BACKING PLATES: PROVIDE METAL BACKING PLATES AT PANEL END SPLICES, FABRICATED FROM MATERIAL RECOMMENDED BY MANUFACTURER.
 - B. FLASHING AND TRIM: FORMED FROM SAME MATERIAL AS ROOF PANELS, PREPAINTED WITH COIL COATING, MINIMUM 0.018 INCH THICK. PROVIDE FLASHING AND TRIM AS REQUIRED TO SEAL AGAINST WEATHER AND TO PROVIDE FINISHED APPEARANCE. LOCATIONS INCLUDE, BUT ARE NOT LIMITED TO, EAVES, RAKES, CORNERS, BASES, FRAMED OPENINGS, RIDGES, FASCIAE, AND FILLERS. FINISH FLASHING AND TRIM WITH SAME FINISH SYSTEM AS ADJACENT METAL ROOF PANELS.
10. **FABRICATION**
 - A. FABRICATE AND FINISH METAL ROOF PANELS AND ACCESSORIES AT THE FACTORY TO GREATEST EXTENT POSSIBLE, BY MANUFACTURER'S STANDARD PROCEDURES AND PROCESSES AND AS NECESSARY TO FULFILL INDICATED PERFORMANCE REQUIREMENTS. COMPLY WITH INDICATED PROFILES AND WITH DIMENSIONAL AND STRUCTURAL REQUIREMENTS.
 - B. PROVIDE PANEL PROFILE, INCLUDING MAJOR RIBS AND INTERMEDIATE STIFFENING RIBS, IF ANY, FOR FULL LENGTH OF PANEL.
 - C. WHERE INDICATED, FABRICATE METAL ROOF PANEL SIDE LAPS WITH FACTORY-INSTALLED CAPTIVE GASKETS OR SEPARATOR STRIPS THAT PROVIDE A TIGHT SEAL AND PREVENT METAL-TO-METAL CONTACT, IN A MANNER THAT WILL SEAL WEATHERTIGHT AND MINIMIZE NOISE FROM MOVEMENTS WITHIN PANEL ASSEMBLY.
 - D. SHEET METAL ACCESSORIES: FABRICATE FLASHING AND TRIM TO COMPLY WITH RECOMMENDATIONS IN SMACNA'S "ARCHITECTURAL SHEET METAL MANUAL" THAT APPLY TO THE DESIGN, DIMENSIONS, METAL, AND OTHER CHARACTERISTICS OF ITEM INDICATED.
11. **PREPARATION**
 - A. MISCELLANEOUS FRAMING: INSTALL SUBPURLINS, EAVE ANGLES, FURRING, AND OTHER MISCELLANEOUS ROOF PANEL SUPPORT MEMBERS AND ANCHORAGE ACCORDING TO METAL ROOF PANEL MANUFACTURER'S WRITTEN INSTRUCTIONS.
12. **UNDERLAYMENT INSTALLATION**
 - A. SELF-ADHERING SHEET UNDERLAYMENT: APPLY PRIMER IF REQUIRED BY MANUFACTURER. COMPLY WITH TEMPERATURE RESTRICTIONS OF UNDERLAYMENT MANUFACTURER FOR INSTALLATION. APPLY AT LOCATIONS INDICATED ON DRAWINGS, WRINKLE FREE, IN SHINGLE FASHION TO SHED WATER, AND WITH END LAPS OF NOT LESS THAN 6 INCHES STAGGERED 24 INCHES BETWEEN COURSES. OVERLAP SIDE EDGES NOT LESS THAN 3-1/2 INCHES. ROLL LAPS WITH ROLLER. COVER UNDERLAYMENT WITHIN 14 DAYS.
 - B. FELT UNDERLAYMENT: APPLY AT LOCATIONS INDICATED ON DRAWINGS, IN SHINGLE FASHION TO SHED WATER, AND WITH LAPPED JOINTS OF NOT LESS THAN 2 INCHES.
 - C. APPLY SLIP SHEET OVER UNDERLAYMENT BEFORE INSTALLING METAL ROOF PANELS.
 - D. INSTALL FLASHINGS TO COVER UNDERLAYMENT TO COMPLY WITH REQUIREMENTS SPECIFIED IN DIVISION 07 SECTION "SHEET METAL FLASHING AND TRIM."
13. **THERMAL INSULATION INSTALLATION**
 - A. RETAINER STRIPS: INSTALL RETAINER STRIPS AT EACH LONGITUDINAL INSULATION JOINT, STRAIGHT AND TAUT, NESTING WITH SECONDARY FRAMING TO HOLD INSULATION IN PLACE.
14. **METAL ROOF PANEL INSTALLATION**
 - A. STANDING-SEAM METAL ROOF PANELS: FASTEN METAL ROOF PANELS TO SUPPORTS WITH CONCEALED CLIPS AT EACH STANDING-SEAM JOINT AT LOCATION, SPACING, AND WITH FASTENERS RECOMMENDED BY MANUFACTURER.
 - INSTALL CLIPS TO SUPPORTS WITH SELF-TAPPING FASTENERS.
 - INSTALL PRESSURE PLATES AT LOCATIONS INDICATED IN MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS.
 - SEAMED JOINT: CRIMP STANDING SEAMS WITH MANUFACTURER-APPROVED, MOTORIZED SEAMER TOOL SO CLIP, METAL ROOF PANEL, AND FACTORY-APPLIED SEALANT ARE COMPLETELY ENGAGED.
15. **ACCESSORY INSTALLATION**
 - A. INSTALL ACCESSORIES WITH POSITIVE ANCHORAGE TO BUILDING AND WEATHERTIGHT MOUNTING AND PROVIDE FOR THERMAL EXPANSION. COORDINATE INSTALLATION WITH FLASHINGS AND OTHER COMPONENTS.
 - B. INSTALL COMPONENTS REQUIRED FOR A COMPLETE METAL ROOF PANEL ASSEMBLY INCLUDING TRIM, COPINGS, RIDGE CLOSURES, SEAM COVERS, FLASHINGS, SEALANTS, GASKETS, FILLERS, CLOSURE STRIPS, AND SIMILAR ITEMS.
 - C. FLASHING AND TRIM: COMPLY WITH PERFORMANCE REQUIREMENTS, MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS, AND SMACNA'S "ARCHITECTURAL SHEET METAL MANUAL." PROVIDE CONCEALED FASTENERS WHERE POSSIBLE, AND SET UNITS TRUE TO LINE AND LEVEL AS INDICATED. INSTALL WORK WITH LAPS, JOINTS, AND SEAMS THAT WILL BE PERMANENTLY WATERTIGHT AND WEATHER RESISTANT.
16. **CLEANING**
 - A. REMOVE TEMPORARY PROTECTIVE COVERINGS AND STRIPPABLE FILMS, IF ANY, AS METAL ROOF PANELS ARE INSTALLED UNLESS OTHERWISE INDICATED IN MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS. ON COMPLETION OF METAL ROOF PANEL INSTALLATION, CLEAN FINISHED SURFACES AS RECOMMENDED BY METAL ROOF PANEL MANUFACTURER. MAINTAIN IN A CLEAN CONDITION DURING CONSTRUCTION.

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DESIGNED: B FARISS-BATEMAN	PROJECT MANAGER:	SCALE: NONE
DRAWN: B FARISS-BATEMAN	APPROVED:	SITE LOCATION NO:
CHECKED: J DAVIS	PROJECT NO:	ONE INCH AT FULL SIZE
RECOMMENDED: D CRIPPEN	WORK REQUEST: CONTRACT NO:	 IF NOT ONE INCH, SCALE ACCORDINGLY



METRO TRANSIT DIVISION STANDARD SINGLE-UNIT DRIVER'S COMFORT STATION FOR CONSTRUCTION WITHIN A NEW BUILDING	DATE: SEPTEMBER 2013
METAL ROOF PANELS SPECIFICATION	DRAWING NO: A7.04
	SHEET NO. OF 7 14

SHEET METAL FLASHING & TRIM SPECIFICATION 076200

1. **SECTION INCLUDES:** FORMED WALL SHEET METAL FABRICATIONS. PROVIDE PERMANENTLY ELASTIC, NONSAG, NONTOXIC, NONSTAINING TAPE 1/2 INCH WIDE AND 1/8 INCH THICK.
2. **QUALITY ASSURANCE**
 - A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.
 - E. ELASTOMERIC SEALANT: ASTM C 920, ELASTOMERIC POLYMER SEALANT; LOW MODULUS; OF TYPE, GRADE, CLASS, AND USE CLASSIFICATIONS REQUIRED TO SEAL JOINTS IN SHEET METAL FLASHING AND TRIM AND REMAIN WATERTIGHT.
 - F. BUTYL SEALANT: ASTM C 1311, SINGLE-COMPONENT, SOLVENT-RELEASE BUTYL RUBBER SEALANT; POLYISOBUTYLENE PLASTICIZED; HEAVY BODIED FOR HOOKED-TYPE EXPANSION JOINTS WITH LIMITED MOVEMENT.
3. **WARRANTY**
 - A. SPECIAL WARRANTY ON FINISHES: MANUFACTURER'S STANDARD FORM IN WHICH MANUFACTURER AGREES TO REPAIR FINISH OR REPLACE SHEET METAL FLASHING AND TRIM THAT SHOWS EVIDENCE OF DETERIORATION OF FACTORY-APPLIED FINISHES WITHIN 20 YEARS FROM DATE OF SUBSTANTIAL COMPLETION.
4. **SHEET METALS**
 - A. GENERAL: PROTECT MECHANICAL AND OTHER FINISHES ON EXPOSED SURFACES FROM DAMAGE BY APPLYING A STRIPPABLE, TEMPORARY PROTECTIVE FILM BEFORE SHIPPING.
 - B. METALLIC-COATED STEEL SHEET: RESTRICTED FLATNESS STEEL SHEET, METALLIC COATED BY THE HOT-DIP PROCESS AND PREPAINTED BY THE COIL-COATING PROCESS TO COMPLY WITH ASTM A 755/A 755M.
 - C. ALUMINUM-ZINC ALLOY-COATED STEEL SHEET: ASTM A 792/A 792M, CLASS AZ50 COATING DESIGNATION, GRADE 40; STRUCTURAL QUALITY.
 - D. SURFACE: MILL PHOSPHATIZED FOR FIELD PAINTING.
 - E. EXPOSED COIL-COATED FINISH:
 - TWO-COAT FLUOROPOLYMER: AAMA 621. FLUOROPOLYMER FINISH CONTAINING NOT LESS THAN 70 PERCENT PVDF RESIN BY WEIGHT IN COLOR COAT.
 - COLOR: COORDINATE WITH METRO RAPIDRIDE BUS SHELTER.
5. **UNDERLAYMENT MATERIALS**
 - A. SELF-ADHERING, HIGH-TEMPERATURE SHEET: MINIMUM 30 TO 40 MILS THICK, CONSISTING OF SLIP-RESISTING POLYETHYLENE-FILM TOP SURFACE LAMINATED TO LAYER OF BUTYL OR SBS-MODIFIED ASPHALT ADHESIVE, WITH RELEASE-PAPER BACKING, COLD APPLIED. PROVIDE PRIMER WHEN RECOMMENDED BY UNDERLAYMENT MANUFACTURER.
 - THERMAL STABILITY: ASTM D 1970; STABLE AFTER TESTING AT 240 DEG F.
 - LOW-TEMPERATURE FLEXIBILITY: ASTM D 1970; PASSES AFTER TESTING AT MINUS 20 DEG F.
 - B. SLIP SHEET: BUILDING PAPER, 3-LB/100 SQ. FT. MINIMUM, ROSIN SIZED.
 - C. EXPANSION PROVISIONS: WHERE LAPPED EXPANSION PROVISIONS CANNOT BE USED, FORM EXPANSION JOINTS OF INTERMESHING HOOKED FLANGES, NOT LESS THAN 1 INCH DEEP, FILLED WITH BUTYL SEALANT CONCEALED WITHIN JOINTS.
 - D. FABRICATE CLEATS AND ATTACHMENT DEVICES FROM SAME MATERIAL AS ACCESSORY BEING ANCHORED OR FROM COMPATIBLE, NONCORROSIVE METAL.
 - E. SEAMS: FABRICATE NONMOVING SEAMS WITH FLAT-LOCK SEAMS. FORM SEAMS AND SEAL WITH ELASTOMERIC SEALANT UNLESS OTHERWISE RECOMMENDED BY SEALANT MANUFACTURER FOR INTENDED USE.
6. **MISCELLANEOUS MATERIALS**
 - A. GENERAL: PROVIDE MATERIALS AND TYPES OF FASTENERS, SOLDER, WELDING RODS, PROTECTIVE COATINGS, SEPARATORS, SEALANTS, AND OTHER MISCELLANEOUS ITEMS AS REQUIRED FOR COMPLETE SHEET METAL FLASHING AND TRIM INSTALLATION.
 - B. FASTENERS: WOOD SCREWS, ANNULAR THREADED NAILS, SELF-TAPPING SCREWS, SELF-LOCKING RIVETS AND BOLTS, AND OTHER SUITABLE FASTENERS DESIGNED TO WITHSTAND DESIGN LOADS AND RECOMMENDED BY MANUFACTURER OF PRIMARY SHEET METAL OR MANUFACTURED ITEM.
 - GENERAL: BLIND FASTENERS OR SELF-DRILLING SCREWS, GASKETED, WITH HEX-WASHER HEAD.
 - EXPOSED FASTENERS: HEADS MATCHING COLOR OF SHEET METAL USING PLASTIC CAPS OR FACTORY-APPLIED COATING.
 - BLIND FASTENERS: HIGH-STRENGTH STAINLESS-STEEL RIVETS SUITABLE FOR METAL BEING FASTENED.
 - FASTENERS FOR ZINC-COATED (GALVANIZED) STEEL SHEET: HOT-DIP GALVANIZED STEEL ACCORDING TO ASTM A 153/A 153M OR ASTM F 2329 OR SERIES 300 STAINLESS STEEL.
 - C. SOLDER:
 - FOR ZINC-COATED (GALVANIZED) STEEL: ASTM B 32, GRADE SN50, 50 PERCENT TIN AND 50 PERCENT LEAD OR GRADE SN60, 60 PERCENT TIN AND 40 PERCENT LEAD.
 - D. SEALANT TAPE: PRESSURE-SENSITIVE, 100 PERCENT SOLIDS, GRAY POLYISOBUTYLENE COMPOUND SEALANT TAPE WITH RELEASE-PAPER BACKING.
7. **REGLETS**
 - A. REGLETS: UNITS OF TYPE, MATERIAL, AND PROFILE INDICATED, FORMED TO PROVIDE SECURE INTERLOCKING OF SEPARATE REGLET AND COUNTERFLASHING PIECES, AND COMPATIBLE WITH FLASHING INDICATED WITH FACTORY-MITERED AND -WELDED CORNERS AND JUNCTIONS.
 - MATERIAL: GALVANIZED STEEL, 0.022 INCH THICK.
 - FINISH: WITH MANUFACTURER'S STANDARD COLOR COATING.
8. **FABRICATION, GENERAL**
 - A. GENERAL: CUSTOM FABRICATE SHEET METAL FLASHING AND TRIM TO COMPLY WITH RECOMMENDATIONS IN SMACNA'S "ARCHITECTURAL SHEET METAL MANUAL" THAT APPLY TO DESIGN, DIMENSIONS, GEOMETRY, METAL THICKNESS, AND OTHER CHARACTERISTICS OF ITEM INDICATED. FABRICATE ITEMS AT THE SHOP TO GREATEST EXTENT POSSIBLE.
 - OBTAIN FIELD MEASUREMENTS FOR ACCURATE FIT BEFORE SHOP FABRICATION.
 - FORM SHEET METAL FLASHING AND TRIM WITHOUT EXCESSIVE OIL CANNING, BUCKLING, AND TOOL MARKS AND TRUE TO LINE AND LEVELS INDICATED, WITH EXPOSED EDGES FOLDED BACK TO FORM HEMS.
 - CONCEAL FASTENERS AND EXPANSION PROVISIONS WHERE POSSIBLE. EXPOSED FASTENERS ARE NOT ALLOWED ON FACES EXPOSED TO VIEW.
 - B. SEALED JOINTS: FORM NONEXPANSION BUT MOVABLE JOINTS IN METAL TO ACCOMMODATE ELASTOMERIC SEALANT.
 - C. EXPANSION PROVISIONS: WHERE LAPPED EXPANSION PROVISIONS CANNOT BE USED, FORM EXPANSION JOINTS OF INTERMESHING HOOKED FLANGES, NOT LESS THAN 1 INCH DEEP, FILLED WITH BUTYL SEALANT CONCEALED WITHIN JOINTS.
 - D. FABRICATE CLEATS AND ATTACHMENT DEVICES FROM SAME MATERIAL AS ACCESSORY BEING ANCHORED OR FROM COMPATIBLE, NONCORROSIVE METAL.
 - E. SEAMS: FABRICATE NONMOVING SEAMS WITH FLAT-LOCK SEAMS. FORM SEAMS AND SEAL WITH ELASTOMERIC SEALANT UNLESS OTHERWISE RECOMMENDED BY SEALANT MANUFACTURER FOR INTENDED USE.
9. **STEEP-SLOPE ROOF SHEET METAL FABRICATIONS**
 - A. APRON, STEP, CRICKET, AND BACKER FLASHING: FABRICATE FROM THE FOLLOWING MATERIALS:
 - ALUMINUM-ZINC ALLOY-COATED STEEL: 0.022 INCH THICK.
 - DRIP EDGES: FABRICATE FROM THE FOLLOWING MATERIALS
 - ALUMINUM-ZINC ALLOY-COATED STEEL: 0.022 INCH THICK.
 - EAVE, RAKE, RIDGE, AND HIP FLASHING: FABRICATE FROM THE FOLLOWING MATERIALS:
 - ALUMINUM-ZINC ALLOY-COATED STEEL: 0.022 INCH THICK.
10. **WALL SHEET METAL FABRICATIONS**
 - A. OPENING FLASHINGS IN FRAME CONSTRUCTION: FABRICATE HEAD, SILL, JAMB AND SIMILAR FLASHINGS TO EXTEND 4 INCHES BEYOND WALL OPENINGS. FORM HEAD AND SILL FLASHING WITH 2-INCH- HIGH, END DAMS. FABRICATE FROM THE FOLLOWING MATERIALS:
 - ALUMINUM-ZINC ALLOY-COATED STEEL: 0.022 INCH THICK.
11. **UNDERLAYMENT INSTALLATION**
 - A. SELF-ADHERING SHEET UNDERLAYMENT: INSTALL SELF-ADHERING SHEET UNDERLAYMENT, WRINKLE FREE. COMPLY WITH TEMPERATURE RESTRICTIONS OF UNDERLAYMENT MANUFACTURER FOR INSTALLATION; USE PRIMER RATHER THAN NAILS FOR INSTALLING UNDERLAYMENT AT LOW TEMPERATURES. APPLY IN SHINGLE FASHION TO SHED WATER, WITH END LAPS OF NOT LESS THAN 6 INCHES STAGGERED 24 INCHES BETWEEN COURSES. OVERLAP SIDE EDGES NOT LESS THAN 3-1/2 INCHES. ROLL LAPS WITH ROLLER. COVER UNDERLAYMENT WITHIN 14 DAYS.
12. **INSTALLATION, GENERAL**
 - A. GENERAL: ANCHOR SHEET METAL FLASHING AND TRIM AND OTHER COMPONENTS OF THE WORK SECURELY IN PLACE, WITH PROVISIONS FOR THERMAL AND STRUCTURAL MOVEMENT SO THAT COMPLETED SHEET METAL FLASHING AND TRIM SHALL NOT RATTLE, LEAK, OR LOOSEN, AND SHALL REMAIN WATERTIGHT. USE FASTENERS, SOLDER, WELDING RODS, PROTECTIVE COATINGS, SEPARATORS, SEALANTS, AND OTHER MISCELLANEOUS ITEMS AS REQUIRED TO COMPLETE SHEET METAL FLASHING AND TRIM SYSTEM.
 - B. INSTALL SHEET METAL FLASHING AND TRIM TRUE TO LINE AND LEVELS INDICATED. PROVIDE UNIFORM, NEAT SEAMS WITH MINIMUM EXPOSURE OF SOLDER, WELDS, AND SEALANT.
 - C. INSTALL SHEET METAL FLASHING AND TRIM TO FIT SUBSTRATES AND TO RESULT IN WATERTIGHT PERFORMANCE. VERIFY SHAPES AND DIMENSIONS OF SURFACES TO BE COVERED BEFORE FABRICATING SHEET METAL.
 - D. SPACE CLEATS NOT MORE THAN 12 INCHES APART. ANCHOR EACH CLEAT WITH TWO FASTENERS. BEND TABS OVER FASTENERS.
 - E. INSTALL EXPOSED SHEET METAL FLASHING AND TRIM WITHOUT EXCESSIVE OIL CANNING, BUCKLING, AND TOOL MARKS.
 - F. INSTALL SEALANT TAPE WHERE INDICATED.
 - G. TORCH CUTTING OF SHEET METAL FLASHING AND TRIM IS NOT PERMITTED.
 - H. METAL PROTECTION: WHERE DISSIMILAR METALS WILL CONTACT EACH OTHER OR CORROSIVE SUBSTRATES, PROTECT AGAINST GALVANIC ACTION BY PAINTING CONTACT SURFACES WITH BITUMINOUS COATING OR BY OTHER PERMANENT SEPARATION AS RECOMMENDED BY SMACNA.
 - COAT BACK SIDE OF UNCOATED ALUMINUM AND STAINLESS-STEEL SHEET METAL FLASHING AND TRIM WITH BITUMINOUS COATING WHERE FLASHING AND TRIM WILL CONTACT WOOD, FERROUS METAL, OR CEMENTITIOUS CONSTRUCTION.
13. **UNDERLAYMENT:** WHERE INSTALLING METAL FLASHING DIRECTLY ON CEMENTITIOUS OR WOOD SUBSTRATES, INSTALL A COURSE OF FELT UNDERLAYMENT AND COVER WITH A SLIP SHEET OR INSTALL A COURSE OF POLYETHYLENE SHEET.
 - A. EXPANSION PROVISIONS: PROVIDE FOR THERMAL EXPANSION OF EXPOSED FLASHING AND TRIM.
 - B. FASTENER SIZES: USE FASTENERS OF SIZES THAT WILL PENETRATE WOOD SHEATHING NOT LESS THAN 1-1/4 INCHES FOR NAILS AND NOT LESS THAN 3/4 INCH FOR WOOD SCREWS.
 - C. SEAL JOINTS AS SHOWN AND AS REQUIRED FOR WATERTIGHT CONSTRUCTION.
14. **ROOF FLASHING INSTALLATION**
 - A. PIPE OR POST COUNTERFLASHING: INSTALL COUNTERFLASHING UMBRELLA WITH CLOSE-FITTING COLLAR WITH TOP EDGE FLARED FOR ELASTOMERIC SEALANT, EXTENDING A MINIMUM OF 4 INCHES OVER BASE FLASHING. INSTALL STAINLESS-STEEL DRAW BAND AND TIGHTEN.
 - B. ROOF-PENETRATION FLASHING: COORDINATE INSTALLATION OF ROOF-PENETRATION FLASHING WITH INSTALLATION OF ROOFING AND OTHER ITEMS PENETRATING ROOF. SEAL WITH ELASTOMERIC SEALANT AND CLAMP FLASHING TO PIPES THAT PENETRATE ROOF.
15. **WALL FLASHING INSTALLATION**
 - A. GENERAL: INSTALL SHEET METAL WALL FLASHING TO INTERCEPT AND EXCLUDE PENETRATING MOISTURE ACCORDING TO SMACNA RECOMMENDATIONS AND AS INDICATED. COORDINATE INSTALLATION OF WALL FLASHING WITH INSTALLATION OF WALL-OPENING COMPONENTS SUCH AS WINDOWS, DOORS, AND LOUVERS.
 - B. OPENING FLASHINGS IN FRAME CONSTRUCTION: INSTALL CONTINUOUS HEAD, SILL, JAMB, AND SIMILAR FLASHINGS TO EXTEND 4 INCHES BEYOND WALL OPENINGS.
16. **CLEANING AND PROTECTION**
 - A. CLEAN EXPOSED METAL SURFACES OF SUBSTANCES THAT INTERFERE WITH UNIFORM OXIDATION AND WEATHERING.
 - B. REMOVE TEMPORARY PROTECTIVE COVERINGS AND STRIPPABLE FILMS AS SHEET METAL FLASHING AND TRIM ARE INSTALLED UNLESS OTHERWISE INDICATED IN MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS.

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DESIGNED: B FARISS-BATEMAN	PROJECT MANAGER:	SCALE: NONE
DRAWN: B FARISS-BATEMAN	APPROVED:	SITE LOCATION NO:
CHECKED: J DAVIS	PROJECT NO:	ONE INCH AT FULL SIZE
RECOMMENDED: D CRIPPEN	WORK REQUEST: CONTRACT NO:	1" SCALE IF NOT ONE INCH, SCALE ACCORDINGLY



METRO TRANSIT DIVISION
 STANDARD SINGLE-UNIT DRIVER'S COMFORT STATION
 FOR CONSTRUCTION WITHIN A NEW BUILDING

SHEET METAL FLASHING & TRIM SPECIFICATION

DATE: SEPTEMBER 2013
DRAWING NO: A7.05
SHEET NO. OF 8 14

DOOR HARDWARE SPECIFICATION 087100

1. PERFORMANCE CRITERIA

- A. DOOR LOCK SETS:
- SHALL BE IN CONFORMANCE WITH LOCAL, STATE, NATIONAL AND INTERNATIONAL ACCESSIBILITY CODES.
 - SHALL HAVE THE CORE PIN SETTING CONFIGURED TO STOP STANDARD SYSTEM KEY ENTRY WHILE LOCKED FROM THE INSIDE.
 - SHALL BE PROVIDED WITH AN EMERGENCY ACCESS MASTER KEY.

2. ACTION SUBMITTALS

- A. DOOR HARDWARE SETS: SHALL CONFORM TO THE REQUIREMENTS OF KING COUNTY METRO TRANSIT, AND SHALL BE AS APPROVED BY THE KING COUNTY PROJECT REPRESENTATIVE.
- B. KEYING SCHEDULE: UPON COMPLETION OF PROJECT, CORE OF KEY HARDWARE WILL BE REPLACED WITH THAT COMPATIBLE WITH KING COUNTY'S KEYING SYSTEM.

2. DELIVERY, STORAGE, AND HANDLING

- A. DELIVER KEYS TO KING COUNTY PROJECT REPRESENTATIVE.

3. WARRANTY

- A. SPECIAL WARRANTY: MANUFACTURER'S STANDARD FORM IN WHICH MANUFACTURER AGREES TO REPAIR OR REPLACE COMPONENTS OF DOOR HARDWARE THAT FAIL IN MATERIALS OR WORKMANSHIP WITHIN SPECIFIED WARRANTY PERIOD: THREE YEARS FROM DATE OF SUBSTANTIAL COMPLETION, EXCEPT AS FOLLOWS:
- EXIT DEVICES: TWO YEARS FROM DATE OF SUBSTANTIAL COMPLETION.
 - MANUAL CLOSERS: 10 YEARS FROM DATE OF SUBSTANTIAL COMPLETION.

4. SCHEDULED DOOR HARDWARE

- A. DOOR HARDWARE SET SHALL HAVE THE FOLLOWING:
- HINGES (3)
 - TYPE: EXTERIOR FIXED.
 - DOOR CLOSER (1)
 - LOCKSET (1)
 - TYPE: SECURITY, LEVER-TYPE, WITH INTERCHANGEABLE CORE.
 - GENERAL: LOCKSET CONFIGURATION SHALL COMPLY WITH GOVERNING ACCESSIBILITY AND LIFE SAFETY CODES WHILE PREVENTING ENTRY BY TRANSIT SYSTEM KEY WHILE OCCUPIED.
 - FLUSH BOLT (1)
 - KICK PLATE (1)
 - THRESHOLD (1)
 - JAMB SEALS (1 SET)
 - SILL SEAL (1)
 - DRIP SEAL (1)
 - PEEP HOLE (1)
- B. FINISH SHALL BE US26D, SATIN CHROME PLATED (BHMA 626).

5. HINGES, GENERAL

- A. TEMPLATE REQUIREMENTS: PROVIDE ONLY TEMPLATE-PRODUCED UNITS.
- B. HINGE BASE METAL: PROVIDE EXTERIOR HINGES: STAINLESS STEEL, WITH STAINLESS-STEEL PIN.
- C. NONREMOVABLE PINS: PROVIDE SET SCREW IN HINGE BARREL THAT, WHEN TIGHTENED INTO A GROOVE IN HINGE PIN, PREVENTS REMOVAL OF PIN WHILE DOOR IS CLOSED; FOR OUTSWINGING EXTERIOR DOORS.
- D. FASTENERS SHALL COMPLY WITH THE FOLLOWING:
- MACHINE SCREWS: FOR METAL DOORS AND FRAMES. INSTALL INTO DRILLED AND TAPPED HOLES.

- SCREWS: PHILLIPS FLAT-HEAD; MACHINE SCREWS (DRILLED AND TAPPED HOLES) FOR METAL DOORS. FINISH SCREW HEADS TO MATCH SURFACE OF HINGES.

6. HINGES

- A. BUTTS AND HINGES: BHMA A156.1.
- B. TEMPLATE HINGE DIMENSIONS: BHMA A156.7.
- C. MANUFACTURERS:
- MCKINNEY PRODUCTS COMPANY; AN ASSA ABLOY GROUP COMPANY (MCK).
 - PBB, INC. (PBB).
 - STANLEY COMMERCIAL HARDWARE; DIV. OF THE STANLEY WORKS (STH).

7. LOCKS AND LATCHES, GENERAL

- A. DOOR HARDWARE MUST BE ACCESSIBLE PER IBC CHAPTER 11 AND BE IN COMPLIANCE WITH IBC CHAPTER 10.
- B. PROVIDE OPERATING DEVICES THAT DO NOT REQUIRE TIGHT GRASPING, PINCHING, OR TWISTING OF THE WRIST AND THAT OPERATE WITH A FORCE OF NOT MORE THAN 5 LBF.
- C. MANUALLY OPERATED FLUSH OR SURFACE BOLTS ARE NOT ALLOWED. UNLATCHING SHALL NOT REQUIRE MORE THAN ONE RELEASING OPERATION TO OPERATE DOOR.
- D. LOCK TRIM:
- LEVERS: AS APPROVED BY KING COUNTY PROJECT REPRESENTATIVE. COMPLY WITH THE REQUIREMENTS OF METRO FACILITIES COMFORT STATION PROGRAM.
- C. DUMMY TRIM: MATCH LEVER LOCK TRIM AND ESCUTCHEONS.
- D. BACKSET: 2-3/4 INCHES, UNLESS OTHERWISE INDICATED.
- E. STRIKES: MANUFACTURER'S STANDARD STRIKE WITH STRIKE BOX FOR EACH LATCHBOLT OR LOCK BOLT, WITH CURVED LIP EXTENDED TO PROTECT FRAME, FINISHED TO MATCH DOOR HARDWARE SET.

8. MECHANICAL LOCKS AND LATCHES: COMPLY WITH THE FOLLOWING:

- A. BORED LOCKS: BHMA A156.2, GRADE 1; SERIES 4000.
- PREFERRED STANDARD CORBIN RUSSWIN/ASSA ABLOY TO MATCH EXISTING LOCK/KEY SYSTEM WITHIN METRO TRANSIT.
 - LOCKS SHALL REQUIRE USE OF A KEY ON THE EXTERIOR FOR OPERATION.
 - COMPLY WITH LOCKS AND LATCHES, GENERAL; BOLT MECHANISM, KEYING AND OPERATING TRIM REQUIREMENTS.
- B. MANUFACTURERS:
- CORBIN RUSSWIN ARCHITECTURAL HARDWARE; AN ASSA ABLOY GROUP COMPANY (CR).
- C. BASIS OF DESIGN:
- MORTISE LOCKSET: CORBIN RUSSWIN ML2029 WITH HOTEL FUNCTION AND 6-PIN INTERCHANGEABLE CORE.

10. LOCK CYLINDERS

- A. STANDARD LOCK CYLINDERS: BHMA A156.5.
- B. PERMANENT CORES: MANUFACTURER'S STANDARD; FINISH FACE TO MATCH LOCKSET; WITH INTERCHANGEABLE CORES.
- C. CONSTRUCTION KEYING, CONSTRUCTION CORES:
- PROVIDE CONSTRUCTION CORES THAT ARE REPLACEABLE BY PERMANENT CORES. PROVIDE 10 CONSTRUCTION MASTER KEYS.
 - FURNISH PERMANENT CORES TO KING COUNTY PROJECT REPRESENTATIVE FOR INSTALLATION.
- D. MANUFACTURER: SAME AS FOR LOCKS AND LATCHES.
- E. BASIS OF DESIGN: CORBIN RUSSWIN ARCHITECTURAL HARDWARE; AN ASSA ABLOY

GROUP COMPANY (CR).

11. KEYING

- A. KEYING SYSTEM: FACTORY REGISTERED, COMPLYING WITH GUIDELINES IN BHMA A156.28, APPENDIX A.
- B. EXISTING SYSTEM: MASTER KEY OR GRAND MASTER KEY LOCKS TO KING COUNTY METRO TRANSIT'S EXISTING SYSTEM.

12. OPERATING TRIM

- A. STANDARD: BHMA A156.6.
- B. MATERIALS: STAINLESS STEEL.
- C. BASIS OF DESIGN: CORBIN RUSSWIN/ASSA ABLOY
- ML 2062 'INTRUDER DEADBOLT' WITH PRIVACY INDICATOR.
 - LEVER & ESCUTCHEON: WROUGHT STAINLESS STEEL.
- D. ACCEPTABLE MANUFACTURERS:
- CORBIN RUSSWIN/ASSA ABLOY
 - AHI HARDWARE.
- E. COMPLY WITH LOCKS AND LATCHES, GENERAL; MECHANICAL LOCKS AND LATCHES, KEYING AND BOLT MECHANISM REQUIREMENTS.

13. CLOSERS

- A. DOOR CLOSERS FOR MEANS OF EGRESS DOORS: COMPLY WITH NFPA 101. DOOR CLOSERS SHALL NOT REQUIRE MORE THAN 30 LBF TO SET DOOR IN MOTION AND NOT MORE THAN 15 LBF TO OPEN DOOR TO MINIMUM REQUIRED WIDTH.
- B. CONCEALED CLOSERS: BHMA A156.4
- C. ACCEPTABLE MANUFACTURERS:
- LCN CLOSERS; AN INGERSOLL-RAND COMPANY (LCN).

14. STOPS AND HOLDERS

- A. PROVIDE WALL STOP: BHMA A156.16.
- B. ACCEPTABLE MANUFACTURERS:
- SARGENT MANUFACTURING COMPANY; AN ASSA ABLOY GROUP COMPANY (SGT).
 - STANLEY COMMERCIAL HARDWARE; DIV. OF THE STANLEY WORKS (STH).
 - TRIMCO (TBM).

15. DOOR GASKETING

- A. STANDARD: BHMA A156.22.
- B. GENERAL: PROVIDE CONTINUOUS WEATHER-STRIP GASKETING AND NONCORROSIVE FASTENERS.
- PERIMETER GASKETING: APPLY TO HEAD AND JAMB, FORMING SEAL BETWEEN DOOR AND FRAME.
 - DOOR BOTTOM: APPLY TO BOTTOM OF DOOR, FORMING SEAL WITH THRESHOLD WHEN DOOR IS CLOSED.
 - REPLACEABLE SEAL STRIPS: PROVIDE ONLY THOSE UNITS WHERE RESILIENT OR FLEXIBLE SEAL STRIPS ARE EASILY REPLACEABLE AND READILY AVAILABLE FROM STOCKS MAINTAINED BY MANUFACTURER.
 - GASKETING MATERIALS: ASTM D 2000 AND AAMA 701/702.
- C. MANUFACTURERS:
- PEMCO MANUFACTURING CO. (PEM).
 - REESE ENTERPRISES (RE).
 - ZERO INTERNATIONAL (ZRO).

16. THRESHOLDS

- A. STANDARD: BHMA A156.21.
- B. ACCESSIBILITY REQUIREMENTS: BEVEL RAISED THRESHOLDS WITH A SLOPE OF NOT MORE THAN 1:2. PROVIDE THRESHOLDS NOT MORE THAN 1/2 INCH HIGH.
- C. ACCEPTABLE MANUFACTURERS:
- PEMCO MANUFACTURING CO. (PEM).

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CHECKED: J DAVIS	PROJECT NO:	ONE INCH AT FULL SIZE
RECOMMENDED: D CRIPPEN	WORK REQUEST: CONTRACT NO:	1" IF NOT ONE INCH, SCALE ACCORDINGLY



METRO TRANSIT DIVISION
STANDARD SINGLE-UNIT DRIVER'S COMFORT STATION
FOR CONSTRUCTION WITHIN A NEW BUILDING

DOOR HARDWARE SPECIFICATION

DATE: SEPTEMBER 2013
DRAWING NO: A7.06
SHEET NO. OF 9 14

FIBERGLASS REINFORCED PLASTIC PANELS SPECIFICATION 097700

1. THIS SECTION INCLUDES THE FOLLOWING:
 - A. FIBERGLASS REINFORCED PLASTIC WALL AND CEILING PANELS.
 - B. SIZE: 48 BY 96 INCHES.
 - INSTALLED THICKNESS, INCLUDING 5/16" PLYWOOD BACKING: 3/8".
 - COLOR AND TEXTURE: WHITE, CLASS A SMOOTH.
 - C. APPROVED EQUAL.
 - D. INSTALLATION
 - A. INSTALL USING METHODS AND MATERIALS RECOMMENDED IN WRITING BY MANUFACTURER.
2. QUALITY ASSURANCE
 - A. FIRE-TEST-RESPONSE CHARACTERISTICS: PROVIDE IMPACT-RESISTANT, UNITS WITH SURFACE-BURNING CHARACTERISTICS AS DETERMINED BY TESTING IDENTICAL PRODUCTS PER ASTM E 84, NFPA 255, OR UL 723 BY UL OR ANOTHER TESTING AND INSPECTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.
 - B. IMPACT RESISTANCE CHARACTERISTICS: ASTM D2583 AND ASTM D5420.
3. DELIVERY, STORAGE, AND HANDLING
 - A. COMPLY WITH MANUFACTURER'S INSTRUCTIONS FOR STORAGE AND HANDLING.
4. WARRANTY
 - A. SPECIAL WARRANTY: MANUFACTURER'S STANDARD FORM IN WHICH MANUFACTURER AGREES TO REPAIR OR REPLACE COMPONENTS OF FIBERGLASS REINFORCED PANELS THAT FAIL IN MATERIALS OR WORKMANSHIP WITHIN SPECIFIED WARRANTY PERIOD.
 - WARRANTY PERIOD: FIVE YEARS FROM DATE OF SUBSTANTIAL COMPLETION.
5. MANUFACTURERS
 - A. IN OTHER PART 2 ARTICLES WHERE TITLES BELOW INTRODUCE LISTS, THE FOLLOWING REQUIREMENTS APPLY TO PRODUCT SELECTION:
 - AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, MANUFACTURERS SPECIFIED.
6. MATERIALS
 - A. GENERAL: PROVIDE ALL MATERIALS REQUIRED FOR COMPLETE INSTALLATION IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
 - B. FIBERGLASS-REINFORCED PLASTIC WALL AND CEILING PANELS:
 - SURFACE: SMOOTH.
 - TYPE: CLASS A.
 - COLOR: WHITE.
 - C. ADHESIVE: TYPE RECOMMENDED BY MANUFACTURER FOR USE WITH MATERIAL BEING ADHERED TO SUBSTRATE INDICATED.
 - USE ADHESIVES AND SEALANTS THAT COMPLY WITH THE FOLLOWING LIMITS FOR VOC CONTENT WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24):
 - a. GYPSUM BOARD AND PANEL ADHESIVES: 50 G/L.
 - b. MULTIPURPOSE CONSTRUCTION ADHESIVES: 70 G/L.
 - c. CONTACT ADHESIVE: 80 G/L.
7. FIBERGLASS REINFORCED WALL AND CEILING PANELS
 - A. SEMIRIGID, IMPACT-RESISTANT SHEET WALL COVERING: FABRICATED FROM PLASTIC SHEET WALL COVERING MATERIAL.
 - BASIS-OF-DESIGN PRODUCT: CRANE COMPOSITES, KEMLITE GLASBORD® FRP, WITH SURFASEAL® FINISH.
 - OR COMPARABLE PRODUCT BY ONE OF THE FOLLOWING MANUFACTURERS:
 - a. ALLIED BUILDING PRODUCTS CORP. DBA CHICAGO METALLIC
 - b. COOK CONSTRUCTION SPECIALTIES, INC.
 - c. CRANE COMPOSITES.

PAINTING SPECIFICATION 099100

1. THIS SECTION INCLUDES SURFACE PREPARATION AND THE APPLICATION OF PAINT SYSTEMS ON THE FOLLOWING EXTERIOR AND INTERIOR SUBSTRATES:
 - A. CONCRETE.
 - B. STEEL.
 - C. GALVANIZED METAL.
2. QUALITY ASSURANCE
 - A. MPI STANDARDS:
 - PRODUCTS: COMPLYING WITH MPI STANDARDS INDICATED AND LISTED IN "MPI APPROVED PRODUCTS LIST."
 - PREPARATION AND WORKMANSHIP: COMPLY WITH REQUIREMENTS IN "MPI ARCHITECTURAL PAINTING SPECIFICATION MANUAL" FOR PRODUCTS AND PAINT SYSTEMS INDICATED.
3. PAINT, GENERAL
 - A. MATERIAL COMPATIBILITY:
 - PROVIDE MATERIALS FOR USE WITHIN EACH PAINT SYSTEM THAT ARE COMPATIBLE WITH ONE ANOTHER AND SUBSTRATES INDICATED, UNDER CONDITIONS OF SERVICE AND APPLICATION AS DEMONSTRATED BY MANUFACTURER, BASED ON TESTING AND FIELD EXPERIENCE.
 - FOR EACH COAT IN A PAINT SYSTEM, PROVIDE PRODUCTS RECOMMENDED IN WRITING BY MANUFACTURERS OF TOPCOAT FOR USE IN PAINT SYSTEM AND ON SUBSTRATE INDICATED.
 - B. COLORS:
 - DOOR: GRAY, AS SELECTED FROM MANUFACTURER'S FULL RANGE AND APPROVED BY THE KING COUNTY PROJECT REPRESENTATIVE.
 - ROOF: GRAY, AS SELECTED FROM MANUFACTURER'S FULL RANGE AND APPROVED BY THE KING COUNTY PROJECT REPRESENTATIVE.
 - SIDING & TRIM: AS SELECTED FROM MANUFACTURER'S FULL RANGE AND APPROVED BY THE KING COUNTY PROJECT REPRESENTATIVE.
 - C. MANUFACTURERS
 - PPG ARCHITECTURAL FINISHES
 - RODDA PAINT
 - VISTA PAINT
 - OR EQUAL.
4. METAL PRIMERS
 - A. QUICK-DRYING ALKYD METAL PRIMER: MPI #76.
 - VOC CONTENT: E RANGE OF E2.
5. QUICK-DRYING ENAMELS
 - A. QUICK-DRYING ENAMEL (SEMIGLOSS): MPI #81 (GLOSS LEVEL 5).
 - VOC CONTENT: E RANGE OF E2.
6. FLOOR COATING
 - A. TWO-PART EPOXY COATING SYSTEM.
 - VOC CONTENT: MAXIMUM E RANGE OF E2.
7. EXAMINATION
 - A. EXAMINE SUBSTRATES AND CONDITIONS, WITH APPLICATOR PRESENT, FOR COMPLIANCE WITH REQUIREMENTS FOR MAXIMUM MOISTURE CONTENT AND OTHER CONDITIONS AFFECTING PERFORMANCE OF WORK.
 - B. MAXIMUM MOISTURE CONTENT OF SUBSTRATES: WHEN MEASURED WITH AN ELECTRONIC MOISTURE METER AS FOLLOWS:
 - CONCRETE: 12 PERCENT.
8. PREPARATION AND APPLICATION
 - A. COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS AND RECOMMENDATIONS IN "MPI ARCHITECTURAL PAINTING SPECIFICATION MANUAL" APPLICABLE TO SUBSTRATES AND PAINT SYSTEMS INDICATED.
 - B. CLEAN SUBSTRATES OF SUBSTANCES THAT COULD IMPAIR BOND OF PAINTS, INCLUDING DIRT, OIL, GREASE, AND INCOMPATIBLE PAINTS AND ENCAPSULANTS.
 - REMOVE INCOMPATIBLE PRIMERS AND REPRIME SUBSTRATE WITH COMPATIBLE PRIMERS AS REQUIRED TO PRODUCE PAINT SYSTEMS INDICATED.
 - C. APPLY PAINTS TO PRODUCE SURFACE FILMS WITHOUT CLOUDINESS, SPOTTING, HOLIDAYS, LAPS, BRUSH MARKS, ROLLER TRACKING, RUNS, SAGS, ROPINESS, OR OTHER SURFACE IMPERFECTIONS. CUT IN SHARP LINES AND COLOR BREAKS.
 - D. PROTECT WORK OF OTHER TRADES AGAINST DAMAGE FROM PAINT APPLICATION. CORRECT DAMAGE TO WORK OF OTHER TRADES BY CLEANING, REPAIRING, REPLACING, AND REFINISHING, AS APPROVED BY ARCHITECT, AND LEAVE IN AN UNDAMAGED CONDITION.
 - E. AT COMPLETION OF CONSTRUCTION ACTIVITIES OF OTHER TRADES, TOUCH UP AND RESTORE DAMAGED OR DEFACED PAINTED SURFACES.
9. EXTERIOR PAINTING SCHEDULE
 - A. STEEL SUBSTRATES:
 - QUICK-DRYING ENAMEL SYSTEM: MPI EXT 5.1A.
 - a. PRIME COAT: QUICK-DRYING ALKYD METAL PRIMER.
 - b. INTERMEDIATE COAT: QUICK-DRYING ENAMEL MATCHING TOPCOAT.
 - c. TOPCOAT: QUICK-DRYING ENAMEL SEMIGLOSS.
 - B. GALVANIZED-METAL SUBSTRATES:
 - AS DESCRIBED IN SECTION 076200 SHEET METAL FLASHING AND TRIM.
10. INTERIOR PAINTING SCHEDULE
 - A. CONCRETE FLOOR:
 - TWO-PART EPOXY ENAMEL, LOW GLOSS, MPI #108.
 - d. PRIME COAT & TOP COAT: COMEX INDUSTRIAL COATINGS 'E-4100 WATERBORNE EPOXY ENAMEL' OR APPROVED EQUAL.
- C. VERIFY SUITABILITY OF SUBSTRATES, INCLUDING SURFACE CONDITIONS AND COMPATIBILITY WITH EXISTING FINISHES AND PRIMERS.
- D. BEGIN COATING APPLICATION ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED AND SURFACES ARE DRY.
 - BEGINNING COATING APPLICATION CONSTITUTES CONTRACTOR'S ACCEPTANCE OF SUBSTRATES AND CONDITIONS.

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CHECKED: J DAVIS	PROJECT NO:	ONE INCH AT FULL SIZE
RECOMMENDED: D CRIPPEN	WORK REQUEST: CONTRACT NO:	1" SCALE IF NOT ONE INCH, SCALE ACCORDINGLY



METRO TRANSIT DIVISION
STANDARD SINGLE-UNIT DRIVER'S COMFORT STATION
FOR CONSTRUCTION WITHIN A NEW BUILDING

**FIBERGLASS REINFORCED
PLASTIC PANELS &
PAINTING SPECIFICATIONS**

DATE:
SEPTEMBER 2013

DRAWING NO:
A7.07

SHEET NO. OF:
10 14

DOUBLE WALL FOR PLUMBING. 2x4 METAL STUD INTERIOR WALL (OMIT 4" INTERIOR WALL AT 'A/S1.01 SIMILAR')

FINISH PER CONDITIONED BUILDING SPACE. SEE NOTE 1 & WEC NOTES ON A0.01 FOR WALL & CEILING INSULATION REQUIREMENTS

8" LIGHT GAGE STEEL "C" CHANNEL @ BASE OF WALL W/ (3) 1/2" STAINLESS STEEL ANCHOR BOLTS

1/2" Ø x 6" STAINLESS STEEL ANCHOR BOLT W/ STAINLESS FENDER WASHER (TYP - EACH END & CENTER OF WALL)

PRESSURE-TREATED WOOD SILL W/ SILL SEAL (TYP)

WALL & CEILING FINISH: SEE NOTE 2

TYPICAL SLAB CONSTRUCTION

PROVIDE CONTINUOUS CAULKING AT INTERSECTION OF 1 x 4 PLASTIC BOARD WALL BASE TO FLOOR.

ELECTRICAL GROUNDING SEE E1.01

#4 REBAR @ 12" OC

22" 6"

TYPICAL WALL CONSTRUCTION FOR FRAMED WALLS

SIMPSON HTT16 AT EACH CORNER AND AT EDGE OF WALL ADJACENT TO DOOR

5/8" Ø x 16" STAINLESS STEEL ANCHOR BOLT - TYPICAL AT EACH SIMPSON HTT16 HOLD-DOWN, AND AT CENTER OF WALL

3"x3"x3/8" GALVANIZED PLATE WASHER (TYP)

1/2" EXTERIOR GRADE PLYWOOD

R-10 RIGID INSULATION W/ FLASHING

1/2" CEMENT BOARD

PROVIDE FLASHING PER DETAIL 1/-

#4 REBAR CONTINUOUS SPLICE AT CORNERS W/ #4 (TYP)

STANDARD HOOK #5 REBAR CONTINUOUS

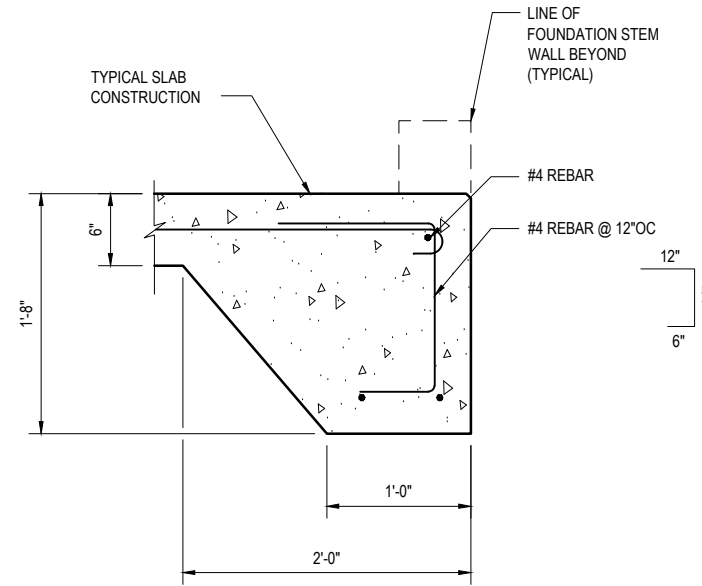
#4 REBAR @ 12" OC

#5 REBAR CONTINUOUS. SPLICE W/ #5 AT CORNERS (TYP)

#4 REBAR @ 12" OC EACH WAY

18" 6"

2'-6" 2'-6"



FOUNDATION AT DOOR OPENING

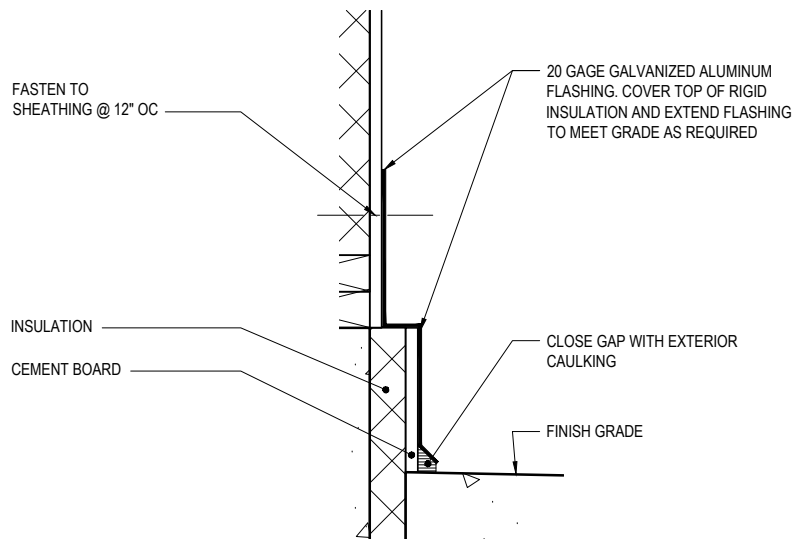
SECTION B
SCALE: 1-1/2"= 1'-0" A1.01

NOTES:

- INSULATION MUST COMPLY WITH WASHINGTON STATE ENERGY CODE REQUIREMENTS, DRAWING A0.01.
- FULL HEIGHT WALL AND CEILING FINISH:
 - REINFORCED FIBERGLASS PANEL SYSTEM BACKED BY
 - 1/2" FIBERGLASS-FACED WATERPROOF GWB: GEORGIA PACIFIC DENS-SHIELD OR EQUAL.
 STOP FINISH AT 5" ABOVE FINISH FLOOR WITH CONTINUOUS "J" CHANNEL.

FOUNDATION

SECTION A
SCALE: 1-1/2"= 1'-0" A1.01



FLASHING

DETAIL 1
SCALE: 3"= 1'-0"

TYPICAL WALL CONSTRUCTION:

HORIZONTAL BEVEL SIDING
15# BUILDING FELT
PLYWOOD SHEATHING (PER A/-)
2 1/2" RIGID INSULATION
2x6 WOOD STUDS @ 16" OC MAX
1/2" FIBERGLASS-FACED WATERPROOF GYPSUM WALL BOARD
REINFORCED FIBERGLASS PLASTIC PANEL.

NOTE:

- SEE DRAWINGS A7.02 & A7.03 FOR ROUGH LUMBER AND SHEATHING SPECIFICATIONS.

METAL CONSTRUCTION ALTERNATIVE:

METAL SILL CONSTRUCTION:

METAL "C" CHANNEL W/ SILL SEAL (TYP).
5.5CU 1.25x045 IN 6" WALL @ 16" OC MAX,
OR 8CU 1.25x045 IN 8" WALL @ 16" OC MAX.

METAL WALL CONSTRUCTION:

3/4" PLYWOOD
TOP PLATE METAL "C" CHANNEL TOP RAIL:
5.5CU 1.25x045 IN 6" WALL @ 16" OC MAX
8CU 1.25x045 IN 8" WALL @ 16" OC MAX.

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CHECKED: J DAVIS	PROJECT NO:	ONE INCH AT FULL SIZE
RECOMMENDED: D CRIPPEN	WORK REQUEST: CONTRACT NO:	1" IF NOT ONE INCH, SCALE ACCORDINGLY



METRO TRANSIT DIVISION
STANDARD SINGLE-UNIT DRIVER'S COMFORT STATION
FOR CONSTRUCTION WITHIN A NEW BUILDING

CONSTRUCTION DETAILS

DATE: SEPTEMBER 2013
DRAWING NO: S5.01
SHEET NO. OF 11 14

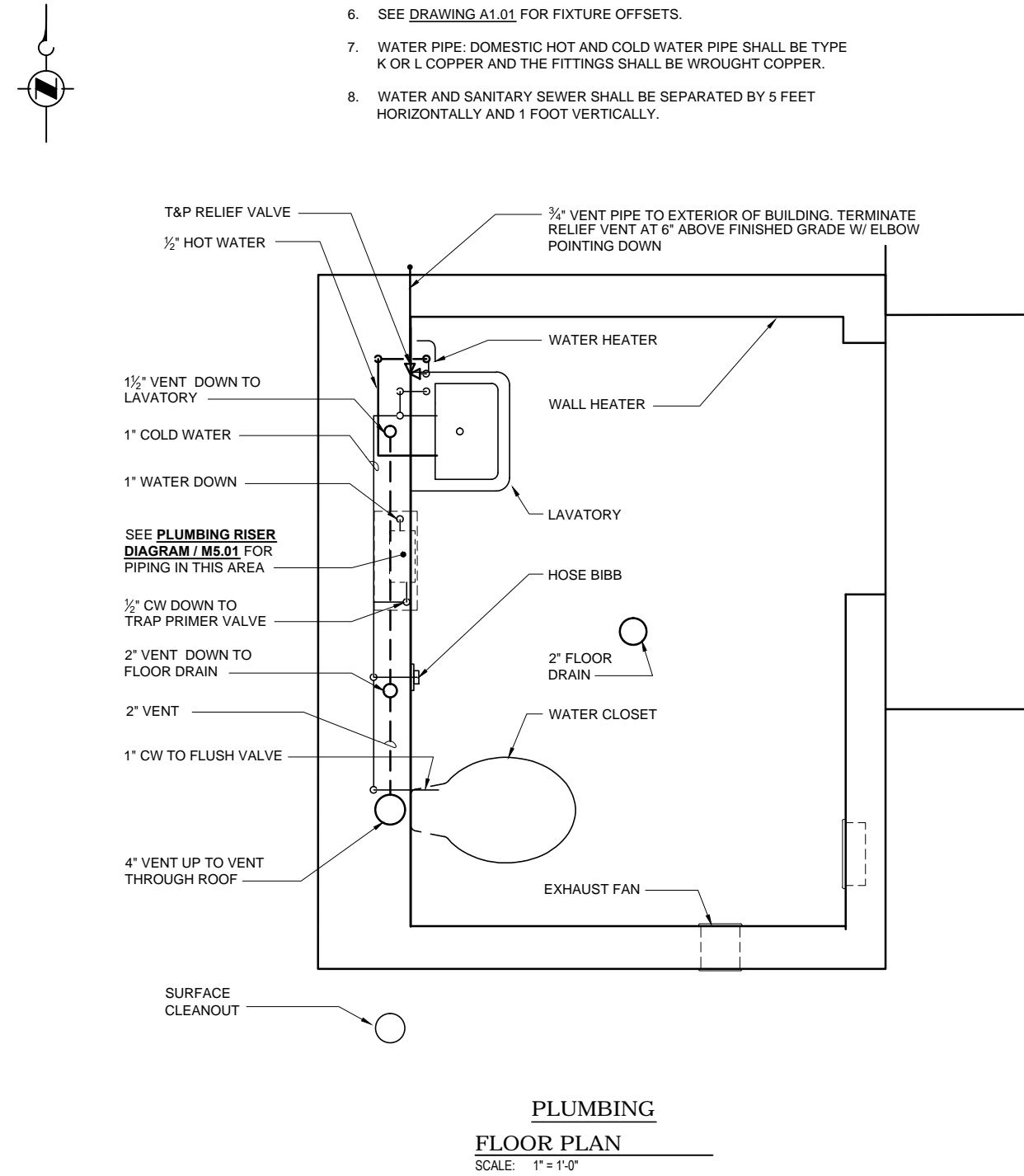
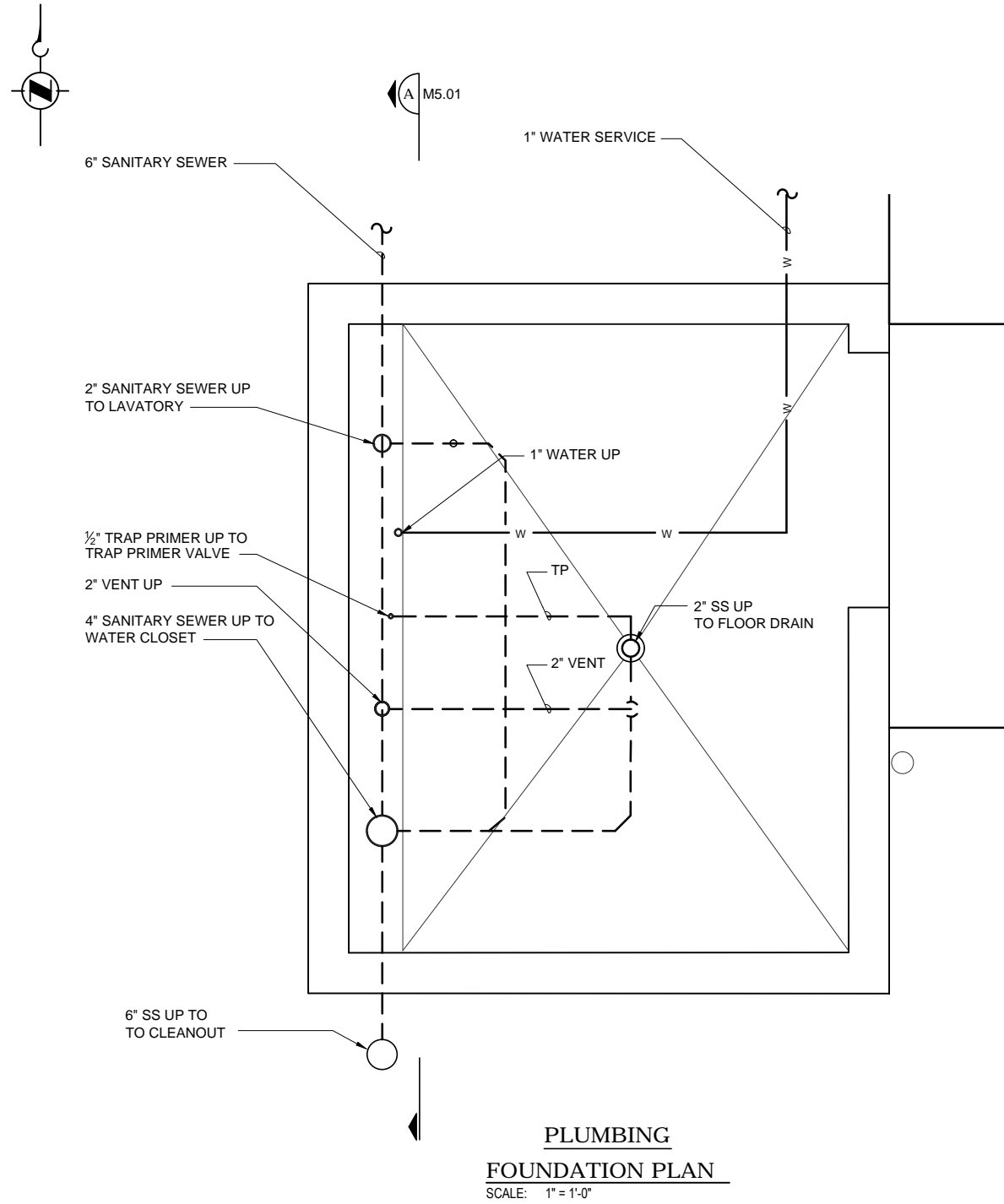
MECHANICAL EQUIPMENT SCHEDULE*

	CAPACITY	SIZE	DESCRIPTION
WATER HEATER	0.5 GPM	-	CHRONOMITE LABRATORIES INSTANT TEMP E-46-FLP-220
FORCED AIR FAN HEATER	65 CFM	-	Q-MARK CWH1202DS
EXHAUST FAN	180 CFM	8-INCH DIAMETER	BROAN MODEL #509

*SEE **DRAWING E1.01** FOR ELECTRICAL INFORMATION.

NOTES:

1. PROVIDE 1" PRESSURE RELIEF VALVE.
2. PROVIDE HOSE BIBB WITH VACUUM BREAKER.
3. PROVIDE TEMP AND PRESS RELIEF VALVE AT HOT WATER HEATER. EXTEND DISCHARGE THROUGH PLUMBING WALL TO THE OUTSIDE.
4. SEE **DRAWING E1.01** FOR NOTE REFERENCES ON ELECTRICAL APPLIANCES.
5. PROVIDE 2" FLOOR DRAIN WITH STRAINER.
6. SEE **DRAWING A1.01** FOR FIXTURE OFFSETS.
7. WATER PIPE: DOMESTIC HOT AND COLD WATER PIPE SHALL BE TYPE K OR L COPPER AND THE FITTINGS SHALL BE WROUGHT COPPER.
8. WATER AND SANITARY SEWER SHALL BE SEPARATED BY 5 FEET HORIZONTALLY AND 1 FOOT VERTICALLY.



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				12/2012

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J.BICKERSTAFF		
CHECKED:	PROJECT NO.:	ONE INCH AT FULL SIZE
J.ZAK		1"
RECOMMENDED:	WORK REQUEST:	IF NOT ONE INCH, SCALE ACCORDINGLY
D.CRIPPEN		

DESIGNED:	PROJECT MANAGER:	SCALE:
J.ZAK		AS NOTED
DRAWN:	APPROVED:	SITE LOCATION NO.:
J.BICKERSTAFF		
CHECKED:	PROJECT NO.:	ONE INCH AT FULL SIZE
J.ZAK		1"
RECOMMENDED:	WORK REQUEST:	IF NOT ONE INCH, SCALE ACCORDINGLY
D.CRIPPEN		

	METRO TRANSIT DIVISION STANDARD SINGLE-UNIT DRIVER'S COMFORT STATION FOR CONSTRUCTION WITHIN A NEW BUILDING	DATE: SEPTEMBER 2013
	PLUMBING PLANS	DRAWING NO: M1.01
		SHEET NO. OF 12 14

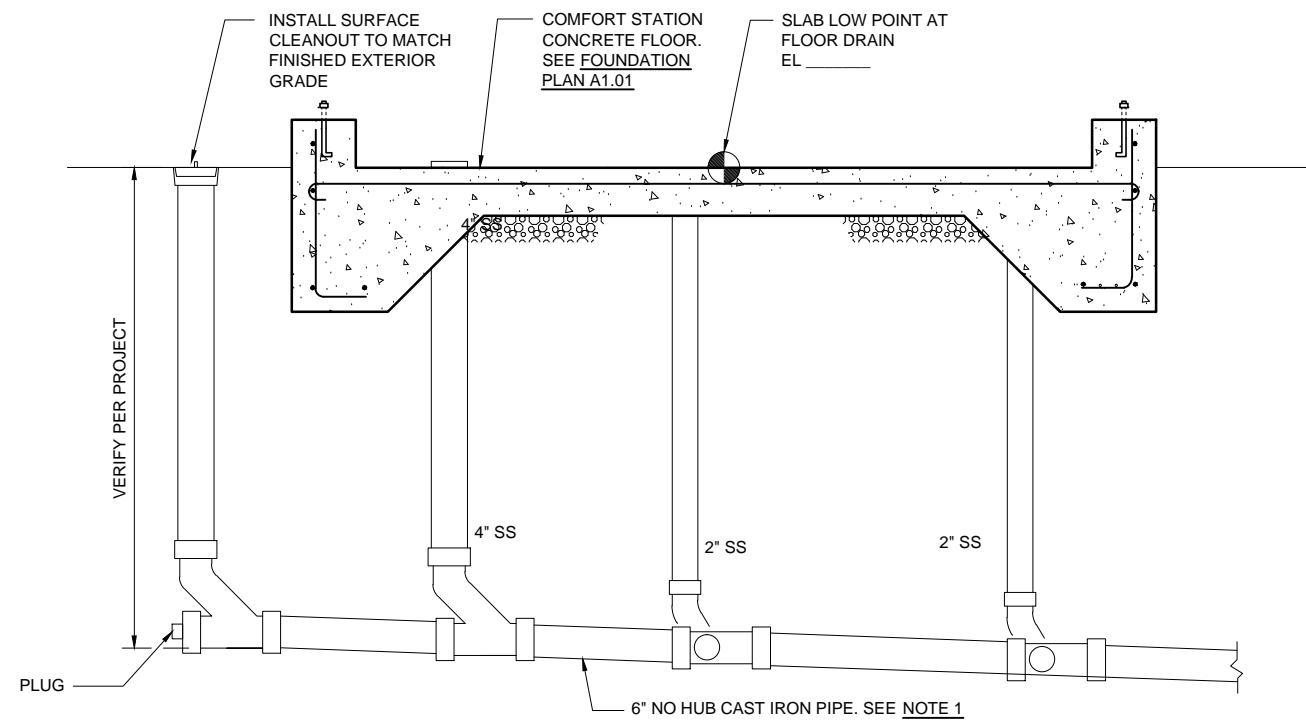
PLUMBING EQUIPMENT SCHEDULE

ITEM	MANUFACTURER	MODEL NUMBER	DIMENSIONS AND NOTES
TOILET SUPPORT, FLOOR-MOUNTED	COMPACT	0544FY	17.5" OVERALL HEIGHT. 3" MIN./8" MAX. TO CENTER OF WASTE PIPE FROM FINISH FLOOR
FLUSHMETER FLUSH VALVE	SLOAN ROYAL	111 (1.6 GPF)	GREATER THAN 11.5" ABOVE TOILET
PRESSURE REDUCING VALVE	WATTS REGULATOR	SERIES 25AUB-Z3	PER PIPE SIZE
FLOOR DRAIN	JR SMITH	2510 WITH INTEGRAL TRAP AND PRIMING CONNECTION	DESIGN BASIS: 2" DIAMETER
SHUT-OFF VALVE	1" GATE VALVE	-	-
HOSE BIBB	-	-	POLISHED CHROME WALL OUTLET WITH VACUUM BREAKER, REMOVABLE TEE KEY.
TRAP PRIMER VALVE	PPP	P-2	-
WATER HAMMER ARRESTOR	PPP, JOSAM, JR SMITH OR WADE	-	PER PIPE SIZE
PLUMBING VALVE BOX	-	FABRICATED	18" X 30" X 4". CONTRACTOR SHALL VERIFY SIZE TO FIT EQUIPMENT AND LOCATION PRIOR TO INSTALLATION. PROVIDE BLOCKING AS REQUIRED.
FAUCETS (NO STOPPER)	CHICAGO FAUCETS	895-317E36VPABCP	4" CENTERS

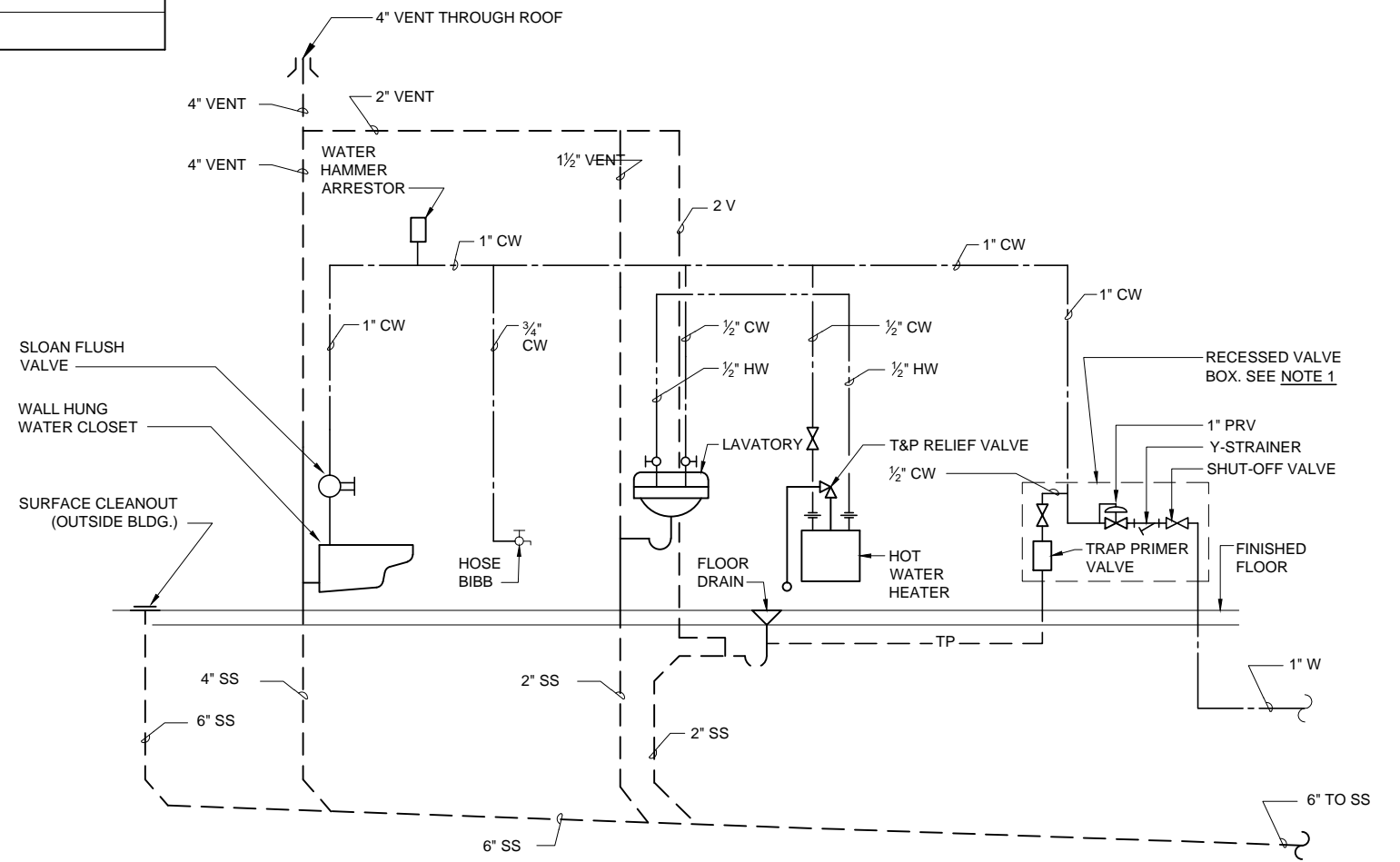
NOTE: SEE DRAWING A1.01 FOR WASHROOM FIXTURES SCHEDULE.

NOTES

- GRAVITY SANITARY WASTE AND VENT PIPING:
 - PIPE: CAST IRON SOIL PIPE WITH NO HUB ENDS, ASTM A888.
 - FITTINGS: CAST IRON, NO HUB
 - JOINTS: NO HUB COUPLINGS SHALL BE MADE OF HEAVY DUTY CORRUGATED ANSI 304 STAINLESS STEEL SHIELD WITH A MINIMUM OF TWO (2) HEAVY DUTY CLAMPS WITH ANSI 305 STAINLESS STEEL SCREWS. GASKETS SHALL BE ONE-PIECE MOLDED NEOPRENE, ASTM C564.
 - PIPING BELOW GROUND SHALL BE DOUBLE CLAMPED.



SEWER & CLEANOUT SECTION A SCALE: 1"=1'-0" M1.01




PLUMBING RISER DIAGRAM 1 SCALE: NONE M1.01

V:\Projects\Transit Properties\Comfort Stations\Standard Comfort Stations\2013 In-Building Single Unit Comfort Stations\2013 In-Building CS_M1.01-M5.01.dwg | Layout | M5.01
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No.	REVISION	BY	APPD	DATE

DESIGNED: J.ZAK	PROJECT MANAGER:	SCALE: AS NOTED
DRAWN: J.BICKERSTAFF	APPROVED:	SITE LOCATION NO:
CHECKED: J.ZAK	PROJECT NO:	ONE INCH AT FULL SIZE
RECOMMENDED: D.CRIPPEN	WORK REQUEST:	1"
	CONTRACT NO:	IF NOT ONE INCH, SCALE ACCORDINGLY



King County
Department of
Transportation

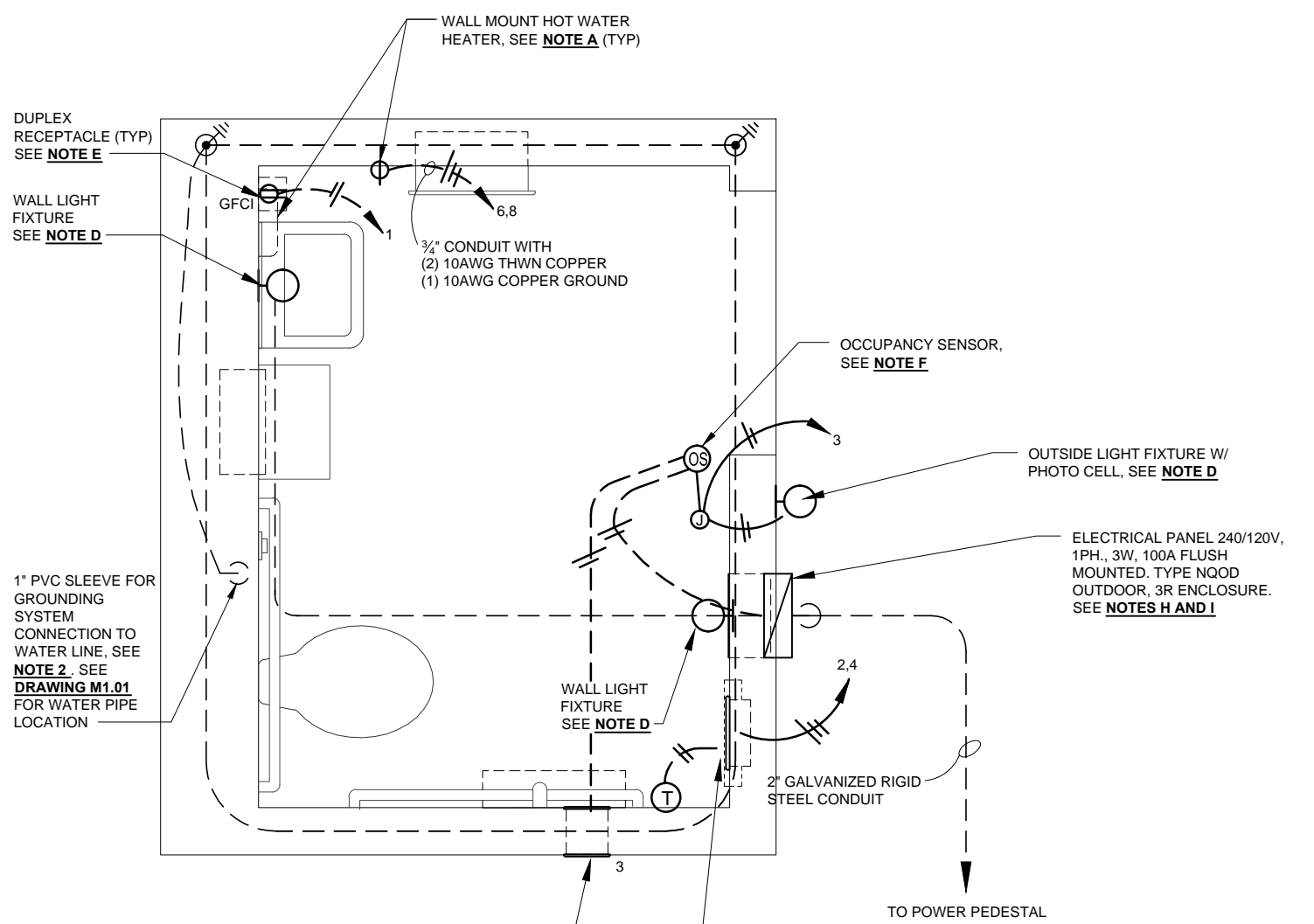
METRO TRANSIT DIVISION
STANDARD SINGLE-UNIT DRIVER'S COMFORT STATION
FOR CONSTRUCTION WITHIN A NEW BUILDING

**SECTION AND
PLUMBING RISER DIAGRAM**

DATE: SEPTEMBER 2013

DRAWING NO: M5.01

SHEET NO. OF 13 14



- LEGEND:**
- DUPLEX RECEPTACLE (GFCI)
 - SINGLE 30A RECEPTACLE
 - THERMOSTAT
 - WALL MOUNTED OCCUPANCY SENSOR SWITCH CONTROL
 - PHOTOCELL LIGHT CONTROLLER
 - ELECTRICAL SERVICE PANEL
 - ELECTRICAL GROUNDING ROD
 - LIGHT FIXTURE-WALL MOUNT CFL

SITE WORK NOTES:

1. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL LICENSES, PERMITS AND INSPECTIONS REQUIRED BY LAWS, ORDINANCES AND RULES GOVERNING WORK SPECIFIED HEREIN.
2. FURNISH AND INSTALL (2) 10' x 3/4". GROUNDING ELECTRODE CONDUCTOR TO THE SERVICE PANEL THROUGH 1" CONDUIT, GRS. STUB CONDUIT 6" ABOVE THE CONCRETE FLOOR (BELOW THE SERVICE PANEL LOCATION) AND PROVIDE 15' OF SLACK ON THE GROUNDING ELECTRODE CONDUCTOR FOR TERMINATION AT THE SERVICE PANEL GROUND LUG. PROVIDE ENOUGH ADDITIONAL #4 BARE COPPER 2" FROM THE BOTTOM OF THE CONCRETE SLAB TO. SEE CONCRETE ENCASED ELECTRODE NEC-250.52 (A) (3). ENCIRCLE THE STRUCTURE AS SHOWN. (APPROX. 50')
3. ALL WIRING SHALL BE IN EMT OR RIGID CONDUIT, WITH A MINIMUM OF 3/4" TRADE SIZES.
4. UNLESS SHOWN OTHERWISE, ALL WIRING SHALL BE 12AWG COPPER.

BUILDING ELECTRICAL CONSTRUCTION NOTES:

- A. THE WATER HEATER SHALL BE POWERED FROM A 30A GFI BREAKER THROUGH A DEDICATED SINGLE FLUSH MOUNTED RECEPTACLE.
- B. CONNECT REMOTE LINE VOLTAGE THERMOSTAT WHITE RODGERS MODEL 152-10.
- C. NOT USED.
- D. FURNISH AND INSTALL 120V, WALL MOUNTED SURFACE FLUORESCENT LIGHTING FIXTURES, (TYP 3) WEATHER PROOF 1 32W LAMP, UL WET RATED FOR INDOOR AND OUTDOOR USE, COOPER LIGHTING MODEL #CT-BW-PP-32-A-120-LLRP-USE OPTION PB-120V FOR OUTDOOR FIXTURE SEE DRAWING A2.02 FOR MOUNTING HEIGHT.
- E. ALL THE RECEPTACLES SHALL HAVE GFCI PROTECTION AND SHALL BE FLUSH MOUNTED 4'-6" ABOVE FINISHED FLOOR.
- F. FURNISH AND INSTALL DUAL TECHNOLOGY OCCUPANCY SENSOR SWITCHES FOR THE LIGHTS AND THE EXHAUST FANS. WATT STOPPER DW-100.
- G. FURNISH AND INSTALL COMPLETE ELECTRICAL SYSTEM PER PANEL SCHEDULE AND AS SHOWN.
- H. THE CONTRACTOR SHALL USE 2" "TRADE SIZE CONDUIT" COMING INTO THE COMFORT STATION FOR THE NEW 100A ELECTRICAL PANEL. CONDUIT SHALL BE GALVANIZED RIGID STEEL.
- I. THE CONTRACTOR SHALL INSTALL A NEW 100A, 120/240V ELECTRICAL PANEL WITH A 100A MAIN BREAKER.

PANEL NO.	MOUNTING: FLUSH <input checked="" type="checkbox"/> SURFACE <input type="checkbox"/>	BRANCH BREAKERS: PLUG IN <input type="checkbox"/> BOLT-ON <input checked="" type="checkbox"/>	PANEL LOCATION: COMFORT STATION STANDARD CONFIGURATION	PANEL TYPE: SE RATING	RATING: 120/240 VOLTS, 100A, 1Ø, 3W, G			
			FEEDERS: (3) #1 AWG THWN, (1) #6 AWG GND IN 2" CONDUIT	REF DWG NO.	MAIN BRKR: 100 SC RATING: 10KA RMS SYMM			
REV	DESCRIPTION & LOCATION	CIRC. BKR	BRKR AMPS	CT NO.	BRKR AMPS	CIRC. BKR	DESCRIPTION & LOCATION	REV
	RECEPTACLES, GFCI	1.5		1		2	WALL HEATER, BUILT IN 208V, 2000W	
	LIGHT FIXTURES/EXH FAN/OUTSIDE LIGHT		3	3		4		
				5		6	HOT WATER HEATER, TANKLESS (GFCI)	
				7		8		
				9		10		
				11		12		
				13		14		
				15		16		
				17		18		
				19		20		
	TOTALS:	1.5	3			29.4	29.4	
						TOTALS:	TOTALS: (ALL)	A 30.9 B 32.4

PANEL LOAD CALCULATIONS

LOAD TYPE	CONNECTED	DEMAND FACTOR	DEMAND
LIGHTS	.105 KVA	125%	.131 KVA
RECEPT	.180 KVA	100%	.180 KVA
MOTORS	.180 KVA	100%	.180 KVA
LARGEST	(.180 KVA)	25%	.045 KVA
SPACE HEATER	2.0 KVA	125%	2.50 KVA
WATER HEATER	4.6 KVA	125%	5.75 KVA
TOTAL	7.1 KVA		8.8 KVA
	CONNECTED AMPS		DEMAND AMPS
	29.6		36.7

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No.	REVISION	BY	APPD	DATE

DESIGNED: D MARABLE	PROJECT MANAGER: APPROVED:	SCALE: 1" = 1'-0"
CHECKED: C REYNOLDS	PROJECT NO.:	SITE LOCATION NO.:
RECOMMENDED: D CRIPPEN	WORK REQUEST: CONTRACT NO.:	ONE INCH AT FULL SIZE 1" IF NOT ONE INCH, SCALE ACCORDINGLY

King County
Department of
Transportation

METRO TRANSIT DIVISION
STANDARD SINGLE-UNIT DRIVER'S COMFORT STATION
FOR CONSTRUCTION WITHIN A NEW BUILDING

**ELECTRICAL PLAN AND
PANEL SCHEDULE**

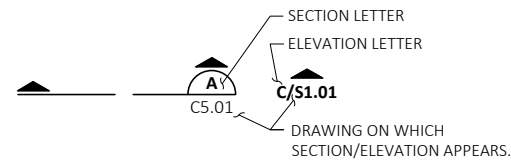
DATE:
SEPTEMBER 2013

DRAWING NO:
E1.01

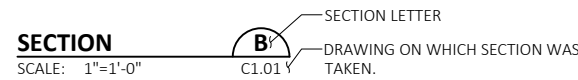
SHEET NO. OF
14 14

TYPICAL SECTION AND DETAIL REFERENCING SYSTEM

(1) THE SECTION IS CUT ON DRAWING A1.01:



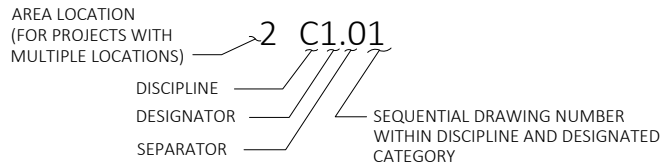
(2) ON DRAWING A105 THIS SECTION IS IDENTIFIED:



STANDARD SINGLE UNIT COMFORT STATION

DRAWING NUMBERING SYSTEM KEY

DISCIPLINE	DESIGNATED CATEGORY
G	GENERAL
C	CIVIL
L	LANDSCAPE
A	ARCHITECTURE
S	STRUCTURAL
M	MECHANICAL
FP	FIRE PROTECTION
E	ELECTRICAL
T	TROLLEY
0	GENERAL
1	PLANS
2	ELEVATIONS
3	SECTIONS
4	ENLARGED PLANS
5	DETAILS
6	SCHEDULES & DIAGRAMS
7	USER DEFINED
8	USER DEFINED
9	3D VIEWS



STRUCTURAL & ARCHITECTURAL CONSTRUCTION NOTES:

- CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CURRENT INTERNATIONAL BUILDING CODE, THE CURRENT UNIFORM PLUMBING CODE, AND LATEST EDITION OF THE APPLICABLE JURISDICTION'S BUILDING CODE AND AMENDMENTS.
- A COPY OF THE APPROVED PLAN MUST BE ON SITE WHENEVER CONSTRUCTION IS IN PROGRESS.
- CODE - LATEST EDITION OF IBC AS ADOPTED BY LOCAL JURISDICTION.
SEISMIC REQUIREMENTS PER ASCE 7 AND USGS:
Ss
SI
SITE CLASS
SDS
SDI
I
ROOF SNOW LOAD = 25 PSF
BASIC WIND SPEED = PER ASCE 7
SOIL BEARING = 1000 PSF OR SOILS REPORT
- CONCRETE (ACI 318-05): f'c = 3000 PSI, 7 DAY, 6 SACK, 3" SLUMP, 5% AIR ENTRAINMENT, REBAR fy = 60,000 PSI
- FIELD VERIFY ALL DIMENSIONS PRIOR TO START OF WORK.
- ALL WATER SERVICE PIPING MUST BE INSPECTED PRIOR TO BACKFILLING TRENCH.
- INSTALL FOUNDATION PERIMETER INSULATION AND CLOSURE PER DRAWING S3.01.
- PROVIDE MINIMUM 6x6 HEADER AT DOORS. PROVIDE BLOCKING AS REQUIRED FOR ALL FIXTURES AND EQUIPMENT.
- ALL TIMBER SHALL BE DOUGLAS FIR/LARCH NUMBER 2 OR BETTER GRADE. PLYWOOD SHALL BE C-D, EXTERIOR GLUE, STRUCTURAL I OR STRUCTURAL II.
- MINIMUM FASTENING SHALL BE PER IBC TABLE 2304.9.1
- SEE DRAWING M1.01 FOR PLUMBING RISER DIAGRAM.
- INSPECTIONS PER IBC SECTION 109.
- FINISHED COMFORT STATION INTERIOR SHALL COMPLY WITH ANSI AND ADA ACCESSIBILITY REQUIREMENTS. SEE BARRIER FREE ACCESS DETAIL, DRAWING A1.01.

GENERAL NOTES:

- ALL LOCATIONS OF EXISTING UTILITIES HAVE BEEN ESTABLISHED BY FIELD SURVEY OR OBTAINED FROM AVAILABLE RECORDS, ARE APPROXIMATE ONLY AND NOT NECESSARILY COMPLETE. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO INDEPENDENTLY VERIFY THE ACCURACY OF ALL UTILITY LOCATIONS SHOWN AND TO FURTHER DISCOVER AND AVOID ANY OTHER UTILITIES NOT SHOWN HEREON WHICH MAY BE AFFECTED BY THE IMPLEMENTATION OF THIS PLAN.
- THE CONTRACTOR SHALL LOCATE AND PROTECT ALL CASTINGS AND UTILITIES DURING CONSTRUCTION AND SHALL CONTACT THE UNDERGROUND UTILITIES LOCATOR SERVICE (1-800-424-5555) AT LEAST 48 HOURS PRIOR TO CONSTRUCTION.
- THE CONTRACTOR SHALL COORDINATE WITH THE APPROPRIATE POWER, WATER, SEWER AUTHORITIES AND KC METRO PRIOR TO THE START OF WORK.
- THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND LOCATIONS PRIOR TO START OF WORK.
- ALL WATER SERVICE PIPING MUST BE INSPECTED PRIOR TO BACKFILLING TRENCH.
- ALL DEMOLITION DEBRIS MUST BE DISPOSED OF LEGALLY, OFF SITE.

INDEX OF COMFORT STATION DRAWINGS

SHEET NUMBER	DRAWING NUMBER	DRAWING TITLE
ARCHITECTURAL		
1	A0.01	CONSTRUCTION NOTES AND GENERAL INFORMATION
2	A1.01	FOUNDATION, FLOOR AND ROOF PLANS
3	A2.01	EXTERIOR ELEVATIONS & DOOR SPECIFICATION
4	A2.02	INTERIOR ELEVATIONS & WASHROOM ACCESSORIES
5	A7.01	CAST-IN-PLACE CONCRETE SPECIFICATION
6	A7.02	ROUGH CARPENTRY & SHEATHING SPECIFICATIONS
7	A7.03	THERMAL INSULATION & EXTERIOR FINISH CARPENTRY SPECIFICATIONS
8	A7.04	METAL ROOF PANELS SPECIFICATION
9	A7.05	SHEET METAL FLASHING & TRIM SPECIFICATION
10	A7.06	DOOR HARDWARE SPECIFICATION
11	A7.07	FIBERGLASS REINFORCED PLASTIC PANELS & PAINTING SPECIFICATIONS
STRUCTURAL		
12	S3.01	CONSTRUCTION DETAILS
13	S3.02	CONSTRUCTION DETAILS
MECHANICAL		
14	M1.01	PLUMBING PLANS
15	M5.01	SECTION & PLUMBING RISER DIAGRAM
ELECTRICAL		
16	E1.01	ELECTRICAL PLAN AND PANEL SCHEDULE

ABBREVIATIONS:

ACI	AMERICAN CONCRETE INSTITUTE
AFF	ABOVE FINISHED FLOOR
APA	AMERICAN PLYWOOD ASSOCIATION
CND	CONDUIT
CFM	CUBIC FEET PER MINUTE
CW	COLD WATER
DIA	DIAMETER
EW	EACH WAY
FRP	FIBERGLASS REINFORCED PLASTIC
GFCI	GROUND FAULT CURRENT INTERRUPT
GFI	GROUND FAULT INDICATOR
GPM	GALLONS PER MINUTE
IBC	INTERNATIONAL BUILDING CODE
MAX	MAXIMUM
NTS	NOT TO SCALE
OC	ON CENTER
PSI	POUNDS PER SQUARE INCH
REQ'D	REQUIRED
RFP	REINFORCED FIBERGLASS PANEL
SCL	SEATTLE CITY LIGHT
SS	SANITARY SEWER
TP	TRAP PRIMER
TYP	TYPICAL
W	WATER
W/	WITH

WASHINGTON ENERGY CODE INFORMATION

FOUNDATION: POLYISOCYANURATE INSULATION - R11.5
WALLS: BATT OR POLYISOCYANURATE INSULATION - R19.0
ROOF: BATT OR POLYISOCYANURATE INSULATION - R38.0

DRAWING SPECIFICATIONS INDEX

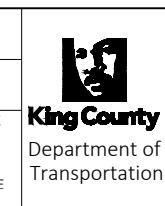
NUMBER	MATERIAL	DRAWING
DIVISION 03		
033000	CAST-IN-PLACE CONCRETE	A7.01
DIVISION 06		
061000	ROUGH CARPENTRY	A7.02
061600	SHEATHING	A7.02
062013	EXTERIOR FINISH CARPENTRY	A7.03
DIVISION 07		
072100	THERMAL INSULATION	A7.03
074113	METAL ROOF PANELS	A7.04
076200	SHEET METAL FLASHING & TRIM	A7.05
DIVISION 08		
087100	DOOR HARDWARE	A7.06
DIVISION 09		
097700	FIBERGLASS REINFORCED PLASTIC PANELS	A7.07
099100	PAINTING	A7.07

PROJECT DESCRIPTION

OWNER:	KING COUNTY
AGENT:	
BUILDING USE:	63 SF COMFORT STATION
PROPERTY ZONING:	
OCCUPANCY GROUP:	U (UTILITY/MISCELLANEOUS)
CONSTRUCTION TYPE:	V
REFERENCE:	2009 INTERNATIONAL BUILDING CODE

No.	REVISION	BY	APP'D	DATE

DESIGNED:	PROJECT MANAGER:	SCALE:
J DAVIS		NONE
DRAWN:	APPROVED:	SITE LOCATION NO:
B FARISS-BATEMAN		
CHECKED:	PROJECT NO:	ONE INCH AT FULL SIZE
J DAVIS	WORK REQUEST:	1"
RECOMMENDED:	CONTRACT NO:	IF NOT ONE INCH, SCALE ACCORDINGLY
D CRIPPEN		



METRO TRANSIT DIVISION
STANDARD SINGLE-UNIT
DRIVER'S COMFORT STATION

CONSTRUCTION NOTES & GENERAL INFORMATION

DATE: DECEMBER 2012

DRAWING NO: A0.01

SHEET NO: OF 1 16

DOOR HARDWARE SPECIFICATION 087100

1. PERFORMANCE CRITERIA
 - A. DOOR LOCK SETS:
 - SHALL BE IN CONFORMANCE WITH LOCAL, STATE, NATIONAL AND INTERNATIONAL ACCESSIBILITY CODES.
 - SHALL HAVE THE CORE PIN SETTING CONFIGURED TO STOP STANDARD SYSTEM KEY ENTRY WHILE LOCKED FROM THE INSIDE.
 - SHALL BE PROVIDED WITH AN EMERGENCY ACCESS MASTER KEY.
2. ACTION SUBMITTALS
 - A. DOOR HARDWARE SETS: SHALL CONFORM TO THE REQUIREMENTS OF KING COUNTY METRO TRANSIT, AND SHALL BE AS APPROVED BY THE KING COUNTY PROJECT REPRESENTATIVE.
 - B. KEYING SCHEDULE: UPON COMPLETION OF PROJECT, CORE OF KEY HARDWARE WILL BE REPLACED WITH THAT COMPATIBLE WITH KING COUNTY'S KEYING SYSTEM.
2. DELIVERY, STORAGE, AND HANDLING
 - A. DELIVER KEYS TO KING COUNTY PROJECT REPRESENTATIVE.
3. WARRANTY
 - A. SPECIAL WARRANTY: MANUFACTURER'S STANDARD FORM IN WHICH MANUFACTURER AGREES TO REPAIR OR REPLACE COMPONENTS OF DOOR HARDWARE THAT FAIL IN MATERIALS OR WORKMANSHIP WITHIN SPECIFIED WARRANTY PERIOD: THREE YEARS FROM DATE OF SUBSTANTIAL COMPLETION, EXCEPT AS FOLLOWS:
 - EXIT DEVICES: TWO YEARS FROM DATE OF SUBSTANTIAL COMPLETION.
 - MANUAL CLOSERS: 10 YEARS FROM DATE OF SUBSTANTIAL COMPLETION.
4. SCHEDULED DOOR HARDWARE
 - A. DOOR HARDWARE SET SHALL HAVE THE FOLLOWING:
 - HINGES (3)
 - TYPE: EXTERIOR FIXED.
 - DOOR CLOSER (1)
 - LOCKSET (1)
 - TYPE: SECURITY, LEVER-TYPE, WITH INTERCHANGEABLE CORE.
 - GENERAL: LOCKSET CONFIGURATION SHALL COMPLY WITH GOVERNING ACCESSIBILITY AND LIFE SAFETY CODES WHILE PREVENTING ENTRY BY TRANSIT SYSTEM KEY WHILE OCCUPIED.
 - FLUSH BOLT (1)
 - KICK PLATE (1)
 - THRESHOLD (1)
 - JAMB SEALS (1 SET)
 - SILL SEAL (1)
 - DRIP SEAL (1)
 - PEEP HOLE (1)
 - B. FINISH SHALL BE US32D, DULL SS (BHMA 630).
5. HINGES, GENERAL
 - A. TEMPLATE REQUIREMENTS: PROVIDE ONLY TEMPLATE-PRODUCED UNITS.
 - B. HINGE BASE METAL: PROVIDE EXTERIOR HINGES: STAINLESS STEEL, WITH STAINLESS-STEEL PIN.
 - C. NONREMOVABLE PINS: PROVIDE SET SCREW IN HINGE BARREL THAT, WHEN TIGHTENED INTO A GROOVE IN HINGE PIN, PREVENTS REMOVAL OF PIN WHILE DOOR IS CLOSED; FOR OUTSWINGING EXTERIOR DOORS.
- D. FASTENERS SHALL COMPLY WITH THE FOLLOWING:
 - MACHINE SCREWS: FOR METAL DOORS AND FRAMES. INSTALL INTO DRILLED AND TAPPED HOLES.
 - SCREWS: PHILLIPS FLAT-HEAD; MACHINE SCREWS (DRILLED AND TAPPED HOLES) FOR METAL DOORS. FINISH SCREW HEADS TO MATCH SURFACE OF HINGES.
6. HINGES
 - A. BUTTS AND HINGES: BHMA A156.1.
 - B. TEMPLATE HINGE DIMENSIONS: BHMA A156.7.
 - C. MANUFACTURERS:
 - MCKINNEY PRODUCTS COMPANY; AN ASSA ABLOY GROUP COMPANY (MCK).
 - PBB, INC. (PBB).
 - STANLEY COMMERCIAL HARDWARE; DIV. OF THE STANLEY WORKS (STH).
7. LOCKS AND LATCHES, GENERAL
 - A. DOOR HARDWARE MUST BE ACCESSIBLE PER IBC CHAPTER 11 AND BE IN COMPLIANCE WITH IBC CHAPTER 10.
 - B. PROVIDE OPERATING DEVICES THAT DO NOT REQUIRE TIGHT GRASPING, PINCHING, OR TWISTING OF THE WRIST AND THAT OPERATE WITH A FORCE OF NOT MORE THAN 5 LBF.
 - C. MANUALLY OPERATED FLUSH OR SURFACE BOLTS ARE NOT ALLOWED. UNLATCHING SHALL NOT REQUIRE MORE THAN ONE RELEASING OPERATION TO OPERATE DOOR.
 - D. LOCK TRIM:
 - LEVERS: AS APPROVED BY KING COUNTY PROJECT REPRESENTATIVE. COMPLY WITH THE REQUIREMENTS OF METRO FACILITIES COMFORT STATION PROGRAM.
 - C. DUMMY TRIM: MATCH LEVER LOCK TRIM AND ESCUTCHEONS.
 - D. BACKSET: 2-3/4 INCHES, UNLESS OTHERWISE INDICATED.
 - E. STRIKES: MANUFACTURER'S STANDARD STRIKE WITH STRIKE BOX FOR EACH LATCHBOLT OR LOCK BOLT, WITH CURVED LIP EXTENDED TO PROTECT FRAME, FINISHED TO MATCH DOOR HARDWARE SET.
8. MECHANICAL LOCKS AND LATCHES: COMPLY WITH THE FOLLOWING:
 - A. BORED LOCKS: BHMA A156.2, GRADE 1; SERIES 4000.
 - PREFERRED STANDARD CORBIN RUSSWIN/ASSA ABLOY TO MATCH EXISTING LOCK/KEY SYSTEM WITHIN METRO TRANSIT.
 - LOCKS SHALL REQUIRE USE OF A KEY ON THE EXTERIOR FOR OPERATION.
 - COMPLY WITH LOCKS AND LATCHES, GENERAL; BOLT MECHANISM, KEYING AND OPERATING TRIM REQUIREMENTS.
 - B. MANUFACTURERS:
 - CORBIN RUSSWIN ARCHITECTURAL HARDWARE; AN ASSA ABLOY GROUP COMPANY (CR).
 - C. BASIS OF DESIGN:
 - MORTISE LOCKSET: CORBIN RUSSWIN ML2029 WITH HOTEL FUNCTION AND 6-PIN INTERCHANGEABLE CORE.
10. LOCK CYLINDERS
 - A. STANDARD LOCK CYLINDERS: BHMA A156.5.
 - B. PERMANENT CORES: MANUFACTURER'S STANDARD; FINISH FACE TO MATCH LOCKSET; WITH INTERCHANGEABLE CORES.
- C. CONSTRUCTION KEYING, CONSTRUCTION CORES:
 - PROVIDE CONSTRUCTION CORES THAT ARE REPLACEABLE BY PERMANENT CORES. PROVIDE 10 CONSTRUCTION MASTER KEYS.
 - FURNISH PERMANENT CORES TO KING COUNTY PROJECT REPRESENTATIVE FOR INSTALLATION.
- D. MANUFACTURER: SAME AS FOR LOCKS AND LATCHES.
- E. BASIS OF DESIGN: CORBIN RUSSWIN ARCHITECTURAL HARDWARE; AN ASSA ABLOY GROUP COMPANY (CR).
11. KEYING
 - A. KEYING SYSTEM: FACTORY REGISTERED, COMPLYING WITH GUIDELINES IN BHMA A156.28, APPENDIX A.
 - B. EXISTING SYSTEM: MASTER KEY OR GRAND MASTER KEY LOCKS TO KING COUNTY METRO TRANSIT'S EXISTING SYSTEM.
12. OPERATING TRIM
 - A. STANDARD: BHMA A156.6.
 - B. MATERIALS: STAINLESS STEEL.
 - C. BASIS OF DESIGN: CORBIN RUSSWIN/ASSA ABLOY
 - ML 2062 'INTRUDER DEADBOLT' WITH PRIVACY INDICATOR.
 - LEVER & ESCUTCHEON: WROUGHT STAINLESS STEEL.
 - D. ACCEPTABLE MANUFACTURERS:
 - CORBIN RUSSWIN/ASSA ABLOY
 - AHI HARDWARE.
 - E. COMPLY WITH LOCKS AND LATCHES, GENERAL; MECHANICAL LOCKS AND LATCHES, KEYING AND BOLT MECHANISM REQUIREMENTS.
13. CLOSERS
 - A. DOOR CLOSERS FOR MEANS OF EGRESS DOORS: COMPLY WITH NFPA 101. DOOR CLOSERS SHALL NOT REQUIRE MORE THAN 30 LBF TO SET DOOR IN MOTION AND NOT MORE THAN 15 LBF TO OPEN DOOR TO MINIMUM REQUIRED WIDTH.
 - B. TYPE: INTERIOR MOUNTED.
 - C. ACCEPTABLE MANUFACTURERS:
 - LCN CLOSERS; AN INGERSOLL-RAND COMPANY (LCN).
14. STOPS AND HOLDERS
 - A. PROVIDE WALL STOP: BHMA A156.16.
 - B. ACCEPTABLE MANUFACTURERS:
 - SARGENT MANUFACTURING COMPANY; AN ASSA ABLOY GROUP COMPANY (SGT).
 - STANLEY COMMERCIAL HARDWARE; DIV. OF THE STANLEY WORKS (STH).
 - TRIMCO (TBM).
15. DOOR GASKETING
 - A. STANDARD: BHMA A156.22.
 - B. GENERAL: PROVIDE CONTINUOUS WEATHER-STRIP GASKETING AND NONCORROSIVE FASTENERS.
 - PERIMETER GASKETING: APPLY TO HEAD AND JAMB, FORMING SEAL BETWEEN DOOR AND FRAME.
 - DOOR BOTTOM: APPLY TO BOTTOM OF DOOR, FORMING SEAL WITH THRESHOLD WHEN DOOR IS CLOSED.
16. THRESHOLDS
 - A. STANDARD: BHMA A156.21.
 - B. ACCESSIBILITY REQUIREMENTS: BEVEL RAISED THRESHOLDS WITH A SLOPE OF NOT MORE THAN 1:2. PROVIDE THRESHOLDS NOT MORE THAN 1/2 INCH HIGH.
 - C. ACCEPTABLE MANUFACTURERS:
 - PEMKO MANUFACTURING CO. (PEM).
17. KICKPLATE
 - A. FINISH: US32D STAINLESS STEEL (BHMA 630)
 - B. TYPE: HEAVY DUTY COMMERCIAL.
 - C. ACCEPTABLE MANUFACTURERS:
 - IVES
 - TRIMCO.
- REPLACEABLE SEAL STRIPS: PROVIDE ONLY THOSE UNITS WHERE RESILIENT OR FLEXIBLE SEAL STRIPS ARE EASILY REPLACEABLE AND READILY AVAILABLE FROM STOCKS MAINTAINED BY MANUFACTURER.
- GASKETING MATERIALS: ASTM D 2000 AND AAMA 701/702.
- MANUFACTURERS:
 - PEMKO MANUFACTURING CO. (PEM).
 - REESE ENTERPRISES (RE).
 - ZERO INTERNATIONAL (ZRO).

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RECOMMENDED: D CRIPPEN	WORK REQUEST: CONTRACT NO:	1" IF NOT ONE INCH, SCALE ACCORDINGLY



METRO TRANSIT DIVISION
STANDARD SINGLE-UNIT
DRIVER'S COMFORT STATION
DOOR HARDWARE
SPECIFICATION

DATE:
DECEMBER 2012
 DRAWING NO:
A7.06
 SHEET NO: OF
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FIBERGLASS REINFORCED PLASTIC PANELS SPECIFICATION 097700

1. THIS SECTION INCLUDES THE FOLLOWING:
 - A. FIBERGLASS REINFORCED PLASTIC WALL AND CEILING PANELS.
 - a. ALLIED BUILDING PRODUCTS CORP. DBA CHICAGO METALLIC
 - b. COOK CONSTRUCTION SPECIALTIES, INC.
 - c. CRANE COMPOSITES.
 - d. APPROVED EQUAL.
2. QUALITY ASSURANCE
 - A. FIRE-TEST-RESPONSE CHARACTERISTICS: PROVIDE IMPACT-RESISTANT, UNITS WITH SURFACE-BURNING CHARACTERISTICS AS DETERMINED BY TESTING IDENTICAL PRODUCTS PER ASTM E 84, NFPA 255, OR UL 723 BY UL OR ANOTHER TESTING AND INSPECTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.
 - B. IMPACT RESISTANCE CHARACTERISTICS: ASTM D2583 AND ASTM D5420.
3. DELIVERY, STORAGE, AND HANDLING
 - A. COMPLY WITH MANUFACTURER'S INSTRUCTIONS FOR STORAGE AND HANDLING.
4. WARRANTY
 - A. SPECIAL WARRANTY: MANUFACTURER'S STANDARD FORM IN WHICH MANUFACTURER AGREES TO REPAIR OR REPLACE COMPONENTS OF FIBERGLASS REINFORCED PANELS THAT FAIL IN MATERIALS OR WORKMANSHIP WITHIN SPECIFIED WARRANTY PERIOD.
 - WARRANTY PERIOD: FIVE YEARS FROM DATE OF SUBSTANTIAL COMPLETION.
5. MANUFACTURERS
 - A. IN OTHER PART 2 ARTICLES WHERE TITLES BELOW INTRODUCE LISTS, THE FOLLOWING REQUIREMENTS APPLY TO PRODUCT SELECTION:
 - AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, MANUFACTURERS SPECIFIED.
6. MATERIALS
 - A. GENERAL: PROVIDE ALL MATERIALS REQUIRED FOR COMPLETE INSTALLATION IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
 - B. FIBERGLASS-REINFORCED PLASTIC WALL AND CEILING PANELS:
 - SURFACE: SMOOTH.
 - TYPE: CLASS A.
 - COLOR: WHITE.
 - C. ADHESIVE: TYPE RECOMMENDED BY MANUFACTURER FOR USE WITH MATERIAL BEING ADHERED TO SUBSTRATE INDICATED.
 - USE ADHESIVES AND SEALANTS THAT COMPLY WITH THE FOLLOWING LIMITS FOR VOC CONTENT WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24):
 - a. GYPSUM BOARD AND PANEL ADHESIVES: 50 G/L.
 - b. MULTIPURPOSE CONSTRUCTION ADHESIVES: 70 G/L.
 - c. CONTACT ADHESIVE: 80 G/L.
7. FIBERGLASS REINFORCED WALL AND CEILING PANELS
 - A. SEMIRIGID, IMPACT-RESISTANT SHEET WALL COVERING: FABRICATED FROM PLASTIC SHEET WALL COVERING MATERIAL.
 - BASIS-OF-DESIGN PRODUCT: CRANE COMPOSITES, KEMLITE GLASBORD® FRP, WITH SURFASEAL® FINISH.
 - OR COMPARABLE PRODUCT BY ONE OF THE FOLLOWING MANUFACTURERS:
8. INSTALLATION
 - A. INSTALL USING METHODS AND MATERIALS RECOMMENDED IN WRITING BY MANUFACTURER.

PAINTING SPECIFICATION 099100

1. THIS SECTION INCLUDES SURFACE PREPARATION AND THE APPLICATION OF PAINT SYSTEMS ON THE FOLLOWING EXTERIOR AND INTERIOR SUBSTRATES:
 - A. CONCRETE.
 - B. STEEL.
 - C. GALVANIZED METAL.
2. QUALITY ASSURANCE
 - A. MPI STANDARDS:
 - PRODUCTS: COMPLYING WITH MPI STANDARDS INDICATED AND LISTED IN "MPI APPROVED PRODUCTS LIST."
 - PREPARATION AND WORKMANSHIP: COMPLY WITH REQUIREMENTS IN "MPI ARCHITECTURAL PAINTING SPECIFICATION MANUAL" FOR PRODUCTS AND PAINT SYSTEMS INDICATED.
3. PAINT, GENERAL
 - A. MATERIAL COMPATIBILITY:
 - PROVIDE MATERIALS FOR USE WITHIN EACH PAINT SYSTEM THAT ARE COMPATIBLE WITH ONE ANOTHER AND SUBSTRATES INDICATED, UNDER CONDITIONS OF SERVICE AND APPLICATION AS DEMONSTRATED BY MANUFACTURER, BASED ON TESTING AND FIELD EXPERIENCE.
 - FOR EACH COAT IN A PAINT SYSTEM, PROVIDE PRODUCTS RECOMMENDED IN WRITING BY MANUFACTURERS OF TOPCOAT FOR USE IN PAINT SYSTEM AND ON SUBSTRATE INDICATED.
 - B. COLORS:
 - DOOR: GRAY, AS SELECTED FROM MANUFACTURER'S FULL RANGE AND APPROVED BY THE KING COUNTY PROJECT REPRESENTATIVE.
 - ROOF: GRAY, AS SELECTED FROM MANUFACTURER'S FULL RANGE AND APPROVED BY THE KING COUNTY PROJECT REPRESENTATIVE.
 - SIDING & TRIM: AS SELECTED FROM MANUFACTURER'S FULL RANGE AND APPROVED BY THE KING COUNTY PROJECT REPRESENTATIVE.
 - C. MANUFACTURERS
 - PPG ARCHITECTURAL FINISHES
 - RODDA PAINT
 - VISTA PAINT
 - OR EQUAL.
4. METAL PRIMERS
 - A. QUICK-DRYING ALKYD METAL PRIMER: MPI #76.
 - VOC CONTENT: E RANGE OF E2.
5. QUICK-DRYING ENAMELS
 - A. QUICK-DRYING ENAMEL (SEMIGLOSS): MPI #81 (GLOSS LEVEL 5).
 - VOC CONTENT: E RANGE OF E2.
6. FLOOR COATING
 - A. TWO-PART EPOXY COATING SYSTEM.
 - VOC CONTENT: MAXIMUM E RANGE OF E2.
7. EXAMINATION
 - A. EXAMINE SUBSTRATES AND CONDITIONS, WITH APPLICATOR PRESENT, FOR COMPLIANCE WITH REQUIREMENTS FOR MAXIMUM MOISTURE CONTENT AND OTHER CONDITIONS AFFECTING PERFORMANCE OF WORK.
 - B. MAXIMUM MOISTURE CONTENT OF SUBSTRATES: WHEN MEASURED WITH AN ELECTRONIC MOISTURE METER AS FOLLOWS:
 - CONCRETE: 12 PERCENT.
 - C. VERIFY SUITABILITY OF SUBSTRATES, INCLUDING SURFACE CONDITIONS AND COMPATIBILITY WITH EXISTING FINISHES AND PRIMERS.
8. PREPARATION AND APPLICATION
 - A. COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS AND RECOMMENDATIONS IN "MPI ARCHITECTURAL PAINTING SPECIFICATION MANUAL" APPLICABLE TO SUBSTRATES AND PAINT SYSTEMS INDICATED.
 - B. CLEAN SUBSTRATES OF SUBSTANCES THAT COULD IMPAIR BOND OF PAINTS, INCLUDING DIRT, OIL, GREASE, AND INCOMPATIBLE PAINTS AND ENCAPSULANTS.
 - REMOVE INCOMPATIBLE PRIMERS AND REPRIME SUBSTRATE WITH COMPATIBLE PRIMERS AS REQUIRED TO PRODUCE PAINT SYSTEMS INDICATED.
 - C. APPLY PAINTS TO PRODUCE SURFACE FILMS WITHOUT CLOUDINESS, SPOTTING, HOLIDAYS, LAPS, BRUSH MARKS, ROLLER TRACKING, RUNS, SAGS, ROPINESS, OR OTHER SURFACE IMPERFECTIONS. CUT IN SHARP LINES AND COLOR BREAKS.
 - D. PROTECT WORK OF OTHER TRADES AGAINST DAMAGE FROM PAINT APPLICATION. CORRECT DAMAGE TO WORK OF OTHER TRADES BY CLEANING, REPAIRING, REPLACING, AND REFINISHING, AS APPROVED BY ARCHITECT, AND LEAVE IN AN UNDAMAGED CONDITION.
 - E. AT COMPLETION OF CONSTRUCTION ACTIVITIES OF OTHER TRADES, TOUCH UP AND RESTORE DAMAGED OR DEFACED PAINTED SURFACES.
9. EXTERIOR PAINTING SCHEDULE
 - A. STEEL SUBSTRATES:
 - QUICK-DRYING ENAMEL SYSTEM: MPI EXT 5.1A.
 - a. PRIME COAT: QUICK-DRYING ALKYD METAL PRIMER.
 - b. INTERMEDIATE COAT: QUICK-DRYING ENAMEL MATCHING TOPCOAT.
 - c. TOPCOAT: QUICK-DRYING ENAMEL SEMIGLOSS.
 - B. GALVANIZED-METAL SUBSTRATES:
 - AS DESCRIBED IN SECTION 076200 SHEET METAL FLASHING AND TRIM.
10. INTERIOR PAINTING SCHEDULE
 - A. CONCRETE FLOOR:
 - TWO-PART EPOXY ENAMEL, LOW GLOSS, MPI #108.
 - d. PRIME COAT & TOP COAT: COMEX INDUSTRIAL COATINGS 'E-4100 WATERBORNE EPOXY ENAMEL' OR APPROVED EQUAL.

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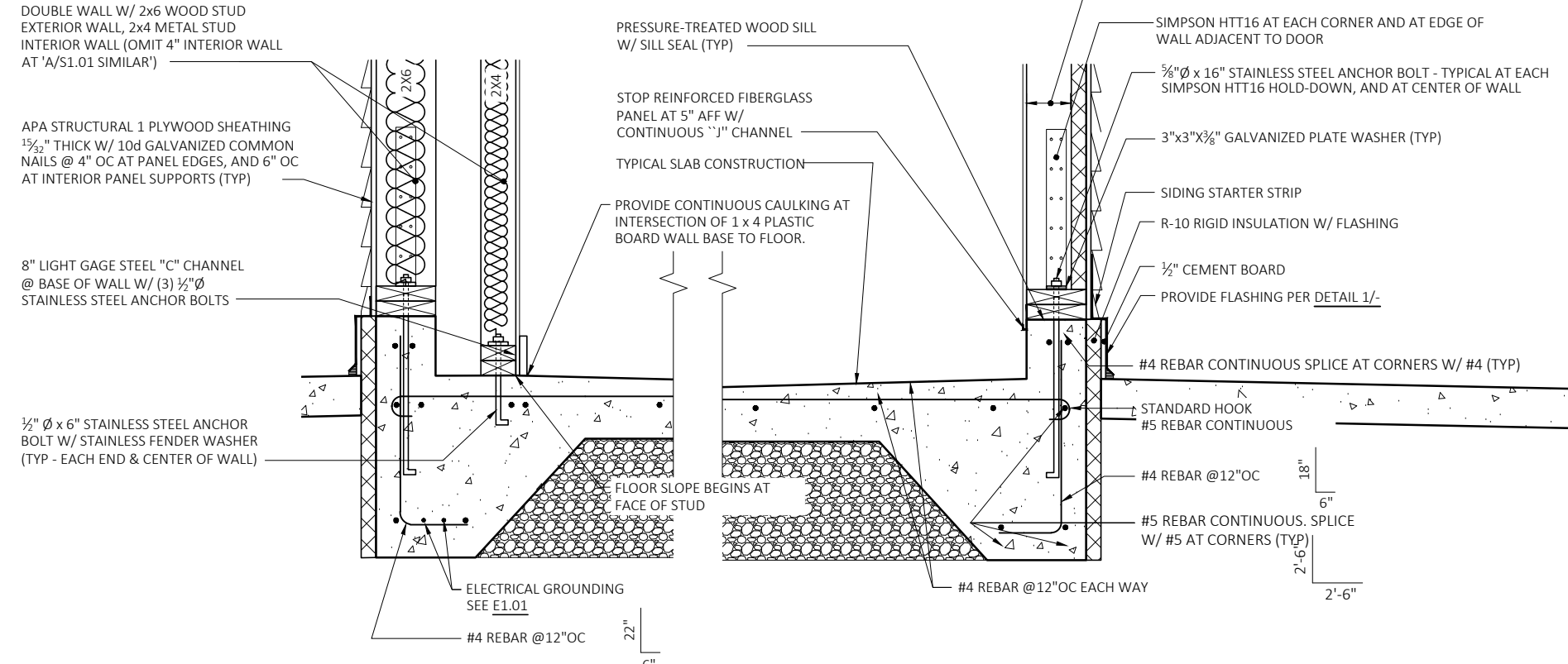
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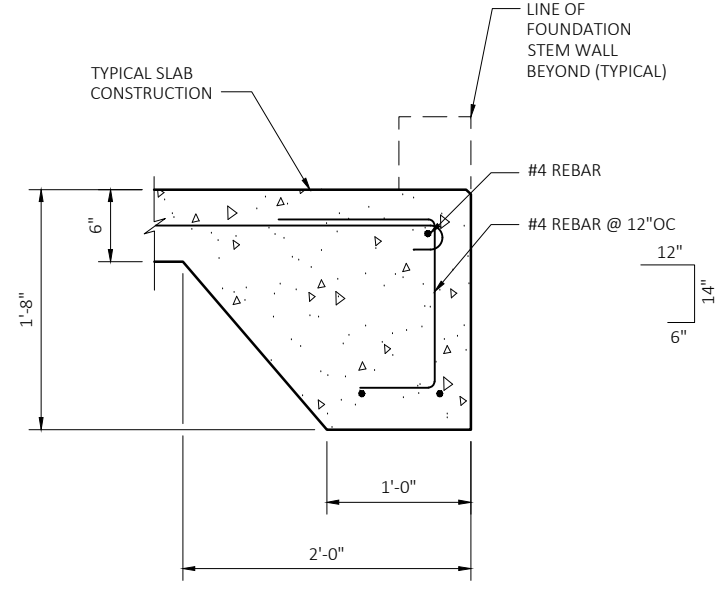


**METRO TRANSIT DIVISION
STANDARD SINGLE-UNIT
DRIVER'S COMFORT STATION
FIBERGLASS REINFORCED
PLASTIC PANELS &
PAINTING SPECIFICATIONS**

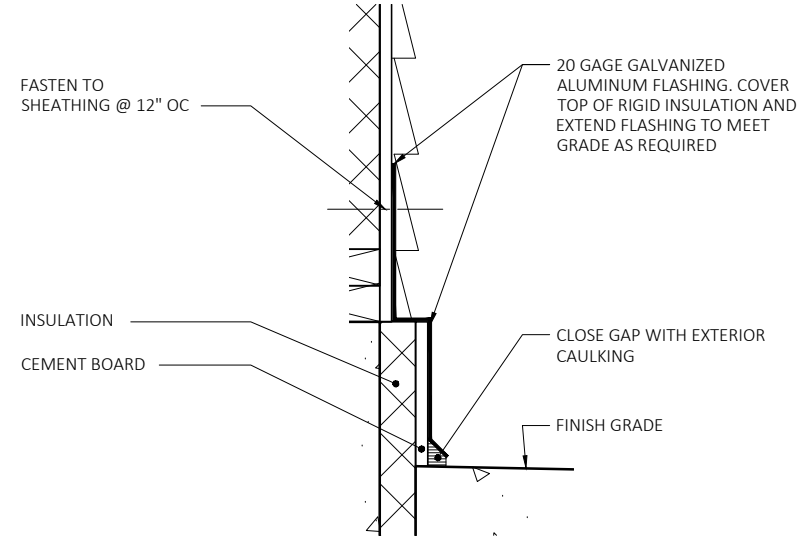
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FOUNDATION
SECTION A
SCALE: 1-1/2"=1'-0" A1.01



FOUNDATION AT DOOR OPENING
SECTION B
SCALE: 1-1/2"=1'-0" A1.01



FLASHING
DETAIL 1
SCALE: 3"=1'-0"

TYPICAL WALL CONSTRUCTION:

HORIZONTAL BEVEL SIDING
15# BUILDING FELT
PLYWOOD SHEATHING (PER A/-)
2 1/2" RIGID INSULATION
2x6 WOOD STUDS @ 16" OC MAX
3/8" REINFORCED FIBERGLASS PLASTIC PANEL.

NOTE:

- SEE DRAWINGS A7.02 & A7.03 FOR ROUGH LUMBER AND SHEATHING SPECIFICATIONS.

METAL CONSTRUCTION ALTERNATIVE:

METAL SILL CONSTRUCTION:
METAL "C" CHANNEL W/ SILL SEAL (TYP).
5.5CU 1.25x045 IN 6" WALL @ 16" OC MAX,
OR 8CU 1.25x045 IN 8" WALL @ 16" OC MAX.

METAL WALL CONSTRUCTION:

3/4" PLYWOOD
TOP PLATE METAL "C" CHANNEL TOP RAIL:
5.5CU 1.25x045 IN 6" WALL @ 16" OC MAX
8CU 1.25x045 IN 8" WALL @ 16" OC MAX.

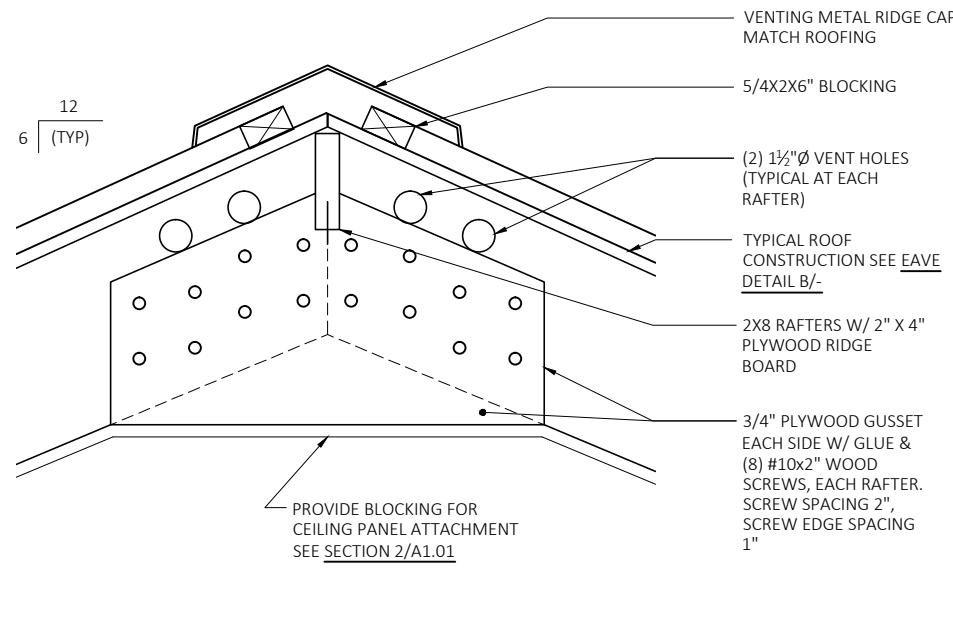
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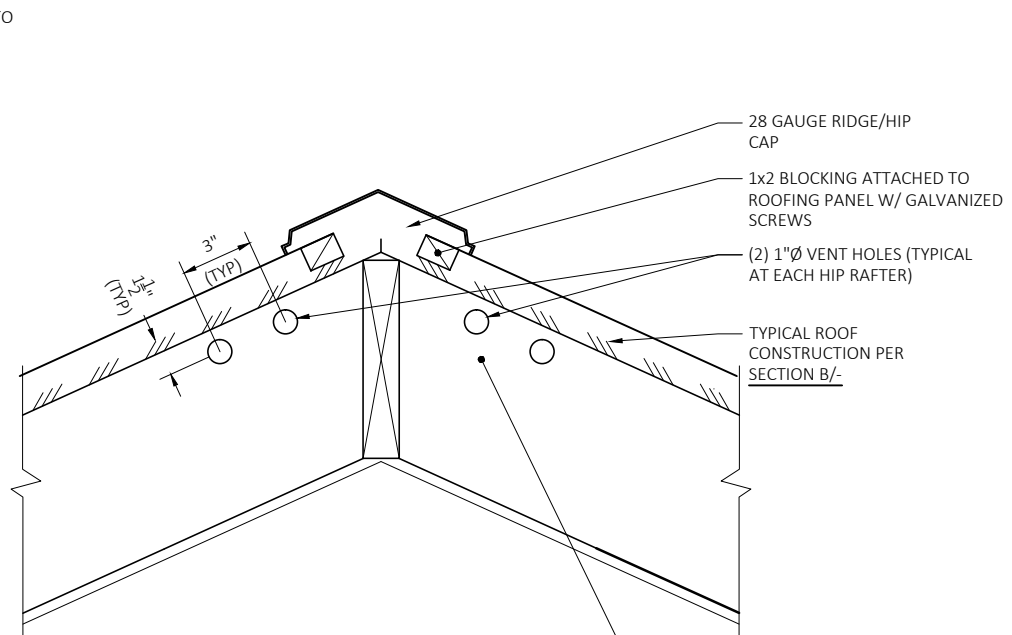
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METRO TRANSIT DIVISION
STANDARD SINGLE-UNIT
DRIVER'S COMFORT STATION
CONSTRUCTION DETAILS

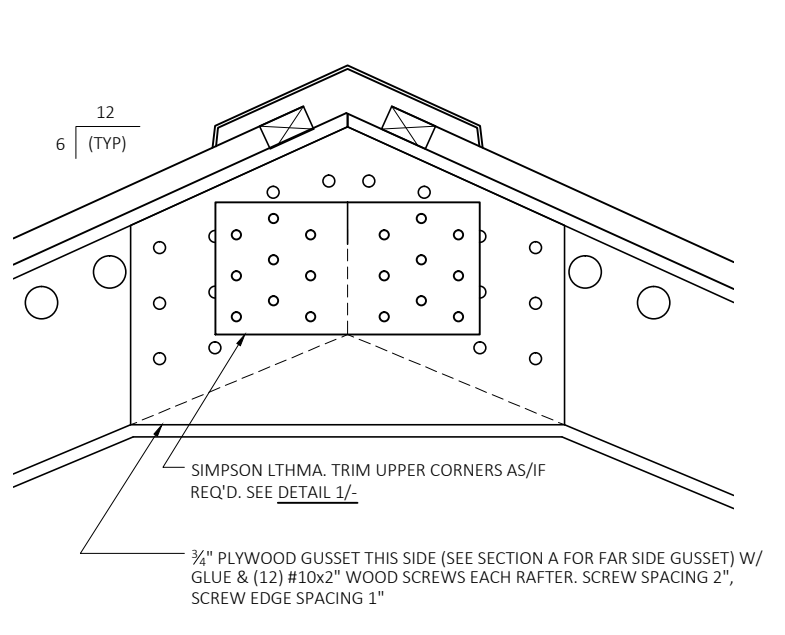
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SECTION A
RIDGE
SCALE: 3"=1'-0"
A1.01

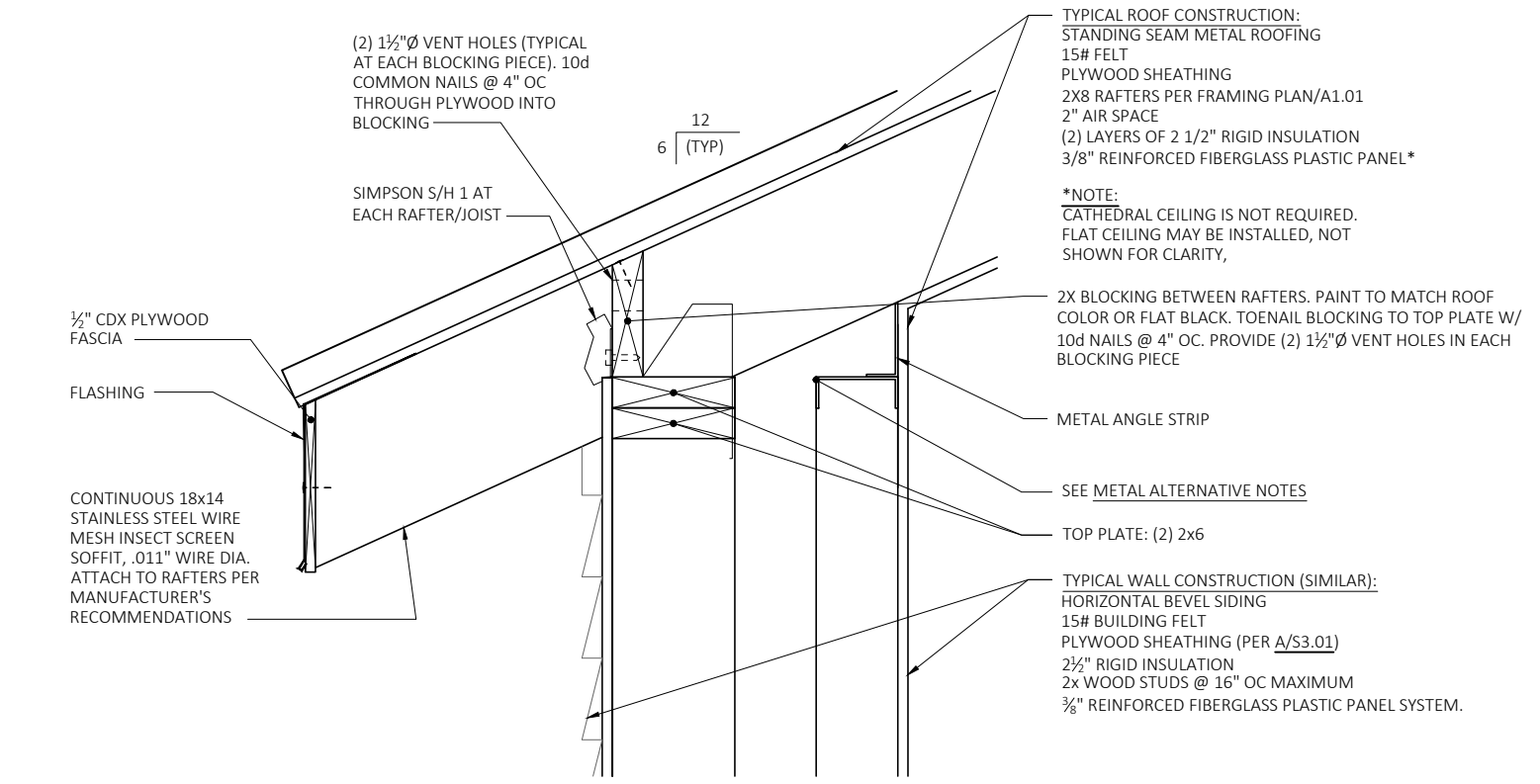


SECTION C
HIP
SCALE: 3"=1'-0"
A1.01

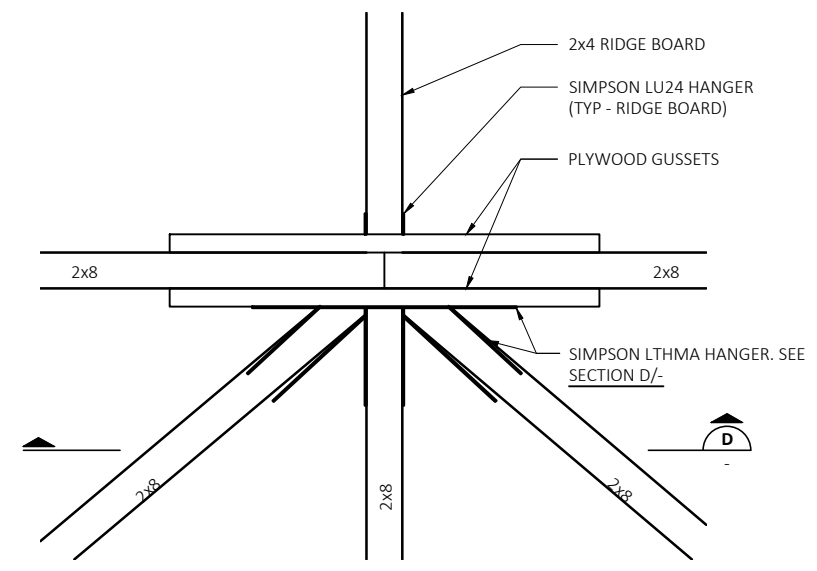


SECTION D
RIDGE
SCALE: 3"=1'-0"
A1.01

NOTE: HIP JOISTS NOT SHOWN.



SECTION B
EAVE
SCALE: 3"=1'-0"
A1.01



DETAIL 1
RIDGE
SCALE: 3"=1'-0"
A1.01

NOTES:

- SEE DRAWING A7.02 FOR ROUGH CARPENTRY & SHEATHING SPECIFICATIONS.
- SEE DRAWING A7.03 FOR THERMAL INSULATION & EXTERIOR FINISH CARPENTRY SPECIFICATIONS.
- SEE DRAWING A7.04 FOR METAL ROOF PANELS SPECIFICATION.
- SEE DRAWING A7.05 SHEET METAL FLASHING & TRIM SPECIFICATION.
- SEE DRAWING A7.06 FOR DOOR HARDWARE SPECIFICATION.
- SEE DRAWING A7.07 FOR FIBERGLASS REINFORCED PLASTIC PANELS & PAINTING SPECIFICATIONS.

TYPICAL ROOF CONSTRUCTION:
STANDING SEAM METAL ROOFING
15# FELT
PLYWOOD SHEATHING
2X8 RAFTERS PER FRAMING PLAN/A1.01
2" AIR SPACE
(2) LAYERS OF 2 1/2" RIGID INSULATION
3/8" REINFORCED FIBERGLASS PLASTIC PANEL*

*NOTE:
CATHEDRAL CEILING IS NOT REQUIRED.
FLAT CEILING MAY BE INSTALLED, NOT SHOWN FOR CLARITY,

2X BLOCKING BETWEEN RAFTERS. PAINT TO MATCH ROOF COLOR OR FLAT BLACK. TOENAIL BLOCKING TO TOP PLATE W/ 10d NAILS @ 4" OC. PROVIDE (2) 1 1/2" Ø VENT HOLES IN EACH BLOCKING PIECE

METAL ANGLE STRIP

SEE METAL ALTERNATIVE NOTES

TOP PLATE: (2) 2x6

TYPICAL WALL CONSTRUCTION (SIMILAR):
HORIZONTAL BEVEL SIDING
15# BUILDING FELT
PLYWOOD SHEATHING (PER A/S3.01)
2 1/2" RIGID INSULATION
2x WOOD STUDS @ 16" OC MAXIMUM
3/8" REINFORCED FIBERGLASS PLASTIC PANEL SYSTEM.

NOTE: PAINT EDGE AND FACE OF 2X8 RAFTER AND PLYWOOD FASCIA TO MATCH METAL ROOFING OR FLAT BLACK.

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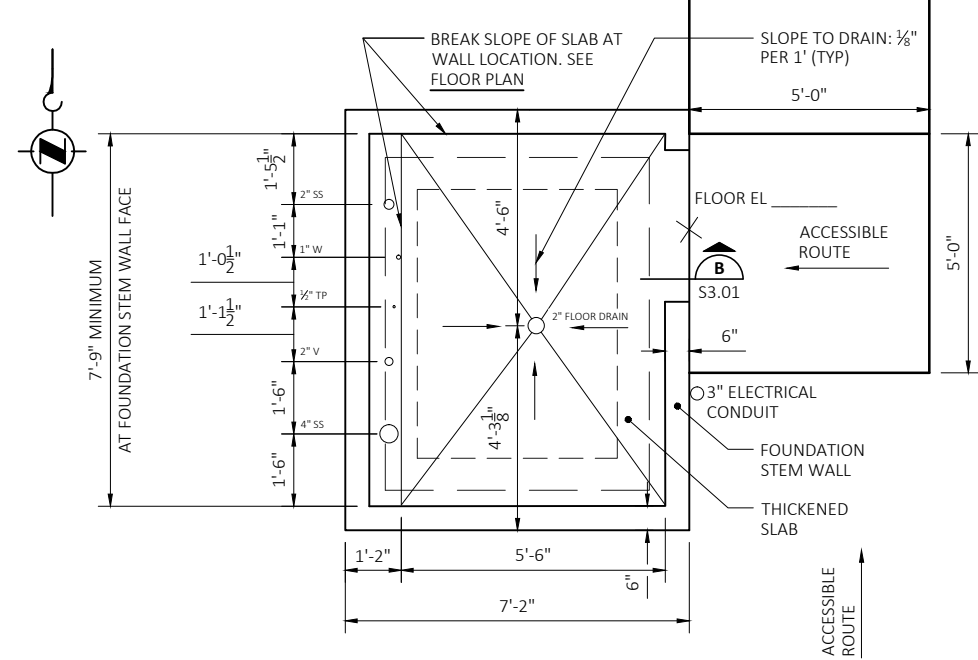
METRO TRANSIT DIVISION
STANDARD SINGLE-UNIT
DRIVER'S COMFORT STATION

**TYPICAL
CONSTRUCTION DETAILS**

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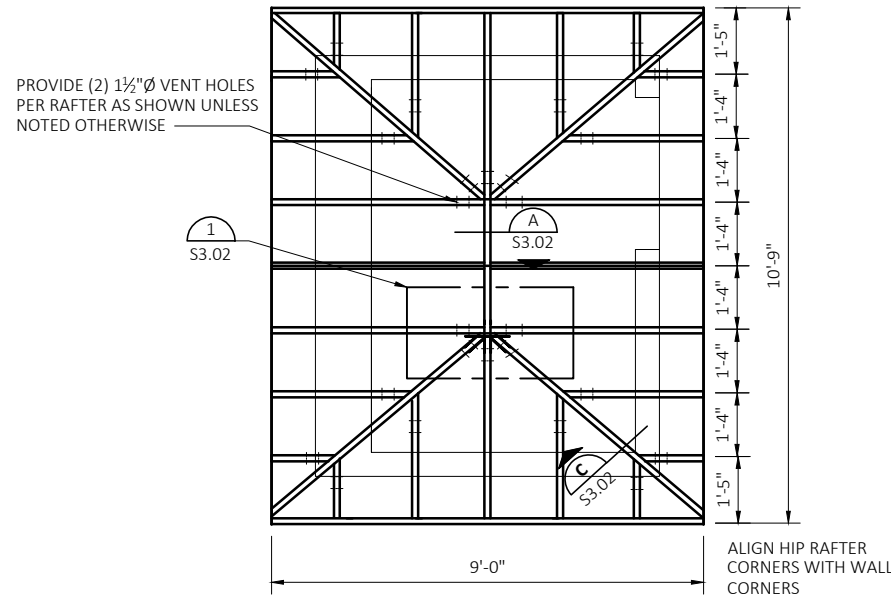
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FOUNDATION PLAN

SCALE: 1/2" = 1'-0"

NOTE: 6" CONCRETE SLAB ON GRADE W/ SMOOTH TROWEL FINISH OVER 4" GRAVEL. SLOPE SLAB 1/8":1 FT TOWARD DRAIN (TYPICAL AS SHOWN)



ROOF FRAMING PLAN

SCALE: 1/2" = 1'-0"

CONSTRUCTION NOTES:

- REFER TO DRAWING A0.01 FOR GENERAL NOTES AND STRUCTURAL & ARCHITECTURAL CONSTRUCTION NOTES.
- PIPE LOCATIONS SHOWN PER PLUMBING SCHEMATIC. SEE DRAWING M1.01.
- SEE DRAWING M5.01 FOR PLUMBING RISER DIAGRAM AND PLUMBING EQUIPMENT SCHEDULE.
- CLEAR FLOOR SPACE AT LAVATORY AND AT WATER CLOSET SHALL BE AS SHOWN IN BARRIER FREE ACCESS DETAIL, THIS DRAWING.
- SEE DRAWING A7.01 FOR CAST-IN-PLACE CONCRETE SPECIFICATION; DRAWING S3.01 FOR DETAILS.
- SEE DRAWING A7.02 FOR ROUGH LUMBER AND SHEATHING SPECIFICATIONS; DRAWINGS S3.01 & S3.02 FOR ADDITIONAL NOTES AND DETAILS.
- PROVIDE BLOCKING AS REQUIRED FOR ALL RESTROOM FIXTURES. PROVIDE ADDITIONAL HORIZONTAL WOOD BLOCKING THROUGHOUT AT 12" OC VERTICAL SPACING.
- INSTALL FOUNDATION PERIMETER INSULATION AND CLOSURE PER DRAWING S3.01. WA ENERGY CODE COMPLIANCE PER DRAWING A0.01 IS REQUIRED.
- SEE DRAWING A2.02 FOR WASHROOM EQUIPMENT SCHEDULE.

EQUIPMENT LEGEND:

ARCHITECTURAL EQUIPMENT PROVIDED BY KING COUNTY METRO TRANSIT, TO BE INSTALLED BY CONTRACTOR. SEE DRAWING A2.02:

- A1 HAND TOWEL DISPENSER
- A2 TOILET PAPER DISPENSER
- A3 SEAT COVER DISPENSER
- A4 SOAP DISPENSER

ARCHITECTURAL EQUIPMENT & FIXTURES PROVIDED AND INSTALLED BY CONTRACTOR. SEE DRAWING A2.02:

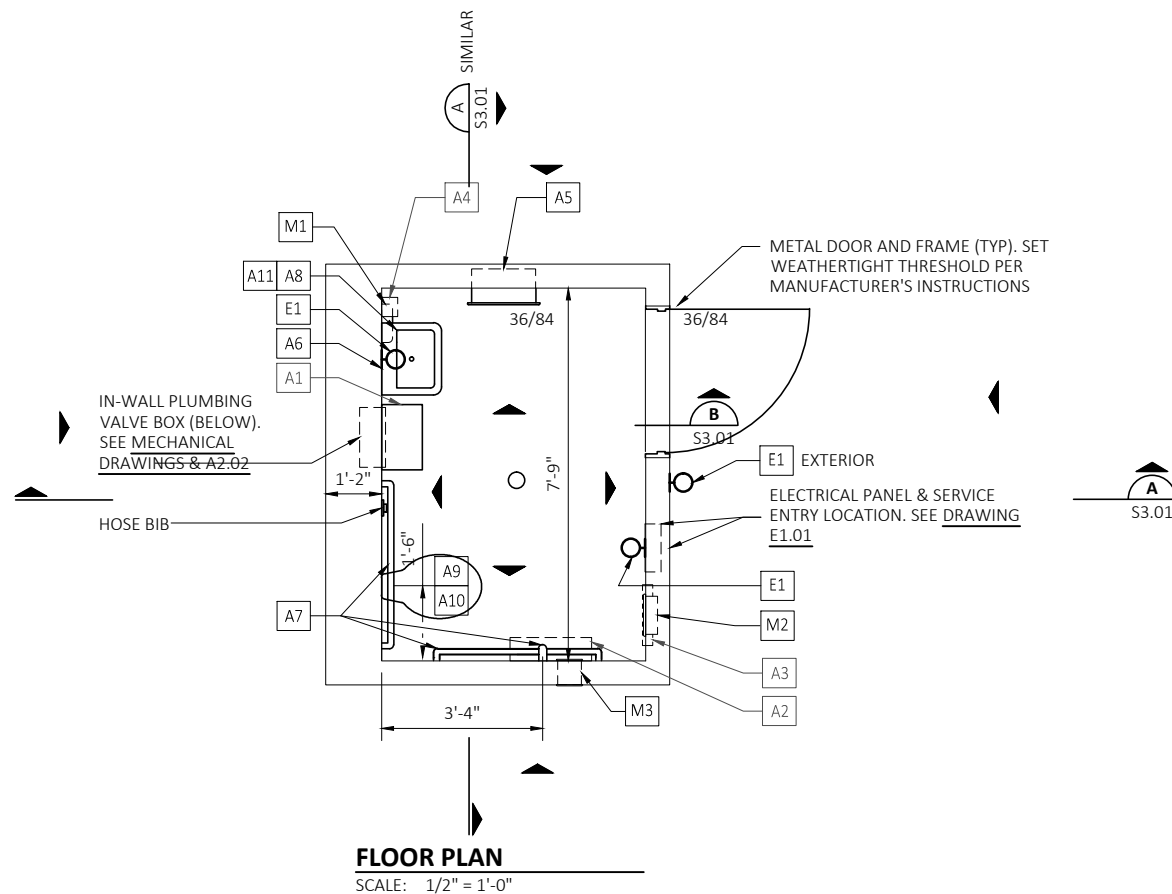
- A5 WASTE RECEPTACLE
- A6 WALL MIRROR
- A7 GRAB BARS
- A8 SINK
- A9 TOILET
- A10 TOILET SEAT
- A11 UNDERLAVATORY GUARDS

ELECTRICAL EQUIPMENT PROVIDED AND INSTALLED BY CONTRACTOR. SEE DRAWING E1.01:

- E1 WALL LIGHT
- M1 IN-LINE WATER HEATER (BELOW)
- M2 IN-WALL ELECTRIC FORCE AIR HEATER W/ TIMER
- M3 EXHAUST FAN

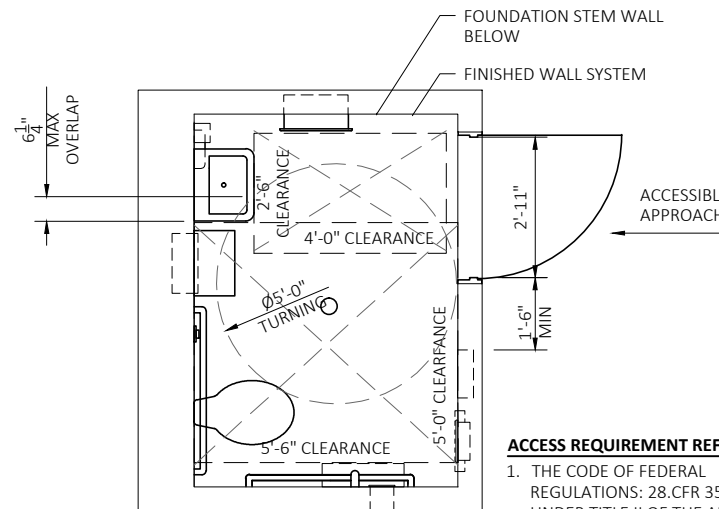
MECHANICAL EQUIPMENT PROVIDED AND INSTALLED BY CONTRACTOR. SEE DRAWING M1.01:

- M1 IN-LINE WATER HEATER (BELOW)
- M2 IN-WALL ELECTRIC FORCE AIR HEATER W/ TIMER
- M3 EXHAUST FAN



FLOOR PLAN

SCALE: 1/2" = 1'-0"



BARRIER FREE ACCESS DETAIL

SCALE: 1/2" = 1'-0"

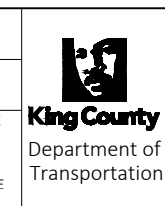
ACCESS REQUIREMENT REFERENCES:

- THE CODE OF FEDERAL REGULATIONS: 28.CFR 35.151(A) UNDER TITLE II OF THE ADA [FACILITY OWNED BY A PUBLIC ENTITY MUST BE ACCESSIBLE].
- THE INTERNATIONAL CONSTRUCTION CODE/AMERICAN NATIONAL STANDARDS INSTITUTE: ICC/ANSI 117 [ACCESSIBILITY REQUIREMENTS].

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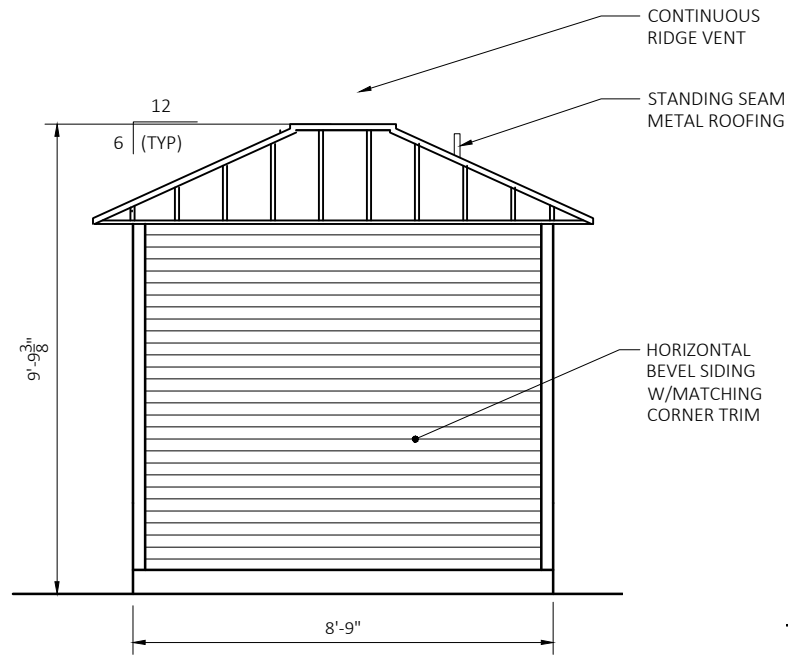
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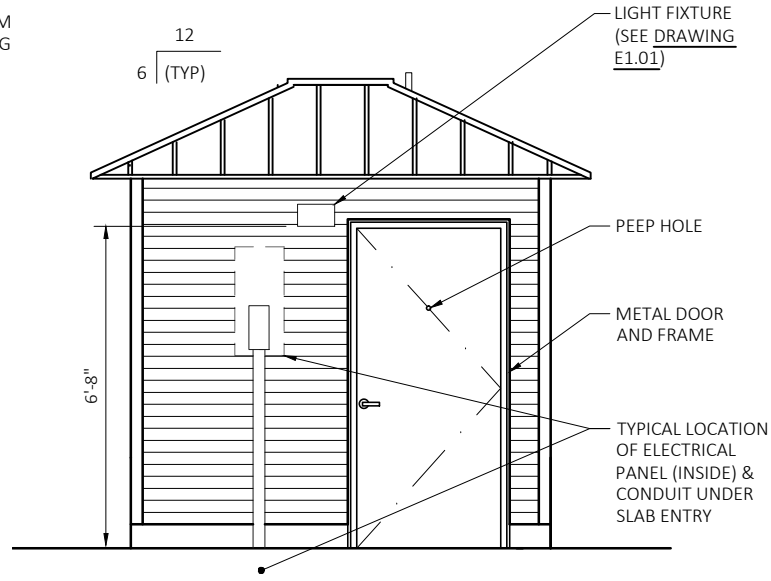
METRO TRANSIT DIVISION
STANDARD SINGLE-UNIT
DRIVER'S COMFORT STATION

FOUNDATION, FLOOR
& ROOF PLANS

DATE: DECEMBER 2012
DRAWING NO: A1.01
SHEET NO: OF 2 16



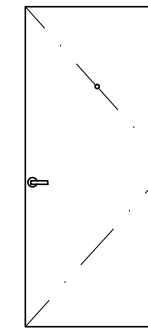
WEST ELEVATION
SCALE: 1/2" = 1'-0"
A
A1.01



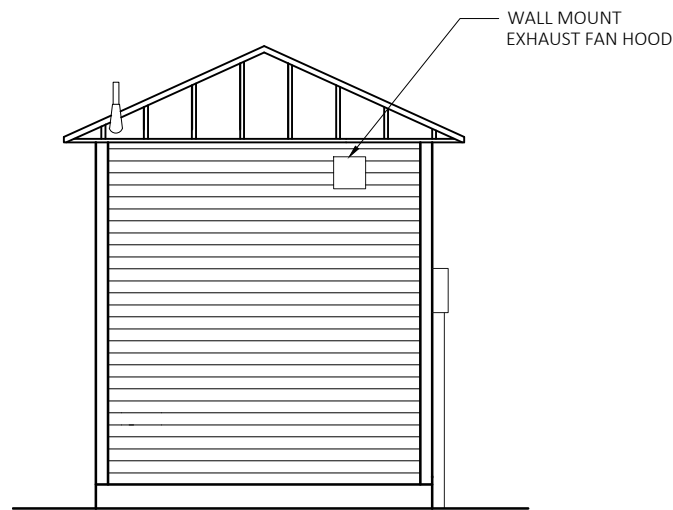
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METAL DOOR AND FRAME SPECIFICATION 087100

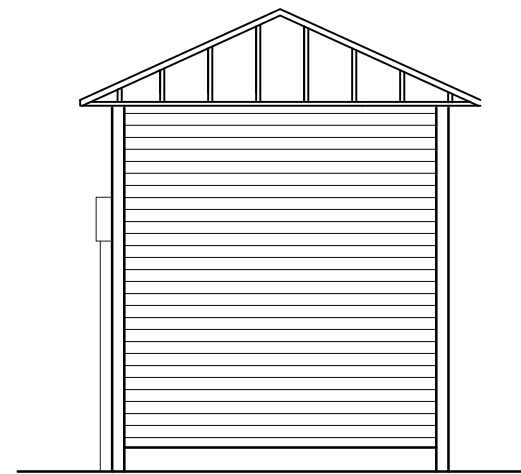
1. ACCEPTABLE MANUFACTURERS INCLUDE THE FOLLOWING:
 - a. CECO DOOR PRODUCTS; AN ASSA ABLOY GROUP COMPANY.
 - b. CURRIES COMPANY; AN ASSA ABLOY GROUP COMPANY.
 - c. KEWANEE CORPORATION (THE).
2. INSTALL PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
3. SEE DRAWING A7.06 FOR DOOR HARDWARE SPECIFICATION.



DOOR TYPE
SCALE: 1/2" = 1'-0"



SOUTH ELEVATION
SCALE: 1/2" = 1'-0"
C
A1.01

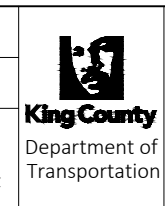


NORTH ELEVATION
SCALE: 1/2" = 1'-0"
D
A1.01

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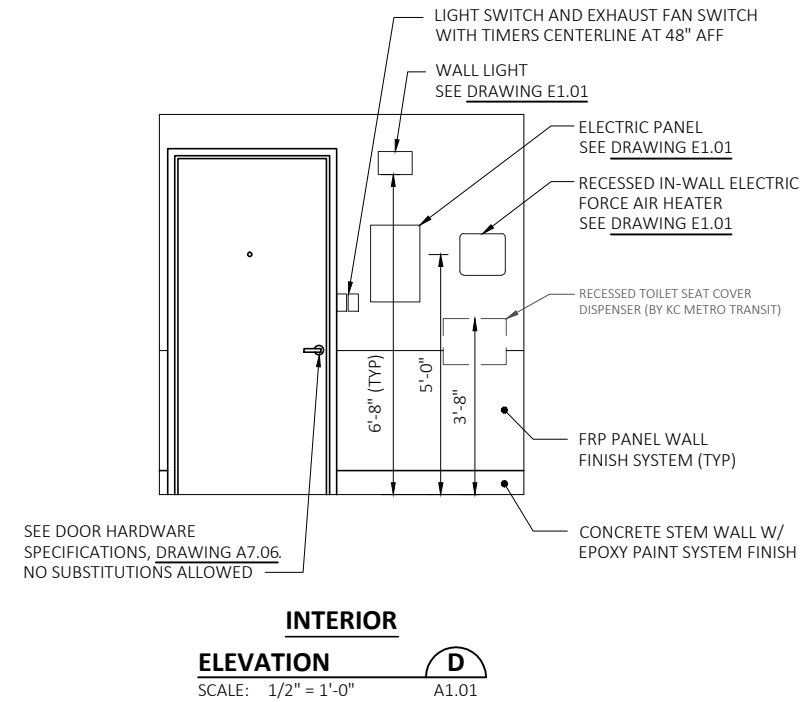
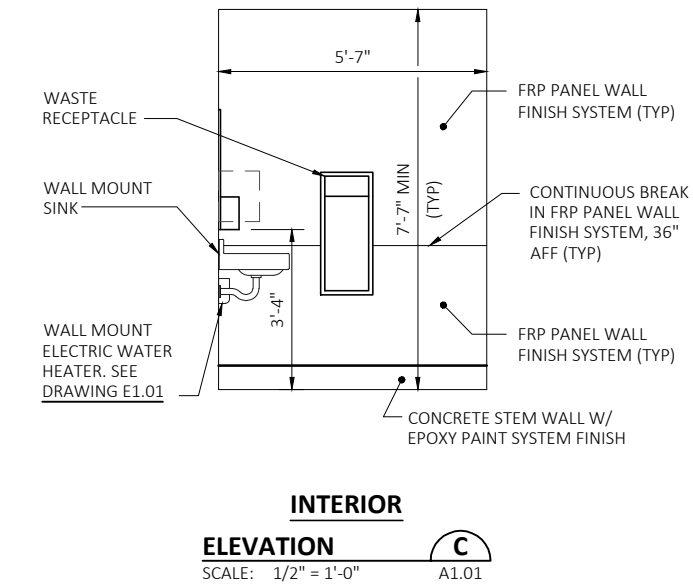
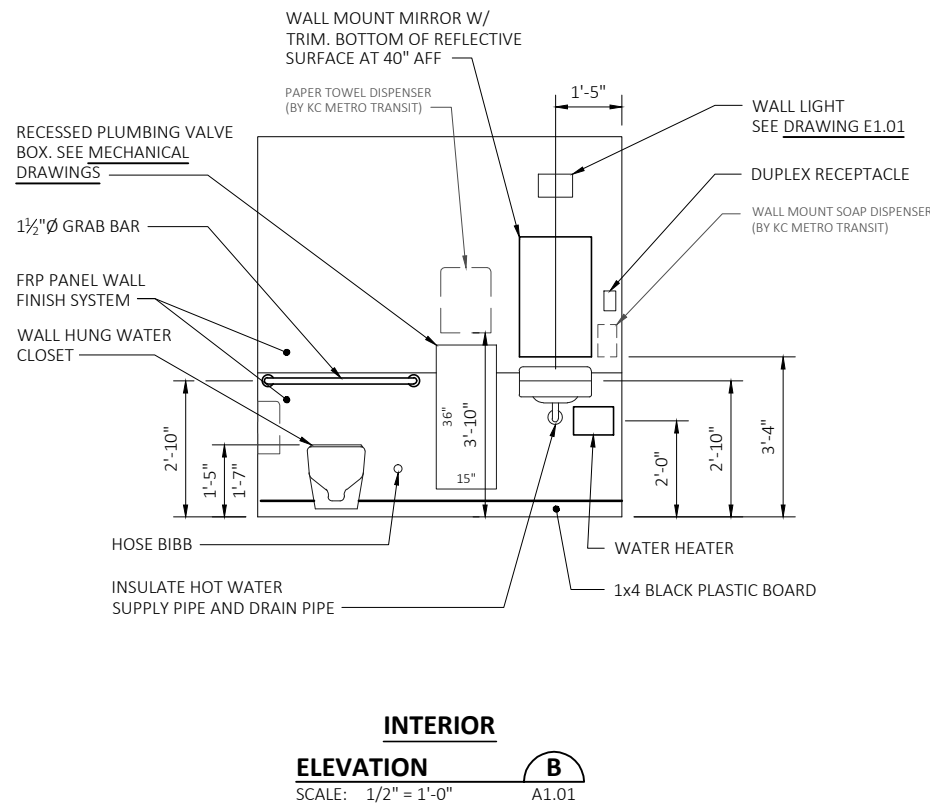
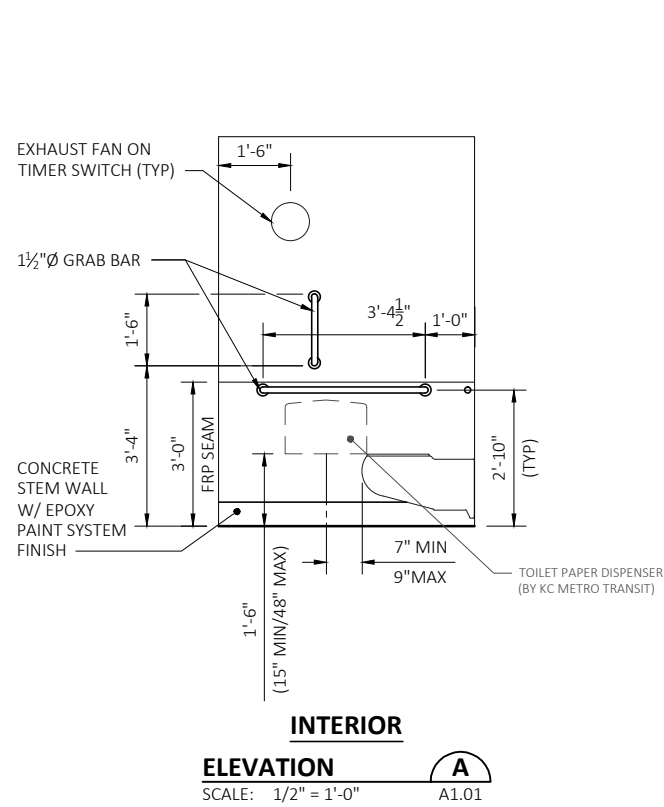
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CHECKED: J DAVIS	PROJECT NO:	ONE INCH AT FULL SIZE
RECOMMENDED: D CRIPPEN	WORK REQUEST: CONTRACT NO:	1" IF NOT ONE INCH, SCALE ACCORDINGLY



METRO TRANSIT DIVISION
STANDARD SINGLE-UNIT
DRIVER'S COMFORT STATION

EXTERIOR ELEVATIONS & DOOR SPECIFICATION

DATE: DECEMBER 2012
DRAWING NO: A2.01
SHEET NO: OF 3 16



WASHROOM EQUIPMENT SCHEDULE

ITEM	MANUFACTURER	MODEL NUMBER	DIMENSIONS
A1 ** PAPER HAND TOWEL DISPENSER	KIMBERLY CLARK PERFORMANCE CRITERIA: MUST ACCEPT KIMBERLY-CLARK MODEL 01000 HAND TOWEL ROLLS	IN SIGHT SANITOUCH® MODEL 09990 COLOR: SMOKE GREY	12.6" X 16.3" X 10.2"
A2 ** RECESSED TOILET SEAT COVER DISPENSER	BOBRICK	B-301	15.1875" X 12.75" X 2.5625" DEPTH
A3 ** WALL MOUNT TOILET PAPER HOLDER	KIMBERLY-CLARK PERFORMANCE CRITERIA: MUST ACCEPT SCOTT TYPE 07202 JUMBO ROLL TISSUE	IN-SIGHT CORED JRT® MODEL 09551, COLOR: SMOKE GREY, STYLE: COMBO UNIT	13.12" X 20.43" X 5.8"
A4 ** SURFACE-MOUNTED SOAP DISPENSER	BOBRICK	B-2111	4 3/4" X 8 1/8" X 3 1/2"
A5 SEMI-RECESSED TRASH RECEPTACLE	BOBRICK	B-3644, FINISH: SATIN-FINISH STAINLESS STEEL, STYLE: SEMI-RECESSED	17.2" X 30.6" X (4.1" X 23" PROJECTION)
A6 WALL MIRROR W/ STAINLESS STEEL CHANNEL FRAME	BOBRICK	B-165 1824	18" X 24"
A7 1 1/2" DIAMETER GRAB BARS	BOBRICK	6806 X 42 6806 X 6 6806 X 12	42" LENGTH x 1 1/2" DIAMETER 36" LENGTH x 1 1/2" DIAMETER 12" LENGTH x 1 1/2" DIAMETER
A8 WALL-MOUNTED VITREOUS CHINA SINK, WHITE	AMERICAN STANDARD	COMRADE 0124.024	20"W X 18.25"D WITH 4" FAUCET CENTERS
A9 WALL-HUNG TOILET, WHITE	KOHLER	KINGSTON K-4330	16.75" X 25.625" X 15" ABOVE FINISH FLOOR (W/O SEAT) WASTE EXIT CENTER = 5" ABOVE FINISHED FLOOR
A10 TOILET SEAT, WHITE	KOHLER	K-4679-CA LUSTRA WITH 1" HEIGHT BUMPERS	DEPTH 2" - 4" PER ADA 4.16.3
A11 UNDERLAVATORY GUARDS	PLUMBEREX SPECIALTY PRODUCTS, INC. TCI PRODUCTS. TRUEBRO, INC.	ANTIMICROBIAL, MOLDED-PLASTIC, WHITE	

** PROVIDED BY KING COUNTY METRO TRANSIT FOR INSTALLATION BY CONTRACTOR. CONTRACTOR SHALL PROVIDE BLOCKING AS REQUIRED FOR INSTALLATION.
NOTE: SEE DRAWING M5.01 FOR PLUMBING EQUIPMENT SCHEDULE.

WASHROOM ACCESSORIES SPECIFICATION 102800

- FABRICATION OF KEYS: PROVIDE UNIVERSAL KEYS FOR INTERNAL ACCESS TO ACCESSORIES FOR SERVICING AND RESUPPLYING. PROVIDE MINIMUM OF SIX KEYS TO KING COUNTY PROJECT REPRESENTATIVE.
- INSTALL ACCESSORIES ACCORDING TO MANUFACTURERS' WRITTEN INSTRUCTIONS, USING FASTENERS APPROPRIATE TO SUBSTRATE INDICATED AND RECOMMENDED BY UNIT MANUFACTURER. INSTALL UNITS LEVEL, PLUMB, AND FIRMLY ANCHORED IN LOCATIONS AND AT HEIGHTS INDICATED.

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CHECKED: J DAVIS	PROJECT NO:	ONE INCH AT FULL SIZE
RECOMMENDED: D CRIPPEN	WORK REQUEST: CONTRACT NO:	1" SCALE IF NOT ONE INCH, SCALE ACCORDINGLY



METRO TRANSIT DIVISION
STANDARD SINGLE-UNIT
DRIVER'S COMFORT STATION

INTERIOR ELEVATIONS & WASHROOM ACCESSORIES


DATE: DECEMBER 2012
DRAWING NO: A2.02
SHEET NO: OF 4 16

CAST-IN-PLACE CONCRETE SPECIFICATION 033000

1. THIS SECTION INCLUDES THE FOLLOWING:
 - A. CAST-IN PLACE CONCRETE.
 - B. FORMWORK.
 - C. REINFORCEMENT.
 - D. CONCRETE MATERIALS.
 - E. MIXTURE DESIGN.
 - F. PLACEMENT PROCEDURES.
 - G. FINISHES.
2. QUALITY ASSURANCE
 - A. MANUFACTURER QUALIFICATIONS: A FIRM EXPERIENCED IN MANUFACTURING READY-MIXED CONCRETE PRODUCTS AND THAT COMPLIES WITH ASTM C 94/C 94M REQUIREMENTS FOR PRODUCTION FACILITIES AND EQUIPMENT.
 - B. ACI PUBLICATIONS: COMPLY WITH THE FOLLOWING UNLESS MODIFIED BY REQUIREMENTS IN THE CONTRACT DOCUMENTS:
 - ACI 301, "SPECIFICATION FOR STRUCTURAL CONCRETE," SECTIONS 1 THROUGH 5.
 - ACI 117, "SPECIFICATIONS FOR TOLERANCES FOR CONCRETE CONSTRUCTION AND MATERIALS."
3. FORM-FACING MATERIALS
 - A. SMOOTH-FORMED FINISHED CONCRETE: FORM-FACING PANELS THAT WILL PROVIDE CONTINUOUS, TRUE, AND SMOOTH CONCRETE SURFACES. FURNISH IN LARGEST PRACTICABLE SIZES TO MINIMIZE NUMBER OF JOINTS.
4. STEEL REINFORCEMENT
 - A. REINFORCING BARS: ASTM A 615/A 615M, GRADE 60, DEFORMED.
 - B. BAR SUPPORTS: BOLSTERS, CHAIRS, SPACERS, AND OTHER DEVICES FOR SPACING, SUPPORTING, AND FASTENING REINFORCING BARS AND WELDED WIRE REINFORCEMENT IN PLACE. MANUFACTURE BAR SUPPORTS FROM STEEL WIRE, PLASTIC, OR PRECAST CONCRETE ACCORDING TO CRSI'S "MANUAL OF STANDARD PRACTICE."
5. CONCRETE MATERIALS
 - A. CEMENTITIOUS MATERIAL: USE THE FOLLOWING CEMENTITIOUS MATERIALS, OF THE SAME TYPE, BRAND, AND SOURCE, THROUGHOUT PROJECT: PORTLAND CEMENT: ASTM C 150, TYPE II.
 - B. NORMAL-WEIGHT AGGREGATES: ASTM C 33, GRADED, 1-1/2-INCH NOMINAL MAXIMUM COARSE-AGGREGATE SIZE.
 - C. WATER: ASTM C 94/C 94M.
 - D. AIR-ENTRAINING ADMIXTURE: ASTM C 260.
 - E. CHEMICAL ADMIXTURES: PROVIDE ADMIXTURES CERTIFIED BY MANUFACTURER TO BE COMPATIBLE WITH OTHER ADMIXTURES AND THAT WILL NOT CONTRIBUTE WATER-SOLUBLE CHLORIDE IONS EXCEEDING THOSE PERMITTED IN HARDENED CONCRETE. DO NOT USE CALCIUM CHLORIDE OR ADMIXTURES CONTAINING CALCIUM CHLORIDE.
 - WATER-REDUCING ADMIXTURE: ASTM C 494/C 494M, TYPE A.
 - RETARDING ADMIXTURE: ASTM C 494/C 494M, TYPE B.
 - WATER-REDUCING AND RETARDING ADMIXTURE: ASTM C 494/C 494M, TYPE D.
 - HIGH-RANGE, WATER-REDUCING ADMIXTURE: ASTM C 494/C 494M, TYPE F.
 - HIGH-RANGE, WATER-REDUCING AND RETARDING ADMIXTURE: ASTM C 494/C 494M, TYPE G.
 - PLASTICIZING AND RETARDING ADMIXTURE: ASTM C 1017/C 1017M, TYPE II.
6. VAPOR RETARDERS
 - A. PLASTIC VAPOR RETARDER: ASTM E 1745, CLASS C, OR POLYETHYLENE SHEET, ASTM D 4397, NOT LESS THAN 10 MILS THICK. INCLUDE MANUFACTURER'S RECOMMENDED ADHESIVE OR PRESSURE-SENSITIVE JOINT TAPE.
7. CURING MATERIALS
 - A. ABSORPTIVE COVER: AASHTO M 182, CLASS 2, BURLAP CLOTH MADE FROM JUTE OR KENAF, WEIGHING APPROXIMATELY 9 OZ./SQ. YD. WHEN DRY.
8. RELATED MATERIALS
 - A. EXPANSION- AND ISOLATION-JOINT-FILLER STRIPS: ASTM D 1751, ASPHALT-SATURATED CELLULOSIC FIBER OR ASTM D 1752, CORK OR SELF-EXPANDING CORK.
9. CONCRETE MIXTURES
 - A. PREPARE DESIGN MIXTURES FOR EACH TYPE AND STRENGTH OF CONCRETE, PROPORTIONED ON THE BASIS OF LABORATORY TRIAL MIXTURE OR FIELD TEST DATA, OR BOTH, ACCORDING TO ACI 301.
 - B. PROPORTION NORMAL-WEIGHT CONCRETE MIXTURE AS FOLLOWS:
 - MINIMUM COMPRESSIVE STRENGTH: 3000 PSI AT 7 DAYS.
 - MAXIMUM WATER-CEMENTITIOUS MATERIALS RATIO: 0.50.
 - SLUMP LIMIT: 4 INCHES MAXIMUM.
 - AIR CONTENT: 5 PERCENT, PLUS OR MINUS 1.5 PERCENT AT POINT OF DELIVERY FOR 1-1/2-INCH NOMINAL MAXIMUM AGGREGATE SIZE.
 - AIR CONTENT: DO NOT ALLOW AIR CONTENT OF TROWELED FINISHED FLOORS TO EXCEED 3 PERCENT.
10. FABRICATING REINFORCEMENT
 - A. FABRICATE STEEL REINFORCEMENT ACCORDING TO CRSI'S "MANUAL OF STANDARD PRACTICE."
11. CONCRETE MIXING
 - A. READY-MIXED CONCRETE: MEASURE, BATCH, MIX, AND DELIVER CONCRETE ACCORDING TO ASTM C 94/C 94M AND ASTM C 1116, AND FURNISH BATCH TICKET INFORMATION.
 - WHEN AIR TEMPERATURE IS BETWEEN 85 AND 90 DEG F, REDUCE MIXING AND DELIVERY TIME FROM 1-1/2 HOURS TO 75 MINUTES; WHEN AIR TEMPERATURE IS ABOVE 90 DEG F, REDUCE MIXING AND DELIVERY TIME TO 60 MINUTES.
12. FORMWORK
 - A. DESIGN, ERECT, SHORE, BRACE, AND MAINTAIN FORMWORK ACCORDING TO ACI 301 TO SUPPORT VERTICAL, LATERAL, STATIC, AND DYNAMIC LOADS, AND CONSTRUCTION LOADS THAT MIGHT BE APPLIED, UNTIL STRUCTURE CAN SUPPORT SUCH LOADS.
 - B. CONSTRUCT FORMWORK SO CONCRETE MEMBERS AND STRUCTURES ARE OF SIZE, SHAPE, ALIGNMENT, ELEVATION, AND POSITION INDICATED, WITHIN TOLERANCE LIMITS OF ACI 117.
 - C. CHAMFER EXTERIOR CORNERS AND EDGES OF PERMANENTLY EXPOSED CONCRETE.
13. EMBEDDED ITEMS INSTALLATION
 - A. PLACE AND SECURE ANCHORAGE DEVICES AND OTHER EMBEDDED ITEMS REQUIRED FOR ADJOINING WORK THAT IS ATTACHED TO OR SUPPORTED BY CAST-IN-PLACE CONCRETE. USE SETTING DRAWINGS, TEMPLATES, DIAGRAMS, INSTRUCTIONS, AND DIRECTIONS FURNISHED WITH ITEMS TO BE EMBEDDED.
14. VAPOR RETARDER INSTALLATION
 - A. PLASTIC VAPOR RETARDERS: PLACE, PROTECT, AND REPAIR VAPOR RETARDERS ACCORDING TO ASTM E 1643 AND MANUFACTURER'S WRITTEN INSTRUCTIONS.
 - LAP JOINTS 6 INCHES AND SEAL WITH MANUFACTURER'S RECOMMENDED TAPE.
15. STEEL REINFORCEMENT INSTALLATION
 - A. GENERAL: COMPLY WITH CRSI'S "MANUAL OF STANDARD PRACTICE" FOR PLACING REINFORCEMENT.
 - DO NOT CUT OR PUNCTURE VAPOR RETARDER. REPAIR DAMAGE AND RESEAL VAPOR RETARDER BEFORE PLACING CONCRETE.
16. JOINTS
 - A. GENERAL: CONSTRUCT JOINTS TRUE TO LINE WITH FACES PERPENDICULAR TO SURFACE PLANE OF CONCRETE.
 - B. ISOLATION JOINTS IN SLABS-ON-GRADE: AFTER REMOVING FORMWORK, INSTALL JOINT-FILLER STRIPS AT SLAB JUNCTIONS WITH VERTICAL SURFACES, SUCH AS RETAINING WALLS, FOUNDATION WALLS, BACK OF CURB, AND OTHER LOCATIONS, AS INDICATED.
17. CONCRETE PLACEMENT
 - A. BEFORE PLACING CONCRETE, VERIFY THAT INSTALLATION OF FORMWORK, REINFORCEMENT, AND EMBEDDED ITEMS IS COMPLETE AND THAT REQUIRED INSPECTIONS HAVE BEEN PERFORMED.
 - B. DEPOSIT CONCRETE CONTINUOUSLY IN ONE LAYER OR IN HORIZONTAL LAYERS OF SUCH THICKNESS THAT NO NEW CONCRETE WILL BE PLACED ON CONCRETE THAT HAS HARDENED ENOUGH TO CAUSE SEAMS OR PLANES OF WEAKNESS. CONSOLIDATE PLACED CONCRETE WITH MECHANICAL VIBRATING EQUIPMENT ACCORDING TO ACI 301.
 - C. COLD-WEATHER PLACEMENT: COMPLY WITH ACI 306.1.
 - D. HOT-WEATHER PLACEMENT: COMPLY WITH ACI 301.
18. FINISHING FORMED SURFACES
 - A. SMOOTH-FORMED FINISH: AS-CAST CONCRETE TEXTURE IMPARTED BY FORM-FACING MATERIAL, ARRANGED IN AN ORDERLY AND SYMMETRICAL MANNER WITH A MINIMUM OF SEAMS. REPAIR AND PATCH THE HOLES AND DEFECTS. REMOVE FINS AND OTHER PROJECTIONS THAT EXCEED SPECIFIED LIMITS ON FORMED-SURFACE IRREGULARITIES.
 - APPLY TO CONCRETE SURFACES EXPOSED TO PUBLIC VIEW: FLOOR AND STEM WALL.
 - B. RELATED UNFORMED SURFACES: AT TOPS OF WALLS, HORIZONTAL OFFSETS, AND SIMILAR UNFORMED SURFACES ADJACENT TO FORMED SURFACES, STRIKE OFF SMOOTH AND FINISH WITH A TEXTURE MATCHING ADJACENT FORMED SURFACES. CONTINUE FINAL SURFACE TREATMENT OF FORMED SURFACES UNIFORMLY ACROSS ADJACENT UNFORMED SURFACES, UNLESS OTHERWISE INDICATED.
19. FINISHING FLOORS AND SLABS
 - A. GENERAL: COMPLY WITH ACI 302.1R RECOMMENDATIONS FOR SCREEDING, RESTRAIGHTENING, AND FINISHING OPERATIONS FOR CONCRETE SURFACES. DO NOT WET CONCRETE SURFACES.
 - B. FLOAT FINISH: CONSOLIDATE SURFACE WITH POWER-DRIVEN FLOATS OR BY HAND FLOATING IF AREA IS SMALL OR INACCESSIBLE TO POWER DRIVEN FLOATS. RESTRAIGHTEN, CUT DOWN HIGH SPOTS, AND FILL LOW SPOTS. REPEAT FLOAT PASSES AND RESTRAIGHTENING UNTIL SURFACE IS LEFT WITH A UNIFORM, SMOOTH, GRANULAR TEXTURE.
 - APPLY FLOAT FINISH TO FLOOR SLAB SURFACES EXPOSED TO VIEW.
 - C. TROWEL FINISH: AFTER APPLYING FLOAT FINISH, APPLY FIRST TROWELING AND CONSOLIDATE CONCRETE BY HAND OR POWER-DRIVEN TROWEL. CONTINUE TROWELING PASSES AND RESTRAIGHTEN UNTIL SURFACE IS FREE OF TROWEL MARKS AND UNIFORM IN TEXTURE AND APPEARANCE. GRIND SMOOTH ANY SURFACE DEFECTS THAT WOULD TELEGRAPH THROUGH APPLIED COATINGS OR FLOOR COVERINGS.
 - APPLY A TROWEL FINISH TO FLOOR SLAB SURFACES EXPOSED TO VIEW.
 - FINISH AND MEASURE SURFACE PER DRAWINGS SO FINISH SLOPES ARE UNIFORM AND DO NOT DEVIATE FROM SPECIFIED SPOT GRADE ELEVATIONS MORE THAN 1/4" IN 10 FEET.
20. CONCRETE PROTECTING AND CURING
 - A. GENERAL: PROTECT FRESHLY PLACED CONCRETE FROM PREMATURE DRYING AND EXCESSIVE COLD OR HOT TEMPERATURES. COMPLY WITH ACI 306.1 FOR COLD-WEATHER PROTECTION AND ACI 301 FOR HOT-WEATHER PROTECTION DURING CURING.
 - B. EVAPORATION RETARDER: APPLY EVAPORATION RETARDER TO UNFORMED CONCRETE SURFACES IF HOT, DRY, OR WINDY CONDITIONS CAUSE MOISTURE LOSS APPROACHING 0.2 LB/SQ. FT. X H BEFORE AND DURING FINISHING OPERATIONS. APPLY ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS AFTER PLACING, SCREEDING, AND BULL FLOATING OR DARBING CONCRETE, BUT BEFORE FLOAT FINISHING.
 - C. CURE CONCRETE ACCORDING TO ACI 308.1, BY ONE OR A COMBINATION OF THE FOLLOWING METHODS:
 - MOISTURE CURING: KEEP SURFACES CONTINUOUSLY MOIST FOR NOT LESS THAN SEVEN DAYS.
 - MOISTURE-RETAINING-COVER CURING: COVER CONCRETE SURFACES WITH MOISTURE-RETAINING COVER FOR CURING CONCRETE, PLACED IN WIDEST PRACTICABLE WIDTH, WITH SIDES AND ENDS LAPPED AT LEAST 12 INCHES, AND SEALED BY WATERPROOF TAPE OR ADHESIVE. CURE FOR NOT LESS THAN SEVEN DAYS. IMMEDIATELY REPAIR ANY HOLES OR TEARS DURING CURING PERIOD USING COVER MATERIAL AND WATERPROOF TAPE.
 - CURING COMPOUND: APPLY UNIFORMLY IN CONTINUOUS OPERATION BY POWER SPRAY OR ROLLER ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS. RECOAT AREAS SUBJECTED TO HEAVY RAINFALL WITHIN THREE HOURS AFTER INITIAL APPLICATION. MAINTAIN CONTINUITY OF COATING AND REPAIR DAMAGE DURING CURING PERIOD.
 - CURING AND SEALING COMPOUND: APPLY UNIFORMLY TO FLOORS AND SLABS INDICATED IN A CONTINUOUS OPERATION BY POWER SPRAY OR ROLLER ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS. RECOAT AREAS SUBJECTED TO HEAVY RAINFALL WITHIN THREE HOURS AFTER INITIAL APPLICATION. REPEAT PROCESS 24 HOURS LATER AND APPLY A SECOND COAT. MAINTAIN CONTINUITY OF COATING AND REPAIR DAMAGE DURING CURING PERIOD.
21. CONCRETE SURFACE REPAIRS
 - A. DEFECTIVE CONCRETE: REPAIR AND PATCH DEFECTIVE AREAS WHEN APPROVED BY KING COUNTY PROJECT REPRESENTATIVE. REMOVE AND REPLACE CONCRETE THAT CANNOT BE REPAIRED AND PATCHED TO ARCHITECT'S APPROVAL.
22. FIELD QUALITY CONTROL
 - A. TESTING AND INSPECTING: OWNER WILL ENGAGE A QUALIFIED INDEPENDENT TESTING AND INSPECTING AGENCY TO PERFORM FIELD TESTS AND INSPECTIONS AND PREPARE TEST REPORTS.
 - TESTING SERVICES: TESTS SHALL BE PERFORMED ACCORDING TO ACI 301.

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METRO TRANSIT DIVISION
STANDARD SINGLE-UNIT
DRIVER'S COMFORT STATION

CAST-IN-PLACE
CONCRETE SPECIFICATION

DATE: DECEMBER 2012
DRAWING NO: A7.01
SHEET NO: OF 5 16

ROUGH CARPENTRY SPECIFICATION 061000

1. THIS SECTION INCLUDES THE FOLLOWING:
 - A. FRAMING WITH DIMENSION LUMBER.
 - B. WOOD BLOCKING, CANTS, AND NAILERS.
2. WOOD PRODUCTS, GENERAL
 - A. LUMBER: DOC PS 20 AND APPLICABLE RULES OF GRADING AGENCIES INDICATED. IF NO GRADING AGENCY IS INDICATED, PROVIDE LUMBER THAT COMPLIES WITH THE APPLICABLE RULES OF ANY RULES-WRITING AGENCY CERTIFIED BY THE ALSB BOARD OF REVIEW. PROVIDE LUMBER GRADED BY AN AGENCY CERTIFIED BY THE ALSB BOARD OF REVIEW TO INSPECT AND GRADE LUMBER UNDER THE RULES INDICATED.
 - FACTORY MARK EACH PIECE OF LUMBER WITH GRADE STAMP OF GRADING AGENCY.
 - PROVIDE DRESSED LUMBER, S4S, UNLESS OTHERWISE INDICATED.
3. WOOD-PRESERVATIVE-TREATED LUMBER
 - A. PRESERVATIVE TREATMENT BY PRESSURE PROCESS: AWPA C2, EXCEPT THAT LUMBER THAT IS NOT IN CONTACT WITH THE GROUND AND IS CONTINUOUSLY PROTECTED FROM LIQUID WATER MAY BE TREATED ACCORDING TO AWPA C31 WITH INORGANIC BORON (SBX).
 - PRESERVATIVE CHEMICALS: ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION AND CONTAINING NO ARSENIC OR CHROMIUM.
 - B. KILN-DRY LUMBER AFTER TREATMENT TO A MAXIMUM MOISTURE CONTENT OF 19 PERCENT.
 - C. MARK LUMBER WITH TREATMENT QUALITY MARK OF AN INSPECTION AGENCY APPROVED BY THE ALSB BOARD OF REVIEW.
 - D. APPLICATION: TREAT ITEMS INDICATED ON DRAWINGS, AND THE FOLLOWING:
 - WOOD SILLS, SLEEPERS, BLOCKING, AND SIMILAR CONCEALED MEMBERS IN CONTACT WITH MASONRY OR CONCRETE.
5. DIMENSION LUMBER FRAMING
 - A. MAXIMUM MOISTURE CONTENT: 19 PERCENT.
 - B. FRAMING OTHER THAN NON-LOAD-BEARING INTERIOR PARTITIONS: CONSTRUCTION OR NO. 2 GRADE AND ANY OF THE FOLLOWING SPECIES:
 - HEM-FIR (NORTH); NLGA.
 - DOUGLAS FIR-LARCH; WCLIB OR WWPA.
6. MISCELLANEOUS LUMBER
 - A. GENERAL: PROVIDE MISCELLANEOUS LUMBER INDICATED AND LUMBER FOR SUPPORT OR ATTACHMENT OF OTHER CONSTRUCTION, INCLUDING THE FOLLOWING:
 - BLOCKING.
 - NAILERS.
 - B. FOR ITEMS OF DIMENSION LUMBER SIZE, PROVIDE CONSTRUCTION OR NO. 2 GRADE LUMBER WITH 19 PERCENT MAXIMUM MOISTURE CONTENT OF ANY SPECIES.
 - C. FOR CONCEALED BOARDS, PROVIDE LUMBER WITH 19 PERCENT MAXIMUM MOISTURE CONTENT AND THE FOLLOWING SPECIES AND GRADES:
 - WESTERN WOODS, CONSTRUCTION OR NO. 2 COMMON GRADE; WCLIB OR WWPA.
7. FASTENERS
 - A. GENERAL: PROVIDE FASTENERS OF SIZE AND TYPE INDICATED THAT COMPLY WITH REQUIREMENTS SPECIFIED.
 - WHERE ROUGH CARPENTRY IS EXPOSED TO WEATHER, IN GROUND CONTACT, PRESSURE-PRESERVATIVE TREATED, OR IN AREA OF HIGH RELATIVE HUMIDITY, PROVIDE FASTENERS WITH HOT-DIP ZINC COATING COMPLYING WITH ASTM A 153/A 153M.
 - B. POWER-DRIVEN FASTENERS: NES NER-272.
 - C. BOLTS: STEEL BOLTS COMPLYING WITH ASTM A 307, GRADE A WITH ASTM A 563 HEX NUTS AND, WHERE INDICATED, FLAT WASHERS.
8. METAL FRAMING ANCHORS

- A. BASIS-OF-DESIGN PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS INDICATED ON DRAWINGS OR COMPARABLE PRODUCTS BY ONE OF THE FOLLOWING:
 - ALPINE ENGINEERED PRODUCTS, INC.
 - KC METALS PRODUCTS, INC.
 - SIMPSON STRONG-TIE CO., INC.
 - USP STRUCTURAL CONNECTORS.
 - B. ALLOWABLE DESIGN LOADS: PROVIDE PRODUCTS WITH ALLOWABLE DESIGN LOADS, AS PUBLISHED BY MANUFACTURER, THAT MEET OR EXCEED THOSE INDICATED. MANUFACTURER'S PUBLISHED VALUES SHALL BE DETERMINED FROM EMPIRICAL DATA OR BY RATIONAL ENGINEERING ANALYSIS AND DEMONSTRATED BY COMPREHENSIVE TESTING PERFORMED BY A QUALIFIED INDEPENDENT TESTING AGENCY.
 - C. GALVANIZED STEEL SHEET: HOT-DIP, ZINC-COATED STEEL SHEET COMPLYING WITH ASTM A 653/A 653M, G60 COATING DESIGNATION.
9. MISCELLANEOUS MATERIALS
 - A. SILL-SEALER GASKETS: GLASS-FIBER-RESILIENT INSULATION, FABRICATED IN STRIP FORM, FOR USE AS A SILL SEALER; 1-INCH NOMINAL THICKNESS, COMPRESSIBLE TO 1/32 INCH; SELECTED FROM MANUFACTURER'S STANDARD WIDTHS TO SUIT WIDTH OF SILL MEMBERS INDICATED.
10. INSTALLATION
 - A. SET ROUGH CARPENTRY TO REQUIRED LEVELS AND LINES, WITH MEMBERS PLUMB, TRUE TO LINE, CUT, AND FITTED. FIT ROUGH CARPENTRY TO OTHER CONSTRUCTION; SCRIBE AND COPE AS NEEDED FOR ACCURATE FIT. LOCATE NAILERS, BLOCKING, AND SIMILAR SUPPORTS TO COMPLY WITH REQUIREMENTS FOR ATTACHING OTHER CONSTRUCTION.
 - B. FRAMING STANDARD: COMPLY WITH AF&PA'S "DETAILS FOR CONVENTIONAL WOOD FRAME CONSTRUCTION," UNLESS OTHERWISE INDICATED.
 - C. METAL FRAMING ANCHORS: INSTALL METAL FRAMING TO COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.
 - D. DO NOT SPLICE STRUCTURAL MEMBERS BETWEEN SUPPORTS, UNLESS OTHERWISE INDICATED.
 - E. COMPLY WITH AWPA M4 FOR APPLYING FIELD TREATMENT TO CUT SURFACES OF PRESERVATIVE-TREATED LUMBER.
 - F. SECURELY ATTACH ROUGH CARPENTRY WORK TO SUBSTRATE BY ANCHORING AND FASTENING AS INDICATED, COMPLYING WITH THE FOLLOWING:
 - NES NER-272 FOR POWER-DRIVEN FASTENERS.
 - TABLE 2304.9.1, "FASTENING SCHEDULE," IN ICC'S INTERNATIONAL BUILDING CODE.
 11. PROTECTION
 - A. PROTECT WOOD THAT HAS BEEN TREATED WITH INORGANIC BORON (SBX) FROM WEATHER. IF, DESPITE PROTECTION, INORGANIC BORON-TREATED WOOD BECOMES WET, APPLY EPA-REGISTERED BORATE TREATMENT. APPLY BORATE SOLUTION BY SPRAYING TO COMPLY WITH EPA-REGISTERED LABEL.

No.	REVISION	BY	APP'D	DATE

SHEATHING SPECIFICATION 061600

1. THIS SECTION INCLUDES THE FOLLOWING:
 - A. WALL SHEATHING.
 - B. ROOF SHEATHING.
 - C. BUILDING PAPER.
 - D. FLEXIBLE FLASHING AT OPENINGS IN SHEATHING.
2. DELIVERY, STORAGE, AND HANDLING
 - A. STACK PLYWOOD AND OTHER PANELS FLAT WITH SPACERS BETWEEN EACH BUNDLE TO PROVIDE AIR CIRCULATION. PROVIDE FOR AIR CIRCULATION AROUND STACKS AND UNDER COVERINGS.
4. WOOD PANEL PRODUCTS, GENERAL
 - A. PLYWOOD: DOC PS OR DOC PS 2.
5. WALL SHEATHING
 - A. PLYWOOD WALL SHEATHING: EXTERIOR, STRUCTURAL I SHEATHING.
6. ROOF SHEATHING
 - A. PLYWOOD ROOF SHEATHING: EXTERIOR, STRUCTURAL I SHEATHING.
7. FASTENERS
 - A. GENERAL: PROVIDE FASTENERS OF SIZE AND TYPE INDICATED.
 - FOR WALL AND ROOF SHEATHING PANELS, PROVIDE FASTENERS WITH CORROSION-PROTECTIVE COATING HAVING A SALT-SPRAY RESISTANCE OF MORE THAN 800 HOURS ACCORDING TO ASTM B 117.
8. WEATHER-RESISTANT SHEATHING PAPER
 - A. BUILDING PAPER: ASTM D 226, TYPE 1 (NO. 15 ASPHALT-SATURATED ORGANIC FELT), UNPERFORATED.
9. MISCELLANEOUS MATERIALS
 - A. ADHESIVES FOR FIELD GLUING PANELS TO FRAMING: FORMULATION COMPLYING WITH ASTM D 3498 THAT IS APPROVED FOR USE INDICATED BY MANUFACTURERS OF BOTH ADHESIVES AND PANELS.
 - USE ADHESIVES THAT HAVE A VOC CONTENT OF 50 G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).
 - B. FLEXIBLE FLASHING: SELF-ADHESIVE, RUBBERIZED-ASPHALT COMPOUND, BONDED TO A HIGH-DENSITY, POLYETHYLENE FILM TO PRODUCE AN OVERALL THICKNESS OF NOT LESS THAN 0.025 INCH.
10. INSTALLATION, GENERAL
 - A. SECURELY ATTACH TO SUBSTRATE BY FASTENING AS INDICATED, COMPLYING WITH THE FOLLOWING:
 - NES NER-272 FOR POWER-DRIVEN FASTENERS.
 - TABLE 2304.9.1, "FASTENING SCHEDULE," IN ICC'S "INTERNATIONAL BUILDING CODE."
 - B. COORDINATE SHEATHING INSTALLATION WITH FLASHING AND JOINT-SEALANT INSTALLATION SO THESE MATERIALS ARE INSTALLED IN SEQUENCE AND MANNER THAT EXCLUDE EXTERIOR MOISTURE.
11. WEATHER-RESISTANT SHEATHING-PAPER INSTALLATION
 - A. GENERAL: COVER SHEATHING WITH WEATHER-RESISTANT SHEATHING PAPER AS FOLLOWS:
 - CUT BACK BARRIER 1/2 INCH ON EACH SIDE OF THE BREAK IN SUPPORTING MEMBERS AT EXPANSION- OR CONTROL-JOINT LOCATIONS.
 - APPLY BARRIER TO COVER VERTICAL FLASHING WITH A MINIMUM 4-INCH OVERLAP, UNLESS OTHERWISE INDICATED.

DESIGNED: B FARISS-BATEMAN	PROJECT MANAGER:	SCALE: NONE
DRAWN: B FARISS-BATEMAN	APPROVED:	SITE LOCATION NO:
CHECKED: J DAVIS	PROJECT NO:	ONE INCH AT FULL SIZE
RECOMMENDED: D CRIPPEN	WORK REQUEST: CONTRACT NO:	1" IF NOT ONE INCH, SCALE ACCORDINGLY



**METRO TRANSIT DIVISION
STANDARD SINGLE-UNIT
DRIVER'S COMFORT STATION**

**ROUGH CARPENTRY &
SHEATHING SPECIFICATIONS**

DATE: DECEMBER 2012
DRAWING NO: A7.02
SHEET NO: OF 6 16

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THERMAL INSULATION SPECIFICATION 072100

1. THIS SECTION INCLUDES THE FOLLOWING:
 - A. PERIMETER WALL INSULATION (SUPPORTING BACKFILL).
 - B. CONCEALED BUILDING INSULATION.
2. QUALITY ASSURANCE
 - A. FIRE-TEST-RESPONSE CHARACTERISTICS: PROVIDE INSULATION AND RELATED MATERIALS WITH THE FIRE-TEST-RESPONSE CHARACTERISTICS INDICATED, AS DETERMINED BY TESTING IDENTICAL PRODUCTS PER ASTM E 84 FOR SURFACE-BURNING CHARACTERISTICS AND OTHER METHODS INDICATED WITH PRODUCT, BY UL OR ANOTHER TESTING AND INSPECTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION. IDENTIFY MATERIALS WITH APPROPRIATE MARKINGS OF APPLICABLE TESTING AND INSPECTING AGENCY.
4. MANUFACTURERS
 - A. ACCEPTABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, MANUFACTURERS SPECIFIED.
5. FOAM-PLASTIC BOARD INSULATION
 - A. EXTRUDED-POLYSTYRENE BOARD INSULATION (FOUNDATION PERIMETER): ASTM C 578, TYPE IV, 1.60 LB/CU. FT., WITH MAXIMUM FLAME-SPREAD AND SMOKE-DEVELOPED INDEXES OF 75 AND 450, RESPECTIVELY:
 - MANUFACTURERS:
 - DIVERSIFOAM PRODUCTS.
 - DOW CHEMICAL COMPANY.
 - OWENS CORNING.
 - PACTIV BUILDING PRODUCTS DIVISION.
 - B. FOIL-FACED, POLYISOCYANURATE BOARD INSULATION (WALLS AND ROOF): ASTM C 1289, TYPE I, CLASS 1 OR 2, WITH MAXIMUM FLAME-SPREAD AND SMOKE-DEVELOPED INDEXES OF 75 AND 450, RESPECTIVELY, BASED ON TESTS PERFORMED ON UNFACED CORE ON THICKNESSES UP TO 4 INCHES.
 - MATERIAL TYPE: HCFC-FREE.
 - MANUFACTURERS:
 - a. ATLAS ROOFING CORPORATION.
 - b. DOW CHEMICAL COMPANY.
 - c. RMAX, INC.
6. GLASS-FIBER BLANKET INSULATION
 - A. AVAILABLE MANUFACTURERS:
 - CERTAINTEED CORPORATION.
 - GUARDIAN FIBERGLASS, INC.
 - JOHNS MANVILLE.
 - KNAUF FIBER GLASS.
 - OWENS CORNING.
 - APPROVED EQUAL.
 - B. FACED, GLASS-FIBER BLANKET INSULATION: ASTM C 665, TYPE III (BLANKETS WITH REFLECTIVE MEMBRANE FACING), CLASS A (MEMBRANE-FACED SURFACE WITH A FLAME-SPREAD INDEX OF 25 OR LESS); CATEGORY 1 (MEMBRANE IS A VAPOR BARRIER), FACED WITH FOIL-SCRIM-KRAFT, FOIL-SCRIM, OR FOIL-SCRIM-POLYETHYLENE VAPOR-RETARDER MEMBRANE ON 1 FACE.
 - C. WHERE GLASS-FIBER BLANKET INSULATION IS INDICATED BY THE FOLLOWING THICKNESSES, PROVIDE BLANKETS IN BATT OR ROLL FORM WITH THERMAL RESISTANCES INDICATED:
 - 5-1/2 INCHES THICK WITH A THERMAL RESISTANCE OF 19 DEG F X H X SQ. FT./BTU AT 75 DEG F (3.3 K X SQ. M/W AT 24 DEG C).
 - 6-1/2 INCHES THICK WITH A THERMAL RESISTANCE OF 21 DEG F X H X SQ. FT./BTU AT 75 DEG F (3.7 K X SQ. M/W AT 24 DEG C).
7. AUXILIARY INSULATING MATERIALS
 - A. ADHESIVE FOR BONDING INSULATION: PRODUCT WITH DEMONSTRATED CAPABILITY TO BOND INSULATION SECURELY TO SUBSTRATES INDICATED WITHOUT DAMAGING INSULATION AND SUBSTRATES.
8. INSULATION FASTENERS
 - A. ADHESIVELY ATTACHED, SPINDLE-TYPE ANCHORS: PLATE OR ANGLE FORMED FROM PERFORATED GALVANIZED CARBON-STEEL SHEET, 0.030 INCH THICK BY 2 INCHES SQUARE, WELDED TO PROJECTING COPPER-COATED STEEL SPINDLE 0.105 INCH IN DIAMETER AND OF LENGTH CAPABLE OF HOLDING INSULATION OF THICKNESS INDICATED SECURELY IN POSITION WITH 1-1/2-INCH- SQUARE OR DIAMETER SELF-LOCKING WASHERS COMPLYING WITH THE FOLLOWING REQUIREMENTS:
 - INSULATION-RETAINING WASHERS: SELF-LOCKING WASHERS FORMED FROM 0.016-INCH- THICK GALVANIZED STEEL SHEET, WITH BEVELED EDGE FOR INCREASED STIFFNESS.
 - B. ANCHOR ADHESIVE: PRODUCT WITH DEMONSTRATED CAPABILITY TO BOND INSULATION ANCHORS SECURELY TO SUBSTRATES INDICATED WITHOUT DAMAGING INSULATION, FASTENERS, AND SUBSTRATES.
9. INSTALLATION, GENERAL
 - A. COMPLY WITH INSULATION MANUFACTURER'S WRITTEN INSTRUCTIONS APPLICABLE TO PRODUCTS AND APPLICATION INDICATED.
 - B. INSTALL INSULATION THAT IS UNDAMAGED, DRY, AND UNSOILED AND THAT HAS NOT BEEN LEFT EXPOSED AT ANY TIME TO ICE, RAIN, AND SNOW.
 - C. EXTEND INSULATION IN THICKNESS INDICATED TO ENVELOP ENTIRE AREA TO BE INSULATED. CUT AND FIT TIGHTLY AROUND OBSTRUCTIONS AND FILL VOIDS WITH INSULATION. REMOVE PROJECTIONS THAT INTERFERE WITH PLACEMENT.
 - D. WATER-PIPING COORDINATION: COORDINATE LOCATION OF PIPING TO ENSURE THAT IT IS PLACED ON WARM SIDE OF INSULATION AND INSULATION ENCAPSULATES PIPING.
 - E. FOR PREFORMED INSULATING UNITS, PROVIDE SIZES TO FIT APPLICATIONS INDICATED AND SELECTED FROM MANUFACTURER'S STANDARD THICKNESSES, WIDTHS, AND LENGTHS. APPLY SINGLE LAYER OF INSULATION UNITS TO PRODUCE THICKNESS INDICATED UNLESS MULTIPLE LAYERS ARE OTHERWISE SHOWN OR REQUIRED TO MAKE UP TOTAL THICKNESS.
10. INSTALLATION OF PERIMETER INSULATION
 - A. ON VERTICAL SURFACES, SET INSULATION UNITS IN ADHESIVE APPLIED ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS. USE ADHESIVE RECOMMENDED BY INSULATION MANUFACTURER.
 - B. PROTECT BELOW-GRADE INSULATION ON VERTICAL SURFACES FROM DAMAGE DURING BACKFILLING BY APPLYING PROTECTION COURSE WITH JOINTS BUTTED. SET IN ADHESIVE ACCORDING TO INSULATION MANUFACTURER'S WRITTEN INSTRUCTIONS.
 - C. PROTECT TOP SURFACE OF HORIZONTAL INSULATION FROM DAMAGE DURING CONCRETE WORK BY APPLYING PROTECTION COURSE WITH JOINTS BUTTED.
11. INSTALLATION OF GENERAL BUILDING INSULATION
 - A. APPLY INSULATION UNITS TO SUBSTRATES BY METHOD INDICATED, COMPLYING WITH MANUFACTURER'S WRITTEN INSTRUCTIONS. IF NO SPECIFIC METHOD IS INDICATED, BOND UNITS TO SUBSTRATE WITH ADHESIVE OR USE MECHANICAL ANCHORAGE TO PROVIDE PERMANENT PLACEMENT AND SUPPORT OF UNITS.
 - B. SEAL JOINTS BETWEEN FOAM-PLASTIC INSULATION UNITS BY APPLYING ADHESIVE, MASTIC, OR SEALANT TO EDGES OF EACH UNIT TO FORM A TIGHT SEAL AS UNITS ARE SHOVED INTO PLACE. FILL VOIDS IN COMPLETED INSTALLATION WITH ADHESIVE, MASTIC, OR SEALANT AS RECOMMENDED BY INSULATION MANUFACTURER.

No.	REVISION	BY	APP'D	DATE

EXTERIOR FINISH CARPENTRY SPECIFICATION 062013

1. THIS SECTION INCLUDES THE FOLLOWING:
 - A. HARDBOARD SIDING AND TRIM.
2. MATERIALS, GENERAL
 - A. LUMBER: DOC PS 20 AND APPLICABLE GRADING RULES OF INSPECTION AGENCIES CERTIFIED BY ALS-C'S BOARD OF REVIEW.
 - B. SOFTWOOD PLYWOOD: DOC PS 1.
 - C. HARDBOARD: AHA A135.4.
3. CEMENT BOARD SIDING
 - A. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
 - COLLINS PRODUCTS LLC; COLLINS COMPANIES, INC. (THE).
 - GEORGIA-PACIFIC CORP.
 - JAMES HARDIE
 - LOUISIANA-PACIFIC CORPORATION.
 - TEMPLE-INLAND INC.
 - B. CEMENT BOARD SIDING: AHA A135.6, PRIMED WITH MANUFACTURER'S STANDARD EXTERIOR PRIMER.
 - TYPE: LAP SIDING.
 - TEXTURE: SMOOTH.
 - C. TRIM
 - TYPE: SQUARE-EDGE FLAT PANELS; WITHOUT GROOVES.
4. MISCELLANEOUS MATERIALS
 - A. FASTENERS FOR EXTERIOR FINISH CARPENTRY: PROVIDE NAILS OR SCREWS, IN SUFFICIENT LENGTH TO PENETRATE NOT LESS THAN 1-1/2 INCHES INTO WOOD SUBSTRATE.
 - FOR PREFINISHED ITEMS, PROVIDE MATCHING PREFINISHED ALUMINUM FASTENERS WHERE FACE FASTENING IS REQUIRED.
 - FOR APPLICATIONS NOT OTHERWISE INDICATED, PROVIDE HOT-DIP GALVANIZED STEEL FASTENERS.
 - B. INSECT SCREENING FOR SOFFIT VENTS: AS SHOWN ON THE DRAWINGS.
 - C. SEALANTS: LATEX, COMPLYING WITH ASTM C 834, TYPE P, GRADE NF AND WITH APPLICABLE REQUIREMENTS IN DIVISION 07 SECTION "JOINT SEALANTS," RECOMMENDED BY SEALANT MANUFACTURER AND MANUFACTURER OF SUBSTRATES FOR INTENDED APPLICATION.
6. PREPARATION
 - A. PRIME LUMBER TO BE PAINTED, INCLUDING BOTH FACES AND EDGES. CUT TO REQUIRED LENGTHS AND PRIME ENDS. COMPLY WITH REQUIREMENTS IN DIVISION 09 SECTION "EXTERIOR PAINTING."
7. INSTALLATION, GENERAL
 - A. INSTALL EXTERIOR FINISH CARPENTRY LEVEL, PLUMB, TRUE, AND ALIGNED WITH ADJACENT MATERIALS. USE CONCEALED SHIMS WHERE NECESSARY FOR ALIGNMENT.
 - SCRIBE AND CUT EXTERIOR FINISH CARPENTRY TO FIT ADJOINING WORK. REFINISH AND SEAL CUTS AS RECOMMENDED BY MANUFACTURER.
8. STANDING AND RUNNING TRIM INSTALLATION
 - A. INSTALL TRIM WITH MINIMUM NUMBER OF JOINTS PRACTICAL, USING FULL-LENGTH PIECES FROM MAXIMUM LENGTHS OF LUMBER AVAILABLE. DO NOT USE PIECES LESS THAN 24 INCHES LONG EXCEPT WHERE NECESSARY.

- USE SCARF JOINTS FOR END-TO-END JOINTS.
 - STAGGER END JOINTS IN ADJACENT AND RELATED MEMBERS.
- B. FIT EXTERIOR JOINTS TO EXCLUDE WATER. COPE AT RETURNS AND MITER AT CORNERS.

9. SIDING INSTALLATION
 - A. INSTALL SIDING TO COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.
 - B. HARDBOARD SIDING: INSTALL HARDBOARD SIDING COMPLYING WITH AHA'S "RECOMMENDED BASIC APPLICATION AND PAINTING INSTRUCTIONS FOR HARDBOARD SIDING." INSTALL PANELS WITH EDGES OVER FRAMING OR BLOCKING. LEAVE 3/16-INCH GAP AT PERIMETER, OPENINGS, AND HORIZONTAL PANEL JOINTS UNLESS OTHERWISE RECOMMENDED BY PANEL MANUFACTURER.
 - SEAL BUTT JOINTS AT INSIDE AND OUTSIDE CORNERS AND AT TRIM LOCATIONS.
 - CONCEAL FASTENERS TO GREATEST PRACTICAL EXTENT BY PLACING IN GROOVES OF SIDING PATTERN OR BY CONCEALING WITH APPLIED TRIM OR BATTENS AS DETAILED.

DESIGNED: B FARISS-BATEMAN	PROJECT MANAGER:	SCALE: NONE
DRAWN: B FARISS-BATEMAN	APPROVED:	SITE LOCATION NO:
CHECKED: J DAVIS	PROJECT NO:	ONE INCH AT FULL SIZE
RECOMMENDED: D CRIPPEN	WORK REQUEST: CONTRACT NO:	1" IF NOT ONE INCH, SCALE ACCORDINGLY



METRO TRANSIT DIVISION
STANDARD SINGLE-UNIT
DRIVER'S COMFORT STATION
**THERMAL INSULATION &
EXTERIOR FINISH
CARPENTRY SPECIFICATIONS**

DATE: DECEMBER 2012
DRAWING NO: A7.03
SHEET NO: OF 7 16

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METAL ROOF PANELS SPECIFICATION 074113

1. PERFORMANCE REQUIREMENTS

- A. WIND-UPLIFT RESISTANCE: PROVIDE METAL ROOF PANEL ASSEMBLIES THAT COMPLY WITH UL 580 FOR WIND-UPLIFT-RESISTANCE CLASS INDICATED.
- B. UPLIFT RATING: UL 90.
- C. FMG LISTING: PROVIDE METAL ROOF PANELS AND COMPONENT MATERIALS THAT COMPLY WITH REQUIREMENTS IN FMG 4471 AS PART OF A PANEL ROOFING SYSTEM AND THAT ARE LISTED IN FMG'S "APPROVAL GUIDE" FOR CLASS 1 OR NONCOMBUSTIBLE CONSTRUCTION, AS APPLICABLE. IDENTIFY MATERIALS WITH FMG MARKINGS.
- D. FIRE/WINDSTORM CLASSIFICATION: CLASS 1A-90.
- E. STRUCTURAL PERFORMANCE: PROVIDE METAL ROOF PANEL ASSEMBLIES CAPABLE OF WITHSTANDING THE EFFECTS OF GRAVITY LOADS AND THE FOLLOWING LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS INDICATED, BASED ON TESTING ACCORDING TO ASTM E 1592, AS INDICATED ON THE DRAWINGS.
- F. ENERGY PERFORMANCE: PROVIDE ROOF PANELS THAT ARE LISTED ON THE U.S. DEPARTMENT OF ENERGY'S ENERGY STAR ROOF PRODUCTS QUALIFIED PRODUCT LIST FOR STEEP-SLOPE ROOF PRODUCTS.

- B. THERMAL STABILITY: STABLE AFTER TESTING AT 240 DEG F; ASTM D 1970.
- C. LOW-TEMPERATURE FLEXIBILITY: PASSES AFTER TESTING AT MINUS 20 DEG F; ASTM D 1970.
- D. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
 - CARLISLE COATINGS & WATERPROOFING INC., DIV. OF CARLISLE COMPANIES INC.; CCW WIP 300HT.
 - GRACE CONSTRUCTION PRODUCTS; A UNIT OF GRACE, W. R. & CO.; ULTRA.
 - HENRY COMPANY; BLUESKIN PE200 HT.
 - METAL-FAB MANUFACTURING, LLC; METSHIELD.
 - OWENS CORNING; WEATHERLOCK METAL HIGH TEMPERATURE UNDERLAYMENT.
- E. FELTS: ASTM D 226, TYPE II (NO. 30).
- F. SLIP SHEET: MANUFACTURER'S RECOMMENDED SLIP SHEET, OF TYPE REQUIRED FOR APPLICATION.

- MANUFACTURER AND AS REQUIRED FOR A COMPLETE METAL ROOF PANEL ASSEMBLY INCLUDING TRIM, COPINGS, FASCIAE, CORNER UNITS, RIDGE CLOSURES, CLIPS, FLASHINGS, SEALANTS, GASKETS, FILLERS, CLOSURE STRIPS, AND SIMILAR ITEMS. MATCH MATERIAL AND FINISH OF METAL ROOF PANELS UNLESS OTHERWISE INDICATED.
- CLOSURES: PROVIDE CLOSURES AT EAVES AND RIDGES, FABRICATED OF SAME METAL AS METAL ROOF PANELS.
 - CLOSURE STRIPS: CLOSED-CELL, EXPANDED, CELLULAR, RUBBER OR CROSSLINKED, POLYOLEFIN-FOAM OR CLOSED-CELL LAMINATED POLYETHYLENE; MINIMUM 1-INCH- THICK, FLEXIBLE CLOSURE STRIPS; CUT OR PREMOLDED TO MATCH METAL ROOF PANEL PROFILE. PROVIDE CLOSURE STRIPS WHERE INDICATED OR NECESSARY TO ENSURE WEATHERTIGHT CONSTRUCTION.
 - BACKING PLATES: PROVIDE METAL BACKING PLATES AT PANEL END SPLICES, FABRICATED FROM MATERIAL RECOMMENDED BY MANUFACTURER.
- B. FLASHING AND TRIM: FORMED FROM SAME MATERIAL AS ROOF PANELS, PREPAINTED WITH COIL COATING, MINIMUM 0.018 INCH THICK. PROVIDE FLASHING AND TRIM AS REQUIRED TO SEAL AGAINST WEATHER AND TO PROVIDE FINISHED APPEARANCE. LOCATIONS INCLUDE, BUT ARE NOT LIMITED TO, EAVES, RAKES, CORNERS, BASES, FRAMED OPENINGS, RIDGES, FASCIAE, AND FILLERS. FINISH FLASHING AND TRIM WITH SAME FINISH SYSTEM AS ADJACENT METAL ROOF PANELS.

- SEAMED JOINT: CRIMP STANDING SEAMS WITH MANUFACTURER-APPROVED, MOTORIZED SEAMER TOOL SO CLIP, METAL ROOF PANEL, AND FACTORY-APPLIED SEALANT ARE COMPLETELY ENGAGED.

2. QUALITY ASSURANCE

- A. FIRE-RESISTANCE RATINGS: WHERE INDICATED, PROVIDE METAL ROOF PANELS IDENTICAL TO THOSE OF ASSEMBLIES TESTED FOR FIRE RESISTANCE PER ASTM E 119 BY A QUALIFIED TESTING AGENCY. IDENTIFY PRODUCTS WITH APPROPRIATE MARKINGS OF APPLICABLE TESTING AGENCIES.
 - COMBUSTION CHARACTERISTICS: ASTM E 136.

7. MISCELLANEOUS MATERIALS

- A. PANEL FASTENERS: SELF-TAPPING SCREWS, BOLTS, NUTS, SELF-LOCKING RIVETS AND BOLTS, END-WELDED STUDS, AND OTHER SUITABLE FASTENERS DESIGNED TO WITHSTAND DESIGN LOADS. PROVIDE EXPOSED FASTENERS WITH HEADS MATCHING COLOR OF METAL ROOF PANELS BY MEANS OF PLASTIC CAPS OR FACTORY-APPLIED COATING. PROVIDE EPDM, PVC, OR NEOPRENE SEALING WASHERS.
- B. BITUMINOUS COATING: COLD-APPLIED ASPHALT MASTIC, SSPC-PAINT 12, COMPOUNDED FOR 15-MIL DRY FILM THICKNESS PER COAT. PROVIDE INERT-TYPE NONCORROSIVE COMPOUND FREE OF ASBESTOS FIBERS, SULFUR COMPONENTS, AND OTHER DELETERIOUS IMPURITIES.

3. WARRANTY

- A. SPECIAL WARRANTY: MANUFACTURER'S STANDARD FORM IN WHICH MANUFACTURER AGREES TO REPAIR OR REPLACE METAL ROOF PANEL ASSEMBLIES THAT FAIL IN MATERIALS OR WORKMANSHIP WITHIN SPECIFIED WARRANTY PERIOD: 15 YEARS FROM DATE OF SUBSTANTIAL COMPLETION.
- B. SPECIAL WARRANTY ON PANEL FINISHES: MANUFACTURER'S STANDARD FORM IN WHICH MANUFACTURER AGREES TO REPAIR FINISH OR REPLACE METAL ROOF PANELS THAT SHOW EVIDENCE OF DETERIORATION OF FACTORY-APPLIED FINISHES WITHIN SPECIFIED FINISH WARRANTY PERIOD: 20 YEARS FROM DATE OF SUBSTANTIAL COMPLETION.

8. STANDING-SEAM METAL ROOF PANELS

- A. GENERAL: PROVIDE FACTORY-FORMED METAL ROOF PANELS DESIGNED TO BE INSTALLED BY LAPPING AND INTERCONNECTING RAISED SIDE EDGES OF ADJACENT PANELS WITH JOINT TYPE INDICATED AND MECHANICALLY ATTACHING PANELS TO SUPPORTS USING CONCEALED CLIPS IN SIDE LAPS. INCLUDE CLIPS, CLEATS, PRESSURE PLATES, AND ACCESSORIES REQUIRED FOR WEATHERTIGHT INSTALLATION.
- B. STEEL PANEL SYSTEMS: UNLESS MORE STRINGENT REQUIREMENTS ARE INDICATED, COMPLY WITH ASTM E 1514.
- C. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
 - AEP-SPAN.
 - ARCHITECTURAL BUILDING COMPONENTS.
 - ARCHITECTURAL METAL SYSTEMS.
 - ATAS INTERNATIONAL, INC.
 - CENTRIA ARCHITECTURAL SYSTEMS.
 - DIMENSIONAL METALS, INC.
 - METAL-FAB MANUFACTURING, LLC.
 - METAL SALES MANUFACTURING CORPORATION.
 - MODERN METAL SYSTEMS, INC.
- D. PROFILE: VERTICAL-RIB, SEAMED JOINT, AS INDICATED ON DRAWINGS.
- E. MATERIAL: ZINC-COATED (GALVANIZED) STEEL SHEET OR ALUMINUM-ZINC ALLOY-COATED STEEL SHEET,, 0.040-INCH NOMINAL THICKNESS.
 - EXTERIOR FINISH: 3-COAT FLUOROPOLYMER.
 - COLOR: MATCH METRO RAPIDRIDE BUS SHELTER.

4. PANEL MATERIALS

- A. METALLIC-COATED STEEL SHEET: RESTRICTED FLATNESS STEEL SHEET METALLIC COATED BY THE HOT-DIP PROCESS AND PREPAINTED BY THE COIL-COATING PROCESS TO COMPLY WITH ASTM A 755/A 755M.
- B. ALUMINUM-ZINC ALLOY-COATED STEEL SHEET: ASTM A 792/A 792M, CLASS AZ50 COATING DESIGNATION, GRADE 40; STRUCTURAL QUALITY.
- C. SURFACE: SMOOTH, FLAT FINISH.
- D. EXPOSED COIL-COATED FINISH: 2-COAT FLUOROPOLYMER: AAMA 621. FLUOROPOLYMER FINISH CONTAINING NOT LESS THAN 70 PERCENT PVDF RESIN BY WEIGHT IN COLOR COAT.
- E. CONCEALED FINISH: MANUFACTURER'S STANDARD WHITE OR LIGHT-COLORED ACRYLIC OR POLYESTER BACKER FINISH.
- F. PANEL SEALANT TAPE: PRESSURE-SENSITIVE, 100 PERCENT SOLIDS, GRAY POLYISOBUTYLENE COMPOUND SEALANT TAPE WITH RELEASE-PAPER BACKING; 1/2 INCH WIDE AND 1/8 INCH THICK.
 - JOINT SEALANT: ASTM C 920; AS RECOMMENDED IN WRITING BY METAL ROOF PANEL MANUFACTURER.
 - BUTYL-RUBBER-BASED, SOLVENT-RELEASE SEALANT: ASTM C 1311.

5. FIELD-INSTALLED THERMAL INSULATION

- A. INSULATION RETAINER STRIPS: 0.019-INCH THICK, FORMED, GALVANIZED-STEEL OR PVC RETAINER CLIPS COLORED TO MATCH INSULATION FACING.
- B. THERMAL SPACER BLOCKS: FABRICATED FROM EXTRUDED POLYSTYRENE, 1 INCH THICK.

6. UNDERLAYMENT MATERIALS

- A. SELF-ADHERING, HIGH-TEMPERATURE SHEET: 30 TO 40 MILS THICK MINIMUM, CONSISTING OF SLIP-RESISTING, POLYETHYLENE-FILM TOP SURFACE LAMINATED TO LAYER OF BUTYL OR SBS-MODIFIED ASPHALT ADHESIVE, WITH RELEASE-PAPER BACKING; COLD APPLIED. PROVIDE PRIMER WHEN RECOMMENDED BY UNDERLAYMENT MANUFACTURER.

10. FABRICATION

- A. FABRICATE AND FINISH METAL ROOF PANELS AND ACCESSORIES AT THE FACTORY TO GREATEST EXTENT POSSIBLE, BY MANUFACTURER'S STANDARD PROCEDURES AND PROCESSES AND AS NECESSARY TO FULFILL INDICATED PERFORMANCE REQUIREMENTS. COMPLY WITH INDICATED PROFILES AND WITH DIMENSIONAL AND STRUCTURAL REQUIREMENTS.
- B. PROVIDE PANEL PROFILE, INCLUDING MAJOR RIBS AND INTERMEDIATE STIFFENING RIBS, IF ANY, FOR FULL LENGTH OF PANEL.
- C. WHERE INDICATED, FABRICATE METAL ROOF PANEL SIDE LAPS WITH FACTORY-INSTALLED CAPTIVE GASKETS OR SEPARATOR STRIPS THAT PROVIDE A TIGHT SEAL AND PREVENT METAL-TO-METAL CONTACT, IN A MANNER THAT WILL SEAL WEATHERTIGHT AND MINIMIZE NOISE FROM MOVEMENTS WITHIN PANEL ASSEMBLY.
- D. SHEET METAL ACCESSORIES: FABRICATE FLASHING AND TRIM TO COMPLY WITH RECOMMENDATIONS IN SMACNA'S "ARCHITECTURAL SHEET METAL MANUAL" THAT APPLY TO THE DESIGN, DIMENSIONS, METAL, AND OTHER CHARACTERISTICS OF ITEM INDICATED.

11. PREPARATION

- A. MISCELLANEOUS FRAMING: INSTALL SUBPURLINS, EAVE ANGLES, FURRING, AND OTHER MISCELLANEOUS ROOF PANEL SUPPORT MEMBERS AND ANCHORAGE ACCORDING TO METAL ROOF PANEL MANUFACTURER'S WRITTEN INSTRUCTIONS.

12. UNDERLAYMENT INSTALLATION

- A. SELF-ADHERING SHEET UNDERLAYMENT: APPLY PRIMER IF REQUIRED BY MANUFACTURER. COMPLY WITH TEMPERATURE RESTRICTIONS OF UNDERLAYMENT MANUFACTURER FOR INSTALLATION. APPLY AT LOCATIONS INDICATED ON DRAWINGS, WRINKLE FREE, IN SHINGLE FASHION TO SHED WATER, AND WITH END LAPS OF NOT LESS THAN 6 INCHES STAGGERED 24 INCHES BETWEEN COURSES. OVERLAP SIDE EDGES NOT LESS THAN 3-1/2 INCHES. ROLL LAPS WITH ROLLER. COVER UNDERLAYMENT WITHIN 14 DAYS.
- B. FELT UNDERLAYMENT: APPLY AT LOCATIONS INDICATED ON DRAWINGS, IN SHINGLE FASHION TO SHED WATER, AND WITH LAPPED JOINTS OF NOT LESS THAN 2 INCHES.
- C. APPLY SLIP SHEET OVER UNDERLAYMENT BEFORE INSTALLING METAL ROOF PANELS.
- D. INSTALL FLASHINGS TO COVER UNDERLAYMENT TO COMPLY WITH REQUIREMENTS SPECIFIED IN DIVISION 07 SECTION "SHEET METAL FLASHING AND TRIM."

13. THERMAL INSULATION INSTALLATION

- A. RETAINER STRIPS: INSTALL RETAINER STRIPS AT EACH LONGITUDINAL INSULATION JOINT, STRAIGHT AND TAUT, NESTING WITH SECONDARY FRAMING TO HOLD INSULATION IN PLACE.

14. METAL ROOF PANEL INSTALLATION

- A. STANDING-SEAM METAL ROOF PANELS: FASTEN METAL ROOF PANELS TO SUPPORTS WITH CONCEALED CLIPS AT EACH STANDING-SEAM JOINT AT LOCATION, SPACING, AND WITH FASTENERS RECOMMENDED BY MANUFACTURER.
 - INSTALL CLIPS TO SUPPORTS WITH SELF-TAPPING FASTENERS.
 - INSTALL PRESSURE PLATES AT LOCATIONS INDICATED IN MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS.

15. ACCESSORY INSTALLATION

- A. INSTALL ACCESSORIES WITH POSITIVE ANCHORAGE TO BUILDING AND WEATHERTIGHT MOUNTING AND PROVIDE FOR THERMAL EXPANSION. COORDINATE INSTALLATION WITH FLASHINGS AND OTHER COMPONENTS.
- B. INSTALL COMPONENTS REQUIRED FOR A COMPLETE METAL ROOF PANEL ASSEMBLY INCLUDING TRIM, COPINGS, RIDGE CLOSURES, SEAM COVERS, FLASHINGS, SEALANTS, GASKETS, FILLERS, CLOSURE STRIPS, AND SIMILAR ITEMS.
- C. FLASHING AND TRIM: COMPLY WITH PERFORMANCE REQUIREMENTS, MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS, AND SMACNA'S "ARCHITECTURAL SHEET METAL MANUAL." PROVIDE CONCEALED FASTENERS WHERE POSSIBLE, AND SET UNITS TRUE TO LINE AND LEVEL AS INDICATED. INSTALL WORK WITH LAPS, JOINTS, AND SEAMS THAT WILL BE PERMANENTLY WATERTIGHT AND WEATHER RESISTANT.

16. CLEANING

- A. REMOVE TEMPORARY PROTECTIVE COVERINGS AND STRIPPABLE FILMS, IF ANY, AS METAL ROOF PANELS ARE INSTALLED UNLESS OTHERWISE INDICATED IN MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS. ON COMPLETION OF METAL ROOF PANEL INSTALLATION, CLEAN FINISHED SURFACES AS RECOMMENDED BY METAL ROOF PANEL MANUFACTURER. MAINTAIN IN A CLEAN CONDITION DURING CONSTRUCTION.

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METRO TRANSIT DIVISION
STANDARD SINGLE-UNIT
DRIVER'S COMFORT STATION

METAL ROOF PANELS SPECIFICATION

DATE: **DECEMBER 2012**
 DRAWING NO: **A7.04**
 SHEET NO: OF 8 16

SHEET METAL FLASHING & TRIM SPECIFICATION 076200

1. SECTION INCLUDES: FORMED WALL SHEET METAL FABRICATIONS.

2. QUALITY ASSURANCE

A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

3. WARRANTY

A. SPECIAL WARRANTY ON FINISHES: MANUFACTURER'S STANDARD FORM IN WHICH MANUFACTURER AGREES TO REPAIR FINISH OR REPLACE SHEET METAL FLASHING AND TRIM THAT SHOWS EVIDENCE OF DETERIORATION OF FACTORY-APPLIED FINISHES WITHIN 20 YEARS FROM DATE OF SUBSTANTIAL COMPLETION.

4. SHEET METALS

- A. GENERAL: PROTECT MECHANICAL AND OTHER FINISHES ON EXPOSED SURFACES FROM DAMAGE BY APPLYING A STRIPPABLE, TEMPORARY PROTECTIVE FILM BEFORE SHIPPING.
- B. METALLIC-COATED STEEL SHEET: RESTRICTED FLATNESS STEEL SHEET, METALLIC COATED BY THE HOT-DIP PROCESS AND PREPAINTED BY THE COIL-COATING PROCESS TO COMPLY WITH ASTM A 755/A 755M.
- C. ALUMINUM-ZINC ALLOY-COATED STEEL SHEET: ASTM A 792/A 792M, CLASS AZ50 COATING DESIGNATION, GRADE 40; STRUCTURAL QUALITY.
- D. SURFACE: MILL PHOSPHATIZED FOR FIELD PAINTING.
- E. EXPOSED COIL-COATED FINISH:
 - TWO-COAT FLUOROPOLYMER: AAMA 621. FLUOROPOLYMER FINISH CONTAINING NOT LESS THAN 70 PERCENT PVDF RESIN BY WEIGHT IN COLOR COAT.
 - COLOR: COORDINATE WITH METRO RAPIDRIDE BUS SHELTER.

5. UNDERLAYMENT MATERIALS

- A. SELF-ADHERING, HIGH-TEMPERATURE SHEET: MINIMUM 30 TO 40 MILS THICK, CONSISTING OF SLIP-RESISTING POLYETHYLENE-FILM TOP SURFACE LAMINATED TO LAYER OF BUTYL OR SBS-MODIFIED ASPHALT ADHESIVE, WITH RELEASE-PAPER BACKING; COLD APPLIED. PROVIDE PRIMER WHEN RECOMMENDED BY UNDERLAYMENT MANUFACTURER.
 - THERMAL STABILITY: ASTM D 1970; STABLE AFTER TESTING AT 240 DEG F.
 - LOW-TEMPERATURE FLEXIBILITY: ASTM D 1970; PASSES AFTER TESTING AT MINUS 20 DEG F.
- B. SLIP SHEET: BUILDING PAPER, 3-LB/100 SQ. FT. MINIMUM, ROSIN SIZED.

6. MISCELLANEOUS MATERIALS

- A. GENERAL: PROVIDE MATERIALS AND TYPES OF FASTENERS, SOLDER, WELDING RODS, PROTECTIVE COATINGS, SEPARATORS, SEALANTS, AND OTHER MISCELLANEOUS ITEMS AS REQUIRED FOR COMPLETE SHEET METAL FLASHING AND TRIM INSTALLATION.
- B. FASTENERS: WOOD SCREWS, ANNULAR THREADED NAILS, SELF-TAPPING SCREWS, SELF-LOCKING RIVETS AND BOLTS, AND OTHER SUITABLE FASTENERS DESIGNED TO WITHSTAND DESIGN LOADS AND RECOMMENDED BY MANUFACTURER OF PRIMARY SHEET METAL OR MANUFACTURED ITEM.
 - GENERAL: BLIND FASTENERS OR SELF-DRILLING SCREWS, GASKETED, WITH HEX-WASHER HEAD.
 - EXPOSED FASTENERS: HEADS MATCHING COLOR OF SHEET METAL USING PLASTIC CAPS OR FACTORY-APPLIED COATING.
 - BLIND FASTENERS: HIGH-STRENGTH STAINLESS-STEEL RIVETS SUITABLE FOR METAL BEING FASTENED.
 - FASTENERS FOR ZINC-COATED (GALVANIZED) STEEL SHEET: HOT-DIP GALVANIZED STEEL ACCORDING TO ASTM A 153/A 153M OR ASTM F 2329 OR SERIES 300 STAINLESS STEEL.
- C. SOLDER:
 - FOR ZINC-COATED (GALVANIZED) STEEL: ASTM B 32, GRADE SN50, 50

PERCENT TIN AND 50 PERCENT LEAD OR GRADE SN60, 60 PERCENT TIN AND 40 PERCENT LEAD.

- D. SEALANT TAPE: PRESSURE-SENSITIVE, 100 PERCENT SOLIDS, GRAY POLYISOBUTYLENE COMPOUND SEALANT TAPE WITH RELEASE-PAPER BACKING. PROVIDE PERMANENTLY ELASTIC, NONSAG, NONTOXIC, NONSTAINING TAPE 1/2 INCH WIDE AND 1/8 INCH THICK.
- E. ELASTOMERIC SEALANT: ASTM C 920, ELASTOMERIC POLYMER SEALANT; LOW MODULUS; OF TYPE, GRADE, CLASS, AND USE CLASSIFICATIONS REQUIRED TO SEAL JOINTS IN SHEET METAL FLASHING AND TRIM AND REMAIN WATERTIGHT.
- F. BUTYL SEALANT: ASTM C 1311, SINGLE-COMPONENT, SOLVENT-RELEASE BUTYL RUBBER SEALANT; POLYISOBUTYLENE PLASTICIZED; HEAVY BODIED FOR HOOKED-TYPE EXPANSION JOINTS WITH LIMITED MOVEMENT.

7. REGLETS

- A. REGLETS: UNITS OF TYPE, MATERIAL, AND PROFILE INDICATED, FORMED TO PROVIDE SECURE INTERLOCKING OF SEPARATE REGLET AND COUNTERFLASHING PIECES, AND COMPATIBLE WITH FLASHING INDICATED WITH FACTORY-MITERED AND -WELDED CORNERS AND JUNCTIONS.
 - MATERIAL: GALVANIZED STEEL, 0.022 INCH THICK.
 - FINISH: WITH MANUFACTURER'S STANDARD COLOR COATING.

8. FABRICATION, GENERAL

- A. GENERAL: CUSTOM FABRICATE SHEET METAL FLASHING AND TRIM TO COMPLY WITH RECOMMENDATIONS IN SMACNA'S "ARCHITECTURAL SHEET METAL MANUAL" THAT APPLY TO DESIGN, DIMENSIONS, GEOMETRY, METAL THICKNESS, AND OTHER CHARACTERISTICS OF ITEM INDICATED. FABRICATE ITEMS AT THE SHOP TO GREATEST EXTENT POSSIBLE.
 - OBTAIN FIELD MEASUREMENTS FOR ACCURATE FIT BEFORE SHOP FABRICATION.
 - FORM SHEET METAL FLASHING AND TRIM WITHOUT EXCESSIVE OIL CANNING, BUCKLING, AND TOOL MARKS AND TRUE TO LINE AND LEVELS INDICATED, WITH EXPOSED EDGES FOLDED BACK TO FORM HEMS.
 - CONCEAL FASTENERS AND EXPANSION PROVISIONS WHERE POSSIBLE. EXPOSED FASTENERS ARE NOT ALLOWED ON FACES EXPOSED TO VIEW.
- B. SEALED JOINTS: FORM NONEXPANSION BUT MOVABLE JOINTS IN METAL TO ACCOMMODATE ELASTOMERIC SEALANT.
- C. EXPANSION PROVISIONS: WHERE LAPPED EXPANSION PROVISIONS CANNOT BE USED, FORM EXPANSION JOINTS OF INTERMESHING HOOKED FLANGES, NOT LESS THAN 1 INCH DEEP, FILLED WITH BUTYL SEALANT CONCEALED WITHIN JOINTS.
- D. FABRICATE CLEATS AND ATTACHMENT DEVICES FROM SAME MATERIAL AS ACCESSORY BEING ANCHORED OR FROM COMPATIBLE, NONCORROSIVE METAL.
- E. SEAMS: FABRICATE NONMOVING SEAMS WITH FLAT-LOCK SEAMS. FORM SEAMS AND SEAL WITH ELASTOMERIC SEALANT UNLESS OTHERWISE RECOMMENDED BY SEALANT MANUFACTURER FOR INTENDED USE.

9. STEEP-SLOPE ROOF SHEET METAL FABRICATIONS

- A. APRON, STEP, CRICKET, AND BACKER FLASHING: FABRICATE FROM THE FOLLOWING MATERIALS:
 - ALUMINUM-ZINC ALLOY-COATED STEEL: 0.022 INCH THICK.
 - DRIP EDGES: FABRICATE FROM THE FOLLOWING MATERIALS
 - ALUMINUM-ZINC ALLOY-COATED STEEL: 0.022 INCH THICK.
 - EAVE, RAKE, RIDGE, AND HIP FLASHING: FABRICATE FROM THE FOLLOWING MATERIALS:
 - ALUMINUM-ZINC ALLOY-COATED STEEL: 0.022 INCH THICK.

10. WALL SHEET METAL FABRICATIONS

- A. OPENING FLASHINGS IN FRAME CONSTRUCTION: FABRICATE HEAD, SILL, JAMB AND SIMILAR FLASHINGS TO EXTEND 4 INCHES BEYOND WALL OPENINGS. FORM HEAD AND SILL FLASHING WITH 2-INCH- HIGH, END DAMS.

FABRICATE FROM THE FOLLOWING MATERIALS:

- ALUMINUM-ZINC ALLOY-COATED STEEL: 0.022 INCH THICK.

11. UNDERLAYMENT INSTALLATION

- A. SELF-ADHERING SHEET UNDERLAYMENT: INSTALL SELF-ADHERING SHEET UNDERLAYMENT, WRINKLE FREE. COMPLY WITH TEMPERATURE RESTRICTIONS OF UNDERLAYMENT MANUFACTURER FOR INSTALLATION; USE PRIMER RATHER THAN NAILS FOR INSTALLING UNDERLAYMENT AT LOW TEMPERATURES. APPLY IN SHINGLE FASHION TO SHED WATER, WITH END LAPS OF NOT LESS THAN 6 INCHES STAGGERED 24 INCHES BETWEEN COURSES. OVERLAP SIDE EDGES NOT LESS THAN 3-1/2 INCHES. ROLL LAPS WITH ROLLER. COVER UNDERLAYMENT WITHIN 14 DAYS.

12. INSTALLATION, GENERAL

- A. GENERAL: ANCHOR SHEET METAL FLASHING AND TRIM AND OTHER COMPONENTS OF THE WORK SECURELY IN PLACE, WITH PROVISIONS FOR THERMAL AND STRUCTURAL MOVEMENT SO THAT COMPLETED SHEET METAL FLASHING AND TRIM SHALL NOT RATTLE, LEAK, OR LOOSEN, AND SHALL REMAIN WATERTIGHT. USE FASTENERS, SOLDER, WELDING RODS, PROTECTIVE COATINGS, SEPARATORS, SEALANTS, AND OTHER MISCELLANEOUS ITEMS AS REQUIRED TO COMPLETE SHEET METAL FLASHING AND TRIM SYSTEM.
- B. INSTALL SHEET METAL FLASHING AND TRIM TRUE TO LINE AND LEVELS INDICATED. PROVIDE UNIFORM, NEAT SEAMS WITH MINIMUM EXPOSURE OF SOLDER, WELDS, AND SEALANT.
- C. INSTALL SHEET METAL FLASHING AND TRIM TO FIT SUBSTRATES AND TO RESULT IN WATERTIGHT PERFORMANCE. VERIFY SHAPES AND DIMENSIONS OF SURFACES TO BE COVERED BEFORE FABRICATING SHEET METAL.
- D. SPACE CLEATS NOT MORE THAN 12 INCHES APART. ANCHOR EACH CLEAT WITH TWO FASTENERS. BEND TABS OVER FASTENERS.
- E. INSTALL EXPOSED SHEET METAL FLASHING AND TRIM WITHOUT EXCESSIVE OIL CANNING, BUCKLING, AND TOOL MARKS.
- F. INSTALL SEALANT TAPE WHERE INDICATED.
- G. TORCH CUTTING OF SHEET METAL FLASHING AND TRIM IS NOT PERMITTED.
- H. METAL PROTECTION: WHERE DISSIMILAR METALS WILL CONTACT EACH OTHER OR CORROSIVE SUBSTRATES, PROTECT AGAINST GALVANIC ACTION BY PAINTING CONTACT SURFACES WITH BITUMINOUS COATING OR BY OTHER PERMANENT SEPARATION AS RECOMMENDED BY SMACNA.
 - COAT BACK SIDE OF UNCOATED ALUMINUM AND STAINLESS-STEEL SHEET METAL FLASHING AND TRIM WITH BITUMINOUS COATING WHERE FLASHING AND TRIM WILL CONTACT WOOD, FERROUS METAL, OR CEMENTITIOUS CONSTRUCTION.

13. UNDERLAYMENT: WHERE INSTALLING METAL FLASHING DIRECTLY ON CEMENTITIOUS OR WOOD SUBSTRATES, INSTALL A COURSE OF FELT UNDERLAYMENT AND COVER WITH A SLIP SHEET OR INSTALL A COURSE OF POLYETHYLENE SHEET.

- A. EXPANSION PROVISIONS: PROVIDE FOR THERMAL EXPANSION OF EXPOSED FLASHING AND TRIM.
- B. FASTENER SIZES: USE FASTENERS OF SIZES THAT WILL PENETRATE WOOD SHEATHING NOT LESS THAN 1-1/4 INCHES FOR NAILS AND NOT LESS THAN 3/4 INCH FOR WOOD SCREWS.
- C. SEAL JOINTS AS SHOWN AND AS REQUIRED FOR WATERTIGHT CONSTRUCTION.

14. ROOF FLASHING INSTALLATION

- A. PIPE OR POST COUNTERFLASHING: INSTALL COUNTERFLASHING UMBRELLA WITH CLOSE-FITTING COLLAR WITH TOP EDGE FLARED FOR ELASTOMERIC SEALANT, EXTENDING A MINIMUM OF 4 INCHES OVER BASE FLASHING. INSTALL STAINLESS-STEEL DRAW BAND AND TIGHTEN.
- B. ROOF-PENETRATION FLASHING: COORDINATE INSTALLATION OF ROOF-PENETRATION FLASHING WITH INSTALLATION OF ROOFING AND OTHER ITEMS PENETRATING ROOF. SEAL WITH ELASTOMERIC SEALANT AND CLAMP FLASHING TO PIPES THAT PENETRATE ROOF.

15. WALL FLASHING INSTALLATION

- A. GENERAL: INSTALL SHEET METAL WALL FLASHING TO INTERCEPT AND EXCLUDE PENETRATING MOISTURE ACCORDING TO SMACNA RECOMMENDATIONS AND AS INDICATED. COORDINATE INSTALLATION OF WALL FLASHING WITH INSTALLATION OF WALL-OPENING COMPONENTS SUCH AS WINDOWS, DOORS, AND LOUVERS.
- B. OPENING FLASHINGS IN FRAME CONSTRUCTION: INSTALL CONTINUOUS HEAD, SILL, JAMB, AND SIMILAR FLASHINGS TO EXTEND 4 INCHES BEYOND WALL OPENINGS.

16. CLEANING AND PROTECTION

- A. CLEAN EXPOSED METAL SURFACES OF SUBSTANCES THAT INTERFERE WITH UNIFORM OXIDATION AND WEATHERING.
- B. REMOVE TEMPORARY PROTECTIVE COVERINGS AND STRIPPABLE FILMS AS SHEET METAL FLASHING AND TRIM ARE INSTALLED UNLESS OTHERWISE INDICATED IN MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS.

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**METRO TRANSIT DIVISION
STANDARD SINGLE-UNIT
DRIVER'S COMFORT STATION**

**SHEET METAL FLASHING
& TRIM SPECIFICATION**

DATE: DECEMBER 2012
DRAWING NO: A7.05
SHEET NO: OF 9 16

Part B - Performance Standards

Facility Performance Standards

Appendix D – Current Standards Mechanical,
Electrical, and Plumbing Equipment

**Appendix D Current Standards: Mechanical, Electrical, and Plumbing
Equipment**

Mechanical Equipment:

Mechanical Equipment		
	Product Category	Manufacturer
A.	Motors	Baldor, GE, GE ECM Motors
B.	Control Actuators	Belimo
C.	Pumps	B&G and Armstrong
D.	Water Treatment	Contact King County for the current contractor for specific chemicals to be used in closed and open loops. At the time of publication of this Facility Performance Standards the contractor is US Water.
E.	Air Compressors	Campbell/Hausfield or DeVilbiss
F.	Boilers	Cleaver Brooks, Aerco Benchmark, Hydrotherm KN
G.	Chillers	York, Carrier
H.	Cooling Towers	BAC, Evapco
I.	Small Refrigeration Compressors	Copeland or Tecumseh
J.	Packaged units	York, Carrier, AAON. Interfaced to BCS
K.	Roof mounted AHU	Energy Labs or Mammoth or Huntair
L.	Computer Room AC Units	Liebert or Compu-Aire: interfaced to BCS
M.	Water Source Heat Pumps	Climatemaster or Florida Heat Pumps
N.	Fan coil unit	Titus or Trane or IEC ES
O.	Fan	Cook or Greenheck
P.	Terminal units for double duct	Nailor or Titus
Q.	Filters	Minimum MERV 8
R.	HVAC Controls	BACnet open protocol system. Thermostats without display
S.	Fire Damper	Ruskin or Pottorff
T.	Inlets/Outlets	Titus or Shoemaker

Part B - Performance Standards

Facility Performance Standards

Appendix D – Current Standards Mechanical,
Electrical, and Plumbing Equipment

Mechanical Equipment		
	Product Category	Manufacturer
U.	Airflow Volume Dampers	Elevated Twist-Knob Handle (1.5" to 2" standoff).

Plumbing Equipment:

Plumbing Equipment		
	Product Category	Manufacturer
A.	Lavatory (non-detention)	Kohler or American Standard
B	Lavatory (detention)	ACORN or Willoby
C	Water Closets (non-detention)	Kohler or American Standard
D	Water Closets (detention)	ACORN or Willoby
E	Flush Valves	Battery or electric operated infra-red sensors – Sloan or Chicago Faucets
F	Flushometer	Sloan or Zurn
G	Lav Faucet	Moen or Chicago Faucets
H	Trap Primer	Sioux Chief or Watts
I	Urinals	Kohler or American Standards
J	Sink	Elkay or Just
K	Service Sink	Kohler or American Standard
L	Hose Bibbs	Zurn or Wade
M	Water Coolers	Elkay or Halsey Taylor
N	Floor Drain and Interceptor	Wade or Zurn
O	Shower Valves (Detention)	Powers or Symmons

Electrical Equipment:

Electrical Equipment		
	Product Category	Manufacturer

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Appendix D – Current Standards Mechanical,
Electrical, and Plumbing Equipment

A.	Switchgear	Siemens or Square D interfaced to BCS
B.	Cable Trays	Monotray
C.	Variable Speed Motor Controllers	Square D
D.	Lighting Control	Square D or ILG tied to BCS
E.	Generators	Catepillar or Cummins integrated with BCS

Appendix E KCIT Physical Infrastructure Standard

Information Technology Governance Standards

Title PHYSICAL INFRASTRUCTURE STANDARD		Document Code No. Revision draft 2.5 03-14-2013 (rek)
Chief Information Officer Approval	Date	Effective Date.

Physical Infrastructure Standard

1. PURPOSE:

This standard establishes the approved requirements for the installation and maintenance of Network infrastructure in King County Facilities for the King County Wide Area Network (KC WAN). The county will benefit from a structured and well documented Network infrastructure. King County's Network infrastructure must support a wide variety of needs at a broad range of physical locations within the county.

2. APPLICABILITY:

This standard is applicable to all King County Workforce Members, including those personnel responsible for the design, specifications, construction, procurement, or installation of Network infrastructure in new and major renovations or remodeling of existing King County Facilities. It is intended to be used early and throughout the design, planning, and construction phases of the remodeling of existing buildings, the construction of new King County Facilities, or as the county looks at leasing new spaces.

3. REFERENCES

- a. Design, manufacture, test, and install telecommunications cabling networks per manufacturer's requirements and in accordance with NFPA-70 (2005 edition of the *National Electrical Code*®), IEEE C2 2007(NESC 2007), state codes, local codes, requirements of authorities having jurisdiction, and particularly the following standards:
 - 1) ANSI/TIA/EIA-568-B.1 -- *Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements*
 - 2) ANSI/TIA/EIA-568-B.2 -- *Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted Pair Cabling Components*
 - 3) ANSI/TIA/EIA-568-B.3 -- *Optical Fiber Cabling Components Standard*

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- 4) ANSI/TIA/EIA-569-B -- *Commercial Building Standard for Telecommunications Pathways and Spaces*
- 5) ANSI/TIA/EIA-606-A -- *The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings*
- 6) ANSI-J-STD-607-A -- *Commercial Building Grounding and Bonding Requirements for Telecommunications*
- 7) TIA-942 – *Telecommunications Infrastructure Standard for Data Centers*
- 8) IEEE STD-1100 (IEEE Emerald Book) IEEE Recommended Practice for Powering and Grounding Electrical Equipment
- 9) National Fire Protection Agency (NFPA) – 70, National Electrical Code.
- 10) Information Technology Policy and Standards Exception Request Process
- 11) Network Equipment Standard.

4. **DEFINITIONS:**

- 4.1 **AMP:** Ampere is a measurement of electrical current in a circuit. Contrast with "volts," which is a measure of force, or pressure, behind the current. Multiplying amps times volts derives "watts," the total measurement of power. One amp is 6,280,000,000,000,000 (6.28 x 10¹⁸) electrons passing by the point of measurement in one second.
- 4.2 **ANSI:** American National Standards Institute
- 4.3 **Category 5e Cable:** Solid copper, 24 AWG, 100 Ω balanced twisted-pair (UTP) **Category 5e** cables with four individually twisted-pairs, which meet or exceed the mechanical and transmission performance specifications in ANSI/TIA/EIA-568-B.2 up to 100 MHz.
- 4.4 **Category 6 Cable:** Solid copper, 22 AWG to 24 AWG, 100 Ω balanced twisted-pair (UTP) **Category 6** cables with four individually twisted-pairs, which meet or exceed the mechanical and transmission performance specifications in ANSI/TIA/EIA-568-B.2-1 up to 250 MHz.
- 4.5 **County Enterprise Network:** The network commonly used to conduct county business that provides transport of data within and between county facilities and other agencies of county government. This definition also refers

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to the network used to transport data between the county, other government agencies and the Internet. It does not refer to networks built for the sole purpose of meeting special operations needs of county business units which include, but are not limited to, process control and supervisory control networks. Nor does it refer to the King County Institutional Network (I-Net) which is required to meet contractual obligations with I-Net customers and the local cable utility.

- 4.6 Data:** Any form of information whether on paper or in electronic form. Data may refer to any electronic file no matter what the format: database data, text, images, audio and video. Everything read and written by the computer can be considered data except for instructions in a program that are executed (software). A common misconception is that software is also data. Software is executed, or run, by the computer. Data are "processed." Thus, software causes the computer to process data.
- 4.7 Data and Telecommunications Area:** (Hereafter referred to as the “Data/Telecommunications Area”, “MDF/MC” or “IDF/IC”) The MDF/MC or IDF/IC is the termination point for all station wiring for the building and floor. This area should also house any data networking and telecommunication equipment required for the facility.
- 4.8 Data Closet:** See Data and Telecommunications Area above.
- 4.9 Data Tail Cable:** A hardwired cable harness from a switch to a remote cross-connect panel.
- 4.10 EIA:** Electronics Industries Association.
- 4.11 EMF:** Electromagnetic Field.
- 4.12 ETL:** Electrical Testing Laboratories.
- 4.13 FCC:** Federal Communications Commission.
- 4.14 Home Run:** A cable that begins at a central distribution point, such as a hub or PBX, and runs to its destination station without connecting to anything else.
- 4.15 HVAC:** Heating, Ventilation and Air-Conditioning
- 4.16 IDF/IC:** Intermediate Distribution Frame or Intermediate Cross-connect. A wiring rack located between the MDF/MC (main distribution frame/main cross-connect) and the intended end user devices (telephones, routers, PCs, etc.). Cables run from the outside world to the MDF and then to the IDFs.
- 4.17 King County Facilities:** Any space King County owns, leases, rents or occupies.
- 4.18 Large Site:** This typically refers to multi-story or campus environments where 100 or more county staff reside in multiple locations.
- 4.19 MDF/MC:** Main Distribution Frame or Main Cross-connect. A wiring rack that connects outside lines with internal lines. It is used to connect public or

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private lines coming into the building to internal Networks. In a telecom central office (CO), the MDF/MC is generally in close proximity to the telephone switch.

- 4.20 Network:** A system that transmits any combination of voice, video, and/or data between users. The network includes the network operating system in the client and server machines, the cables connecting them and all supporting hardware in between; such as bridges, routers and switches. In wireless systems, antennas and towers are also part of the network.
- 4.21 Network Infrastructure Equipment:** Equipment that enables network connections for a facility, group or individual to other points on the County Enterprise Network. This definition includes LAN switches, routers and wireless access points serving each facility and those used to aggregate and distribute data destined to other parts of the network. It also includes appliances used to control network traffic and secure the network from unauthorized access. The appliances include, but are not limited to; network traffic shapers, network firewalls, VPN concentrators and network intrusion sensors.
- 4.22 Non-infrastructure Server:** Servers that are not part of the Network’s basic fundamental structure such as; video, voice and wireless controllers and servers.
- 4.23 Organization:** Every county office, every officer, every institution, whether educational, correctional or other; and every department, division, board, and commission.
- 4.24 SC:** “Stick and Click” or Subscription Channel. This is a type of fiber cable connector.
- 4.25 Small Site:** This typically refers to environments in which less than 100 county staff reside in a single location.
- 4.26 Telecommunications Spaces:** Telecommunications Spaces are the rooms and areas where telecommunications cabling systems are terminated and telecommunications equipment is installed. Telecommunications Enclosure (TE), Telecommunications Room (TR), Equipment Room (ER), Entrance Facility (EF).
- 4.27 TGB:** Telecommunications Grounding Bus-bar.
- 4.28 TIA:** Telecommunications Industries Association.
- 4.29 TMGB:** Telecommunications Main Grounding Bus-bar.
- 4.30 UPS:** Uninterruptible Power Supply.
- 4.31 VAC:** Volts Alternating Current
- 4.32 Workforce Member:** Employees, volunteers, and other persons whose conduct, in the performance of work for King County, is under the direct

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control of King County, whether or not they are paid by King County. This includes full and part time elected or appointed officials, employees, affiliates, associates, students, volunteers, and staff from third party entities who provide service to King County.

4.33 Work Stations: Any place a person may work. This includes reception areas, conference rooms, lunch rooms, day rooms, copier rooms, printer rooms, etc.

5. STANDARDS:

5.1 General Requirements:

5.1.1 Management of all Telecommunications Spaces is the responsibility of the KCIT Network No equipment shall be installed in Telecommunication Spaces without prior approval from KCIT Network Network Services.

- 1) Access to Telecommunications Spaces shall be restricted to Network KCIT Network Services Workforce Members.
- 2) Temporary access to Telecommunications spaces may be granted by the Network KCIT Network Services Management or his or her delegate.
- 3) Network KCIT Network Services reserves the right to remove any unauthorized cables, connections and/or hardware. The effected Organization's LAN Administrator and Technology Management Board (TMB) representative shall be notified of Network KCIT Network Services intentions five (5) business days prior to removal. This time frame will allow the effected Organization sufficient time to acknowledge the removal.

5.1.2 All county owned facilities and non-county owned facilities shall use Category 5e or better, unshielded twisted pair (UTP) cable.

5.1.3 For Large sites and business critical buildings, a minimum of two (2) separate fiber paths shall enter the site from different directions. A four foot (4') deep hand hole or vault shall be installed at ground level for each fiber entry at the property line.

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- 5.1.4 Each hand hole or vault shall contain a minimum of four (4), four inch (4”) electrical conduits to the interior of the building.

5.2 Telecommunications Spaces:

- 5.1.1 All Telecommunications Space designs, including layout, elevations and Wall field layout designs shall be pre-approved by Network KCIT Network Services and shall be designed in accordance with ANSI/TIA/EIA 569-B standard. Cut sheets and or material samples may be required by KCIT Network Network Services.
- 5.1.2 A dedicated, secured Telecommunications Space shall be available. In the case of smaller sites where the Telecommunication Space cannot be fully secured, every effort shall be made to protect and promote the security of the Telecommunication Space as completely as possible. In no case shall the public have unescorted access to the space.
- 5.1.3 This area shall contain the terminations for all Workstation wiring, equipment racks for any rack mounted equipment, PBX and Data equipment.
- 5.1.4 Non-infrastructure Servers shall not be located in the MC / IC.
- 5.1.5 The MC shall have A/C grade, fire-rated, three quarter inch (3/4”) primed and painted plywood installed. The fire rating stamp shall be left visible for inspection by AHJ. It shall be large enough to accommodate the Data/Telecommunication terminations. This backboard shall cover, at a minimum, eight by four feet (8’x4’). This standard is meant to ensure that local, state and federal codes are met.
- 5.1.6 The backboard shall be exclusively used for Data/Telecommunication terminations.
- 5.1.7 All Network equipment shall be installed on standard nineteen inch (19”) form factor racks unless otherwise specified.
- 5.1.8 Each installed equipment rack shall be nineteen inches by a maximum of seven feet (19”x7’) aluminum, open frame equipment racks (Chatsworth 46353-503), and shall be installed in the area, aligned to the backboard, bolted to the floor. These racks shall be

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installed to the standards stated for the remainder of the room. In cases where it is not possible to drill into the flooring, the equipment racks shall be stabilized in a manner that meets with Network KCIT Network Services and building owner approval.

Standard nineteen inch (19”) cabinet enclosures may be used with Network KCIT Network Services approval.

- 5.1.9 The double-sided racks shall have a double sided vertical wire manager (Chatsworth VCS line 11729-503, Evolution line or Panduit PatchRunner PRV6, PRV8, or PRV10 with pre-approval by KCIT Network Network Services.
- 5.1.10 The racks shall be installed in a way that allows future expansion and access to all sides. Install with a minimum of forty-eight inches (48”) of clear space in front and thirty-six inches (36”) in the back.
- 5.1.11 There shall be a twelve inch (12”) wide, at a minimum, cable runway above the rack and extended to the backboard. This cable runway shall be appropriately sized and used for Data networking equipment and patch cables. This cable tray may require seismic transitions to the backboard and/or racks.
- 5.1.12 In some instances and configurations, the rack and associated equipment may require additional seismic bracing. This bracing shall be installed in a way that does not interfere with accessibility or installation of equipment in the open frame rack.
- 5.1.13 A TMGB or TGB shall be available for equipment grounding.
- 5.1.14 The rack(s) and associated equipment shall be grounded and bonded to the TMGB or TGB and shall be in accordance with ANSI-J-STD-607-A.

5.2 Main Distribution Frame / Main Cross-connect (MDF/ MC) to Intermediate Distribution Frame / Intermediate Cross-connect (IDF/IC) Requirements:

- 5.2.1 Each IDF/IC shall have a single, complete path to the MDF/MC, also known as a “Home Run” path.

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- 5.2.2 Primary wiring from the MDF/MC to the IDF/IC shall be twenty four (24) strands of single-mode optical fiber and/or (24) strands of multi-mode fiber and multi-pair copper cabling, The type and quantity of optical fiber cable and type and quantity of pairs for the copper backbone required will be specified and approved by KCIT Network Network Services.
- 5.2.3 Fiber optics shall be terminated in Fiber Distribution Units (FDU) large enough to terminate all fibers including future expansion. FDU manufacture and model shall be specified and pre-approved by KCIT Network Network Services.
- 5.2.4 For new construction, fiber optics shall be terminated with SC or LC flat polished connectors, or as approved by KCIT Network Network Services.
- 5.2.5 For existing facilities, the fiber, FDUs and connectors shall be matched to the existing installation, as approved by KCIT Network Services.
- 5.2.6 Fiber optic cable and FDUs shall be labeled in a consistent manner with descriptive and unique labels “to” and “from” on each end. Individual fiber connectors shall be labeled with the same label on each end and be in accordance with ANSI/TIA/EIA-606-A and UL 969.
- 5.2.7 All Optical Fiber components and installation shall be in accordance to ANSI/TIA/EIA-568-B.3.

5.3 Conduit and Riser Core Drill Requirements for Infrastructure or Larger Buildings:

- 5.3.1 Three (3) separate four inch (4”) conduits or sleeves shall be a”Home Run” from the MDF to each IDF/IC.
- 5.3.2 At least one conduit or riser core drill shall be provided on any MDF/MC to IDF/IC run, to be open and available for future expansion.
- 5.3.3 Conduit shall not be successive or “daisy chained”. Each cable path shall be separate.

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- 5.3.4 Riser core drills, where required, shall be five inches (5”) in diameter, with a four inch (4”) sleeve and appropriate fire stopping.
- 5.3.5 In buildings under five (5) floors in height, the riser core drills shall be grouped at a minimum of three (3) dedicated cores for each floor.
- 5.3.6 Buildings of five (5) floors and above shall have a riser core plan approved by KCIT Network Services.

5.4 Conduit and Riser Core Drill Requirements for Workstations:

- 5.4.1 The minimum size for Workstation conduit is three-quarter inch (3/4”).
- 5.4.2 Conduits shall not have a bend radius of less than one foot. ***Note:** If conduit is not necessary, there shall be at least a hole cut in the sheet rock with a mud ring installed at each Workstation. A pull string shall be installed and tied off to the ceiling above the highest point to which the sheet rock extends.
- 5.4.3 Each conduit or mud ring installed shall have a pull string/tape/rope with no less than twelve inches (12”) excess at each end of the pull cord.

5.5 Main Distribution Frame / Main Cross-connect (MDF/MC) Requirements:

5.5.1 MDF General Requirements for Larger Sites:

- 5.5.1.1 The MDF/MC shall be secured by a card key or combination lock.
- 5.5.1.2 The MDF/MC shall have Cross Zone Detection and fire suppression.
- 5.5.1.3 Non-infrastructure Servers shall not be housed in the MDF/MC.
- 5.5.1.4 The MDF/MC may contain the IDF/IC wiring for the same floor. This wiring shall be in separate racks and/or area.

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5.5.1.5 Wall mounted punch down connection blocks shall be installed with integrated vertical and horizontal wire management throughout.

5.5.2 MDF/MC General Requirements for Small Sites:

5.5.2.1 The Small Site MDF shall be either electronically or physically secured. There shall be no unescorted public access.

5.5.2.2 The MDF/MC shall have Cross Zone Detection and be supplied with a fire extinguisher. The fire extinguisher shall be checked annually, with the LAN administrator's sign-off, to verify it is at the appropriate level and in proper worker condition.

5.5.2.3 The MDF/MC may contain the IDF/IC wiring for the same floor. This wiring shall be in separate racks and/or area.

5.5.2.4 Wall mounted punch down connection blocks shall be installed with integrated vertical and horizontal wire management throughout.

5.5.3 MDF/MC Space Requirements:

5.5.3.1 All Telecommunications Spaces designs shall be in accordance with ANSI/TIA/EIA-569-B standard. The design of the telecommunications spaces including termination types and technologies shall be pre-approved by KCIT Network Services.

5.5.3.2 The space shall not be located below grade.

5.5.3.3 The space shall not be located below water or drains pipes, bathroom or kitchen facilities, with the exception of fire suppression systems.

5.5.3.4 The space shall not be located adjacent to the elevator equipment, control room, or any EMI generating sources.

5.5.3.5 The space shall not have external windows.

5.5.3.6 The space shall be a highly secure location with 24 hour secure access, seven (7) days a week.

5.5.3.7 For security reasons, the space shall be identified only by a room number.

5.5.3.8 One thousand square feet. At a minimum, is required for large (greater than 100 employees) buildings.

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- 5.5.3.9 At least 150 square feet of storage room is required/ the storage room shall be as close to the MDF/MC as possible.
- 5.5.3.10 At least 400 square feet, in or near the MDF/MC, is required for UPS and HVAC equipment.
- 5.5.3.11 No ceiling tile is preferred. Ceilings may be suspended acoustical tile.
- 5.5.3.12 Flooring shall be antistatic tile or sealed concrete.
- 5.5.3.13 Four (4) 10 x 12 foot equipment/work areas are required for each MDF/MC.
- 5.5.3.14 The space should contain six (6) standard 7 foot x 19 inch racks (7' x 19").
- 5.5.3.15 Each rack requires a minimum thirty-six inches (36") rear clearance from the wall.
- 5.5.3.16 Each rack requires a minimum of forty-eight inches (48") of clearance in front.
- 5.5.3.17 Racks may be mounted in one or more rows with three feet (3') of clearance at the either end of the row.
- 5.5.3.18 Racks shall be secured in a manner consistent with the seismic requirements for the facility.
- 5.5.3.19 "Clearance space" from the racks shall not overlap in these areas.
- 5.5.3.20 There shall be no less than 8 x 20 feet of backboard, with four feet (4') of clearance in front for the placement of punch down blocks and other wall mounted terminations.
- 5.5.3.21 The rack(s) and associated equipment shall be grounded and bonded to the TMGB or TGB and shall be in accordance with ANSI-J-STD-607-A.

5.5.4 MDF/MC Cable tray Requirements:

- 5.5.4.1 Overhead, a minimum of twelve inch (12") open cable tray or ladder racks, dependant upon the final room shape, are required.
- 5.5.4.2 Cable trays shall be installed from the rack group to each work area.
- 5.5.4.3 Cable trays shall be installed between all racks

5.6 Intermediate Distribution Frame / Intermediate Cross-connect (IDF/IC) Requirements:

5.6.1 IDF/IC General Requirements:

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- 5.6.1.1 The IDF/IC Shall be secured by a card key or combination lock.
- 5.6.1.2 Cabling between IDF/IC and Workstations shall not exceed 90 meters.
- 5.6.1.3 IDF/IC wiring for the same floor may be located in the MDF/MC, but shall be on separate racks and/or area.
- 5.6.1.4 The IDF/IC's shall be shared between data and voice and shall distribute on that same floor, regardless of the cable path.
- 5.6.1.5 All voice/data workstation wiring for a floor shall be terminated on that same floor, regardless of the cable path.
- 5.6.1.6 Each Floor shall have a single IDF/IC.
- 5.6.1.7 Primary phone wiring, from the MDF/MC to each IDF/IC. The design of the telecommunications spaces including termination types and technologies shall be pre-approved by KCIT Network Services.

5.6.2 IDF/IC Space Requirements:

- 5.6.2.1 The IDF/IC shall not be located below grade.
- 5.6.2.2 The space shall not be located below water or drain pipes, bathroom or kitchen facilities, with the exception of fire suppression systems.
- 5.6.2.3 It shall not be located adjacent to the elevator equipment, control room, or any EMF generating sources.
- 5.6.2.4 The space shall not have external windows.
- 5.6.2.5 The IDF/IC shall be a highly secure location.
- 5.6.2.6 The IDF/IC requires at least 150 square feet of floor space.
- 5.6.2.7 The ceilings preference is no ceiling tile. Ceilings may be suspended acoustical tile.
- 5.6.2.8 The flooring shall be antistatic tile or sealed concrete.
- 5.6.2.9 The IDF/IC should contain racks that are seven feet by nineteen inches (7' x 19").
- 5.6.2.10 Each rack requires a minimum of thirty-six inches (36") rear clearance from the wall.
- 5.6.2.11 Each rack requires a minimum of forty-eight inches (48") front clearance or as designed or pre-approved by KCIT Network Services. In no case

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shall there be less than three feet (3') of front clearance.

5.6.2.12 There shall be no less than eight feet by four feet (8' x 4') of backboard, with four feet (4') of clearance in front, to allow for the placement of punch down blocks and other wall mounted terminations.

5.6.2.13 The rack(s) and associated equipment shall be grounded and bonded to the TMGB or TGB and shall be in accordance with ANSI-J-STD-607-A.

5.7 Telecommunications System Requirements:

- 5.7.1 A telecommunications cabling system generally consists of one telecommunications outlet in each workstation, wall telephones in common and mechanical areas, telecommunications rooms (TRs) and Telecommunications Enclosures (TEs) located on each floor, and the equipment room (ER) located within building. The design of the telecommunications cabling system including termination types and technologies shall be pre-approved by KCIT Network Services.
- 5.7.2 The typical work area consists of a four port, single-gang plate with three standards compliant work area outlets (jacks).
- 5.7.3 One work area outlet consists of one (1) four-pair data Category 5e cable (Category 6 recommended), installed from work area outlet to the TR. Terminate data cables on wall or rack mounted modular patch panels or wall mounted connecting blocks (Systimax VisiPatch 360 Wall Field System or equivalent) located in the appropriate TR. The design of the telecommunications cabling system including termination types and technologies shall be pre-approved by KCIT Network Services. Cut sheets and or material samples may be required by KCIT Network Services.
- 5.7.4 A minimum of three (3) Category 5e (Category 6 cables recommended) unshielded twisted pair (UTP) cables shall be run to each faceplate unless otherwise specified by KCIT Network Services.
- 5.7.5 The outlets shall be labeled as "A,B&C", prefaced by the communications faceplate numbering scheme proposed for the building.
- 5.7.6 Wall phone outlets shall consist of single-gang stainless steel faceplate with a Category 5e (Category 6 recommended) jack and wall telephone mounting lugs
- 5.7.7 All RJ45 outlets shall be "universal", allowing voice or data to be

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used in any combination.

- 5.7.8 All RJ45 outlets and connectors shall be wired T568B unless otherwise specified by KCIT Network Services.
- 5.7.9 All Network cabling available in public area shall be electronically or physically secured.
- 5.7.10 All wiring shall be installed in accordance with ANSI/TIA/EIA 568-B standards.
- 5.7.11 All cable shall be rated at Cat5e or better.
- 5.7.12 All cable shall be rated for the plenum and air space in which it is to be installed.
- 5.7.13 All cable shall be marked with a unique identifier at each end.
- 5.7.14 All cables shall have a service loop of 1 meter (3.28') in the suspended ceiling above the work area and 3 meters (10') at the TR or TE.
- 5.7.15 All cables and terminations shall be tested, at the minimum, to Cat5e standards.
- 5.7.16 All cable shall be routed to the Data/telecommunications area in the MDF/IDF using approved cable trays or communication cable support materials. The cable shall use the most direct route.
- 5.7.17 A cable tray shall be installed to carry the Workstation cable from the central corridor cable tray to the backboard in the Data/Telecommunications Area.
- 5.7.18 Cable bundles shall be supported at intervals of not less than four feet (4').
- 5.7.19 Support points can not bend with less than a four inch (4") radius or pinch into jackets of the cables.
- 5.7.20 Cable bundles shall be tied together neatly, wherever possible, using only Velcro style material.
- 5.7.21 Ensure cables installed under the access flooring do not come in contact with any electrical conduits, electrical equipment, mechanical equipment, or ducts.
- 5.7.22 Fire suppression shall be used as required by local, county, state, and federal fire codes.
- 5.7.23 Cable installation, routing, and dressing shall be done following all applicable local, regional, and national codes, as well as industry best practices.
- 5.7.24 Cable length shall not exceed ninety (90) meters of installed cable

from the Workstation to the IDF patch panel.

5.7.25 Patching Systems

- 5.7.25.1 Patch panels shall be 19 in. rack mountable, 24-port 8-pin modular to insulation displacement connector (IDC) meeting Category 5e or Category 6 performance standards, and pinned to be universal both T568A&B standards. The design and layout of the Patching system shall be pre-approved by KCIT Network Services. Cut sheets and or material samples may be required by KCIT Network Services.
- 5.7.25.2 Wall mounted connecting blocks shall be Systimax VisiPatch 360 Wall Field System or equivalent with vertical and horizontal wire management throughout. The design and layout of the Wall Field Patching system shall be pre-approved by KCIT Network Services. Wire management for the Wall Field system shall be required and specified with backboard elevations. The design and layout of the Patching system shall be pre-approved by KCIT Network Services. Cut sheets and or material samples may be required by KCIT Network Services.
- 5.7.25.3 The backboard shall contain Wall Field units for Workstation cable terminations, copper PBX extensions and units for future expansion. The units for the Workstation terminations and copper PBX extensions shall occupy the bottom two thirds (2/3) of the wall field, with space left for future units at the top third (1/3).
- 5.7.25.4 The top one third (1/3) of the wall field is to be used for Data Tail Cables from the rack mounted Network equipment.
- 5.7.25.5 Voice and Data patch cables for the wall field shall be matched to the Wall Field Patching system on each end, manufactured by the Wall Field System manufacture. Data patch cables shall connect the upper one-third (1/3), the Data Tail terminations, to the lower two-thirds (2/3), the station terminations. Telephone patch cables shall connect the copper PBX extensions to the station terminations. Quantity, configuration, specification and lengths

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of patch cables shall be pre-approved KCIT Network Services.

5.7.26 Data shall be served from Network equipment, within Telecommunications Spaces, ordered through Network KCIT Network Services and installed by Network KCIT Network Services in accordance with the Network Equipment Standard.

5.7.27

5.7.28 Each floor's Telecommunications Spaces shall have a copy of its "as-built" documentation, including a floor map showing all Work Area locations and cable pathways.

5.8 Data Tail (cable harness) Cabling Requirements

5.8.1 King County Network KCIT Network Services shall approve the quantity and length of the installed patch and Data Tail Cables utilized inside the Data Closets. The design and layout of the Patching system shall be pre-approved by KCIT Network Services. Cut sheets and or material samples may be required by KCIT Network Services.

5.8.2 Each Data Tail Cable shall be cut to length and terminated with an RJ-45 connector dressed neatly and tested to Workstation cable standards.

5.8.3 Service loop(s) shall be left in the Data Tail Cables to provide seismic isolation of the racks from the backboard and cable trays.

5.8.4 Data Tail Cables shall be supported in a manner consistent with seismic survivability, including slack.

5.8.5 An MDF/MC / IDF/IC may have the voice/Data Workstation wiring on rack mounted RJ-45 patch panels or to wall field to match previously installed cabling.

5.8.6 Each termination shall be uniquely labeled in accordance with the labeling scheme proposed for the building and ANSI/TIA/EIA-606-A.

5.9 Power Requirements:

5.9.1.1 Electrical service for the racks shall be from panels that are separate from any large electrical loads, such as elevator or HVAC motors.

5.9.1.2 Circuits shall be terminated above the racks and shall be of the dedicated and isolated ground types.

5.9.1.3 There shall be a minimum of two (2) 20 amp, 120 VAC circuits, with 4-plex outlets (5-20R).

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- 5.9.1.4 A 20 Amp, 120 VAC dedicated circuit, isolated ground with four (4) 20 Amp outlets (5-20R) shall be installed near the backboard. These outlets shall be located at each end of the backboard and no closer than twelve inches (12”) from any copper telecommunications cable or termination.
- 5.9.1.5 A 30 Amp, 208 VAC dedicated circuit, with an isolated ground (L6-30R) and a 20 Amp dedicated circuit, with isolated ground with four (4) 20 Amp outlets (5-20R), shall be installed above each rack located in the MDF/IDF. These outlets shall be located no closer than twelve inches (12”) from any copper telecommunications cable or termination.
- 5.9.1.6 The above circuits shall be on generator power and marked as such.
- 5.9.1.7 Larger installations may have specific individual requirements that supersede those above.

5.10 Air Conditioning Requirements:

- 5.10.1.1 Air conditioning for the Large Site MDF/IDFs shall be supplied from units separate from the general building HVAC.
- 5.10.1.2 The HVAC requirements of the MDF shall be pre-approved by Network KCIT Network Services for each individual room.
- 5.10.1.3 The HVAC requirements of the IDF shall be pre-approved by Network KCIT Network Services for each individual room.
- 5.10.1.4 The HVAC systems for Large Site MDF/IDF room(s) shall be required to operate 7 x 24 x 365.
 - 5.10.1.4.1 Relative humidity shall be between 45% and 51%. The recommended set-point is 48%, +/- 3%, with hi/lo alarms set at 20% and 70% respectively.
 - 5.10.1.4.2 The temperature shall be between 64 and 75 degrees Fahrenheit (18-24 Celsius) year round.

6 EXCEPTIONS:

- 6.1 Any Organization seeking an exception to this standard must follow the Information Technology Policy and Standards Exception Request Process using the Policy and Standards Exception Request form. This form can be found on the Office of Information Resource Management policies and procedures Web page at <http://kcweb.kingcounty.gov/oirm/policies.aspx>.

7 **RESPONSIBILITIES:**

- 7.1 King County Network KCIT Network Services shall be the approval authority for the layout of the MDF/IDF room(s) in relation to Data/Telecommunication layouts and backboard elevations.
- 7.2 King County Network KCIT Network Services shall be the approval authority for the riser core plan where required.
- 7.3 King County Network KCIT Network Services shall be the approval authority for the submittals of all materials used in the cable plant installation.
- 7.4 King County Network KCIT Network Services shall be the approval authority for the electrical and HVAC designs for the MDF/IDF room(s).
- 7.5 The Chief Information Officer (CIO) is the approval authority for the **Physical Infrastructure Standard**.
- 7.6 Network KCIT Network Services Network, Systems, and Operations is the steward of the Network infrastructure and is responsible for providing all transport services across the KC WAN. As such, Network KCIT Network Services will become the owners of the Network policies, standards, and guidelines.
- 7.7 Network KCIT Network Services is responsible for the operations and maintenance of all Network Infrastructure Equipment connected to the King County Enterprise Network. Network KCIT Network Services is not responsible for Network Infrastructure Equipment that operates solely with a department **and** that Network KCIT Network Services has previously determined neither connects to, nor affects the operation of the County Enterprise Network.
- 7.8 Network KCIT Network Services is responsible for protecting the integrity of the County Enterprise Network. To meet this responsibility KCIT Network Services shall ensure compliance with the terms detailed in the **Physical Infrastructure Standard**.
- 7.9 Network KCIT Network Services is responsible for the security of the County Enterprise Network. Policies, standards, guidelines, and associated oversight relating to Network security are established and maintained by the Chief Information Security and Privacy Officer (CISPO). Managers in charge of information technology within each Organization or IT Service Delivery Managers are responsible for ensuring that devices, systems and applications under their control are in compliance with the **Physical Infrastructure Standard**.
- 7.10 King County departments/agencies are responsible for informing their employees of this policy.

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7.11 The **Physical Infrastructure Standard** will be reviewed annually, or as needed, by KCIT Network Services.

8 **STANDARDS GUIDELINES:**

8.1 When vacating a leased space, the cabling and equipment disposal is dependent upon the Facilities Management Division's (FMD) lease agreement. King County policy dictates that the county may not gift to private enterprise. Please consult FMD about their agreement on the disposal or removal of equipment.

End of Facility Performance Standard