Kaiser Permanente

Medical Office Building Center of Excellence

Covina Medical Office Building

Basis of Design

July 1, 2019

Prepared by:

CANNONDESIGN

2355 Main Street, Suite 175

Irvine, CA 92614

Kaiser Permanente

Medical Office Building Center of Excellence

Covina Medical Office Building

01. **PROJECT SCOPE & DESCRIPTION**

Medical Office Building Center of Excellence

The Medical Office Building Center of Excellence (MOB COE) is a response to Kaiser Permanente's need to reduce medical office building construction cost while maintaining high-quality, efficient facilities that reflect the KP brand. The goals of the MOB COE are:

- Develop a system-based logic for application of modular elements
- Accelerate project delivery timeframe by 30%, saving 6-9 months
- Achieve 20% savings in construction cost, removing wasted material and time
- Drive preconstruction and design costs down by 50%
- Achieve operational energy use performance target of 35 EUI

The MOB COE will utilize technology enabled, modularized project delivery strategies, supported by high-quality, pre-engineered solutions, and on-site assembly to reduce individual project variations and consistently achieve predictable outcomes and deliver buildings in less time, at a lower cost, and with equal or improved quality.

Project Statistics

The Covina Medical Office Building will be located on 1664 Park View Dr. in Covina, California. It will be a three-story building of 58,800 sf with a 4-story parking structure (256 parking spaces) on the northwest side, 7 parking spaces adjacent to the garage (which includes 6 accessible and 1 regular parking space) on the southeast side and 66 surface parking spaces (which includes 2 accessible parking spaces) adjacent to the southeast side of the building. This development is located on the northeast side of Park View Dr. approximately south of the intersection of East Holt Avenue and San Bernardino Freeway, in the City of Covina, California. The Facility will include two templated outpatient clinics, a retail pharmacy, a behavioral health clinic, imaging, nurse clinic, speech therapy, and a clinical lab. A conference space is provided and is designed so that it can be available to the public during hours when the building is closed.

Code Analysis

The Kaiser Permanente Covina Medical Office Building is a three-story business occupancy. Building structure is an unprotected steel frame of construction Type IIB. The building is to be a fully sprinklered building.

Applicable Codes:

1. 2019 California Building Code
2. 2019 California Green Building Standards Code
3. 2019 California Plumbing Code
4. 2019 California Mechanical Code
5. 2019 California Electrical Code
6. 2019 California Fire Code
7. 2019 International Fire Code
8. 2010 ADA Standards for Accessible Design

There are no OSHPD reviewable occupancies in the KP Covina MOB.

Maximum building Height is 53'-6" and three stories including roof. The building is fully sprinklered Type IIB Group B Occupancy and one hour rated shaft enclosures. Structure supporting shafts is not required to be protected per CBC 713.4 Exception 2.

CBC tabular building area is 69,000 sf. After increases for sprinklers and frontage the maximum building area is 120,750 sf. Actual building area is 58,800 sf.

One enclosed exit stairway serves the building in addition to an unenclosed stair designed as follows:

The unenclosed Thrive Stair is an interior exit stairway per CBC 1023.2 and connects the Lower Level to Level 2 and Level 3 and will be designed as a communicating space and an unenclosed exit access stair. The opening(s) will be protected by a draft curtain and closely spaced sprinklers. Interior Exit stairways that are enclosed within an Atrium are allowed per CBC 1023.2 Ex. 2.

The Public Square is open to Level 3 at the Thrive Stair. This space is considered a three-story atrium. Per CBC 404.6 smoke control is not required for Atriums that connect only three stories.

The second stair is an interior exit stairway per CBC 1023. This stair is enclosed with one hour rated walls. The steel frame protecting these stairs is not required to be rated per CBC 713.4 Exception 2. Accessible means of egress is provided via the stairs per CBC 1009.3. Stairs in a sprinklered building do not require accessibility. See exceptions in CBC 1009.4.

The building will comply with the requirements of Seismic Design Category D.

02. **SUSTAINABILITY**

LEED Strategies

Consistent with KP's LEED objectives and those of the MOB COE program, the project goal is to achieve LEED Gold certification. The project anticipates utilizing LED efficient lighting, optimizing envelope thermal properties, managing water usage, and optimizing energy performance and controls while also managing material selections for renewable content and indoor environmental quality (consistent with KP environmentally preferred purchasing program) in order to achieve certification. As the project progresses, these items as well as additional strategies and refinements will be evaluated and applied as appropriate. An initial LEED scorecard represents the anticipated objectives for certification.

LEED Scorecard

See following sheet

LEED v4 for BD+C: New Construction and Major Renovation

Project Checklist

Project Name: KP MOB CoE COVINA
Date: July 1, 2019

Y	?	N			
			Credit	Integrative Process	1

Y	?	N		Location and Transportation	16
		16	Credit	LEED for Neighborhood Development Location	16
1			Credit	Sensitive Land Protection	1
		2	Credit	High Priority Site	2
1	1	3	Credit	Surrounding Density and Diverse Uses	5
	1	4	Credit	Access to Quality Transit	5
	1		Credit	Bicycle Facilities	1
		1	Credit	Reduced Parking Footprint	1
1			Credit	Green Vehicles	1

Y	?	N		Sustainable Sites	10
Y			Prereq	Construction Activity Pollution Prevention	Required
1			Credit	Site Assessment	1
		2	Credit	Site Development - Protect or Restore Habitat	2
		1	Credit	Open Space	1
2		1	Credit	Rainwater Management	3
	2		Credit	Heat Island Reduction	2
1			Credit	Light Pollution Reduction	1

Y	?	N		Water Efficiency	11
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
2			Credit	Outdoor Water Use Reduction	2
4		2	Credit	Indoor Water Use Reduction	6
		2	Credit	Cooling Tower Water Use	2
1			Credit	Water Metering	1

Y	?	N		Energy and Atmosphere	33
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
4		2	Credit	Enhanced Commissioning	6
18			Credit	Optimize Energy Performance	18
1			Credit	Advanced Energy Metering	1
1	1		Credit	Demand Response	2
3			Credit	Renewable Energy Production	3
1			Credit	Enhanced Refrigerant Management	1
2			Credit	Green Power and Carbon Offsets	2

Y	?	N		Materials and Resources	13
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
		5	Credit	Building Life-Cycle Impact Reduction	5
2			Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
2			Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
2			Credit	Building Product Disclosure and Optimization - Material Ingredients	2
2			Credit	Construction and Demolition Waste Management	2

Y	?	N		Indoor Environmental Quality	16
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
2			Credit	Enhanced Indoor Air Quality Strategies	2
3			Credit	Low-Emitting Materials	3
1			Credit	Construction Indoor Air Quality Management Plan	1
2			Credit	Indoor Air Quality Assessment	2
	1		Credit	Thermal Comfort	1
1	1		Credit	Interior Lighting	2
		3	Credit	Daylight	3
		1	Credit	Quality Views	1
	1		Credit	Acoustic Performance	1

Y	?	N		Innovation	6
1			Credit	Innovation (green building education or DC lighting)	5
1			Credit	LEED Accredited Professional	1

Y	?	N		Regional Priority	4
1			Credit	Regional Priority: Specific Credit (optimize energy performance)	1
	1		Credit	Regional Priority: Specific Credit (outdoor water use)	1
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1

64	10	45	TOTALS	Possible Points:	110

Certified: 40 to 49 points, **Silver:** 50 to 59 points, **Gold:** 60 to 79 points, **Platinum:** 80 to 110

03. **SPATIAL ORGANIZATION AND PLANNING**

Planning overview:

The Covina Medical Office Building is a new primary and specialty care MOB with the following breakout:

- 41 Provider Offices (PO), include behavioral health
- 52 Exam Rooms
- Behavioral Health, Physical Therapy, Pharmacy and Imaging, Blood Draw
- Family Medicine, Internal Medicine and Pediatrics

It is a three (3) level facility with a maximum allowable building area of 58,800 SF (per zoning).

The plans are developed based upon the approved Space Program, dated March 19, 2019 (version 4) with approved modifications as indicated in the program to actual report. The floor plan is arranged with the 'Radial' Next Gen template (Module A, version 4) to allow access to Enclave from Clinic Module with a central collaboration zone for staff and providers. Common clinic support spaces such as the Procedure Room/ Meds/ Soiled/ Clean Storage are centralized for shared, streamlined access from all exam and provider locations.

Several iterations of the first floor plan were studied throughout the design phase. The needs of the community and members were at the forefront of consideration when exploring options. The position of the entry allows for welcome transition from exterior to public square. The conference center was located to allow for exterior, afterhours access with the ability to close the rest of the facility from a security standpoint. Other services were arranged around the public square, each having required front porch space for member waiting.

The plan incorporates several guardrails that were established as part of the MOB COE program:

- Shafts, TR, Electrical and Flex Infrastructure Zone (if applicable) is to remain on the Infrastructure Spine
- All clinical corridors are 5'-0" unless noted otherwise
- All rooms which are not rated or lead lined on Level 2 are to be constructed of demountable partitions for future flexibility

- Column grid spacing is to remain to meet the clinic module components and infrastructure spine to ensure rooms and infrastructure components are column and beam free where needed.
- All rooms on Level 1 are to be built with typical non-structural framing.

Rooms which are designated as templated space (as described in the comments section of the approved space program) are planning using the latest approved templates as available on Info Zone and/or were provided to the Revit template development team during the course of the project. All elements of the room templates including medical equipment, power and data devices, etc. are to be included as the basis of design for these spaces.

04. **SITE WORK**

Overview

The Kaiser Permanente Covina MOB will be constructed on three lots (Lot 8, Lot 9 and Lot 10), a total of 3.42 acres. The site is bounded by a commercial building, for the Weickert Allison Jeter Co, to the north of the site on Park View Drive, the cul-de-sac ending of Park View Drive on the west side of the site, a commercial building, for Continental Business Services, on Park View Drive, south west of the site, the 10 Freeway westbound on the south side of the site, and four residential homes along the northeast, east, and southeast portion of the site. The proposed project includes the construction of a slab-on-grade structure and associated surface parking. The project will include installation and implementation of Low Impact Development (LID) features within the redevelopment areas as required by code standards.

Entitlements Process

On March 26, 2019 the project was submitted to City of Covina for review; this was a pre-submittal meeting. Comments from the City were received on May 1st and a meeting with City Officials took place on May 5th, 2019. The Final entitlement submittal is scheduled for July 9th, 2019.

Public Way

As determined in the entitlements process, the west access road to the site is constructed per City of Covina engineering standards as a public road. This road will connect the KP MOB parking to Park View Dr.

Permitting

The 2019 version of the California Building Code and the City of Covina Standards will be reviewed, utilized, and implemented throughout this project.
The current local water quality design requirements and MS4 permit will be followed

Accessibility- Since access locations of the new structure vary, the differences in elevation will be addressed with sloped walks, in lieu of ramps and steps, wherever possible. This will happen

along the Thrive Path as well as out to the public rights of way. Coordination with the architect and landscape architect is on-going in order to achieve this.

Parking

The project site includes 412 total spaces. This is exceeds the Kaiser Permanente's requirement of 5 spaces/1000sf, or 302 spaces.
Disabled access parking spaces are provided in compliance with CBC chapter 11B and ADAAG. 8 accessible car parking spaces and 2 accessible Van spaces are provided.

These parking spaces are included in the 412 total parking count, as permitted by local jurisdictional approval.

Service trucks will be received at a service yard that is screened by walls that match the building façade. The service yard is partially covered. The service yard will include space for a 20-yard compacting dumpster and a 10-yard covered dumpster for cardboard. Circulation at the service yard is designed for a straight truck to access the dock via a three-point turn. A grade separated loading dock Is not provided.

Renewable energy

Renewable energy will be generated by an array of photovoltaic carports located on the roof of the garage and provided by Ameresco. The required energy generation will be estimated during the VBD phase. The implementation of the photovoltaic array will be under a separate contract. It is covered in this BOD for entitlement purposes only. The project will seek LEED points for renewable energy generation. It is the KP's intent to have the photovoltaic arrays operational on opening day.

Zoning, FAR and Setbacks

Zoning is C-P Administrative + Professional Office. Zoning allows a 1.5 FAR. The setback along Park View Drive is 10 ft on the West, 10 ft to the East and South.

Traffic Studies

A detailed traffic study was prepared by LLG. The City of Covina has reviewed it and it will be deemed complete once the final plan is submitted and final Memorandum is submitted by LLG.

Site Grading

The site is currently vacant, void of any structures on-site. Current ground surface cover consists of grass and weeds with trees and shrubs located between Lots 9 and 10. Current existing grades slope the south side of the project side to the west towards Park View Drive.

The site grading design will accommodate the proposed site planning concept. All new site work will be graded to comply with ADA requirements:

1. Cross Slope will be less than 2% but will be graded for a maximum of 1.8% due to construction tolerance.
2. Directional Slope will be less than 5% but will be graded for a maximum of 4.8% due to construction tolerance.
3. If required, ramp slope will be less than 8.33%, but will be graded for a maximum of 8% due to construction tolerance.

In addition, all new site work will be graded for surface drainage. All site drainage shall be collected and controlled in non-erosive drainage devices.

Drainage shall not be allowed to pond anywhere on the site, and especially not against any foundation or retaining wall. The site shall be graded and maintained such that surface drainage is directed away from structures in accordance with 2019 CBC 1804.3 or other applicable standards. In addition, drainage should not be allowed to flow uncontrolled over any descending slope. Discharge from downspouts, roof drains and scuppers are not recommended onto unprotected soils within 5 feet of the building perimeter. Landscape irrigation shall not be within 5 feet of the building perimeter footings except when enclosed in protected planters.

Positive site drainage shall be provided away from structures, pavement, and the tops of slopes to swales or other controlled drainage structures. The building pad and pavement areas shall be fine graded such that water is not allowed to pond.

Utilities

Storm Drainage – Per survey, there is an existing storm drain line that begins as an 18" line, increases to a 24" line once it reaches the second storm drain (located in Lot 10), and then increases again to a 27" line, which ultimately discharges to the main storm drain line. This line in currently collecting the runoff on Park View Dr. The site will have a series of catch basins and roof drains that will be hard piped to a network of storm drain lines which will be connected to our

storm drain Best Management Practices (BMP) and a detention tank. The detention tank will be sized to capture the Design Capture Volume per Low Impact Development (LID) requirements. The storm water collected in the detention tank will be routed and pumped to a biofiltration device and will be discharged out onto the public right of way. Stormwater overflow will be collected and discharged on to Park View Dr.

Sanitary Sewer – There is one (1) existing 8" sanitary sewer main line located on Park View Dr. that is southeast of our project site. There are two existing sewer laterals fronting the project site. There is one existing lateral connection to Lot 8 and one existing lateral connection to Lot 10.

Domestic and Fire Water – There Is one (1) existing 8" domestic water main line on Park View Dr. that is southwest of our project site. The waterline is 14 feet from the centerline of the street located on the side adjacent to the proposed site. There is a 10-foot wide easement on the southeast border of the property, in the middle of the easement runs a continuation from the 8" waterline extending further as a 6" waterline. There are three existing water laterals fronting the project site along Park View Dr. There is one existing lateral connected to Lot 8, Lot 9 and Lot 10. There are two existing 6" fire hydrants located on the Park View Drive sidewalk, in front of the site. One is located in front of Lot 10, and the other is between lots 8 & 9 at the end of the cul-de-sac. Additionally, there are 3 water valves, two are located directly in front of the fire hydrants, and the last one in the middle of the street, at the end of the cul-de-sac on Park View Drive. We do not foresee the need to add an on-site private fire hydrant or provide a fire-loop system for the site.

Current state regulations and requirements will be met, specifically as it relates to the storm water management.

Storm Water Management

The proposed development is required to comply with the current MS4 permit and Low Impact Development (LID) requirements of the County of Los Angeles. The preliminary geotechnical report found that there is primarily sandy silt or silty sand throughout the site, along with shallow bedrock. Because of this, the project is deemed not suitable for infiltration. Each drainage area within the project area was analyzed for the most efficient solution in order to fully comply with the local storm water permits. Since infiltration is not feasible per LID requirements, we will need to implement a harvest and use BMP. This project would not provide sufficient irrigation water demand for use of stored stormwater runoff due to limited landscaping, therefore, harvest and use is considered infeasible for this project. Because infiltration and harvest and use BMPs are infeasible for this site, a biofiltration BMP will be used. The site will have a series of catch basins

and roof drains that will be hard piped to a network of storm drain lines which will be connected to our storm drain Best Management Practices (BMP) and a detention tank. The detention tank will be sized to capture the Design Capture Volume per Low Impact Development (LID) requirements. The storm water collected in the detention tank will be routed and pumped to a biofiltration device and will be discharged out onto the public right of way. Stormwater overflow will be collected and discharged on to Park View Dr.

Landscape and Hardscape Elements

The site design of Kaiser Permanente Covina reinforces Kaiser Permanente's commitment to providing members and staff with a rejuvenating, multifunctional, and healthy environment. The design goals include:

- Providing areas of rejuvenation and connections to nature
- Providing community spaces for meaningful interactions
- Programmed outdoor space for physical therapy
- Incorporating sustainable environmental design principles

Programming

The exterior landscape of Kaiser Permanente Covina offers a welcoming experience to members and staff. The Medical Office Building is surrounded on three sides by landscaped garden spaces which provide a variety of locations to sit, relax, converse, walk and wait. A series of small and large curvilinear benches weave through a linear tree canopy to create shaded outdoor rooms of various sizes, allowing for both large and small group gathering spaces as well areas for individual solace.

Pedestrian circulation is designed to guide visitors and staff easily and safely from parking areas to the building entrance. The building entrance on the north façade is flanked by a large seating area and plant bed that serves to provide shade and screen the loading dock from view. Along the western façade, a linear walk is interrupted with a small garden space visible from the patient drop off zone. As users continue south along the building and turn to the southern façade, they discover a larger garden area offering various seating area adjacent to plantings. These spaces are all linked along an 830 foot walking path (thrive path) which continues along the perimeter of the surface parking lot through a landscaped area designed to be a pollinator friendly garden with native plantings.

Hardscape

The primary paving material used in the landscape areas around the building will be poured in place concrete with a variety of finishes and joint patterns used to define circulation patterns and gathering spaces. Curvilinear forms within the entry plaza complement the orthogonal building forms and resonate with the natural patterns of the San Gabriel Mountains due north of Covina. The Thrive path will be concrete with finish and joint patterns matching the entry plaza linking so as to clearly define pedestrian flows through and around the parking lot. We plan to use permeable asphalt for the parking stalls to reduce site storm water runoff.

Planting

The plant palette for the overall landscape is comprised of native and adapted plants that reflect the local character of Covina. Plants are selected to be water efficient, ecologically appropriate and aesthetically pleasing. The Plaza Gardens will be planted with a backdrop of evergreen species punctuated by flowering perennials that provide color at all times of year. Plaza trees will be deciduous trees that provide shade for the outdoor rooms in spring and summer as well as fall color and winter light to mark the changing of the seasons. The perimeter landscape will be lined with trees and plants acting as a buffer between adjacent properties yet still allowing for key views in and out of the site. The sloped eastern border will be vegetated with species that will provide erosion control and require minimal water. Existing trees can be found directly adjacent to the property and tree protection measures will be taken during construction to ensure vitality is maintained. For trees planted in hardscape, structural soil shall be installed under the adjacent hardscape at a minimum of 10' around trees to allow for unencumbered root growth which will yield a larger, longer-lived tree. Trees are provided within the surface parking lot in order to provide shade to 50% of the area 15 years following installation and also meet the City of Covina design guidelines of 1 tree per every 5 parking spaces. A 3" layer of bark mulch will be applied to all planting areas for moisture retention. Plants located within the Water Purveyor's Easement along the west and south borders will be small and easily removed/transplanted if needed in the future.

Furnishings

Seating opportunities are integrated within the curvilinear design language of hardscape spaces and plant bed edges, which extrude to become benches at key programmatic

moments. The curvilinear benches follow two radii to allow for both intimate conversations as well as large group gatherings. Benches will be made of a cast-in-place concrete base with a wooden seat cap and back rest attachment. Limiting the curved forms to two radii facilitates replication and allow for standardization across multiple Kaiser Permanente sites. Additional moveable furniture such as bistro tables and chairs may be located throughout the plaza spaces to provide members a place to relax, gather, and dine. All furnishings will conform to Kaiser Permanente's approved furnishings list and will be selected to enhance the use of each courtyard and space. Trash and Recycling receptacles as well as bicycle racks will be provided as required.

Irrigation

All planting on the project will be irrigated using the potable water, with higher irrigation use anticipated during the establishment period. A water efficient irrigation system and controller, including correct valving of hydro zones and the proper use of irrigation spray heads and bubblers will be designed. Implementation of these irrigation methods along with a plant palette with low water needs will help to minimize overall water usage.

KAISER PERMANENTE COVINA MOB

BASIS OF DESIGN

STRUCTURAL FRAMING / FOUNDATION

The 2019 Edition of the California Building Code (CBC) will be utilized to design the facility. The new facility will be a three-story structure. The total area of the building will be approximately 58,800 square feet with a column grid spacing of 30' to 37.5' in each direction. The column grid can be adjusted as needed to fit Kaiser's preferred medical planning module.

We anticipate the buildings superstructure will be supported by typical reinforced concrete spread wall footings founded on properly compacted fill. Over excavation below spread footings is required in accordance with the geotechnical report. The allowable bearing pressure is 2,200psf and can be increased with wider and deeper footings up to 5,000psf. It is anticipated the ground level floor will be a 5" mildly reinforced concrete slab supported on grade with a 4" open-graded gravel cushion and vapor barrier below.

Foundation systems to resist wind and seismic overturning and lateral load may rely on several methods to transfer load into the earth including passive pressure of soil, friction at the base of the foundations, and combined footings. Where each method will be utilized depends largely on the lateral force resisting system (LFRS) chosen for the building. Moment frames, which tend to have more columns engaged in the LFRS, tend to result in more spread out lateral base reactions which can usually be resisted using passive pressure and/or friction on individual footings. Braced frame systems concentrate base shear and overturning at a few isolated locations, which will likely require combined footings.

The lateral force resisting system should balance the need for maximizing seismic safety with economy while utilizing a layout that integrates functional and architectural considerations. A variety of lateral force resisting systems were considered including steel moment-resisting frames, steel braced frames (eccentric and buckling-restrained), and reinforced concrete shear walls. With flexible open spaces as a primary goal, a ConXtech steel moment frame system proved to be the lateral system most beneficial to the project. The steel framing system using ConXtech connections is a very durable and redundant structural framing system and has the same advantages of a typical steel frame including efficiency, flexibility, serviceability, vibration performance, and constructability. The use of this system allows for an extremely fast and efficient field erection process. Additionally, this system allows for a high level of architectural and program efficiency and flexibility, and can satisfy budget considerations for the structure. It is anticipated that moment frame beams will be approximately W24x, and moment frame columns will be concrete-filled 16 inch square HSS sections.

All structural steel framing that is exposed to weather will be galvanized and/or coated with a high performance exterior paint. This includes, but is not limited to, canopy framing, screen wall framing, all framing located above the roof, and all framing provided to support the exterior façade. Coating decisions will be developed in coordination with the architecture team and applicable standards. Architecturally Exposed Structural Steel (AESS) provisions will be considered for structural steel framing that is exposed to view.

This superstructure framing system selection was based on the combined considerations of efficiency, flexibility, serviceability, vibration performance, and constructability. The most dominant factors in the decision were cost, speed of construction and the overall quality control associated with structural steel. When selecting the structural system, an important factor is the seismic design category of the building defined by the local building code. The seismic design category for this project is "D". Special seismic detailing is required for this category. The typical floor and roof construction will consist of steel composite deck supporting a light weight concrete slab supported by wide flange steel beams and columns.

The adjacent property to the north side of the side of the site occurs at a higher elevation. The grade currently slopes down to this site at the property line. To accommodate the new structure and site improvements the slope will be tiered and a series of 6ft high reinforced concrete or concrete masonry (CMU) retaining walls shall be designed to hold back the earth. The walls shall be supported on continuous spread footings sized to be stable for overturning and sliding loads from the retained earth.

DESIGN CRITERIA

The governing code will be the 2019 California Building Code. Other referenced design codes include:

- ASCE 7-16: Minimum Design Loads for Buildings and Other Structures,
- ACI 318-14: Building Code Requirements for Structural Concrete and Commentary
- AISC 360-16: Specification for Structural Steel Buildings
- AISC 341-16: Seismic Provisions for Structural Steel Buildings, Including Supplements
- ANSI/AWS D1.1 thru D1.9: AWS Structural Welding Code, Latest Editions

Seismic Loads:

- Risk Category II (Ordinary structures which do not fall into higher classification criteria of III and IV)
- Importance Factor: I=1.0

Live Loads

- General Offices/Exam Rooms: 50 psf
- Exit Corridors above First Floor: 80 psf

- Exit Corridors at First Floor: 100 psf
- Stairs: 100 psf
- Roof (non-Mechanical): 20 psf
- Mechanical Areas: 150 psf (or per equipment/pads layout and weights if heavier)

Design Criteria Cont'd

Structural Materials:

- Concrete: All Structural concrete mixes shall be Type II or Type V cement. All structural concrete shall be normal-weight (145 pcf) or lightweight concrete (110 pcf) with minimum compressive Strength at 28-days as follows:
    - Typical Lightweight concrete over metal deck: f'c = 3000 psi
    - Foundations: f'c = 4000 psi
    - All other Concrete: f'c = 4000 psi

- Masonry:
    - Block ASTM C-90, normal weight (f'm = 2000 psi)
    - Cement (Low Alkali, Type I or II): ASTM C150
    - Grout ASTM C476

- Reinforcement:
    - Typical Reinforcement: ASTM A615, Grade 60
    - Welded Rebar: ASTM A706, Grade 60
    - Welded Wire Fabric: ASTM A185

- Structural Steel:
    - Typical Wide-Flange Structural Steel: ASTM A992, Grade 50
    - Steel Angles and Channels: ASTM A36 (Fy = 36 ksi)
    - Structural Tubes (HSS): ASTM A500, Grade C (Fy = 50 ksi)
    - Structural Pipes: ASTM A53, Grade B (Fy = 35 ksi)
    - Structural Bolt: A325N unless noted otherwise.

- Welding:
    - Structural Steel Electrode Strength: E70XX
    - Reinforcing Steel Electrode Strength: E80XX

06. **EXTERIOR ENCLOSURE**

Overview

As part of the Medical Office Building Center of Excellence, the Covina MOB uses a modular process to achieve accelerated project delivery. The design of the exterior enclosure takes advantage of several strategies to achieve efficiency and acceleration.

The exterior of the templated 3-story module is designed according to a preprogrammed decision tree matching exterior façade with programmatic elements within the module.

The exterior wall is factory fabricated as panels and assembled on site, maximizing speed and minimizing variation in quality.

Branded entry elements including a canopy, entry vestibule, Thrive Stair and elevators are visible to members at the point of arrival.

Prefabricated Exterior Wall Panels

The panelized exterior skin uses the system-based logic developed in the Center of Excellence initiative. Panels are selected from the catalog, with a maximum width of 10 feet. The panels consist of cold-formed metal framing (CFMF), exterior sheathing, fluid applied air/water barrier, punched windows, and Exterior Finish Insulation System (EIFS). The EIFS has a fine sand finish. The panel joints are sealed with a primary joint is a pre-compressed foam (Tremco ILMod 600) at the plane of the sheathing, and a secondary sealant joint at the outer face of finish. The wall system is a ground stacked system, with the gravity load of the wall being transferred to the foundation and the raised slab edge connections taking only lateral load. The exterior wall attaches to the slab edge via a continuous metal channel that is installed prior to pouring concrete. Panels arrive onsite fully finished with glazing installed.

EIFS insulation thickness is to be 3" to 4" (depending on final R-value calculations).

Windows are to be installed in the shop prior to shipping panels to the site.

Panels which extend above roof level are to be delivered with exposed CFMF on the back side of the parapet, with the intent that sheathing, and a roofing assembly will be installed up the back of the wall and over the top of the wall. The top of parapets is to have an continuous insulated plywood blocking assembly that extends over the EIFS assembly installed after the

panels are placed. A weather barrier is to be applied to cover the front edge and the exposed bottom of the plywood blocking assembly that is tied into the water resistive barrier of EIFS system. The Single ply roofing membrane is installed up the back of the parapet, over the top of the plywood blocking assembly, and fastened to its front face. Copings are to be field applied after the roof membrane installation.

Perforated metal panels

Custom perforated metal screen is to be installed on a portion of the façade, integrated into prefabricated exterior wall panels, representing Kaiser national brand.

Glazed Curtain Wall

The 3-story glazing system is designed as a 4-sided SSG aluminum curtain wall system.

Basis of design is Oldcastle "Reliance Cassette" system. The cassette system allows factory glazed cassettes to be glazed into a system of structural mullions erected in the field.

Single-Story Glazing on Level 1

The continuous single-story glazing on Level 1 is designed as a 4-sided SSG aluminum curtain wall system. Basis of design is Oldcastle "Reliance Cassette" system. The cassette system allows factory glazed cassettes to be glazed into a system of structural mullions erected in the field.

Glazing Surrounds and Soffits

At locations shown in drawings continuous single-story glazing at level 1 is surrounded by a protruding metal panel brow soffit made of Aluminum Composite Material. All ACM to be provided with FR core. Where required, structural steel HSS wind girt spans between columns to support dead load of wall panels above glazing and/or the head of the glazing. Soffit support is thermally broken cold formed metal framing with 4" continuous mineral wool insulation, over a weather barrier and exterior gypsum sheathing; basis of design Smartci GreenGirt.

Where surround protrude is greater than 12" from the face of the sheathing, it is supported by additional tube steel structure, cantilevering from the panel framing.

Windows

Punched openings are large single pane glazed openings using structurally glazed, thermally broken, aluminum framing.

The glazing is to be 1" insulating glazing units (GL-1) with clear glass and a triple silver Low-E coating (Viracon VNE1-63 or equal, see Section 088000) on the 2nd surface. A snap-on aluminum trim to capture the gypsum board to be on the back of the curtainwall framing at sill.

Foundation Walls

Foundation walls to be insulated with 2" mineral wool insulation which also acts as a drainage layer and protection course on face of walls and edge of slabs down to the top of foundation

Canopy

The canopy is to be constructed of painted steel HSS tubes with 6" deep custom perforated rib panels, installed to the underside of the secondary steel structure. Portions of canopy that protect main walk path at the entrance to the building are to be covered with additional solid metal panels.

Rooftop Screen Wall

Rooftop Screen Wall structure to be hot dipped galvanized Structural Steel HSS tubes

Roofing to flash up posts; bottom 24" of posts to be filled with spray foam insulation. Weathertight welded cap plates to be installed at tops of posts

Roof screen wall is to be vertically oriented Centria metal panels with concealed fasteners.

Bottoms of rooftop screen wall panels to be set above roofing high-point level (approximately level with the top of parapets of the main exterior walls) to allow airflow and minimize area of wall.

Loading Dock Walls

The loading dock is to be constructed a CMU walls, with the surface facing the service yard being painted, and the surfaces facing outwards having skim-coat plaster and an EIFS finish coat to match the EIFS on the building's wall panels.

Roof

Roof structure is a concrete composite deck. The concrete roof deck allows for continuous lateral bracing of the prefabricated exterior wall panels. The concrete roof deck also provides the advantage of a continuous plane of attachment for hangers, including mechanical equipment hangers, DIRTT walls and medical equipment.

The roof structure is not sloped. The level roof structure allows for efficiencies in the fabrication of the steel structure. This could not be achieved with a sloped-structure design, in which all steel pieces would be unique.

The roof membrane is a cool-roof white TPO over tapered insulation. The u-factor of the roof is 0.041. This will be achieved with 7.1" thickness of polyisocyanurate insulation. The roof membrane is the air barrier. A roofing vapor barrier will be installed if required, based on manufacturers detail.

Exterior wall panels are dead loaded to the foundation. For this reason, a continuous movement joint is required at the roof-wall interface at the back side of parapet.

Roofing membrane extends to parapet coping, over the top of the prefabricated wall and overlapping the front edge by 2". Copings are to be field applied.

Roof Access

Guardrail height parapet is provided at all locations.

Mechanical equipment is provided at the level 3 roof. The enclosed stair at the back of the building extends to the roof and a straight ladder with a hatched opening is provided. The replacement of mechanical equipment is to be achieved via a crane from the ground.

Window Washing

Window washing is to be accessed from a basket lift from grade

07. **TOTAL HEALTH ENVIRONMENT**

Throughout the design process, the concepts of both the KP Design Excellence and Total Health Environment (T.H.E) program have been incorporated into the concepts for the site, exterior and interior design of the building to build a consistent brand experience across the COE program.

Site – Entry, Orientation, Parking and Drop-Off

The exterior design indicated a space for the overall building signage to be visible from the approach to the site or traveling on I-10 East. The signage design includes typical KP signage including the large "welcome" sign visible when entering the site and adjacent to the drop-off zone. Working in conjunction with SKA, the required signage has been incorporated into the overall site plan for ease of wayfinding by members from the initial entry to the site, to the parking garage, to the entry of the building. The canopy on the building allows for covered drop-off of members from the passenger side of the car. Exterior seating is to be provided for members waiting for a ride, and/or for members who may have been dropped off and waiting for their loved one to park.

Interior – Entry, Public Square, and Outpatient Experience

The interior entry sequence is designed to include the tenants of the 'Public Square' and is intended to be a welcome zone for members to check into their appointments and waiting in an active area with a variety of seating options. Spaces are provided with powered furniture to allow for members to use personal devices for working, and then quiet seating zones for members who choose to sit in a more secluded area. The check-in area includes furniture anchor stations, powered kiosks, and then provisions for mobile greeters including tablet charging and printer areas.

The building is designed with the concepts of the outpatient encounter in mind to provide options for members, as well as distinct zones for members and staff. Staff amenity areas, including an outdoor space, are provided to allow for areas of respite for staff members. Member facing dashboard monitors are placed at clinic entries and throughout the public

square for ease of wayfinding by members as to when their provider is ready for their appointment.

Staff work areas, such as the enclaves, are designed to allow for staff to have a variety of options of where and how to work, including spaces for respite within the enclave space. Amenity counters are provided with coffee makers, microwaves and refrigerators.

Retail and Amenities

The Covina program includes retail elements such as a café and a retail pharmacy as a place for wellness within the community. The café is intended to be contracted by a local vendor, but is designed to include a service counter, exterior service window, refrigeration case, and water line availability for coffee and/or specialty beverages. The retail pharmacy is designed to follow the standards of the national outpatient pharmacy template and includes all provisions for both the back of house pharmacy area as well as the queuing, over the counter sales area, and waiting space for the pharmacy.

Additional elements as outlined in the KP Total Health Environment Toolkit and the Design Excellence Guidelines are to be included in the project and further delineated on the drawings as the project progresses through the design phases.

08. **Interior Building Systems**

DIRTT Walls

DIRTT is an adaptive approach to rapid construction. At the core of the solution are robust interface interior construction elements such as interior partitions and millwork, that support reconfiguration, customization, and adaptability. DIRTT's modularity ensures the successful installation of a high-quality solution in a short period of time. Material efficiency, controlled costs, sustainability, speed to market and long-term flexibility are also benefits of DIRTT's modular capabilities.

Project designs are based upon templated Center of Excellence MOB standards in coordination with Cannon Design.

BIM

DIRTT/Pivot Interiors provides the design team with a DIRTT layout Revit model within BIM 360 platform. DIRTT participates in clash detection as it relates to seismic bracing, MEP, equipment, and overall floor plan layout. In addition, virtual box walks will be performed during Virtual Building Design phase as well as before fabrication. The virtual box walk is completed with the design team, the client, electrical engineers and sub-contractors for real time team review.

Prefabrication

DIRTT is a custom pre-fabricated interior construction solution. Factory built construction offers several benefits including superior fit and finish, speed of construction, long-term flexibility to accommodate changing facility needs and ease of maintenance over time. Prefabrication is driven by DIRTT's ICE software which is an end-to-end application that ensures precision and quality of the manufacturing process. The DIRTT solution consists of multiple configurable layers, primarily structural, aesthetic, technological, and application specific. Through this multi-layer approach DIRTT can support a high velocity of install and manufacturing, because multiple processes can be done in parallel in multiple locations.

Overview DIRTT Scope of Work

Demountable interior partitions (DIRTT walls or similar) are to be provided in areas designated by the Owner and the Owner's modular construction program. Initial assumptions are that

demountable partitions will be utilized as roughly 90% of interior partitions on the clinic floors. DIRTT walls extend from finished floor to underside of finished ceiling. Ceilings typically run over top of DIRTT walls. Demountable partitions are not to be used in any of the following locations:

- Partitions required to extend from floor to deck
- Partitions required to be rated including, but not limited to Fire Partitions, Fire Barriers, Fire Walls.
- Partitions designed to enclose mechanical, electrical and other utilities in a multi-floor chase or shaft.
- Partitions required to include safety and /or protective measures such as lead lining, wire mesh or bullet / blast resistant material.

Finishes

DIRTT finishes vary by use and type of space within the building. Finishes in *clinic* include smooth, cleanable materials to aid infection control measures. Public or non-clinic rooms, spaces and areas shall include selections from manufacturers standard materials. Refer to plans for locations of *sterile* and non-sterile areas.

Finishes in *clinic* rooms, spaces and areas are as follows:

- Enzo antler reveals with plastic insert at all clinic locations
- Thermofoil (TF) at all sterile finish locations
- Clear Aluminum finish at all clinic areas
- Gasketed floor/ceiling attachments

Finishes in *non-sterile* rooms, spaces and areas are as follows:

- Powder coated frames (may be custom color)
- Tempered glazing
- Standard MDF Panels, painted to match gypsum board
- Custom Antler configurations

Doors

All doors indicated in DIRTT walls are to be provided by DIRTT. Door types are indicated on plans and include:

- Swing Doors: Solid wood thermofoil wrapped, Grade 2 finish unless otherwise noted.
- Sliding Doors: Solid wood thermofoil wrapped, Grade 2 finish unless otherwise noted.
- Sliding office doors: Full view glass, wood veneer surround, Grade 2 finish unless otherwise noted.

Hardware included for all doors located in DIRTT SOW

- Schlage/Falcon Passage set (locking options available) for all Hinge doors
- 30" non locking Bar Pull for all Barn Doors

Security hardware NOT included: Electric locks, mag locks, electric strikes, wiring & activation of devices

- Security hardware to be coordinated with DIRTT & Pivot

Accessories / Backing

DIRTT shall provide support and backing for room accessories where located in or on DIRTT walls. Accessories include Madonna brackets, single brackets are to be located in exam rooms, offices and patient toilets. Backing provided by DIRTT where required for casework wall hung sinks and equipment.

(END OF DIRTT NARRATIVE)

09. **ACOUSTICS**

Kaiser Covina MOB

Covina, CA

Acoustical Basis of Design Guidelines

June 28, 2019

Architectural Acoustics
Mechanical Systems Noise and Vibration Control
Plumbing Systems Noise and Vibration Control
Electrical Systems Noise and Vibration Control

I. Architectural Acoustics Design Criteria/Guidelines

A. Acoustical Criteria Matrix

Kaiser Permanente has adopted an Acoustical Criteria Matrix (Version 14, September 2016) which references STC requirements for various room types and their respective adjacencies. Several ratings have been indicated in the matrix as shown in Table 1 describes the options available to achieve the specified STC requirements. Recommendations have been provided for the door assembly to ensure a decrease in performance of the entire wall assembly is minimized. All partition types specified are based on 20-gauge metal studs, as it is presumed that lighter gauge studs will not be provided, spaced 24-inches on-center.

We also understand that LEED Gold v4 for BD+C: New Construction and Major Renovation is being pursued for the project.

Table 1 - STC Requirements from Kaiser Acoustical Criteria Matrix

Rooms	Adjacent to Service Space	Adjacent to Toilet	Adjacent to Public Space	Adjacent to consult space	Adjacent to patient bedroom	Comments
Conference Rooms, CONFR	STC 52	STC 44	STC 44	STC 44	STC 44	-
Consultation Room, CONSR	STC 52	STC 44	STC 40	STC 40	N/A	-
Exam Room, EXROM	STC 52	STC 44	STC 44	STC 40	STC 44	Will utilize sound masking to achieve speech privacy (SPP 75-80) in place of STC criteria. Refer to Chapter 27.
Exam Room Special Needs, EXSNA	STC 52	STC 44	STC 44	STC 40	STC 44	Will utilize sound masking to achieve speech privacy (SPP 75-80) in place of STC criteria. Refer to Chapter 27.
Group	STC 52	STC 44	STC 40	STC 44	N/A	-

Therapy, GROUP-MED						
Observation Rooms, OBSRV OBSRM-BMD	STC 52	STC 44	STC 44	STC 44	N/A	Will utilize sound masking to achieve speech privacy (SPP 75-80) in place of STC criteria. Refer to Chapter 27.
Offices, Provider, OPROV	STC 52	STC 44	STC 40	STC 40	N/A	-
Offices, General, OGENL-OB ADA	STC 52	STC 44	STC 40	STC 40	STC 44	-
Office Exam Provider, OEXPO	STC 52	STC 44	STC 44	STC 44	N/A	Will utilize sound masking to achieve speech privacy (SPP 75-80) in place of STC criteria. Refer to Chapter 27.
Testing Room, Audio, Pediatrics TRAUD-PED	STC 52	STC 44	STC 44	STC 44	STC 44	-
Treatment Room, Therapy, Private TRTHP-PRV	STC 52	STC 44	STC 40	STC 40	N/A	
Treatment Room, Therapy, Private Speech TRTHP-SPC	STC 52	STC 44	STC 40	STC 44	N/A	
Waiting Areas, WTAGN-SUB WTAPL	STC 52	STC 44	STC 44	STC 44	STC 44	-

B. Speech Privacy Potential (SPP) Criteria Matrix

Kaiser Permanente also indicates for each of the room types that sound masking be considered to achieve speech privacy (SPP 75-80) in place of the STC criteria.

Speech Privacy Potential (SPP) is a metric used to define the level of speech privacy between two adjacent spaces. It is calculated by adding together the background noise level in the receiving space, in this case expressed as a Noise Criterion (NC), and the acoustic separation of the total construction between the spaces, expressed as the STC. The degrees of SPP can be seen in Table 2.

Table 2 – Degrees of Speech Privacy Potential (SPP)

Privacy Rating	Speech Privacy Potential	Description of Privacy
Total privacy	90	Shouting is only barely audible.
Highly confidential	85	Normal levels are not audible. Raised voices are barely audible but not intelligible.
Excellent	80	Normal voices are barely audible. Raised voices are audible but mostly unintelligible.
Good	75	Normal voices are audible but unintelligible most of the time. Raised voices are partially intelligible.
Fair	70	Normal voices are audible and intelligible some of the time.
Poor	65	Normal voices are audible and intelligible most of the time.
None	Less than 60	No speech privacy.

C. DIRTT System

We understand that a modular design for the interior walls is proposed. Walls will be the DIRTT STC 45 system. The manufacturer must provide an acoustical lab test report for the system proposed for our review and comment. This system must not be used in Conference Rooms or Meeting Rooms that will include tele / video conferencing.

The partition should extend several inches above the ceiling or, at the very least, be thoroughly acoustically sealed at the ceiling intersection. A gypsum backed acoustical ceiling tile such as Kinetics QuietTile may also be needed. We will analyze and comment further for each room as the design progresses. Ideally, return air is fully duct but, in the case of a return air plenum, noise control (e.g. 90-degree, lined ducts) must be used at return grilles. Alternately, 5' of acoustical flex duct can be coiled up and placed over the ceiling at the return grilles.

In addition, in order to achieve the minimum target of 75 SPP per Kaiser's design criteria, there are several different options to consider. In isolated cases full-height demising walls will be constructed to provide separation, otherwise the project will implement one of the two following methods depending on location. (However not both simultaneously):

Option 1 – Utilize a plenum barrier via two layers of 1-3/8" thick rigid insulation separated by

a 3/4" air space installed atop the demising walls. This has been shown to improve the transmission loss through the ceiling plenum upwards of 10 to 20 dB.

Option 2 – The background noise level must meet an NC-40. This will likely be achieved with the use of a sound masking system. Please note that the NC-40 can be noticeable to private offices when in use and could in fact be distracting.

D. Partition Options for STC ratings (Non DIRTT Partition Locations)

The following table describes the options available to achieve the specified STC requirements for locations where the DIRTT system is not proposed to meet the STC ratings shown in Table 1 above. Recommendations have been provided for the door assembly to ensure a decrease in performance of the entire wall assembly is minimized. All partition types specified are based on 20-gauge metal studs, as it is presumed that lighter gauge studs will not be provided, located 24-inches on-center.

Table 3 – Partition Options for STC Requirements

STC Requirement	Minimum Partition Construction	Door
STC 52	• 2 layers 5/8" Type 'X' gypsum board • 3-5/8" metal studs (20-gauge) spaced 24" on center (OC) • Batt insulation in the cavity • 1 layer 5/8" damped drywall	Solid-core, wood or metal with perimeter gasketing and automatic door bottom
	• 2 layers 5/8" Type 'X' gypsum board • 3-5/8" metal studs (20-gauge) spaced 24" on center (OC) • Batt insulation in the cavity • Resilient channel • 1 layer 5/8" Type 'X' gypsum board	
STC 44	• 2 layers 5/8" Type 'X' gypsum board • 3-5/8" metal studs (16-gauge) spaced 24" OC (preferred) or 16" OC (acceptable) • Batt insulation in the cavity • 2 layers 5/8" Type 'X' gypsum board	Solid-core, wood or metal with perimeter gasketing and automatic door bottom
	• 2 layers 5/8" Type 'X' gypsum board • 3-5/8" metal studs (20-gauge) spaced 24" OC (preferred) or 16" OC (acceptable) • Batt insulation in the cavity • 2 layers 5/8" Type 'X' gypsum board	
STC 40	• 2 layers 5/8" Type 'X' gypsum board • 3-5/8" metal studs (20-gauge or 16-gauge) spaced 24" OC (preferred) or 16" OC (acceptable) • Batt insulation in the cavity • 1 layer 5/8" Type 'X' gypsum board	Solid-core, wood or metal with perimeter gasketing and automatic door bottom

Notes:
1) *For single-stud partitions, the STC rating for the partition construction given depends on the stud gauge and spacing. If heavier gauge studs or a closer spacing is required, it will be necessary to revise the partition construction to achieve appropriate sound isolation.*
2) *Where two spaces are adjacent and have different demising walls, the higher performing wall shall be selected.*

E. Interior Glazing

Glass partitions will have significantly lower sound isolation performance as compared with a solid gypsum board partition.

Some locations in the project will have a glass wall separating a room and a public space. To maintain the STC rating shown in Table 1 above, a double-glazing system with an air gap is recommended. Each pane of glass should be laminated with a different thickness. We understand that the Modernus Lama dual glazed system is proposed at these locations. The manufacturer must provide an acoustical lab test report for the system proposed for our review and comment.

F. Miscellaneous Sound Isolation Requirements

Sound leaks can greatly reduce the rating of the partitions, the floor/ceiling sound isolation, and other acoustical isolation efforts. To reduce the likelihood of this, details will be developed to describe effective ways to address potential sound leaks, including partition intersections, electrical outlet boxes, and door seals. These details will be developed as the design progresses.

G. Room Acoustics

The room acoustics describes the desired acoustical ambience for any given space. Acoustical ambience is achieved in the design of finishes, and it takes into account the intended use of the room. A properly designed room will incorporate both reflective materials (ex. glass, gypsum board, concrete) and absorptive materials (ex. fiberglass panels, acoustical ceiling tiles, carpet) to appropriately control reverberation, echoes, and background noise levels. Excess reverberation reduces speech intelligibility and can be perceived as annoying in the wrong environment, as the room may be perceived as having a "high" background noise level. Echoes cause a similar effect as reverberation, and they occur when parallel, hard surfaces are present. The goal of the acoustical finishes is to limit these effects.

A representation of room types for the project and their associated finish recommendations have been indicated in Table 4.

Table 4 – Examples of acoustical finish for various spaces

Area	Acoustical Finish			Comment (additional LEED v4.1 requirement)
	Ceiling	Walls	Floor	
Exam, Consult, Therapy, Observation, Patient, Treatment, Procedure, Interview, Imaging, Testing Rooms	AC	Hard	NC	-
Conference Rooms	AC	ACWP, Hard	CPT	RT60 less than 0.6 seconds

Private Offices	AC	Hard	NC	RT60 less than 0.6 seconds
Open-plan office with sound masking	AC	Hard	NC	RT60 = 0.8 seconds
Open-plan office without sound masking	AC	Hard	NC	RT60 less than 0.8 seconds
Workrooms, Workstations, Waiting Areas, Reception, Lounge	AC	Hard	NC	-
Corridors	AC, Hard	Hard	CPT, Hard	-

Legend:
AC: Acoustical material with an NRC of 0.70 or greater.
ACWP: Acoustical wall panel (two adjacent walls: 80% coverage, 3' AFF), minimum 1" thick with an NRC of 0.80 or greater
CPT: Carpet
Hard: A sound reflecting surface – gypsum board, wood, metal, glass, etc.
NC: Not critical
RT60: Reverberation time at 500Hz, 1000Hz, and 2000Hz. Limit reverberation time to ensure good speech intelligibility, excessive noise from patrons, etc.

H. Sound Masking

The background noise level has a profound influence on an acoustical environment. If the background noise level is too low, speech privacy will be poor, and many sounds will be distracting, since the contrast between quiet and noisy periods will be great.

If the background noise levels in spaces next to private rooms is too low, a masking noise system is suggested. This system consists of electronically generated noise that is continuous in time and spatially uniform. It is produced by loudspeakers located above the ceiling plane. The sound level and frequency or tonal characteristics are carefully adjusted for optimal performance. Use of a masking noise system provides a constant background sound level that hides sounds from nearby activities, minimizing distraction and improving speech privacy. The masking noise system can also be utilized for paging. We understand that this system will be used in areas shown in Table 1 above, in rooms with DIRTT partitions, and in areas listed in Chapter 27 of the Kaiser Permanente Facilities Design Program Design Criteria dated June 08, 2017, V9.

I. Impact Insulation

Carpeting should be utilized above noise-sensitive spaces (NC-35 or less), if possible, to help mitigate mid- and high-frequency footfall noise and help raise the impact isolation (IIC) performance to the spaces below.

Where hard-surface flooring (ceramic tile, stone, wood) is to be used above or adjacent to a space rated as NC-35 or less, install a resilient underlayment to avoid footfall impact noise disturbance to occupants below (e.g. 10 mm Pliteq Geniemat). This includes corridors, elevator lobbies, etc.

For all heavily trafficked areas throughout the project, soft or resilient flooring finishes should be installed in order to minimize footfall noise to adjacent work areas.

J. Sound Transmission at Mullions/Sidelites

Mullions are often the weak link in a demising partition that separates two spaces with a common curtain wall or sidelite. This can happen in one of three ways: 1) Sound travels through the gap between the partition and mullion; 2) sound transmits through the mullion itself; or 3) sound vibrates the shared glass in one room, vibrates the mullion, and—in turn—vibrates the glass in the secondary room. This has long been a problem for sound isolation concerns, as it can significantly decrease the sound isolation between two rooms. This phenomenon affects all areas with a curtainwall, window wall, or shared sidelite, including offices and patient rooms.

To address this issue the project intends to utilize a Gordon "Mullion Mate" to close the gap between the end of the partitions and the back of the glass and still allow for glass deflection. The manufacturer must provide an acoustical lab test report for the system proposed for our review and comment.

At some locations, the partitions will terminate at the glass. Where speech privacy and sound isolation are concerns, it is recommended to avoid terminating partitions directly into the curtainwall or to forego sidelites altogether. VA recommends wrapping the mullion with gypsum board. The layering of gypsum board on top of the mullion provides additional mass that can greatly increase sound isolation at this weak point. Another approach is to terminate the partition to two adjacent mullions, creating a "faux column" which provides a longer sound path through the curtainwall. However, the best approach is still to avoid terminating partitions into the mullion wherever possible.

K. Exterior Sound Isolation

The site is approximately 300 feet from I-10. To address this noise exposure, either a prescriptive method (Section 5.507.4.1.1) or a performance method (Section 5.507.4.2) of 2016 California Green Building Code can be utilized to address the situation.

Section 5.507.4.1.1 (noise exposure where noise contours are not readily available) of the prescriptive method of the 2016 California Green Building Code stipulates that buildings exposed to a noise level of 65 dB Leq-1-hr during any hour of operation shall have building, addition or alteration exterior wall and roof-ceiling assemblies exposed to the noise source meeting a composite STC rating of at least 45 (or OITC 35), with exterior windows of a minimum STC of 40 (or OITC 30).

Section 5.507.4.2 (Performance Method) of the 2016 California Green Building Code stipulates that for buildings exposed to a noise level of 65 dB or more when measured as a 1-hour Equivalent Sound Level (Leq), the building façade, including walls, windows, and roofs, shall provide enough sound insulation so that the interior sound level from exterior sources does not exceed 50 dBA during any hour of operation.

The project intends to pursue the performance method of the Code for a realistic understanding of noise levels, which has historically reduced the required STC/OITC ratings.

A site noise acoustical report has been completed for the project released on June 28, 2019. STC 30 windows are recommended for the project. This report should be included in the project documents.

Veneklasen Associates
Consultants in Acoustics | AV | IT | Environmental Noise

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II. Preliminary HVAC Noise and Vibration Control Design Criteria and Guidelines

A. HVAC Design Criteria

Maximum Interior Noise Levels (HVAC system at maximum CFM; other noise sources–off).

Space Type	Maximum Noise Criteria (NC)
Conference Rooms, Large	NC-25
Conference Rooms, Small	NC-30
Private Offices	NC-35
Interview Room	NC-30
Exam Room	NC-35
Observation Room	NC-35
Group Therapy Room	NC-35
Consult Room	NC-35
Treatment Room	NC-35
Testing Rooms	NC-35
Procedure Room	NC-35
Imaging Room	NC-35
Workrooms	NC-35
Waiting Area	NC-40
Reception	NC-40
Workstation	NC-40
Corridors	NC-40
Multiple Occupant Patient Care Area	NC-40
Open Office Seating	NC-40
Open Spaces Exposed to Structure	NC-40
Lounge	NC-40
Operating Rooms	NC-45

Maximum Duct Velocities (FPM)

Location	Noise Criteria (NC)				
	45	40	35	30	25
Main Branch Supply*	1950	1700	1500	1000	800
Main Branch Return*	1450	1200	1000	750	600
Duct to Grille Supply	700	600	500	400	300
Duct to Grille Return	700	600	500	400	300
Size diffuser/grille so manufacturer's NC rating does not exceed	40	35	30	25	20

* Upstream of volume control box

B. HVAC General Guidelines

1. Meet design NC levels through selection based on manufacturer's sound power level data and use of sound attenuating devices including: sound attenuators (sound traps); acoustical duct; plenum lining; and flexible ductwork.

2. Minimize low-frequency noise generation by minimizing air turbulence. Utilize circular ductwork or flat oval where possible to avoid duct "oil-canning."

3. Vibration isolate equipment and piping in order to help mitigate noise and vibration transmission to adjacent spaces and other floors.

4. Utilize guidelines in *A Practical Guide to Noise and Vibration Control for HVAC Systems* published by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) and Chapter 48 of the *2011 ASHRAE Applications Handbook*.

C. HVAC Guidelines for Specific Noise Sources

1. Air Handling Units (AHU)

   The most important consideration for reducing fan noise at its source is choosing fan systems that are inherently "low noise." The use of noise barriers around any rooftop fans should also be planned in order to help meet applicable local noise ordinances at the site's property line. These barriers should be 18" – 24" above the highest point of the equipment.

   There are two options to support the AHU's:
   - Utilize 4" to 6" thick housekeeping pads and seismically restrained spring isolators;
   - Utilize a seismically restrained rooftop curb isolation system (see VA detail VIB-23). VA recommends the Mason Industries Seismic Rooftop Spring Curb (SRSC).

2. Fan Coil Units (FCU) and Variable Air Volume (VAV) Boxes

   To mitigate radiated noise in occupied spaces, FCUs and VAV boxes should be located outside or away from any noise-sensitive areas. Line ductwork with 1" lining after the FCUs or VAV boxes.

D. Mechanical Vibration Isolation

Below are preliminary requirements for vibration isolation of any mechanical equipment that may be introduced.

1. Exhaust Fans Less than 25,000 CFM
   - Provide steel spring isolator with 2" deflection. The isolator shall be free standing and laterally stable without any housing and complete with a molded neoprene cup or 1/4" neoprene acoustical friction pad between the baseplate and the support. All mountings shall have leveling bolts that must be rigidly bolted to the equipment. Spring diameters shall be no less than 0.8 of the compressed height of the spring at rated load. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. Bolt holes shall be provided in the base plate to permit attachment to the building structure where required.
   - Separate seismic restraints shall be provided to meet all applicable codes.

2. Air Handling Units
   - See item II.C.1, above.
   - Separate seismic restraints shall be provided to meet all applicable codes.

3. Pumps on Grade
   - Provide a neoprene isolator with steel housing with a design deflection of 0.2". The mount shall consist of a captive steel insert embedded into a neoprene element which is enclosed by a steel housing which also includes floor mounting holes.

4. Pumps at Roof Level
   - Provide a bare, steel spring isolator with 2" deflection. The isolator shall be free standing and laterally stable without any housing and complete with a molded neoprene cup or 1/4" neoprene acoustical friction pad between the baseplate and the support. All mountings shall have leveling bolts that must be rigidly bolted to the equipment. Spring diameters shall be no less than 0.8 of the

compressed height of the spring at rated load. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. Bolt holes shall be provided in the base plate to permit attachment to the building structure where required.

- Separate seismic restraints shall be provided to meet all applicable codes.

5. Fan Coil Units
   - Provide a neoprene washer/bushing at all equipment supports to prevent metal-to-metal contact between equipment support and through-bolts. Washer/bushing to be equal to Mason Industries type HG.

6. Packaged Units
   - Provide a prefabricated spring isolation curb for rooftop equipment with a design deflection of 2". The lower member shall consist of a rectangular steel tube containing adjustable and removable steel springs that support the upper floating section. The upper frame must provide continuous support for the equipment and must be captive so as to resiliently resist wind and seismic forces. All directional neoprene snubber bushings shall be a minimum of 1/4" thick. Steel springs shall rest on 1/4" thick neoprene acoustical pads. Hardware must be cadmium plated or galvanized and the springs plated or provided with an approved rust resistant finish. Weatherproofing shall be provided by a continuous flexible aluminum seal joined at the corners by a flexible frictionless neoprene bellows. The aluminum seal must be nailed over and provide flashing to the curb's waterproofing. Provision shall be made for access ports with waterproof covers at the spring location and 2" thermal insulation on the sides of the lower curb.

7. Piping
   - Provide closed-cell foam insulation with minimum 1/2" thick wall at all support points. Insulation shall prevent all rigid contact between piping and building structure and/or pipe clamps. Provide insulation shield at attachment points to prevent crushing of material.
   - Provide twin-sphere flexible pipe connectors between all vibration isolated equipment and associated piping.
   - Risers: Provide neoprene pad minimum 1/4" thick with load-distributing plate below all riser clamps.

8. Boilers
   - Provide a neoprene isolator with steel housing and a design deflection of 0.2". The mount shall consist of a captive steel insert embedded into a neoprene element which is enclosed by a steel housing which also includes floor mounting holes.

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Plumbing Systems Noise and Vibration Control

1711 Sixteenth Street □ Santa Monica California 90404 □ tel: 310.450.1733 □ fax: 310.396.3424 □ **www.veneklasen.com**

III. Preliminary Plumbing Noise and Vibration Control Guidelines

A. General

In all areas, avoid any rigid contact between plumbing piping and the building structure. This applies to piping including cold and hot water lines, waste and vent lines, and storm drain lines. In other areas, install in accordance with the requirements of the building code or other applicable standards.

All plumbing shall be vibration isolated with the following approved products:

- Hubbard Enterprises – Hubbard HoldRite Silencer System;
- Specialty Products – Acousto-Plumb;
- Mason Industries – Type HD vibration hangers and Mini Super W Pads.

B. Flexible Connections and Seismic Restraint

Flexible connections should be provided at the attachment to all pumps, water heaters, and other similar equipment to reduce vibration transfer through pipes and cables.

Seismic restraints should not degrade vibration isolation. Vibration-isolated suspended equipment or piping must be provided with slack aircraft cables as seismic restraint.

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Electrical Systems Noise and Vibration Control

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IV. Preliminary Electrical Noise and Vibration Control Guidelines

A. Vibration Isolation

Electrical equipment has a high potential of producing vibration, especially where power generation or transformation occurs. Due to this, transformers should be installed on neoprene mounts or neoprene isolation hangers, as applicable. It is important that there are no wall-mounted transformers used, as this is almost impossible to vibration isolate properly. Lastly, unit substations should not be placed directly below, or adjacent to, noise-sensitive occupancies.

B. Flexible Connections and Seismic Restraint

Flexible conduit should be provided at the connection to all motors and other vibration-producing equipment to reduce vibration transfer through pipes and cables. The flexible conduit should be installed with sufficient slack to create either a loose loop or a shallow “U” form.

Seismic restraints should not degrade vibration isolation. Vibration-isolated suspended equipment or piping must be provided with slack aircraft cables as seismic restraint.

C. Noise Control

Placement of electrical wiring for rooms can often attribute to noise, as it can cause a weak link in the sound isolation between spaces. Outlet boxes are a particular culprit for this. It is recommended that outlet boxes are not installed back to back but are located in alternating stud bays. Also, the use of outlet box pads to encase the boxes themselves is recommended (see VA detail E-1A).

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Glossary of Acoustical Terminology

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V. Glossary of Terms

A-Weighted Sound Pressure Level (dBA) – The A-weighted sound level is a quantity, in decibels, read from a standard sound level meter with A-weighting circuitry. The A-scale weighting discriminates against the lower frequencies according to a relationship approximating the auditory sensitivity of the human ear. The A-scale sound level is used to approximate the relative "noisiness" or "annoyance" of many common sounds.

Ceiling Attenuation Class (CAC) – CAC is a measure for rating the performance of a ceiling system as a barrier to airborne sound transmission through a common plenum between adjacent enclosed spaces, such as offices. The higher the CAC rating, the better the performance. Typical CAC ratings will vary from 20 (low) to 40 (high).

Community Noise Equivalent Level (CNEL) – The 24-hour A-weighted average sound level referenced to 20 micropascals from midnight to midnight obtained after the addition of 5 dB to sound levels occurring between 1900 and 2200 hours, and 10 dB to sound levels occurring between 2200 and 0700 hours.

Day-Night Average Sound Level (L_{DN}) – Ten times the logarithm to the base 10 of the ratio of the day-night average sound pressure to the reference sound pressure of 20 micropascals. The day-night average sound pressure exposure is defined for a 24-hour calendar day and calculated by adding the sound exposure during the daytime (0700 to 2200 hours) to 10 times the sound exposure obtained during the nighttime (2200 to 0700 hours).

Impact Insulation Class (IIC) – A single number rating used to compare the effectiveness of floor/ceiling assemblies in providing reduction of impact generated sounds such as footsteps and other impact sources. This rating is derived from values of normalized impact sound pressure levels in accordance with ASTM E492. The higher the IIC rating, the better the isolation, typically provided by the floor, etc. Can be measured in any direction. The metric does not correlate well with human reaction. Typically, a rating of 60 translates to sound levels from impact sources being barely audible. A rating of 50 would roughly translate to sound twice as loud as that of the 60 rating and would be clearly audible.

Noise Criterion (NC) – A single numerical index commonly used to define design goals for the maximum allowable noise in a given space as produced by a ventilation system. NC consist of a family of curves that define the maximum allowable octave-band sound pressure level corresponding to a chosen NC design goal.

Sound Power Level (L_W) – A measure, in decibels, of the rate of sound energy output of a sound source. Technically, it is the total energy per second produced by a sound source equal to $10\log_{10}$ of the ratio of the power of a sound to the reference power of 10^{-12} watts. PWL is normally given for the octave bands from 63 to 8000 Hz.

Sound Transmission Class (STC) – A single number rating of the Sound Transmission Loss of a construction element (window, door, partition, etc.) over a frequency range where speech transmission is the primary concern.

Sound Transmission Loss (TL) – A measurement of how much sound energy is reduced in transmission through materials. Materials with greater mass provide higher TL values. However, due to a coincidence effect, the TL at some frequencies will be far less than would be predicted by only considering the mass of the material.

- *The pages that follow were developed by the National Research Council of Canada (NRC)[1] and provide an explanation of acoustical measurement methods.*

Airborne Sound Transmission Loss

To prevent the passage of sound requires a solid barrier that is impervious to air. Common barrier materials are gypsum

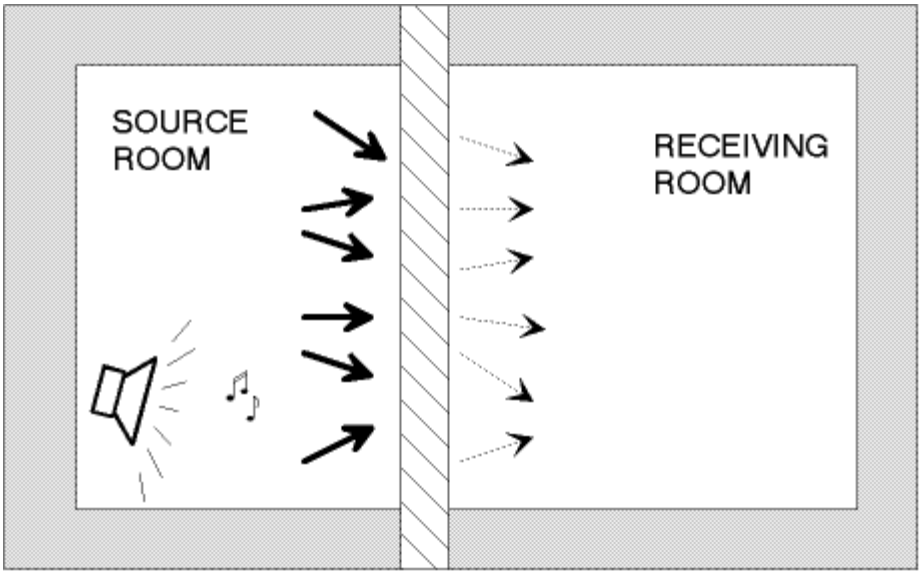
[1] NRC-IRC, National Research Council of Canada, Institute for Research in Construction (10 March 2005). *Airborne Sound Transmission Loss* [online]. Available from: http://irc.nrc-cnrc.gc.ca/ie/acoustics/floors/airborne_transmission_loss_e.html [Accessed 29 January 2007]

board, concrete etc. Soft porous materials, like rock or glass fibre on their own do not prevent the passage of sound. They are, however, beneficial when placed inside properly designed cavity walls or floors.

1. How walls are tested

An idealized facility for measuring wall sound transmission loss

In a laboratory, specimens to be measured are placed between two rooms that are isolated from each other so there is no transmission of vibration. Usually the rooms are supported on springs.



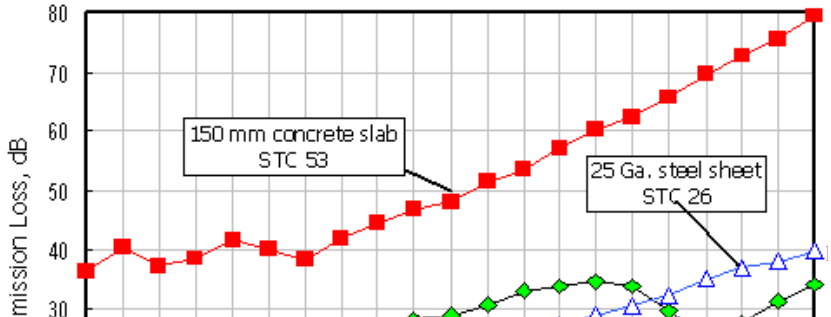
Noise is generated in one room and the sound pressure levels in decibels are measured in both at several different frequencies. The bandwidth for the measurement is one-third of an octave. The difference in levels is corrected to account for the acoustical properties of the receiving room.

The quantity that results is the transmission loss (TL) in decibels (dB). This represents the loss in sound power due to transmission through the specimen. The sketch shows an idealized facility for measuring wall sound transmission. Such facilities are also used for evaluating windows, doors and other elements that are built into walls. A facility for testing floors has one room above the other.

The higher the transmission loss, the less sound passes through the wall.

The ASTM standard governing these tests is *ASTM E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.* The corresponding ISO standard is *ISO 140/III, Laboratory Measurement of Airborne Sound Insulation of Building Elements*.

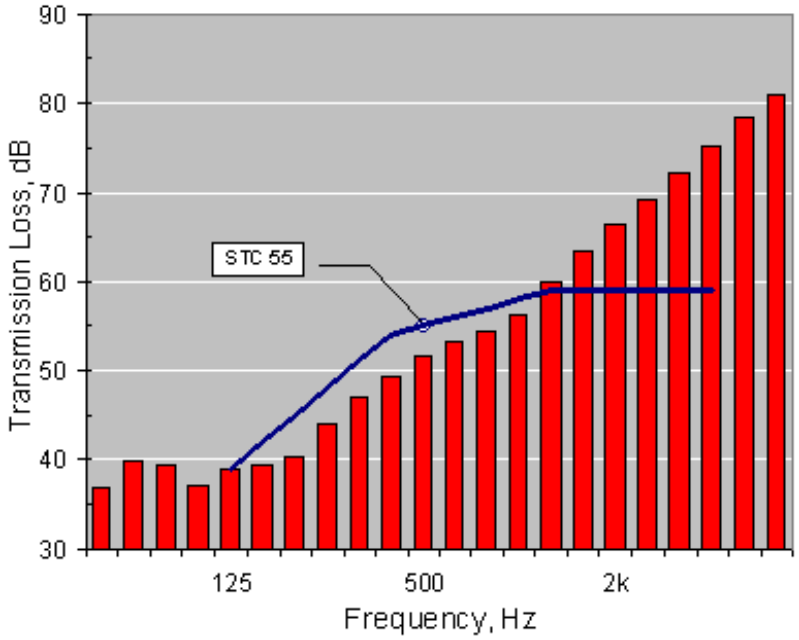
Note that in a laboratory test, the only path between rooms is through the wall or floor being tested. This is often not true in buildings.



The above figure shows sample transmission loss results for single layer walls constructed using common materials. The dip in the gypsum board curve is caused by the stiffness of the board itself. The stiffer or thicker the material, the lower the frequency where this dip occurs. Thin or limp materials do not show such dips in the usual frequency range. The dip for the concrete is not obvious but occurs around 100 Hz. Plywood and oriented strandboard (OSB) have different stiffness properties depending on the axis for bending. This means the coincidence dip is broad and not well defined.

Sound Transmission Class

Plots of sound transmission loss data are complex and are usually reduced to single number ratings. In North America the sound transmission class, STC, is the usual rating. This is calculated from transmission loss data according to *ASTM E413 Classification for Rating Sound Insulation.* This chart shows an example of the fitting process.



The STC contour extends from 125 to 4000 Hz. The measured 1/3 octave band transmission losses are fitted to the contour as shown, subject to the following rules:

- Deviations occur when a measured value (red bars) is less than the contour (blue line).
- The contour is adjusted until sum of deviations <=32 and no individual deviation > 8 dB.
- The STC value is read from the contour value at 500 Hz.

As for TL, the higher the STC, the better the sound insulation.

Weighted Sound Reduction Index

The Weighted Sound Reduction Index (R_w) is the ISO equivalent of STC. It is determined in accordance with *ISO 717, Rating of Sound Insulation in Buildings and of Building Elements*. The reference contour extends from 100 to 3150 Hz and there is no 8 dB rule. Usually STC and R_w are approximately equal.

Veneklasen Associates
Consultants in Acoustics | Noise | Vibration | AV | IT

June 28, 2019

VI. **Cannon Design**
2355 Main Street, Suite 220
Irvine, CA 92614

VII. Attention: **Gustavo Ripalda, AIA, CCM | Senior Vice President**

Subject: **Kaiser Permanente Covina MOB**

VIII. **Covina, CA**
Exterior Noise and Exterior Façade Acoustical Analysis
VA Project No. 2118-162

Dear Gustavo:

Veneklasen Associates, Inc. (VA) has completed our review of the Kaiser Medical Office Building in Covina, California. This report predicts the exterior noise level at the site using measurements. Using this information, interior noise levels were calculated based on the exterior noise exposure and the construction types proposed. From this, the exterior façade design was determined. This report represents the results of our findings.

IX. 1.0 INTRODUCTION

This study was conducted to determine the impact of the exterior noise sources on the Kaiser Medical Office Building in Covina, California. VA's scope of work included calculating the exterior noise levels impacting the site and determining the method, if any, required to reduce the interior and exterior sound levels to meet the applicable code requirements of the State of California and to meet the standards of the client.

The project consists of a 3-level medical office building with exam rooms, conference rooms, observation rooms, consultation rooms, treatment rooms, and offices. The project is bounded by existing residential land to the north and east, existing commercial spaces to the west, and the I-10 Freeway to the south. The proposed building will be approximately 300 feet from the I-10 Freeway.

2.1 NOISE CRITERIA

Leq (equivalent continuous sound level) is defined as the steady sound pressure level which, over a given period of time, has the same total energy as the actual fluctuating noise.

2.2 CALGreen – Non-residential

Section 5.507.4.2 of the 2016 California Green Building Code stipulates that for buildings exposed to a noise level of 65 dB or more when measured as a 1-hour Equivalent Sound Level (Leq), the building façade, including walls, windows, and roofs, shall provide enough sound insulation so that the interior sound level from exterior sources does not exceed 50 dBA during any hour of operation.

2.3 Kaiser Requirements

The Kaiser room data sheets do not have any requirements for exterior noise intrusion.

3.1 EXTERIOR NOISE AND VIBRATION ENVIRONMENT

3.2 Noise Measurements

Traffic on the I-10 Freeway was the primary sources of noise affecting the site.

Acoustical measurements for the project were completed by Veneklasen Associates on June 27, 2019 to establish the project's sound exposure. Bruel & Kjaer Type 2270 sound level meters were placed at various locations on the project site to capture sound levels on the site.

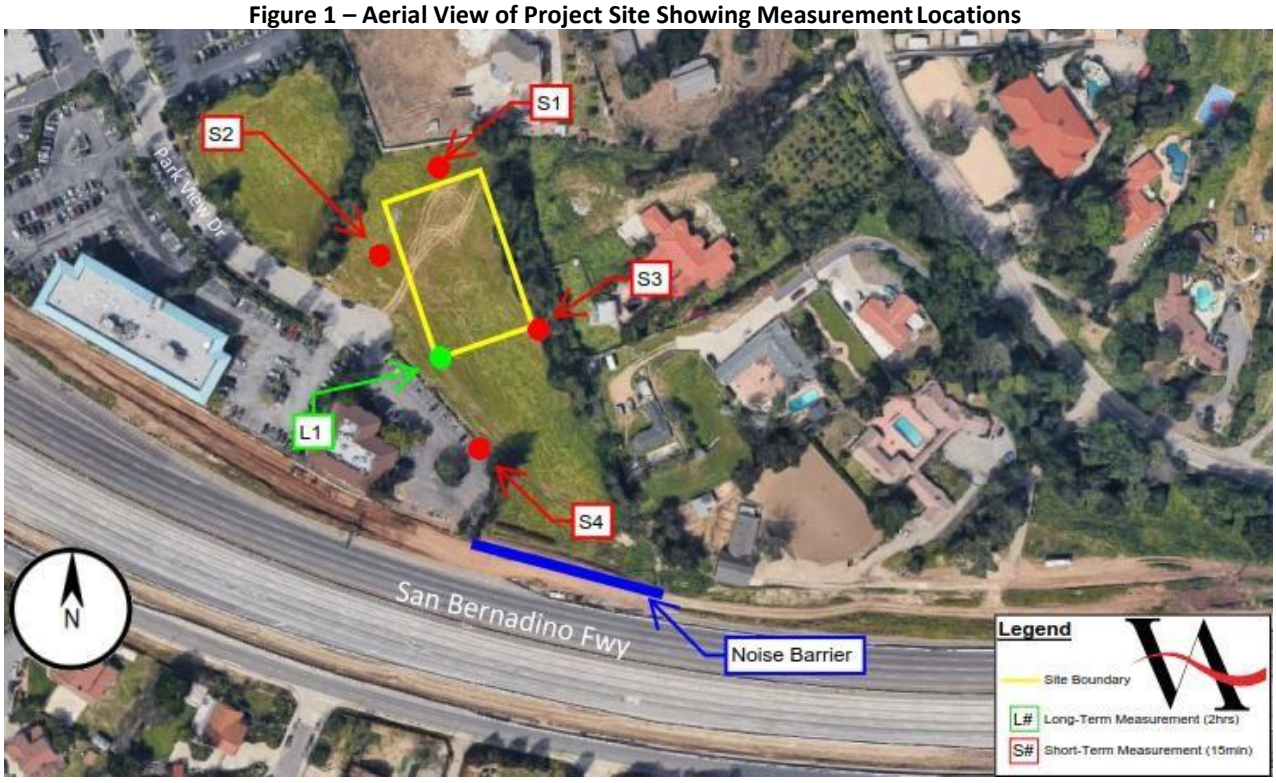
Measurements were conducted at hours of the day that provided maximum traffic noise levels due to traffic volume and flow rate. VA utilized a statistical methodology to determine the maximum hourly level from the measurements[1].

The measured sound levels are summarized in Table 1 and Figure 1 below.

X. Table 1 – Measured Sound Levels

Location	Exterior Sound Level, 1-hour LAeq
Long-Term 1	62
Short-Term 1	62
Short-Term 2	62
Short-Term 3	63
Short-Term 4	65

Figure 1 – Aerial View of Project Site Showing Measurement Locations



3.3 Overall Exterior Exposure

Per the California Green Building Code, if the exterior hourly noise levels on the façade of the project do not exceed the 65 dBA threshold, no further analysis is required to demonstrate compliance. As shown in Figure 1 and Table 1, the exterior noise level does not exceed 65 dBA at the project location (shown in the yellow box). However, the on-site measurements were made at a height of 6 feet off the ground, and the subject

[1] LoVerde, John; Dong, Wayland; Rawlings, Samantha. "Noise Prediction of Traffic on Freeways and Arterials from Measured Data." Noise-Con 2014. Fort Lauderdale, Florida.

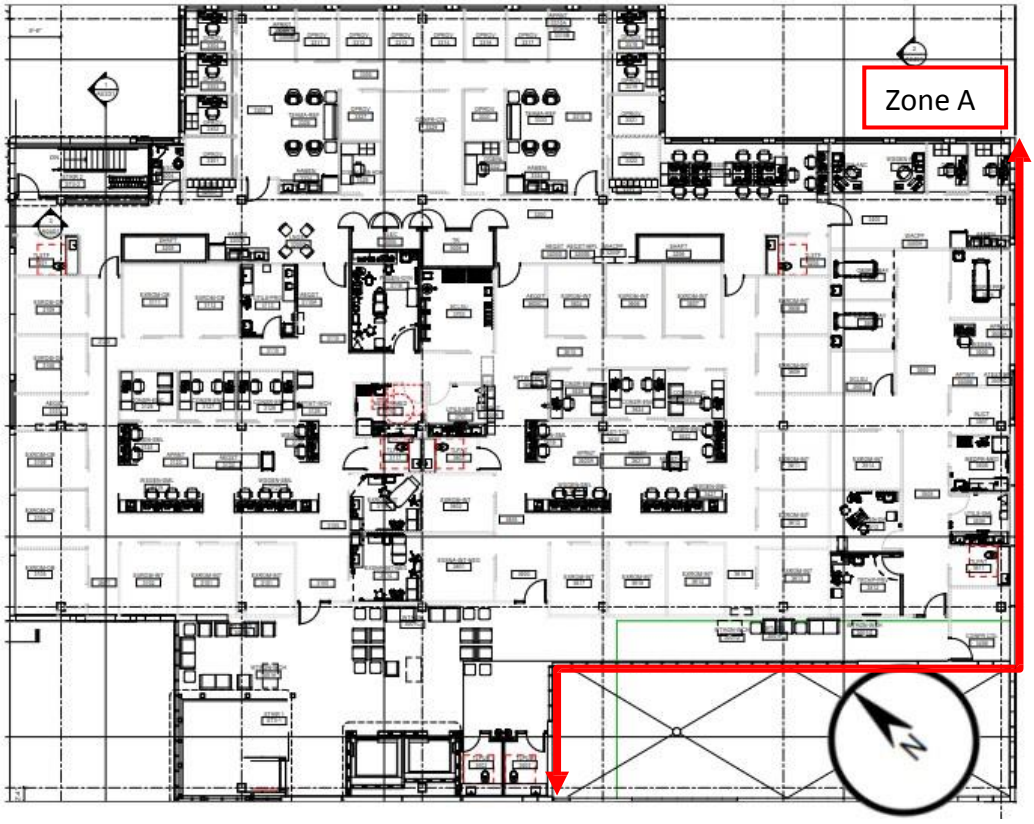
project will be three levels tall. VA expects the noise levels to exceed the threshold on the 3rd level of the project, therefore an acoustical analysis is required to demonstrate compliance.

Based on our measurements and the project site plan provided by the Client, VA calculated the existing hourly Leq noise levels at various locations within the project site (shown in Table 1 above). To simplify the presentation of the exterior noise levels, VA has separated the site into locations based on the sound exposure and required mitigation. The predicted sound levels at each zone, shown in Figure 2, are listed in Table 2 below.

XI. Table 2 - Exterior Noise Levels

Location	Floor	Exterior Sound Level, 1-hour LAeq
Zone A	3	67
Remaining Areas	All	< 65

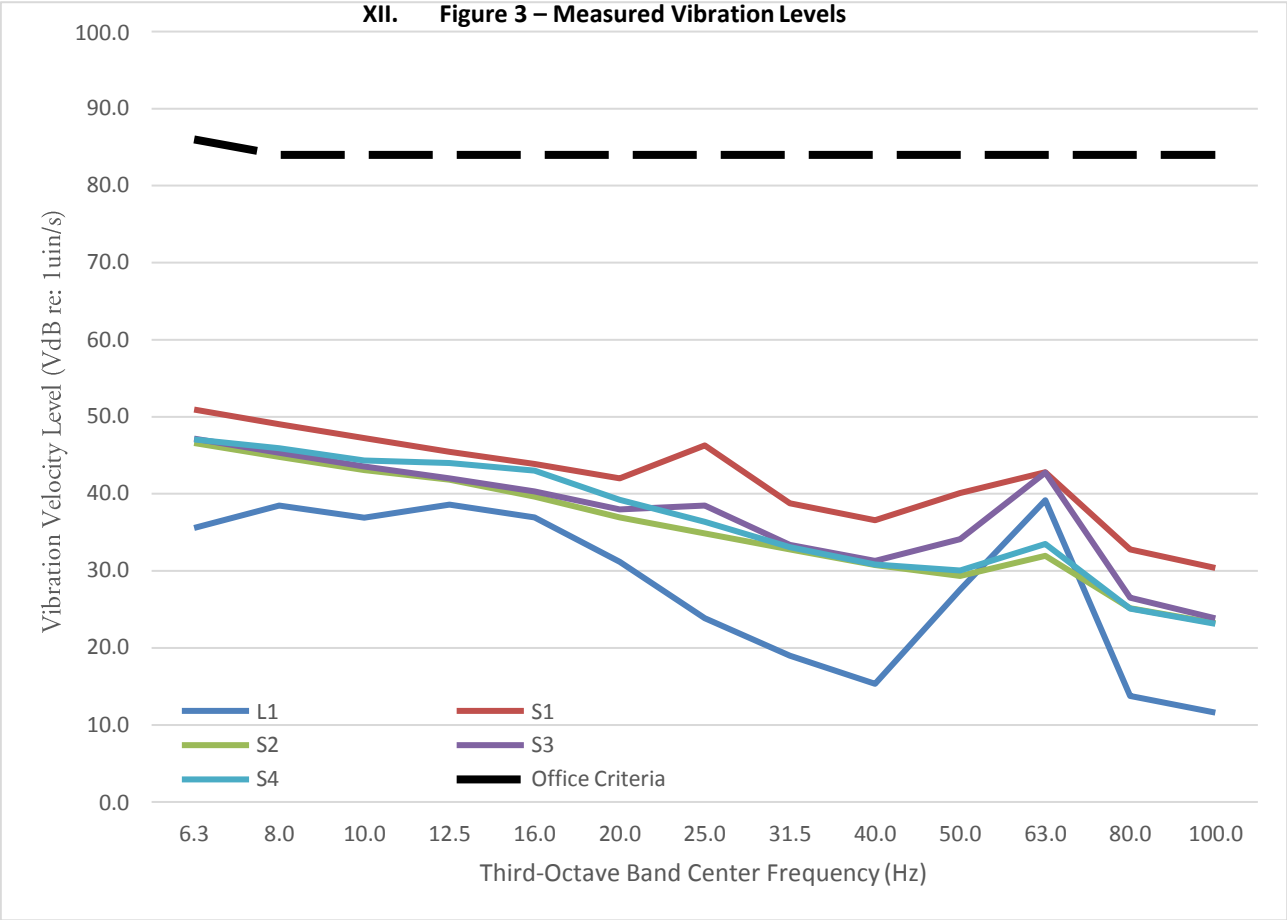
Figure 2 - Noise Zones: Level 3



3.4 Vibration Measurements

Short term vibration measurements were also performed at measurement locations shown in Figure 1 above and plotted in Figure 3 below.

XII. Figure 3 – Measured Vibration Levels



The levels measured are compared to typical vibration levels acceptable in office spaces (shown as dotted line in Figure 3 above). As seen in the figure, the site ambient vibration levels are acceptable for office usage.

4.1 INTERIOR NOISE CALCULATION

4.2 Exterior Facade Construction

The plans show that the exterior wall will consist of EIFS (exterior insulation finishing system) and glass fiber faced gypsum sheathing on cold formed metal framing with a single layer of gypsum board on the interior.

VA's calculations included the roof path, but this was insignificant in the interior noise level calculated. VA utilized the glazing ratings (glass, frame and seals) shown in Appendix I.

4.3 Interior Average Noise Level

VA calculated the noise level within non-residential spaces. CALGreen is based on the loudest hourly Leq. VA utilized a statistical methodology to determine this level from the measurements[2]. The results are shown in Table 3 below. Hourly noise level summaries and sample calculations are included in the appendices.

[2] LoVerde, John; Dong, Wayland; Rawlings, Samantha. "Noise Prediction of Traffic on Freeways and Arterials from Measured Data." Noise-Con 2014. Fort Lauderdale, Florida.

XIII. Table 3 – Calculated Interior Average Noise Levels at Non-Residential Areas

Location	Exterior Leq, dBA Loudest hour	Minimum Glazing	Interior Leq
Zone A	67	STC 30	< 50
Remaining Areas	< 65	CALGreen Analysis not required.	

5.1 SUMMARY

The following summarizes the acoustical items required to satisfy the noise and vibration criteria as described in this report.

- The predicted interior sound levels within the building are in compliance with the maximum hourly Leq criterion of 50 dBA.
- Exterior hourly noise levels on the façades do not exceed the 65 dBA threshold per the California Green Building Code on Levels 1 and 2, no further analysis is required to demonstrate compliance with the CALGreen acoustical requirements on these levels.
- Windows and glass doors as shown in Table 33 are required to meet the all applicable criteria on Zone A on Level 3.
- Even though, no further analysis is required to demonstrate compliance with CALGreen at other locations, we recommend STC 30 rating for the glazing assembly.
- The site ambient vibration levels are acceptable for office usage.

If necessary for structural, fire, or other reasons, it is permissible to increase thickness of the assemblies described in this report, since increasing thickness would result in further reduction in interior sound level.

We trust this information is satisfactory. If you have any questions or comments regarding this report, please do not hesitate to contact us.

Sincerely,

XIV. Veneklasen Associates, Inc.

AGBalani

Aditya Balani
Senior Associate

Kevin Patterson

Kevin Patterson
Associate

Appendix A: Glazing Requirements

In order to meet the predicted interior noise levels described in Section 3.0, the glazing shall meet the following requirements:

XV. Table 4– Acoustical Glazing Requirements: Minimum Octave Band Transmission Loss and STC Rating

Nominal Thickness	Minimum Transmission Loss Octave Band Center Frequency (Hz)						Min. STC Rating
	125	250	500	1000	2000	4000	
1" dual	21	18	27	34	37	32	**30**

The transmission loss values in the table above can likely be met with the following glazing assemblies:

1. STC 30: 1/8" monolithic – 3/4" airspace – 1/8" monolithic

However, it should be noted that an assembly's frame and seals may limit the performance of the overall system. The assemblies given above are provided as a basis of design, but regardless of construction, the octave band transmission loss of the particular system selected must meet the minimum values in Table 4 above. Similarly, it is permissible to use an alternate assembly construction if it meets the transmission loss requirements. Note that the systems shall not be selected on the basis of STC rating alone.

Independent laboratory acoustical test reports should be provided for review by the design team to ensure compliance with glazing acoustical performance requirements. Lab shall be a current member of the NVLAP program for accreditation and shall be pre-approved by Veneklasen Associates, Inc. Lab reports shall be in compliance with ASTM standard E90 and be no more than 10 years old (from date of submission on specific project). VA requires invitation to witness acoustical testing completed to demonstrate compliance with the requirements of this report and reserves the right to exclude test reports from laboratories that are not pre-approved by Veneklasen Associates, Inc. for the specific test standard. The tests shall be performed on the entire assembly, including frame and seals and hardware, if applicable to be used for the project. If test reports are not available for the assembly, VA would require that the assembly be tested at a third-party independent lab accredited through NVLAP for the ASTM E90.

XVI. Appendix B: Summary of Measured Sound Levels

Measurement Start Time	Exterior Sound Level, 1-hour LAeq LOCATION L1
8:00 AM	61
9:00 AM	61
10:00 AM	61

Measurement Start Time	Measurement Duration	Exterior Sound Level, LAeq LOCATION S1
8:04 AM	30 minutes	61

Measurement Start Time	Measurement Duration	Exterior Sound Level, LAeq LOCATION S2
8:39 AM	30 minutes	59

Measurement Start Time	Measurement Duration	Exterior Sound Level, LAeq LOCATION S3
9:12 AM	30 minutes	61

Measurement Start Time	Measurement Duration	Exterior Sound Level, LAeq LOCATION S4
9:45 AM	30 minutes	63

10. **FINISHES**

Finish Material Concepts

The finish materials will be carefully selected to coordinate with the "Total Health Environment" concepts and recommendations. Materials with more saturated colors are to be used in spaces where more active functions are desired and muted tone materials for functional spaces where calm/respite are indicated. The interior architecture material palette will create an optimistic environment and elevate the overall member and staff experience that supports the Kaiser Permanente Brand.

Walls

Aside from the gypsum metal stud framed wall, the project will use a pre-fabricated wall panel system manufactured by DIRTT Environmental Solution. The DIRTT wall system would be used where its warranted in lieu of the Kaiser standard partition types.

All Paint specifications will be Water based Low VOC that comply with Kaiser Permanante Facilities Design Program Design Criteria- Chapter 09 to provide a healthy environment and prevent potential health issues for members and staff. The architect will comply with the Kaiser Permanante Total Health Environment Color Theory Diagram to reinforce the brand.

Floors

All Floor material specifications will comply with Kaiser Permanente Facilities Design Program Design Criteria- Chapter 09. Only PVC-free products will be selected that meet or exceed the most stringent performance criteria. Manufactures will be selected from the National Supplier List.

Ceilings

All Ceiling material specifications will comply with Kaiser Permanente Facilities Design Program Design Criteria- Chapter 09. The Ceiling assembly approach will be to install one continuous 15/16 Grid throughout with Lay-in Ceiling Tile. The following types will be specified;

ACP-1 2 X 2 Acoustical Ceiling Tile High NRC and CAC, Location: General use throughout

ACP-2 2 x 2 Clean scrubable tile, Location: Procedure Rooms, General use

Note: Public Square and Front Porch Areas will have exposed ceilings. Refer to Reflected Ceiling Plan for Extent.

Note: DIRTT walls will be installed below the ceiling assembly. This Building is Seismic Design Category D.

Casework

All architectural modular and custom casework will be manufactured to follow the guidelines provided by Kaiser Permanante Capital Projects Facilities Construction Casework Catalog and comply with the Facilities Design Program Chapter 06. Any deviation from the CPFC Casework Catalogue requires use of the Design Modification Process.

Plastic laminate will be specified for both modular and custom casework pieces. Materials need to meet UL Green Guard Gold Certification for low chemical emissions and/ or meet SCS/Indoor advantage Gold certified. Architect will specify Neutral colors with matte finish.

Solid surface countertops with a 4"high integral coved backsplash will be specified for wet areas

Stainless steel countertops will be specified as indicated in the Room Templates.

Public Square -Entry Interior

The Interior architectural design of Kaiser Permanente Covina will draw inspiration from the surrounding community.

The entry at the interior sets the tone for the visitor's journey throughout the building. Surrounded by full height glass windows and 3- story height curtain wall system at the Thrive Stair, members

are met with abundant light and connections to the surrounding environment. This contemporary, dynamic, multifunctional space is welcoming and well organized environment it has all branded elements woven into the interior design aesthetic to provide a consistent member and community experience. The color palette will be composed of primarily neutral color applied to the architectural envelope with pops of 'full spectrum' colors to reinforce the brand voice of optimistic, spring/summer colors.

Floor: Polished Concrete or Porcelain Tile, General use throughout and Walk off matt material at Vestibule

Wall: Painted Gypsum Board Metal stud framed walls, Millwork Wood wall paneling, Graphics and Signage, 4"high resilient base.

Ceiling: 2 x 2 Acoustical Ceiling Tile with High NRC, CAC (for General use throughout) and sections of Painted Exposed ceiling, Refer to Reflected Ceiling Plan for Extent.

Front Porch Areas

An extension of the Public Square this space will provide a variety of furniture groupings that support work, respite, education or play. The space will be filled with natural daylight and views to outdoors.

Floor: Level 01- Polished Concrete or Porcelain Tile, Level 02-03 – Biobased Tile, 2 colors

Wall: Painted Gypsum Board Metal stud framed walls. Integrated wall graphics and signage will be applied to the gypsum wall sections to support the Kaiser Permanente brand. 4"high resilient base

Ceiling: Painted Exposed Ceiling

Public and Staff Toilets

Neutral toned colors and materials will be used along with individual personal mirrors to deinstitutionalize the space. The public will be a gender neutral room.

Floor: Shell and Core will receive Polished Concrete or Porcelain Tile and Modular DIRTT will receive Resilient Sheet, 1 color

Wall: Shell and Core will be constructed of gypsum metal stud framed wall with porcelain tile and accent ceramic tile on wet walls, 4"high porcelain base. Modular solutions will be DIRTT Solid Wall Partition assembly - Thermofoil wrapped MDF Tiles partial height at all walls, 4"high integral cove wall base

Ceiling: Painted Gypsum Board

Enclave- Provider Office and Collaboration Spaces

This off-stage retreat is designed to create an environment that supports both quiet focused activity as well as collaboration. The provider offices are located along the exterior wall to provide the maximum amount of natural daylight into the offices. DIRTT aluminum storefront assembly with glass panels and glass sliding doors will be designed along the corridor side to allow light to penetrate deeper into the interior and achieve a more pleasant working environment for the staff.

Floor: Carpet Tile (Offices and Corridor); Biobased Tile, 1 color (Collaboration and Amenity spaces)

Wall: DIRTT Aluminum Storefront with glass panels and decorative film (Provider Office) DIRTT Solid Wall partition assembly- Painted MDF Tiles and Aluminum Storefront with glass panels (Conference Rooms); Partial height Architectural Resin Panel (Collaboration space), 4"high resilient base

Ceiling: 2 x 2 Acoustical Ceiling Tile with High NRC

*Window Treatment: Provide manual roller shades along exterior walls at all Provider offices.

Clinical Pod - Exam Rooms

The Exam Room will be more focused on the personal interaction that happens in this space. The necessary clinical aspects are hidden to lower anxiety. Design elements like the exam chair, dry erase wall and a large monitor promote better communication and support Care Portal. Providers and the other care team members will have a docking station in the room to access

health information real time without having to log-in to an in-room computer. The use of accent colors and sustainable flooring materials with accent patterns, lighting and artwork help enhance the patient experience and create a less intimidating environment.

Floor: Resilient Sheet, 2 accent colors or 2 tones of wood visual

Wall: DIRTT Solid Wall Partition assembly; both Full Height Painted and Partial Height Thermofoil wrapped MDF Tiles; 4"high resilient base and DIRTT Barn Door with Thermofoil finish.

Ceiling: 2 x 2 Acoustical Ceiling Tile with High NRC

Typical Procedure Rooms

Typical procedure rooms constructed of DIRTT gypsum wall assembly with integrated wall protection on all walls and (1) feature wall with full height graphic to create a calm and respite environment.

Floor: Resilient Sheet, 2 colors

Wall: DIRTT Solid Wall Partition assembly - Thermofoil wrapped MDF Tiles full height on all walls and (1) feature wall with integrated full height graphic, 4"high integral cove base and DIRTT Barn Doors with Thermofoil finish.

Ceiling: 2 x 2 Clean Scrubable Ceiling Tile

Imaging Procedure Room

The modern state of the art - high tec Imaging space will have clean white walls and and 1 feature wall with accent color and monitor displaying imagery to create a calm and respite environment.

Floor: Resilient Sheet, 2 colors

Wall: Lead Lined Gypsum wall assembly, 4"high integral cove base and Lead Lined doors

Ceiling: 2 x 2 Acoustical Ceiling Tile with High NRC

Retail Pharmacy

The Retail Pharmacy amenity is located on Level 01 open to the Public Square along the exterior south east corner of the facility. The roll down gate in front of the transaction counters is designed from floor to ceiling with the security wire mesh above that extends to deck with an additional/security shutter to close the over the counter sales counters at night. Perimeter wall is also constructed with security wire mesh that extends to deck to meet hardening requirements.

Floor: Anti fatigue Resilient Sheet, 4"high resilient base

Wall: Gypsum Board with 18 gauge security mesh assembly

Ceiling: Painted Gypsum Board

Mental Health and Wellness

The main entry to the department is discrete to provide a sense of privacy. Behavioral Health spaces will be designed for patient and staff safety, privacy and confidentiality and will comply with Total Heath Environment Key Experience 18, to elevate the health and well- being of the Kaiser Permanente Brand.

Floor: Resilient Sheet, 2 colors, 4"high resilient base; Note: Observation rooms to receive integral 4"high base with pick resistant sealant.

Wall: Painted Impact Resistant Gypsum Board Metal stud framed walls

Ceiling: 2 x 2 Acoustical Ceiling Tile with High NRC; Note: Observation rooms to receive Painted Gypsum Board.

Back Of House – Storage Room, Electrical, IT

Typical Back of House support spaces are constructed of gypsum metal stud framed walls.

Floor: Resilient Sheet, 4"high resilient base

Wall: Painted Gypsum Board (note: wall protection not required)

Ceiling: 2 x 2 Acoustical Ceiling Tile with High NRC

11. **Interior Openings**

DIRTT Interior Openings

Door openings are anticipated to be DIRTT standard core Thermofoil doors in extruded aluminum DIRTT partition frames. At designated locations there are also glass doors with aluminum stile and rails.

Interior glass entry doors will be utilized at entries into clinic and department suites and specialty conference rooms.

Sliding Door hardware to be provided by DIRTT.

Hardware in DIRTT doors is to be selected by Architect and specified and provided in Contract by DIRTT for Construction.

Standard Interior Openings

Door openings are anticipated to be solid core wood doors with a plastic laminate to coordinate with DIRTT Thermofoil finish in extruded aluminum frames with intent of matching DIRTT system.

Hardware is to be Specified by Architect and provided in Contract for Construction.

Fire Rated Openings

Door openings are anticipated to be solid core wood doors with a plastic laminate to coordinate with DIRTT Thermofoil finish in rated frames.

Hardware is to be Specified by Architect and provided in Contract for Construction.

Security Openings

Door openings are anticipated to be solid core wood doors with a plastic laminate to coordinate with DIRTT Thermofoil finish in rated frames.

Hardware is to be Specified by Architect and provided in Contract for Construction.

Electrified hardware to be provided at locations delineated in security narrative

Radiation Shielded Openings

Radiation shielded door and window and frames are to be provided at IAMMO and IGENL rooms.

Coiling Grill and Doors

Vision Essentials is separated from the Public Square by an overhead coiling security grill.

Pharmacy is separated from the Public Square by an impact rated overhead coiling security door.

Conference Room

The Conference Room opens onto the Public Square with a large multi-leaf folding glass wall.

12. **INTERIOR SPECIALTIES**

Interior Specialties Concepts

All Interior Specialties materials specified will comply with Kaiser Permanente Facility Design Program Chapter 10.

Toilet Accessories

The architect intends to interface with the Kaiser owner's project representative to coordinate the locations and placement of facility approved dispensers that comply with Kaiser Permanente Facility Design Program Chapter 10. The architect will select products from the list of "acceptable dispensers" and approved manufactures. All toilet accessory locations, mounting heights will comply with the most stringent regulatory requirement, whether the Americans with Disabilities Act (ADA), state or local building codes.

Wall Protection

Wall protection material specifications will comply with Kaiser Permanente Facilities Design Program Design Criteria- Chapter 10. Only PVC-free products will be selected that meet or exceed the most stringent performance criteria. Manufactures will be selected from the National Supplier List.

Window Coverings

Roller shade specifications will comply with Kaiser Permanente Facilities Design Program Chapter 12. The architect will specify neutral colors that will blend with the interior and exterior architecture.

Motorized single roller shade will be specified in all Public areas with large expanses of glass as well as, Conference Rooms and the Gym on level 01.

Manual single roller shades with safety devices will be specified in all other spaces with windows.

13. **CONVEYING SYSTEMS**

Elevators

General

Elevators at the Covina Medical Office Building will stop at the following building levels:

Level 01: 100'-0"

Level 02: 114'-6"

Level 03: 129'-6"

Per the Center of Excellence template elevators are located in the Public Square on Level 01 with arrival in the front porch on upper levels.

The elevator entrances are placed directly opposite the landings of the Thrive Stair to encourage use of the stair.

The clear space in front of elevators is approximately 12 feet in width.

Branded Lobby Elements

The elevators are integrated into a core element that has been developed as a part of a Kit of Parts that is common to all KP MOB Center of Excellence projects. This core element includes elevators, elevator control closet and public toilet rooms.

Function

A 4,000 lb car with wide orientation is provided to comply with medical emergency service elevator (ambulance gurney) transport requirements of building codes (CBC 3002.4; 11B-407.4.1)

A second elevator with 3,000 lb capacity is provided to achieve required redundancy and service level.

Both cars are configured with a single slide entrance in brushed stainless steel finish

Both elevators are to be Machine Room-less (MRL). Control cabinets are to be located at Level 3 (highest) stop

Shaft dimension, pit depth, overrun and controls closet are provided as worst-case combination of the following elevator products:

1. Otis Gen2 Overslung
2. Thyssen-Krupp Evolution 200

These products are selected in part because product line includes a single slide entrance 3,000lb California Building Code compliant product.

Note that The Otis design includes a rear counterweight, while the Thyssen-Krupp is a side counterweight design. Rail support strategies thus would be different depending on selection.

No additional service elevator is provided.

Other Conveying Systems

Dock Levelers, Hoists, Pneumatic Tube Systems, Escalators, and Wheelchair Lifts are not included in the design of the Covina Medical Office Building.

14. **FURNITURE**

FF&E

CannonDesign intends to interface with Kaiser Permanente's FF&E vendor/consultant to ensure that the design of the project and the FF&E components are integrated and coordinated in the most seamless way possible. Recommendations for process and path forward will be made to KP that support this approach.

15. **SIGNAGE**

INTRODUCTION

The Kaiser Permanente Covina MOB is a new three-story, approximately 58,800 SF building with a parking garage on the northwest side and surface parking on the southeast side. It is located within the east side of Park View Dr. in the City of Covina. The signage program for the facility shall be developed to reflect the current KP National Facilities Services (NFS) Sign Program, including the Total Health Environment and NextGen MOB branded graphics and signage guidelines. This program includes standards and guidelines for the project signage and graphics. The exception to the prescribed sign standards, shall be graphic elements developed specifically for the project. The graphic elements include imagery and patterns developed for the project that reflect the facility's function and design. It is understood that integration of the graphics with the architectural and interior design elements of the facility shall be developed and coordinated with the Cannon Design team.

Description of Sign Program

KP's sign program is a robust system of sign types designed to accommodate all needs of the project. The project sign program shall be developed to accommodate the preparation of three (3) separate documentation packages: (1) exterior site and building-mounted signs, (2) parking garage signs, and (3) interior signs. It is understood that all interior signage and parking garage signs shall be fabricated and installed by KP Capital Projects Facilities Construction (CPFC) Vernon Manufacturing SCAL. Exterior signs shall be bid and awarded to a Sign Vendor experienced in the fabrication and installation of KP Signage.

Exterior Site and Building Signage

The exterior sign program shall reflect KP standard sign types for a freestanding medical office building and comply with design direction dictated by the City of Covina Community Development Department - Planning Division. These requirements include development of a master sign program for the site that will be reviewed by the Planning Division for approval, prior to permitting individual sign types. The development of the Master Sign Program for the site

precludes the need to adhere to specific sign codes typically required by the C-P commercial, administrative and professional office zone.

Building-Mounted Signs: Two building-mounted site identification signs are proposed. The signs display the "Kaiser Permanente" logotype/symbol and consist of individual, internally-illuminated channel letters.

Site Signs: A site identification monument sign shall be located at the east side of the vehicular entrance to prominently identify the facility to vehicular traffic. The single-faced sign consists of a tall pylon, with an attached horizontal monument. The pylon includes "Kaiser Permanente" branding and the monument identifies the site as "Covina Medical Offices," with address and a message to indicate that emergency services are not available at the site.

A separate sign/art installation, consisting of a "Welcome" message of individual dimensional letters, shall be designed to incorporate into the landscape of the facility. This sign/art piece is located in the traffic island adjacent to the member drop-off zone.

Parking Garage Signage

The parking garage sign program includes KP standard signage designs for the exterior and interior of the garage. The site has two (2) vehicular entrances to the parking garage, the first is located on Parkview Road, prior to the main site entrance to the MOB, and the second entrance is located within the site adjacent to the MOB drop-off zone. The parking structure is identified to vehicular traffic by the placement of a double-faced sign perpendicular to the street on the southeast corner of the structure. The sign is an internally-illuminated sign cabinet with copy that reads "Parking" together with the international "P" symbol and the KP logotype. Both vehicular entrances include the standard orange portal color scheme with welcome and entrance/exit messages required for all KP parking structures.

Signage throughout the four-level parking garage will reflect the KP Sign Program designs and use color coded parking signage to distinguish the different levels. All signage located with the garage shall be non-illuminated. Additionally, select walls at the elevator lobby and stairwells will feature wall graphics designed specifically for the project.

Building Interior Signage

The interior sign program includes standard KP interior sign designs as well as signage developed specifically for the NextGen MOB's. Additionally, graphics will be developed for the medical offices that are appropriate for the function of the space. The background color of the sign system is white with grey copy, except for regulatory signs, as required.

The wayfinding system for the Medical Offices will use the KP's adopted Universal Wayfinding numbering system. A number is assigned to a department within the medical office. The user first encounters the department name and associated number at a main building directory located on the medical office's first floor. The user will then be guided by the department name and number on the various wayfinding directional signs throughout the medical office until he or she reaches the destination point. The wayfinding signs will direct people through a logical path of travel from the entrance of the building to the desired destination. The wayfinding system also has a bilingual element. The second language (Spanish) will be introduced at the main building directory along with the English name and Universal Wayfinding number. The second language will then be introduced again at the destination point signage. Additionally, informational signs shall have bilingual copy. All other interior signage for the facility shall be English only. It is understood that all interior project signs shall comply with both Federal ADA and California State Title 24 signage requirements.

16. **EQUIPMENT**

Medical and IT Equipment

CannonDesign has not received a preliminary high-level medical equipment lists from KP Medical Planning. Equipment shown in the PAV documents is based on national approved templates and is not indicative of project specific models. During the VBD phase, more detailed equipment lists will be generated by KP medical equipment planners in conjunction with the users. At that time, for non-templated spaces, equipment as provided on the list will been incorporated into the model. For templated space, equipment will be included per the KP standard national templates and be compared for discrepancies. Likewise, IT equipment will be verified once equipment lists are received from KP IT during the VBD phase.

17. **ARTWORK**

Artwork

CannonDesign intends to interface with Kaiser Permanente's artwork vendor/consultant to ensure that the art selections, including photography, sculpture, paintings, collages, quilts, etc. support the design of the project and are integrated in the most seamless way possible. The art pieces shall reinforce the culture of the community and be engaging, uplifting, inspiring, support wayfinding and create an overall healing environment.

18. **PLUMBING NARRATIVE**

Design Codes and Standards

The work shall be in accordance with, but not limited to, the requirements of:

1. Kaiser Permanente Facilities Design Program Design Criteria (8/30/2018)
2. 2019 California Building Code
3. 2019 California Plumbing Code
4. California Green Building Code
5. ADAAG Americans with Disabilities Act Accessibility Guidelines, 2010
6. ASTM American Society for Testing and Materials International

No plumbing/piping are in ceilings above or buried under slabs below major electrical or data/communications equipment areas. Piping is not located above any panelboards or switchgear including required services areas for such equipment.

All pipe penetrations that occur through floors are appropriately protected with sleeves which are permanently bonded to the floor construction and extend above the floor surface a minimum of 2-inches. Where sleeves occur adjacent to wet areas, and where fixtures such as floor sinks or floor drains are provided in wet areas, the fixture/penetration are provided with a membrane and clamping collar or water stop flange to protect the immediate area of the penetration (unless the floor construction is otherwise provided with safing provisions). All pipe penetrations will be fire- and smoke- stopped in accordance with Building Code requirements.

All welding is performed by qualified tradesmen and done in accordance with appropriate ASME/ANSI Section IX standards.

Provisions to preclude noise and vibration transfer including resilient supports, vibration dampening equipment bases, and flexible connectors.

SANITARY WASTE AND VENT SYSTEM
All sanitary waste and vent piping is Schedule 40 DWV cast iron.

Gravity sanitary drainage stacks serve all levels. These stacks will be collected within the ceiling and connected to the city sewer system. All fixtures located in areas either below the invert elevation of the side sewer connection or otherwise unable to leave the building via gravity flow will be connected to a duplex sewage ejector pump which will lift the sewage to a point where it can flow to the city sewer by gravity.

All fixtures with sanitary traps have sanitary vent connections. Vents collect and extend through the building roof level in approved locations.

Provide and install one (1) Elevator Sump Pump for each isolated elevator shaft. Pump(s) will be equipped with Oil Minder controls and monitored through the BAS.

The Sanitary system has one sanitary outfall. The sanitary waste system is designed to slope towards the side sewer connection at 1% minimum. Higher slopes are provided where ceiling space allows. The sanitary system is hydraulically designed to minimize waste line stoppages and provide for maximum drain-line carry from low-consumption plumbing fixtures. Piping systems are routed as directly as practical with minimal offsets. Cleanouts will be provided as required by the Plumbing Code, as well as in other areas to permit necessary maintenance.

Sheet Metal Pans are installed under the Sanitary waste piping in the TER rooms and Electrical rooms. Water sensors with alarm connected to the BMS shall be provided at all drain pan locations. Acceptance Criteria: Demonstration of leak alarm at BMS operator workstation.

STORM DRAINAGE SYSTEM

Provide and install a complete storm drainage Collection system. Refer to Outline Specifications for materials accepted.

Storm drain leaders serve all roof areas of the Medical Office Building. Primary storm drainage piping collects within the building ceiling areas and discharge to the municipal storm sewer as coordinated with the project Civil Engineer. Storm drainage piping are limited to a maximum size of 12". Secondary storm drainage is assumed to be provided via overflow roof drains connected to a dedicated secondary storm piping system. The secondary storm drainage system terminates at outlets located in visible locations above grade on the exterior of the building.

The primary and secondary storm drainage system is sized based on a maximum rainfall rate of 3.0 in/hr. for a 1-hour duration and a 100-year return. The storm water drainage systems are designed to minimize maintenance.

HVAC condensate will be collected from non-fuel-fired equipment and reclaimed for use either as makeup for the HVAC system or as irrigation water.

Any storm drainage not able to reach the municipal storm drain connection via gravity, along with the project under slab drainage (if necessary per the Geotechnical engineer's recommendation) will be delivered to a duplex sump pump below the lowest building slab level and pumped up to a level from which it can connect to the storm sewer by gravity flow. No drainage from outside of the building is piped into the building storm drainage sump.

DOMESTIC WATER SERVICE

Provide and install a complete domestic water system. Include horizontal and vertical mains serving each fixture and equipment. The building's water system is isolated from the City's Water District by a lead-free reduced pressure backflow preventer (ASSE 1013-compliant), located inside the building at the water service room. The backflow preventer (BFP) will be sized for 112 GPM, which is 100% of the building peak design demand. A digital water meter is provided at the building service line, and submeters are provided for landscaping. The building water meters communicate with the BMS.

Acceptance Criteria: GPM water meters indicate, at the BMS user screen, correct GPM's to the facility (tested by a controlled test).

Additional RPZ backflow preventers to isolate the following sub-systems from the building potable water system: lab water systems, mechanical water systems and irrigation.

A variable speed triplex domestic booster pump package will be provided to ensure uniform delivery pressure to the MOB. Unit shall be skid mounted, and each pump shall be sized to provide a minimum of 50% of the maximum calculated GPM demand of the new facility at the required pressure, making one pump redundant. Booster pump is to be provided with the ability to communicate and be controlled by the BMS.

The water service is designed to provide water to the furthest point within the system at 45 psig. Maximum pressure in the building will not exceed 80 psig. Flow velocities are limited to 8 fps (for cold water piping) and 5 feet/second (for hot and recirculating hot water piping). All system and pump sizing are based on the results of a site hydrant flow test provided by the water supplier and requested by the Civil Engineer.

Acceptance Criteria: Building potable pressure shall be measured at 45 psig (+/-5) at the level 3 public toilet room.

DOMESTIC HOT WATER

Domestic hot water is provided by tankless natural gas-fired water heaters (connected in parallel) within the building. Each water heater will produce hot water at 140 degrees F to inhibit the growth of legionella bacteria within the hot water system. The water heating system shall include thermostatic mixing valve stations to reduce hot water temperature to 110 degrees for use at handwashing sinks and lavatories.

The temperatures for the hot water systems are maintained by variable speed circulating pumps. The pumps have ECM motors, and are monitored by the BMS.

Acceptance Criteria: Building potable hot water shall be 140°F (+/-3) for 90% of daily 15-minute observations.

Acceptance Criteria: Building potable hot water shall be 110°F (+/-3) at all handwashing fixtures (one time test).

Water hammer arrestors will be provided at all fast-acting valves at toilets and at all potential water hammer sources, including but not limited to batteries of plumbing fixtures and ends of long branch lines. Placement and sizing of devices in the piping system is in accordance with Plumbing and Drainage Institute Guidelines, PDI WH201.

The water distribution piping systems have shutoff valves such that any fixture branch may be shut down without disruption to other portions of the system supply. In addition, valves will be provided at the base of all supply risers, at main service lines, and at connections to all plumbing fixtures and equipment. Centralized piping shutdown valve stations are provided at all connections to the building water service risers.

Piping material is PEX for all piping 1-1/2 inch and below. All copper or steel piping is installed with press fittings.

NATURAL GAS SYSTEM

A natural gas service with a master meter and pressure regulator assembly (if required) delivers natural gas to the building. Each connection to a piece of gas-fired equipment has a flexible gas connector, shutoff valve and sediment tee.

Gas pressure regulators reduce the gas pressure to fall within the operating range of each piece of gas-fired equipment. The ranges of pressures needed are:

1. Water Heaters: 7-14" WC.
2. Boilers: 7-14" WC.

Gas is schedule 40 black steel piping with threaded malleable iron fittings. Fittings are welded for gas piping 2-1/2" and larger.

Gas meters are provided for energy management and validation at the following pieces of gas-fired equipment:

1. Water heaters.
2. Boilers

Acceptance Criteria: Natural gas meters indicate, at the BMS screen, correct flow rates to the equipment (tested by a controlled test).

PLUMBING FIXTURES

Fixture Type	Energy Policy Act 1992 Baseline Water Usage	Water Usage
Water Closet Flushometer if utilizing domestic city water	1.6 gallons per flush	1.2 gallons per flush, MaP=1000
Lavatory Faucet	0.5 gallons per minute, 30 seconds	0.35 gallons per minute, 30 seconds
Break Room Sink	2.5 gallons per minute, 15 seconds	0.5 gallons per minute, 15 seconds
Exam room sinks	Not regulated	0.5 gallons per minute

New plumbing fixtures: water closets and lavatories are of vitreous china. The glazed and vitreous china fixtures are white. All water closets are floor-mounted rear discharge fixtures that comply with ADA guidelines. All wall-mounted plumbing fixtures have fixture supports. Sinks in treatment, exam rooms, etc. are 18 gage stainless steel, self-rimmed, ADA compliant type. Mop sink basins are enameled cast iron type. Chemical dispensers at each mop sink are provided with a cold-water feed.

All fixture trap assemblies on sinks, lavatories, and similar domestic plumbing fixtures are 17-gagecast brass. Fixture traps on lab fixtures are polypropylene connected with polypropylene tailpieces. Accessible fixture traps serving lab sinks and similar fixtures have mechanical joints for the P-trap assembly to permit maintenance.

Floor drains are provided for mechanical spaces as required.

Floor sinks or other appropriate indirect waste receptors are provided for the following equipment. Indirect waste receptors consist of flush-with-floor fixtures such as floor sinks, exposed wall boxes, and in some cases approved funnel-top drains. The use of hub drains and similar unsanitary fixtures are limited to mechanical areas where justified and not prone to introduction of debris. Indirect wastes discharge through air gaps and air breaks and serve any fixture of special health concern or not normally classified as a direct-connect plumbing fixture. All interceptors will be selected of appropriate shape, depth, size, and capacity to minimize potential for splashing or overflow. Floor drain and floor sink outlets will be a minimum of 3-inches diameter.

There are electronic faucets at the lavatory faucets. Turbine rechargeable battery type will be utilized. Public lavatory faucets will be low-flow, and will aim for a maximum water use of 0.35 gallons per metering cycle. All trim will be chrome plated brass or stainless-steel construction.

Exterior frost-proof anti-siphon hose bibs are provided at the building exterior, and interior hose bibs with backflow protection are provided at major mechanical rooms and as otherwise indicated.

INSULATION

Service	**Temperature Range (degrees F)**	**Material**	**Insulation Thickness (inches) for Pipe Sizes:**				
			1 and less	**1 to 1.25**	**1.5 to 4**	**5 to 6**	**8 and up**
Domestic hot water, recirculated hot water	105 to 140	Glass fiber	1	1	1.5	1.5	1.5
Domestic Cold Water	40 to 60	Elastomeric foam, glass fiber	1	1	1	1	1
Condensate drains (i.e., bodies and piping)	All	Elastomeric foam, glass fiber	0.5	0.5	0.5	-	-
Roof drain bodies and vertical drop to horizontal piping	All	Glass fiber	-	1.5	1.5	1.5	1.5
Horizontal roof drainage piping and first 18 inches of vertical riser	All	Glass fiber	-	1.5	1.5	1.5	1.5
Piping subject to freezing and heat-traced piping	All	Glass fiber	1.5	1.5	1.5	1.5	1.5
Hot water and drain piping below lavatories	ADA	Manufactured Plastic Wrap	n/a	n/a	n/a	-	-

APPENDIX 1: PLUMBING LOAD CALCULATIONS

Fixture Matrix:

The unit quantities and floor areas as identified in the summary below were used to establish the baseline plumbing utility loads.

OFFICE FIXTURE CALCULATION MATRIX
(Based on International 2015 Plumbing Code)

Room Types	Floor	Typical Floor area	Estimated # People (1/100 sq ft)	Min. # Water Closets	Total	Min. # Urinals	Total	Min. # of Lavatories	Total	Min. # Service Sinks	Total	Min. # EWC	Total	Remarks
Men's Toilet Rooms	Level 01	21,450	53	2	2	-		1	1	-		-		
Women's Toilet Rooms	Level 01	21,450	53	4	4	-		1	1	-		-		
Men's Toilet Rooms	Level 02	19,346	48	1	1	-		1	1	-		-		
Women's Toilet Rooms	Level 02	19,346	48	3	3	-		1	1	-		-		
Men's Toilet Rooms	Level 03	17,697	44	1	1	-		1	1	-		-		
Women's Toilet Rooms	Level 03	17,697	44	3	3	-		1	1	-		-		
EWC's												6	6	Building total
Service Sink										4	4			Building total
Fixture Totals					10				6	4	4	6		

Projected Peak Domestic Water and Sanitary Requirements:

SANITARY DRAIN & DOMESTIC WATER SERVICE CALCULATIONS

TYPE	NO.	DFU	TOTAL	WSFU	TOTAL	CWFU	TOTAL	HWFU	TOTAL
Public Fixtures:									
Water Closet, FV, 1.28 gpf`	10	4	40	5	50	5	50	-	-
Lavatory, 0.35 gpm	10	1	10	1	10	.75	7.5	.75	7.5
Drinking Fountain & EWC	3	0.5	1.5	0.5	1.5	0.5	1.5	-	-
Mop Receptor	3	3	9	3	9	2.25	6.75	2.25	6.75
MOB Fixtures									
General Sink	28	2	56	1.5	42	1.125	31.5	1.125	31.5
Exam Sink	63	1	63	1.5	94	1.125	70	1.125	70
Water Closet Private	17	3	51	5	85	5	85		
Lavatories Private	17	1	17	1	17	.75	12.75	.75	12.75
Wall Hydrant	7	-		8.5	8.5				
Hose Bibb	2	-		2.5	3.5	-		-	
Floor Drain		2				1.5		1.5	3
TOTAL		247.5 DFU		319 WSFU		263.5 CWFU		128.5 HWFU	
				112 GPM		102 GPM		48 GPM	

Peak Domestic Water Demand

SANITARY DRAIN & DOMESTIC WATER SERVICE SUMMARY	
Description	**Total**
Drainage Fixture Units (DFU):	247 x 22.5 Gallons per day -
	5805 Effluent / Day (Gallons)
Sanitary Building Drain:	
One (1) Discharge Points	6 @ 1/8" Per Foot Slope
Two (2) Discharge Points	4 @ 1/8" Per Foot Slope
Three (3) Discharge Points	4 @ 1/8" Per Foot Slope
Four (4) Discharge Points	4 @ 1/8" Per Foot Slope
Total Water Supply Fixture Units (WSFU):	319 Fixture Units
Total Flow for Plumbing Fixtures:	112 Gallons Per Minute
Total Building Flow:	112 Gallons Per Minute
Water Service Size:	3 Inches

Storm Loads:

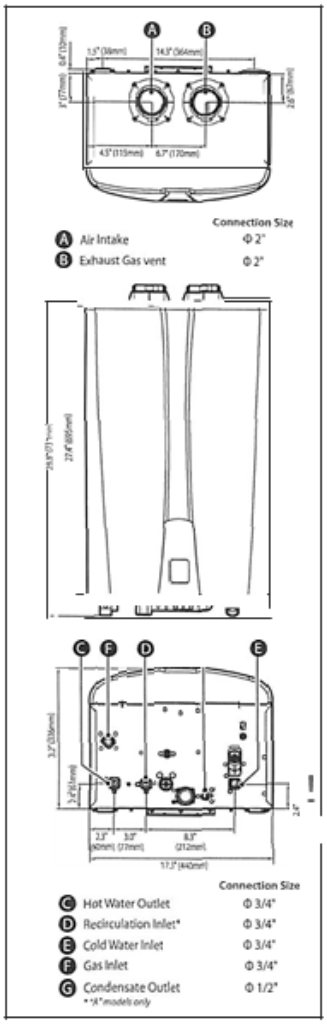
The storm calculations are based on the approximate square footage of the roof areas of the entire building excluding the drainage from the site which will need to be collected separately from the roof drainage.

STORM DRAINAGE CALCULATIONS					
Site Drainage Area	**No. of Outlets**	**Flow Rate (cfs)**	**Rainfall Rate (Inches per Hour)**	**Total Flow (Gallons per Minute)**	**Pipe Sizes (Inches)**
24,718	1	1.72	3	772	1 @ 10"
24,718	2	.86	3	385	2 @ 8"
24,718	3	.57	3	257	3 @ 6"
24,718	4	.43	3	193	4 @ 6"
			Total GPM: 849		
				Main Building Pipe Size(s):	**AS SHOWN ABOVE**

«wawaew
Premium Condensing
Tcinkle5s Gas Water Heater

NPE Series Tankless Water Heaters
Specification Sheet

Dimensions



Specifications

Heat (Input)	Natural Gas	18,000- BTU/H	15,000160,0008TU/H		9, 80,000 BTU/I-I		19,900-199,900 BTU/H	
	Propane Gas		15,000-150,000 BTU/(L		19,900-180,000 BTL/H		19,900-199,900 BTU/H	
Efficiency Ratings	UEF (for NG & LP)	0.96	0.96	0.97	.9	0.97	0.96	0.97
	EF (Canada) (for NG & LP)	0.97	0.97	0.99	0.9?	0.99	0.97	"
Flow Rate (DHW)	35°F(19°C) Temp Rise	6.8 GPM (26 L/m)	8.4 GPM (32 L/m)		10.1 GPM (38 L/m)		11.2 sPu f42 Unit	
	45°F(25°C) Temp Rise	5.3 GPM (20 L/m)	6.5 GPM (25 L/m)		7.8 GPM f30 Lim)		8.7 GPM (33 L/m)	
	6?°F(36°€) Temp Rise	3.2 GPM (12 L/m)	4.3 GPM (16 L/m)	4Z GPM (16 L/m)	5.0 GPM (19 L/m)	5.2 GPM (20 L/m)	5.6GPM f21 Lim)	5.7 GPM (32 Lim)
Dimensions		1y.3"(W) X 27.4"(H) x13J"fD)						
Weight		US lbs [35kg]	75 lbs. [34kg]	67 lbs. [30kg]	82 lbs [37 kg]	75 lbs [34kg]	82 lbs. (37 kg)	ys lbs. (34kg)
Installation Type		Indoor or Outdoor Wall-Hung						
Venting Type		Forced Draft DirectVent						
Ignition		Electronic Ignition						
Water Pressure		15-150 PSI						
Natural Gas Supply Pressure (from source)		3.5 in WC-10.5 in WP						
Propane Gas Supply Pressure (from source)		6]n WC-13 in WS						
Natural Gas Manifold Pressure (min-max)		-0.04 in WC - -0.38 in WC	-0.04 in WC - -0.84 in WC		-0.0$ inWS--0.36 InWS		-0.05 in WC - -0.58 in WC	
Propane Gas Manifold Pressure (min-max)		g "	-0.OR InWT--0.50 inPC		-0.10 InW€ - -0.66 in NE		-0.\0 in WP -0.78 in WC	
Minimum flow Rate		o.s GPM ft.9 Lim), < o.01 GPM fo.04 Lim) option for 'A' models•						
Connection Sizes	Cold Water inlet	3/4 In NPT						
	Hot Water Outlet	3/4 in NPT						
	Gas Inlet	3/4 in NPT						
Power Supply	Main Supply	120V AC, 60Hz						
	Maximum Power Consumption	200W (max 2A), 350W (max 4A) with external pump connected						
Materials	Casing	Cold Rolled €arbon Steel						
	Heat Exchangers	Primary Heat Exchanger: Stainless Steel Secondary Heat Exchanger: Stainless Steel						
Venting	Exhaust	2• or 3" PVC, GPVS, Polypropylene 2• or 3" Special Gas Vent Type BH (Class II, A/B/C)						
	Intake	2• or 3" PVE, €PVE, Polypropylene 2• or 3" Special Gas Vent Type BH II, A/B/C)						
	Rent Clearance	0" \o combo Xib)m						
Safety Devices		flame Rod, UPS, Ignition Operation Detector Water Temperature High Limit Switch, Exhaust Temperature High Limit Sensor, Power Surge Fuse						

** Available for "A" models configured in an optional ComfortFlow recirculation mode. Additional energy use will occur when using recirculation.*

APPENDIX 3: WATER USE OPTIMIZATION CALCULATION

Water Use Optimization Calculation

Building Description:

T1. Occupancy Calculation

Level	Floor Area (SF)	FTE	Transients	
1	21,450	40	82	
2	17,697	30	62	
3	17,697	30	62	*All levels assume 50/50 Gender Distribution

T2. Baseline Water Use

a. Flush Fixtures

Fixture Family	Fixture Type	FTE Uses/Day	Transient Uses/Day	Flush Rate (GPF)	Gallons/Day
Water Closet (Female)	1.6 GPF	3	0.5	1.6	322
Water Closet (Male)	1.6 GPF	3	0.1	1.6	257

b. Flow Fixtures

Fixture Family	FTE/Uses/Day	Transient Uses/Day	Use Time (mins)	Flow Rate (GPM)	Gallons/Day
Lavatory Faucet		**1**	**0.25**	**0.5**	26
Sink Faucet	**1**		**4**	**2.2**	880
Lavatory Faucet (Private)	**3**		**0.25**	**0.5**	38

Total Daily Water Use: 1523

T3. Design Water Use

a. Flush Fixtures

Fixture Family	Fixture Type	FTE Uses/Day	Transient Uses/Day	Flush Rate (GPF)	Gallons/Day
Water Closet (Female)	1.28 GPF	3	0.5	1.28	258
Water Closet (Male)	1.28 GPF	3	0.1	1.28	205

b. Flow Fixtures						
Fixture Family	**FTE Uses/Day**	**Transient Uses/Day**	**Use Time (Mins)**	**Flow Rate (GPM)**	**Gallons/Day**	
Lavatory Faucet (Public)		1	0.25	0.35	18	
Sink Faucet	1		4	0.5	200	
Lavatory Faucet (Private)	3		0.25	0.5	38	
Total Daily Water Use: 719						
Estimated Percentage of Space Water Use Reduction: 47%						

19. FIRE PROTECTION

DESIGN CODES AND STANDARDS

The work shall be in accordance with, but not limited to, the requirements of:

1. Kaiser Permanente Facilities Design Program Design Criteria (8/30/2018)
2. 2019 California Building Code
3. ADAAG Americans with Disabilities Act Accessibility Guidelines, 2010
4. National Fire Protection Association
    a. NFPA 13 – Installation of Sprinkler Systems
    b. NFPA 55: Compressed Gases and Cryogenic Fluids Code, 2010
    c. NFPA 72: National Fire Alarm Code
    d. NFPA 101: Safety to Life from Fire in Buildings and Structures
5. ASTM American Society for Testing and Materials International

FIRE PROTECTION SYSTEM

FIRE SERVICE

The building will be provided with a new dedicated incoming fire sprinkler service line designed by the project Civil Engineer. A backflow prevention device will be installed in the fire water service line.

A minimum of two (2) fire department connection locations will be coordinated with site fire hydrant locations and will be approved by the local Fire Marshal.

DESIGN CRITERIA

A current flow test will be utilized to determine the capacity of the water mains and required pressure demand from the wet pipe sprinkler system.

Sprinkler coverage should be designed per NFPA 13 and Factory Mutual standards.

WET SPRINKLER SYSTEM

The building will be protected throughout with hydraulically calculated sprinkler systems, which except for special protection needs, will be wet pipe systems. All areas of the building will be protected per NFPA 13, including electrical rooms (i.e. switchgear rooms, transformer rooms, generator rooms, electrical closets, and similar rooms), loading docks, stair towers, exterior canopies, and mechanical rooms unless otherwise approved by the AHJ.

SYSTEM ZONING

Sprinkler zone control valve assemblies will be supplied by standpipes in the stairwells. Each control valve assembly will serve no more than 52,000 sq. ft.

Sprinkler zones will be coordinated with any smoke compartments and fire alarm zones for proper alarm signaling.

DESIGN CRITERIA

Areas designated as Light Hazard will be designed for a minimum sprinkler flow of 0.10 gpm per sq ft. over 1,500 sq. ft.

Areas designated as Ordinary Hazard Group 1 and where stockpiles of combustibles do not exceed 8 ft. will be designed for a minimum sprinkler flow of 0.15 gpm per sq. ft. over 1,500 sq. ft.

Areas designated as Ordinary Hazard Group 2 and where stockpiles of combustibles do not exceed 12 ft. will be designed for a minimum sprinkler flow of 0.20 gpm per sq. ft. over 1,500 sq. ft.

Areas designated as Extra Hazard Group 1 and where the quantity and combustibility of contents is very high and the probability of rapidly developing fires with high rates of heat release are expected will be designed for a minimum sprinkler flow of 0.30 gpm per sq. ft. The system demand will be based upon the most remote 2,500 sq. ft.

The design area shall not be reduced through the use of quick-response sprinkler heads.

Pipe sizing for the systems will be determined by hydraulic calculations for the given demand. The room design method shall not be used. The hydraulic calculations and system design shall allow for a safety factor of 10 psi for new construction.

The design layout generally shall follow the tree system. Cross mains shall be continuous in size from the connection at the standpipe to the end of the corridor.

Sprinkler Spacing shall be in accordance with NFPA 13 and the listing of the sprinkler used.

EQUIPMENT AND MATERIAL

The piping for the wet pipe sprinkler system will be black steel. Piping will be Schedule 40 with threaded joints.

All sprinklers in Light and Ordinary Hazard areas shall be quick-response type.

High temperature-rated sprinkler heads will be provided for protection of Mechanical Rooms.

The type of sprinkler installed in a particular area will be selected as the project design proceeds. All sprinkler head locations, types, and finishes shall be coordinated with the Project Architect prior to purchase of the materials. Generally, concealed sprinklers will be installed in areas having suspended ceilings. Upright sprinklers will be installed in areas without ceilings. Sidewall sprinklers will be provided only when other types cannot be utilized.

Areas subject to temperatures below 40°F will be protected by dry sprinklers when possible. If dry sprinklers cannot be supplied from the wet system, then a dry pipe sprinkler system will be installed. Glycol antifreeze system will not be accepted as an alternative to dry sprinklers or dry pipe systems. Remote inspectors test and drains will be installed downstream of the flow indicator in accordance with NFPA 13 for each sprinkler system on each floor.

The type of sprinkler installed in a particular area will be selected as the project design proceeds. All sprinkler head locations, types, and finishes shall be coordinated with the Project Architect prior to purchase of the materials. Generally, concealed sprinklers will be installed in areas having suspended ceilings. Upright sprinklers will be installed in areas without ceilings. Sidewall sprinklers will be provided only when other types cannot be utilized.

Areas subject to temperatures below 40°F will be protected by dry sprinklers when possible. If dry sprinklers cannot be supplied from the wet system, then a dry pipe sprinkler system will be installed. Glycol antifreeze system will not be accepted as an alternative to dry sprinklers or dry pipe systems.

Remote inspectors test and drains will be installed downstream of the flow indicator in accordance with NFPA 13 for each sprinkler system on each floor.

DRY SPRINKLER SYSTEM

SYSTEM DESCRIPTION

Dry valves will be installed in heated spaces and supplied by wet standpipes.

Each dry valve will serve a single dry sprinkler zone within the area limitations of NFPA 13 and such that all commissioning tests will be satisfied.

Dry piping will be pitched in accordance with NFPA 13.

DESIGN CRITERIA

Design areas shall be calculated with a 30% increase as compared to the same hazard protected by a wet sprinkler system.

PRE-ACTION SPRINKLER SYSTEM

SYSTEM DESCRIPTION

A complete pre-action system will be installed to protect and provide coverage for the Technology Equipment Room (TER).

20. **MECHANICAL SYSTEMS NARRATIVE**

DESIGN CODES AND STANDARDS

All mechanical systems were designed to meet or exceed the requirements of the following codes and standards.

1. Kaiser Permanente Facilities Design Program Design Criteria (8/30/2018)
2. FGI Guidelines for the Design and Construction of Healthcare Facilities, 2018, ASHRAE 170 does not apply per section 2.1-8.2.
3. City of Covina, CA Municipal Code (adopts CBC)
4. 2019 California Building Code, Title 24
5. 2019 California Plumbing Code
6. 2019 California Electrical Code
7. 2019 California Mechanical Code
8. 2019 California Residential Code
9. 2019 California Green Building Code
10. 2019 California Energy Code
11. 2019 California Fire Code
12. ASCE 7-10
13. ADAAG Americans with Disabilities Act Accessibility Guidelines, 2010
14. National Fire Protection Association
    a. NFPA 13 – Installation of Sprinkler Systems
    b. NFPA 14 – Installation of Standpipe and Hose Systems
    c. NFPA 20 – Installation of Stationary Pumps and Fire Protection

d. NFPA 55: Compressed Gases and Cryogenic Fluids Code, 2010

e. NFPA 72: National Fire Alarm Code

f. NFPA 90A: Standard for the Installation of Air-Conditioning and Ventilating Systems, 2012

g. NFPA 90B: Standard for the Installation of Warm Air Heating and Air-Conditioning Systems, 2012

h. NFPA 101: Safety to Life from Fire in Buildings and Structures

15. OSHA 1910 - General Industry Standards

a. Subpart G Occupational Health and Environmental Control (1910.94-.100): ventilation, noise control, ionizing/non-ionizing radiation

b. Subpart H Hazardous Materials (1910.101-.126): storage, handling of hazardous materials

c. Subpart J General Environmental Controls (1910.141-.147) safety color coding and lockout/tag- out systems

16. National Fire Protection Association

a. NFPA 55: Compressed Gases and Cryogenic Fluids Code, 2010

b. NFPA 90A: Standard for the Installation of Air-Conditioning and Ventilating Systems, 2012

c. NFPA 90B: Standard for the Installation of Warm Air Heating and Air-Conditioning

d. Systems, 2012

e. NFPA 101: Safety to Life from Fire in Buildings and Structures, 2012

17. ASTM American Society for Testing and Materials International

18. ASHRAE – All are based on most recent editions

a. Handbook – Fundamentals

b. Handbook – HVAC Applications

c. Standard 55 – Thermal Environmental Conditions for Human Comfort

d. Standard 62.1 – Ventilation for Acceptable Indoor Air Quality

e. Standard 90.1 – Energy Standard for Building Except Low-Rise Residential

BASE DESIGN CRITERIA

1. Climatic Data was assumed to be similar to Burbank Glendale Pasadena Airport in Burbank, California which is the closest weather recording station to Covina, CA with 8760 weather data.

2. Heating Design Temperature: 39.8 degrees F DB (ASHRAE Fundamentals 2017 99.6%)

3. Cooling Design Temperature: 98.3 degrees F DB/69.0 degrees F MCWB (ASHRAE Fundamentals 2017, 0.4% DB/WB)

4. The 0.4%/99.6% design conditions may be exceeded for a number of hours per year (due to outside temperatures exceeding these design conditions). While designing to the 0.4% and 99.6% conditions by definition indicates that design setpoints will be exceeded during peak periods, typical design often requires a minimal amount of over sizing so that control is always maintained. This results in small amounts of risk and results in significant first cost and operating cost savings.

5. Dehumidification: 68.3 degrees F Dew Point, 78.9 degrees F MCDB (0.4% DP/MCDB)

6. Humidification: Humidification is not considered for his project due to the occupancy of the building.

7. Lighting Load – LPD's were based on the lighting design.

Spaces	Design Model LPD (W/sf)
Conference/Meeting/ Multipurpose Room	0.65
Corridor	0.65
Exam/Treatment Room	0.65
Enclosed Office	0.65

8. Plug Loads were based on Kaiser Permanente's white paper of plug loads:

Space Type	Plug Load (W/sf)
Enclosed Office	0.75
Exam/Treatment Room	0.75
Conference/Collaboration Zone	0.50
Lobby	0.25

9. The following Factors of Safety were applied to all systems:

    a. Heating Systems = 10%

    b. Cooling Systems = 10%

    c. Humidification Systems – N/A

d. Fan Sizing = Minimum of 4% for leakage.

e. Duct Sizing : Ducts will were sized as follows:

System	Maximum Pressure Drop (in. w.c. / 100')	Maximum Velocity (fpm)
Supply ductwork upstream of VFDs	0.02"	2000
Supply ductwork downstream of VAVs	0.1"	800. Branches to sound sensitive spaces 300 fpm
Return duct mains from plenum shaft to AHU	0.15"	1500
Exhaust ductwork from grilles to main	0.1"	800. Branches to sound sensitive spaces 300 fpm
Exhaust ductwork mains	0.15"	1500

f. Shaft Sizing = 10% for future reconfiguration and accessibility

g. Pipe Branch sizing = 3%. Minimum pipe size is ¾" for heating water systems.

10. Fenestration = 35% South, 15% North, 8% East, 8% West

11. Roof R-Value = 30 R

12. Wall R-Value = 19.0 R

13. Glazing U-Value = 0.29

14. Glazing SHGC = 0.33

15. Infiltration: Was assumed not to exceed 1.5 CFM per linear foot of exterior wall with glazing, and 1.0 CFM per linear foot of exterior wall without windows.

16. Occupancy is consistent with Kaiser Permanente MOB proof of concept.

HEATING AND COOLING LOAD CALCULATIONS

1. **Outdoor Air Needed for Air Quality:**

    a. The building was designed as an unlicensed (non-OSHPD) medical office building. Therefore the spaces housed within this facility fall outside the scope of ASHRAE 170 Ventilation of Healthcare Facilities - 2017. Using the ASHRAE 62.1 calculation methodology the peak outdoor airflow rate for the building is estimated at 8,800 CFM. (Approximately 0.16 CFM/sq.ft.)

    b. The design assumed an operational model where spaces are not coincidentally occupied. In the ventilation calculations the total (maximum) number of occupants in the building was based on Kaiser Permanente's MOB standard of 250sqft/person which equates to 216 people, including staff, visitors and patients. This represents an occupant diversity (D) of 0.32 for all spaces being fully occupied based on their intended use.

    c. The calculated level of outdoor air was designed to also achieve the LEED credit for "Enhanced Ventilation". LEED requirements for Enhanced Indoor Air Quality Credits are met as follows:

        i. Installation of entryway systems.

        ii. Exhausting spaces where hazardous gases or chemical are present in compliance with ASHRAE 62.1.

        iii. Providing MERV 13 filtration.

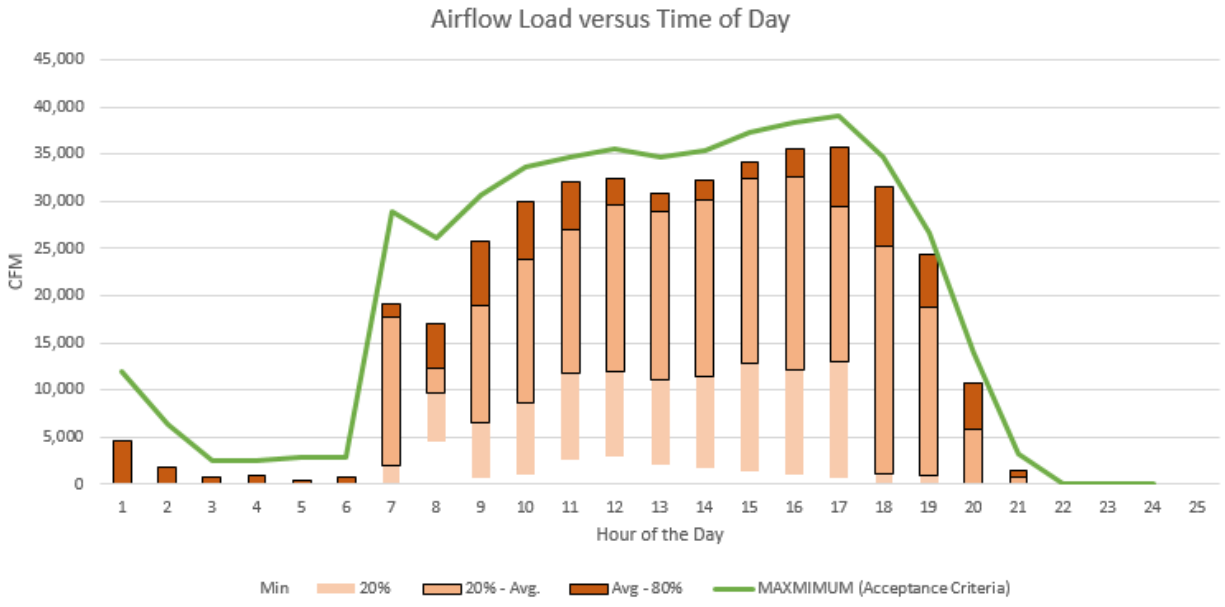
        iv. Providing CO2 monitoring within all densely occupied spaces.

2. **Air Capacity:** Peak Building Cooling CFM is estimated at 42,800 CFM (0.79 CFM/sq.ft.). This was determined using Trane Trace 700 (see Appendix G). This total includes approximately 1,300 CFM of airflow for data closets, electric rooms, medication rooms, etc, which operate on small independent split systems during unoccupied hours:

   a. **CFM Profile:**

Load Profile for Airflow

Maximum Hourly Airflow		39,022 CFM	0.72 CFM / sq.ft.
Zero Airflow Hours	2832 Hours	32% of Annual Hours	
5% Of Annual Hours, Airflow is		33,858 CFM or higher	0.63 CFM / sq.ft.
10% Of Annual Hours, Airflow is		32,025 CFM or higher	0.59 CFM / sq.ft.
20% Of Annual Hours, Airflow is		27,554 CFM or higher	0.51 CFM / sq.ft.
50% Of Annual Hours, Airflow is		6,511 CFM or higher	0.12 CFM / sq.ft.
60% Of Annual Hours, Airflow is		1,247 CFM or higher	0.02 CFM / sq.ft.
80% Of Annual Hours, Airflow is		- CFM or higher	0 CFM / sq.ft.



b. **Minimum CFM:**

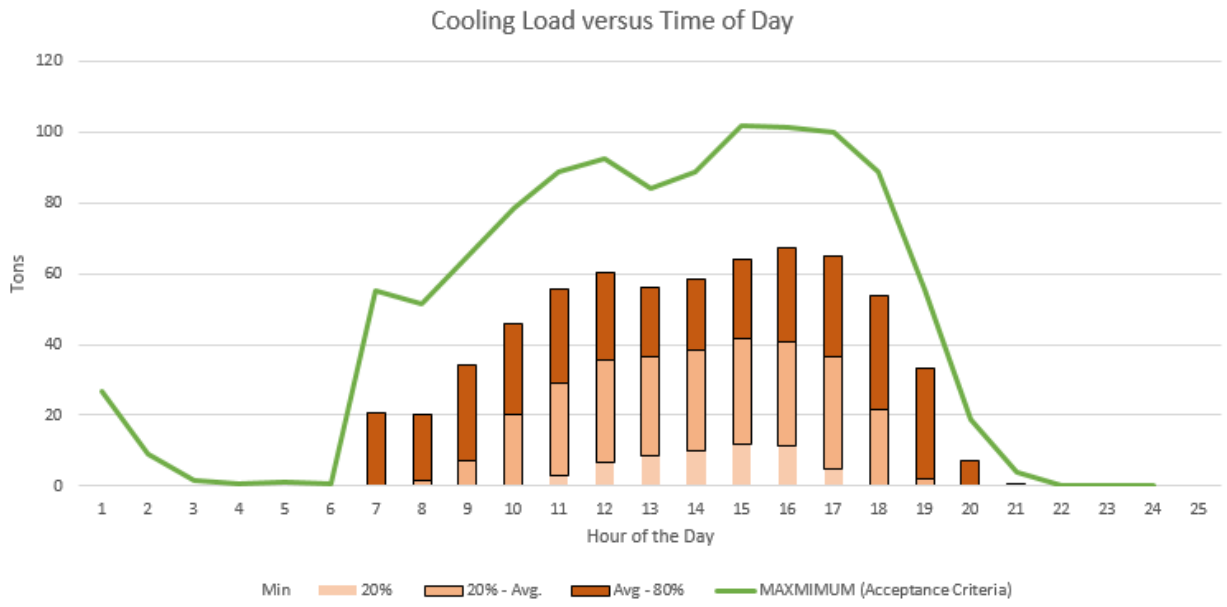
i. The minimum air to the building from the roof top units during occupied hours is estimated at 11,600 cfm, which is 27% of the peak. This will occur as the spaces go into unoccupied mode in the evening hours.

3. **Cooling Load:** The peak coincident cooling load is estimated at 114 Tons (474 sq.ft./ton). This was determined using Trane Trace 700. See Appendix G

a. Cooling Load Profile:

Load Profile for Cooling

Maximum Hourly Load		102 Tons	531.8 Sq. Ft./Ton
Zero Load Hours	4721 Hours	54% of Annual Hours	
5%	Of Annual Hours, Cooling load is	64	Tons or higher
10%	Of Annual Hours, Cooling load is	53	Tons or higher
20%	Of Annual Hours, Cooling load is	34	Tons or higher
50%	Of Annual Hours, Cooling load is	-	Tons or higher
60%	Of Annual Hours, Cooling load is	-	Tons or higher
80%	Of Annual Hours, Cooling load is	-	Tons or higher



b. **Minimum Cooling:**

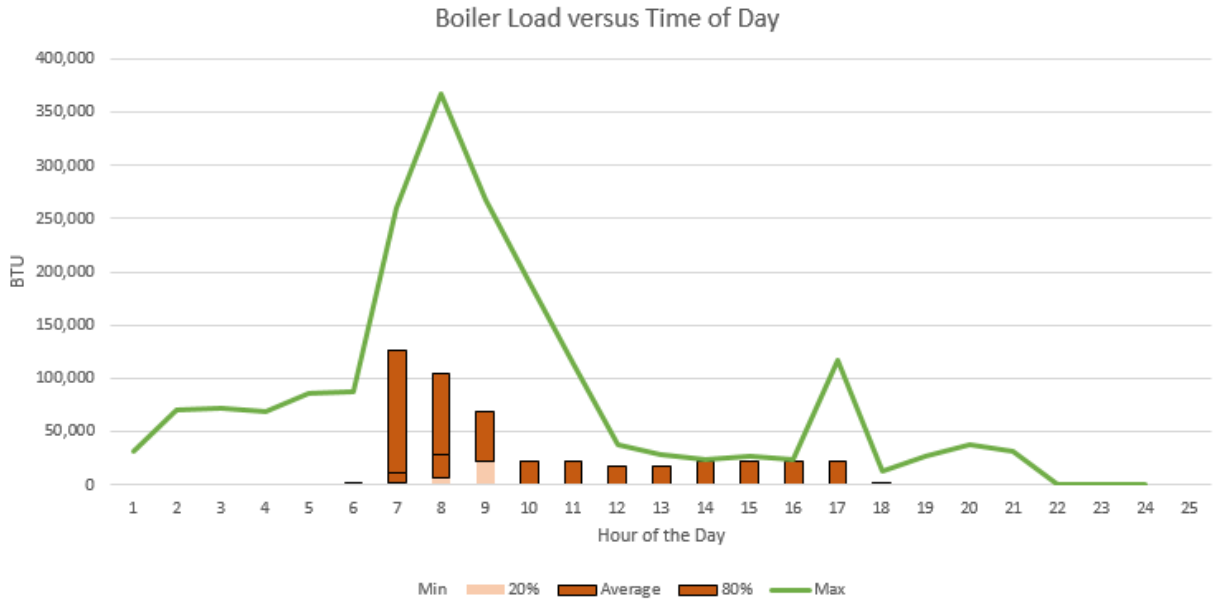
i. The minimum mechanical cooling to the building is expected to be zero, during economizer hours. This will occur whenever the outdoor air is below 57 degrees.

4. The heating load was estimated at 368 MBH (6.8 BTU/sq.ft.). This was determined using Trane Trace 700. See Appendix G

a. Heating Load Profile:

Load Profile for Boiler

Maximum Hourly Energy		367,660 BTU	6.8 BTU / sq.ft.
Zero Load Hours	4935 Hours	56% of Annual Hours	
5% Of Annual Hours, Boiler load is		53,561 BTU or higher	0.99 BTU / sq.ft.
10% Of Annual Hours, Boiler load is		22,520 BTU or higher	0.42 BTU / sq.ft.
20% Of Annual Hours, Boiler load is		22,520 BTU or higher	0.42 BTU / sq.ft.
50% Of Annual Hours, Boiler load is		- BTU or higher	0 BTU / sq.ft.
60% Of Annual Hours, Boiler load is		- BTU or higher	0 BTU / sq.ft.
80% Of Annual Hours, Boiler load is		- BTU or higher	0 BTU / sq.ft.



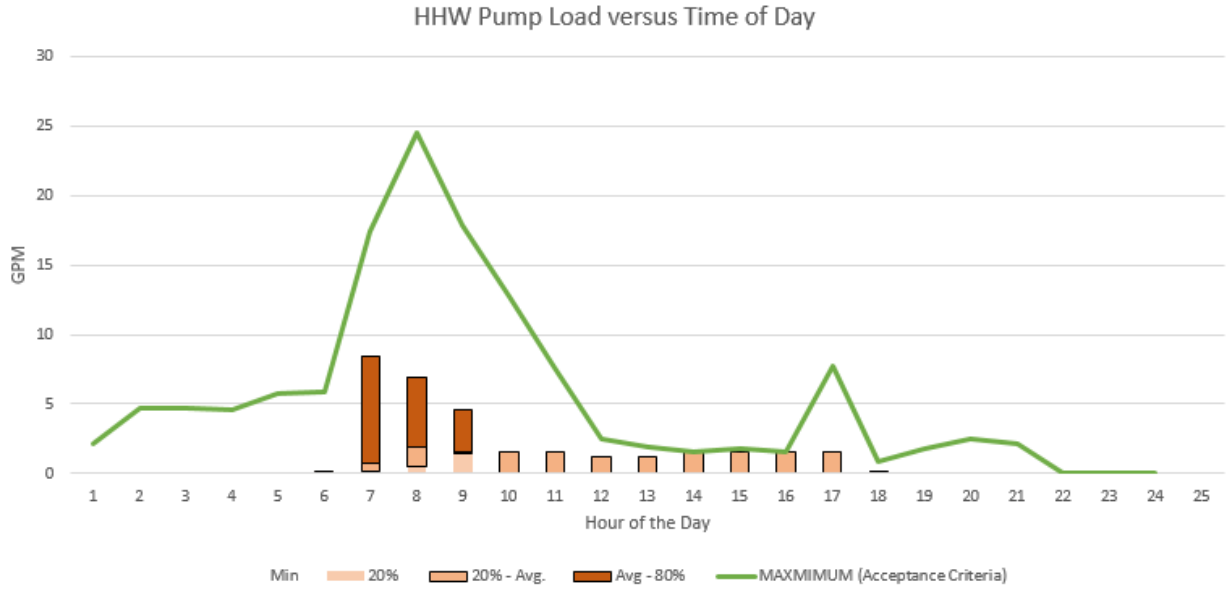
i. The minimum heat to the building, during occupied hours when the boiler fires, is expected to be at 56.4 MBH (1.04 BTU/sf), which is 15% of the peak.

5. **Heating Water Flow:** Peak heating load is estimated at 25 gpm (0.45 gpm/1,000 sq.ft.)

a. Heating Pump Load Profile:

Load Profile for HHW Pump

Maximum Hourly Energy		25 GPM	0.45 GPM / 1,000 sq.ft.
Zero Load Hours	4935 Hours	56% of Annual Hours	
5%	Of Annual Hours, HHW Pump load is	4	GPM or higher
10%	Of Annual Hours, HHW Pump load is	2	GPM or higher
20%	Of Annual Hours, HHW Pump load is	2	GPM or higher
50%	Of Annual Hours, HHW Pump load is	-	GPM or higher
60%	Of Annual Hours, HHW Pump load is	-	GPM or higher
80%	Of Annual Hours, HHW Pump load is	-	GPM or higher



BUILDING SYSTEMS

To achieve LEED Gold, systems were compared to a baseline system in ASHRAE 90.1 - 2010, Appendix G. The baseline system was a packaged roof top unit with fossil fuel - based heating and hot water terminal boxes. The energy comparisons use the Building Performance Rating Method of ASHRAE 90.1-2010, Appendix G. The analysis used a simple blended utility rate structure as follows:

a. $0.18 / kW-Hr for electricity.

b. $1.01 / therm for natural gas

Base Comparison: ASHRAE 90.1, Appendix G, Systems Package DX Rooftop Unit with hot water VAV boxes at code baseline efficiency.

Alternate 1: Packaged DX RTU with Heating water VAV boxes with design equipment efficiencies and operational characteristics described elsewhere in this narrative.

Heating and Hot Water System

The heating hot water system for the building was designed as a premanufactured boiler skid rated for outdoor use. All portions of the skid were finished with factory corrosion resistant paint designed to exceed a 2500 hour salt spray test.

The system was completely factory assembled, piped and wired. The six field connections were: city make-up water, natural gas, hot water supply, hot water return, controls connection via ethernet, and single point power connection with 480 volt, 3Ph power.

The boiler control system DDC controller is fully BACnet compatible with readout graphics available at the building automation system and over internet protocol for remote monitoring.

The Heating water system includes two outdoor rated 300 MBH input / 282 MBH output gas-fired condensing boilers, two primary pumps sized to match each boiler, two 30 GPM, 65' head secondary pumps, expansion tank, thermal buffer tank, controller, and chemical treatment options. Each boiler was sized for 76% of the 368 MBH load. The total plant capacity is 564 MBH, which is 153% of the load. In the case of failure of one boiler, the system can provide 76% of the peak load, which is sufficient to heat the building 95% of the year, but will not be capable of handling cold morning temperatures under normal operation.

The boilers are always expected to produce water at 140 degrees when they run, within +/-3 degrees.

The heating hot water system uses a charged tank as the source of heating water. The tank is charged to 140 degrees by the boiler, then allowed to fall to 120 degrees. The boilers cycle to charge the tank to full temperature. The design intent is to prevent

boilers from cycling more than twice per hour. The primary pumps are used when the boiler fires to charge the tank. Otherwise, they are off.

Boiler thermal efficiency is a minimum of 92%. Each pump is capable of full capacity. There is no redundancy in the VFDs. There are no bypasses in the VFDs. Pumping system is a variable primary pumping arrangement with 2-way modulating pressure independent control valves at all coils. Supply water temperature is 140 degrees F to maximize boiler efficiency and coils are sized for a 30 degree delta T to minimize pumping HP and piping size.

The minimum load expected for the system during occupied hours is 22,520 BTU. This will happen during summer months as the building begins to occupy, approximately 7:00 AM. The boiler can turn down to 56,400 Btu/Hr without cycling. The buffer tank is sized to allow 30 min cycle durations when at minimum load.

Hot Water Pumping System

A differential pressure transmitter between the heating water supply and return mains is used to vary the speed of the secondary pumps. The starting pressure setpoint is 15 psi. However, this setpoint adjusts by the system to the lowest setpoint possible while maintaining at least 1 valve 90% open. A modulating 2-way valve is provided on the ground level, connecting the supply and return mains to maintain a minimum flow rate in the piping system.

The maximum flow expected for the system is 25 gpm. This will occur during morning warm-up on cold mornings, when the overnight temperature is below 30F. The pumps will frequently run at min speed. The pump and the VFD can cycle down to 12Hz which will provide approximately 7 gpm of flow. A min bypass valve was installed to allow pumps to run in this condition without bein placed in a dead head condition.

Heating hot water system is provided with inhibitor chemicals for corrosion protection and a shot feeder system, which is typical for a closed loop system.

The basis of design hot water heating piping is insulated PEX tubing . Ball valves are used for 2-1/2" and smaller sizes and butterfly valves for 3" and larger sizes. Piping is

sized for a maximum pressure drop of 4' of water/100' of pipe. Copper and steel piping may have been considered as alternate materials to PEX. All joints shall be press fit or grooved.

All piping is insulated in accordance with the Energy Code requirements. All piping is labeled and valves are tagged with numbered brass tags that relate to a valve chart.

Heating pipe sizing is based on:

- Friction loss of 1.0 to 4.0 ft H2O per 100 feet of piping at peak flow in the branch.
- Maximum velocity of 4 fps for copper pipe, 6 fps for steel, 10 fps for PEX

Please reference Mechanical Appendix A for a heating hot water system diagram and Mechanical Appendix B for a basic boiler plant layout.

Reference Mechanical Appendix C for current Boiler selections.

Main Building Air Systems

The three-story Medical Office Building platform is provided with supply and return air generated from two off-the shelf, 60 ton, 25,000 CFM roof mounted packaged direct expansion cooled rooftop mounted air handling units. The main ductwork of both units are connected on the roof by ductwork. When one unit fails, the remaining unit continues to provide service.

1. Air Cooled Condenser
2. UV Lights at cooling coil
3. Cooling Coil. Provide Stainless steel casing and liner.
4. Supply Fan.
5. Fixed dry-bulb economizer section.

6. MERV 8 Prefilters, with MERV 13 min final filters with differential pressure gauges and ports for connection to BAS.
7. Minimum outdoor air controls.
8. Exhaust fan
    a. Single exhaust fan with VFDs.
9. Factory Roof curb with spring isolation.
10. Hot gas reheat on air handling units allows for proper humidity control through the use of condenser heat rejection into the air stream in lieu of relying solely on hot water reheat.
11. Factory controls with BACnet and Internet protocol interface.

Exhaust: Restrooms, janitor's rooms, and other exhausted spaces are served by a constant, single fan exhaust system. One is provided for the building, with ductwork run within the supply and return shaft.

Air handler components are sized for the following maximum velocities:

1. Economizer intake Louver = 400 fpm
2. Economizer relief Louver = 700 fpm
3. Cooling and Heating coils = 400 fpm
4. Filters = 400 fpm

A static pressure transmitter in the supply ductwork is used to vary the speed of the fans. The starting pressure setpoint is 1.0 in w.g. However, this setpoint adjusts by the system to the lowest setpoint possible while maintaining at least 1 zone 90% open.

The maximum flow expected at each main building air handling unit is 21,400 CFM. This will occur during hot afternoons, when outdoor temperatures are higher than 85 degrees. The minimum flow expected at each unit is 4,280 CFM. 4,280 is expected to be

a fan speed of 27% (16 Hz), which is allowed by the unit, fan, and the VFD. The unit and the VFD can cycle down to 20% speed (12Hz).

Ventilation (ASHRAE 62.1)

Trane trace 700 was used to complete the ASHRAE 62.1 ventilation calculations for the project. Refer to Appendix G for print outs of the Ventilation calculations.

Supply Air Temperature

Any time the outdoor air temperature is above 70F, the rooftop units provide supply air at 55 F, plus or minus 2F.

The design includes supply air reset, which, combined with the economizer, is intended to prevent compressors from running in cool weather. Any time outdoor air temperature is below 57F, mechanical cooling should be off, and the rooftop units should provide supply air at 57F, plus or minus 2F. The supply air reset sequence is part of the factory controls provided by the rooftop unit manufacturer.

However, the supply temperature reset is contingent on all zones being in control.

Economizer

Economizers provide the building with free cooling when outdoor air is cool. The compressors should not run any time the outdoor air is less than 57 degrees. The economizer sequence is part of the factory controls provided by the rooftop unit manufacturer. The economizer is fixed-dry bulb control type.

ACCEPTANCE CRITERIA: Rooftop package units shall maintain a supply temperature setpoint between 52 degrees and 65 to +/-2F, with 90% of daily 15 minute observations in the control range.

ACCEPTANCE CRITERIA: Rooftop package units shall maintain a supply static pressure setpoint between 0.5 in.w.g. and 1.3 in.w.g. +/- 0.2 in.w.g., with 90% of daily 15 minute observations in the control range.

ACCEPTANCE CRITERIA: During any hour when outdoor air is below 60 degrees, supply air temperature shall meet the supply temperature acceptance criteria with no compressor energy used. No compressor starts shall be observed.

Condensation from air handling units on roof is collected and utilized for either irrigation or gray water purposes.

Please reference mechanical Appendix D for the current air riser diagram for this building.

Zoning

Zones were selected by an algorithm, refer to Appendix E for the zoning plan that matches the energy model. For cost and controllability, KP standards target a range of 500 – 850 sq.ft. per zone in Medical Office Buildings. There are 109 total zones in this building, which is 496 sq.ft. per zone based on a total conditioned square footage of 54,100 square feet.

Zones terminal units and zone controllers are off-the shelf products, provided by manufacturers. See the "Controls" section below.

Please reference Mechanical Appendix F for current air handling unit selections.

Supplemental Cooling Units

The following spaces shall have supplemental cooling/heating units as described:

1. Telecommunications closets, electrical closets, elevator machine rooms, and medication preparation rooms with pharmacy refrigerators have split air conditioning units. The condensing units of these split units on the roof. These control the rooms to a design temperature of 74 degrees. These rooms are also backed up by VAV boxes, which open in the event of FCU failure once temperature has risen to 78 degrees for more than two hours.
2. Elevator machine rooms are exhausted 100% and kept in negative pressure condition.

Air Distribution Systems

All sheet metal ductwork serving the conditioned spaces is minimum 26 gauge galvanized sheet metal fabricated and installed in accordance with the current SMACNA Duct Construction Standards and Duct Cleanliness for New Construction Guidelines Level C, Advanced Level. All ducts were sealed to Class A Standards. The primary supply ductwork and risers were fabricated for 3" w.c positive pressure in the in the shafts, and 3" w.c. pressure class on the branch take-of to each floor and 2" w.c. from VAV boxes to grilles. The return ductwork is fabricated for 3" w.c. negative pressure class from shafts to the rooftop units & 2"w.c. negative pressure class on floors. Return ductwork will not be ducted within shafts. Exhaust ductwork is fabricated for 3" w.c. negative pressure class from fans through shafts, 2" w.c. negative pressure class on floor distribution. All concealed supply and outside air ductwork is insulated with foil faced duct wrap with vapor barrier.

The primary supply air risers are sized at a velocity between 1500 fpm and 2000 fpm with floor run- out duct velocities beginning at 2000 fpm and gradually decreasing to 1500 fpm at the further most terminal unit. At no point shall supply ductwork be sized more than 0.2"w.c. /100' upstream of terminal boxes. Return air duct to be sized at a velocity between 1000 fpm and 1500 fpm with floor run-out duct velocities from shafts beginning at 1000 fpm. Return air duct shall utilize plenum return systems for all systems. Provide motorized damper and Ebtron Gold air flow measuring device with control damper at each floor branch of the return air system. Damper shall modulate to maintain a predetermined offset of the sum of the supply VAV boxes on each floor. Return grilles shall all be provided with insulated sound boots, and each through wall return transfer is sized for 500 fpm and provided with a minimum of 2 elbows.

VAV Terminal units are double wall type with insulation within the walls. The units have hot water heating coils with automatic flow balancing devices or pressure independent control valves. Each terminal box will have a strainer upstream of the control valve. The majority of the units are of the single duct, VAV terminal type. Sound attenuators are provided for especially sound sensitive spaces.

Fire, Smoke, and combination fire/smoke dampers are provided at locations as required by code. Please see Mechanical Appendix D for vertical shaft requirements. Typical floor plan Zoning has been provided in Appendix E below. A typical plan as well as the first level plan have been included for reference.

Facility Controls System

DDC Control system for new Medical Office Building is BACnet Tridium Niagara based and provided with the following features:

1. Mechanical systems will be controlled and monitored through a DDC based Building Automation System (BAS) with distributed processing at the local level.
2. All data is mapped back to the Kaiser Permanente Corporate offices. Protocol is open infrastructure capable of BACnet interconnectivity.
3. Rooftop packaged units shall be off the shelf controllers. These controllers are responsible for fan speed control to a pressure reset, supply temperature control to a supply temperature setpoint, and economizer control.
4. Terminal Boxes will be off the shelf controllers from a pre-validated provider, using a dual-maximum VAV sequence. Electric actuation will be utilized for all valves and dampers. Setpoints shall be adjustable from the head end control system. There are three sequences:
    a. Single duct terminal unit, cooling-only
    b. Single-duct terminal unit, with hot water heating
    c. Single-duct terminal unit with hot water heating and demand control ventilation
5. Lighting occupancy sensors shall be collected at the zone level
6. The system is fully accessible from a tablet (android, iOS) or mobile phone.

7. Building Automation System (BAS) will integrate with the corporate KP infrastructure as requested and required by owner.

8. DDC controllers will utilize distributed architecture and will not rely on "front-end" or higher level controller to perform required control sequence.

9. Each DDC controller will have a minimum of 20% spare points of each type (DI, DO, AI and AO) at each panel. For universal points, the spares will be divided evenly between the analog and digital types of points.

10. All DDC system primary LAN controllers, PC's and communications equipment that monitor life safety and critical points (fre alarm, elevator emergency, etc.) will be supported by emergency generators and will have UPS for minimum of 4 hrs.

11. System will monitor temperature, humidity, supply and exhaust air quantities.

12. Airflow tracking control using DDC will be utilized instead of space pressure control, to maintain the space pressure (positive, neutral or negative) as required by the programming.

13. All actuators are to be electric or electronic.

14. BAS shall monitor all Generators, ATS, etc.

15. BAS shall monitor all domestic water heaters, softeners, etc.

16. BAS shall monitor all critical refrigerators as determined by owner.

17. Energy Conservation Measures:

    a. The following energy conservation measures will be incorporated into the HVAC design:

    b. Supply air temperature reset to minimize compressor run time and reheat

    c. Static pressure reset of air handling systems.

    d. Static pressure reset of hot water pumping system.

e. Integration of occupancy control for lighting, receptacles, and HVAC to setback temperature and allow airflow in unoccupied, non-pressure sensitive spaces, to go to zero flow.

f. Full economizer control on air handling units to reduce energy consumption.

g. High efficiency condensing boiler system with outdoor hot water temperature reset to reduce gas usage.

h. Night setback on air handling systems to allow systems to be disabled in the unoccupied hours.

Acoustics:

Noise Criteria

The design targets the following average noise levels. The average noise levels are based on measurements taken three feet in front of any equipment, and do not include noise from equipment or personnel located within these spaces.

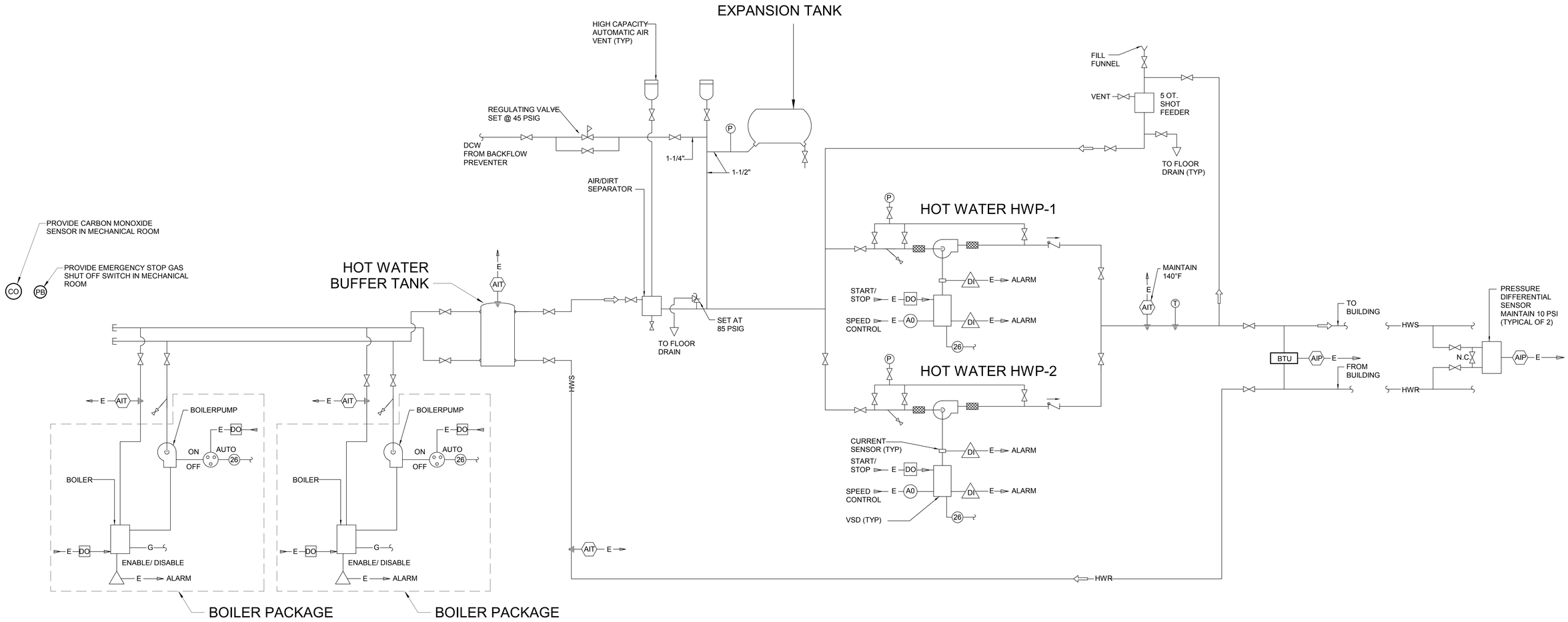
Space Type	NC Ratings	Max Supply Air Outlet Velocity (fpm)	Max Return Air Inlet Velocity (fpm)	Max Air Velocity Main Duct (fpm)	Max Air Velocity Branch Duct (fpm)
Private Office	35	500	600	1400	1000
Open Plan Office	40	550	675	1600	1200

Corridors	45	625	750	1500	1400
Conference	30	425	500	1200	900
Learning	30	425	500	1200	900
Lobby	40	550	675	1600	1200
Restrooms	45	625	750	1500	1400
Exam Rooms	35	500	600	1500	1000

Refer to the Acoustics Basis of design report authored by Veneklasen Associates. The major vibration and sound isolation strategies include

1. Velocity criteria in ducts and pipes. Ductwork shall meet the design criteria listed elsewhere in this narrative. Certain spaces such as private office and conference rooms shall have ductwork sized below 400 fpm.
2. Spring mounting of the HVAC rooftop units, fans, and pumps
3. Neoprene isolators for boilers

Appendix A: Heating Hot Water System Diagram



KAISER COVINA MOB

HOT WATER SCHEMATIC

0 2' 8' 16'

06/19/19

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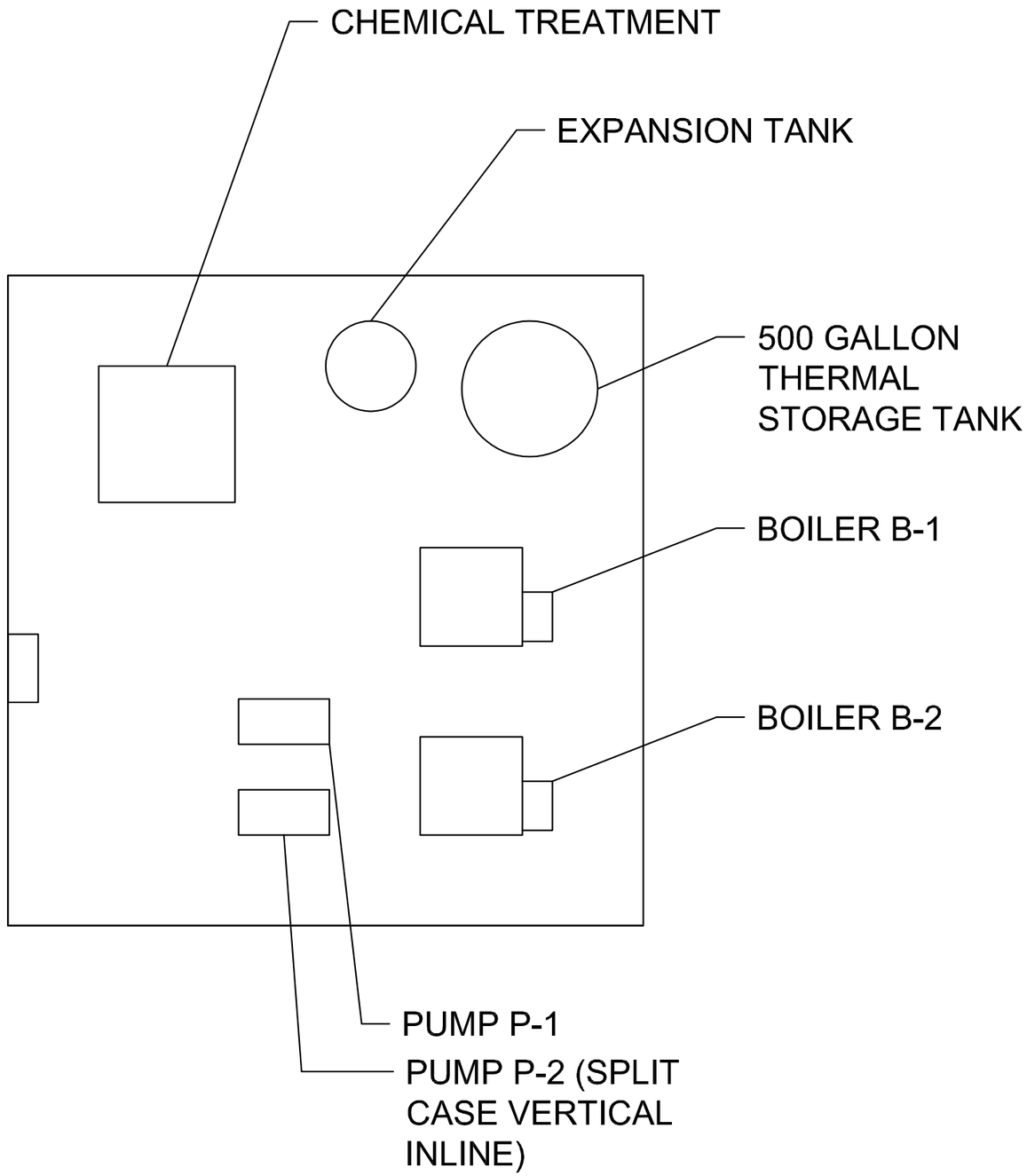
Appendix B: Boiler Plant Layout



KAISER PERMANENTE

KAISER COVINA MOB

CANNONDESIGN

0 2' 8' 16'

HOT WATER SKID PLAN

06/19/19

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Appendix C: Boiler Selection Cut Sheets

XFYRE® HIGHER PERFORMANCE

STAINLESS STEEL
DESIGN

SMARTER
CONTROLS

MAXIMUM
EFFICIENCY

Raypak®
A Rheem® Company

Maximum Efficiency and Performance

Key Features

- 5 models from 300 to 850 MBTUH
- 94% thermal efficiency hydronic AHRI; 95% water heaters CSA
- Equipped with 316L welded stainless steel heat exchanger and copper plumbing. ASME Section IV constructed and stamped. National Board registered.
- All models CSA indoor/outdoor construction
- Small footprint, less than 9-1/2 square feet
- Top water connections - allows side by side installation
- Multiple pump outputs - Boiler, System, and Indirect
- Dual flame sensing - Remote flame sensor and spark ignition rod
- Modulating gas valve and burner, up to 5:1 turndown
- On-board diagnostic center, with easy to understand messaging
- 0-10 VDC BMS Interface (setpoint or direct drive)
- Modbus BMS port
- Built-in cascade function
- Built-in outdoor reset functionality
- Complete cabinet protects all controls and wiring
- Tough rust-resistant powder coat finish
- Easy to service - air filter
- PVC, CPVC, Centrotherm™ Polypropylene or Stainless Venting Certified[1]
- Suitable for altitudes up to 10,000 ft. (derate may apply)
- Meets all current Low NOx regulations, less than 20ppm

Options

- Outdoor air sensor (B-32)
- Indirect tank sensor (B-65)
- TruSeal® direct vent kit (D-21 factory installed, D-22 Loose)
- Condensate treatment kit (Z-12)

Built for easy installation and service

The Raypak XFyre offers state of the art features in one complete boiler package. XFyre is outdoor certified and utilizes cabinet and control protection technology already proven in thousands or installed Raypak products.

Mechanical engineers, architects and building owners now have extreme installation flexibility, high efficiency, space saving footprint, zero side clearance, direct vent capability, inexpensive PVC or polypropylene venting, and full service access.

Installers enjoy ease-of-commissioning, reliability, serviceability and long-term performance. XFyre's vertical water connections allow the units to be installed side by side, further reducing the footprint on multi-boiler installations. Our compact design makes it possible to install up to 3.4 million BTUH in under 67 ft² of floor space, plus front and rear clearance.

A combustion system built on over 70 years of experience

The XFyre is cutting edge technology with atmospheric simplicity. XFyre will precisely track the heating load with its built-in VERSA IC platform, eliminating costly overshooting. The optimum fuel-air ratio is maintained throughout the entire range of the load-tracking operation. Our 5:1 turndown ensures efficiency is maintained throughout the firing rate and actually increases during part load, right when you want it! The XFyre automatically self-tunes to accommodate the widest range of gas supply pressures. The high quality integrated blower-gas valve is self-correcting and allows smooth operation with fluctuating gas supply pressures.

High efficiency and vent flexibility

When the job requires high efficiency, XFyre meets your needs. Category IV - AHRI-certified 94% efficiency at full fire for hydronic boilers and CSA-certified 95% for domestic water heaters.

Combined vent and combustion air duct length of up to 200 equivalent feet.

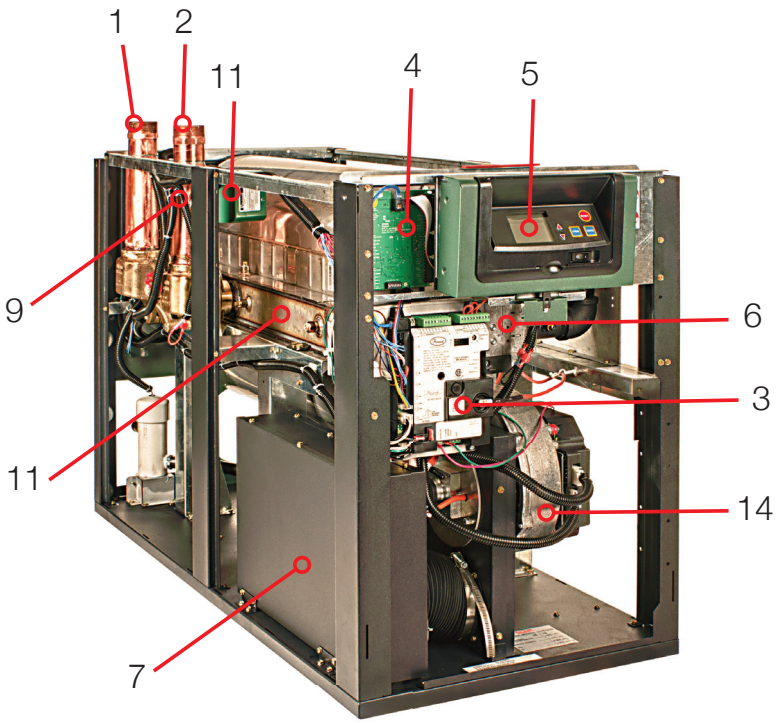
Models H7-300A thru 500A and WH7-300A thru 850A are certified to use PVC, CPVC, polypropylene or stainless steel for your project, depending on the return water temperature[2]. Models H7-700A and H7-850A require water temperatures below 130ºF for PVC venting.

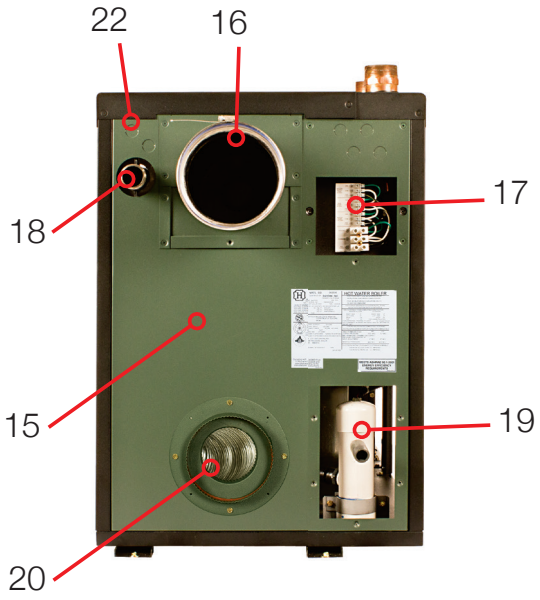
Note 1: PVC venting on Models H7-700A and H7-850A is acceptable with system temperatures below 130°F only. See I & O Manual Cat. 1000.65

Note 2: Max 170ºF return water & Max 180ºF setpoint at 9.0% CO2.

Purpose built for the contractor and service professional.

Completely serviceable from the front, top and rear!





1. Water Inlet – male NPT
As low as 50°F entering. All copper and brass factory installed vertical plumbing connections.

2. Water Outlet – male NPT
All copper and brass factory installed vertical plumbing connections.

3. Direct Spark Ignition
Dual electrode igniter to start the combustion cycle. After ignition, the spark rod also acts as a second flame sensor.

4. VERSA IC
Combined temperature, safety, and ignition control device.

5. Control Interface
Large easy to read (3.5") LCD display.

6. Air Fuel Ratio Gas Valve
Precision manufactured, main gas valve working in unison with the combustion air blower. Smooth and quiet light-offs while delivering a 5:1 turn down.

7. Intake Air Filter
Standard front access, easy to service, Merv 8 media, combustion air filter.

8. Manual Reset High Limit
Fully integrated into the VERSA IC.

9. Vent Switch
Senses possible obstructions in the flue vent pipe. (Not Shown)

10. Flow Switch
Flow switch mounted inside the cabinet to protect it during shipping and in the boiler room.

11. "Duo" Style Heat Exchanger
Combined 316L stainless steel dual chamber condensing and non condensing heat exchanger. Weld-sealed technology eliminates gaskets and o-rings. Special glycol seals are not required for hydronic applications. ASME Section IV constructed and stamped. National Board registered.

12. Flame Sense Electrode
After a call for heat, separate flame electrode monitors flame rectification. This helps to ensure proper carry over while also constantly monitoring the flame. (Not Shown)

13. Internal TruSeal Connection
Allows the XFyre to be direct vented up to 200 combined equivalent feet (vent and air intake) in a horizontal or vertical vent system. (Not Shown)

14. Smart Blower Technology
All metal, technologically advanced combustion blower. Air and fuel are precisely mixed.

15. Weather-Proof Jacket
Heavy gauge galvanized steel with a UV-resistant Polytuf powder coat finish is impervious to weather and corrosion.

16. Flue Outlet
Category IV. Most models certified for PVC*, CPVC, polypropylene and stainless steel. XFyres ship PVC-readyon models H7-300A through H7-500A and all WH models. (*PVC vent requires max 170°F return water & max 180°F setpoint at 9.0%CO_2)

17. High Voltage Wiring Box
120VAC main incoming power connections. Boiler pump, system pump, and indirect DHW pump wiring.

18. Gas Inlet

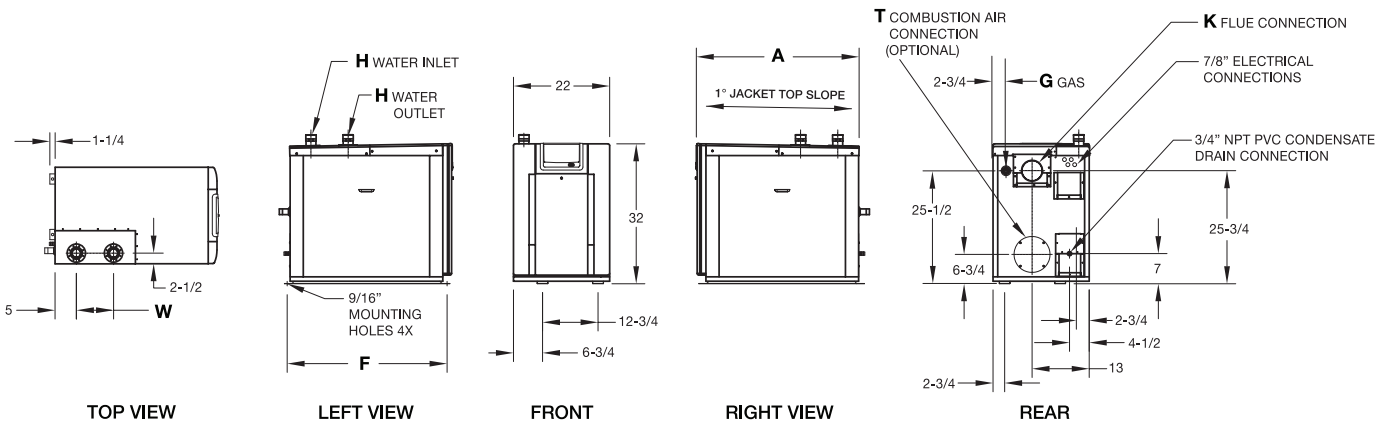
19. Condensate Drain and Trap
3/4"-NPT PVC connection for condensate removal. Built in condensate trap, overfill sensor and pressure switch for the flue accessible through an access panel. Optional condensate treatment kits (option Z-12) available.

20. Direct Vent Capability
Optional combustion air adapter for direct vent. For factory installation, order (option D-21) TruSeal at time of order.

21. Easy Access Rating Plate Location

22. Low Voltage Knockouts
Separate conduit location for all sensor, communication, and low-voltage wiring.

Higher Performance



PHYSICAL DATA

Model	Dimensions (in.)							Ship Weight (lbs.)	Foot-Print (ft^2)	Amps*
	A Length	F Mounting	G NPT	H NPT	K Flue Ø	T C/A Ø	W			
300A	28 - 1/4	27-9/16	3/4	1 - 1/2	4	4	8 - 1/2	410	4.3	3
400A	30 - 3/4	32-5/16	1	2	4	4	7	465	4.7	4
500A	37 - 1/4	39-9/16	1	2	4	4	8 - 1/2	505	5.7	4
700A	47 - 3/4	49-5/16	1 - 1/4	2	6	6	10 - 5/8	550	7.3	5
850A	54 - 1/4	53-9/16	1 - 1/4	2	6	6	10 - 5/8	580	8.3	5

For installations at elevations above 2,000 feet, derate may apply, please consult the factory for additional instructions. No mechanical changes required up to 10,000 feet.

*Current Draw is for heater only. (Supply breaker must have delayed trip.)

MBTUH

Model	MBTUH Input	Boiler (AHRI Certified)		MBTUH Input	Water Heaters (CSA Certified)		MBTUH Minimum Input
		Output	Efficiency		Output	Efficiency	
300A	300	282	94%	300	285	95%	60
400A	399	375	94%	399	379	95%	80
500A	500	470	94%	500	475	95%	100
700A	700	658	94%	700	665	95%	140
850A	850	799	94%	850	808	95%	170

CLEARANCES

Heater Side	Certified Minimum	Service Minimum
Front	24”	24”
Rear	24”	24”
Right	0”	0”
Left	0”	0”
Top	12”	24”
Floor*	0”	---
Vent	1”	---

*Do not install on carpeting
Note: Local codes may require increased clearances

Model	Standard Pump Models			
	H		WH	
	HP	Amps	HP	Amps
300A	1/8hp	1.3	1/4hp	5.7
400A	1/8hp	1.3	1/2hp	6.9
500A	1/4hp	5.7	1/2hp	6.9
700A	1/2hp	6.9	1hp	14.0
850A	1/2hp	6.9	1hp	14.0

Note: Current draw is for pump only

Max 75 equivalent feet

Water hardness above 15 gpg requires water softener.

Hydronic Boiler

TYPE H

Model	Rates Of Flow And Pressure Drops											
	20°F		30°F		35°F		Minimum Flow*			Maximum Flow		
	GPM	ΔP	GPM	ΔP†	GPM	ΔP†	GPM	ΔP†	ΔT	GPM	ΔP†	ΔT
300A	28	17	19	8	16	6	14	5	39	36	28	16
400A	38	18	25	7	21	5	19	4	39	47	29	16
500A	47	16	31	7	27	5	24	4	39	56	23	17
700A	66	30	44	13	38	9	34	7	39	70	34	19
850A*	80	40*	53	17	46	12	41	10	39	80	40	20

*Closed systems only. †See submittal note **.

Water Heater

TYPE WH

Model	Water Hardness					Flow Rates						Do not use when hardness exceeds 15 grains per gallon
	3-15 Grains Per Gallon					Minimum Flow			Maximum Flow			
	ΔT	GPM	ΔP	MTS	SHL	GPM	ΔP	ΔT	GPM	ΔP	ΔT	
300A	24	24	12	1.5	17	20	9	29	36	28	16	
400A	20	38	18	2	20	26	8	29	47	29	16	
500A	20	48	16	2	19	33	8	29	56	23	17	
700A	20	67	30	2	36	46	14	29	70	34	19	
850A	23	70	30	2	36	56	19	29	80	40	20	

ΔT = Temperature rise, °F
ΔP = Pressure drop through heat exchanger, ft
MTS = Minimum Tube Size, inch.
SHL = System Head Loss, ft (based on max 75 equivalent ft. of piping).

TYPE WH

Model	Recovery Rates (GPH)								
	Temperature Rise (°F)								
	20	30	40	50	60	70	80	90	100
300A	1728	1151	863	691	576	494	432	384	345
400A	2297	1532	1149	919	765	656	575	511	459
500A	2879	1919	1440	1151	959	823	720	640	576
700A	4031	2687	2015	1612	1344	1151	1008	896	806
850A	4894	3262	2446	1958	1632	1398	1224	1087	978

Smarter Controls

Raypak's VERSA IC combines modulating temperature control, safety limits, and ignition programming into one user-friendly integrated control platform. With self-learning features that prevent equipment damage, this automated controller is easy to set-up, understand, and use making it as close to plug and play as possible.

Large easy to read 3.5" LCD display. Continuously monitored flame strength (μA), sensor temps, BMS signal (0-10V) setpoints, DeltaT, all safety signals, full diagnostics and fault history for last 15 events. Simple touch pad settings. Everything you need from set-up to service is at your fingertips, all in one location.

Easy front access to all field wiring including outdoor sensor, DHW sensor, system alarm, Modbus BMS port (standard), and 0-10V DC input connections. Inlet and outlet sensors factory-installed in boiler. Remote sensor for system included. Can drive and monitor external motorized auxiliaries such as extractors and louvers. Factory-equipped with cascade control capability.

Diagnostic Information

Safety Faults
- Sensor Failures
- Condensate Full
- Vent Temp Limit
- Low Water Level
- Low Water Flow
- High Temperature Limit
- Low Gas
- High Gas
- ΔT Error
- Blower Failure
- Blower Speed
- Low 24v Power
- History to 15 Faults

Ignition Control Faults
- Ignition Failure
- False Flame Sense

XFyre NINETY PLUS

			Water Heaters (Type WH)	Boilers (Type H)
HEAT EXCHANGER	ASME Section IV, National Board Registered, 160 PSI	• H Stamp	●	●
	Heat Exchanger Tubes	• 316L Stainless Steel	●	●
	Stainless Steel	• CSA Certified CA AB-1953 low lead	●	●
	Pressure Relief Valve (loose)	• 60 PSI	○	●
		• 125 PSI	●	○
		• 30, 45, 75, 150 PSI	○	○
	Temperature & Pressure Gauge (Loose)		●	●
	Pump	• 120V, Single-Phase	○	○
JACKET	Indoor/Outdoor Certified		●	●
	Vent Terminal	• Outdoor	○	○
		• Through-the-Wall	○	○
	Combustible Floor Rated		●	●
	Fully-Enclosed Controls		●	●
OPERATING CONTROLS	120V Power Supply		●	●
	On/Off Switch		●	●
	Programmable Pump Time Delay, Single-Phase	• Included in Controller	●	●
	Terminal Block Connections (Front mounted)	• Enable / Disable	●	●
		• 0-10 VDC Setpoint/Direct Drive Input	●	●
	LCD diagnostic display with 15-Event History		●	●
	VERSA IC	• (up to 5:1 Turndown)	●	●
		• Outdoor Reset Sensor (B-32)	N/A	○
		• DHW Indirect Sensor	N/A	●
	External Multiple Boiler Controller	• TempTracker Mod+ Hybrid (up to 5:1 Turndown)	○	○
SAFETIES	Direct Spark Ignition System	• 1-try (C-6)	○	○
		• 3-try	●	●
	High/Low Gas Pressure Switches		○	○
	Blocked Vent Switch		●	●
	High Limit Switch	• Manual Reset, Fixed	●	●
		• Automatic Reset, Fixed	○	○
		• Adjustable	○	○
	Low Water Cut-Off, 24V	• With Manual Reset and Test Buttons (F-10)	○	○
	Flow Switch		●	●
GAS TRAIN	Combination Gas Valve		●	●
	Modulating Air Blower		●	●
	Additional Safety Valve	• Motorized (externally mounted) (M-1)	○	○
		• Solenoid (externally mounted) (M-10)	○	○
OTHER	AHRI-Certified (H)	• 94% at Full Fire	N/A	●
	CSA-Certified Efficiency (WH)	• 95% at Full Fire	●	N/A
		• 99% at Part Load	●	●
	Air Filter		●	●
	TruSeal Direct-Vent (D-21 or D-22)		○	○
	Alarm Contacts		●	●
	CSD-1 / GE GAP Control System (G-1)		○	○
	Low NOx	• Meets all current requirements	●	●
	Condensate Drain and Trap		●	●
	Condensate Treatment Kit (Z-12)		○	○

● = Standard ○ = Optional

www.raypak.com
2151 Eastman Avenue | Oxnard, CA 93030 | 805-278-5300

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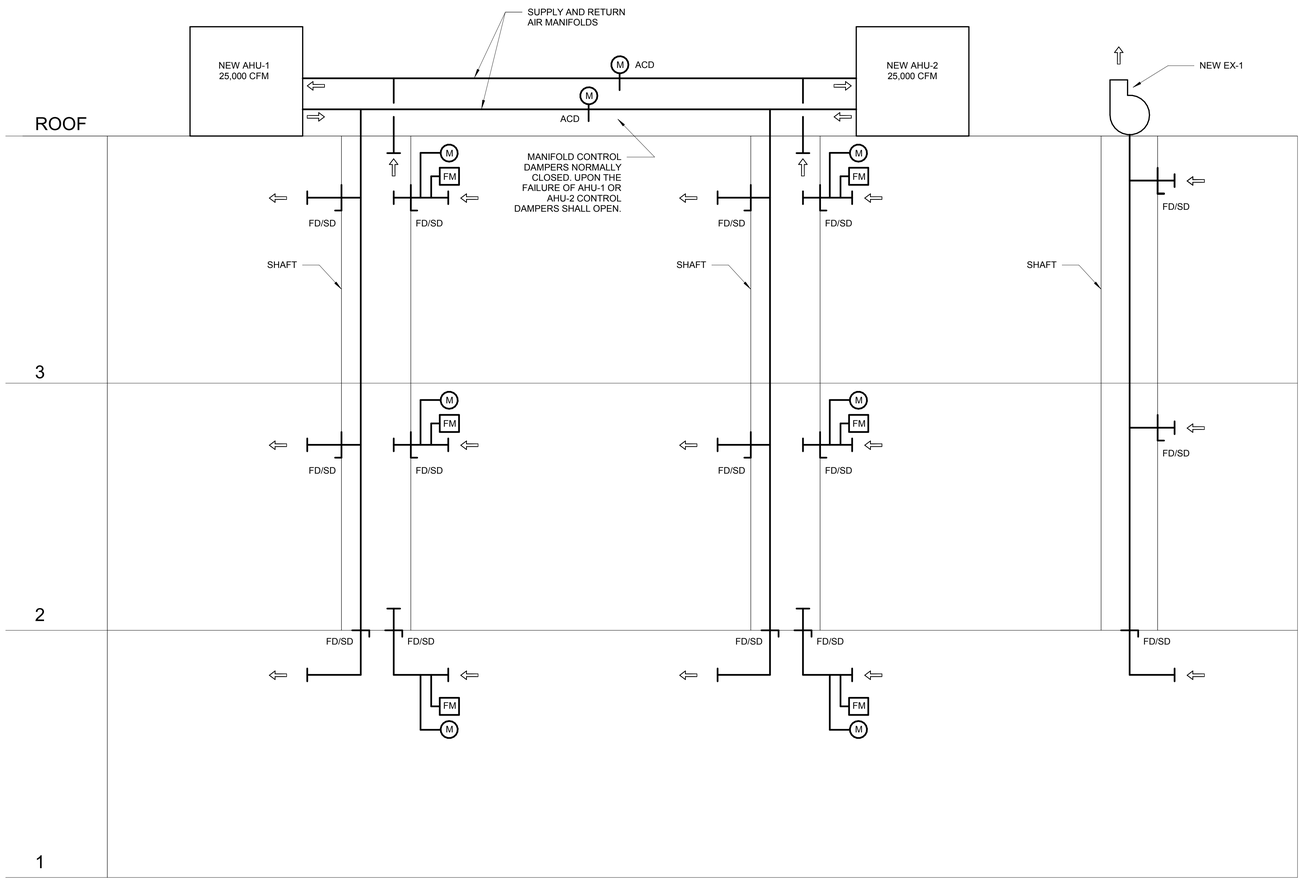
Appendix D: Air Riser Diagram



KAISER PERMANENTE®

KAISER COVINA MOB

CANNONDESIGN

0 2' 8' 16'

AIR RISER DIAGRAM

06/19/19

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Appendix E: Zoning Diagram

Appendix F: Air Handling Unit Selections

Weather Series
Single-Packaged Rooftop Units
20 - 100 Ton

Selection Guide

	Unit Size – Tons												
	20	25	27	30	35	40	50	55	60	70	75	90	100
WeatherMaker A-Series	✓	✓	✓	✓	✓	✓	✓		✓				
WeatherMaster P-Series				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Benefits at a Glance
For Building Owners and Managers

- Easy system monitoring
- Reduced operating expense
- Advanced IAQ solutions
- Supports LEED® certification
- Delivers greater occupant comfort

For Consulting Engineers

- ASHRAE 90.1 compliant
- Advanced IAQ solutions
- HFC refrigerant
- Simple to specify
- System-integrated controls

For Contractors

- Streamlined installation
- Easy to service
- Extensive factory-installed options
- Ideal for replacement
- 100 Percent run-tested units

Factory-Installed Options

- Digital Compressor
- Hot Gas Bypass
- SCR Electric Heat
- Hydronic Heat
- CO_2 Sensor
- Return Fan
- Adaptive Dehumidification
- Modulating Gas Heat
- UV-C Germicidal Lamps
- Non-Fused Disconnect
- BACnet® Communication
- High Efficiency Filtration
- 115V Convenience Outlet
- Stainless Steel Drain Pan
- Modulating Power Exhaust
- Low Outdoor Sound
- Low Ambient Control
- Double Wall Construction
- Smoke Detector
- Enthalpy Control Economizer
- Dry Bulb Control Economizer
- Stainless Steel Heat Exchanger
- *Enviro-Shield*™ Coil Protection

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LEED® is a registered trademark of the U.S. Green Building Council

The Future of the World Depends on Our Ability... to Sustain it.

As the world's leader in high technology heating, air-conditioning and refrigeration solutions, we believe that market leadership requires environmental leadership. Carrier sets industry standards for environmentally sound business practices and a commitment to sustainability across its products, services and operations. We demonstrate this commitment by creating environmentally responsible solutions that consume less energy and incorporate innovations that improve the world — indoors and out.

A Legacy of Training

Willis H. Carrier began training members of the heating, ventilation, air conditioning and refrigeration industry in 1905. Carrier continues to promote technical expertise in the industry with the expansion of its sustainable solutions curriculum and has recently been named a U.S. Green Building Council Education Provider (USGBC EP).

To earn this status, Carrier's course materials were reviewed by a panel of USBGC peers and deemed to provide the high level of quality required for training Leadership in Energy and Environmental Design (LEED) professionals. The courses and workshops supporting LEED-Accredited Professional and Green Associates credential maintenance are administered through Carrier University.

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Weather Series
Single-Packaged Rooftop Units
Factory-Packaged VAV Solution

WeatherMaster®

WeatherMaker®

Weather Series single-packaged rooftop units by Carrier provide solutions for every comfort-conditioning requirement. The Weather Series rooftop units in 20 ton and larger capacities are designed for optimal performance with Puron® refrigerant.

WeatherMaster® units provide high-energy efficiency to meet or exceed the latest ASHRAE 90.1 requirements and offer a wide range of feature choices to meet unique application and comfort requirements.

WeatherMaker® products provide competitively priced cooling and heating that meets the latest ASHRAE 90.1 energy efficiency requirements.

Weather Series rooftop units offer a wide range of options for either factory or field installation. With leading energy efficiency levels, backward replacement capability, and a host of available options, the Weather Series units are ideal for replacement applications and new construction projects.

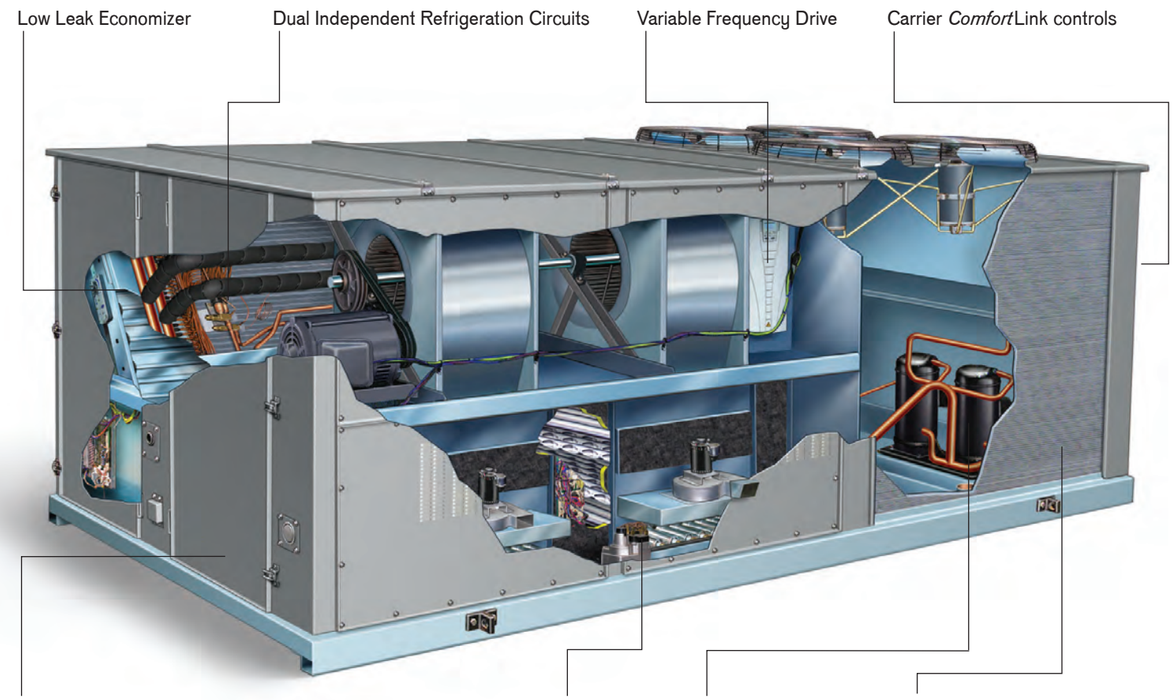
Flexibility
Units are provided with dedicated vertical or horizontal supply/return configurations to allow easy utilization on replacement jobs or new construction applications. The rooftop units may be configured to precisely match the building requirements through the use of factory-installed options such as: integrated economizer, power exhaust, Humidi-MiZer® adaptive dehumidification system, premium efficiency indoor fan motors and coil protection options.

Efficiency
Weather Series rooftop units save money in operating costs through a variety of means. These units utilize Novation® heat exchanger technology for improved operating efficiency. The staging of Weather Series units equipped with scroll compressors allows the capacity of the unit to be precisely matched to the cooling/heating requirements of the building. Variable-frequency drive (VFD)-controlled high-efficiency indoor fan motors conserve energy while providing the airflow requirements for superior temperature control. These energy efficiency features insure that you maximize the value of your energy expenditures.

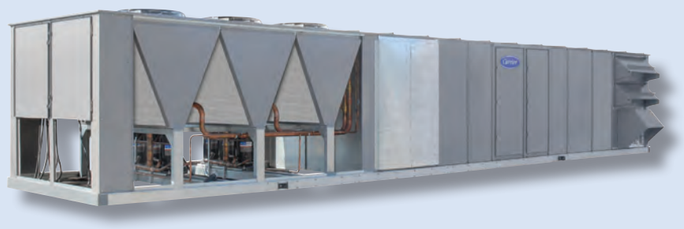
Indoor Air Quality
Weather Series rooftop unit's indoor air quality options include: double wall construction with Agion® coating, economizer control via outdoor air temperature, enthalpy, or CO_2, sloped condensate drain pans available in stainless steel, gear-driven economizers capable of handling 100 percent outdoor air, demand control ventilation (DCV), and high-efficiency filtration systems.

Serviceability
Weather Series large rooftop units are designed with low life cycle costs in mind. A key component of life cycle cost is installation and service. Carrier rooftop units excel in this area by providing: single point electrical connections — making electrical service access available through the roof curb or the side of the unit — large-sized hinged access panels and built-in diagnostic routines.

WeatherMaker® 48/50A



WeatherMaker A-Series
20 – 60 ton, CV or VAV
Ideal for replacement application
Carrier *Comfort*Link controls



WeatherMaster P-Series
30 – 100 ton, CV or VAV
Wide range of options
Applied System in a box
Carrier *Comfort*Link controls

The Right Level of Control

Carrier *Comfort*Link controls are your link to a world of simple and easy-to-use rooftop units that offer outstanding performance and value. The Weather Series rooftop units are uniquely designed in that the controls will support both constant volume (CV) and variable air volume (VAV) applications.

Carrier *Comfort*Link controls maintain control over the unit's major systems including the compressor, condenser fans, supply fan, economizer and power exhaust. Based on input from a space temperature sensor or a simple thermostat, the control optimizes the performance of the multiple refrigeration circuits to maintain occupant comfort as conditions change.

Carrier *Comfort*Link controls make it easy to monitor and control each Weather Series rooftop unit. The large scrolling marquee and optional navigator display act as windows into the unit's operation. These features simplify unit start-up and provide the maintenance technician with all of the unit's operational and performance data. In addition, Weather Series rooftop units with Carrier *Comfort*Link controls are also configured for use with the Carrier Comfort Network® (CCN) controls system or other communication protocols. This on-board communication capability can provide remote control as well as monitoring, data collection and alarms.

For all your comfort needs, Carrier has the right level of control.

Appendix G: Load Calculations

System Checksums

By CannonDesign

System - 002 - EAST — **Variable Volume Reheat (30% Min Flow Default)**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 8 / 16
Outside Air: OADB/WB/HR: 93 / 68 / 66

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	25,998	25,998	5
Glass Solar	87,585	0	87,585	16
Glass/Door Cond	13,773	0	13,773	3
Wall Cond	7,218	6,213	13,431	2
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	108,575	32,211	140,787	26
Internal Loads				
Lights	47,359	11,840	59,199	11
People	129,572	0	129,572	24
Misc	54,551	0	54,551	10
Sub Total ==>	231,482	11,840	243,322	44
Ceiling Load	12,920	-12,920	0	0
Ventilation Load	0	0	101,095	18
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	5,936		5,936	1
Exhaust Heat		-12,186	-12,186	-2
Sup. Fan Heat			47,794	9
Ret. Fan Heat		23,691	23,691	4
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	358,913	42,637	550,439	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 89

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	103,182	33
Glass/Door Cond	11,320	4
Wall Cond	7,737	2
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	122,240	39
Internal Loads		
Lights	47,359	15
People	72,307	23
Misc	54,551	17
Sub Total ==>	174,218	55
Ceiling Load	12,817	4
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	5,940	2
Grand Total ==>	315,214	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 39

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-9,447	2.31
Glass Solar	0	0	0.00
Glass/Door Cond	-21,497	-21,497	5.25
Wall Cond	-4,966	-9,183	2.24
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	0	0	0.00
Sub Total ==>	-26,462	-40,126	9.80
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-5,846	0	0.00
Ventilation Load	0	-150,665	36.79
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-126,016	-126,016	30.77
Exhaust Heat		3,271	-0.80
OA Preheat Diff.		-15,579	3.80
RA Preheat Diff.		-80,369	19.63
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-158,324	-409,484	100.00

TEMPERATURES

	Cooling	Heating
SADB	59.0	84.0
Ra Plenum	75.5	69.3
Return	76.6	69.3
Ret/OA	80.3	56.3
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	21,072	10,320
Terminal	21,072	10,320
Main Fan	21,072	10,320
Sec Fan	0	0
Nom Vent	4,435	4,435
AHU Vent	4,435	4,435
Infil	0	0
MinStop/Rh	10,470	10,320
Return	20,898	10,203
Exhaust	4,261	4,318
Rm Exh	174	118
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	21.0	43.0
cfm/ft²	0.79	0.39
cfm/ton	418.03	
ft²/ton	529.39	
Btu/hr·ft²	22.67	-12.66
No. People	291	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	50.4	604.9	533.3	20,163	80.3	63.9	64.2	56.9	53.8	57.9
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	50.4	604.9								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	26,685		
Part	0		
Int Door	0		
ExFlr	0		
Roof	9,445	0	0
Wall	8,145	2,389	29
Ext Door	42	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-337.8	10,320	56.9	84.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	4,435	39.0	56.9
Reheat	-163.6	10,320	56.9	70.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-337.8			

System Checksums

By CannonDesign

System - 003 - WEST — **Variable Volume Reheat (30% Min Flow Default)**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 9 / 15
Outside Air: OADB/WB/HR: 94 / 68 / 65

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	17,967	17,967	3
Glass Solar	93,335	0	93,335	13
Glass/Door Cond	15,275	0	15,275	2
Wall Cond	6,030	6,602	12,632	2
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0.00	0.00	0.00	0.00
Infiltration	0		0	0
Sub Total ==>	114,640	24,569	139,209	20
Internal Loads				
Lights	48,650	12,162	60,812	9
People	161,175	0	161,175	23
Misc	87,316	0	87,316	12
Sub Total ==>	297,141	12,162	309,303	44
Ceiling Load	10,644	-10,644	0	0
Ventilation Load	0	0	134,778	19
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	51,677		51,677	7
Exhaust Heat		-10,636	-10,636	-2
Sup. Fan Heat			50,342	7
Ret. Fan Heat		25,022	25,022	4
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	474,101	40,473	699,693	100.00

CLG SPACE PEAK

Mo/Hr: 11 / 14
OADB: 79

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	115,431	28
Glass/Door Cond	2,841	1
Wall Cond	4,445	1
Partition/Door	0	0
Floor	0.00	0
Adjacent Floor	0.00	0.00
Infiltration	0	0
Sub Total ==>	122,716	30
Internal Loads		
Lights	48,650	12
People	93,727	23
Misc	87,316	21
Sub Total ==>	229,693	55
Ceiling Load	7,086	2
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	415,620	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 39

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-7,630	1.38
Glass Solar	0	0	0.00
Glass/Door Cond	-23,255	-23,255	4.21
Wall Cond	-4,438	-9,080	1.64
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0.00	0.00	0.00
Infiltration	0	0	0.00
Sub Total ==>	-27,692	-39,964	7.23
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-4,468	0	0.00
Ventilation Load	0	-147,204	26.64
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	-180,187	-180,187	32.61
Exhaust Heat		2,404	-0.43
OA Preheat Diff.		-14,206	2.57
RA Preheat Diff.		-173,456	31.39
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-212,347	-552,613	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.0	84.0
Ra Plenum	75.2	69.5
Return	76.3	69.5
Ret/OA	80.0	59.9
Fn MtrTD	0.2	0.0
Fn BldTD	0.5	0.0
Fn Frict	1.5	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	21,690	13,842
Terminal	21,690	13,842
Main Fan	21,690	13,842
Sec Fan	0	0
Nom Vent	4,333	4,333
AHU Vent	4,333	4,333
Infil	0	0
MinStop/Rh	14,098	13,842
Return	21,564	13,773
Exhaust	4,207	4,264
Rm Exh	126	69
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	20.0	31.3
cfm/ft²	0.79	0.50
cfm/ton	340.47	
ft²/ton	430.28	
Btu/hr·ft²	27.89	-18.97
No. People	379	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	63.7	764.5	649.1	21,238	80.0	61.8	54.7	52.8	48.8	45.6
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	63.7	764.5								

AREAS

	Gross Total	Glass ft²	Glass (%)
Floor	27,412		
Part	0		
Int Door	0		
ExFlr	0		
Roof	7,584	0	0
Wall	8,235	2,554	31
Ext Door	90	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-519.9	13,842	52.8	84.0
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	4,333	39.0	52.8
Reheat	-286.3	13,842	52.8	70.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-519.9			

ENERGY CONSUMPTION SUMMARY

By CannonDesign

	Elect Cons. (kWh)	Gas Cons. (kBtu)	% of Total Building Energy	Total Building Energy (kBtu/yr)	Total Source Energy* (kBtu/yr)
Alternative 1					
Primary heating					
Primary heating		119,260	6.9 %	119,260	125,537
Other Htg Accessories	4,318		0.9 %	14,737	44,216
Heating Subtotal	**4,318**	**119,260**	**7.7** %	**133,997**	**169,753**
Primary cooling					
Cooling Compressor	94,460		18.6 %	322,394	967,278
Tower/Cond Fans	7,132		1.4 %	24,340	73,028
Condenser Pump	3,667		0.7 %	12,514	37,547
Other Clg Accessories	787		0.2 %	2,685	8,056
Cooling Subtotal....	**106,046**		**20.8** %	**361,933**	**1,085,909**
Auxiliary					
Supply Fans	121,363		23.8 %	414,212	1,242,759
Pumps	47		0.0 %	160	480
Stand-alone Base Utilities			0.0 %	0	0
Aux Subtotal....	121,410		23.8 %	414,372	1,243,239
Lighting					
Lighting	115,040		22.6 %	392,630	1,178,007
Receptacle					
Receptacles	127,526		25.0 %	435,247	1,305,871
Cogeneration					
Cogeneration			0.0 %	0	0
Totals					
Totals**	**474,339**	**119,260**	**100.0** %	**1,738,179**	**4,982,779**

* Note: Resource Utilization factors are included in the Total Source Energy value .

** Note: This report can display a maximum of 7 utilities. If additional utilities are used, they will be included in the total.

Load / Airflow Summary

By CannonDesign

System	Zone	Room **		Floor Area ft²	People #	Coil Cooling Sensible Btu/h	Coil Cooling Total Btu/h	Space Design Max SA cfm	Air Changes ach/hr	VAV Minimum SA cfm	VAV Minimum %	Main Coil Heating Sensible Btu/h	Heating Fan Max SA cfm	Percent OA Clg	Percent OA Htg
Alternative 1															
		01 VESTIDRO	Rm Peak	1,874	1.9	17,371	17,948	444	1.58	357	80	-9,294	0	19.0	43.0
	Zone - 022		Zn Peak	1,874	1.9	17,371	17,948	444			80	-9,294	0	19.0	43.0
	Zone - 022		Zn Block	1,874	1.9	17,371	17,948	444			80	-9,294	0	19.0	43.0
		01 LOADDSMD	Rm Peak	378	0.0	3,394	3,467	126	2.22	126	100	-3,749	0	19.0	43.0
		01 SHSKG 1501	Rm Peak	201	0.0	1,665	1,704	67	2.22	67	100	-1,994	0	19.0	43.0
		01 SSECR LN 1514A	Rm Peak	63	0.4	702	840	28	2.93	27	98	-807	0	19.0	43.0
		01 TLSTF 620	Rm Peak	157	0.0	1,664	1,756	157	6.67	47	30	-1,401	0	19.0	43.0
	Zone - 023		Zn Peak	799	0.4	7,197	7,539	378			71	-7,951	0	25.0	43.0
	Zone - 023		Zn Block	799	0.4	7,197	7,539	288			93	-7,951	0	25.0	43.0
		01 TER 1504	Rm Peak	325	1.6	4,296	4,978	325	6.67	108	33	-3,223	0	19.0	43.0
	Zone - 024		Zn Peak	325	1.6	4,296	4,978	325			33	-3,223	0	19.0	43.0
	Zone - 024		Zn Block	325	1.6	4,296	4,978	325			33	-3,223	0	19.0	43.0
		01 ST1-1	Rm Peak	313	0.0	20,936	21,068	898	19.12	269	30	-8,015	0	19.0	43.0
	Zone - 025		Zn Peak	313	0.0	20,936	21,068	898			30	-8,015	0	19.0	43.0
	Zone - 025		Zn Block	313	0.0	20,936	21,068	898			30	-8,015	0	19.0	43.0
		01 VESTI 01	Rm Peak	244	0.2	24,834	24,762	1,046	28.57	314	30	-9,334	0	19.0	43.0
	Zone - 026		Zn Peak	244	0.2	24,834	24,762	1,046			30	-9,334	0	19.0	43.0
	Zone - 026		Zn Block	244	0.2	24,834	24,762	1,046			30	-9,334	0	19.0	43.0
		02 WATGN 298	Rm Peak	865	18.0	17,598	21,664	724	5.58	394	54	-11,729	0	19.0	43.0
	Zone - 027		Zn Peak	865	18.0	17,598	21,664	724			54	-11,729	0	19.0	43.0
	Zone - 027		Zn Block	865	18.0	17,598	21,664	724			54	-11,729	0	19.0	43.0
		01 WTAGN LAB 1301B	Rm Peak	396	18.0	30,185	33,519	1,329	22.37	399	30	-11,862	0	19.0	43.0
	Zone - 028		Zn Peak	396	18.0	30,185	33,519	1,329			30	-11,862	0	19.0	43.0
	Zone - 028		Zn Block	396	18.0	30,185	33,519	1,329			30	-11,862	0	19.0	43.0
		01 BLDRR 492	Rm Peak	101	2.0	2,864	3,373	118	7.79	45	38	-1,327	0	19.0	43.0
		01 GYMNA 510	Rm Peak	509	2.5	13,523	16,088	580	7.60	226	39	-6,731	0	19.0	43.0
	Zone - 029		Zn Peak	610	4.5	16,233	19,308	698			39	-8,059	0	19.0	43.0
	Zone - 029		Zn Block	610	4.5	16,263	19,292	698			39	-8,059	0	19.0	43.0
		01 WACPR MOB 1309	Rm Peak	339	3.0	7,747	8,325	333	6.54	100	30	-2,969	0	19.0	43.0
	Zone - 030		Zn Peak	339	3.0	7,747	8,325	333			30	-2,969	0	19.0	43.0
	Zone - 030		Zn Block	339	3.0	7,747	8,325	333			30	-2,969	0	19.0	43.0
		01 CORR 03	Rm Peak	724	0.7	3,541	3,781	138	1.27	138	100	-3,590	0	19.0	43.0
		01 EVSCL 539	Rm Peak	48	1.0	398	407	16	2.22	16	100	-476	0	19.0	43.0
		01 ST2-1	Rm Peak	217	0.0	1,140	1,156	45	1.38	36	81	-1,076	0	19.0	43.0
	Zone - 031		Zn Peak	989	1.7	4,921	5,187	199			96	-5,143	0	19.0	43.0

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System	Zone Room **		Floor Area ft²	People #	Coil Cooling Sensible Btu/h	Coil Cooling Total Btu/h	Space Design Max SA cfm	Air Changes ach/hr	VAV Minimum SA cfm	VAV Minimum %	Main Coil Heating Sensible Btu/h	Heating Fan Max SA cfm	Percent OA Clg	Percent OA Htg
	Zone - 031	Zn Block	989	1.7	4,872	5,148	199			96	-5,143	0	19.0	43.0
	01 WATGN 30	Rm Peak	900	22.0	13,470	18,635	556	4.12	456	82	-13,555	0	19.0	43.0
	Zone - 032	Zn Peak	900	22.0	13,470	18,635	556			82	-13,555	0	19.0	43.0
	Zone - 032	Zn Block	900	22.0	13,470	18,635	556			82	-13,555	0	19.0	43.0
	01 RECEP MBL 519	Rm Peak	1,241	14.0	26,417	29,658	1,094	5.88	401	37	-11,940	0	19.0	43.0
	Zone - 033	Zn Peak	1,241	14.0	26,417	29,658	1,094			37	-11,940	0	19.0	43.0
	Zone - 033	Zn Block	1,241	14.0	26,417	29,658	1,094			37	-11,940	0	19.0	43.0
	01 WTAGN 746	Rm Peak	1,654	24.0	18,069	23,786	747	3.01	609	82	-18,121	0	19.0	43.0
	Zone - 035	Zn Peak	1,654	24.0	18,069	23,786	747			82	-18,121	0	19.0	43.0
	Zone - 035	Zn Block	1,654	24.0	18,069	23,786	747			82	-18,121	0	19.0	43.0
	01 TLPATS 690	Rm Peak	115	0.0	1,219	1,286	115	6.67	35	30	-1,027	0	19.0	43.0
	Zone - 036	Zn Peak	115	0.0	1,219	1,286	115			30	-1,027	0	19.0	43.0
	Zone - 036	Zn Block	115	0.0	1,219	1,286	115			30	-1,027	0	19.0	43.0
	01 PHARM SML 268	Rm Peak	1,061	7.0	9,591	11,017	397	2.49	274	69	-8,155	0	19.0	43.0
	01 SGENL 598	Rm Peak	105	0.0	870	890	35	2.22	35	100	-1,041	0	19.0	43.0
	Zone - 045	Zn Peak	1,166	7.0	10,438	11,884	432			72	-9,196	0	19.0	43.0
	Zone - 045	Zn Block	1,166	7.0	10,438	11,884	432			72	-9,196	0	19.0	43.0
	02 OPROV 2501	Rm Peak	55	1.0	836	1,076	34	4.18	23	67	-686	0	19.0	43.0
	02 OPROV 894	Rm Peak	55	1.0	3,381	3,523	149	18.09	45	30	-1,332	0	19.0	43.0
	02 OPROV 895	Rm Peak	55	1.0	3,950	4,204	172	20.83	52	30	-1,534	0	19.0	43.0
	02 OPROV 898	Rm Peak	55	1.0	3,381	3,523	149	18.09	45	30	-1,332	0	19.0	43.0
	Zone - 046	Zn Peak	220	4.0	11,854	12,633	505			33	-4,885	0	19.0	43.0
	Zone - 046	Zn Block	220	4.0	11,236	12,216	505			33	-4,885	0	19.0	43.0
	02 OPROV 2505	Rm Peak	55	1.0	2,661	2,540	136	16.50	41	30	-1,215	0	19.0	43.0
	02 OPROV 2506	Rm Peak	55	1.0	2,661	2,540	136	16.50	41	30	-1,215	0	19.0	43.0
	02 OPROV 2507	Rm Peak	55	1.0	2,661	2,540	136	16.50	41	30	-1,215	0	19.0	43.0
	02 WACPF 2500C	Rm Peak	332	0.3	4,134	3,555	203	4.07	63	31	-1,809	0	19.0	43.0
	Zone - 047	Zn Peak	497	3.3	12,391	11,451	611			30	-5,454	0	19.1	43.0
	Zone - 047	Zn Block	497	3.3	11,686	10,891	607			31	-5,454	0	19.1	43.0
	02 TLPAT 01	Rm Peak	152	0.0	1,949	1,941	152	6.67	46	30	-1,357	0	19.0	43.0
	02 WATGN 480	Rm Peak	808	24.3	23,338	28,876	1,006	8.30	472	47	-14,035	0	19.0	43.0
	Zone - 048	Zn Peak	960	24.3	25,172	30,703	1,158			45	-15,391	0	20.9	43.0
	Zone - 048	Zn Block	960	24.3	24,981	30,550	1,054			49	-15,391	0	20.9	43.0
	02 ST2-1	Rm Peak	315	0.0	27,998	27,858	1,176	24.90	353	30	-10,501	0	19.0	43.0
	Zone - 049	Zn Peak	315	0.0	27,998	27,858	1,176			30	-10,501	0	19.0	43.0
	Zone - 049	Zn Block	315	0.0	27,998	27,858	1,176			30	-10,501	0	19.0	43.0
	02 EXROM FM 638	Rm Peak	109	2.0	3,026	3,539	125	7.63	46	37	-1,367	0	19.0	43.0
	02 EXROM FM 656	Rm Peak	109	2.0	3,026	3,539	125	7.63	46	37	-1,367	0	19.0	43.0
	02 EXROM FM 657	Rm Peak	109	2.0	3,511	3,971	140	8.57	46	33	-1,367	0	19.0	43.0
	Zone - 050	Zn Peak	327	6.0	9,602	11,088	390			35	-4,101	0	19.0	43.0
	Zone - 050	Zn Block	327	6.0	9,470	11,018	389			35	-4,101	0	19.0	43.0

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System	Zone	Room **		Floor Area ft²	People #	Coil Cooling Sensible Btu/h	Coil Cooling Total Btu/h	Space Design Max SA cfm	Air Changes ach/hr	VAV Minimum SA cfm	VAV Minimum %	Main Coil Heating Sensible Btu/h	Heating Fan Max SA cfm	Percent OA Clg	Percent OA Htg
		02 EXROM FM 658	Rm Peak	110	2.0	3,278	3,798	137	8.32	46	34	-1,372	0	19.0	43.0
		02 EXROM FM 659	Rm Peak	110	2.0	3,278	3,798	137	8.32	46	34	-1,372	0	19.0	43.0
		02 EXROM FM 716	Rm Peak	121	2.0	4,215	4,646	164	9.05	49	30	-1,466	0	19.0	43.0
	Zone - 051		Zn Peak	341	6.0	10,868	12,341	439			32	-4,211	0	19.1	43.0
	Zone - 051		Zn Block	341	6.0	10,585	12,162	438			32	-4,211	0	19.1	43.0
		02 CORR 03	Rm Peak	554	0.6	5,376	5,544	230	2.77	106	46	-2,747	0	19.0	43.0
		02 EXROM FM 661	Rm Peak	110	2.0	3,278	3,798	137	8.32	46	34	-1,372	0	19.0	43.0
		02 EXROM FM 667	Rm Peak	110	2.0	3,278	3,798	137	8.32	46	34	-1,372	0	19.0	43.0
		02 TLSTF 2301	Rm Peak	67	0.0	749	762	67	6.67	20	30	-598	0	19.0	43.0
	Zone - 052		Zn Peak	841	4.6	12,128	13,349	572			38	-6,090	0	20.6	43.0
	Zone - 052		Zn Block	841	4.6	12,422	13,538	527			41	-6,090	0	20.6	43.0
		02 CORR 04	Rm Peak	578	0.6	2,795	2,987	110	1.27	110	100	-2,866	0	19.0	43.0
		02 EXROM FM 913	Rm Peak	100	2.0	2,843	3,352	117	7.81	44	38	-1,322	0	19.0	43.0
		02 INJCT 690	Rm Peak	70	2.0	2,235	2,728	92	8.77	39	43	-1,174	0	19.0	43.0
	Zone - 053		Zn Peak	748	4.6	7,732	8,926	319			61	-5,363	0	19.0	43.0
	Zone - 053		Zn Block	748	4.6	7,732	8,926	319			61	-5,362	0	19.0	43.0
		02 CORR 05	Rm Peak	595	0.6	2,905	3,102	113	1.27	113	100	-2,951	0	19.0	43.0
	Zone - 054		Zn Peak	595	0.6	2,905	3,102	113			100	-2,951	0	19.0	43.0
	Zone - 054		Zn Block	595	0.6	2,905	3,102	113			100	-2,951	0	19.0	43.0
		02 ST2-2	Rm Peak	191	0.0	1,390	1,408	51	1.78	32	62	-947	0	19.0	43.0
		02 TEAMA 2302	Rm Peak	52	0.0	431	441	17	2.22	17	100	-516	0	19.0	43.0
	Zone - 055		Zn Peak	243	0.0	1,803	1,832	68			72	-1,463	0	19.0	43.0
	Zone - 055		Zn Block	243	0.0	1,806	1,831	68			72	-1,463	0	19.0	43.0
		02 OPROV 2518	Rm Peak	55	1.0	836	1,076	34	4.18	23	67	-686	0	19.0	43.0
		02 OPROV 2519	Rm Peak	55	1.0	836	1,076	34	4.18	23	67	-686	0	19.0	43.0
		02 TEAMA 109	Rm Peak	172	3.0	2,299	2,866	95	3.68	70	74	-2,093	0	19.0	43.0
	Zone - 056		Zn Peak	282	5.0	3,970	5,018	164			71	-3,465	0	19.0	43.0
	Zone - 056		Zn Block	282	5.0	3,969	5,016	164			71	-3,465	0	19.0	43.0
		02 CONFR MED 2520	Rm Peak	220	11.0	5,796	7,812	239	7.24	189	79	-5,637	0	19.0	43.0
	Zone - 057		Zn Peak	220	11.0	5,796	7,812	239			79	-5,637	0	19.0	43.0
	Zone - 057		Zn Block	220	11.0	5,796	7,812	239			79	-5,637	0	19.0	43.0
		02 WSGEN 01	Rm Peak	525	11.0	7,751	9,814	320	4.06	240	75	-7,150	0	19.0	43.0
	Zone - 226		Zn Peak	525	11.0	7,751	9,814	320			75	-7,150	0	19.0	43.0
	Zone - 226		Zn Block	525	11.0	7,751	9,814	320			75	-7,150	0	19.0	43.0
		02 WSGENENC 790	Rm Peak	77	2.0	1,414	1,888	58	5.05	41	70	-1,208	0	19.0	43.0
		02 WSGENENC 791	Rm Peak	77	2.0	1,414	1,888	58	5.05	41	70	-1,208	0	19.0	43.0
		02 WSGENENC 869	Rm Peak	77	2.0	1,414	1,888	58	5.05	41	70	-1,208	0	19.0	43.0
	Zone - 227		Zn Peak	231	6.0	4,243	5,665	175			70	-3,625	0	19.0	43.0
	Zone - 227		Zn Block	231	6.0	4,241	5,664	175			70	-3,625	0	19.0	43.0
		02 PRGEN 01	Rm Peak	156	2.0	3,980	4,516	164	7.01	54	33	-1,600	0	19.0	43.0
	Zone - 228		Zn Peak	156	2.0	3,980	4,516	164			33	-1,600	0	19.0	43.0

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	Zone - 228	Zn Block	156	2.0	3,980	4,516	164			33	-1,600	0	19.0	43.0
	02 MEDPR 466	Rm Peak	117	0.8	1,304	1,559	51	2.93	50	98	-1,499	0	19.0	43.0
	02 TLPAT 02	Rm Peak	105	0.0	1,113	1,174	105	6.67	32	30	-937	0	19.0	43.0
	02 UTILSMED 467	Rm Peak	81	0.6	903	1,080	36	2.93	35	98	-1,037	0	19.0	43.0
	Zone - 229	Zn Peak	303	1.4	3,197	3,690	192			61	-3,473	0	28.9	43.0
	Zone - 229	Zn Block	303	1.4	3,197	3,690	126			92	-3,473	0	28.9	43.0
	02 EXROM FM 696	Rm Peak	110	2.0	3,046	3,560	126	7.61	46	37	-1,372	0	19.0	43.0
	02 EXROM PEDS 696	Rm Peak	110	2.0	3,046	3,560	126	7.61	46	37	-1,372	0	19.0	43.0
	02 EXSNA NEG FM 721	Rm Peak	130	2.0	3,452	3,976	142	7.30	49	35	-1,471	0	19.0	43.0
	02 EXSNA NEG PEDS 622	Rm Peak	130	2.0	3,452	3,976	142	7.30	49	35	-1,471	0	19.0	43.0
	Zone - 230	Zn Peak	480	8.0	12,998	15,071	536			36	-5,687	0	19.0	43.0
	Zone - 230	Zn Block	480	8.0	12,995	15,068	536			36	-5,686	0	19.0	43.0
	03 EXROM INT 511	Rm Peak	109	2.0	3,794	4,255	140	8.57	46	33	-1,367	0	19.0	43.0
	03 EXROM INT 521	Rm Peak	109	2.0	3,334	3,847	125	7.63	46	37	-1,367	0	19.0	43.0
	03 EXROM INT 523	Rm Peak	109	2.0	3,334	3,847	125	7.63	46	37	-1,367	0	19.0	43.0
	Zone - 234	Zn Peak	327	6.0	10,501	11,988	390			35	-4,101	0	19.0	43.0
	Zone - 234	Zn Block	327	6.0	10,394	11,942	389			35	-4,101	0	19.0	43.0
	03 CORR 03	Rm Peak	554	0.6	6,795	6,962	227	2.73	106	47	-2,747	0	19.0	43.0
	03 EXROM OB 641	Rm Peak	110	2.0	3,586	4,106	137	8.32	46	34	-1,372	0	19.0	43.0
	03 EXROM OB 653	Rm Peak	110	2.0	3,586	4,106	137	8.32	46	34	-1,372	0	19.0	43.0
	Zone - 235	Zn Peak	774	4.6	13,610	14,818	501			39	-5,491	0	19.0	43.0
	Zone - 235	Zn Block	774	4.6	14,002	15,104	501			39	-5,491	0	19.0	43.0
	03 CORR 04	Rm Peak	578	0.6	4,510	4,713	110	1.27	110	100	-2,866	0	19.0	43.0
	Zone - 236	Zn Peak	578	0.6	4,510	4,713	110			100	-2,866	0	19.0	43.0
	Zone - 236	Zn Block	578	0.6	4,510	4,713	110			100	-2,866	0	19.0	43.0
	03 EXROM OB 3104	Rm Peak	122	2.0	4,481	4,981	165	8.99	49	30	-1,469	0	19.0	43.0
	03 EXROM OB 654	Rm Peak	110	2.0	4,481	4,957	180	10.89	54	30	-1,604	0	19.0	43.0
	03 EXROM OB 655	Rm Peak	110	2.0	3,586	4,106	137	8.32	46	34	-1,372	0	19.0	43.0
	Zone - 237	Zn Peak	342	6.0	12,673	14,169	481			31	-4,445	0	19.1	43.0
	Zone - 237	Zn Block	342	6.0	12,397	13,895	479			31	-4,445	0	19.1	43.0
	03 WSGENENC 872	Rm Peak	77	2.0	1,632	2,106	58	5.05	41	70	-1,208	0	19.0	43.0
	03 WSGENENC 905	Rm Peak	77	2.0	1,632	2,106	58	5.05	41	70	-1,208	0	19.0	43.0
	03 WSGENENC 906	Rm Peak	77	2.0	1,632	2,106	58	5.05	41	70	-1,208	0	19.0	43.0
	Zone - 238	Zn Peak	231	6.0	4,896	6,318	175			70	-3,625	0	19.0	43.0
	Zone - 238	Zn Block	231	6.0	4,895	6,318	175			70	-3,625	0	19.0	43.0
	03 WSGEN 01	Rm Peak	525	11.0	9,235	11,297	320	4.06	240	75	-7,150	0	19.0	43.0
	Zone - 239	Zn Peak	525	11.0	9,235	11,297	320			75	-7,150	0	19.0	43.0
	Zone - 239	Zn Block	525	11.0	9,235	11,297	320			75	-7,150	0	19.0	43.0
	03 CORR 05	Rm Peak	595	0.6	4,708	4,917	113	1.27	113	100	-2,951	0	19.0	43.0
	03 TLSTF 3301	Rm Peak	67	0.0	958	971	67	6.67	20	30	-598	0	19.0	43.0
	Zone - 240	Zn Peak	662	0.6	5,524	5,746	180			74	-3,549	0	23.5	43.0

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	Zone - 240	Zn Block	662	0.6	5,457	5,712	146			91	-3,549	0	23.5	43.0
	03 EVS 3302	Rm Peak	52	0.0	614	624	17	2.22	17	100	-516	0	19.0	43.0
	03 ST2-3	Rm Peak	191	0.0	1,927	1,962	51	1.77	32	63	-947	0	19.0	43.0
	Zone - 241	Zn Peak	243	0.0	2,517	2,561	68			72	-1,463	0	19.0	43.0
	Zone - 241	Zn Block	243	0.0	2,526	2,572	68			72	-1,463	0	19.0	43.0
	03 EXROM OB 642	Rm Peak	110	2.0	3,357	3,871	126	7.61	46	37	-1,372	0	19.0	43.0
	03 EXROM OB 646	Rm Peak	110	2.0	3,357	3,871	126	7.61	46	37	-1,372	0	19.0	43.0
	03 UTILS PRO 318	Rm Peak	100	0.7	1,397	1,615	44	2.93	43	98	-1,281	0	19.0	43.0
	Zone - 242	Zn Peak	320	4.7	8,062	9,307	295			46	-4,025	0	19.0	43.0
	Zone - 242	Zn Block	320	4.7	8,061	9,307	295			46	-4,025	0	19.0	43.0
	03 OPROV 3501	Rm Peak	55	1.0	991	1,231	34	4.18	23	67	-686	0	19.0	43.0
	03 OPROV 888	Rm Peak	55	1.0	3,543	3,685	149	18.09	45	30	-1,332	0	19.0	43.0
	03 OPROV 889	Rm Peak	55	1.0	3,965	4,098	165	20.06	50	30	-1,477	0	19.0	43.0
	03 OPROV 892	Rm Peak	55	1.0	3,543	3,685	149	18.09	45	30	-1,332	0	19.0	43.0
	Zone - 243	Zn Peak	220	4.0	11,957	12,615	498			33	-4,828	0	19.0	43.0
	Zone - 243	Zn Block	220	4.0	11,991	12,611	498			33	-4,828	0	19.0	43.0
	03 OPROV 3505	Rm Peak	55	1.0	2,681	2,560	136	16.50	41	30	-1,215	0	19.0	43.0
	03 OPROV 3506	Rm Peak	55	1.0	2,681	2,560	136	16.50	41	30	-1,215	0	19.0	43.0
	03 OPROV 3507	Rm Peak	55	1.0	2,681	2,560	136	16.50	41	30	-1,215	0	19.0	43.0
	03 WACPF 2500C	Rm Peak	332	0.3	3,806	4,059	199	4.00	63	32	-1,776	0	19.0	43.0
	Zone - 244	Zn Peak	497	3.3	10,706	10,597	607			31	-5,422	0	19.0	43.0
	Zone - 244	Zn Block	497	3.3	12,131	11,345	607			31	-5,422	0	19.0	43.0
	03 WATGN 07	Rm Peak	1,311	18.0	27,670	31,835	1,029	5.23	469	46	-13,940	0	19.0	43.0
	Zone - 245	Zn Peak	1,311	18.0	27,670	31,835	1,029			46	-13,940	0	19.0	43.0
	Zone - 245	Zn Block	1,311	18.0	27,670	31,835	1,029			46	-13,940	0	19.0	43.0
	03 ST1-1	Rm Peak	290	0.0	26,783	26,654	1,088	25.02	326	30	-9,714	0	19.0	43.0
	Zone - 246	Zn Peak	290	0.0	26,783	26,654	1,088			30	-9,714	0	19.0	43.0
	Zone - 246	Zn Block	290	0.0	26,783	26,654	1,088			30	-9,714	0	19.0	43.0
	03 TLPAT 03	Rm Peak	147	0.0	2,303	2,296	147	6.67	44	30	-1,312	0	19.0	43.0
	Zone - 247	Zn Peak	147	0.0	2,303	2,296	147			30	-1,312	0	19.0	43.0
	Zone - 247	Zn Block	147	0.0	2,303	2,296	147			30	-1,312	0	19.0	43.0
	03 PRGEN 856	Rm Peak	180	2.0	4,976	5,524	184	6.82	58	31	-1,719	0	19.0	43.0
	03 SCLSU 853	Rm Peak	164	1.1	2,292	2,649	72	2.93	71	98	-2,101	0	19.0	43.0
	Zone - 259	Zn Peak	344	3.1	7,185	8,090	256			50	-3,820	0	19.0	43.0
	Zone - 259	Zn Block	344	3.1	7,185	8,090	256			50	-3,820	0	19.0	43.0
	03 MEDPR 1243	Rm Peak	90	0.6	1,258	1,454	40	2.93	39	98	-1,153	0	19.0	43.0
	03 TLPAT 3115	Rm Peak	104	0.0	1,396	1,457	104	6.67	31	30	-928	0	19.0	43.0
	03 UTILS MED 592	Rm Peak	86	0.6	1,202	1,389	38	2.93	37	98	-1,102	0	19.0	43.0
	Zone - 260	Zn Peak	280	1.2	3,744	4,188	181			59	-3,183	0	29.9	43.0
	Zone - 260	Zn Block	280	1.2	3,744	4,188	116			93	-3,183	0	29.9	43.0
	03 EXROM INT 550	Rm Peak	110	2.0	3,357	3,871	126	7.61	46	37	-1,372	0	19.0	43.0

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System	Zone	Room **		Floor Area ft²	People #	Coil Cooling Sensible Btu/h	Coil Cooling Total Btu/h	Space Design Max SA cfm	Air Changes ach/hr	VAV Minimum SA cfm	VAV Minimum %	Main Coil Heating Sensible Btu/h	Heating Fan Max SA cfm	Percent OA Clg	Percent OA Htg
		03 EXROM INT 577	Rm Peak	110	2.0	3,357	3,871	126	7.61	46	37	-1,372	0	19.0	43.0
		03 EXROM INT NEG 294	Rm Peak	130	2.0	3,820	4,343	142	7.30	49	35	-1,471	0	19.0	43.0
		03 EXROM INT NEG 295	Rm Peak	130	2.0	3,820	4,343	142	7.30	49	35	-1,471	0	19.0	43.0
	Zone - 261		Zn Peak	480	8.0	14,354	16,428	536			36	-5,687	0	19.0	43.0
	Zone - 261		Zn Block	480	8.0	14,354	16,428	536			36	-5,686	0	19.0	43.0
System - 002 - EAST			**Sys Peak**	**26,685**	**291.3**	**576,411**	**642,901**	**23,322**				**-307,082**	**0**	**21.0**	**43.0**
System - 002 - EAST			**Sys Block**	**26,685**	**291.3**	**533,287**	**604,889**	**21,072**				**-307,080**	**0**	**21.0**	**43.0**
		01 ELEC 1502	Rm Peak	251	1.3	4,002	4,888	251	6.67	108	43	-3,673	0	17.1	31.3
	Zone - 185		Zn Peak	251	1.3	4,002	4,888	251			43	-3,673	0	17.1	31.3
	Zone - 185		Zn Block	251	1.3	4,002	4,888	251			43	-3,673	0	17.1	31.3
		01 CORR 04	Rm Peak	600	0.6	4,346	4,774	147	1.63	147	100	-4,390	0	17.1	31.3
		01 DRSSB 664	Rm Peak	55	1.0	1,006	1,291	31	3.71	30	97	-1,012	0	17.1	31.3
		01 DRSSB 728	Rm Peak	50	1.0	998	1,266	30	4.01	29	95	-976	0	17.1	31.3
	Zone - 186		Zn Peak	705	2.6	6,070	7,052	208			99	-6,378	0	17.1	31.3
	Zone - 186		Zn Block	705	2.6	5,931	6,981	208			99	-6,378	0	17.1	31.3
		01 PRGEN 726	Rm Peak	317	2.2	10,816	12,073	381	8.01	114	30	-3,902	0	17.1	31.3
	Zone - 187		Zn Peak	317	2.2	10,816	12,073	381			30	-3,902	0	17.1	31.3
	Zone - 187		Zn Block	317	2.2	10,816	12,073	381			30	-3,902	0	17.1	31.3
		01 OPROV 1407	Rm Peak	131	1.0	1,511	1,837	53	2.67	46	87	-1,568	0	17.1	31.3
		01 OPROV 1408	Rm Peak	104	1.0	1,828	2,106	57	3.68	40	70	-1,371	0	17.1	31.3
		01 OPROV 1409	Rm Peak	131	1.0	1,511	1,837	53	2.67	46	87	-1,568	0	17.1	31.3
		01 OPROV 1410	Rm Peak	131	1.0	1,511	1,837	53	2.67	46	87	-1,568	0	17.1	31.3
	Zone - 188		Zn Peak	497	4.0	6,368	7,624	215			83	-6,076	0	17.1	31.3
	Zone - 188		Zn Block	497	4.0	6,227	7,499	215			83	-6,076	0	17.1	31.3
		01 CORR 01	Rm Peak	1,051	1.1	7,687	8,438	257	1.63	257	100	-7,690	0	17.1	31.3
	Zone - 189		Zn Peak	1,051	1.1	7,687	8,438	257			100	-7,690	0	17.1	31.3
	Zone - 189		Zn Block	1,051	1.1	7,687	8,438	257			100	-7,690	0	17.1	31.3
		01 OPROV 608	Rm Peak	130	1.0	5,284	6,607	246	12.59	74	30	-2,516	0	17.1	31.3
		01 OPROV 609	Rm Peak	130	1.0	5,284	6,607	246	12.59	74	30	-2,516	0	17.1	31.3
		01 OPROV 610	Rm Peak	130	1.0	5,284	6,607	246	12.59	74	30	-2,516	0	17.1	31.3
		01 OPROV 611	Rm Peak	130	1.0	2,820	3,591	123	6.29	46	37	-1,561	0	17.1	31.3
	Zone - 190		Zn Peak	520	4.0	18,671	23,411	859			31	-9,108	0	17.1	31.3
	Zone - 190		Zn Block	520	4.0	18,667	23,407	859			31	-9,108	0	17.1	31.3
		01 OPROV 419	Rm Peak	102	1.0	1,462	1,729	48	3.13	40	83	-1,356	0	17.1	31.3
		01 OPROV 600	Rm Peak	130	1.0	2,275	2,522	78	3.98	46	59	-1,561	0	17.1	31.3
		01 OPROV 607	Rm Peak	130	1.0	5,284	6,607	246	12.59	74	30	-2,516	0	17.1	31.3
		01 SGENL 530	Rm Peak	60	0.0	923	948	26	2.86	26	100	-878	0	17.1	31.3
	Zone - 191		Zn Peak	422	3.0	9,749	11,613	397			47	-6,311	0	17.3	31.3
	Zone - 191		Zn Block	422	3.0	8,978	11,421	393			47	-6,311	0	17.3	31.3
		01 CORR 02	Rm Peak	136	0.1	1,031	1,128	33	1.63	33	100	-995	0	17.1	31.3
	Zone - 192		Zn Peak	136	0.1	1,031	1,128	33			100	-995	0	17.1	31.3

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System	Zone Room **		Floor Area ft²	People #	Coil Cooling Sensible Btu/h	Coil Cooling Total Btu/h	Space Design Max SA cfm	Air Changes ach/hr	VAV Minimum SA cfm	VAV Minimum %	Main Coil Heating Sensible Btu/h	Heating Fan Max SA cfm	Percent OA Clg	Percent OA Htg
	Zone - 192	Zn Block	136	0.1	1,031	1,128	33			100	-995	0	17.1	31.3
	01 CONFRMED 1010	Rm Peak	403	20.2	23,181	31,522	1,092	18.07	446	41	-15,236	0	17.1	31.3
	Zone - 193	Zn Peak	403	20.2	23,181	31,522	1,092			41	-15,236	0	17.1	31.3
	Zone - 193	Zn Block	403	20.2	23,181	31,522	1,092			41	-15,236	0	17.1	31.3
	01 CONFRMED 1011	Rm Peak	403	20.2	23,464	28,263	838	13.87	446	53	-15,236	0	17.1	31.3
	Zone - 194	Zn Peak	403	20.2	23,464	28,263	838			53	-15,236	0	17.1	31.3
	Zone - 194	Zn Block	403	20.2	23,464	28,263	838			53	-15,236	0	17.1	31.3
	01 SDIETCOF	Rm Peak	77	0.0	7,902	8,377	293	25.34	88	30	-2,998	0	17.1	31.3
	01 TLPAT 01	Rm Peak	150	0.0	1,978	2,195	150	6.67	45	30	-1,537	0	17.1	31.3
	01 WTAGN 01	Rm Peak	608	17.0	38,235	43,408	1,399	15.34	434	31	-14,815	0	17.1	31.3
	Zone - 195	Zn Peak	835	17.0	48,100	53,967	1,841			31	-19,349	0	18.1	31.3
	Zone - 195	Zn Block	835	17.0	48,017	53,910	1,742			33	-19,349	0	18.1	31.3
	01 LACTN 1506	Rm Peak	105	1.0	1,198	1,499	40	2.56	40	100	-1,378	0	17.1	31.3
	01 LNGST 2001	Rm Peak	220	5.0	4,069	5,197	136	4.13	136	100	-4,659	0	17.1	31.3
	01 TLPAT 652	Rm Peak	58	0.0	671	788	58	6.67	17	30	-594	0	17.1	31.3
	01 TLPTS 2001	Rm Peak	57	0.0	660	775	57	6.67	17	30	-584	0	17.1	31.3
	Zone - 196	Zn Peak	440	6.0	6,326	7,988	292			72	-7,215	0	21.9	31.3
	Zone - 196	Zn Block	440	6.0	6,326	7,988	228			93	-7,215	0	21.9	31.3
	01 DRSSA 550	Rm Peak	252	2.0	2,705	3,327	90	2.37	90	100	-3,063	0	17.1	31.3
	01 MAMO 508	Rm Peak	150	2.0	3,546	4,238	125	5.56	68	54	-2,317	0	17.1	31.3
	Zone - 197	Zn Peak	402	4.0	6,098	7,411	215			73	-5,381	0	17.1	31.3
	Zone - 197	Zn Block	402	4.0	6,098	7,411	215			73	-5,381	0	17.1	31.3
	01 GROUPMED 1210	Rm Peak	576	25.0	17,021	22,434	570	6.60	570	100	-19,459	0	17.1	31.3
	Zone - 198	Zn Peak	576	25.0	17,021	22,434	570			100	-19,459	0	17.1	31.3
	Zone - 198	Zn Block	576	25.0	17,021	22,434	570			100	-19,459	0	17.1	31.3
	01 GROUPMED 1403	Rm Peak	576	25.0	17,021	22,434	570	6.60	570	100	-19,459	0	17.1	31.3
	Zone - 199	Zn Peak	576	25.0	17,021	22,434	570			100	-19,459	0	17.1	31.3
	Zone - 199	Zn Block	576	25.0	17,021	22,434	570			100	-19,459	0	17.1	31.3
	01 AAMEN 328	Rm Peak	130	0.9	2,131	2,526	72	3.69	72	100	-2,457	0	17.1	31.3
	01 DRSSA 670	Rm Peak	100	1.0	1,166	1,465	39	2.62	39	100	-1,341	0	17.1	31.3
	01 SCLSU 849	Rm Peak	51	0.4	836	991	28	3.69	28	100	-964	0	17.1	31.3
	01 TLSTF 761	Rm Peak	64	0.0	741	870	64	6.67	19	30	-656	0	17.1	31.3
	01 UTILS PRO 785	Rm Peak	90	0.0	1,118	1,196	39	2.86	39	100	-1,317	0	17.1	31.3
	Zone - 200	Zn Peak	435	2.3	5,785	6,842	242			81	-6,735	0	19.7	31.3
	Zone - 200	Zn Block	435	2.3	5,785	6,842	210			94	-6,735	0	19.7	31.3
	01 IBONE 665	Rm Peak	140	2.0	3,359	4,038	119	5.64	66	55	-2,244	0	17.1	31.3
	01 IUSND 666	Rm Peak	235	2.0	5,130	5,936	181	5.13	86	48	-2,939	0	17.1	31.3
	Zone - 201	Zn Peak	375	4.0	8,489	9,974	299			51	-5,183	0	17.1	31.3
	Zone - 201	Zn Block	375	4.0	8,489	9,974	299			51	-5,183	0	17.1	31.3
	01 OGENL 450	Rm Peak	54	1.0	888	1,167	29	3.63	29	100	-1,005	0	17.1	31.3
	01 OGENL 675	Rm Peak	101	1.0	1,198	1,498	40	2.61	40	100	-1,349	0	17.1	31.3

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System	Zone	Room **		Floor Area ft²	People #	Coil Cooling Sensible Btu/h	Coil Cooling Total Btu/h	Space Design Max SA cfm	Air Changes ach/hr	VAV Minimum SA cfm	VAV Minimum %	Main Coil Heating Sensible Btu/h	Heating Fan Max SA cfm	Percent OA Clg	Percent OA Htg
		01 OGENL 850	Rm Peak	88	1.0	1,112	1,407	37	2.78	37	100	-1,254	0	17.1	31.3
		01 SGENL 676	Rm Peak	81	0.0	1,006	1,076	35	2.86	35	100	-1,185	0	17.1	31.3
		01 TLPAT 529	Rm Peak	167	0.0	1,933	2,270	167	6.67	50	30	-1,711	0	17.1	31.3
	Zone - 202		Zn Peak	491	3.0	5,883	7,164	307			62	-6,504	0	25.4	31.3
	Zone - 202		Zn Block	491	3.0	5,883	7,163	206			92	-6,503	0	25.4	31.3
		01 WATGN 29	Rm Peak	977	24.0	19,033	25,602	638	4.35	638	100	-21,783	0	17.1	31.3
	Zone - 203		Zn Peak	977	24.0	19,033	25,602	638			100	-21,783	0	17.1	31.3
	Zone - 203		Zn Block	977	24.0	19,033	25,602	638			100	-21,783	0	17.1	31.3
		01 CORR 05	Rm Peak	968	1.0	7,071	7,763	237	1.63	237	100	-7,083	0	17.1	31.3
	Zone - 204		Zn Peak	968	1.0	7,071	7,763	237			100	-7,083	0	17.1	31.3
	Zone - 204		Zn Block	968	1.0	7,071	7,763	237			100	-7,083	0	17.1	31.3
		02 OPROV 2508	Rm Peak	55	1.0	2,533	2,672	107	13.02	32	30	-1,100	0	17.1	31.3
		02 OPROV 2509	Rm Peak	55	1.0	2,533	2,672	107	13.02	32	30	-1,100	0	17.1	31.3
		02 OPROV 2510	Rm Peak	55	1.0	2,533	2,672	107	13.02	32	30	-1,100	0	17.1	31.3
		02 WACPF 2500E	Rm Peak	332	0.3	4,232	4,081	160	3.21	81	51	-2,429	0	17.1	31.3
	Zone - 205		Zn Peak	497	3.3	10,735	11,002	482			37	-5,730	0	17.1	31.3
	Zone - 205		Zn Block	497	3.3	11,332	11,391	482			37	-5,730	0	17.1	31.3
		02 OPROV 2513	Rm Peak	55	1.0	3,249	4,131	147	17.86	44	30	-1,509	0	17.1	31.3
		02 OPROV 2514	Rm Peak	55	1.0	894	1,174	30	3.59	30	100	-1,012	0	17.1	31.3
		02 OPROV 896	Rm Peak	55	1.0	3,249	4,131	147	17.86	44	30	-1,509	0	17.1	31.3
		02 OPROV 897	Rm Peak	55	1.0	4,700	4,843	181	21.91	54	30	-1,852	0	17.1	31.3
	Zone - 206		Zn Peak	220	4.0	11,764	13,951	505			34	-5,883	0	17.7	31.3
	Zone - 206		Zn Block	220	4.0	13,252	13,916	488			35	-5,883	0	17.7	31.3
		02 WSGEN 326	Rm Peak	285	12.0	8,419	11,021	275	6.44	275	100	-9,403	0	17.1	31.3
	Zone - 207		Zn Peak	285	12.0	8,419	11,021	275			100	-9,403	0	17.1	31.3
	Zone - 207		Zn Block	285	12.0	8,419	11,021	275			100	-9,403	0	17.1	31.3
		02 EXROM 877	Rm Peak	160	2.0	6,305	8,000	279	11.64	84	30	-2,862	0	17.1	31.3
		02 SCLSU 878	Rm Peak	80	0.6	3,843	3,876	160	13.32	48	30	-1,638	0	17.1	31.3
		02 TRAUDPED 717	Rm Peak	80	2.0	4,941	5,224	207	17.28	62	30	-2,125	0	17.1	31.3
	Zone - 208		Zn Peak	320	4.6	14,475	16,487	647			30	-6,624	0	19.2	31.3
	Zone - 208		Zn Block	320	4.6	14,758	15,304	576			34	-6,624	0	19.2	31.3
		02 CORR 01	Rm Peak	403	0.4	4,847	4,684	179	2.97	99	55	-2,949	0	17.1	31.3
	Zone - 209		Zn Peak	403	0.4	4,847	4,684	179			55	-2,949	0	17.1	31.3
	Zone - 209		Zn Block	403	0.4	4,847	4,684	179			55	-2,949	0	17.1	31.3
		02 EXROM 857	Rm Peak	54	2.0	4,043	5,303	182	22.52	55	30	-1,869	0	17.1	31.3
		02 OBSRM BAY 271	Rm Peak	86	2.0	2,646	3,255	93	7.18	54	58	-1,849	0	17.1	31.3
		02 OBSRM BAY 272	Rm Peak	86	2.0	2,646	3,255	93	7.18	54	58	-1,849	0	17.1	31.3
	Zone - 210		Zn Peak	226	6.0	9,089	11,567	368			44	-5,566	0	17.3	31.3
	Zone - 210		Zn Block	226	6.0	10,038	11,488	363			45	-5,566	0	17.3	31.3
		02 LNGST 506	Rm Peak	153	4.0	3,262	4,135	104	4.54	104	100	-3,559	0	17.1	31.3
		02 TLPAT 689	Rm Peak	51	0.0	709	760	51	6.67	15	30	-522	0	17.1	31.3

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		02 TRTHP SPC 687	Rm Peak	121	2.0	6,386	8,145	294	16.18	88	30	-3,008	0	17.1	31.3
	Zone - 211		Zn Peak	325	6.0	9,799	12,481	449			46	-7,089	0	18.3	31.3
	Zone - 211		Zn Block	325	6.0	9,291	12,429	420			49	-7,089	0	18.3	31.3
		02 TRTHP SPC 680	Rm Peak	121	2.0	6,422	8,172	292	16.07	87	30	-2,988	0	17.1	31.3
		02 TRTHP SPC 683	Rm Peak	121	2.0	6,386	8,145	294	16.18	88	30	-3,008	0	17.1	31.3
		02 TRTHP SPC 688	Rm Peak	121	2.0	6,386	8,145	294	16.18	88	30	-3,008	0	17.1	31.3
	Zone - 212		Zn Peak	363	6.0	19,194	24,462	879			30	-9,003	0	17.1	31.3
	Zone - 212		Zn Block	363	6.0	19,154	24,421	878			30	-9,003	0	17.1	31.3
		02 APRNT 246	Rm Peak	89	0.0	1,276	1,332	38	2.86	38	100	-1,302	0	17.1	31.3
		02 TRTHP SPC 476	Rm Peak	119	2.0	7,489	8,361	266	14.88	80	30	-2,722	0	17.1	31.3
		02 TRTHP SPC 477	Rm Peak	119	2.0	13,041	14,258	478	26.77	143	30	-4,894	0	17.1	31.3
		02 TRTHP SPC 478	Rm Peak	119	2.0	13,041	14,258	478	26.77	143	30	-4,894	0	17.1	31.3
	Zone - 213		Zn Peak	446	6.0	34,821	38,182	1,259			32	-13,813	0	17.1	31.3
	Zone - 213		Zn Block	446	6.0	34,772	38,140	1,259			32	-13,813	0	17.1	31.3
		02 CONFR COL 475	Rm Peak	114	5.0	12,575	14,177	461	26.98	138	30	-4,727	0	17.1	31.3
		02 CORR 02	Rm Peak	514	0.5	3,723	4,090	126	1.63	126	100	-3,761	0	17.1	31.3
		02 WTAPL 2001	Rm Peak	75	0.1	768	816	22	1.94	18	84	-549	0	17.1	31.3
	Zone - 214		Zn Peak	703	5.6	16,946	18,964	609			46	-9,037	0	17.1	31.3
	Zone - 214		Zn Block	703	5.6	16,942	18,914	609			46	-9,037	0	17.1	31.3
		02 OGENL 426	Rm Peak	55	1.0	894	1,174	30	3.59	30	100	-1,012	0	17.1	31.3
		02 OPROV 2521	Rm Peak	55	1.0	894	1,174	30	3.59	30	100	-1,012	0	17.1	31.3
		02 TEAMA 112	Rm Peak	172	3.0	2,713	3,407	90	3.51	90	100	-3,088	0	17.1	31.3
	Zone - 215		Zn Peak	282	5.0	4,254	5,508	150			100	-5,112	0	17.1	31.3
	Zone - 215		Zn Block	282	5.0	4,254	5,507	150			100	-5,112	0	17.1	31.3
		02 CORR 06	Rm Peak	565	0.6	4,092	4,496	138	1.63	138	100	-4,134	0	17.1	31.3
	Zone - 216		Zn Peak	565	0.6	4,092	4,496	138			100	-4,134	0	17.1	31.3
	Zone - 216		Zn Block	565	0.6	4,092	4,496	138			100	-4,134	0	17.1	31.3
		02 EXROM FM 684	Rm Peak	110	2.0	2,800	3,439	99	5.99	59	60	-2,024	0	17.1	31.3
		02 EXROM FM 685	Rm Peak	110	2.0	2,800	3,439	99	5.99	59	60	-2,024	0	17.1	31.3
		02 EXROM FM 686	Rm Peak	110	2.0	2,800	3,439	99	5.99	59	60	-2,024	0	17.1	31.3
	Zone - 217		Zn Peak	330	6.0	8,399	10,318	296			60	-6,073	0	17.1	31.3
	Zone - 217		Zn Block	330	6.0	8,399	10,317	296			60	-6,073	0	17.1	31.3
		02 CORR 07	Rm Peak	578	0.6	4,186	4,599	142	1.63	142	100	-4,229	0	17.1	31.3
	Zone - 218		Zn Peak	578	0.6	4,186	4,599	142			100	-4,229	0	17.1	31.3
	Zone - 218		Zn Block	578	0.6	4,186	4,599	142			100	-4,229	0	17.1	31.3
		02 CORR 08	Rm Peak	554	0.6	4,012	4,408	136	1.63	136	100	-4,054	0	17.1	31.3
		02 EXROM PEDS 597	Rm Peak	110	2.0	2,800	3,439	99	5.99	59	60	-2,024	0	17.1	31.3
		02 EXROM PEDS 601	Rm Peak	110	2.0	2,800	3,439	99	5.99	59	60	-2,024	0	17.1	31.3
	Zone - 219		Zn Peak	774	4.6	9,465	11,140	333			76	-8,103	0	17.1	31.3
	Zone - 219		Zn Block	774	4.6	9,465	11,140	333			76	-8,103	0	17.1	31.3
		02 WSGEN 02	Rm Peak	525	11.0	9,260	11,759	309	3.92	309	100	-10,549	0	17.1	31.3

*** This report does not display heating only systems.**

System	Zone	Room **		Floor Area ft²	People #	Coil Cooling Sensible Btu/h	Coil Cooling Total Btu/h	Space Design Max SA cfm	Air Changes ach/hr	VAV Minimum SA cfm	VAV Minimum %	Main Coil Heating Sensible Btu/h	Heating Fan Max SA cfm	Percent OA Clg	Percent OA Htg
	Zone - 220		Zn Peak	525	11.0	9,260	11,759	309			100	-10,549	0	17.1	31.3
	Zone - 220		Zn Block	525	11.0	9,260	11,759	309			100	-10,549	0	17.1	31.3
		02 CONSRENC 2001	Rm Peak	77	1.0	1,033	1,273	34	2.97	34	100	-1,173	0	17.1	31.3
		02 CONSRENC 2002	Rm Peak	77	1.0	1,033	1,273	34	2.97	34	100	-1,173	0	17.1	31.3
		02 CONSRENC 649	Rm Peak	77	1.0	1,033	1,273	34	2.97	34	100	-1,173	0	17.1	31.3
		02 CONSRENC 885	Rm Peak	77	1.0	1,033	1,273	34	2.97	34	100	-1,173	0	17.1	31.3
	Zone - 221		Zn Peak	308	4.0	3,906	4,866	137			100	-4,693	0	17.1	31.3
	Zone - 221		Zn Block	308	4.0	3,906	4,866	137			100	-4,693	0	17.1	31.3
		02 EXROM PEDS 596	Rm Peak	110	2.0	2,800	3,439	99	5.99	59	60	-2,024	0	17.1	31.3
		02 EXROM PEDS 602	Rm Peak	110	2.0	2,800	3,439	99	5.99	59	60	-2,024	0	17.1	31.3
		02 EXROM PEDS 604	Rm Peak	110	2.0	2,800	3,439	99	5.99	59	60	-2,024	0	17.1	31.3
	Zone - 222		Zn Peak	330	6.0	8,399	10,318	296			60	-6,073	0	17.1	31.3
	Zone - 222		Zn Block	330	6.0	8,399	10,317	296			60	-6,073	0	17.1	31.3
		02 EXROM PEDS 605	Rm Peak	110	2.0	2,800	3,439	99	5.99	59	60	-2,024	0	17.1	31.3
		02 EXROM PEDS 606	Rm Peak	110	2.0	2,800	3,439	99	5.99	59	60	-2,024	0	17.1	31.3
		02 EXROM PEDS 613	Rm Peak	110	2.0	2,800	3,439	99	5.99	59	60	-2,024	0	17.1	31.3
	Zone - 223		Zn Peak	330	6.0	8,399	10,318	296			60	-6,073	0	17.1	31.3
	Zone - 223		Zn Block	330	6.0	8,399	10,317	296			60	-6,073	0	17.1	31.3
		02 EXROM PEDS 615	Rm Peak	110	2.0	2,800	3,439	99	5.99	59	60	-2,024	0	17.1	31.3
		02 EXROM PEDS 616	Rm Peak	110	2.0	2,800	3,439	99	5.99	59	60	-2,024	0	17.1	31.3
		02 EXROM PEDS 617	Rm Peak	110	2.0	2,800	3,439	99	5.99	59	60	-2,024	0	17.1	31.3
	Zone - 224		Zn Peak	330	6.0	8,399	10,318	296			60	-6,073	0	17.1	31.3
	Zone - 224		Zn Block	330	6.0	8,399	10,317	296			60	-6,073	0	17.1	31.3
		02 AAMEN 865	Rm Peak	75	0.5	1,229	1,458	42	3.69	42	100	-1,417	0	17.1	31.3
		02 AEQST MPL 695	Rm Peak	72	0.5	1,180	1,399	40	3.69	40	100	-1,361	0	17.1	31.3
		02 SCLSU 828	Rm Peak	86	0.6	1,410	1,671	48	3.69	48	100	-1,625	0	17.1	31.3
		02 TLSTF 03	Rm Peak	126	0.0	1,458	1,713	126	6.67	38	30	-1,291	0	17.1	31.3
	Zone - 225		Zn Peak	359	1.6	5,091	6,054	255			65	-5,694	0	24.4	31.3
	Zone - 225		Zn Block	359	1.6	5,091	6,054	178			93	-5,694	0	24.4	31.3
		02 SCLSU 691	Rm Peak	69	0.5	1,131	1,341	38	3.69	38	100	-1,304	0	17.1	31.3
		02 TRTHP SPC 2406	Rm Peak	120	2.0	2,986	3,639	105	5.85	61	58	-2,098	0	17.1	31.3
		02 TRTHP-SPC 2001	Rm Peak	120	2.0	2,986	3,639	105	5.85	61	58	-2,098	0	17.1	31.3
	Zone - 231		Zn Peak	309	4.5	7,057	8,573	249			65	-5,499	0	17.1	31.3
	Zone - 231		Zn Block	309	4.5	7,057	8,573	249			65	-5,499	0	17.1	31.3
		02 TRTHP SPC 2001J	Rm Peak	120	2.0	2,986	3,639	105	5.85	61	58	-2,098	0	17.1	31.3
		02 TRTHP-SPC 2001K	Rm Peak	120	2.0	2,986	3,639	105	5.85	61	58	-2,098	0	17.1	31.3
		02 TRTHP-SPC 241	Rm Peak	120	2.0	3,284	3,967	105	5.85	61	58	-2,098	0	17.1	31.3
	Zone - 232		Zn Peak	360	6.0	9,221	11,209	316			58	-6,293	0	17.1	31.3
	Zone - 232		Zn Block	360	6.0	9,157	11,205	316			58	-6,293	0	17.1	31.3
		03 OPROV 3508	Rm Peak	55	1.0	2,553	2,692	107	13.02	32	30	-1,100	0	17.1	31.3
		03 OPROV 3509	Rm Peak	55	1.0	2,553	2,692	107	13.02	32	30	-1,100	0	17.1	31.3

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System	Zone	Room **		Floor Area ft²	People #	Coil Cooling Sensible Btu/h	Coil Cooling Total Btu/h	Space Design Max SA cfm	Air Changes ach/hr	VAV Minimum SA cfm	VAV Minimum %	Main Coil Heating Sensible Btu/h	Heating Fan Max SA cfm	Percent OA Clg	Percent OA Htg
		03 OPROV 3510	Rm Peak	55	1.0	2,553	2,692	107	13.02	32	30	-1,100	0	17.1	31.3
		03 WACPF 2500E	Rm Peak	332	0.3	4,143	4,098	157	3.15	81	52	-2,429	0	17.1	31.3
	Zone - 233		Zn Peak	497	3.3	11,558	11,930	479			37	-5,730	0	17.1	31.3
	Zone - 233		Zn Block	497	3.3	11,558	11,930	479			37	-5,730	0	17.1	31.3
		03 OPROV 3513	Rm Peak	55	1.0	3,237	4,118	147	17.86	44	30	-1,509	0	17.1	31.3
		03 OPROV 3514	Rm Peak	55	1.0	1,040	1,328	30	3.59	30	100	-1,012	0	17.1	31.3
		03 OPROV 890	Rm Peak	55	1.0	3,237	4,118	147	17.86	44	30	-1,509	0	17.1	31.3
		03 OPROV 891	Rm Peak	55	1.0	4,665	4,946	173	20.94	52	30	-1,770	0	17.1	31.3
	Zone - 248		Zn Peak	220	4.0	12,333	14,666	497			34	-5,801	0	17.5	31.3
	Zone - 248		Zn Block	220	4.0	13,134	14,190	485			35	-5,801	0	17.5	31.3
		03 CORR 06	Rm Peak	565	0.6	5,760	6,176	138	1.63	138	100	-4,134	0	17.1	31.3
	Zone - 249		Zn Peak	565	0.6	5,760	6,176	138			100	-4,134	0	17.1	31.3
	Zone - 249		Zn Block	565	0.6	5,760	6,176	138			100	-4,134	0	17.1	31.3
		03 WSGEN 836	Rm Peak	261	10.0	7,841	10,087	235	5.99	235	100	-8,008	0	17.1	31.3
	Zone - 250		Zn Peak	261	10.0	7,841	10,087	235			100	-8,008	0	17.1	31.3
	Zone - 250		Zn Block	261	10.0	7,841	10,087	235			100	-8,008	0	17.1	31.3
		03 OGENL 2001B	Rm Peak	55	1.0	1,098	1,391	32	3.86	30	93	-1,012	0	17.1	31.3
		03 OGENL 2001P	Rm Peak	55	1.0	1,098	1,391	32	3.86	30	93	-1,012	0	17.1	31.3
		03 WSGEN 841	Rm Peak	399	3.0	10,015	10,439	384	6.42	139	36	-4,749	0	17.1	31.3
	Zone - 251		Zn Peak	509	5.0	12,608	13,618	448			44	-6,773	0	17.1	31.3
	Zone - 251		Zn Block	509	5.0	11,746	12,856	448			44	-6,773	0	17.1	31.3
		03 INJCT 2001	Rm Peak	110	2.0	3,895	4,627	127	7.68	59	47	-2,024	0	17.1	31.3
		03 OBSRM PRM 2001	Rm Peak	110	2.0	3,325	3,976	104	6.31	59	57	-2,024	0	17.1	31.3
		03 WSGEN 704	Rm Peak	110	1.0	1,926	2,274	55	3.36	41	75	-1,415	0	17.1	31.3
	Zone - 252		Zn Peak	330	5.0	9,129	10,859	286			56	-5,464	0	17.1	31.3
	Zone - 252		Zn Block	330	5.0	9,097	10,856	286			56	-5,464	0	17.1	31.3
		03 CONFR COL 2001	Rm Peak	119	4.0	3,506	4,346	97	5.43	97	100	-3,310	0	17.1	31.3
		03 EXROM 283	Rm Peak	86	2.0	3,386	4,081	111	8.60	54	49	-1,849	0	17.1	31.3
		03 EXROM 838	Rm Peak	86	2.0	3,386	4,081	111	8.60	54	49	-1,849	0	17.1	31.3
		03 TLPAT 585	Rm Peak	65	0.0	1,015	1,109	65	6.67	20	30	-666	0	17.1	31.3
	Zone - 253		Zn Peak	356	8.0	11,282	13,607	384			59	-7,673	0	19.0	31.3
	Zone - 253		Zn Block	356	8.0	11,161	13,499	345			65	-7,673	0	19.0	31.3
		03 CORR 09	Rm Peak	566	0.6	5,770	6,187	139	1.63	139	100	-4,142	0	17.1	31.3
		03 OBSRM BAY 2001	Rm Peak	88	2.0	2,605	3,239	84	6.39	55	65	-1,863	0	17.1	31.3
		03 OBSRM BAY 796	Rm Peak	88	2.0	2,605	3,239	84	6.39	55	65	-1,863	0	17.1	31.3
		03 SCLSU 2001	Rm Peak	72	0.5	1,370	1,600	40	3.69	40	100	-1,361	0	17.1	31.3
	Zone - 254		Zn Peak	814	5.1	12,187	14,103	347			83	-9,229	0	17.1	31.3
	Zone - 254		Zn Block	814	5.1	12,049	13,991	347			83	-9,229	0	17.1	31.3
		03 EXROM INT 584	Rm Peak	110	2.0	3,072	3,739	99	5.99	59	60	-2,024	0	17.1	31.3
		03 SCREN DIA 583	Rm Peak	113	2.0	3,135	3,807	101	5.94	60	59	-2,046	0	17.1	31.3
		03 TRTHP PRV 578	Rm Peak	113	2.0	3,135	3,807	101	5.94	60	59	-2,046	0	17.1	31.3

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System	Zone Room **		Floor Area ft²	People #	Coil Cooling Sensible Btu/h	Coil Cooling Total Btu/h	Space Design Max SA cfm	Air Changes ach/hr	VAV Minimum SA cfm	VAV Minimum %	Main Coil Heating Sensible Btu/h	Heating Fan Max SA cfm	Percent OA Clg	Percent OA Htg
	Zone - 255	Zn Peak	336	6.0	9,343	11,354	300			60	-6,117	0	17.1	31.3
	Zone - 255	Zn Block	336	6.0	9,343	11,354	300			60	-6,117	0	17.1	31.3
	03 CORR 10	Rm Peak	467	0.5	48,289	50,849	1,695	24.19	508	30	-17,362	0	17.1	31.3
	Zone - 256	Zn Peak	467	0.5	48,289	50,849	1,695			30	-17,362	0	17.1	31.3
	Zone - 256	Zn Block	467	0.5	48,289	50,849	1,695			30	-17,362	0	17.1	31.3
	03 CORR 07	Rm Peak	578	0.6	5,892	6,318	142	1.63	142	100	-4,229	0	17.1	31.3
	Zone - 257	Zn Peak	578	0.6	5,892	6,318	142			100	-4,229	0	17.1	31.3
	Zone - 257	Zn Block	578	0.6	5,892	6,318	142			100	-4,229	0	17.1	31.3
	03 CORR 08	Rm Peak	554	0.6	5,647	6,055	136	1.63	136	100	-4,054	0	17.1	31.3
	03 EXROM INT 571	Rm Peak	110	2.0	3,072	3,739	99	5.99	59	60	-2,024	0	17.1	31.3
	03 EXROM INT 574	Rm Peak	110	2.0	3,072	3,739	99	5.99	59	60	-2,024	0	17.1	31.3
	Zone - 258	Zn Peak	774	4.6	11,680	13,423	333			76	-8,103	0	17.1	31.3
	Zone - 258	Zn Block	774	4.6	11,545	13,314	333			76	-8,103	0	17.1	31.3
	03 EXROM INT 556	Rm Peak	110	2.0	3,072	3,739	99	5.99	59	60	-2,024	0	17.1	31.3
	03 EXROM INT 567	Rm Peak	110	2.0	3,072	3,739	99	5.99	59	60	-2,024	0	17.1	31.3
	03 EXROM INT 568	Rm Peak	110	2.0	3,072	3,739	99	5.99	59	60	-2,024	0	17.1	31.3
	Zone - 262	Zn Peak	330	6.0	9,215	11,218	296			60	-6,073	0	17.1	31.3
	Zone - 262	Zn Block	330	6.0	9,215	11,218	296			60	-6,073	0	17.1	31.3
	03 EXROM INT 3214	Rm Peak	121	2.0	3,305	3,989	106	5.84	62	58	-2,105	0	17.1	31.3
	03 EXROM INT 575	Rm Peak	110	2.0	3,072	3,739	99	5.99	59	60	-2,024	0	17.1	31.3
	03 EXROM INT 576	Rm Peak	110	2.0	3,072	3,739	99	5.99	59	60	-2,024	0	17.1	31.3
	Zone - 263	Zn Peak	341	6.0	9,449	11,468	304			59	-6,154	0	17.1	31.3
	Zone - 263	Zn Block	341	6.0	9,449	11,468	304			59	-6,154	0	17.1	31.3
	03 EXROM INT 524	Rm Peak	110	2.0	3,072	3,739	99	5.99	59	60	-2,024	0	17.1	31.3
	03 EXROM INT 537	Rm Peak	110	2.0	3,072	3,739	99	5.99	59	60	-2,024	0	17.1	31.3
	03 EXROM INT 539	Rm Peak	110	2.0	3,072	3,739	99	5.99	59	60	-2,024	0	17.1	31.3
	Zone - 264	Zn Peak	330	6.0	9,215	11,218	296			60	-6,073	0	17.1	31.3
	Zone - 264	Zn Block	330	6.0	9,215	11,218	296			60	-6,073	0	17.1	31.3
	03 WSGEN 02	Rm Peak	525	11.0	10,634	13,221	309	3.92	309	100	-10,549	0	17.1	31.3
	Zone - 265	Zn Peak	525	11.0	10,634	13,221	309			100	-10,549	0	17.1	31.3
	Zone - 265	Zn Block	525	11.0	10,634	13,221	309			100	-10,549	0	17.1	31.3
	03 CONSR ENC 793	Rm Peak	77	3.9	2,727	3,580	85	7.38	85	100	-2,911	0	17.1	31.3
	03 CONSR ENC 794	Rm Peak	77	3.9	2,727	3,580	85	7.38	85	100	-2,911	0	17.1	31.3
	03 CONSR ENC 858	Rm Peak	77	3.9	2,727	3,580	85	7.38	85	100	-2,911	0	17.1	31.3
	Zone - 266	Zn Peak	231	11.5	7,802	10,361	256			100	-8,733	0	17.1	31.3
	Zone - 266	Zn Block	231	11.5	7,802	10,361	256			100	-8,733	0	17.1	31.3
System - 003 - WEST		**Sys Peak**	**27,412**	**378.6**	**713,931**	**841,970**	**25,355**				**-472,658**	**0**	**20.0**	**31.3**
System - 003 - WEST		**Sys Block**	**27,412**	**378.6**	**649,074**	**764,495**	**21,690**				**-472,655**	**0**	**20.0**	**31.3**

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ASHRAE Standard 62.1-2004-2010

By CannonDesign

System Ventilation Requirements

AHU Location	Description		∑Vpz cfm	Ps People	∑ Pz People	D Ps / ∑Pz	Vou cfm	Vps cfm	Xs	Ev	Vot cfm	%OA Vot / Vps
Alternative 1												
System	System - 002 - EAST	Cooling	23,322	291	291	1.00	3,105	21,072	0.147	0.700	4,435	21.0
		Heating	10,320	291	291	1.00	3,105	10,320	0.301	0.851	3,649	35.4
System	System - 003 - WEST	Cooling	25,355	379	379	1.00	3,520	21,690	0.162	0.812	4,333	20.0
		Heating	13,842	379	379	1.00	3,520	13,842	0.254	0.904	3,892	28.1

* Apply Single Zone Ventilation Calculation

ASHRAE Standard 62.1-2004-2010

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Ventilation Parameters

System Zone Room	Occupancy Category	Rp cfm / p	Pz People	Ra cfm/ft²	Az ft²	Vbz cfm	Std 170 Min OA ach	Cooling Ez	Cooling Voz cfm	Heating Ez	Heating Voz cfm
Alternative 1											
01 VESTIDRO	Corridors	0.00	1.87	0.06	1,874	112		0.70	161	0.80	141
Zone - 022		0.00	1.87	0.06	1,874	112			161		141
01 LOADDSMD	Storage rooms	0.00	0.00	0.12	378	45		1.00	45	0.80	57
01 SSECR LN 1514A	Laundry Rooms, Central	5.00	0.44	0.12	63	10		1.00	10	0.80	12
01 SHSKG 1501	Storage rooms	0.00	0.00	0.12	201	24		1.00	24	0.80	30
01 TLSTF 620	Default Std62	0.00	0.00	0.00	157	0		1.00	0	0.80	0
Zone - 023		5.00	0.44	0.10	799	79			79		99
01 TER 1504	Elevator Machine Rooms	0.00	1.63	0.12	325	39		1.00	39	0.80	49
Zone - 024		0.00	1.63	0.12	325	39			39		49
01 ST1-1	Corridors	0.00	0.00	0.06	313	19		1.00	19	0.80	23
Zone - 025		0.00	0.00	0.06	313	19			19		23
01 VESTI 01	Corridors	0.00	0.24	0.06	244	15		0.70	21	0.80	18
Zone - 026		0.00	0.24	0.06	244	15			21		18
02 WATGN 298	Lobbies	5.00	18.00	0.06	865	142		1.00	142	0.80	177
Zone - 027		5.00	18.00	0.06	865	142			142		177
01 WTAGN LAB 1301B	Lobbies	5.00	18.00	0.06	396	114		1.00	114	0.80	142
Zone - 028		5.00	18.00	0.06	396	114			114		142
01 GYMNA 510	Health club/ aerobics room	20.00	2.55	0.06	509	81		1.00	81	0.80	102
01 BLDRR 492	Office space	5.00	2.00	0.06	101	16		1.00	16	0.80	20
Zone - 029		13.40	4.55	0.06	610	98			98		122
01 WACPR MOB 1309	Office space	5.00	3.00	0.06	339	35		1.00	35	0.80	44
Zone - 030		5.00	3.00	0.06	339	35			35		44
01 ST2-1	Corridors	0.00	0.00	0.06	217	13		1.00	13	0.80	16
01 CORR 03	Corridors	0.00	0.72	0.06	724	43		0.70	62	0.80	54
01 EVSCL 539	Storage rooms	0.00	1.00	0.12	48	6		1.00	6	0.80	7
Zone - 031		0.00	1.72	0.06	989	62			81		78
01 WATGN 30	Lobbies	5.00	22.00	0.06	900	164		1.00	164	0.80	205
Zone - 032		5.00	22.00	0.06	900	164			164		205
01 RECEP MBL 519	Lobbies	5.00	14.00	0.06	1,241	144		1.00	144	0.80	181
Zone - 033		5.00	14.00	0.06	1,241	144			144		181
01 WTAGN 746	Lobbies	5.00	24.00	0.06	1,654	219		1.00	219	0.80	274

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System Zone Room	Occupancy Category	Rp cfm / p	Pz People	Ra cfm/ft²	Az ft²	Vbz cfm	Std 170 Min OA ach	Cooling Ez	Cooling Voz cfm	Heating Ez	Heating Voz cfm
Alternative 1											
Zone - 035		5.00	24.00	0.06	1,654	219			219		274
01 TLPATS 690	Default Std62	0.00	0.00	0.00	115	0		1.00	0	0.80	0
Zone - 036		0.00	0.00	0.00	115	0			0		0
01 PHARM SML 268	Office space	5.00	7.00	0.06	1,061	99		1.00	99	0.80	123
01 SGENL 598	Storage rooms	0.00	0.00	0.12	105	13		1.00	13	0.80	16
Zone - 045		5.00	7.00	0.07	1,166	111			111		139
02 OPROV 2501	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
02 OPROV 898	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
02 OPROV 894	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
02 OPROV 895	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
Zone - 046		5.00	4.00	0.06	220	33			33		42
02 WACPF 2500C	Corridors	0.00	0.33	0.06	332	20		0.70	28	0.80	25
02 OPROV 2505	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
02 OPROV 2506	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
02 OPROV 2507	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
Zone - 047		4.50	3.33	0.06	497	45			53		56
02 TLPAT 01	Default Std62	0.00	0.00	0.00	152	0		1.00	0	0.80	0
02 WATGN 480	Lobbies	5.00	24.26	0.06	808	170		1.00	170	0.80	212
Zone - 048		5.00	24.26	0.05	960	170			170		212
02 ST2-1	Corridors	0.00	0.00	0.06	315	19		1.00	19	0.80	24
Zone - 049		0.00	0.00	0.06	315	19			19		24
02 EXROM FM 638	Office space	5.00	2.00	0.06	109	17		1.00	17	0.80	21
02 EXROM FM 656	Office space	5.00	2.00	0.06	109	17		1.00	17	0.80	21
02 EXROM FM 657	Office space	5.00	2.00	0.06	109	17		1.00	17	0.80	21
Zone - 050		5.00	6.00	0.06	327	50			50		62
02 EXROM FM 716	Office space	5.00	2.00	0.06	121	17		1.00	17	0.80	22
02 EXROM FM 658	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
02 EXROM FM 659	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
Zone - 051		5.00	6.00	0.06	341	50			50		63
02 EXROM FM 661	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
02 EXROM FM 667	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21

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System Zone Room	Occupancy Category	Rp cfm / p	Pz People	Ra cfm/ft²	Az ft²	Vbz cfm	Std 170 Min OA ach	Cooling Ez	Cooling Voz cfm	Heating Ez	Heating Voz cfm
Alternative 1											
02 CORR 03	Corridors	0.00	0.55	0.06	554	33		0.70	47	0.80	42
02 TLSTF 2301	Default Std62	0.00	0.00	0.00	67	0		1.00	0	0.80	0
Zone - 052		4.39	4.55	0.06	841	66			81		83
02 CORR 04	Corridors	0.00	0.58	0.06	578	35		0.70	50	0.80	43
02 INJCT 690	Office space	5.00	2.00	0.06	70	14		1.00	14	0.80	18
02 EXROM FM 913	Office space	5.00	2.00	0.06	100	16		1.00	16	0.80	20
Zone - 053		4.37	4.58	0.06	748	65			80		81
02 CORR 05	Corridors	0.00	0.60	0.06	595	36		0.70	51	0.80	45
Zone - 054		0.00	0.60	0.06	595	36			51		45
02 ST2-2	Corridors	0.00	0.00	0.06	191	11		1.00	11	0.80	14
02 TEAMA 2302	Storage rooms	0.00	0.00	0.12	52	6		1.00	6	0.80	8
Zone - 055		0.00	0.00	0.07	243	18			18		22
02 TEAMA 109	Office space	5.00	3.00	0.06	172	25		1.00	25	0.80	32
02 OPROV 2518	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
02 OPROV 2519	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
Zone - 056		5.00	5.00	0.06	282	42			42		52
02 CONFR MED 2520	Conference/ meeting	5.00	11.00	0.06	220	68		1.00	68	0.80	85
Zone - 057		5.00	11.00	0.06	220	68			68		85
02 WSGEN 01	Office space	5.00	11.00	0.06	525	87		1.00	87	0.80	108
Zone - 226		5.00	11.00	0.06	525	87			87		108
02 WSGENENC 869	Office space	5.00	2.00	0.06	77	15		1.00	15	0.80	18
02 WSGENENC 790	Office space	5.00	2.00	0.06	77	15		1.00	15	0.80	18
02 WSGENENC 791	Office space	5.00	2.00	0.06	77	15		1.00	15	0.80	18
Zone - 227		5.00	6.00	0.06	231	44			44		55
02 PRGEN 01	Office space	5.00	2.00	0.06	156	19		1.00	19	0.80	24
Zone - 228		5.00	2.00	0.06	156	19			19		24
02 MEDPR 466	Laundry Rooms, Central	5.00	0.82	0.12	117	18		1.00	18	0.80	23
02 UTILSMED 467	Laundry Rooms, Central	5.00	0.57	0.12	81	13		1.00	13	0.80	16
02 TLPAT 02	Default Std62	0.00	0.00	0.00	105	0		1.00	0	0.80	0
Zone - 229		5.00	1.38	0.08	303	31			31		38
02 EXROM FM 696	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21

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System Zone Room	Occupancy Category	Rp cfm / p	Pz People	Ra cfm/ft²	Az ft²	Vbz cfm	Std 170 Min OA ach	Cooling Ez	Cooling Voz cfm	Heating Ez	Heating Voz cfm
Alternative 1											
02 EXROM PEDS 696	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
02 EXSNA NEG FM 721	Office space	5.00	2.00	0.06	130	18		1.00	18	0.80	22
02 EXSNA NEG PEDS 622	Office space	5.00	2.00	0.06	130	18		1.00	18	0.80	22
Zone - 230		5.00	8.00	0.06	480	69			69		86
03 EXROM INT 523	Office space	5.00	2.00	0.06	109	17		1.00	17	0.80	21
03 EXROM INT 521	Office space	5.00	2.00	0.06	109	17		1.00	17	0.80	21
03 EXROM INT 511	Office space	5.00	2.00	0.06	109	17		1.00	17	0.80	21
Zone - 234		5.00	6.00	0.06	327	50			50		62
03 CORR 03	Corridors	0.00	0.55	0.06	554	33		0.70	47	0.80	42
03 EXROM OB 641	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
03 EXROM OB 653	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
Zone - 235		4.39	4.55	0.06	774	66			81		83
03 CORR 04	Corridors	0.00	0.58	0.06	578	35		0.70	50	0.80	43
Zone - 236		0.00	0.58	0.06	578	35			50		43
03 EXROM OB 3104	Office space	5.00	2.00	0.06	122	17		1.00	17	0.80	22
03 EXROM OB 655	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
03 EXROM OB 654	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
Zone - 237		5.00	6.00	0.06	342	51			51		63
03 WSGENENC 906	Office space	5.00	2.00	0.06	77	15		1.00	15	0.80	18
03 WSGENENC 872	Office space	5.00	2.00	0.06	77	15		1.00	15	0.80	18
03 WSGENENC 905	Office space	5.00	2.00	0.06	77	15		1.00	15	0.80	18
Zone - 238		5.00	6.00	0.06	231	44			44		55
03 WSGEN 01	Office space	5.00	11.00	0.06	525	87		1.00	87	0.80	108
Zone - 239		5.00	11.00	0.06	525	87			87		108
03 TLSTF 3301	Default Std62	0.00	0.00	0.00	67	0		1.00	0	0.80	0
03 CORR 05	Corridors	0.00	0.60	0.06	595	36		0.70	51	0.80	45
Zone - 240		0.00	0.60	0.05	662	36			51		45
03 ST2-3	Corridors	0.00	0.00	0.06	191	11		1.00	11	0.80	14
03 EVS 3302	Storage rooms	0.00	0.00	0.12	52	6		1.00	6	0.80	8
Zone - 241		0.00	0.00	0.07	243	18			18		22
03 EXROM OB 646	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21

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System Zone Room	Occupancy Category	Rp cfm / p	Pz People	Ra cfm/ft²	Az ft²	Vbz cfm	Std 170 Min OA ach	Cooling Ez	Cooling Voz cfm	Heating Ez	Heating Voz cfm
Alternative 1											
03 EXROM OB 642	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
03 UTILS PRO 318	Laundry Rooms, Central	5.00	0.70	0.12	100	15		1.00	15	0.80	19
Zone - 242		5.00	4.70	0.08	320	49			49		61
03 OPROV 3501	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
03 OPROV 892	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
03 OPROV 888	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
03 OPROV 889	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
Zone - 243		5.00	4.00	0.06	220	33			33		42
03 WACPF 2500C	Corridors	0.00	0.33	0.06	332	20		0.70	28	0.80	25
03 OPROV 3505	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
03 OPROV 3506	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
03 OPROV 3507	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
Zone - 244		4.50	3.33	0.06	497	45			53		56
03 WATGN 07	Lobbies	5.00	18.00	0.06	1,311	169		1.00	169	0.80	211
Zone - 245		5.00	18.00	0.06	1,311	169			169		211
03 ST1-1	Corridors	0.00	0.00	0.06	290	17		1.00	17	0.80	22
Zone - 246		0.00	0.00	0.06	290	17			17		22
03 TLPAT 03	Default Std62	0.00	0.00	0.00	147	0		1.00	0	0.80	0
Zone - 247		0.00	0.00	0.00	147	0			0		0
03 PRGEN 856	Office space	5.00	2.00	0.06	180	21		1.00	21	0.80	26
03 SCLSU 853	Laundry Rooms, Central	5.00	1.15	0.12	164	25		1.00	25	0.80	32
Zone - 259		5.00	3.15	0.09	344	46			46		58
03 MEDPR 1243	Laundry Rooms, Central	5.00	0.63	0.12	90	14		1.00	14	0.80	17
03 UTILS MED 592	Laundry Rooms, Central	5.00	0.60	0.12	86	13		1.00	13	0.80	17
03 TLPAT 3115	Default Std62	0.00	0.00	0.00	104	0		1.00	0	0.80	0
Zone - 260		5.00	1.23	0.08	280	27			27		34
03 EXROM INT 577	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
03 EXROM INT 550	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
03 EXROM INT NEG 295	Office space	5.00	2.00	0.06	130	18		1.00	18	0.80	22
03 EXROM INT NEG 294	Office space	5.00	2.00	0.06	130	18		1.00	18	0.80	22
Zone - 261		5.00	8.00	0.06	480	69			69		86

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System Zone Room	Occupancy Category	Rp cfm / p	Pz People	Ra cfm/ft²	Az ft²	Vbz cfm	Std 170 Min OA ach	Cooling Ez	Cooling Voz cfm	Heating Ez	Heating Voz cfm
Alternative 1											
System - 002 - EAST		4.97	291.30	0.06	26,685	3,105			3,284		3,881
01 ELEC 1502	Elevator Machine Rooms	0.00	1.26	0.12	251	30		1.00	30	0.80	38
Zone - 185		0.00	1.26	0.12	251	30			30		38
01 DRSSB 728	Office space	5.00	1.00	0.06	50	8		1.00	8	0.80	10
01 DRSSB 664	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
01 CORR 04	Corridors	0.00	0.60	0.06	600	36		0.70	51	0.80	45
Zone - 186		3.85	2.60	0.06	705	52			68		65
01 PRGEN 726	Office space	5.00	2.22	0.06	317	30		1.00	30	0.80	38
Zone - 187		5.00	2.22	0.06	317	30			30		38
01 OPROV 1407	Office space	5.00	1.00	0.06	131	13		1.00	13	0.80	16
01 OPROV 1410	Office space	5.00	1.00	0.06	131	13		1.00	13	0.80	16
01 OPROV 1409	Office space	5.00	1.00	0.06	131	13		1.00	13	0.80	16
01 OPROV 1408	Office space	5.00	1.00	0.06	104	11		1.00	11	0.80	14
Zone - 188		5.00	4.00	0.06	497	50			50		62
01 CORR 01	Corridors	0.00	1.05	0.06	1,051	63		0.70	90	0.80	79
Zone - 189		0.00	1.05	0.06	1,051	63			90		79
01 OPROV 611	Office space	5.00	1.00	0.06	130	13		1.00	13	0.80	16
01 OPROV 610	Office space	5.00	1.00	0.06	130	13		1.00	13	0.80	16
01 OPROV 609	Office space	5.00	1.00	0.06	130	13		1.00	13	0.80	16
01 OPROV 608	Office space	5.00	1.00	0.06	130	13		1.00	13	0.80	16
Zone - 190		5.00	4.00	0.06	520	51			51		64
01 OPROV 607	Office space	5.00	1.00	0.06	130	13		1.00	13	0.80	16
01 OPROV 600	Office space	5.00	1.00	0.06	130	13		1.00	13	0.80	16
01 OPROV 419	Office space	5.00	1.00	0.06	102	11		1.00	11	0.80	14
01 SGENL 530	Storage rooms	0.00	0.00	0.12	60	7		1.00	7	0.80	9
Zone - 191		5.00	3.00	0.07	422	44			44		55
01 CORR 02	Corridors	0.00	0.14	0.06	136	8		0.70	12	0.80	10
Zone - 192		0.00	0.14	0.06	136	8			12		10
01 CONFRMED 1010	Conference/ meeting	5.00	20.15	0.06	403	125		1.00	125	0.80	156
Zone - 193		5.00	20.15	0.06	403	125			125		156
01 CONFRMED 1011	Conference/ meeting	5.00	20.15	0.06	403	125		1.00	125	0.80	156

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System Zone Room	Occupancy Category	Rp cfm / p	Pz People	Ra cfm/ft²	Az ft²	Vbz cfm	Std 170 Min OA ach	Cooling Ez	Cooling Voz cfm	Heating Ez	Heating Voz cfm
Alternative 1											
Zone - 194		5.00	20.15	0.06	403	125			125		156
01 SDIETCOF	Storage rooms	0.00	0.00	0.12	77	9		1.00	9	0.80	12
01 WTAGN 01	Lobbies	5.00	17.00	0.06	608	121		1.00	121	0.80	152
01 TLPAT 01	Default Std62	0.00	0.00	0.00	150	0		1.00	0	0.80	0
Zone - 195		5.00	17.00	0.05	835	131			131		163
01 LACTN 1506	Office space	5.00	1.00	0.06	105	11		1.00	11	0.80	14
01 TLPAT 652	Default Std62	0.00	0.00	0.00	58	0		1.00	0	0.80	0
01 LNGST 2001	Lobbies	5.00	5.00	0.06	220	38		1.00	38	0.80	48
01 TLPTS 2001	Default Std62	0.00	0.00	0.00	57	0		1.00	0	0.80	0
Zone - 196		5.00	6.00	0.04	440	50			50		62
01 DRSSA 550	Office space	5.00	2.00	0.06	252	25		1.00	25	0.80	31
01 MAMO 508	Office space	5.00	2.00	0.06	150	19		1.00	19	0.80	24
Zone - 197		5.00	4.00	0.06	402	44			44		55
01 GROUPMED 1210	Office space	5.00	25.00	0.06	576	160		1.00	160	0.80	199
Zone - 198		5.00	25.00	0.06	576	160			160		199
01 GROUPMED 1403	Office space	5.00	25.00	0.06	576	160		1.00	160	0.80	199
Zone - 199		5.00	25.00	0.06	576	160			160		199
01 DRSSA 670	Office space	5.00	1.00	0.06	100	11		1.00	11	0.80	14
01 UTILS PRO 785	Storage rooms	0.00	0.00	0.12	90	11		1.00	11	0.80	14
01 TLSTF 761	Default Std62	0.00	0.00	0.00	64	0		1.00	0	0.80	0
01 AAMEN 328	Laundry Rooms, Central	5.00	0.91	0.12	130	20		1.00	20	0.80	25
01 SCLSU 849	Laundry Rooms, Central	5.00	0.36	0.12	51	8		1.00	8	0.80	10
Zone - 200		5.00	2.27	0.09	435	50			50		62
01 IUSND 666	Office space	5.00	2.00	0.06	235	24		1.00	24	0.80	30
01 IBONE 665	Office space	5.00	2.00	0.06	140	18		1.00	18	0.80	23
Zone - 201		5.00	4.00	0.06	375	43			43		53
01 OGENL 675	Office space	5.00	1.00	0.06	101	11		1.00	11	0.80	14
01 SGENL 676	Storage rooms	0.00	0.00	0.12	81	10		1.00	10	0.80	12
01 TLPAT 529	Default Std62	0.00	0.00	0.00	167	0		1.00	0	0.80	0
01 OGENL 850	Office space	5.00	1.00	0.06	88	10		1.00	10	0.80	13
01 OGENL 450	Office space	5.00	1.00	0.06	54	8		1.00	8	0.80	10

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System Zone Room	Occupancy Category	Rp cfm / p	Pz People	Ra cfm/ft²	Az ft²	Vbz cfm	Std 170 Min OA ach	Cooling Ez	Cooling Voz cfm	Heating Ez	Heating Voz cfm
Alternative 1											
Zone - 202		5.00	3.00	0.05	491	39			39		49
01 WATGN 29	Lobbies	5.00	24.00	0.06	977	179		1.00	179	0.80	223
Zone - 203		5.00	24.00	0.06	977	179			179		223
01 CORR 05	Corridors	0.00	0.97	0.06	968	58		0.70	83	0.80	73
Zone - 204		0.00	0.97	0.06	968	58			83		73
02 OPROV 2508	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
02 OPROV 2509	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
02 OPROV 2510	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
02 WACPF 2500E	Corridors	0.00	0.33	0.06	332	20		0.70	28	0.80	25
Zone - 205		4.50	3.33	0.06	497	45			53		56
02 OPROV 897	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
02 OPROV 896	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
02 OPROV 2513	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
02 OPROV 2514	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
Zone - 206		5.00	4.00	0.06	220	33			33		42
02 WSGEN 326	Office space	5.00	12.00	0.06	285	77		1.00	77	0.80	96
Zone - 207		5.00	12.00	0.06	285	77			77		96
02 TRAUDPED 717	Office space	5.00	2.00	0.06	80	15		1.00	15	0.80	18
02 SCLSU 878	Laundry Rooms, Central	5.00	0.56	0.12	80	12		1.00	12	0.80	15
02 EXROM 877	Office space	5.00	2.00	0.06	160	20		1.00	20	0.80	24
Zone - 208		5.00	4.56	0.08	320	47			47		58
02 CORR 01	Corridors	0.00	0.40	0.06	403	24		0.70	35	0.80	30
Zone - 209		0.00	0.40	0.06	403	24			35		30
02 OBSRM BAY 271	Office space	5.00	2.00	0.06	86	15		1.00	15	0.80	19
02 OBSRM BAY 272	Office space	5.00	2.00	0.06	86	15		1.00	15	0.80	19
02 EXROM 857	Office space	5.00	2.00	0.06	54	13		1.00	13	0.80	17
Zone - 210		5.00	6.00	0.06	226	44			44		54
02 LNGST 506	Lobbies	5.00	4.00	0.06	153	29		1.00	29	0.80	36
02 TLPAT 689	Default Std62	0.00	0.00	0.00	51	0		1.00	0	0.80	0
02 TRTHP SPC 687	Office space	5.00	2.00	0.06	121	17		1.00	17	0.80	22
Zone - 211		5.00	6.00	0.05	325	46			46		58

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Ventilation Parameters

System Zone Room	Occupancy Category	Rp cfm / p	Pz People	Ra cfm/ft²	Az ft²	Vbz cfm	Std 170 Min OA ach	Cooling Ez	Cooling Voz cfm	Heating Ez	Heating Voz cfm
Alternative 1											
02 TRTHP SPC 683	Office space	5.00	2.00	0.06	121	17		1.00	17	0.80	22
02 TRTHP SPC 688	Office space	5.00	2.00	0.06	121	17		1.00	17	0.80	22
02 TRTHP SPC 680	Office space	5.00	2.00	0.06	121	17		1.00	17	0.80	22
Zone - 212		5.00	6.00	0.06	363	52			52		65
02 APRNT 246	Storage rooms	0.00	0.00	0.12	89	11		1.00	11	0.80	13
02 TRTHP SPC 476	Office space	5.00	2.00	0.06	119	17		1.00	17	0.80	21
02 TRTHP SPC 477	Office space	5.00	2.00	0.06	119	17		1.00	17	0.80	21
02 TRTHP SPC 478	Office space	5.00	2.00	0.06	119	17		1.00	17	0.80	21
Zone - 213		5.00	6.00	0.07	446	62			62		78
02 WTAPL 2001	Corridors	0.00	0.08	0.06	75	5		0.70	6	0.80	6
02 CONFR COL 475	Conference/ meeting	5.00	5.00	0.06	114	32		1.00	32	0.80	40
02 CORR 02	Corridors	0.00	0.51	0.06	514	31		0.70	44	0.80	39
Zone - 214		4.47	5.59	0.06	703	67			82		84
02 OPROV 2521	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
02 OGENL 426	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
02 TEAMA 112	Office space	5.00	3.00	0.06	172	25		1.00	25	0.80	32
Zone - 215		5.00	5.00	0.06	282	42			42		52
02 CORR 06	Corridors	0.00	0.57	0.06	565	34		0.70	48	0.80	42
Zone - 216		0.00	0.57	0.06	565	34			48		42
02 EXROM FM 684	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
02 EXROM FM 685	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
02 EXROM FM 686	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
Zone - 217		5.00	6.00	0.06	330	50			50		62
02 CORR 07	Corridors	0.00	0.58	0.06	578	35		0.70	50	0.80	43
Zone - 218		0.00	0.58	0.06	578	35			50		43
02 CORR 08	Corridors	0.00	0.55	0.06	554	33		0.70	47	0.80	42
02 EXROM PEDS 601	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
02 EXROM PEDS 597	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
Zone - 219		4.39	4.55	0.06	774	66			81		83
02 WSGEN 02	Office space	5.00	11.00	0.06	525	87		1.00	87	0.80	108
Zone - 220		5.00	11.00	0.06	525	87			87		108

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Ventilation Parameters

System Zone Room	Occupancy Category	Rp cfm / p	Pz People	Ra cfm/ft²	Az ft²	Vbz cfm	Std 170 Min OA ach	Cooling Ez	Cooling Voz cfm	Heating Ez	Heating Voz cfm
Alternative 1											
02 CONSRENC 2001	Conference/ meeting	5.00	1.00	0.06	77	10		1.00	10	0.80	12
02 CONSRENC 2002	Conference/ meeting	5.00	1.00	0.06	77	10		1.00	10	0.80	12
02 CONSRENC 885	Conference/ meeting	5.00	1.00	0.06	77	10		1.00	10	0.80	12
02 CONSRENC 649	Conference/ meeting	5.00	1.00	0.06	77	10		1.00	10	0.80	12
Zone - 221		5.00	4.00	0.06	308	38			38		48
02 EXROM PEDS 596	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
02 EXROM PEDS 604	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
02 EXROM PEDS 602	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
Zone - 222		5.00	6.00	0.06	330	50			50		62
02 EXROM PEDS 605	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
02 EXROM PEDS 606	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
02 EXROM PEDS 613	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
Zone - 223		5.00	6.00	0.06	330	50			50		62
02 EXROM PEDS 615	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
02 EXROM PEDS 616	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
02 EXROM PEDS 617	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
Zone - 224		5.00	6.00	0.06	330	50			50		62
02 AEQST MPL 695	Laundry Rooms, Central	5.00	0.50	0.12	72	11		1.00	11	0.80	14
02 TLSTF 03	Default Std62	0.00	0.00	0.00	126	0		1.00	0	0.80	0
02 SCLSU 828	Laundry Rooms, Central	5.00	0.60	0.12	86	13		1.00	13	0.80	17
02 AAMEN 865	Laundry Rooms, Central	5.00	0.52	0.12	75	12		1.00	12	0.80	15
Zone - 225		5.00	1.63	0.08	359	36			36		45
02 SCLSU 691	Laundry Rooms, Central	5.00	0.48	0.12	69	11		1.00	11	0.80	13
02 TRTHP-SPC 2001	Office space	5.00	2.00	0.06	120	17		1.00	17	0.80	22
02 TRTHP SPC 2406	Office space	5.00	2.00	0.06	120	17		1.00	17	0.80	22
Zone - 231		5.00	4.48	0.07	309	45			45		56
02 TRTHP-SPC 2001K	Office space	5.00	2.00	0.06	120	17		1.00	17	0.80	22
02 TRTHP-SPC 241	Office space	5.00	2.00	0.06	120	17		1.00	17	0.80	22
02 TRTHP SPC 2001J	Office space	5.00	2.00	0.06	120	17		1.00	17	0.80	22
Zone - 232		5.00	6.00	0.06	360	52			52		65
03 OPROV 3508	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10

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Ventilation Parameters

System Zone Room	Occupancy Category	Rp cfm / p	Pz People	Ra cfm/ft²	Az ft²	Vbz cfm	Std 170 Min OA ach	Cooling Ez	Cooling Voz cfm	Heating Ez	Heating Voz cfm
Alternative 1											
03 OPROV 3509	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
03 OPROV 3510	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
03 WACPF 2500E	Corridors	0.00	0.33	0.06	332	20		0.70	28	0.80	25
Zone - 233		4.50	3.33	0.06	497	45			53		56
03 OPROV 891	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
03 OPROV 890	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
03 OPROV 3513	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
03 OPROV 3514	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
Zone - 248		5.00	4.00	0.06	220	33			33		42
03 CORR 06	Corridors	0.00	0.57	0.06	565	34		0.70	48	0.80	42
Zone - 249		0.00	0.57	0.06	565	34			48		42
03 WSGEN 836	Office space	5.00	10.00	0.06	261	66		1.00	66	0.80	82
Zone - 250		5.00	10.00	0.06	261	66			66		82
03 WSGEN 841	Office space	5.00	3.00	0.06	399	39		1.00	39	0.80	49
03 OGENL 2001P	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
03 OGENL 2001B	Office space	5.00	1.00	0.06	55	8		1.00	8	0.80	10
Zone - 251		5.00	5.00	0.06	509	56			56		69
03 OBSRM PRM 2001	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
03 WSGEN 704	Office space	5.00	1.00	0.06	110	12		1.00	12	0.80	15
03 INJCT 2001	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
Zone - 252		5.00	5.00	0.06	330	45			45		56
03 EXROM 838	Office space	5.00	2.00	0.06	86	15		1.00	15	0.80	19
03 EXROM 283	Office space	5.00	2.00	0.06	86	15		1.00	15	0.80	19
03 TLPAT 585	Default Std62	0.00	0.00	0.00	65	0		1.00	0	0.80	0
03 CONFR COL 2001	Conference/ meeting	5.00	4.00	0.06	119	27		1.00	27	0.80	34
Zone - 253		5.00	8.00	0.05	356	57			57		72
03 CORR 09	Corridors	0.00	0.57	0.06	566	34		0.70	49	0.80	42
03 OBSRM BAY 796	Office space	5.00	2.00	0.06	88	15		1.00	15	0.80	19
03 OBSRM BAY 2001	Office space	5.00	2.00	0.06	88	15		1.00	15	0.80	19
03 SCLSU 2001	Laundry Rooms, Central	5.00	0.50	0.12	72	11		1.00	11	0.80	14
Zone - 254		4.44	5.07	0.07	814	76			90		95

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Ventilation Parameters

System Zone Room	Occupancy Category	Rp cfm / p	Pz People	Ra cfm/ft²	Az ft²	Vbz cfm	Std 170 Min OA ach	Cooling Ez	Cooling Voz cfm	Heating Ez	Heating Voz cfm
Alternative 1											
03 EXROM INT 584	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
03 SCREN DIA 583	Office space	5.00	2.00	0.06	113	17		1.00	17	0.80	21
03 TRTHP PRV 578	Office space	5.00	2.00	0.06	113	17		1.00	17	0.80	21
Zone - 255		5.00	6.00	0.06	336	50			50		63
03 CORR 10	Corridors	0.00	0.47	0.06	467	28		0.70	40	0.80	35
Zone - 256		0.00	0.47	0.06	467	28			40		35
03 CORR 07	Corridors	0.00	0.58	0.06	578	35		0.70	50	0.80	43
Zone - 257		0.00	0.58	0.06	578	35			50		43
03 CORR 08	Corridors	0.00	0.55	0.06	554	33		0.70	47	0.80	42
03 EXROM INT 571	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
03 EXROM INT 574	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
Zone - 258		4.39	4.55	0.06	774	66			81		83
03 EXROM INT 556	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
03 EXROM INT 567	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
03 EXROM INT 568	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
Zone - 262		5.00	6.00	0.06	330	50			50		62
03 EXROM INT 575	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
03 EXROM INT 576	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
03 EXROM INT 3214	Office space	5.00	2.00	0.06	121	17		1.00	17	0.80	22
Zone - 263		5.00	6.00	0.06	341	50			50		63
03 EXROM INT 539	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
03 EXROM INT 537	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
03 EXROM INT 524	Office space	5.00	2.00	0.06	110	17		1.00	17	0.80	21
Zone - 264		5.00	6.00	0.06	330	50			50		62
03 WSGEN 02	Office space	5.00	11.00	0.06	525	87		1.00	87	0.80	108
Zone - 265		5.00	11.00	0.06	525	87			87		108
03 CONSR ENC 793	Conference/ meeting	5.00	3.85	0.06	77	24		1.00	24	0.80	30
03 CONSR ENC 794	Conference/ meeting	5.00	3.85	0.06	77	24		1.00	24	0.80	30
03 CONSR ENC 858	Conference/ meeting	5.00	3.85	0.06	77	24		1.00	24	0.80	30
Zone - 266		5.00	11.55	0.06	231	72			72		90
System - 003 - WEST		4.87	378.60	0.06	27,412	3,520			3,747		4,400

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Ventilation Calculations for Cooling Design

System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-clg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz
Alternative 1													
01 VESTIDRO	VAV Reheat	444	444	444	357	161	0.450	1.00	0.00	1.00	1.00	1.00	0.700
Zone - 022		444	444	444	357	161							0.700
01 LOADDSMD	VAV Reheat	126	126	126	126	45	0.360	1.00	0.00	1.00	1.00	1.00	0.787
01 SSECR LN 1514A	VAV Reheat	28	28	28	27	10	0.360	1.00	0.00	1.00	1.00	1.00	0.787
01 SHSKG 1501	VAV Reheat	67	67	67	67	24	0.360	1.00	0.00	1.00	1.00	1.00	0.787
01 TLSTF 620	VAV Reheat	157	157	157	47	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000
Zone - 023		378	378	378	267	79							0.787
01 TER 1504	VAV Reheat	325	325	325	108	39	0.360	1.00	0.00	1.00	1.00	1.00	0.787
Zone - 024		325	325	325	108	39							0.787
01 ST1-1	VAV Reheat	898	898	898	270	19	0.070	1.00	0.00	1.00	1.00	1.00	1.000
Zone - 025		898	898	898	270	19							1.000
01 VESTI 01	VAV Reheat	1,046	1,046	1,046	314	21	0.067	1.00	0.00	1.00	1.00	1.00	1.000
Zone - 026		1,046	1,046	1,046	314	21							1.000
02 WATGN 298	VAV Reheat	724	724	724	394	142	0.360	1.00	0.00	1.00	1.00	1.00	0.787
Zone - 027		724	724	724	394	142							0.787
01 WTAGN LAB 1301B	VAV Reheat	1,329	1,329	1,329	399	114	0.285	1.00	0.00	1.00	1.00	1.00	0.862
Zone - 028		1,329	1,329	1,329	399	114							0.862
01 GYMNA 510	VAV Reheat	580	580	580	226	81	0.360	1.00	0.00	1.00	1.00	1.00	0.787
01 BLDRR 492	VAV Reheat	118	118	118	45	16	0.360	1.00	0.00	1.00	1.00	1.00	0.787
Zone - 029		698	698	698	271	98							0.787
01 WACPR MOB 1309	VAV Reheat	333	333	333	100	35	0.354	1.00	0.00	1.00	1.00	1.00	0.794
Zone - 030		333	333	333	100	35							0.794
01 ST2-1	VAV Reheat	45	45	45	36	13	0.360	1.00	0.00	1.00	1.00	1.00	0.787
01 CORR 03	VAV Reheat	138	138	138	138	62	0.450	1.00	0.00	1.00	1.00	1.00	0.700
01 EVSCL 539	VAV Reheat	16	16	16	16	6	0.360	1.00	0.00	1.00	1.00	1.00	0.787
Zone - 031		199	199	199	190	81							0.700
01 WATGN 30	VAV Reheat	556	556	556	456	164	0.360	1.00	0.00	1.00	1.00	1.00	0.787
Zone - 032		556	556	556	456	164							0.787
01 RECEP MBL 519	VAV Reheat	1,094	1,094	1,094	401	144	0.360	1.00	0.00	1.00	1.00	1.00	0.787
Zone - 033		1,094	1,094	1,094	401	144							0.787
01 WTAGN 746	VAV Reheat	747	747	747	609	219	0.360	1.00	0.00	1.00	1.00	1.00	0.787
Zone - 035		747	747	747	609	219							0.787
01 TLPATS 690	VAV Reheat	115	115	115	35	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000

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Ventilation Calculations for Cooling Design

System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-clg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz	
Alternative 1														
Zone - 036		115	115	115	35	0							1.000	
01 PHARM SML 268	VAV Reheat	397	397	397	274	99	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
01 SGENL 598	VAV Reheat	35	35	35	35	13	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
Zone - 045		432	432	432	309	111							0.787	
02 OPROV 2501	VAV Reheat	35	35	35	23	8	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
02 OPROV 898	VAV Reheat	149	149	149	45	8	0.185	1.00	0.00	1.00	1.00	1.00	0.962	
02 OPROV 894	VAV Reheat	149	149	149	45	8	0.185	1.00	0.00	1.00	1.00	1.00	0.962	
02 OPROV 895	VAV Reheat	172	172	172	52	8	0.161	1.00	0.00	1.00	1.00	1.00	0.987	
Zone - 046		505	505	505	164	33							0.787	
02 WACPF 2500C	VAV Reheat	203	203	203	63	28	0.450	1.00	0.00	1.00	1.00	1.00	0.700	
02 OPROV 2505	VAV Reheat	136	136	136	41	8	0.203	1.00	0.00	1.00	1.00	1.00	0.944	
02 OPROV 2506	VAV Reheat	136	136	136	41	8	0.203	1.00	0.00	1.00	1.00	1.00	0.944	
02 OPROV 2507	VAV Reheat	136	136	136	41	8	0.203	1.00	0.00	1.00	1.00	1.00	0.944	
Zone - 047		611	611	611	186	53							0.700	
02 TLPAT 01	VAV Reheat	152	152	152	46	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000	
02 WATGN 480	VAV Reheat	1,006	1,006	1,006	472	170	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
Zone - 048		1,158	1,158	1,158	517	170							0.787	
02 ST2-1	VAV Reheat	1,176	1,176	1,176	353	19	0.053	1.00	0.00	1.00	1.00	1.00	1.000	
Zone - 049		1,176	1,176	1,176	353	19							1.000	
02 EXROM FM 638	VAV Reheat	125	125	125	46	17	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
02 EXROM FM 656	VAV Reheat	125	125	125	46	17	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
02 EXROM FM 657	VAV Reheat	140	140	140	46	17	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
Zone - 050		390	390	390	138	50							0.787	
02 EXROM FM 716	VAV Reheat	164	164	164	49	17	0.350	1.00	0.00	1.00	1.00	1.00	0.797	
02 EXROM FM 658	VAV Reheat	137	137	137	46	17	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
02 EXROM FM 659	VAV Reheat	137	137	137	46	17	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
Zone - 051		439	439	439	142	50							0.787	
02 EXROM FM 661	VAV Reheat	137	137	137	46	17	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
02 EXROM FM 667	VAV Reheat	137	137	137	46	17	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
02 CORR 03	VAV Reheat	230	230	230	106	47	0.450	1.00	0.00	1.00	1.00	1.00	0.700	*
02 TLSTF 2301	VAV Reheat	67	67	67	20	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000	
Zone - 052		572	572	572	218	81							0.700	
02 CORR 04	VAV Reheat	110	110	110	110	50	0.450	1.00	0.00	1.00	1.00	1.00	0.700	

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System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-clg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz
Alternative 1													
02 INJCT 690	VAV Reheat	92	92	92	39	14	0.360	1.00	0.00	1.00	1.00	1.00	0.787
02 EXROM FM 913	VAV Reheat	117	117	117	44	16	0.360	1.00	0.00	1.00	1.00	1.00	0.787
Zone - 053		319	319	319	194	80							0.700
02 CORR 05	VAV Reheat	113	113	113	113	51	0.450	1.00	0.00	1.00	1.00	1.00	0.700
Zone - 054		113	113	113	113	51							0.700
02 ST2-2	VAV Reheat	51	51	51	32	11	0.360	1.00	0.00	1.00	1.00	1.00	0.787
02 TEAMA 2302	VAV Reheat	17	17	17	17	6	0.360	1.00	0.00	1.00	1.00	1.00	0.787
Zone - 055		68	68	68	49	18							0.787
02 TEAMA 109	VAV Reheat	95	95	95	70	25	0.360	1.00	0.00	1.00	1.00	1.00	0.787
02 OPROV 2518	VAV Reheat	35	35	35	23	8	0.360	1.00	0.00	1.00	1.00	1.00	0.787
02 OPROV 2519	VAV Reheat	35	35	35	23	8	0.360	1.00	0.00	1.00	1.00	1.00	0.787
Zone - 056		164	164	164	116	42							0.787
02 CONFR MED 2520	VAV Reheat	239	239	239	189	68	0.360	1.00	0.00	1.00	1.00	1.00	0.787
Zone - 057		239	239	239	189	68							0.787
02 WSGEN 01	VAV Reheat	320	320	320	240	87	0.360	1.00	0.00	1.00	1.00	1.00	0.787
Zone - 226		320	320	320	240	87							0.787
02 WSGENENC 869	VAV Reheat	58	58	58	41	15	0.360	1.00	0.00	1.00	1.00	1.00	0.787
02 WSGENENC 790	VAV Reheat	58	58	58	41	15	0.360	1.00	0.00	1.00	1.00	1.00	0.787
02 WSGENENC 791	VAV Reheat	58	58	58	41	15	0.360	1.00	0.00	1.00	1.00	1.00	0.787
Zone - 227		175	175	175	122	44							0.787
02 PRGEN 01	VAV Reheat	164	164	164	54	19	0.360	1.00	0.00	1.00	1.00	1.00	0.787
Zone - 228		164	164	164	54	19							0.787
02 MEDPR 466	VAV Reheat	51	51	51	50	18	0.360	1.00	0.00	1.00	1.00	1.00	0.787
02 UTILSMED 467	VAV Reheat	36	36	36	35	13	0.360	1.00	0.00	1.00	1.00	1.00	0.787
02 TLPAT 02	VAV Reheat	105	105	105	32	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000
Zone - 229		192	192	192	117	31							0.787
02 EXROM FM 696	VAV Reheat	126	126	126	46	17	0.360	1.00	0.00	1.00	1.00	1.00	0.787
02 EXROM PEDS 696	VAV Reheat	126	126	126	46	17	0.360	1.00	0.00	1.00	1.00	1.00	0.787
02 EXSNA NEG FM 721	VAV Reheat	142	142	142	49	18	0.360	1.00	0.00	1.00	1.00	1.00	0.787
02 EXSNA NEG PEDS 622	VAV Reheat	142	142	142	49	18	0.360	1.00	0.00	1.00	1.00	1.00	0.787
Zone - 230		536	536	536	191	69							0.787
03 EXROM INT 523	VAV Reheat	125	125	125	46	17	0.360	1.00	0.00	1.00	1.00	1.00	0.787
03 EXROM INT 521	VAV Reheat	125	125	125	46	17	0.360	1.00	0.00	1.00	1.00	1.00	0.787

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System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-clg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz	
Alternative 1														
03 EXROM INT 511	VAV Reheat	140	140	140	46	17	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
Zone - 234		390	390	390	138	50							0.787	
03 CORR 03	VAV Reheat	227	227	227	106	47	0.450	1.00	0.00	1.00	1.00	1.00	0.700	*
03 EXROM OB 641	VAV Reheat	137	137	137	46	17	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
03 EXROM OB 653	VAV Reheat	137	137	137	46	17	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
Zone - 235		501	501	501	198	81							0.700	
03 CORR 04	VAV Reheat	110	110	110	110	50	0.450	1.00	0.00	1.00	1.00	1.00	0.700	
Zone - 236		110	110	110	110	50							0.700	
03 EXROM OB 3104	VAV Reheat	165	165	165	49	17	0.350	1.00	0.00	1.00	1.00	1.00	0.797	
03 EXROM OB 655	VAV Reheat	137	137	137	46	17	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
03 EXROM OB 654	VAV Reheat	180	180	180	54	17	0.308	1.00	0.00	1.00	1.00	1.00	0.840	
Zone - 237		481	481	481	149	51							0.787	
03 WSGENENC 906	VAV Reheat	58	58	58	41	15	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
03 WSGENENC 872	VAV Reheat	58	58	58	41	15	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
03 WSGENENC 905	VAV Reheat	58	58	58	41	15	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
Zone - 238		175	175	175	122	44							0.787	
03 WSGEN 01	VAV Reheat	320	320	320	240	87	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
Zone - 239		320	320	320	240	87							0.787	
03 TLSTF 3301	VAV Reheat	67	67	67	20	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000	
03 CORR 05	VAV Reheat	113	113	113	113	51	0.450	1.00	0.00	1.00	1.00	1.00	0.700	
Zone - 240		180	180	180	133	51							0.700	
03 ST2-3	VAV Reheat	51	51	51	32	11	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
03 EVS 3302	VAV Reheat	17	17	17	17	6	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
Zone - 241		68	68	68	49	18							0.787	
03 EXROM OB 646	VAV Reheat	126	126	126	46	17	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
03 EXROM OB 642	VAV Reheat	126	126	126	46	17	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
03 UTILS PRO 318	VAV Reheat	44	44	44	43	15	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
Zone - 242		295	295	295	135	49							0.787	
03 OPROV 3501	VAV Reheat	35	35	35	23	8	0.360	1.00	0.00	1.00	1.00	1.00	0.787	
03 OPROV 892	VAV Reheat	149	149	149	45	8	0.185	1.00	0.00	1.00	1.00	1.00	0.962	
03 OPROV 888	VAV Reheat	149	149	149	45	8	0.185	1.00	0.00	1.00	1.00	1.00	0.962	
03 OPROV 889	VAV Reheat	165	165	165	50	8	0.167	1.00	0.00	1.00	1.00	1.00	0.980	
Zone - 243		498	498	498	162	33							0.787	

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System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-clg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz
Alternative 1													
03 WACPF 2500C	VAV Reheat	199	199	199	63	28	0.450	1.00	0.00	1.00	1.00	1.00	0.700
03 OPROV 3505	VAV Reheat	136	136	136	41	8	0.203	1.00	0.00	1.00	1.00	1.00	0.944
03 OPROV 3506	VAV Reheat	136	136	136	41	8	0.203	1.00	0.00	1.00	1.00	1.00	0.944
03 OPROV 3507	VAV Reheat	136	136	136	41	8	0.203	1.00	0.00	1.00	1.00	1.00	0.944
Zone - 244		607	607	607	186	53							0.700
03 WATGN 07	VAV Reheat	1,029	1,029	1,029	469	169	0.360	1.00	0.00	1.00	1.00	1.00	0.787
Zone - 245		1,029	1,029	1,029	469	169							0.787
03 ST1-1	VAV Reheat	1,088	1,088	1,088	327	17	0.053	1.00	0.00	1.00	1.00	1.00	1.000
Zone - 246		1,088	1,088	1,088	327	17							1.000
03 TLPAT 03	VAV Reheat	147	147	147	44	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000
Zone - 247		147	147	147	44	0							1.000
03 PRGEN 856	VAV Reheat	184	184	184	58	21	0.360	1.00	0.00	1.00	1.00	1.00	0.787
03 SCLSU 853	VAV Reheat	72	72	72	71	25	0.360	1.00	0.00	1.00	1.00	1.00	0.787
Zone - 259		256	256	256	128	46							0.787
03 MEDPR 1243	VAV Reheat	40	40	40	39	14	0.360	1.00	0.00	1.00	1.00	1.00	0.787
03 UTILS MED 592	VAV Reheat	38	38	38	37	13	0.360	1.00	0.00	1.00	1.00	1.00	0.787
03 TLPAT 3115	VAV Reheat	104	104	104	31	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000
Zone - 260		181	181	181	107	27							0.787
03 EXROM INT 577	VAV Reheat	126	126	126	46	17	0.360	1.00	0.00	1.00	1.00	1.00	0.787
03 EXROM INT 550	VAV Reheat	126	126	126	46	17	0.360	1.00	0.00	1.00	1.00	1.00	0.787
03 EXROM INT NEG 295	VAV Reheat	142	142	142	49	18	0.360	1.00	0.00	1.00	1.00	1.00	0.787
03 EXROM INT NEG 294	VAV Reheat	142	142	142	49	18	0.360	1.00	0.00	1.00	1.00	1.00	0.787
Zone - 261		536	536	536	191	69							0.787
System - 002 - EAST		23,322	21,072	23,322	10,473	3,284							0.700
01 ELEC 1502	VAV Reheat	251	251	251	108	30	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 185		251	251	251	108	30							0.882
01 DRSSB 728	VAV Reheat	30	30	30	29	8	0.280	1.00	0.00	1.00	1.00	1.00	0.882
01 DRSSB 664	VAV Reheat	31	31	31	30	8	0.280	1.00	0.00	1.00	1.00	1.00	0.882
01 CORR 04	VAV Reheat	147	147	147	147	51	0.350	1.00	0.00	1.00	1.00	1.00	0.812
Zone - 186		208	208	208	205	68							0.812
01 PRGEN 726	VAV Reheat	381	381	381	114	30	0.263	1.00	0.00	1.00	1.00	1.00	0.899
Zone - 187		381	381	381	114	30							0.899
01 OPROV 1407	VAV Reheat	53	53	53	46	13	0.280	1.00	0.00	1.00	1.00	1.00	0.882

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System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-clg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz
Alternative 1													
01 OPROV 1410	VAV Reheat	53	53	53	46	13	0.280	1.00	0.00	1.00	1.00	1.00	0.882
01 OPROV 1409	VAV Reheat	53	53	53	46	13	0.280	1.00	0.00	1.00	1.00	1.00	0.882
01 OPROV 1408	VAV Reheat	57	57	57	40	11	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 188		215	215	215	178	50							0.882
01 CORR 01	VAV Reheat	257	257	257	257	90	0.350	1.00	0.00	1.00	1.00	1.00	0.812
Zone - 189		257	257	257	257	90							0.812
01 OPROV 611	VAV Reheat	123	123	123	46	13	0.280	1.00	0.00	1.00	1.00	1.00	0.882
01 OPROV 610	VAV Reheat	246	246	246	74	13	0.174	1.00	0.00	1.00	1.00	1.00	0.989
01 OPROV 609	VAV Reheat	246	246	246	74	13	0.174	1.00	0.00	1.00	1.00	1.00	0.989
01 OPROV 608	VAV Reheat	246	246	246	74	13	0.174	1.00	0.00	1.00	1.00	1.00	0.989
Zone - 190		859	859	859	267	51							0.882
01 OPROV 607	VAV Reheat	246	246	246	74	13	0.174	1.00	0.00	1.00	1.00	1.00	0.989
01 OPROV 600	VAV Reheat	78	78	78	46	13	0.280	1.00	0.00	1.00	1.00	1.00	0.882
01 OPROV 419	VAV Reheat	48	48	48	40	11	0.280	1.00	0.00	1.00	1.00	1.00	0.882
01 SGENL 530	VAV Reheat	26	26	26	26	7	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 191		397	397	397	185	44							0.882
01 CORR 02	VAV Reheat	33	33	33	33	12	0.350	1.00	0.00	1.00	1.00	1.00	0.812
Zone - 192		33	33	33	33	12							0.812
01 CONFRMED 1010	VAV Reheat	1,092	1,092	1,092	446	125	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 193		1,092	1,092	1,092	446	125							0.882
01 CONFRMED 1011	VAV Reheat	838	838	838	446	125	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 194		838	838	838	446	125							0.882
01 SDIETCOF	VAV Reheat	293	293	293	88	9	0.105	1.00	0.00	1.00	1.00	1.00	1.000
01 WTAGN 01	VAV Reheat	1,399	1,399	1,399	434	121	0.280	1.00	0.00	1.00	1.00	1.00	0.882
01 TLPAT 01	VAV Reheat	150	150	150	45	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000
Zone - 195		1,841	1,841	1,841	567	131							0.882
01 LACTN 1506	VAV Reheat	40	40	40	40	11	0.280	1.00	0.00	1.00	1.00	1.00	0.882
01 TLPAT 652	VAV Reheat	58	58	58	17	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000
01 LNGST 2001	VAV Reheat	136	136	136	136	38	0.280	1.00	0.00	1.00	1.00	1.00	0.882
01 TLPTS 2001	VAV Reheat	57	57	57	17	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000
Zone - 196		292	292	292	211	50							0.882
01 DRSSA 550	VAV Reheat	90	90	90	90	25	0.280	1.00	0.00	1.00	1.00	1.00	0.882
01 MAMO 508	VAV Reheat	125	125	125	68	19	0.280	1.00	0.00	1.00	1.00	1.00	0.882

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System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-clg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz	
Alternative 1														
Zone - 197		215	215	215	158	44							0.882	
01 GROUPMED 1210	VAV Reheat	570	570	570	570	160	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
Zone - 198		570	570	570	570	160							0.882	
01 GROUPMED 1403	VAV Reheat	570	570	570	570	160	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
Zone - 199		570	570	570	570	160							0.882	
01 DRSSA 670	VAV Reheat	39	39	39	39	11	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
01 UTILS PRO 785	VAV Reheat	39	39	39	39	11	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
01 TLSTF 761	VAV Reheat	64	64	64	19	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000	
01 AAMEN 328	VAV Reheat	72	72	72	72	20	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
01 SCLSU 849	VAV Reheat	28	28	28	28	8	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
Zone - 200		242	242	242	197	50							0.882	
01 IUSND 666	VAV Reheat	181	181	181	86	24	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
01 IBONE 665	VAV Reheat	119	119	119	66	18	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
Zone - 201		299	299	299	152	43							0.882	
01 OGENL 675	VAV Reheat	40	40	40	40	11	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
01 SGENL 676	VAV Reheat	35	35	35	35	10	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
01 TLPAT 529	VAV Reheat	167	167	167	50	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000	
01 OGENL 850	VAV Reheat	37	37	37	37	10	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
01 OGENL 450	VAV Reheat	29	29	29	29	8	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
Zone - 202		307	307	307	190	39							0.882	
01 WATGN 29	VAV Reheat	638	638	638	638	179	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
Zone - 203		638	638	638	638	179							0.882	
01 CORR 05	VAV Reheat	237	237	237	237	83	0.350	1.00	0.00	1.00	1.00	1.00	0.812	
Zone - 204		237	237	237	237	83							0.812	
02 OPROV 2508	VAV Reheat	107	107	107	32	8	0.258	1.00	0.00	1.00	1.00	1.00	0.905	
02 OPROV 2509	VAV Reheat	107	107	107	32	8	0.258	1.00	0.00	1.00	1.00	1.00	0.905	
02 OPROV 2510	VAV Reheat	107	107	107	32	8	0.258	1.00	0.00	1.00	1.00	1.00	0.905	
02 WACPF 2500E	VAV Reheat	160	160	160	81	28	0.350	1.00	0.00	1.00	1.00	1.00	0.812	*
Zone - 205		482	482	482	178	53							0.812	
02 OPROV 897	VAV Reheat	181	181	181	54	8	0.153	1.00	0.00	1.00	1.00	1.00	1.000	
02 OPROV 896	VAV Reheat	147	147	147	44	8	0.188	1.00	0.00	1.00	1.00	1.00	0.975	
02 OPROV 2513	VAV Reheat	147	147	147	44	8	0.188	1.00	0.00	1.00	1.00	1.00	0.975	
02 OPROV 2514	VAV Reheat	30	30	30	30	8	0.280	1.00	0.00	1.00	1.00	1.00	0.882	

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System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-clg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz
Alternative 1													
Zone - 206		505	505	505	172	33							0.882
02 WSGEN 326	VAV Reheat	275	275	275	275	77	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 207		275	275	275	275	77							0.882
02 TRAUDPED 717	VAV Reheat	207	207	207	62	15	0.238	1.00	0.00	1.00	1.00	1.00	0.924
02 SCLSU 878	VAV Reheat	160	160	160	48	12	0.258	1.00	0.00	1.00	1.00	1.00	0.904
02 EXROM 877	VAV Reheat	279	279	279	84	20	0.234	1.00	0.00	1.00	1.00	1.00	0.928
Zone - 208		647	647	647	194	47							0.904
02 CORR 01	VAV Reheat	179	179	179	99	35	0.350	1.00	0.00	1.00	1.00	1.00	0.812
Zone - 209		179	179	179	99	35							0.812
02 OBSRM BAY 271	VAV Reheat	93	93	93	54	15	0.280	1.00	0.00	1.00	1.00	1.00	0.882
02 OBSRM BAY 272	VAV Reheat	93	93	93	54	15	0.280	1.00	0.00	1.00	1.00	1.00	0.882
02 EXROM 857	VAV Reheat	182	182	182	55	13	0.242	1.00	0.00	1.00	1.00	1.00	0.920
Zone - 210		368	368	368	163	44							0.882
02 LNGST 506	VAV Reheat	104	104	104	104	29	0.280	1.00	0.00	1.00	1.00	1.00	0.882
02 TLPAT 689	VAV Reheat	51	51	51	15	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000
02 TRTHP SPC 687	VAV Reheat	294	294	294	88	17	0.196	1.00	0.00	1.00	1.00	1.00	0.966
Zone - 211		449	449	449	208	46							0.882
02 TRTHP SPC 683	VAV Reheat	294	294	294	88	17	0.196	1.00	0.00	1.00	1.00	1.00	0.966
02 TRTHP SPC 688	VAV Reheat	294	294	294	88	17	0.196	1.00	0.00	1.00	1.00	1.00	0.966
02 TRTHP SPC 680	VAV Reheat	292	292	292	87	17	0.197	1.00	0.00	1.00	1.00	1.00	0.965
Zone - 212		879	879	879	264	52							0.965
02 APRNT 246	VAV Reheat	38	38	38	38	11	0.280	1.00	0.00	1.00	1.00	1.00	0.882
02 TRTHP SPC 476	VAV Reheat	266	266	266	80	17	0.215	1.00	0.00	1.00	1.00	1.00	0.947
02 TRTHP SPC 477	VAV Reheat	478	478	478	143	17	0.120	1.00	0.00	1.00	1.00	1.00	1.000
02 TRTHP SPC 478	VAV Reheat	478	478	478	143	17	0.120	1.00	0.00	1.00	1.00	1.00	1.000
Zone - 213		1,259	1,259	1,259	405	62							0.882
02 WTAPL 2001	VAV Reheat	22	22	22	18	6	0.350	1.00	0.00	1.00	1.00	1.00	0.812
02 CONFR COL 475	VAV Reheat	461	461	461	138	32	0.230	1.00	0.00	1.00	1.00	1.00	0.932
02 CORR 02	VAV Reheat	126	126	126	126	44	0.350	1.00	0.00	1.00	1.00	1.00	0.812
Zone - 214		609	609	609	283	82							0.812
02 OPROV 2521	VAV Reheat	30	30	30	30	8	0.280	1.00	0.00	1.00	1.00	1.00	0.882
02 OGENL 426	VAV Reheat	30	30	30	30	8	0.280	1.00	0.00	1.00	1.00	1.00	0.882
02 TEAMA 112	VAV Reheat	90	90	90	90	25	0.280	1.00	0.00	1.00	1.00	1.00	0.882

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System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-clg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz
Alternative 1													
Zone - 215		150	150	150	150	42							0.882
02 CORR 06	VAV Reheat	138	138	138	138	48	0.350	1.00	0.00	1.00	1.00	1.00	0.812
Zone - 216		138	138	138	138	48							0.812
02 EXROM FM 684	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
02 EXROM FM 685	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
02 EXROM FM 686	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 217		296	296	296	178	50							0.882
02 CORR 07	VAV Reheat	142	142	142	142	50	0.350	1.00	0.00	1.00	1.00	1.00	0.812
Zone - 218		142	142	142	142	50							0.812
02 CORR 08	VAV Reheat	136	136	136	136	47	0.350	1.00	0.00	1.00	1.00	1.00	0.812
02 EXROM PEDS 601	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
02 EXROM PEDS 597	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 219		333	333	333	254	81							0.812
02 WSGEN 02	VAV Reheat	309	309	309	309	87	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 220		309	309	309	309	87							0.882
02 CONSRENC 2001	VAV Reheat	34	34	34	34	10	0.280	1.00	0.00	1.00	1.00	1.00	0.882
02 CONSRENC 2002	VAV Reheat	34	34	34	34	10	0.280	1.00	0.00	1.00	1.00	1.00	0.882
02 CONSRENC 885	VAV Reheat	34	34	34	34	10	0.280	1.00	0.00	1.00	1.00	1.00	0.882
02 CONSRENC 649	VAV Reheat	34	34	34	34	10	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 221		137	137	137	137	38							0.882
02 EXROM PEDS 596	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
02 EXROM PEDS 604	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
02 EXROM PEDS 602	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 222		296	296	296	178	50							0.882
02 EXROM PEDS 605	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
02 EXROM PEDS 606	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
02 EXROM PEDS 613	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 223		296	296	296	178	50							0.882
02 EXROM PEDS 615	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
02 EXROM PEDS 616	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
02 EXROM PEDS 617	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 224		296	296	296	178	50							0.882
02 AEQST MPL 695	VAV Reheat	40	40	40	40	11	0.280	1.00	0.00	1.00	1.00	1.00	0.882

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System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-clg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz	
Alternative 1														
02 TLSTF 03	VAV Reheat	126	126	126	38	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000	
02 SCLSU 828	VAV Reheat	48	48	48	48	13	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
02 AAMEN 865	VAV Reheat	42	42	42	42	12	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
Zone - 225		255	255	255	167	36							0.882	
02 SCLSU 691	VAV Reheat	38	38	38	38	11	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
02 TRTHP-SPC 2001	VAV Reheat	105	105	105	61	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
02 TRTHP SPC 2406	VAV Reheat	105	105	105	61	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
Zone - 231		249	249	249	161	45							0.882	
02 TRTHP-SPC 2001K	VAV Reheat	105	105	105	61	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
02 TRTHP-SPC 241	VAV Reheat	105	105	105	61	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
02 TRTHP SPC 2001J	VAV Reheat	105	105	105	61	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
Zone - 232		316	316	316	184	52							0.882	
03 OPROV 3508	VAV Reheat	107	107	107	32	8	0.258	1.00	0.00	1.00	1.00	1.00	0.905	
03 OPROV 3509	VAV Reheat	107	107	107	32	8	0.258	1.00	0.00	1.00	1.00	1.00	0.905	
03 OPROV 3510	VAV Reheat	107	107	107	32	8	0.258	1.00	0.00	1.00	1.00	1.00	0.905	
03 WACPF 2500E	VAV Reheat	157	157	157	81	28	0.350	1.00	0.00	1.00	1.00	1.00	0.812	*
Zone - 233		479	479	479	178	53							0.812	
03 OPROV 891	VAV Reheat	173	173	173	52	8	0.160	1.00	0.00	1.00	1.00	1.00	1.000	
03 OPROV 890	VAV Reheat	147	147	147	44	8	0.188	1.00	0.00	1.00	1.00	1.00	0.975	
03 OPROV 3513	VAV Reheat	147	147	147	44	8	0.188	1.00	0.00	1.00	1.00	1.00	0.975	
03 OPROV 3514	VAV Reheat	30	30	30	30	8	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
Zone - 248		497	497	497	170	33							0.882	
03 CORR 06	VAV Reheat	138	138	138	138	48	0.350	1.00	0.00	1.00	1.00	1.00	0.812	
Zone - 249		138	138	138	138	48							0.812	
03 WSGEN 836	VAV Reheat	235	235	235	235	66	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
Zone - 250		235	235	235	235	66							0.882	
03 WSGEN 841	VAV Reheat	384	384	384	139	39	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
03 OGENL 2001P	VAV Reheat	32	32	32	30	8	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
03 OGENL 2001B	VAV Reheat	32	32	32	30	8	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
Zone - 251		448	448	448	198	56							0.882	
03 OBSRM PRM 2001	VAV Reheat	104	104	104	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
03 WSGEN 704	VAV Reheat	55	55	55	41	12	0.280	1.00	0.00	1.00	1.00	1.00	0.882	
03 INJCT 2001	VAV Reheat	127	127	127	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882	

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System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-clg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz
Alternative 1													
Zone - 252		286	286	286	160	45							0.882
03 EXROM 838	VAV Reheat	111	111	111	54	15	0.280	1.00	0.00	1.00	1.00	1.00	0.882
03 EXROM 283	VAV Reheat	111	111	111	54	15	0.280	1.00	0.00	1.00	1.00	1.00	0.882
03 TLPAT 585	VAV Reheat	65	65	65	20	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000
03 CONFR COL 2001	VAV Reheat	97	97	97	97	27	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 253		384	384	384	225	57							0.882
03 CORR 09	VAV Reheat	139	139	139	139	49	0.350	1.00	0.00	1.00	1.00	1.00	0.812
03 OBSRM BAY 796	VAV Reheat	84	84	84	55	15	0.280	1.00	0.00	1.00	1.00	1.00	0.882
03 OBSRM BAY 2001	VAV Reheat	84	84	84	55	15	0.280	1.00	0.00	1.00	1.00	1.00	0.882
03 SCLSU 2001	VAV Reheat	40	40	40	40	11	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 254		347	347	347	288	90							0.812
03 EXROM INT 584	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
03 SCREN DIA 583	VAV Reheat	101	101	101	60	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
03 TRTHP PRV 578	VAV Reheat	101	101	101	60	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 255		300	300	300	179	50							0.882
03 CORR 10	VAV Reheat	1,695	1,695	1,695	508	40	0.079	1.00	0.00	1.00	1.00	1.00	1.000
Zone - 256		1,695	1,695	1,695	508	40							1.000
03 CORR 07	VAV Reheat	142	142	142	142	50	0.350	1.00	0.00	1.00	1.00	1.00	0.812
Zone - 257		142	142	142	142	50							0.812
03 CORR 08	VAV Reheat	136	136	136	136	47	0.350	1.00	0.00	1.00	1.00	1.00	0.812
03 EXROM INT 571	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
03 EXROM INT 574	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 258		333	333	333	254	81							0.812
03 EXROM INT 556	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
03 EXROM INT 567	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
03 EXROM INT 568	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 262		296	296	296	178	50							0.882
03 EXROM INT 575	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
03 EXROM INT 576	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
03 EXROM INT 3214	VAV Reheat	106	106	106	62	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 263		304	304	304	180	50							0.882
03 EXROM INT 539	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
03 EXROM INT 537	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882

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Ventilation Calculations for Cooling Design

System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-clg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz
Alternative 1													
03 EXROM INT 524	VAV Reheat	99	99	99	59	17	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 264		296	296	296	178	50							0.882
03 WSGEN 02	VAV Reheat	309	309	309	309	87	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 265		309	309	309	309	87							0.882
03 CONSR ENC 793	VAV Reheat	85	85	85	85	24	0.280	1.00	0.00	1.00	1.00	1.00	0.882
03 CONSR ENC 794	VAV Reheat	85	85	85	85	24	0.280	1.00	0.00	1.00	1.00	1.00	0.882
03 CONSR ENC 858	VAV Reheat	85	85	85	85	24	0.280	1.00	0.00	1.00	1.00	1.00	0.882
Zone - 266		256	256	256	256	72							0.882
System - 003 - WEST		25,355	21,690	25,355	14,098	3,747							0.812

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Ventilation Calculations for Heating Design

System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-htg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz	
Alternative 1														
01 VESTIDRO	VAV Reheat	312	312	312	312	141	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 022		312	312	312	312	141							0.851	
01 LOADDSMD	VAV Reheat	126	126	126	126	57	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
01 SSECR LN 1514A	VAV Reheat	27	27	27	27	12	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
01 SHSKG 1501	VAV Reheat	67	67	67	67	30	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
01 TLSTF 620	VAV Reheat	47	47	47	47	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000	
Zone - 023		267	267	267	267	99							0.851	
01 TER 1504	VAV Reheat	108	108	108	108	49	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 024		108	108	108	108	49							0.851	
01 ST1-1	VAV Reheat	269	269	269	269	23	0.087	1.00	0.00	1.00	1.00	1.00	1.000	
Zone - 025		269	269	269	269	23							1.000	
01 VESTI 01	VAV Reheat	314	314	314	314	18	0.058	1.00	0.00	1.00	1.00	1.00	1.000	
Zone - 026		314	314	314	314	18							1.000	
02 WATGN 298	VAV Reheat	394	394	394	394	177	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 027		394	394	394	394	177							0.851	
01 WTAGN LAB 1301B	VAV Reheat	399	399	399	399	142	0.357	1.00	0.00	1.00	1.00	1.00	0.944	
Zone - 028		399	399	399	399	142							0.944	
01 GYMNA 510	VAV Reheat	226	226	226	226	102	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
01 BLDRR 492	VAV Reheat	45	45	45	45	20	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 029		271	271	271	271	122							0.851	
01 WACPR MOB 1309	VAV Reheat	100	100	100	100	44	0.443	1.00	0.00	1.00	1.00	1.00	0.858	
Zone - 030		100	100	100	100	44							0.858	
01 ST2-1	VAV Reheat	36	36	36	36	16	0.450	1.00	0.00	1.00	1.00	1.00	0.851	*
01 CORR 03	VAV Reheat	121	121	121	121	54	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
01 EVSCL 539	VAV Reheat	16	16	16	16	7	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 031		173	173	173	173	78							0.851	
01 WATGN 30	VAV Reheat	456	456	456	456	205	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 032		456	456	456	456	205							0.851	
01 RECEP MBL 519	VAV Reheat	401	401	401	401	181	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 033		401	401	401	401	181							0.851	
01 WTAGN 746	VAV Reheat	609	609	609	609	274	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 035		609	609	609	609	274							0.851	
01 TLPATS 690	VAV Reheat	35	35	35	35	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000	

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System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-htg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz
Alternative 1													
Zone - 036		35	35	35	35	0							1.000
01 PHARM SML 268	VAV Reheat	274	274	274	274	123	0.450	1.00	0.00	1.00	1.00	1.00	0.851
01 SGENL 598	VAV Reheat	35	35	35	35	16	0.450	1.00	0.00	1.00	1.00	1.00	0.851
Zone - 045		309	309	309	309	139							0.851
02 OPROV 2501	VAV Reheat	23	23	23	23	10	0.450	1.00	0.00	1.00	1.00	1.00	0.851
02 OPROV 898	VAV Reheat	45	45	45	45	10	0.232	1.00	0.00	1.00	1.00	1.00	1.000
02 OPROV 894	VAV Reheat	45	45	45	45	10	0.232	1.00	0.00	1.00	1.00	1.00	1.000
02 OPROV 895	VAV Reheat	52	52	52	52	10	0.201	1.00	0.00	1.00	1.00	1.00	1.000
Zone - 046		164	164	164	164	42							0.851
02 WACPF 2500C	VAV Reheat	61	61	61	61	25	0.410	1.00	0.00	1.00	1.00	1.00	0.891
02 OPROV 2505	VAV Reheat	41	41	41	41	10	0.254	1.00	0.00	1.00	1.00	1.00	1.000
02 OPROV 2506	VAV Reheat	41	41	41	41	10	0.254	1.00	0.00	1.00	1.00	1.00	1.000
02 OPROV 2507	VAV Reheat	41	41	41	41	10	0.254	1.00	0.00	1.00	1.00	1.00	1.000
Zone - 047		183	183	183	183	56							0.891
02 TLPAT 01	VAV Reheat	46	46	46	46	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000
02 WATGN 480	VAV Reheat	472	472	472	472	212	0.450	1.00	0.00	1.00	1.00	1.00	0.851
Zone - 048		517	517	517	517	212							0.851
02 ST2-1	VAV Reheat	353	353	353	353	24	0.067	1.00	0.00	1.00	1.00	1.00	1.000
Zone - 049		353	353	353	353	24							1.000
02 EXROM FM 638	VAV Reheat	46	46	46	46	21	0.450	1.00	0.00	1.00	1.00	1.00	0.851
02 EXROM FM 656	VAV Reheat	46	46	46	46	21	0.450	1.00	0.00	1.00	1.00	1.00	0.851
02 EXROM FM 657	VAV Reheat	46	46	46	46	21	0.450	1.00	0.00	1.00	1.00	1.00	0.851
Zone - 050		138	138	138	138	62							0.851
02 EXROM FM 716	VAV Reheat	49	49	49	49	22	0.438	1.00	0.00	1.00	1.00	1.00	0.863
02 EXROM FM 658	VAV Reheat	46	46	46	46	21	0.450	1.00	0.00	1.00	1.00	1.00	0.851
02 EXROM FM 659	VAV Reheat	46	46	46	46	21	0.450	1.00	0.00	1.00	1.00	1.00	0.851
Zone - 051		142	142	142	142	63							0.851
02 EXROM FM 661	VAV Reheat	46	46	46	46	21	0.450	1.00	0.00	1.00	1.00	1.00	0.851
02 EXROM FM 667	VAV Reheat	46	46	46	46	21	0.450	1.00	0.00	1.00	1.00	1.00	0.851
02 CORR 03	VAV Reheat	92	92	92	92	42	0.450	1.00	0.00	1.00	1.00	1.00	0.851
02 TLSTF 2301	VAV Reheat	20	20	20	20	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000
Zone - 052		205	205	205	205	83							0.851
02 CORR 04	VAV Reheat	96	96	96	96	43	0.450	1.00	0.00	1.00	1.00	1.00	0.851

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System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-htg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz	
Alternative 1														
02 INJCT 690	VAV Reheat	39	39	39	39	18	0.450	1.00	0.00	1.00	1.00	1.00	0.851	*
02 EXROM FM 913	VAV Reheat	44	44	44	44	20	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 053		180	180	180	180	81							0.851	
02 CORR 05	VAV Reheat	99	99	99	99	45	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 054		99	99	99	99	45							0.851	
02 ST2-2	VAV Reheat	32	32	32	32	14	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
02 TEAMA 2302	VAV Reheat	17	17	17	17	8	0.450	1.00	0.00	1.00	1.00	1.00	0.851	*
Zone - 055		49	49	49	49	22							0.851	
02 TEAMA 109	VAV Reheat	70	70	70	70	32	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
02 OPROV 2518	VAV Reheat	23	23	23	23	10	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
02 OPROV 2519	VAV Reheat	23	23	23	23	10	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 056		116	116	116	116	52							0.851	
02 CONFR MED 2520	VAV Reheat	189	189	189	189	85	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 057		189	189	189	189	85							0.851	
02 WSGEN 01	VAV Reheat	240	240	240	240	108	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 226		240	240	240	240	108							0.851	
02 WSGENENC 869	VAV Reheat	41	41	41	41	18	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
02 WSGENENC 790	VAV Reheat	41	41	41	41	18	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
02 WSGENENC 791	VAV Reheat	41	41	41	41	18	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 227		122	122	122	122	55							0.851	
02 PRGEN 01	VAV Reheat	54	54	54	54	24	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 228		54	54	54	54	24							0.851	
02 MEDPR 466	VAV Reheat	50	50	50	50	23	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
02 UTILSMED 467	VAV Reheat	35	35	35	35	16	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
02 TLPAT 02	VAV Reheat	32	32	32	32	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000	
Zone - 229		117	117	117	117	38							0.851	
02 EXROM FM 696	VAV Reheat	46	46	46	46	21	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
02 EXROM PEDS 696	VAV Reheat	46	46	46	46	21	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
02 EXSNA NEG FM 721	VAV Reheat	49	49	49	49	22	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
02 EXSNA NEG PEDS 622	VAV Reheat	49	49	49	49	22	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 230		191	191	191	191	86							0.851	
03 EXROM INT 523	VAV Reheat	46	46	46	46	21	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
03 EXROM INT 521	VAV Reheat	46	46	46	46	21	0.450	1.00	0.00	1.00	1.00	1.00	0.851	

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System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-htg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz	
Alternative 1														
03 EXROM INT 511	VAV Reheat	46	46	46	46	21	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 234		138	138	138	138	62							0.851	
03 CORR 03	VAV Reheat	92	92	92	92	42	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
03 EXROM OB 641	VAV Reheat	46	46	46	46	21	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
03 EXROM OB 653	VAV Reheat	46	46	46	46	21	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 235		185	185	185	185	83							0.851	
03 CORR 04	VAV Reheat	96	96	96	96	43	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 236		96	96	96	96	43							0.851	
03 EXROM OB 3104	VAV Reheat	49	49	49	49	22	0.439	1.00	0.00	1.00	1.00	1.00	0.862	
03 EXROM OB 655	VAV Reheat	46	46	46	46	21	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
03 EXROM OB 654	VAV Reheat	54	54	54	54	21	0.385	1.00	0.00	1.00	1.00	1.00	0.916	
Zone - 237		149	149	149	149	63							0.851	
03 WSGENENC 906	VAV Reheat	41	41	41	41	18	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
03 WSGENENC 872	VAV Reheat	41	41	41	41	18	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
03 WSGENENC 905	VAV Reheat	41	41	41	41	18	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 238		122	122	122	122	55							0.851	
03 WSGEN 01	VAV Reheat	240	240	240	240	108	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 239		240	240	240	240	108							0.851	
03 TLSTF 3301	VAV Reheat	20	20	20	20	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000	
03 CORR 05	VAV Reheat	99	99	99	99	45	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 240		119	119	119	119	45							0.851	
03 ST2-3	VAV Reheat	32	32	32	32	14	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
03 EVS 3302	VAV Reheat	17	17	17	17	8	0.450	1.00	0.00	1.00	1.00	1.00	0.851	*
Zone - 241		49	49	49	49	22							0.851	
03 EXROM OB 646	VAV Reheat	46	46	46	46	21	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
03 EXROM OB 642	VAV Reheat	46	46	46	46	21	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
03 UTILS PRO 318	VAV Reheat	43	43	43	43	19	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 242		135	135	135	135	61							0.851	
03 OPROV 3501	VAV Reheat	23	23	23	23	10	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
03 OPROV 892	VAV Reheat	45	45	45	45	10	0.232	1.00	0.00	1.00	1.00	1.00	1.000	
03 OPROV 888	VAV Reheat	45	45	45	45	10	0.232	1.00	0.00	1.00	1.00	1.00	1.000	
03 OPROV 889	VAV Reheat	50	50	50	50	10	0.209	1.00	0.00	1.00	1.00	1.00	1.000	
Zone - 243		162	162	162	162	42							0.851	

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System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-htg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz	
Alternative 1														
03 WACPF 2500C	VAV Reheat	60	60	60	60	25	0.417	1.00	0.00	1.00	1.00	1.00	0.884	
03 OPROV 3505	VAV Reheat	41	41	41	41	10	0.254	1.00	0.00	1.00	1.00	1.00	1.000	
03 OPROV 3506	VAV Reheat	41	41	41	41	10	0.254	1.00	0.00	1.00	1.00	1.00	1.000	
03 OPROV 3507	VAV Reheat	41	41	41	41	10	0.254	1.00	0.00	1.00	1.00	1.00	1.000	
Zone - 244		182	182	182	182	56							0.884	
03 WATGN 07	VAV Reheat	469	469	469	469	211	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 245		469	469	469	469	211							0.851	
03 ST1-1	VAV Reheat	326	326	326	326	22	0.067	1.00	0.00	1.00	1.00	1.00	1.000	
Zone - 246		326	326	326	326	22							1.000	
03 TLPAT 03	VAV Reheat	44	44	44	44	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000	
Zone - 247		44	44	44	44	0							1.000	
03 PRGEN 856	VAV Reheat	58	58	58	58	26	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
03 SCLSU 853	VAV Reheat	71	71	71	71	32	0.450	1.00	0.00	1.00	1.00	1.00	0.851	*
Zone - 259		128	128	128	128	58							0.851	
03 MEDPR 1243	VAV Reheat	39	39	39	39	17	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
03 UTILS MED 592	VAV Reheat	37	37	37	37	17	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
03 TLPAT 3115	VAV Reheat	31	31	31	31	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000	
Zone - 260		107	107	107	107	34							0.851	
03 EXROM INT 577	VAV Reheat	46	46	46	46	21	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
03 EXROM INT 550	VAV Reheat	46	46	46	46	21	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
03 EXROM INT NEG 295	VAV Reheat	49	49	49	49	22	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
03 EXROM INT NEG 294	VAV Reheat	49	49	49	49	22	0.450	1.00	0.00	1.00	1.00	1.00	0.851	
Zone - 261		191	191	191	191	86							0.851	
System - 002 - EAST		10,320	10,320	10,320	10,320	3,881							0.851	
01 ELEC 1502	VAV Reheat	108	108	108	108	38	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 185		108	108	108	108	38							0.904	
01 DRSSB 728	VAV Reheat	29	29	29	29	10	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
01 DRSSB 664	VAV Reheat	30	30	30	30	10	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
01 CORR 04	VAV Reheat	129	129	129	129	45	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 186		187	187	187	187	65							0.904	
01 PRGEN 726	VAV Reheat	114	114	114	114	38	0.329	1.00	0.00	1.00	1.00	1.00	0.925	
Zone - 187		114	114	114	114	38							0.925	
01 OPROV 1407	VAV Reheat	46	46	46	46	16	0.350	1.00	0.00	1.00	1.00	1.00	0.904	

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System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-htg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz	
Alternative 1														
01 OPROV 1410	VAV Reheat	46	46	46	46	16	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
01 OPROV 1409	VAV Reheat	46	46	46	46	16	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
01 OPROV 1408	VAV Reheat	40	40	40	40	14	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 188		178	178	178	178	62							0.904	
01 CORR 01	VAV Reheat	225	225	225	225	79	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 189		225	225	225	225	79							0.904	
01 OPROV 611	VAV Reheat	46	46	46	46	16	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
01 OPROV 610	VAV Reheat	74	74	74	74	16	0.217	1.00	0.00	1.00	1.00	1.00	1.000	
01 OPROV 609	VAV Reheat	74	74	74	74	16	0.217	1.00	0.00	1.00	1.00	1.00	1.000	
01 OPROV 608	VAV Reheat	74	74	74	74	16	0.217	1.00	0.00	1.00	1.00	1.00	1.000	
Zone - 190		267	267	267	267	64							0.904	
01 OPROV 607	VAV Reheat	74	74	74	74	16	0.217	1.00	0.00	1.00	1.00	1.00	1.000	
01 OPROV 600	VAV Reheat	46	46	46	46	16	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
01 OPROV 419	VAV Reheat	40	40	40	40	14	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
01 SGENL 530	VAV Reheat	26	26	26	26	9	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 191		185	185	185	185	55							0.904	
01 CORR 02	VAV Reheat	29	29	29	29	10	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 192		29	29	29	29	10							0.904	
01 CONFRMED 1010	VAV Reheat	446	446	446	446	156	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 193		446	446	446	446	156							0.904	
01 CONFRMED 1011	VAV Reheat	446	446	446	446	156	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 194		446	446	446	446	156							0.904	
01 SDIETCOF	VAV Reheat	88	88	88	88	12	0.132	1.00	0.00	1.00	1.00	1.00	1.000	
01 WTAGN 01	VAV Reheat	434	434	434	434	152	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
01 TLPAT 01	VAV Reheat	45	45	45	45	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000	
Zone - 195		567	567	567	567	163							0.904	
01 LACTN 1506	VAV Reheat	40	40	40	40	14	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
01 TLPAT 652	VAV Reheat	17	17	17	17	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000	
01 LNGST 2001	VAV Reheat	136	136	136	136	48	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
01 TLPTS 2001	VAV Reheat	17	17	17	17	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000	
Zone - 196		211	211	211	211	62							0.904	
01 DRSSA 550	VAV Reheat	90	90	90	90	31	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
01 MAMO 508	VAV Reheat	68	68	68	68	24	0.350	1.00	0.00	1.00	1.00	1.00	0.904	*

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System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-htg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz	
Alternative 1														
Zone - 197		158	158	158	158	55							0.904	
01 GROUPMED 1210	VAV Reheat	570	570	570	570	199	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 198		570	570	570	570	199							0.904	
01 GROUPMED 1403	VAV Reheat	570	570	570	570	199	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 199		570	570	570	570	199							0.904	
01 DRSSA 670	VAV Reheat	39	39	39	39	14	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
01 UTILS PRO 785	VAV Reheat	39	39	39	39	14	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
01 TLSTF 761	VAV Reheat	19	19	19	19	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000	
01 AAMEN 328	VAV Reheat	72	72	72	72	25	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
01 SCLSU 849	VAV Reheat	28	28	28	28	10	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 200		197	197	197	197	62							0.904	
01 IUSND 666	VAV Reheat	86	86	86	86	30	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
01 IBONE 665	VAV Reheat	66	66	66	66	23	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 201		152	152	152	152	53							0.904	
01 OGENL 675	VAV Reheat	40	40	40	40	14	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
01 SGENL 676	VAV Reheat	35	35	35	35	12	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
01 TLPAT 529	VAV Reheat	50	50	50	50	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000	
01 OGENL 850	VAV Reheat	37	37	37	37	13	0.350	1.00	0.00	1.00	1.00	1.00	0.904	*
01 OGENL 450	VAV Reheat	29	29	29	29	10	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 202		190	190	190	190	49							0.904	
01 WATGN 29	VAV Reheat	638	638	638	638	223	0.350	1.00	0.00	1.00	1.00	1.00	0.904	*
Zone - 203		638	638	638	638	223							0.904	
01 CORR 05	VAV Reheat	207	207	207	207	73	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 204		207	207	207	207	73							0.904	
02 OPROV 2508	VAV Reheat	32	32	32	32	10	0.322	1.00	0.00	1.00	1.00	1.00	0.932	
02 OPROV 2509	VAV Reheat	32	32	32	32	10	0.322	1.00	0.00	1.00	1.00	1.00	0.932	
02 OPROV 2510	VAV Reheat	32	32	32	32	10	0.322	1.00	0.00	1.00	1.00	1.00	0.932	
02 WACPF 2500E	VAV Reheat	71	71	71	71	25	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 205		168	168	168	168	56							0.904	
02 OPROV 897	VAV Reheat	54	54	54	54	10	0.191	1.00	0.00	1.00	1.00	1.00	1.000	
02 OPROV 896	VAV Reheat	44	44	44	44	10	0.235	1.00	0.00	1.00	1.00	1.00	1.000	
02 OPROV 2513	VAV Reheat	44	44	44	44	10	0.235	1.00	0.00	1.00	1.00	1.00	1.000	
02 OPROV 2514	VAV Reheat	30	30	30	30	10	0.350	1.00	0.00	1.00	1.00	1.00	0.904	

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System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-htg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz
Alternative 1													
Zone - 206		172	172	172	172	42							0.904
02 WSGEN 326	VAV Reheat	275	275	275	275	96	0.350	1.00	0.00	1.00	1.00	1.00	0.904
Zone - 207		275	275	275	275	96							0.904
02 TRAUDPED 717	VAV Reheat	62	62	62	62	18	0.297	1.00	0.00	1.00	1.00	1.00	0.957
02 SCLSU 878	VAV Reheat	48	48	48	48	15	0.323	1.00	0.00	1.00	1.00	1.00	0.931
02 EXROM 877	VAV Reheat	84	84	84	84	24	0.292	1.00	0.00	1.00	1.00	1.00	0.962
Zone - 208		194	194	194	194	58							0.931
02 CORR 01	VAV Reheat	86	86	86	86	30	0.350	1.00	0.00	1.00	1.00	1.00	0.904
Zone - 209		86	86	86	86	30							0.904
02 OBSRM BAY 271	VAV Reheat	54	54	54	54	19	0.350	1.00	0.00	1.00	1.00	1.00	0.904
02 OBSRM BAY 272	VAV Reheat	54	54	54	54	19	0.350	1.00	0.00	1.00	1.00	1.00	0.904
02 EXROM 857	VAV Reheat	55	55	55	55	17	0.302	1.00	0.00	1.00	1.00	1.00	0.952
Zone - 210		163	163	163	163	54							0.904
02 LNGST 506	VAV Reheat	104	104	104	104	36	0.350	1.00	0.00	1.00	1.00	1.00	0.904
02 TLPAT 689	VAV Reheat	15	15	15	15	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000
02 TRTHP SPC 687	VAV Reheat	88	88	88	88	22	0.245	1.00	0.00	1.00	1.00	1.00	1.000
Zone - 211		208	208	208	208	58							0.904
02 TRTHP SPC 683	VAV Reheat	88	88	88	88	22	0.245	1.00	0.00	1.00	1.00	1.00	1.000
02 TRTHP SPC 688	VAV Reheat	88	88	88	88	22	0.245	1.00	0.00	1.00	1.00	1.00	1.000
02 TRTHP SPC 680	VAV Reheat	87	87	87	87	22	0.247	1.00	0.00	1.00	1.00	1.00	1.000
Zone - 212		264	264	264	264	65							1.000
02 APRNT 246	VAV Reheat	38	38	38	38	13	0.350	1.00	0.00	1.00	1.00	1.00	0.904
02 TRTHP SPC 476	VAV Reheat	80	80	80	80	21	0.269	1.00	0.00	1.00	1.00	1.00	0.985
02 TRTHP SPC 477	VAV Reheat	143	143	143	143	21	0.149	1.00	0.00	1.00	1.00	1.00	1.000
02 TRTHP SPC 478	VAV Reheat	143	143	143	143	21	0.149	1.00	0.00	1.00	1.00	1.00	1.000
Zone - 213		405	405	405	405	78							0.904
02 WTAPL 2001	VAV Reheat	16	16	16	16	6	0.350	1.00	0.00	1.00	1.00	1.00	0.904
02 CONFR COL 475	VAV Reheat	138	138	138	138	40	0.288	1.00	0.00	1.00	1.00	1.00	0.967
02 CORR 02	VAV Reheat	110	110	110	110	39	0.350	1.00	0.00	1.00	1.00	1.00	0.904
Zone - 214		265	265	265	265	84							0.904
02 OPROV 2521	VAV Reheat	30	30	30	30	10	0.350	1.00	0.00	1.00	1.00	1.00	0.904
02 OGENL 426	VAV Reheat	30	30	30	30	10	0.350	1.00	0.00	1.00	1.00	1.00	0.904
02 TEAMA 112	VAV Reheat	90	90	90	90	32	0.350	1.00	0.00	1.00	1.00	1.00	0.904

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System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-htg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz	
Alternative 1														
Zone - 215		150	150	150	150	52							0.904	
02 CORR 06	VAV Reheat	121	121	121	121	42	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 216		121	121	121	121	42							0.904	
02 EXROM FM 684	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
02 EXROM FM 685	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
02 EXROM FM 686	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 217		178	178	178	178	62							0.904	
02 CORR 07	VAV Reheat	124	124	124	124	43	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 218		124	124	124	124	43							0.904	
02 CORR 08	VAV Reheat	119	119	119	119	42	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
02 EXROM PEDS 601	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
02 EXROM PEDS 597	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 219		237	237	237	237	83							0.904	
02 WSGEN 02	VAV Reheat	309	309	309	309	108	0.350	1.00	0.00	1.00	1.00	1.00	0.904	*
Zone - 220		309	309	309	309	108							0.904	
02 CONSRENC 2001	VAV Reheat	34	34	34	34	12	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
02 CONSRENC 2002	VAV Reheat	34	34	34	34	12	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
02 CONSRENC 885	VAV Reheat	34	34	34	34	12	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
02 CONSRENC 649	VAV Reheat	34	34	34	34	12	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 221		137	137	137	137	48							0.904	
02 EXROM PEDS 596	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
02 EXROM PEDS 604	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
02 EXROM PEDS 602	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 222		178	178	178	178	62							0.904	
02 EXROM PEDS 605	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
02 EXROM PEDS 606	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
02 EXROM PEDS 613	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 223		178	178	178	178	62							0.904	
02 EXROM PEDS 615	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
02 EXROM PEDS 616	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
02 EXROM PEDS 617	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 224		178	178	178	178	62							0.904	
02 AEQST MPL 695	VAV Reheat	40	40	40	40	14	0.350	1.00	0.00	1.00	1.00	1.00	0.904	

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System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-htg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz
Alternative 1													
02 TLSTF 03	VAV Reheat	38	38	38	38	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000
02 SCLSU 828	VAV Reheat	48	48	48	48	17	0.350	1.00	0.00	1.00	1.00	1.00	0.904
02 AAMEN 865	VAV Reheat	42	42	42	42	15	0.350	1.00	0.00	1.00	1.00	1.00	0.904
Zone - 225		167	167	167	167	45							0.904
02 SCLSU 691	VAV Reheat	38	38	38	38	13	0.350	1.00	0.00	1.00	1.00	1.00	0.904
02 TRTHP-SPC 2001	VAV Reheat	61	61	61	61	22	0.350	1.00	0.00	1.00	1.00	1.00	0.904
02 TRTHP SPC 2406	VAV Reheat	61	61	61	61	22	0.350	1.00	0.00	1.00	1.00	1.00	0.904
Zone - 231		161	161	161	161	56							0.904
02 TRTHP-SPC 2001K	VAV Reheat	61	61	61	61	22	0.350	1.00	0.00	1.00	1.00	1.00	0.904
02 TRTHP-SPC 241	VAV Reheat	61	61	61	61	22	0.350	1.00	0.00	1.00	1.00	1.00	0.904
02 TRTHP SPC 2001J	VAV Reheat	61	61	61	61	22	0.350	1.00	0.00	1.00	1.00	1.00	0.904
Zone - 232		184	184	184	184	65							0.904
03 OPROV 3508	VAV Reheat	32	32	32	32	10	0.322	1.00	0.00	1.00	1.00	1.00	0.932
03 OPROV 3509	VAV Reheat	32	32	32	32	10	0.322	1.00	0.00	1.00	1.00	1.00	0.932
03 OPROV 3510	VAV Reheat	32	32	32	32	10	0.322	1.00	0.00	1.00	1.00	1.00	0.932
03 WACPF 2500E	VAV Reheat	71	71	71	71	25	0.350	1.00	0.00	1.00	1.00	1.00	0.904
Zone - 233		168	168	168	168	56							0.904
03 OPROV 891	VAV Reheat	52	52	52	52	10	0.200	1.00	0.00	1.00	1.00	1.00	1.000
03 OPROV 890	VAV Reheat	44	44	44	44	10	0.235	1.00	0.00	1.00	1.00	1.00	1.000
03 OPROV 3513	VAV Reheat	44	44	44	44	10	0.235	1.00	0.00	1.00	1.00	1.00	1.000
03 OPROV 3514	VAV Reheat	30	30	30	30	10	0.350	1.00	0.00	1.00	1.00	1.00	0.904
Zone - 248		170	170	170	170	42							0.904
03 CORR 06	VAV Reheat	121	121	121	121	42	0.350	1.00	0.00	1.00	1.00	1.00	0.904
Zone - 249		121	121	121	121	42							0.904
03 WSGEN 836	VAV Reheat	235	235	235	235	82	0.350	1.00	0.00	1.00	1.00	1.00	0.904
Zone - 250		235	235	235	235	82							0.904
03 WSGEN 841	VAV Reheat	139	139	139	139	49	0.350	1.00	0.00	1.00	1.00	1.00	0.904
03 OGENL 2001P	VAV Reheat	30	30	30	30	10	0.350	1.00	0.00	1.00	1.00	1.00	0.904
03 OGENL 2001B	VAV Reheat	30	30	30	30	10	0.350	1.00	0.00	1.00	1.00	1.00	0.904
Zone - 251		198	198	198	198	69							0.904
03 OBSRM PRM 2001	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904
03 WSGEN 704	VAV Reheat	41	41	41	41	15	0.350	1.00	0.00	1.00	1.00	1.00	0.904
03 INJCT 2001	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904

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System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-htg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz
Alternative 1													
Zone - 252		160	160	160	160	56							0.904
03 EXROM 838	VAV Reheat	54	54	54	54	19	0.350	1.00	0.00	1.00	1.00	1.00	0.904
03 EXROM 283	VAV Reheat	54	54	54	54	19	0.350	1.00	0.00	1.00	1.00	1.00	0.904
03 TLPAT 585	VAV Reheat	20	20	20	20	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000
03 CONFR COL 2001	VAV Reheat	97	97	97	97	34	0.350	1.00	0.00	1.00	1.00	1.00	0.904
Zone - 253		225	225	225	225	72							0.904
03 CORR 09	VAV Reheat	121	121	121	121	42	0.350	1.00	0.00	1.00	1.00	1.00	0.904
03 OBSRM BAY 796	VAV Reheat	55	55	55	55	19	0.350	1.00	0.00	1.00	1.00	1.00	0.904
03 OBSRM BAY 2001	VAV Reheat	55	55	55	55	19	0.350	1.00	0.00	1.00	1.00	1.00	0.904
03 SCLSU 2001	VAV Reheat	40	40	40	40	14	0.350	1.00	0.00	1.00	1.00	1.00	0.904
Zone - 254		270	270	270	270	95							0.904
03 EXROM INT 584	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904
03 SCREN DIA 583	VAV Reheat	60	60	60	60	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904
03 TRTHP PRV 578	VAV Reheat	60	60	60	60	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904
Zone - 255		179	179	179	179	63							0.904
03 CORR 10	VAV Reheat	508	508	508	508	35	0.069	1.00	0.00	1.00	1.00	1.00	1.000
Zone - 256		508	508	508	508	35							1.000
03 CORR 07	VAV Reheat	124	124	124	124	43	0.350	1.00	0.00	1.00	1.00	1.00	0.904
Zone - 257		124	124	124	124	43							0.904
03 CORR 08	VAV Reheat	119	119	119	119	42	0.350	1.00	0.00	1.00	1.00	1.00	0.904
03 EXROM INT 571	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904
03 EXROM INT 574	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904
Zone - 258		237	237	237	237	83							0.904
03 EXROM INT 556	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904
03 EXROM INT 567	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904
03 EXROM INT 568	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904
Zone - 262		178	178	178	178	62							0.904
03 EXROM INT 575	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904
03 EXROM INT 576	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904
03 EXROM INT 3214	VAV Reheat	62	62	62	62	22	0.350	1.00	0.00	1.00	1.00	1.00	0.904
Zone - 263		180	180	180	180	63							0.904
03 EXROM INT 539	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904
03 EXROM INT 537	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904

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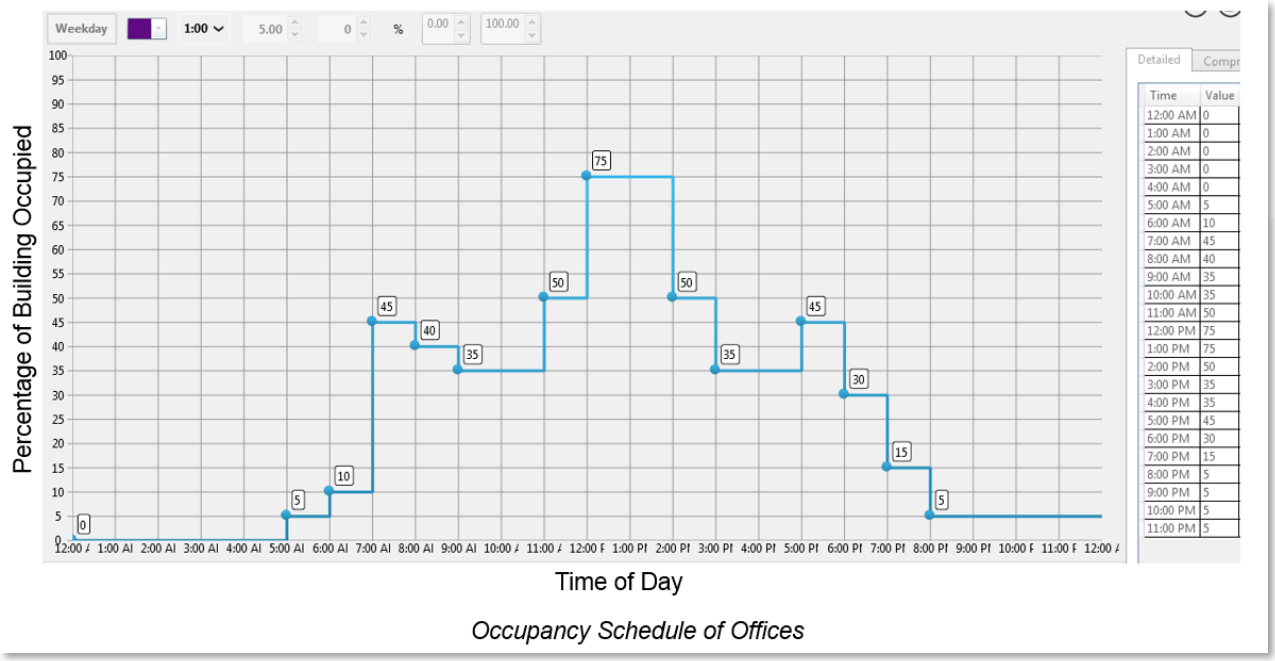
System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-htg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz	
Alternative 1														
03 EXROM INT 524	VAV Reheat	59	59	59	59	21	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 264		178	178	178	178	62							0.904	
03 WSGEN 02	VAV Reheat	309	309	309	309	108	0.350	1.00	0.00	1.00	1.00	1.00	0.904	*
Zone - 265		309	309	309	309	108							0.904	
03 CONSR ENC 793	VAV Reheat	85	85	85	85	30	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
03 CONSR ENC 794	VAV Reheat	85	85	85	85	30	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
03 CONSR ENC 858	VAV Reheat	85	85	85	85	30	0.350	1.00	0.00	1.00	1.00	1.00	0.904	
Zone - 266		256	256	256	256	90							0.904	
System - 003 - WEST		13,842	13,842	13,842	13,842	4,400							0.904	

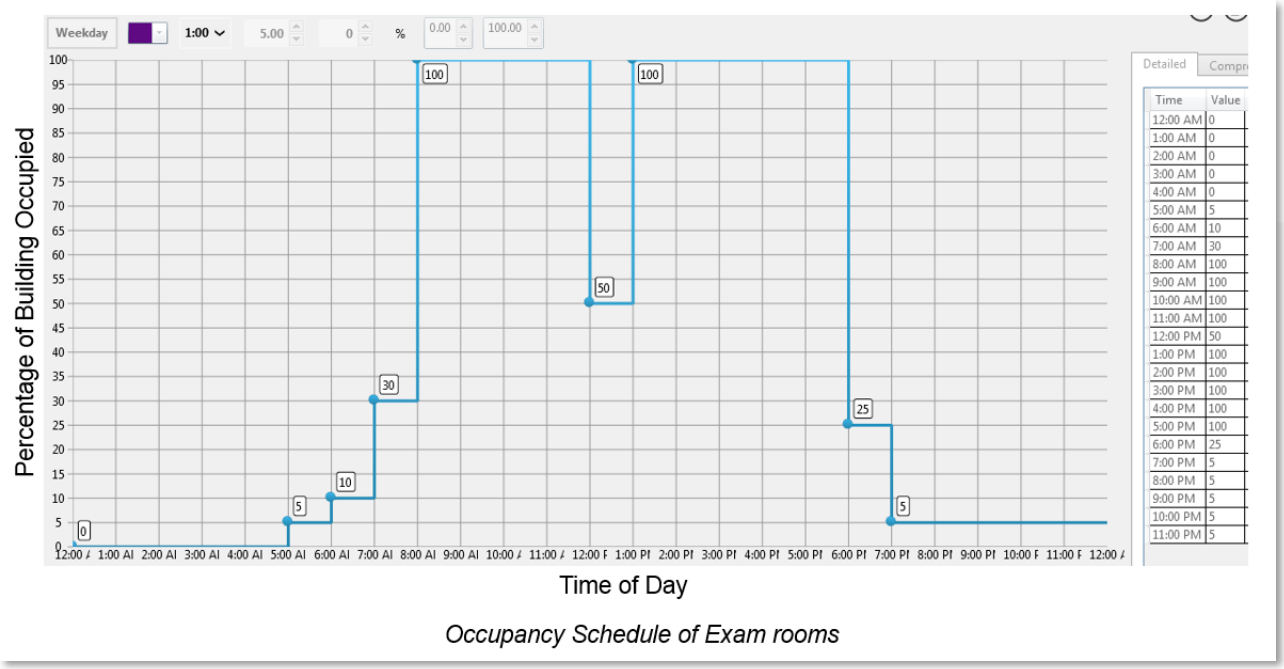
Outputs – See included data sheets From Trane Trace

Inputs and Assumptions

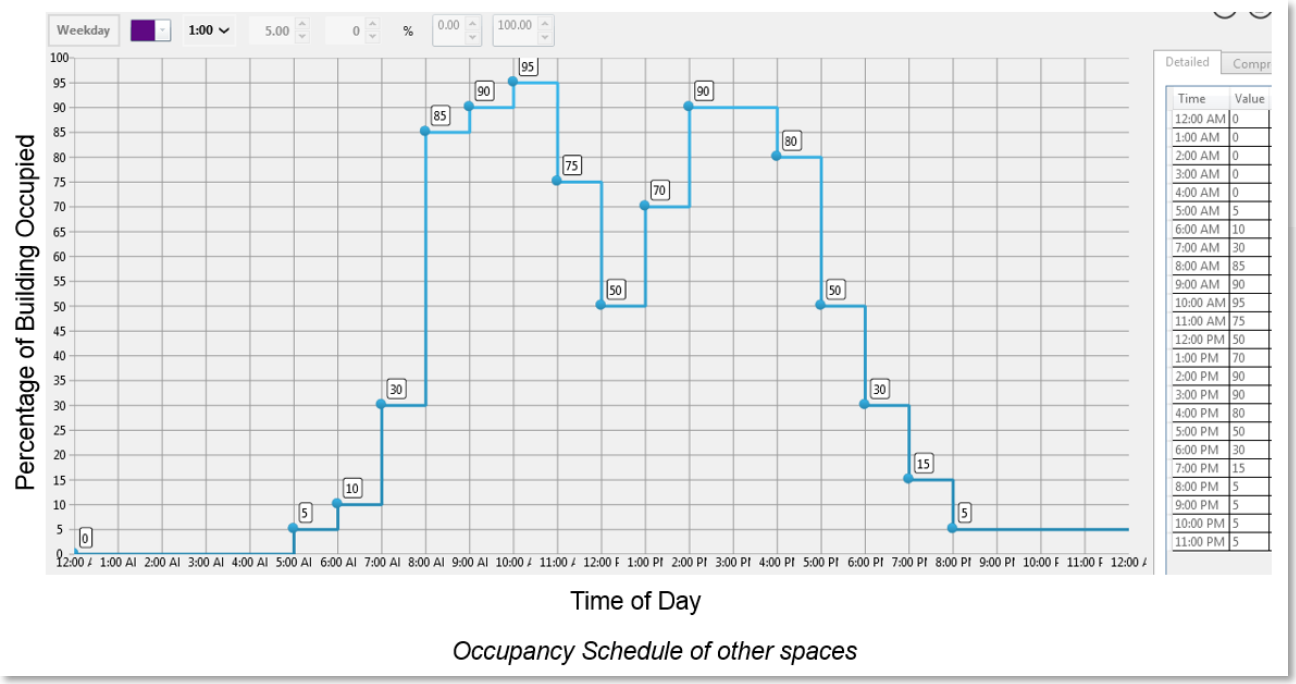
Occupant cooling loads were modelled using the following Time of Day models:



Occupancy Schedule of Offices



Occupancy Schedule of Exam rooms



Occupancy Schedule of other spaces

a. Equipment plug loads were modeled using the following schedule:

Space Type	Plug Load (W/sf)
Enclosed Office	0.75
Exam/Treatment Room	0.75
Conference/Collaboration Zone	0.50
Lobby	0.25

Indoor Environment Design Conditions

Summary: Interior Design Conditions

Indoor environmental condition controlled for non-comfort needs are:

- Medication Preparation Rooms: Maximum of 78 degrees, 24/7 for the functioning of the medical refrigerator
- Pharmacy Stacking Area: 50F to 80F, 24/7, for the storage of non-refrigerated pharmaceuticals.

Indoor environmental conditions in occupied spaces are based on *Thermal Environmental Conditions for Human Occupancy* ASHRAE Standard 55-2004.

Space Type	**Design Air Temperature Setpoint (°F)**		**Design Air Humidity Setpoint (RH)**
	Summer	**Winter**	
Medical Office Area	74 ±3	70 ±3	Not controlled
Office Area	74 ±3	70 ±3	Not controlled

Conference	74 ±3	70 ±3	Not controlled
Exam Rooms	76 ±3	77 ±3	Not controlled
Lobby/Waiting	77 ±3	75 ±3	Not controlled
OT/PT	70 ±3	68 ±3	Not controlled
Corridor	70 ±3	68 ±3	Not controlled
Elec/Mech Rooms	85 (max)	68 ±3	Not controlled
Telecommunication	74 (max)	68 ±3	Not controlled
Technology Room	80 (max)	74 (min)	Not controlled
Technology Equipment Room	78 (max)	72 (min)	Not controlled

Figure 1: Design Condition

Based on the above, thermostats in the building are user adjustable, from 67 to 77 degrees.

ACCEPTANCE CRITERIA: The building is considered "in control" when all spaces are controlled to their setpoint +/- 3F, with 90% of daily 15 minute observations within the control range.

Thermal Comfort Control:

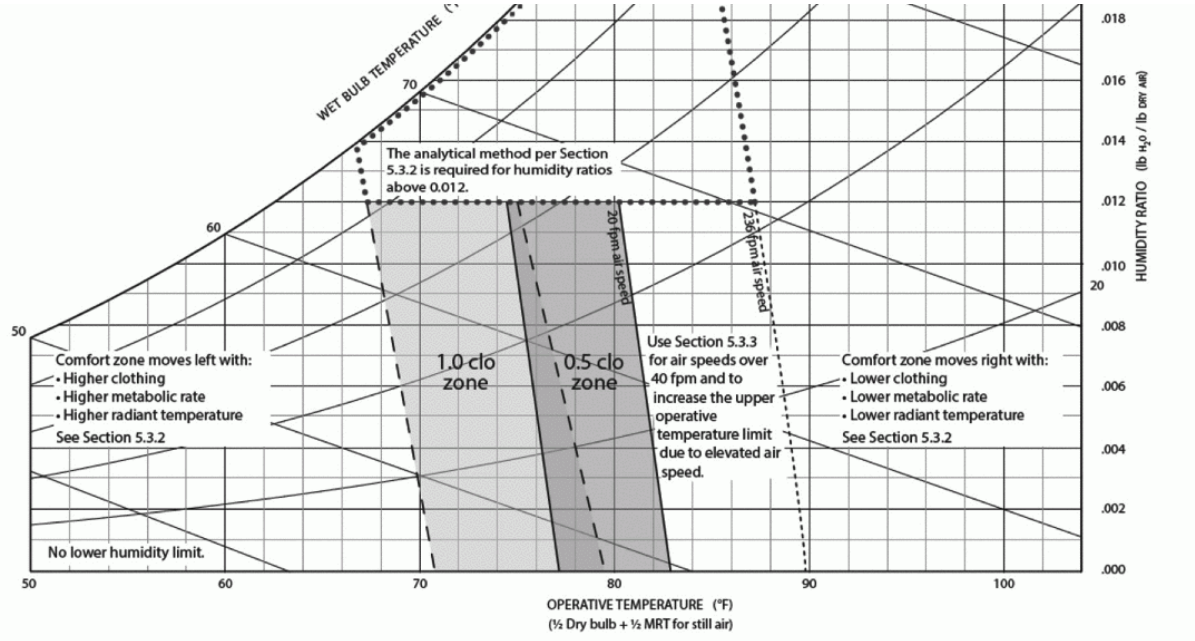
All regularly occupied areas include both cooling and heating.

Space Type	Temperature	Humidity Range	Zone Control	Clothing Level (Clo)	Metabolic Rate (Met)
Medical Office	**74°F Cooling +/-3** **70°F Heating +/-3**	**20%-55% RH**	**T-stat**	**0.76 Spring/Summer** **1.01 Fall/Winter**	**1.2**
Office	**74°F Cooling +/-3** **70°F Heating +/-3**	**20%-55% RH**	**T-stat**	**0.76 Spring/Summer** **1.01 Fall/Winter**	**1.2**
Conference	**74°F Cooling +/-3** **70°F Heating +/-3**	**20%-55% RH**	**T-stat**	**0.76 Spring/Summer** **1.01 Fall/Winter**	**1.2**
Corridors	**70°F Cooling +/-3** **68°F Heating +/-3**	**20%-55% RH**	**T-stat**	**0.66 Spring/Summer** **0.91 Fall/Winter**	**1.7**
Lobby/Waiting	**77°F Cooling +/-3** **75°F Heating +/-3**	**20%-55% RH**	**T-stat**	**0.58 Spring/Summer** **0.85 Fall/Winter**	**1.0**
Exam/Procedure	**76°F Cooling +/-3** **77°F Heating +/-3**	**20%-55% RH**	**T-stat**	**0.48 Spring/Summer**	**1.2**

				0.48 Fall/Winter	
OT/PT	**70°F Cooling +/-3** **68°F Heating +/-3**	**20%-55% RH**	**T-stat**	**0.33 Spring/Summer** **0.53 Fall/Winter**	**2.0**

The design with ASHRAE Standard 55 takes into consideration six primary factors.

Figure 1: Temperature and humidity range set-points for non-perimeter spaces based on summer and winter office clothing (0.5 – 1.0 Clo)



The following table summarizes the assumed Clo conditions for medical offices and general offices within the building

Medical Office & General Office clo Assumptions		
	Summer (cooling)	**Winter (heating)**

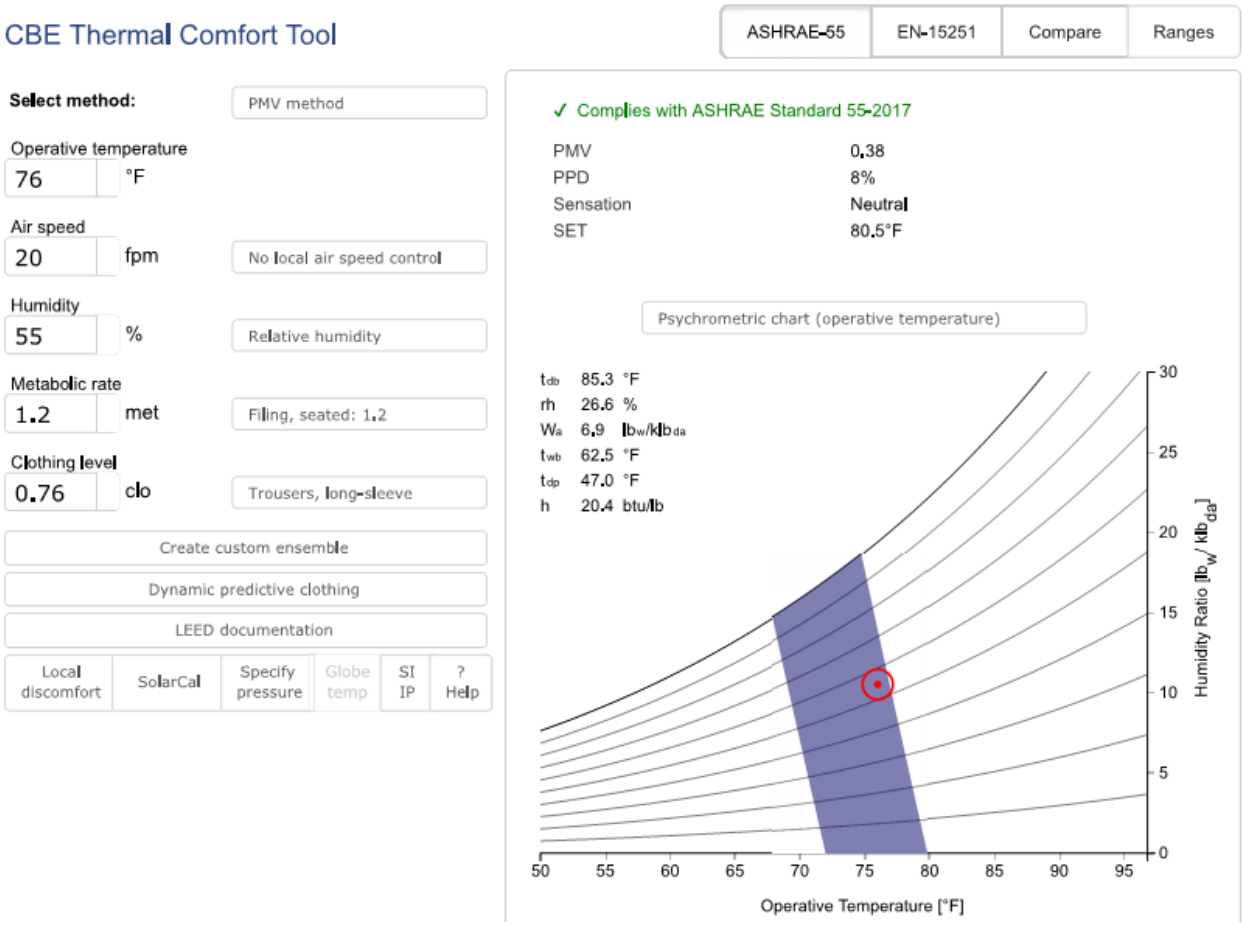
briefs	**0.04**	**0.04**
T-shirt	**0.08**	**0.08**
calf socks	**0.03**	**0.03**
shoes	**0.02**	**0.02**
long-sleeve dress shirt	**0.25**	**0.25**
thick trousers	**0.24**	**0.24**
standard office chair	**0.1**	**0.1**
Long-sleeve thin sweater	**N/A**	**0.25**

Medical Office & General Office Summary		
Total clo	**0.76**	**1.01**
Low Temp	**72**	**68**
High Temp	**76**	**72**
RH	**55**	**38**
MET	**1.2**	**1.2**

The following table and graph shows the calculated PMV for medical offices and general offices within the building during Spring/summer maximum & Fall/Winter minimum temperature.

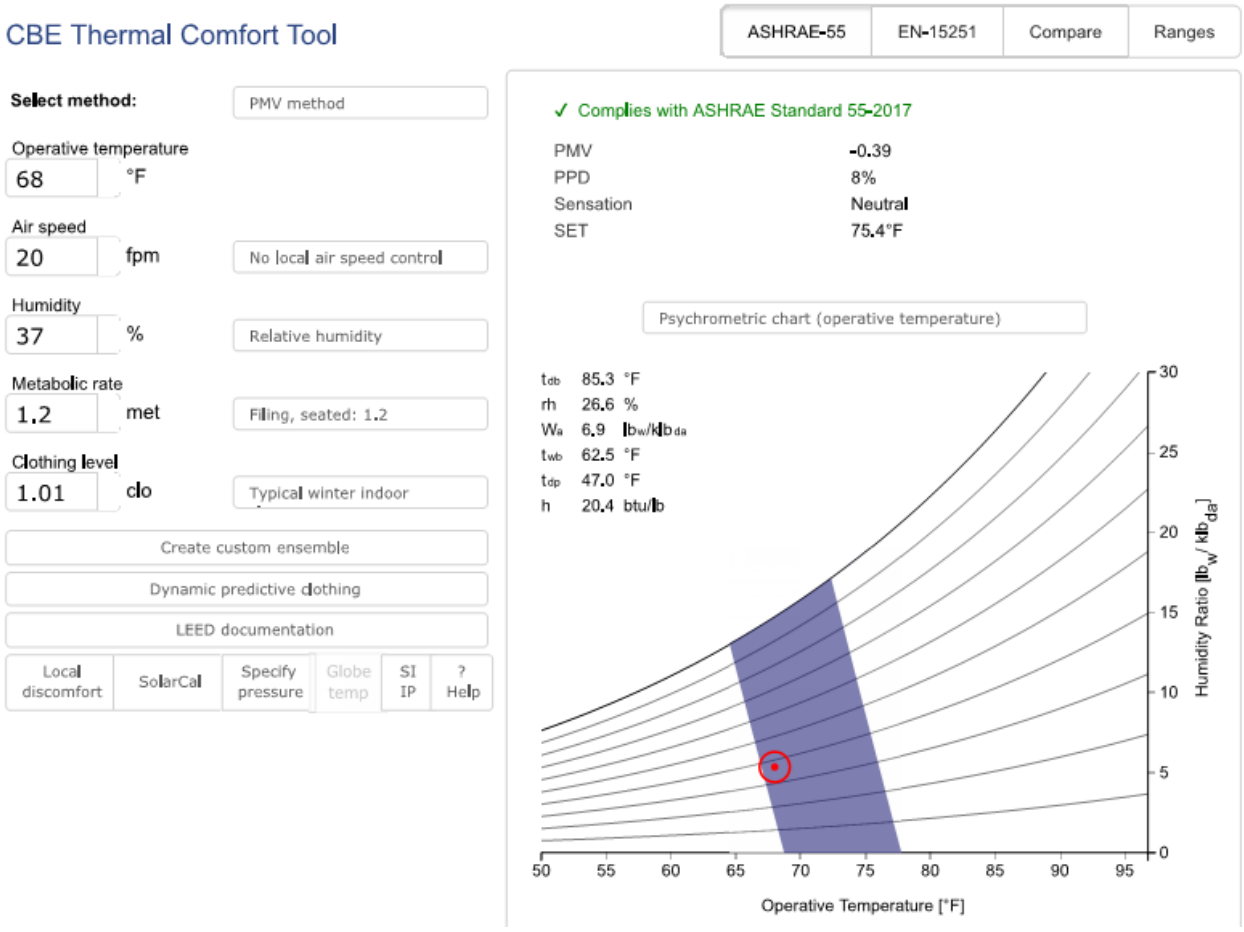
Medical Office & General Office Spring & Summer Maximum Temperature			
Parameter	**Input**	**°F & ft/min**	
Clothing (clo)	**0.76**		**[0 to 2clo]**
Air temp. (°C)	**24.4**	**76**	**[10 to 30°C]**
Mean radiant temp. (°C)	**24.4**	**76**	**[10 to 40°C]**
Activity (met)	**1.2**		**[0.8 to 4met]**
Air speed (m/s)	**0.10**	**20.0**	**[0 to 1m/s]**
Relative humidity (%)	**55.0**		**[30 to 70%]**

Parameter	Results	°F
Operative temp. (°C)	**24.4**	**76**
PMV	**0.38**	
PPD	**8.0**	



Medical Office & General Office Fall & Winter Minimum Temperature			
Parameter	**Input**	**°F & ft/min**	
Clothing (clo)	**1.01**		**[0 to 2clo]**
Air temp. (°C)	**20.0**	**68**	**[10 to 30°C]**
Mean radiant temp. (°C)	**20.0**	**68**	**[10 to 40°C]**
Activity (met)	**1.2**		**[0.8 to 4met]**
Air speed (m/s)	**0.10**	**20.0**	**[0 to 1m/s]**
Relative humidity (%)	**37.0**		**[30 to 70%]**

Parameter	Results	°F
Operative temp. (°C)	20	68
PMV	-0.39	
PPD	8.0	



The following table summarizes the assumed Clo conditions for a conference room within the building

Conference Room clo Assumptions		
	Summer (cooling)	Winter (heating)

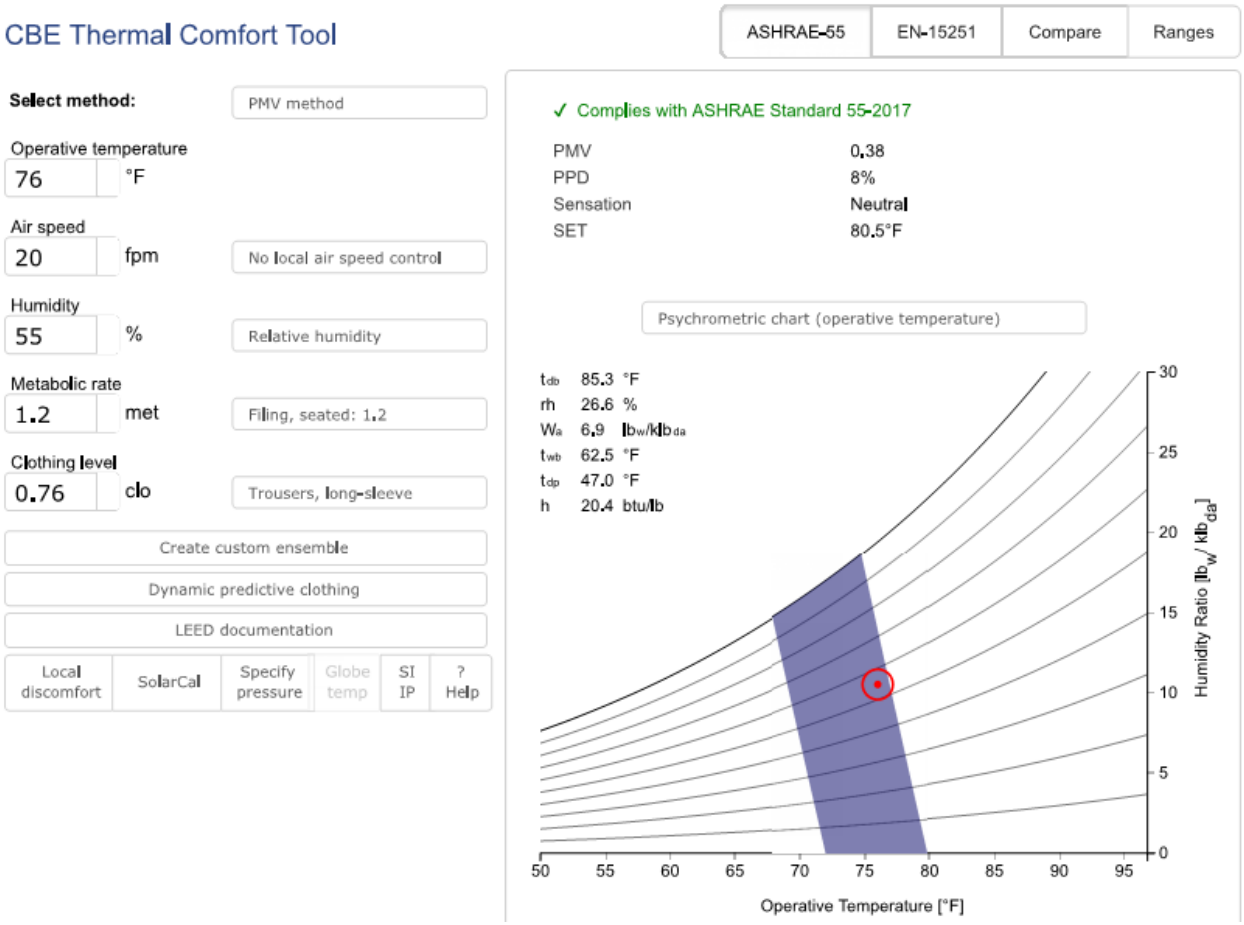
briefs	0.04	0.04
T-shirt	0.08	0.08
calf socks	0.03	0.03
shoes	0.02	0.02
long-sleeve dress shirt	0.25	0.25
thick trousers	0.24	0.24
standard office chair	0.1	0.1
Long-sleeve thin sweater		0.25

Conference Room Summary		
Total clo	0.76	1.01
Low Temp	72	68
High Temp	76	72
RH	55	38
MET	1.2	1.2

The following table and graph shows the calculated PMV for a conference room within the building during Spring/summer maximum & Fall/Winter minimum temperature.

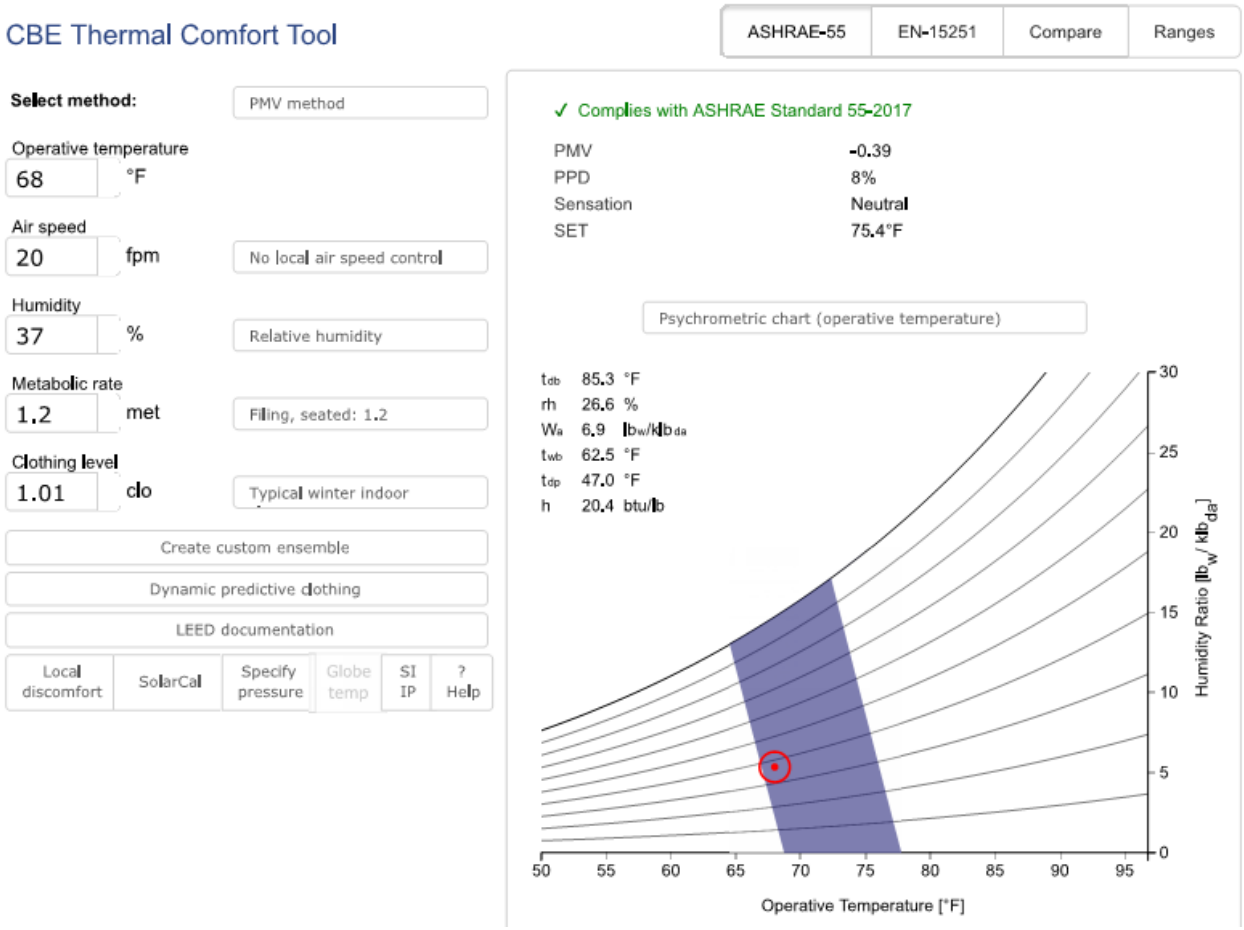
Conference Room Spring & Summer Maximum Temperature			
Parameter	Input	°F & ft/min	
Clothing (clo)	0.76		[0 to 2clo]
Air temp. (°C)	24.4	76	[10 to 30°C]
Mean radiant temp. (°C)	24.4	76	[10 to 40°C]
Activity (met)	1.2		[0.8 to 4met]
Air speed (m/s)	0.10	20.0	[0 to 1m/s]
Relative humidity (%)	55.0		[30 to 70%]

Parameter	Results	°F
Operative temp. (°C)	24.4	76
PMV	0.38	
PPD	8.0	



Conference Room Fall & Winter Minimum Temperature			
Parameter	**Input**	**°F & ft/min**	
Clothing (clo)	**1.01**		**[0 to 2clo]**
Air temp. (°C)	**20.0**	**68**	**[10 to 30°C]**
Mean radiant temp. (°C)	**20.0**	**68**	**[10 to 40°C]**
Activity (met)	**1.2**		**[0.8 to 4met]**
Air speed (m/s)	**0.10**	**20.0**	**[0 to 1m/s]**
Relative humidity (%)	**37.0**		**[30 to 70%]**

Parameter	Results	°F
Operative temp. (°C)	20	68
PMV	-0.39	
PPD	8.0	



The following table summarizes the assumed Clo conditions for corridors within the building

Corridor clo Assumptions		
	Summer (cooling)	Winter (heating)

briefs	0.04	0.04
T-shirt	0.08	0.08
calf socks	0.03	0.03
shoes	0.02	0.02
long-sleeve dress shirt	0.25	0.25
thick trousers	0.24	0.24
Long-sleeve thin sweater		0.25

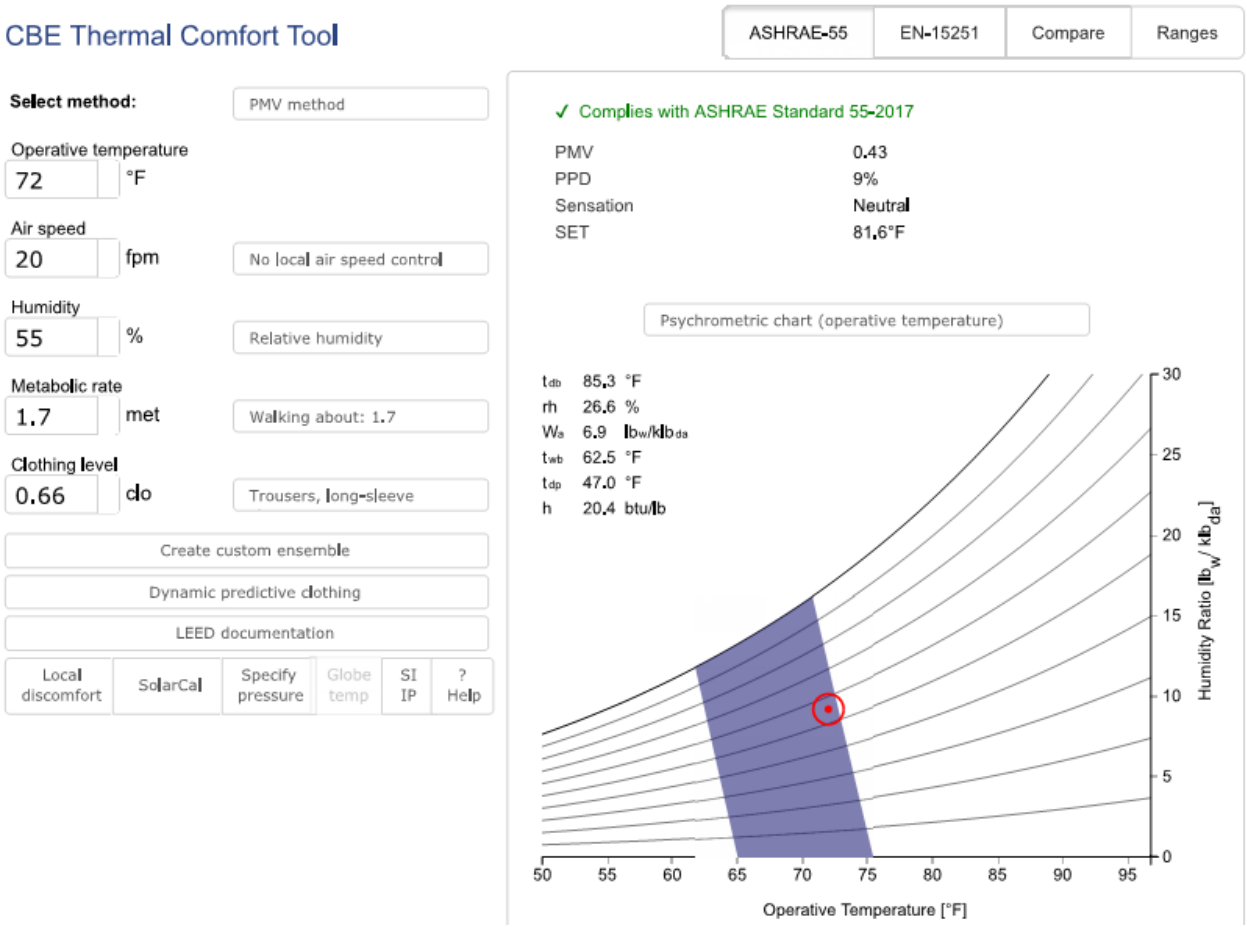
Corridor Summary		
Total clo	0.66	0.91
Low Temp	68	66
High Temp	72	70
RH	55	37
MET	1.7	1.7

The following table and graph shows the calculated PMV for a corridor within the building during Spring/summer maximum & Fall/Winter minimum temperature.

Corridor Spring & Summer Maximum Temperature

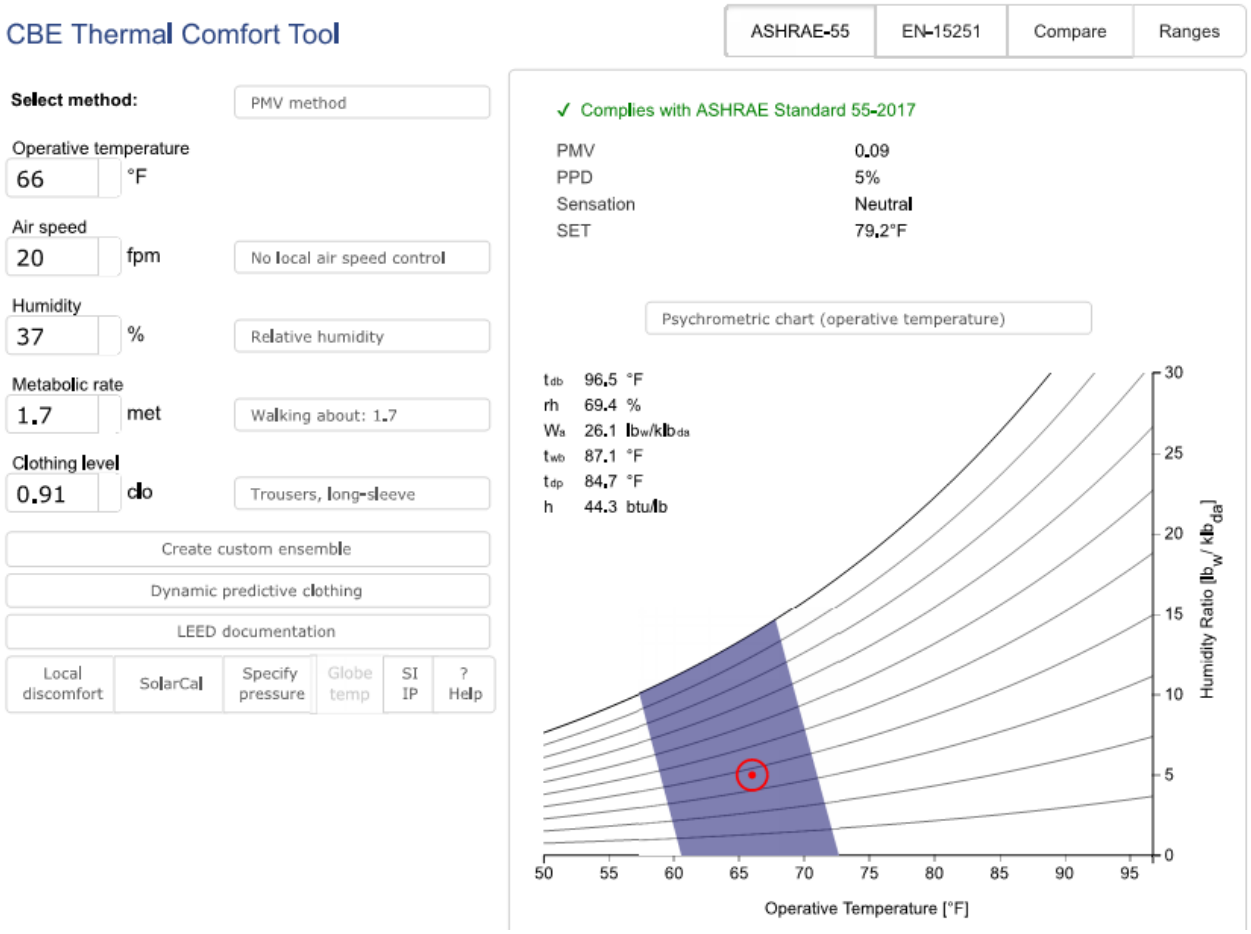
Parameter	Input	°F & ft/min	
Clothing (clo)	0.66		[0 to 2clo]
Air temp. (°C)	22.2	72	[10 to 30°C]
Mean radiant temp. (°C)	22.2	72	[10 to 40°C]
Activity (met)	1.7		[0.8 to 4met]
Air speed (m/s)	0.10	20.0	[0 to 1m/s]
Relative humidity (%)	55.0		[30 to 70%]

Parameter	Results	°F
Operative temp. (°C)	22.2	72
PMV	0.43	
PPD	9.0	



Corridor Fall & Winter Minimum Temperature			
Parameter	**Input**	**°F & ft/min**	
Clothing (clo)	**0.91**		**[0 to 2clo]**
Air temp. (°C)	**18.9**	**66**	**[10 to 30°C]**
Mean radiant temp. (°C)	**18.9**	**66**	**[10 to 40°C]**
Activity (met)	**1.7**		**[0.8 to 4met]**
Air speed (m/s)	**0.10**	**20.0**	**[0 to 1m/s]**
Relative humidity (%)	**37.0**		**[30 to 70%]**

Parameter	Results	°F
Operative temp. (°C)	18.9	66
PMV	0.09	
PPD	5.0	



The following table summarizes the assumed Clo conditions for a conference room within the building

Lobby/Waiting Room clo Assumptions		
	Summer (cooling)	Winter (heating)

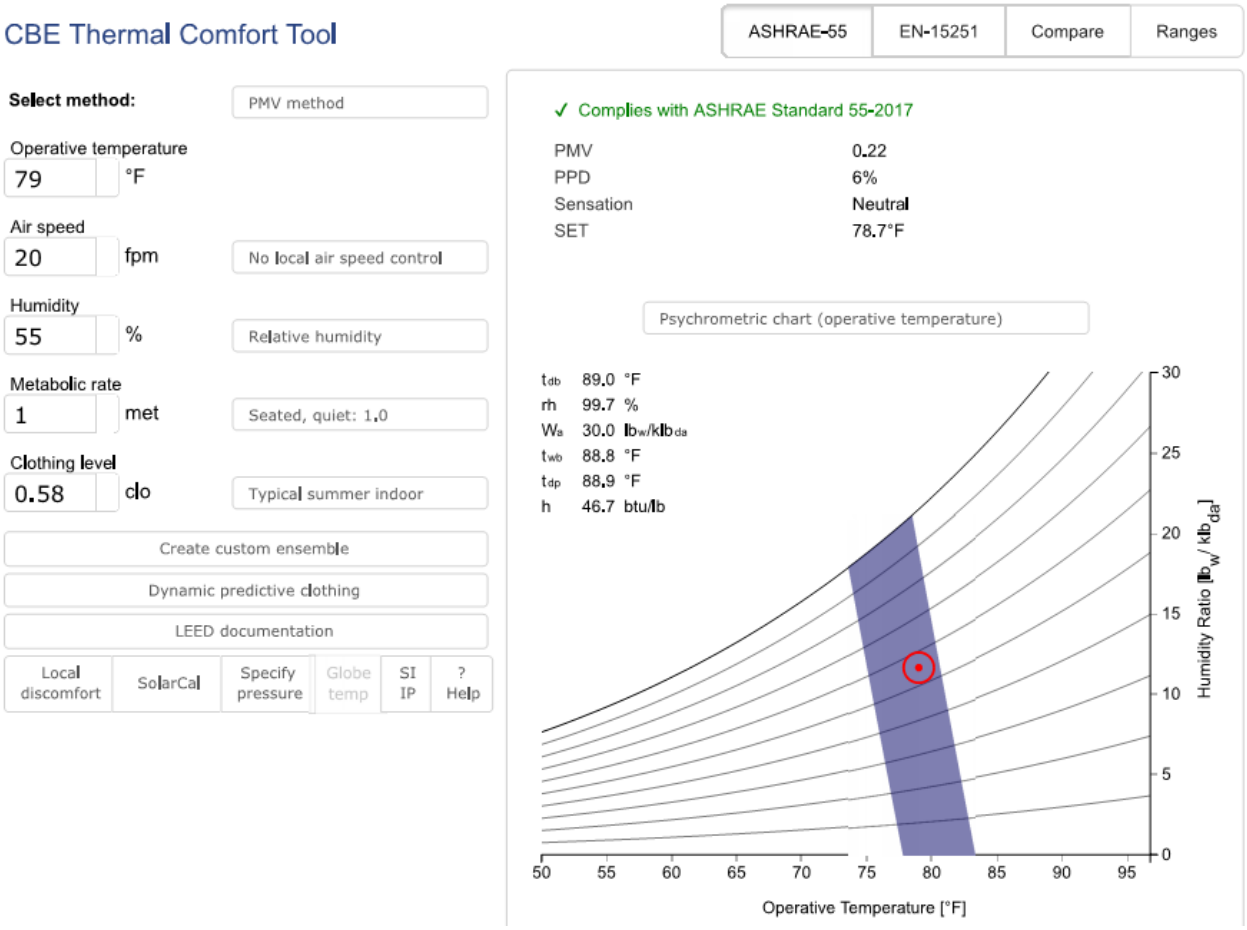
briefs	**0.04**	**0.04**
T-shirt	**0.08**	**0.08**
calf socks	**0.03**	**0.03**
shoes	**0.02**	**0.02**
short-sleeve dress shirt	**0.17**	**N/A**
long-sleeve dress shirt	**N/A**	**0.19**
thick trousers	**0.24**	**0.24**
Long-sleeve thin sweater	**N/A**	**0.25**

Lobby/Waiting Room Summary		
Total clo	**0.58**	**0.85**
Low Temp	**75**	**73**
High Temp	**79**	**77**
RH	**55**	**37**
MET	**1.0**	**1.0**

The following table and graph shows the calculated PMV for a lobby/waiting room within the building during Spring/summer maximum & Fall/Winter minimum temperature.

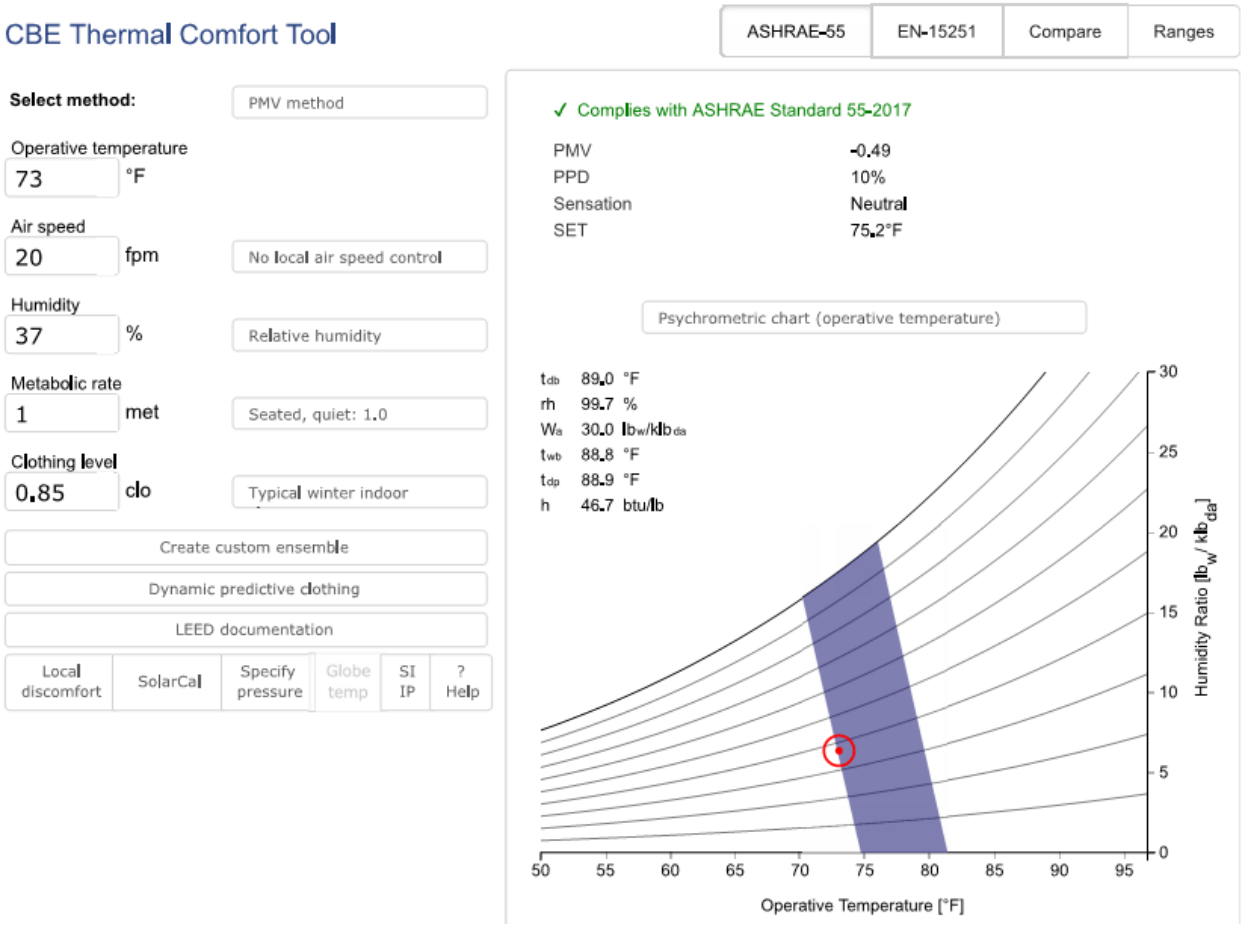
Lobby/Waiting Room Spring & Summer Maximum Temperature			
Parameter	Input	°F & ft/min	
Clothing (clo)	0.58		[0 to 2clo]
Air temp. (°C)	26.1	79	[10 to 30°C]
Mean radiant temp. (°C)	26.1	79	[10 to 40°C]
Activity (met)	1.0		[0.8 to 4met]
Air speed (m/s)	0.10	20.0	[0 to 1m/s]
Relative humidity (%)	55.0		[30 to 70%]

Parameter	Results	°F
Operative temp. (°C)	26.1	79
PMV	0.22	
PPD	6.0	



Lobby/Waiting Room Fall & Winter Minimum Temperature			
Parameter	**Input**	**°F & ft/min**	
Clothing (clo)	**0.85**		**[0 to 2clo]**
Air temp. (°C)	**22.8**	**73**	**[10 to 30°C]**
Mean radiant temp. (°C)	**22.8**	**73**	**[10 to 40°C]**
Activity (met)	**1.2**		**[0.8 to 4met]**
Air speed (m/s)	**0.10**	**20.0**	**[0 to 1m/s]**
Relative humidity (%)	**37.0**		**[30 to 70%]**

Parameter	Results	°F
Operative temp. (°C)	22.8	68
PMV	-0.49	
PPD	10.0	



The following table summarizes the assumed Clo conditions for an exam room within the building

Conference Room clo Assumptions		
	Summer (cooling)	Winter (heating)
briefs	0.04	0.04

T-shirt	**0.08**	**0.08**
calf socks	**0.03**	**0.03**
shoes	**0.02**	**0.02**
Hospital gown	**0.31**	**0.31**

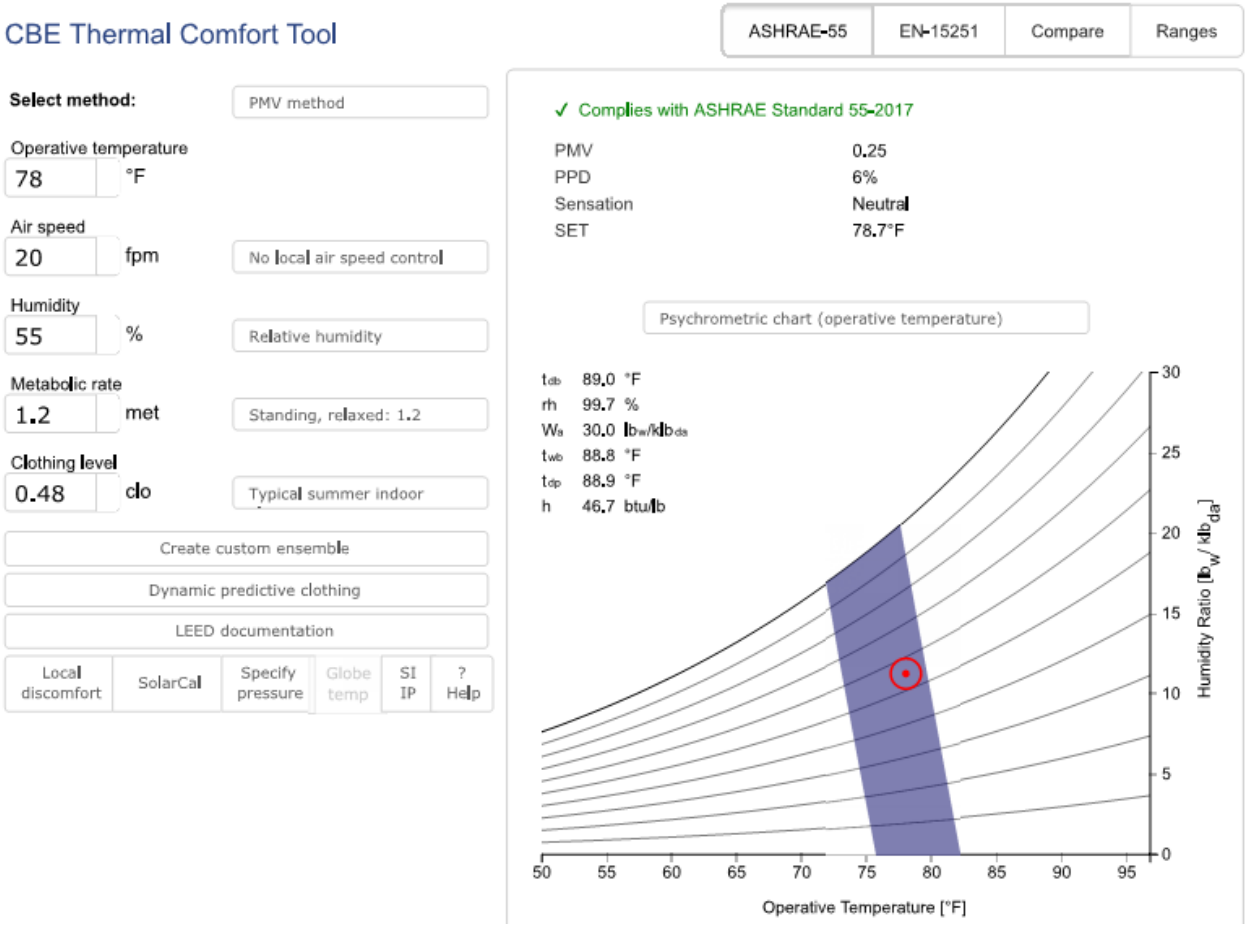
Exam Room Summary		
Total clo	**0.48**	**0.48**
Low Temp	**74**	**75**
High Temp	**78**	**79**
RH	**55**	**37**
MET	**1.2**	**1.2**

The following table and graph shows the calculated PMV for a exam room within the building during Spring/summer maximum & Fall/Winter minimum temperature.

Exam Room Spring & Summer Maximum Temperature			
Parameter	**Input**	**°F & ft/min**	
Clothing (clo)	**0.48**		**[0 to 2clo]**
Air temp. (°C)	**25.6**	**78**	**[10 to 30°C]**
Mean radiant temp. (°C)	**25.6**	**78**	**[10 to 40°C]**

Activity (met)	**1.2**		**[0.8 to 4met]**
Air speed (m/s)	**0.10**	**20.0**	**[0 to 1m/s]**
Relative humidity (%)	**55.0**		**[30 to 70%]**

Parameter	Results	°F
Operative temp. (°C)	**25.6**	**78**
PMV	**0.25**	
PPD	**6.0**	



Exam Room Fall & Winter Minimum Temperature			
Parameter	Input	°F & ft/min	
Clothing (clo)	0.48		[0 to 2clo]
Air temp. (°C)	23.9	75	[10 to 30°C]
Mean radiant temp. (°C)	23.9	75	[10 to 40°C]
Activity (met)	1.2		[0.8 to 4met]
Air speed (m/s)	0.10	20.0	[0 to 1m/s]
Relative humidity (%)	37.0		[30 to 70%]

Parameter	Results	°F
Operative temp. (°C)	23.9	75
PMV	-0.37	
PPD	8.0	

The following table summarizes the assumed Clo conditions for a PT/OT room within the building

PT/OT Room clo Assumptions		
	Summer (cooling)	**Winter (heating)**
briefs	**0.04**	**0.04**
ankle socks	**0.02**	**0.02**
shoes	**0.02**	**0.02**
Short-sleeve athletic shirt	**0.17**	**0.17**

Walking shorts	**0.08**	**N/A**
Sweatpants	**N/A**	**0.28**

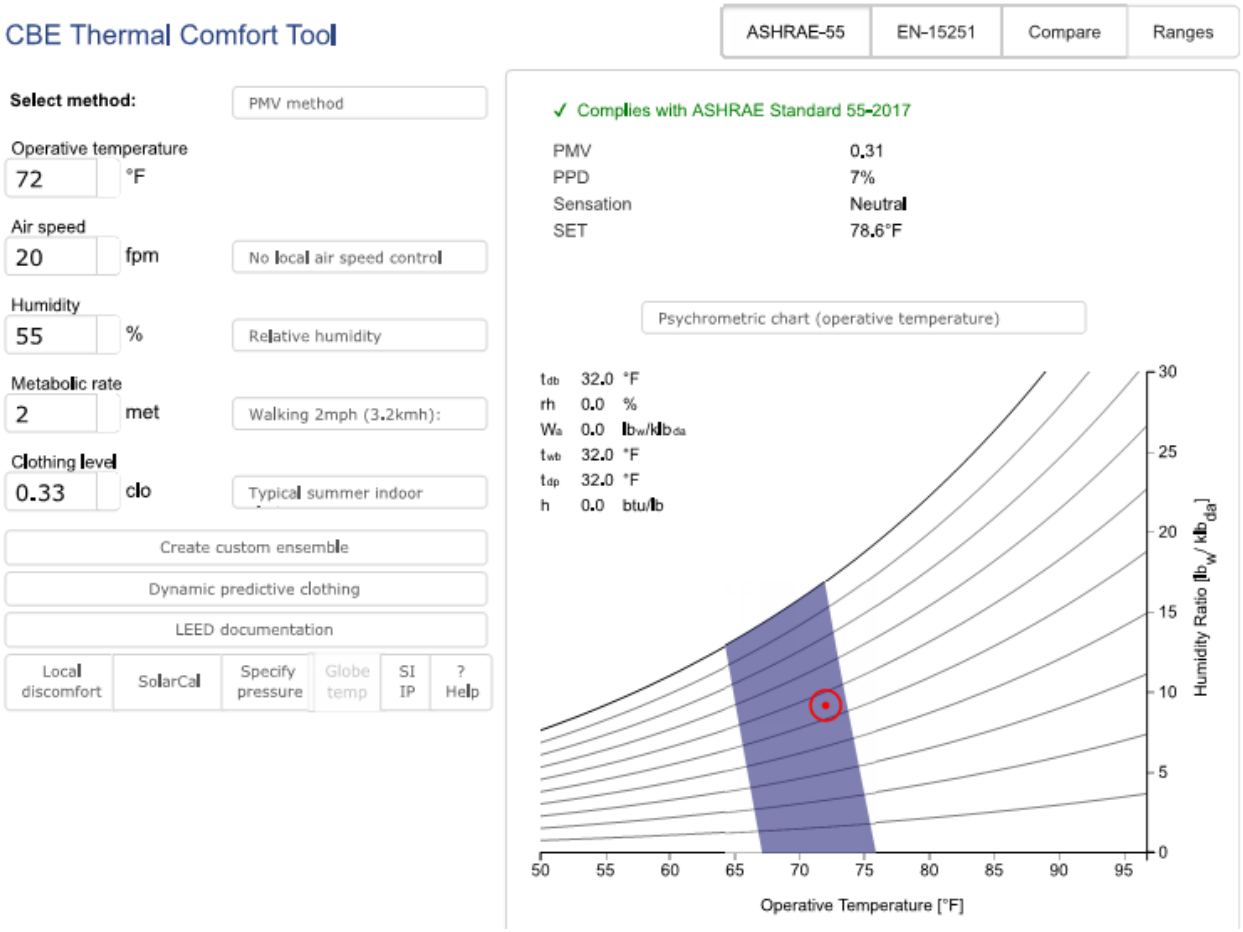
PT/OT Summary		
Total clo	**0.33**	**0.53**
Low Temp	**68**	**66**
High Temp	**72**	**70**
RH	**55**	**37**
MET	**2.0**	**2.0**

The following table and graph shows the calculated PMV for a PT/OT room within the building during Spring/summer maximum & Fall/Winter minimum temperature.

PT/OT Room Spring & Summer Maximum Temperature			
Parameter	**Input**	**°F & ft/min**	
Clothing (clo)	**0.33**		**[0 to 2clo]**
Air temp. (°C)	**22.2**	**72**	**[10 to 30°C]**
Mean radiant temp. (°C)	**22.2**	**72**	**[10 to 40°C]**
Activity (met)	**2.0**		**[0.8 to 4met]**
Air speed (m/s)	**0.10**	**20.0**	**[0 to 1m/s]**

Relative humidity (%)	**55.0**	**[30 to 70%]**

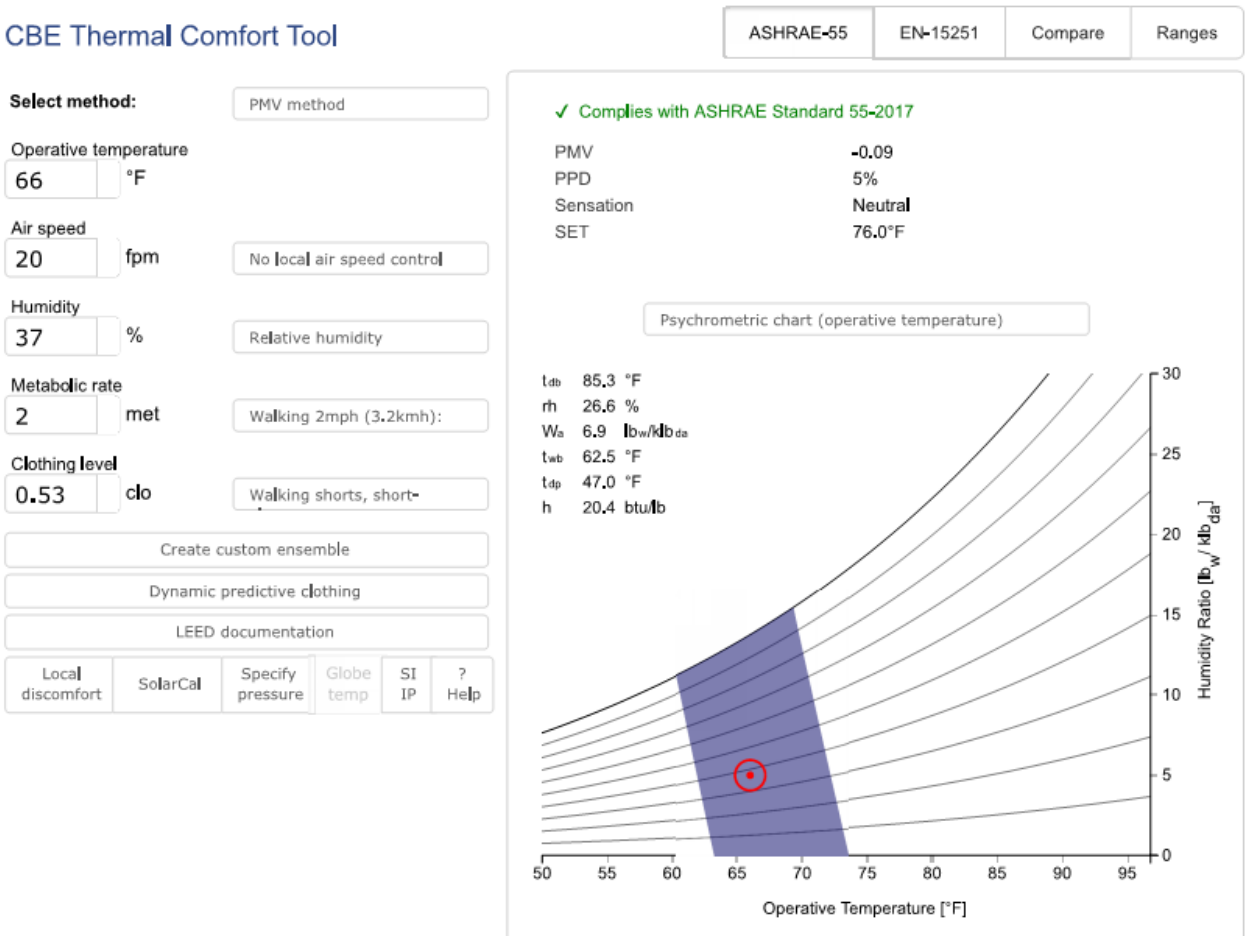
Parameter	Results	°F
Operative temp. (°C)	**22.2**	**72**
PMV	**0.31**	
PPD	**7.0**	



PT/OT Room Fall & Winter Minimum Temperature

Parameter	Input	°F & ft/min	
Clothing (clo)	0.53		[0 to 2clo]
Air temp. (°C)	18.9	66	[10 to 30°C]
Mean radiant temp. (°C)	18.9	66	[10 to 40°C]
Activity (met)	2.0		[0.8 to 4met]
Air speed (m/s)	0.10	20.0	[0 to 1m/s]
Relative humidity (%)	37.0		[30 to 70%]

Parameter	Results	°F
Operative temp. (°C)	18.9	66
PMV	-0.09	
PPD	5.0	



Humidity Occurrence and Control

The annual design weather data is used to establish humidity design (See figure). For the upper limit, 77.5F at 55% humidity equates to a dew point of 60F. For the lower limit, 66F at 20% equates to a dew point of 25F. For both building occupants and materials, it is best to control the spaces to between 25F and 60F dewpoint most of the time (>80% of the time).

Dew-Point (Deg F) \ Dry-Bulb (Deg F)	10	20	30	40	50	60	70	80	90	100
85	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
80	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
75	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.02%	0.09%	0.00%
70	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	1.02%	0.40%	0.25%	0.00%
65	0.00%	0.00%	0.00%	0.00%	0.00%	3.19%	3.99%	2.06%	0.56%	0.00%
60	0.00%	0.00%	0.00%	0.00%	2.07%	8.71%	7.01%	2.65%	0.59%	0.00%
55	0.00%	0.00%	0.00%	0.00%	8.88%	7.81%	3.12%	1.36%	0.50%	0.00%
50	0.00%	0.00%	0.00%	0.94%	8.34%	3.72%	1.71%	0.83%	0.31%	0.00%
45	0.00%	0.00%	0.00%	2.33%	4.17%	1.63%	0.74%	0.33%	0.31%	0.00%
40	0.00%	0.00%	0.18%	1.70%	2.36%	1.46%	0.61%	0.53%	0.18%	0.00%
35	0.00%	0.00%	0.00%	0.55%	1.12%	0.66%	0.54%	0.25%	0.03%	0.00%
30	0.00%	0.00%	0.19%	1.29%	1.19%	0.87%	0.67%	0.24%	0.02%	0.00%
25	0.00%	0.00%	0.09%	0.57%	0.42%	0.42%	0.27%	0.01%	0.00%	0.00%
20	0.00%	0.00%	0.09%	0.69%	0.56%	0.57%	0.53%	0.01%	0.00%	0.00%
15	0.00%	0.00%	0.00%	0.10%	0.21%	0.30%	0.09%	0.00%	0.00%	0.00%
10	0.00%	0.00%	0.00%	0.02%	0.08%	0.26%	0.09%	0.00%	0.00%	0.00%
5	0.00%	0.00%	0.00%	0.00%	0.05%	0.08%	0.01%	0.00%	0.00%	0.00%

Upper Limit Dewpoint	60	33% Hours Above
		19% Hours Above Which Are Also Above 70
		14% Non-Cooling Hours Above
Lower Limit DewPoint	25	6% Hours Below

High humidity occurrence and control: Dew-Point is above 60F dew point for 33% of hours. During all of those hours, the systems are expected to be in cooling mode, with a supply air temperature of 55 degrees, and dehumidification to 55 degree dewpoint. As such, high humidity controls are generally a consequence of normal comfort cooling. Supply air reset is allowed.

Low humidity occurrence and control: Dew-Point is below 25F for 6% of the yearly hours. All of those hours occur between the hours of 6 PM and 7AM. Since this is infrequent, the initial cost and maintenance costs of humidification systems are not justified.

21. ELECTRICAL SYSTEMS NARRATIVE

DESIGN CODES AND STANDARDS

All electrical systems shall meet or exceed the requirements of the following codes and standards.

1. City of Covina Municipal Code
2. 2019 California Building Code, Title 24
3. 2019 California Electrical Code
4. 2019 California Green Building Code
5. 2019 California Energy Code
6. National Fire Protection Association
    a. NFPA 101: Safety to Life from Fire in Buildings and Structures
7. California ADA Standards for Accessible Design
8. OSHA General Industry Standards
9. IESNA Illuminating Engineering Society of North America
10. LPI Lightning Protection Institute
11. NECA National Electrical Contractors Association
12. NEMA National Electrical Manufacturers Association
13. NETA International Electrical Testing Association
14. ASTM American Society for Testing and Materials International
15. CBMA Certified Ballast Manufacturers Association

ELECTRICAL PERFORMANCE REQUIREMENTS

1. Electrical criteria
    a. Description of the electrical equipment and systems required to serve the Kaiser Permanente Covina MOB project in accordance with the referenced codes standards, and design criteria.
    b. The work under this contract shall include all labor, materials, tools, equipment, transportation, insurance, temporary protection, supervision and incidental items essential for proposer installation, testing, adjusting, coordination, commissioning, and operation, even though not specifically mentioned or indicated, but which are usually provided or are essential for proper installation and operation of all systems related to this section.
2. Protective Device Coordination Study:
    a. A fault study, arc flash study, equipment interrupting rating evaluation, and a protective device coordination study for the new electrical distribution system will be

performed by the successful supplier for their specific equipment. The Contractor will be required to verify the proper equipment and adjustable protective device settings.

b. Study shall be performed by the chosen electrical gear manufacturer with their professionals.
c. Arc flash shall exceed NFPA 70E requirements

3. Inspections and Testing:

   a. Inspections and testing will adhere to industry and manifesting standards and additional requirements described herein.
   b. Field testing of the electrical systems will be specified to assure that the equipment is operational and within industry and manufacturer's tolerances and is installed in accordance with design specifications.
   c. The Contractor will be responsible to facilitate the testing and correct any deficiencies found in the testing process as well as any required retesting.
   d. Testing reports will be submitted to the engineer for approval.
   e. The contractor is responsible for coordinating and obtaining electrical parameters of the utility service, including the new exterior pad mounted transformer provided by the Utility company.

4. Utility Company Coordination:

   a. The design team and contractor will be responsible to meet the Utility Company requirements for rough-in, operation, and metering of new electric, signal, and telecommunications services.
   b. The temporary power will be coordinated and provided by the General Contractor, including the energy cost and required equipment to bring power from the Utility to the site.

5. Seismic Controls:

   a. The project is in an active seismic zone. Provide seismic restrains to comply with the requirements of this project. Provide seismic certifications.

6. Arc Flash Hazard Minimization:

   a. Arc flash ratings are based on the equipment's ability under a fault condition to cause an explosion, or arc fault. The rating defines the equipment's ability to deliver energy and correlate to the personal protective equipment (PPE) gear an electrician is required to wear to be safe when working on or around energized equipment.
   b. Critical electrical systems must remain energized during maintenance procedures, and the lower the arc flash hazard of the equipment, the safer the personnel working on that equipment.
   c. The incident energy level is directly proportional to the available fault current level available at the equipment and the time it takes to clear a fault condition. Methods which will be considered to reduce or mitigate incident energy levels include:

1. Reduce available fault current:
    - Reduce power sources during maintenance (e.g., open ties)
    - Include current limiting fuses
    - Increase transformer impedance
    - Include high resistance grounding
    - Limit transformer sizes
2. Shorten clearing time:
    - Use bus differential protection scheme
    - Use light sensing arc flash protection system
    - Use zone selective interlocking
    - Use arc flash protection system
3. Remote operation:
    - Use EPMS to monitor and control protective devices
    - Use remote racking devices
    - Rack in/out while behind a door
    - Use remote control breaker control system
    - Isolate assembly compartment barriers
4. Predict and prevent faults:
    - Monitor insulation integrity

PRIMARY POWER SERVICE

1. Electrical Utility Service
   The building electrical services will be supplied from new, underground, primary service from the local electric utility, Southern California Edison. The medium voltage utility will be stepped down at the secondary of the utility transformers to provide 480V, 3-phase, 4-wire plus ground utilization voltages to the facilities.

   Refer to 'Load Calculations' section for anticipated connected and design loads.

2. Power Distribution
   The power distribution in the medical office building will be derived from the main switchboard, and generally distributed up through stacked electrical closets.

   The utilization voltage will be 480-volt, 3-phase, 4-wire, and 60-hertz. The majority of the lighting will be LED and will operate at DC voltage via 120-volts, 1-phase converters. HVAC equipment, elevators, and imaging equipment will typically operate at 480-volts, 3-phase. Step-down transformers will provide 208/120-volt single-phase power and three-phase power for receptacles, medical equipment, and control panels.

   Devices will be fully rated. Series ratings of protective devices will not be acceptable.

3. Main Disconnect
   The incoming secondary utility feeders will enter the building below the main electrical room and connect to the utility CT section of the main switchboard prior to the main circuit breaker disconnect section.

4. Main Switchboard Construction

The switchboard shall be the ANSI freestanding, front connected and front accessible, and service entrance rated. Spare cubicles to include a minimum of one spare cubicle for each frame size utilized in the switchgear lineup shall be provided. All spaces shall be fully bused based on frame sizes indicated on design drawings, including draw-out assemblies, bused connections, and hardware. Spaces shall have insulated covers over bus stubs and a complete draw-out mechanism ready for breaker installation. All buses shall be copper.

Main switchboard main breaker and feeder breakers shall include ground fault protection relays. Main-breaker ground sensing shall be provided for proper selective ground fault operation. Ground fault protection is required on main circuit breakers as well as feeder circuit breakers to provide selective tripping of the breaker closest to the fault.

Main switchboard circuit breakers shall be solid state to allow for full time current coordination. Over-current devices shall have short-time, long-time, ground fault, and instantaneous trip settings.

5. Main Switchboard Metering
   Main switchboard line-up shall be provided with a multi-function digital power meter measuring total power output of the switchboard. Digital readout metering shall be provided on the load side of the main circuit breaker.

   The following minimum metering is required:
   a. Volts (phase-to-phase and phase-to-neutral)
   b. Frequency
   c. Ampere demand (per phase and average three-phase)
   d. Kilowatt hours (re-settable)
   e. Kilowatt demand (three-phase) (re-settable)
   f. kVA demand (three-phase) (re-settable)
   g. Harmonic load content (percent THD)
   h. Power factor

In addition, SCADA outputs shall be provided for remote monitoring of the metering and control system. Each feeder breaker shall have self-contained local digital metering with remote reporting capability.

The following values shall be metered:
   a. Volts (phase-to-phase and phase-to-neutral)
   b. Amperes
   c. Kilowatt hours (resettable)
   d. Kilowatt demand
   e. Kilowatt peak demand

ELECTRICAL DISTRIBUTION SYSTEM EQUIPMENT

1. Integrated Power Center Switchboards

Electrical distribution equipment (i.e. – panelboards, transformers) combined into a single factory assembled and prewired integrated system will be considered for this facility.

2. Step-down Transformers
Transformers shall be 480V delta primary with solidly grounded 208/120V wye-connected secondary. Step-down transformers will provide 208/120V single- and three-phase power for receptacles via panelboards located in the electrical rooms. All sensitive electronic equipment and telecom rooms will be served by 120/208-volt power through K-13 rated transformers per Kaiser Permanente Electrical Design Standards. All step- down 480V-208/120V transformers shall have capacity as defined by Kaiser Permanente Electrical Design Standards for future loads after completion of construction. Transformers 45-KVA and greater shall have 20 percent spare capacity. Transformers 45-kva and less shall have 5 percent spare capacity and allow for forced air cooling. All dry-type step-down transformers shall comply with the minimum efficiencies as tested and rated in accordance with US DOE CSL-3.

3. Panelboards and Distribution Panelboards
Panelboards and distribution panels shall be located in electrical rooms with a minimum of 3-inch separation between adjacent panelboards. Branch-circuit panelboards shall be 3-phase, 4-wire, have no less than 42 poles regardless of bus ampacity, and utilize bolt-on type circuit breakers. Branch-circuit panelboards shall have a 100 percent neutral bus and a ground bus. All buses shall be copper. Panelboards serving high harmonic load content (50 percent or greater nonlinear load) shall have a 200 percent neutral bus. All panelboard breaker busing, including spaces, shall be rated no less than 100- A and as indicated on the one-line diagram.

Every panelboard shall have a main breaker in the same enclosure. The main breaker can be likened to a local disconnect and must be readily accessible should the panelboard need to be de-energized in an emergency situation. Single-pole breakers shall not be ganged to form multi-pole breakers. Panelboards and breakers shall be rated to withstand and interrupt the available fault current without taking credit for the series rating due to upstream breakers.

Panelboards shall contain 25 percent spare load capacity, 10 percent spare circuit breakers and spaces for 10 percent more circuit breakers after completion of construction. The spare breakers shall be left in the "OFF" position and the panelboard directory card shall list the word "SPARE" for these breakers.

Panelboards shall be provided with a hinged trim feature with a full-height piano hinge. The trim shall hinge open with the removal of a few screws. The panel door giving access to the circuit breakers only shall have a flush tumbler lock. All panelboard doors shall be keyed alike.

4. Central Battery Inverter

A 10kVA UPS battery inverter is being utilized to supply back up power to all egress lighting in the facility.

5. Power Monitoring Metering

The electrical power system will be designed to measure the total load of specific building load types per Kaiser Permanente Electrical Design Standards. Measured data should be recorded at a minimum of 15 minute intervals and have the capability to report to a remote interface via Internet.

The required load types are as follows:

- HVAC System Loads
- Lighting Loads
- Plug and Process Loads
- Elevators
- Imaging Equipment

The following minimum metering metrics required are as follows:

- Volts (phase-to-phase and phase-to-neutral)
- Frequency
- Ampere demand (per phase and average three-phase)
- Kilowatt hours (re-settable)
- Kilowatt demand (three-phase) (re-settable)
- kVA demand (three-phase) (re-settable)
- Harmonic load content (percent THD)
- Power factor

6. Conductors and Raceways

Branch-circuit conductors shall have colored insulation. Larger conductors shall be taped with the appropriate color tape for a minimum 6 inches starting from the termination. Each conductor of a multiconductor cable shall be color coded in the same manner as single conductors. Color coding for power conductors shall be as follows:

Power Conductor	208/120V	480/277V
Phase A	Black	Brown
Phase B	Red	Purple
Phase C	Blue	Yellow
Neutral	White	Gray
Ground	Green	Green

Conductor Material shall be Copper.

600V feeders shall be single conductor copper, 600V rated with XHHW or THHN insulation. Feeders shall be color coded using color type at all connections and in all pull and junction boxes. All feeders shall be installed in conduit. All feeder conductors shall be installed splice free unless conditions prohibit.

Branch circuit conductors shall be copper single conductors 600V rated with THWN or THHN insulation with continuous color coding. All conductors #8 AWG and above shall be stranded.

Branch circuit conductor shall be designed to utilize the advantage of multi wire distribution, however, no more than 12 current carrying conductors (6 phase, 6 neutral and 1 ground) shall be installed in a common homerun conduit. Dedicated neutrals will be used for all circuits.

Branch circuits shall allow for up to 8 general purpose receptacles per 20A/1P circuit. Conduit shall be metallic to provide a redundant ground path. RGS conduit shall be used in underground applications and shall be used in concrete duct-banks. PVC conduit is not allowed. Direct burial of power and signal cables shall not be allowed.

The intent is for EMT to be used for all feeder circuits, and for branch circuit home runs from the junction box that serves receptacles, lighting, motor branch circuits within an area or defined space. The EMT shall also contain a NEC grounding conductor. EMT fittings shall be all steel compression type fittings. EMT must be utilized, per code, for emergency power circuits.

Flexible, AC or MC cable may be used for non-emergency wiring within walls, from a junction box in an adjacent corridor, or from a junction box within the space being served. Flexible cable should not be utilized within mechanical or electrical rooms. Utilize AC or MC cabling for branch circuiting as much as possible.

The minimum conduit size shall be ½" except for flexible conduit. Surface-mounted conduit shall be IMC or RGS with threaded couplings. Flexible metal conduit shall be used for lighting fixture connections (from junction boxes to individual light fixtures and maximum of 6 foot length to each fixture) and for connections to equipment (3 foot minimum, 6 foot maximum) subject to vibration, noise transmission, or movement. Liquid-tight flexible metal conduit (3 foot minimum, 6 foot maximum) shall be used for motor connections and transformers.

All aboveground conduits shall be installed parallel with the building features. Conduit shall not be installed in concrete structures. Fittings for metallic conduits shall be compression-type steel or malleable iron. All service and feeder conduits shall be marked with machine-made labels every 5 ft indicating their use. All conduits shall be supported independent of other systems and equipment and shall be supported with approved devices. Conduit shall not be run exposed on top of roof surfaces. All conduits shall be concealed in walls or ceilings unless otherwise noted.

RGS conduit with threaded fittings shall be used in the following locations:

- All exterior areas and other areas where physical damage is probable.
- Where exposed within 7 ft of the finished floor and at a point above 7 ft past the vertical to horizontal transition (except electrical rooms).

- Below concrete floor slab on grade.
- PVC schedule 40 nonmetallic conduit, or any other PVC based raceway is not allowed.

RGS or IMC conduit shall be used for all other conduits except where EMT is specifically allowed. EMT shall be used only for the locations permitted as follows:

- In sizes up to and including 4 inch, EMT may be used inside dry locations where not subject to mechanical damage.
- EMT may be used in air-conditioned spaces, such as accessible ceilings, dry wall partitions and exposed where 7 feet above the floor.

Schedule 80 Nonmetallic Conduit may be used in:

- Direct contact with the earth
- Locations embedded in concrete

Schedule 80 Nonmetallic Conduit shall not be used in HVAC plenums.

Schedule 40 Nonmetallic Conduit may be used in:

- Locations embedded in concrete

Schedule 40 Nonmetallic Conduit shall not be used in HVAC plenums.

7. Boxes and Wiring Devices

Backboxes shall be used for interior and exterior equipment. Provide cover plates for all wiring devices and junction boxes, and special backboxes for equipment and applications as required. Obtain special backboxes with equipment when available.

Provide cabinets to house equipment and components with enclosure type to match application requirements.

Wiring devices shall be standard styles with cover plates to match wiring device color.

Automatically controlled receptacles shall be grey in color with matching faceplate. Automatic on/off control of at least 50% of all receptacles in the following locations: administrative areas; provider offices; exam rooms and other locations dictated by local energy codes.

Receptacles shall be specification grade, generally NEMA 5-20R. GFCI receptacles will be utilized within 6 feet of a sink, in all exterior locations, and where specifically required by CEC.

Tamper resistant receptacles will be utilized in waiting rooms and pediatric areas.

8. Grounding

A solid-grounding electrode system shall be provided to ground the service entrance equipment. A #4/0 AWG ground conductor shall encircle the building as a

ground ring. A #4/0 AWG ground conductor shall extend from the outdoor building ground ring underground to the main electrical room ground bus. All grounding shall be installed per requirements of the CEC.

9. Surge Protective Device System (SPD/TVSS)
   Transient voltage suppression shall be provided to limit transient voltage disturbances. TVSS shall be provided at main switchgear, penthouse switchboards and panels serving outdoor equipment. ANSI/IEEE Standard C62.41 Category C3 TVSS shall be provided at the main service switchgear and the standby power switchgear. ANSI/IEEE Standard C62.41 Category B3 TVSS shall be provided at the downstream distribution panelboards.

10. Vibration and Noise Control
    Electrical systems will be designed to respond to criteria published under the sound and vibration control section of the ASHRAE Systems and Application Handbook and IEEE Standards.

    Electrical equipment placement will be considered for 60 Hz noise, vibration or electromagnetic interference.

11. Elevator machine room and machinery spaces
    The elevator machines room and the elevator hoists are being pressurized by exhaust fans. Refer to architectural drawings for locations of machine rooms and elevator hoists.

    Provide the power, lighting, fire alarm and other systems to comply with NEC Art. 620.

    Provide GFI receptacles in all elevator machine rooms and elevator pit areas. Provide lighting in elevator machine rooms and elevator pits, including the associated light switch.

    Provide the grounding system required in NEC Art. 250.

    Disconnect serving the elevator motors shall be in sight of elevator motor and controller and adjacent to machine room entry door, one disconnect required for each elevator. Label on disconnect per NEC Art. 6250-51

    For hydraulic elevator, the main line disconnect auxiliary contact for emergency battery lowering operation shall be within the main line disconnect. Auxiliary contact shall comply with NEC Art. 620-91.

    Car lighting disconnect shall be provided by a separate branch circuit. This circuit shall serve also receptacle, auxiliary lighting power source, and ventilation on each elevator car. Labeling per NEC Art. 620-22 and 620.51.

    Provide shunt trip circuit breaker for the elevator main power in order to remove power from elevator controls before any sprinkler is activated in the elevator machine room and hoist way overhead. The shut trip circuit breaker shall be installed in the elevator machine room (ASME A17.1)

Provide separate circuits for elevator pit lighting and receptacles and another for the pit sump pump (NEC Art. 620-24)

Provide separate branch circuit for machine room lighting and outlets (NEC Art. 620-23).

Comply with NEC 110-26 for electrical clearances requirements around all electrical equipment in elevator machine room.
Provide emergency phone and data line in all elevator machine rooms to the elevator controller and terminate on the elevator controller with coordination with elevator contractor.

LIGHTING

1. The lighting performance goal for Kaiser Permanente Medical Office Buildings is to achieve aggressive energy performance from the system while creating a less institutional lighting atmosphere.

2. Lighting Levels

The lighting levels for the project will be defined by the Kaiser Permanente Lighting Performance Guidelines. For spaces not otherwise defined by the Kaiser Permanente Lighting performance Guidelines, the lighting levels recommend by Illuminating Engineering Society of North America (IESNA) will be incorporated into the design. The values listed are average maintained illuminance levels using a total maintenance factor of 75%. The numbers listed are target values and will be adjusted to meet the research requirements.

Function/Space	Lighting Levels
Main Entrance	5 fc
Waiting Area	20-25 fc
Offices/Open Office	30 fc
Conference Rooms	5-30 fc
Corridors	10-15 fc
Stairwells	5 fc
Mechanical and Electrical Rooms	30 fc
Exam Rooms	50 fc
Consultation Rooms	30 fc
Procedure Room	50 fc
Patient Bays	30 fc
Imaging Rooms	10-30 fc
Blood Draw	15-50 fc
Clinical Lab	15-50 fc
Pharmacy	25-100 fc
Staff Lounge	15-20 fc
Storage Rooms	25 fc

Restrooms	15 fc
Utility Rooms	30 fc
Gym	30 fc
Loading Dock	10 fc

3. Lighting Power Density
   The project lighting power density will have a target performance goal of 0.6 w/sf.

4. Lighting Fixtures
   General illumination will DC power utilizing Acuity brand luminaires. Design and specification to by DPB Engineers.

LIGHTING CONTROLS

Lighting control for this building will be compatible with the DC powered luminaires. Design and specification to by DPB Engineers.

FIRE ALARM SYSTEM

8. Overall System Description:
   a. The complete fire alarm system will be UL listed and function as a communication, signaling, monitoring, and control system shall bear the UL label.
   b. The system will be of a solid-state modular design to allow for future expansion with a minimum of hardware additions.
   c. The fire alarm system will be a microprocessor based monitoring and control system. The complete system will incorporate multiplex wiring techniques, a central processing unit (FACU), an emergency command center (ECC), annunciator units, field processing units, firefighter's emergency telephone communications, voice control evacuation communications, and peripheral detection and alarm devices such as smoke/heat detectors, speakers and manual pull stations.
   d. The system will be divided into the following three major components:
      i. Detection and signaling system.
      ii. Voice communication system.
      iii. Firefighter's radio communication system.

2. Detection and Signaling System:
   a. The fire alarm detection and signaling system will be of the addressable type operating at 24 volt DC with standby battery or UPS power to function for four hours during a major power failure.
   b. These systems will provide complete fire detection and alarm capabilities monitoring manual pull stations and automatic detectors supplied and connected under the electrical section as well as monitoring sprinkler system waterflow and valve position indicators provided by the mechanical section.

Signaling devices will be via an audible speaker system and visual flashing indicator lights for the hearing impaired. These systems will be audibly coded utilizing a selection of audio tone and voice signaling over loudspeakers utilized for fire alarm and evacuation signals.

c. In an alarm condition, the fire alarm system shall also initiate the following:
   i. Door unlocking and release.
   ii. HVAC smoke damper control initiation.
   iii. Control elevator system recall operations.

9. Wiring will be as recommended by the manufacturer. All wiring will be supervised and run using fire rated cable.

LOAD CALCULATIONS

The spreadsheet below reflects preliminary utility load calculations for the building. These calculations are for concept planning only, and will be updated with increased accuracy as mechanical equipment selections and program requirements are further along in the design process.

MDP LOAD SUMMARY
1600A, 480/277V, 3 PHASE, 4 WIRE, 65kAIC

LOAD CATEGORY	CONNECTED VA	DESIGN FACTOR	DESIGN VA	DESIGN AMPS
LIGHTING	58475	100%	58475	70
RECEPT	10000	100%	10000	12
RECEPT	78475	50%	39238	47
MISC/GENERAL (Medical Equipment, Data Rooms, Process Load)	88475	75%	66356	80
MECHANICAL/VENTILATION	467800	80%	374240	450
ELEVATOR (DEMAND PER NEC 620.14)	60000	95%	57000	69
MODALITY ((1) X-Ray; (1) Mommography; (1) Bone Density; (1) Ultrasound - DEMAND PER NEC 660)	135500	80%	108400	130
SUB-TOTAL	898725		713709	859
		FUTURE GROWTH (10%)	71371	86
TOTAL			785080	945

22. TECHNOLOGY

GENERAL

1. The General Contractor shall be responsible for the installation of the following systems/components:
    a. Construction of the Technology Rooms
    b. HVAC systems for all Technology Rooms
    c. Fire protection systems for all Technology Rooms
    d. Electrical power for all Technology Rooms
    e. Grounding system for all Technology Rooms
    f. Backbone and horizontal cable pathways including: conduits, pull-boxes, j-hooks, wall penetrations and floor penetrations
    g. Box and conduit stubs for individual outlets
    h. Cable runways within Technology Rooms
    i. UPS units and related external maintenance by-pass switch and sub-panel(s)

TECHNOLOGY ROOMS

1. Technology Equipment Room (TER)
    a. The technology equipment in the TER will include KP-IT, Clinical Engineering and other low voltage systems.
    b. The TER is the central IT and low voltage equipment room serving the entire facility.
    c. The TER will also function as a Telecommunications Room (TR).
    d. The TER will contain the UPS and entrance conduits from the Service Providers.
2. Technology Room (TR)
    a. The TRs will house technology equipment, distribution cabling from the TER and horizontal cabling to individual Communications outlets.
    b. The technology equipment in the TR will include KP-IT, Clinical Engineering and other low voltage systems.
3. MEP for Technology Rooms
    a. All Technology Rooms shall be provided a conditioned supply of air 24/7, the temperature in the rooms shall not exceed 80-degrees Fahrenheit.
    b. All Technology Rooms shall be provided photoelectric smoke detectors constituting a single fire alarm initiation zone.
    c. All Technology Rooms shall be provided an automatic pre-action fire sprinkler system.
    d. The facility will be provided a UPS to support all technology rooms.
    e. The cabinets and racks located in all Technology Rooms shall provide distributed power through a dual Starline Busway system.
4. Distribution Pathways
    a. All cables shall be provided cable supports in the main corridors.
        i. (2) 4" cable hooks will be provided in corridors with less than 200 installed cables.
        ii. Basket cable tray will be provided in corridors within more than 200 installed cables.
    b. STI EZ-Path rated wall penetration assemblies will be provided where the cable pathway pass through all full height walls.
    c. All standard outlet locations will be provided a 5-square, 2-7/8" deep backbox with a single gang device ring and a 1" EMT conduit stubbed into the ceiling space terminated with a push-on bushing.

5. Data/Video/Voice Cabling Infrastructure
    a. System shall include Data Network backbone & horizontal cabling, connectivity outlets, termination racks. Data network infrastructure will include connectivity for Wi-Fi, Imaging, Med Dispensing and other such devices and will include coordination with the Medical Equipment planner for such related equipment.
    b. Horizontal Data/Voice Cabling:
    All horizontal data cabling systems shall be Category 6A rated, including RJ45 outlets, cables, patch cables and patch panels. Patch panels shall contain 20% spare capacity per TR. Installation shall conform to current Hospital standards.
    c. All required components necessary for the Cabling Infrastructure shall be utilized including but not limited to the following:
        i. Backbone cabling (fiber & UTP)
        ii. Horizontal cabling
        iii. Equipment Racks with vertical & horizontal wire management
        iv. Patch panels
        v. Patch cords
        vi. Fire-rated plywood backboards
        vii. Fiber interconnect centers
        viii. Faceplates and jacks

6. Data Hardware
    a. Requirements for the Data Switches shall be closely coordinated with and selected by KP-IT. Space shall be planned appropriately within the TR racks, as well as power and HVAC requirements.
    b. Core Data Switches shall be a Chassis configuration to comply with Kaiser Permanente Standards. Dual power supplies, dual supervisor engines, uplinks and support for POE are normal standards that are expected at a minimum.

7. Voice Hardware
    a. Requirements for the Data Switches shall be closely coordinated with and selected by KP-IT. Space shall be planned appropriately within the TR racks, as well as power and HVAC requirements.

8. Wireless
    a. An 802.11ac wireless network will be deployed to provide complete coverage throughout the facility. Wireless requirements shall be coordinated with KP-IT to determine service considerations.
    b. The wireless system shall utilize 802.3af Power Over Ethernet (PoE).
    c. A wireless access point survey will be conducted by approved vendors contracted by KP-IT for final placement. Cabling for the access points will be provided an additional 25' of slack to allow for relocation as necessary.

9. Video Distribution
    a. Distributed Televisions system (CATV) is not required for this project.

10. Sound Masking
    a. Sound masking systems shall be provided in the following areas:

i. MOB Exam rooms
ii. Patient corridors
iii. Waiting areas

b. Each group of speakers shall be programmed by zone to meet individual space acoustic requirements.

ELECTRONICS SAFETY AND SECURITY

ACCESS CONTROL

1. The new facility shall be provided a Lenel OnGuard security system.
2. The Access Controls system shall act as a database/license/communication host server and shall be located in the TER.
3. The Access Control system includes a building access control and alarm monitoring system. Kaiser Permanente will provide all computers and servers as required.
4. The Access Control system requires tamper monitoring and supervision for all system components and devices.
5. All required components necessary to operate the doors with the access control system shall be utilized including but not limited to the following:
    a. Workstations
    b. Badging printer
    c. Access controllers
    d. Reader boards
    e. Input boards
    f. Relay output boards
    g. Multiplexers
    h. Communications interfaces
    i. Proximity card readers
    j. Access cards
    k. Power supplies
    l. Battery chargers

VIDEO SURVEILLANCE

1. An IP based Video Surveillance shall be provided for the facility based on Kaiser Permanente standards. New cameras shall be IP cameras and located to provide appropriate coverage of the new facility.
2. The cameras shall transport their video images via category cables provided, installed, tested, and certified by the division 27 contractor.
3. CCTV Servers will be added to the system for management and administration of the system, and storage of the video images.
4. Additional video image archiving can be accomplished via industry standard NAS, SAS, or other data storage medium as is standard for the hospital IS department.
5. All required components necessary for the Video Surveillance System shall be utilized including but not limited to the following:
6. Fixed Cameras
    a. PTZ Cameras
    b. CCTV Servers

c. Power Supplies
d. Workstations
e. CCTV Monitors

23. **SECURITY SYSTEMS**

INTRODUCTION

The Kaiser Permanente (KP) Covina Medical Office Building (MOB) is a new three (3) story, approximately 58,800 SF building with a parking garage on the northwest side and surface parking lot on the southeast side. The signage program for the facility shall be developed to reflect the current KP National Facilities (NFS) Sign Program. This program includes standards and guidelines for the project signage and graphics. The exception to the prescribed sign standards, shall be graphic elements developed specifically for the project. The graphic elements include imagery and patterns developed for the project that reflect the facilities function and design. It is understood that integration of the graphics with the architectural and interior design elements of the facility shall be developed and coordinated with the Cannon Design team.

KAISER SECURITY STANDARDS

The security systems and devices shall be in compliance with Kaiser National Facilities Services Division (NFS) Standards for Medical Office Buildings (MOB) and Outpatient Pharmacies: Division 28, Section 28 1000 and 28 2000 – Security Access & Closed-Circuit Television (CCTV) Surveillance – Design Criteria. Where applicable, required devices are listed in this plan as the Kaiser NFS security system standards. Exceptions are site-specific issues, which by necessity require individual review, response and approval.

The Security program should incorporate elements of exterior security, physical and operational security measures, and electronic security systems to provide a level of protection for Kaiser's members, visitors, contractors, and employees. The intent of this plan is to establish the level and type of electronic security only.

Electronic security design and engineering shall be provided by a Kaiser approved security consultant and installed by a Kaiser approved security integrator as listed by NFS which are all Lenel authorized dealers. Using a non-approved vendor or non-Lenel integrator may result in warranty issues for the Service Area where the work is completed.

DESIGN GUIDELINES

The Kaiser Covina MOB and Outpatient Pharmacy Design Criteria establishes guidelines pertaining to minimum construction and installation requirements for physical and electronic security measures and devices for use in providing a safe environment as well as protection from unauthorized entry, and to provide security communications and surveillance between the site and Service Area Security Operations Center (SOC).

GENERAL SECURITY SYSTEM REQUIREMENTS MEDICAL OFFICE BUILDINGS

Certain perimeter entries will be equipped with card access devices for employee entry.

Staff entries shall also feature audio and video entry phones and card readers to enable staff to communicate with SOC staff for remote communications and entry.

All entry/exit points shall be equipped with alarm monitoring points, local annunciation, IP CCTV cameras, and related equipment to provide building monitoring after hours.

All access control alarms, IP CCTV cameras, and security communication systems will be connected to and controlled by a centralized access control system and Network Video Recorder (NVR) housed in the facility Telephone Equipment Room (TER). All devices will be programed on the existing Lenel Server for the Service Area.

Installation of new devices may require software to be added to the existing server for camera and reader licenses. During design the system will be reviewed for capacity with increases provided on an as needed basis.

With the exception of the main waiting area, daytime public access, all exterior doors are to be locked and alarmed at all times. All exterior out swinging door hinges are to be installed with concealed metal hinge pins, which inhibit exterior removal of the hinge pin. Auto sliding doors shall be equipped with access control locking. This feature allows the door to remain positively locked when closed so the slider cannot be pried open from the exterior.

Conference centers made available to the public shall be installed with intrusion devices that can be controlled separately from the remainder of the building. Doors shall be equipped with alarm contacts and electrified hardware so they can be controlled remotely from the Security Operations Center. The separation between the conference space and main building shall be closed and locked and monitored when the space is in use and the building is closed.

Exiting for the public spaces shall be configured so as not to require travel through controlled doors into back of house spaces, provider enclaves or staff corridors. Where the building configuration and codes require exiting through the aforementioned spaces delayed egress will be required. Delayed egress will require additional interfaces with low voltage systems, comply with local codes and may require local City or Fire Department approval. Delayed egress by nature produces a building condition which is less secure, carries a higher capital cost and can result in higher operational costs.

GENERAL SECURITY SYSTEM REQUIREMENTS OUTPATIENT PHARMACY

Certain pharmacy entries will be equipped with card access devices for employee entry.

All entry exit points shall be equipment electrical and electronic devices such as alarm contacts, motion detection, IP high-resolution CCTV cameras, exit warning devices, and security communication systems.

All access control alarms, color CCTV cameras, and security communication systems will be controlled locally from a dedicated access control and CCTV camera server.

With the exception of the main waiting area, daytime public access, all exterior doors are to be locked and alarmed at all times. All exterior out swinging door hinges are to be installed with concealed metal hinge pins, which inhibit exterior removal of the hinge pin.

Employee external access to the pharmacy shall be from designated entry points in the lobby. Employee and delivery access shall be from a video intercom at the employee entry and shipping receiving entry to the main Pharmacist work area.

All access control, alarm, and communications signals will be monitored and controlled from the dedicated and local server. Outpatient pharmacy alarms from the network connection on the intrusion panel shall be sent to the local Security Operations Center with intrusion panel alarms also sent to the offsite monitoring company via phone line.

ACCESS CONTROL SYSTEM & DOORS MEDICAL OFFICE BUILDINGS

A proximity card access system shall be used to control movement into the MOB and within certain internal spaces.

All access control cards shall be integrated with the existing photo-identification system. All employees, contractors, and visitors shall externally display ID card while working inside the facility. Production of the ID badge and access card lamination will be the responsibility of Kaiser Service Area Security Department.

All card readers, alarm inputs, and signal outputs shall be controlled and monitored by the access control system.

The access control system shall be compatible with existing video ID badging station, SOC monitoring equipment and Lenel software and servers

The architect will specify all electric lock hardware. This includes mortise, cylindrical, panic and electric strikes per the Service Area standards. All door hardware shall be equipped with IC cores. Door hardware shall be fail secure unless required my code to be fail safe. Outswing doors where the latch is exposed should be equipped with a latch guard to limit tampering.

Upon alarm activation, the access control system shall be fully integrated with the color CCTV surveillance system for automatic camera call-up and digital recording.

Required elements for a fully functional access electronic security system include; conduit, raceways, cables, j-hook cable supports, back boxes, door hardware, 120 VAC power as needed, fire penetrations, network cable, and non-PoE ports from Owner network switches with static IP addresses.

All doors with electrified hardware installed by the General Contractor shall be pre-cored, for lock wiring and frames punched for door contacts including temporary doors before Listing labels are applied. These doors, permanent and/or temporary, shall be installed with an electrified lockset, keyed to the building master key system, and a power transfer hinge. The security contractor shall be responsible for connecting the security system to the door hardware from the frame all the way to the lock. Trades should coordinate this effort so as to wire, connect and install the lock a single time. The door manufacturer shall prep the doors and frames to meet all fire code requirements. The Door Hardware Contractor shall install a door closer adjusted so it shall close from any open position.

The Security Contractor shall install all proximity card readers, and related controllers and power supplies. The proximity card reader shall be mounted in such a way so as to not create an employee safety hazard and be outside the outward swing path of the door.

All security devices requiring regular use shall be mounted to comply with ADA requirements have no operable components above 48" above finished floor (AFF).

All card reader locksets / panic devices must be electrified and interfaced to the access control system.

A new access control panel located in the expansion telephone room will be used to serve all new devices. The existing Lenel work stations and clients shall use software to enable control, programming, and event history recall of the access control system via the Owner's LAN/WAN.

Security panels shall be in locked enclosures with tamper switches.

- Location of proposed card readers shall be as follows;
    - Staff Entry (exterior)
    - Telephone Room (TR)
    - Telephone Equipment Rooms (TER)
    - Shipping Receiving
    - Service Yard
    - Safe room (cash drop safe)
    - Facilities work areas
    - Back of house hallways
    - Staff Lounge
    - Waiting to Clinic doors
    - Medication Room
    - Behavioral Health
    - Clean Utility
    - Soiled Utility
    - Provider Enclaves

Exterior doors to conference center spaces shall be equipped with electrified hardware and integrated with the access control system. This integration will allow remote locking and unlocking of the doors from the Security Operations Center.

ACCESS CONTROL SYSTEM & DOORS OUTPATIENT PHARMACY

A proximity card access system shall be used to control movement into Outpatient Pharmacy and within certain internal spaces. Shipping receiving, and employee entry exterior doors shall

also be equipped with security intercoms programmed to ring the pharmacist work bench intercom. Upon alarm, Security Officers will be dispatched to respond to the alarm.

All access control cards shall be integrated with the existing photo-identification system. All employees, contractors, and visitors shall externally display ID card while working inside the Outpatient Pharmacy. Production of the ID badge and access card lamination will be the responsibility of Kaiser Area Security Department.

All card readers, alarm inputs, and signal outputs shall be controlled and monitored by the access control system.

The access control system shall be compatible with existing video ID badging station, multimedia, and management system.

The architect will specify all electric lock hardware. This includes Best mortise locking hardware with deadbolts at pharmacy entry points. These locations shall also have welded steel frames and steel doors.

Upon alarm activation, the access control system shall be fully integrated with the color CCTV surveillance system for automatic camera call-up and digital recording.

Related accessories include; conduit, raceways, cables, back boxes, card and readers, access cards, motion detectors, alarm contacts, local and remote alarms, and electric locks.

All doors with electrified hardware installed by the General Contractor shall be pre-cored, including temporary doors. These doors, permanent and/or temporary, shall be installed with an electrified lockset, keyed to the pharmacy master key system, and a power transfer hinge. The General Contractor shall be responsible for connecting the security system to the frame side of the power transfer hinge and connecting the security cable between the electrified lockset and the power transfer hinge. The door manufacturer shall prep the doors and frames to meet all fire code requirements. The Door Hardware Contractor shall install a door closer adjusted, so it shall close from any open position. Some doors may require a wide-angle door viewer.

The Security Contractor shall install all proximity card readers, and related controllers and power supplies. The proximity card reader shall be mounted in such a way so as to not create an employee safety hazard and be outside the path of the outward swinging door.

All card reader doors will require fixed exterior lever lockset or panic device, prepared with mechanical key override.

All card reader locksets / panic devices must be electrified and interfaced to the access control system.

A dedicated access control system for the Pharmacy will be installed within the Pharmacy. The Pharmacy manager's PC workstation shall be loaded with client software to enable control, programming, and event history recall of the access control system via the Pharmacy LAN/WAN.

Security panels shall be installed in the pharmacy in locked enclosures with tamper switches, separate from all other systems and not combined with other MOB access control system or panels.

- Location of proposed pharmacy card readers shall be as follows;
    - Staff Entry
    - Point of Sale to Waiting Area
    - Schedule 2 Drug Cabinets

ALARM SYSTEMS MEDICAL OFFICE BUILDINGS

Separate alarm systems will be provided for the MOB. Points will be tied to the access control system and monitored by the Security Operations Center at the Medical Center. Field alarm points shall be terminated to the Lenel access control system, separate intrusion systems will not be provided.

- Location of proposed perimeter sensors shall be as follows;
    - Alarm contacts at perimeter entry/exit points
    - Alarm contacts and local alarms at emergency exit doors
    - Alarm contacts at Materials Management roll up doors.
    - Alarm contacts at secure storage.
    - Motion detectors at perimeter glass areas
    - Motion detectors at interior intersection points
    - Motion detectors at entry/exit lobbies and employee entry hallways.
    - Arming stations provided at main employee entry point
    - Exterior siren and strobe as part of the pharmacy hardening requirements.
    - Help buttons behavioral health provider offices
    - Help buttons behavioral health group rooms
    - Help buttons behavioral health exam rooms
    - Help buttons behavioral health check in reception

    - Arming stations in behavioral health hallways
    - Arming stations at behavioral health security desk.
    - The facility will be designed with arming station at the main employee entry.
- Location of proposed conference space sensors shall be as follows;
    - Alarm contacts at perimeter entry/exit points
    - Alarm contacts at building separation
    - Motion detectors to cover all areas.

ALARM SYSTEMS OUTPATIENT PHARMACY

Separate alarm systems will be provided for the Pharmacy all points will be tied to the Intrusion alarm system and monitored a Listed central station. The panels for the Outpatient Pharmacy shall be installed within the pharmacy in a locked enclosure separate from the MOB intrusion alarm system.

- Location of proposed perimeter sensors shall be as follows;
    - Alarm Contacts at Perimeter Entry Exit Points
    - Alarm Contacts at POS Roll UP
    - Motion Detectors at Entry and Exits Points
    - Motion Detectors Interior Isles Work Areas
    - Interior Strobe
    - Interior Siren

Systems shall report to the service areas off site monitoring company via phone line and also send alarms via software to the Lenel system at the Security Operations Center.

CLOSED CIRCUIT TELEVISION SYSTEM MEDICAL OFFICE BUILDING

CCTV color camera system shall be used at all entry exit points where existing coverage is deficient.

CCTV color camera surveillance will be utilized primarily as a post incident or alarm review tool. All cameras shall digitally record color CCTV signals on-site. All exterior CCTV cameras shall be fixed-mount only. The recording equipment and media will be interfaced to a new NVR system.

Color CCTV Cameras shall be high-resolution color digital cameras and no less than 2MP in resolution recorded at no less than 8 fps.

NVR's will record color CCTV cameras using new H.264 compression on a continual basis.

The new NVR for the clinic shall be located in the TER. The NVR shall record video from all cameras within the facility and archive video to hard drives for storage. Video shall be kept for a minimum of 60 days. The NVR shall be accessible from the SOC and security managers workstation via the Owner's LAN/WAN.

The recorder shall be installed in a 4-post rack and connected to the Kaiser network.

The recorder shall be connected to two separate 120 VAC power sources.

The recorder shall be connected to three network connections.

Color CCTV control systems integration shall be fully programmable. The features shall include:

- Automatic call-up of real time and pre-alarm views, initiated by alarm events from the card access system.
- Notification from the color CCTV system to the access control system in the event of video loss or other equipment failure, as well as video motion detection events.
- Color CCTV recording search function by camera, time, alarm event, or movement in the field of view.
- Record using H.264 compression.

- New color cameras will be located at the following and areas;
    - Entry/Exit doors
    - Elevator lobbies
    - Emergency exit doors
    - Shipping/Receiving or Materials Management
    - Lobby check-in areas
    - Behavioral Health waiting areas.
    - Cash safe locations (transaction and drop)
    - Exterior building approach (pharmacy hardening)

CLOSED CIRCUIT TELEVISION SYSTEM OUTPATIENT PHARMACY

CCTV color camera system shall be used at certain employee entrances, Pharmacy rear entrance, and interior areas, cash handling areas, schedule II narcotics, staff entry areas, and the main lobby waiting area

CCTV color camera surveillance will be utilized primarily as a post incident or alarm review tool. The Pharmacy shall have the capability to digitally record color CCTV signals on-site. All exterior CCTV cameras shall be fixed-mount only. The recording equipment and media will be interfaced to a new and separate NVR system.

Color CCTV Cameras shall be high-resolution color digital cameras and no less than 2MP in resolution recorded at no less than 10 fps.

NVR's will record color CCTV cameras using new H.264 compression on a continual basis.

A dedicated NVR for the Pharmacy shall be installed within the TER. The NVR shall record video from all cameras within the Pharmacy and archive video to hard drives for storage. Video shall be kept for a minimum of 90 days with capacity to expand to 120 days. The NVR will also be loaded with access control server and serve as the head end for all access control and CCTV systems. The NVR shall be accessible from the Pharmacy manager's PC workstation via the Pharmacy LAN/WAN.

The recorder shall be installed in a 4-post rack and connected to the Kaiser network.

Color CCTV control systems integration shall be fully programmable. The features shall include:

- Automatic call-up of real time and pre-alarm views, initiated by alarm events from the card access system.
- Notification from the color CCTV system to the access control system in the event of video loss or other equipment failure, as well as video motion detection events.
- Color CCTV recording search function by camera, time, alarm event, or movement in the field of view.
- Record using H.264 compression.

- New color cameras will be located at the following and areas
    - Main Pharmacy waiting
    - Pharmacy OTC
    - Waiting Public View Monitor Camera
    - Main Pharmacy rear entry
    - Pharmacy POS Counter (1 station per camera)
    - Pharmacy Cash Count and Safe
    - Pharmacy Dispensing Counter

- Pharmacy Tote Breakdown
- Pharmacy Schedule 2 Drug Storage (1 per MESA cabinet)
- Every Drug Isle
- Pharmacist Bench
- Tech Bench
- Intellicab (pick side)
- Kirby Lester (pick/fill side)

- New color LCD monitors will be located at the following and areas;
  - Main lobby for public view
  - Pharmacist tech work area
  - Shipping and receiving entry.

Pharmacy Hardening Requirements

- Expanded metal mesh shall be installed in all separating walls where a department other than pharmacy resides on the opposite side.
- Entry doors to the licensed space may require new 3-point locking systems currently in review by NFS.
- Storefront glass may not be permitted in the Pharmacy dispensing space without special approval.
- Storefront glass in the waiting area may require ballistics film.
- Roll down grills will be required at the Point of Sale counter operated by electric motor and key switch keyed to the pharmacy keyway.
- Manual chains may be mounted outside the pharmacy roll down with approval and if they are padlocked.
- Motors may require new equipment to lock the mechanism so that it won't rotate when closed.
- The building designated to receive the new pharmacy has not housed one before and therefor will require an external siren and strobe.

PRELIMINARY ELECTRONIC SECURITY COST ESTIMATE MEDICAL OFFICE BUILDING

The preliminary security cost estimate for this project is $323,000

PRELIMINARY ELECTRONIC SECURITY COST ESTIMATE OUTPATIENT PHARMACY

The preliminary security cost estimate for this project is $165,000