An Architectural Space Program of Requirements for Northeast Lakeview College
The Alamo Colleges District

New STEM Education Building (NLC2017-01)

Final Document - April 27, 2018

FACILITY PROGRAMMING AND CONSULTING

ALAMO COLLEGES DISTRICT
Northeast Lakeview College

An Architectural Space Program of Requirements for Northeast Lakeview College
The Alamo Colleges District

New STEM Education Building (NLC 2017-01)

Final Document

April 27, 2018

Facility programming and Consulting (FPC) was engaged to prepare an architectural space program of requirements for the **New STEM Education Building** for *Northeast Lakeview College*, part of The Alamo College District. The architectural program is intended to give the design team a "workbook" from which to design, listing all of the requirements for each space within the building. The architectural program is not intended to influence the creativity of the design team by advocating any design style or procedure. All diagrams and drawings contained herein are intended to illustrate relationships involved, and are provided as an example to augment the text. The design team should not consider any of the diagrams as a design directive.

This architectural program document is structured as follows:

1. *Sign-Offs and Acknowledgements* contains the required signatures for approval of the program. It also acknowledges the people involved with the program.

2. The *Executive Summary* contains a brief overview of the project. The chapter establishes the project's objectives, overall project process and site location. The campus mission statement is also presented in this chapter.

3. *Space and Adjacency Requirements* deals with the space requirements and functional relationships portion of the program. It, along with the next chapter, comprise the majority of the document.

4. *Technical Requirements* deals with project requirements that affect the design of the building including architectural, structural, mechanical, and electrical requirements, finishes and illuminations, fixtures furnishings and equipment lists required for the proper design and construction of the individual spaces listed in the space summaries of the previous chapter.

5. *Site Studies* is an analysis of the proposed project site.

6. *Project Impact* explains the implications these changes will have on the existing campus, faculty, and students.

7. *Preliminary Project Check List* is a list to determine the building's compliance to the District's standards.

8. *Appendix* chapter includes additional support and reference data relevant to this project.

Foreword

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Architectural Programming
Laboratory Planning
Healthcare Planning
Strategic Facilities Planning
Needs Assessment
Space Utilization Analysis

SAN ANTONIO | HOUSTON

This document supersedes all previous publications. The contents of this document are not for regulatory approval, permitting, or construction.

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Sign-Offs and Acknowledgements

New STEM Education Building

Northeast Lakeview College (The Alamo Colleges District)

Recommended for Approval

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President, Northeast Lakeview College
THE ALAMO COLLEGES DISTRICT

Dr. Tangila Dove DATE
Vice President of College Services, Northeast Lakeview College
THE ALAMO COLLEGES DISTRICT

Approved

John Strybos, PE DATE
Associate Vice Chancellor of Facilities Operations and Construction Management
THE ALAMO COLLEGES DISTRICT

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Acknowledgements

A significant commitment of time and effort was made by the following participants to create the program for the STEM Education Building at Northeast Lakeview College. Their participation is greatly appreciated.

The Alamo Colleges District

Dr. Veronica Garcia	President
Dr. Tangila Dove	Vice President of College Services
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Executive Summary 2

Introduction

Facility Programming and Consulting was engaged by The Alamo Colleges District to prepare a building program of requirements for the New STEM Education Building located on the Northeast Lakeview College (NLC) campus. The new facility will accommodate a variety of general courses, support a collaborative effort in engineering with Texas A&M University, and provide a new home for some of the sciences. The New STEM Education Building will be the home to Chemistry, Physics, and Geology, while the Biology programs will remain in the current Science Building. Space reallocation of vacated areas within the Science Building are not a part of this programming exercise.

During the initial planning process, the programming team met with the users and College Administration to determine and outline their vision, goals, and requirements for the new facility. The interviews and meetings conducted helped to guide and shape the requirements and preliminary design diagrams discussed within this document. The result of these discussions is the basis of this document which is organized as follows:

1. Sign-Offs and Acknowledgements
2. Executive Summary
3. Space and Adjacency Requirements
4. Technical Requirements
5. Site Studies
6. Project Impact
7. Preliminary Project Check List
8. Appendix

Project Description and Scope

The construction of the New STEM Education Building at Northeast Lakeview College (NLC) is the result of the current and on-going student population growth. The increase in demand for science and math courses has caused the campus to outgrow the existing Science Building, which was first opened in August 2008 as part of the Phase I Building Projects. Phase I at NLC also included the construction of Academic I, Career Technology, and the Library / Learning Resource Center. The existing Science Building houses approximately 26,000 square-feet of spaces for Science, including Chemistry and Physics. The new building is planned to offset the high demand for science spaces by providing a second building on campus for disciplines related to Science, Technology, Engineering, and Math (STEM).

The New STEM Education Building will provide spaces for the following users / departments and space categories:

- General Classrooms
- STEM (Science, Technology, Engineering, and Math Teaching Spaces)
- Chemistry
- Physics
- Geology
- STEM Advising
- Meeting Spaces
- Support Spaces

The project aims to provide additional spaces for Chemistry, Physics, and Geology, while creating a STEM component that meets the increasing student demand for various disciplines. The current Biology curriculum is planned to remain in the existing Science Building. The new facility will also provide a large Flexible Meeting Room which will be shared among building users and the college.

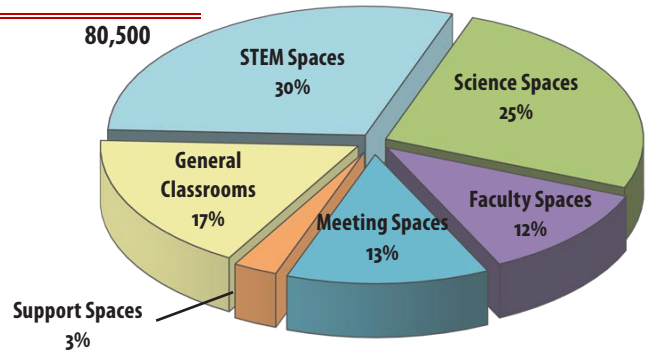
As currently programmed, the New STEM Education Building will total approximately 48,300 assignable square feet (ASF), which translates to 80,500 gross square feet (GSF) at 60% efficiency.

Building Space Summary

The following chart and graph indicate an overview of the spaces included within the New STEM Education Building on the NLC campus. Additional requirements for each space are identified in greater detail in Chapters 3 and 4 of this document.

Northeast Lakeview College STEM Education Building	Projected ASF	Projected GSF*
General Classrooms	8,375	13,958
STEM Spaces	14,400	24,000
Science Spaces	12,400	20,667
Faculty Spaces	5,635	9,392
Meeting Spaces	6,150	10,250
Support Spaces	1,340	2,233
Total Project Size	**48,300**	**80,500**

***Note** : Net to Gross Ratio of 60% was utilized on all spaces.



Project Location

The proposed STEM Education Building is planned to be located just west of Academic I Building, on the northwest portion of the Northeast Lakeview College (NLC) campus. The exact location and shape of the proposed structure will be determined as the project moves forward into the schematic and design development phases. The approximate location of the new facility has been identified on the map below.

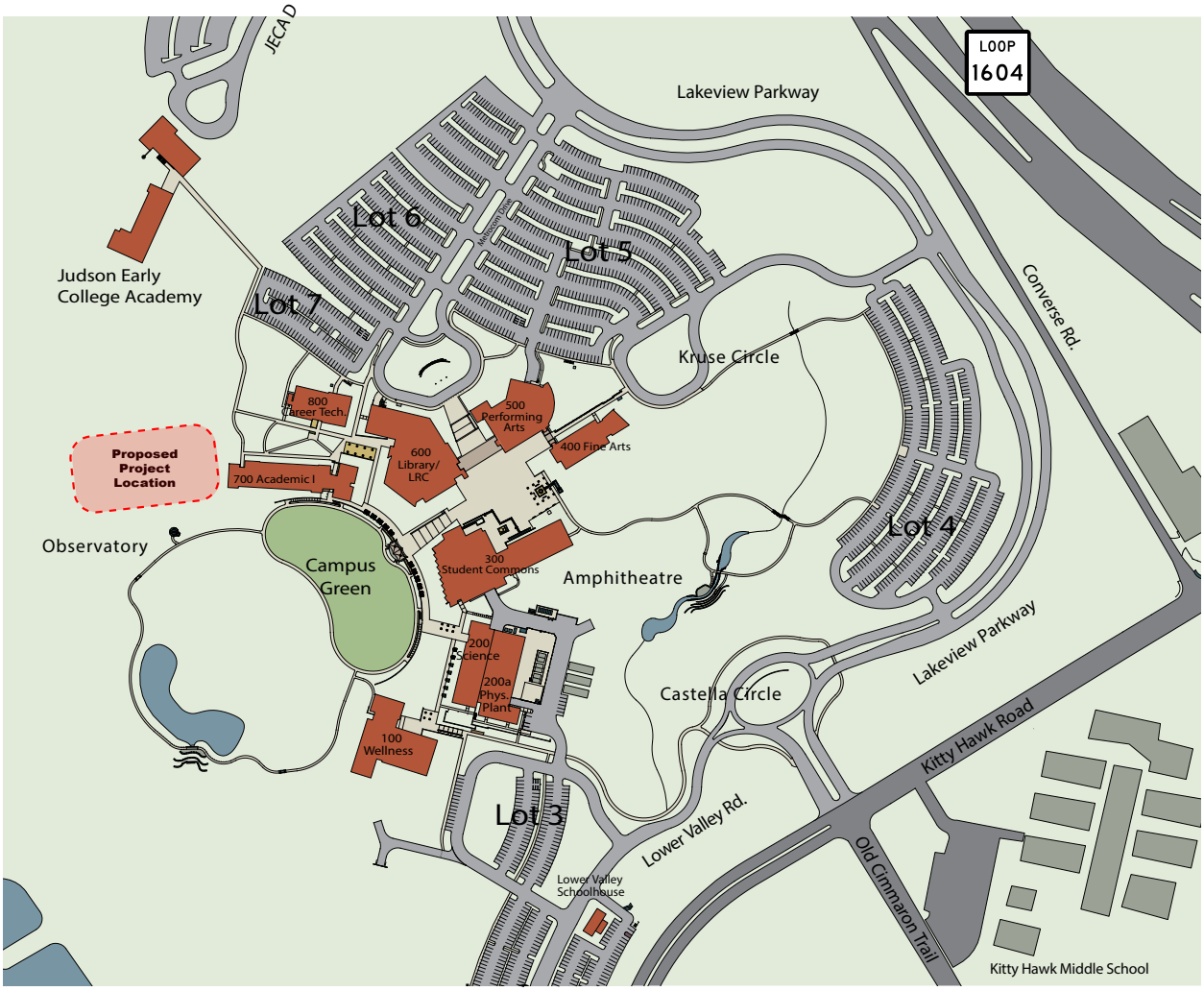


Figure 1: Campus map indicating the location of the proposed STEM Education Building within the Northeast Lakeview College campus.

Mission and Vision Statements

The Alamo Colleges District

Mission Statement

"Empowering our diverse communities for success."

Vision Statement

"The Alamo Colleges District will be the best in the nation in Student Success and Performance Excellence."

Strategic Objectives and Goals

Strategic Objective I: Student Success

Provide academic and student support and align labor market-based pathways with a focus on Achieving the Dream to achieve student completion.

- A. Leverage and strengthen engagement with P-12 partners to improve the college-readiness and transition of students from high school to college and to work/careers.
- B. Increase overall student performance by closing performance gaps between ethnic/racial, gender and socioeconomic groups.
- C. Deploy and improve the MyMAP student experience to integrate advising, support and academic progress.
- D. Provide an aligned, comprehensive approach to accelerate the completion of required AlamoPREP and AlamoREADY to accelerate students' progress toward their academic and career goals.
- E. Define, align, assess, and improve student learning outcomes/competencies for all academic and workforce programs.
- F. Organize and deploy the Alamo INSTITUTES to align our instructional system to labor market demand and career pathways.
- G. Increase performance (retention, graduation, transfer, and job placement) of all students to exceed the state and national average levels.

Strategic Objective II: Principle-Centered Leadership

Provide opportunities for the Alamo Colleges District students and employees to develop as principle-centered leaders.

- A. Incorporate personal and social responsibility, global citizenship, critical thinking, and life-long learning as the framework of principle-centered leadership into the culture and curriculum of the Alamo Colleges District.

- B. Promote data-informed innovation, intelligent risk taking, and entrepreneurship with a focus on action, value, and the future.
- C. Build and foster a system that allows us to model two-way internal communication with students and employees to improve collaboration, teamwork, and build trust to promote leadership.

Strategic Objective III: Performance Excellence

Continuously improve our employee, financial, technological, physical and other capacities with focus on effectiveness, efficiency, and agility.

- A. Deploy to scale performance excellence (Baldrige) approaches to ensure organizational sustainability through use of data, continuous improvement, and efficient and effective work systems.
- B. Build talent and engage employees with a focus on collaboration, application of knowledge and skills, and high performance teams.
- C. Ensure sound financial management with emphasis on cost containment.
- D. Innovate and maximize technology to support student and employee success.
- E. Develop environmental sustainability initiatives and processes.
- F. Improve partnerships and alliances by two-way communication with external communities.

Northeast Lakeview College

Mission Statement

Northeast Lakeview College is a public community college within the system of The Alamo Colleges District, established in partnership with its communities, that is focused on student success through the offering of Associate degrees and continuing education, promoting engagement in civic activities and organizations, and encouraging participation in cultural and enrichment programs.

Vision

The first choice for higher education in the communities we serve.

Values

- Students First
- Respect for All
- Community-Engaged
- Collaboration

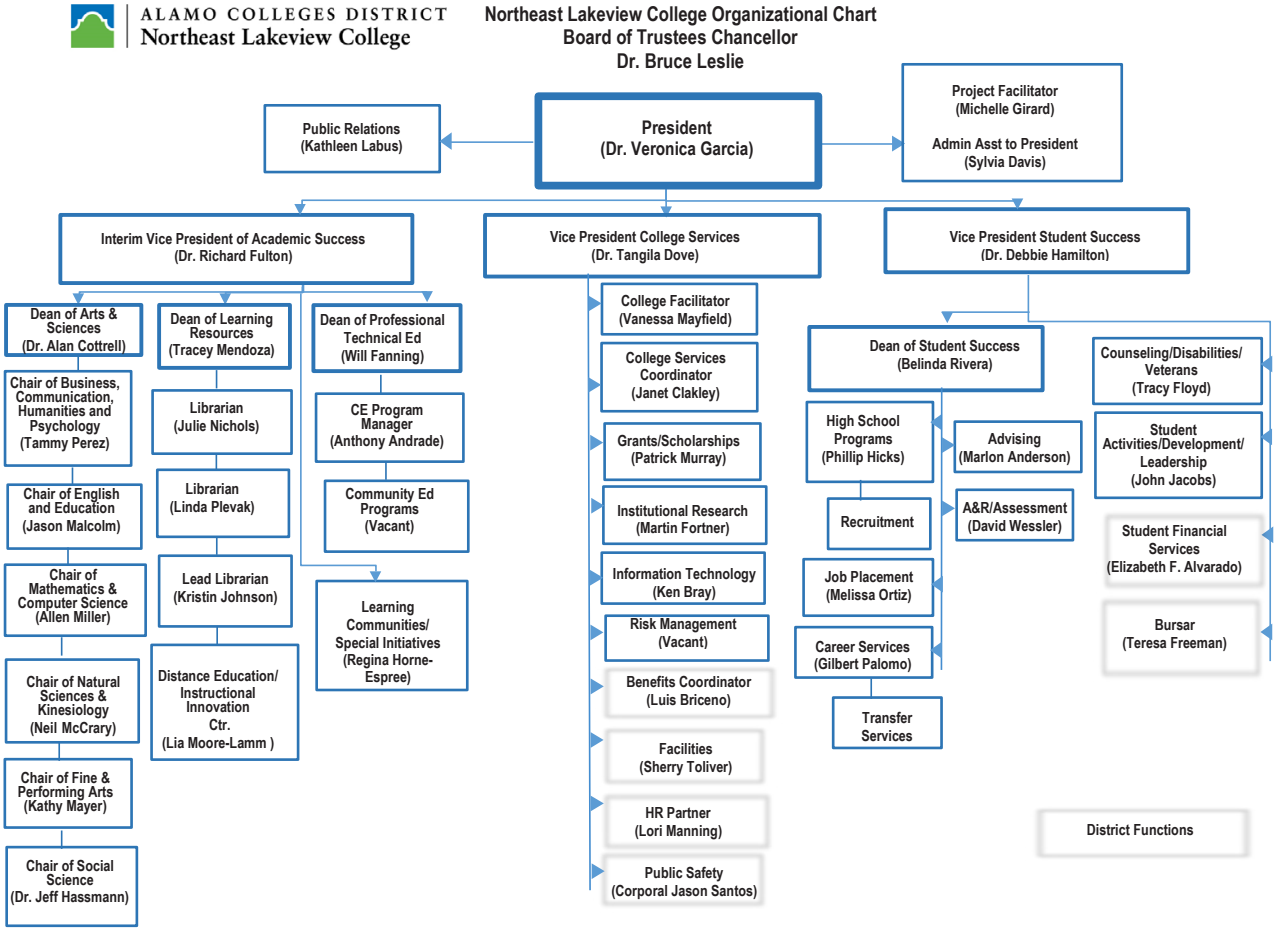
- Can-Do Spirit
- Data-Informed

Core Objectives

- ***Critical Thinking Skills:*** including creative thinking, innovation, inquiry, as well as analysis, evaluation and synthesis of information.
- ***Communication Skills:*** including effective development, interpretation and expression of ideas through written, oral and visual communication.
- ***Empirical and Quantitative Skills:*** including the ability to manipulate and analyze numerical data or observable facts resulting in informed conclusions.
- ***Teamwork:*** including the ability to consider different points of view and to work effectively with others to support a shared purpose or goal.
- ***Personal Responsibility:*** including the ability to connect choices, actions and consequences to ethical decision making.
- ***Social Responsibility:*** including intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities.

Organizational Chart

Northeast Lakeview College



Project Vision and Goals

During the information gathering process, numerous items were identified by the users and the planning team as deficiencies of the existing spaces. The following list of items was outlined by the users and campus administration as visions and goals which would make the proposed project a success.

- Provide additional General Classrooms for shared use among all building users.
- Create space within the new building for the development and expansion of the STEM program, including a dedicated Theatre Style Classroom, Computer Labs, and a Flexible Classroom.
- Expand the existing Science spaces. Include large Chemistry, Physics, and Geology labs.
- Enhance the functionality and efficiency of the STEM lab spaces by creating strong adjacencies and providing flexibility of layout reconfiguration in the Studio Spaces.
- Create space for the STEM Advising Suite within the new building.
- Allocate space for a large Flexible Meeting Room which can be shared among all campus departments and outside institutions and organizations. The space will be divisible and provide exterior building access.
- Review lessons learned from the construction of existing Science Building:
  - Lab benches need (2) sets of services.
  - Sinks should not be located in the center of the Lab tables.
  - Screens shall not block whiteboards.
  - Fume hoods shall not be located directly adjacent to teaching spaces.

The intent of this program is to outline the specific needs of the users designated for relocation to the facility. The New STEM Education Building should be designed to comply with the latest District Standards for new construction.

Preliminary Project Cost

At the time of publication of this document, a total project cost (TPC) of approximately $40 million had been approved for the STEM Education Building, as part of the May 2017 Alamo Colleges District bond proposal.

This project TPC includes budget for furniture, fixtures, and equipment (FFE), building permit fees, moving costs, and other soft costs.

The budget will continue to be reviewed and updated regularly during the design and construction phases to determine necessary adjustments.

Project Schedule

The project schedule which follows is preliminary and will be adjusted as the project moves further through the design and construction document phases. Items which may affect scheduling include, programmatic, budget and/or site constraints which may require spaces to be either added or value engineered out of the project or additional site information to be gathered and analyzed. Major milestones of the project schedule include:

Project Milestones	Dates
Complete Programming Document	April 2018
Design	May 2018 - November 2018
Construction	August 2018 - December 2019
Project Completion	January 2020

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Space and Adjacency Requirements 3

Introduction

This chapter deals with the space requirements and functional relationships portion of the program for the STEM Education Building on the Northeast Lakeview College (NLC) campus.

This chapter will serve as a checklist for the design team as they design and lay out the building. The chapter is organized into the following sections:

- Symbols, Abbreviations and Definitions
- Organization and Overview
  - Building Space Summary
  - Detailed Building Space List
  - Building Stacking Diagram
- Adjacencies
  - Adjacency Diagrams
  - Site Flow Diagram
- Non-Assignable Spaces

Detailed technical requirements for the individualized spaces within the proposed building, including, but not limited to, architectural, mechanical, and electrical requirements are found in Chapter 4, *Technical Requirements*.

Symbols, Abbreviations and Definitions

Symbols

Walled Area

Designated Area *(not walled)*

Circulation Path

Main Entry

Strong Relationship Between Spaces
(should be able to travel directly between areas)

Medium Relationship Between Spaces
(should be nearby, but not necessarily directly adjacent)

Weak Relationship Between Spaces
(can travel through other spaces or down hallways, but not necessary to travel directly between the spaces)

Abbreviations

Many terms used in this document have been abbreviated:

ADA	Americans with Disabilities Act
ACD	The Alamo Colleges District
AFF	Above Finish Floor
ASF	Assignable Square Feet
CFCI	Contractor Furnished, Contractor Installed
GFCI	Ground Fault Circuit Interrupter
GSF	Gross Square Feet
HVAC	Heating, Ventilation and Air Conditioning
MAX / MIN	Maximum / Minimum
NASF	Non-Assignable Square Feet
NLC	Northeast Lakeview College
NO	Number
OFOI	Owner Furnished, Owner Installed
OFCI	Owner Furnished, Contractor Installed
QTY	Quantity
STEM	Science, Technology, Engineering, and Math
VCT	Vinyl Composition Tile

Definitions

Listed below are definitions of frequently used terms in this chapter:

Assignable Square Feet (ASF)	The usable area or area within the inside face of the interior walls of each space
Gross Square Feet (GSF)	The area within the outside face of the exterior walls of the building which includes assignable square feet, non-assignable square feet, building service area, circulation area, mechanical area, and structural area
Non-Assignable Square Feet (NASF)	Areas such as mechanical space, telecommunication closets, janitor closets, etc., which are an inherent part of the building, but are not usable space for the owner's program activities (includes building service, circulation, and mechanical areas)
Structural Area	The sum of all areas on all floors that can not be occupied or put to use because of structural building features
Technical Requirements	Mechanical, electrical, and plumbing (MEP) and other physical, technical, or building construction requirements

Assignable vs. Gross Square Feet

The tables and charts in this chapter depict area sizes in Assignable Square Feet (ASF) and non-assignable square feet (NASF) unless Gross Square Feet (GSF) is specifically noted. Assignable square footage measures only the usable area of a given space. It does not include spaces such as lobbies, corridors (except for internal circulation within suites) and other public and support spaces such as mechanical rooms, toilets, stairs, etc. These types of spaces are included in the non-assignable square footage. The sum of the assignable square footage, the non-assignable square footage, and the structural areas is equal to the gross square footage of the building.

Internal Circulation

In addition to stairwells, elevators, lobbies, and mechanical rooms, the assignable-to-gross factor for the building will include space for major building corridors which provide access to the major spaces in the facility. This space allocation does not include enough space for hallways and semi-public waiting or reception spaces which are affiliated with office suites. The suites themselves are accessed from the major building corridors, while the offices and other spaces within the suite are accessed from "internal circulation." A factor for internal circulation has been included where applicable.

Organization and Overview

The STEM Education Building at NLC will provide a second building on campus to provide additional spaces for Science and other new and developing STEM programs. The new building will help alleviate the demand for the overutilized labs in the existing building by providing multiple teaching spaces, including General Classrooms, STEM Classrooms and Labs, Science Labs, and a Flexible Meeting Room. The building space summary below and the space list on the following pages are organized into the following categories:

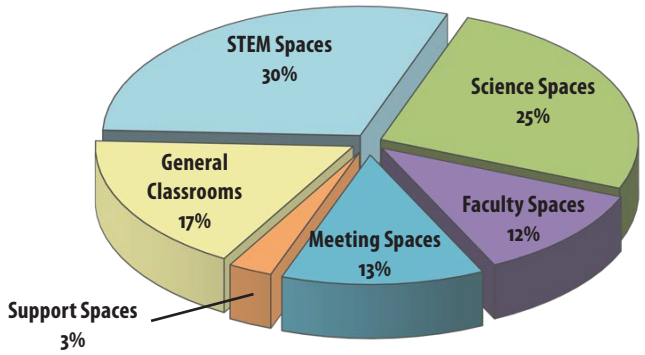
- Teaching Spaces
  - General Classrooms
  - STEM Spaces
  - Science Spaces
- Faculty Spaces (STEM Advising Suite)
- Shared Building Spaces
  - Meeting Spaces
  - Support Spaces

A brief discussion of Non-Assignable Spaces which have been identified for inclusion in the building is located at the end of this chapter.

Building Space Summary

Northeast Lakeview College STEM Education Building	Projected ASF	Projected GSF*
General Classrooms	8,375	13,958
STEM Spaces	14,400	24,000
Science Spaces	12,400	20,667
Faculty Spaces	5,635	9,392
Meeting Spaces	6,150	10,250
Support Spaces	1,340	2,233
Total Project Size	**48,300**	**80,500**

***Note** : Net to Gross Ratio of 60% was utilized on all spaces.



Detailed Building Space List

Note: Detailed information for each space is provided in Chapter 4.

Alamo Colleges - Northeast Lakeview College STEM Education Building Final Space List	Proposed Spaces No. and Size of Space(s)	ASF	Number of Occupants	Space Type	Page No.
Teaching Spaces					
General Classrooms					
Classrooms	9 @ 875 asf	7,875	35 Students	TS-01	4.12
Classroom and Computer Lab Shared Storage Room	1 @ 500 asf	500	NA	TS-02	4.14
General Classroom Spaces		8,375			
STEM					
Theatre Style Classroom	1 @ 2,000 asf	2,000	75 Students	TS-03	4.16
Associated Storage Room (Shared with Classroom Storage)	0 @ 0 asf	0	NA	TS-02	4.14
Computer Labs	4 @ 1,000 asf	4,000	35 Students	TS-04	4.18
Associated Storage Room (Shared with Classroom Storage)	0 @ 0 asf	0	NA	TS-02	4.14
Flexible Classroom (Divisible by 4)	1 @ 2,700 asf	2,700	100	TS-05	4.20
Associated Storage Room (A&M)	1 @ 200 asf	200	NA	TS-06	4.22
Technical Lab/ Studio	2 @ 1,700 asf	3,400	20 Students	TS-07	4.24
Lab Prep Space	1 @ 400 asf	400	NA	TS-08	4.26
Technical Lab/ Studio	1 @ 1,500 asf	1,500	20 Students	TS-09	4.28
Lab Prep Space	1 @ 200 asf	200	NA	TS-10	4.30
STEM Spaces		14,400			
Science					
Chemistry Labs (Organic, Intro, Gen 1 & Gen 2)	4 @ 1,300 asf	5,200	24 Students	TS-11/TS-12	4.32/4.34
Instrumentation Room	1 @ 400 asf	400	NA	TS-13	4.36
Chemical Storage	2 @ 100 asf	200	NA	TS-14	4.37
Chemistry Research Lab	1 @ 300 asf	300	NA	TS-15	4.38
Adjacent Student Work Area	1 @ 80 asf	80	NA	TS-16	4.39
Bio Chem Lab	1 @ 1,300 asf	1,300	NA	TS-17	4.40
Shared Science Prep Rooms	2 @ 400 asf	800	NA	TS-18	4.42
Lab Tech Office	2 @ 110 asf	220	NA	TS-19	4.43
Physics Lab	1 @ 1,300 asf	1,300	24 Students	TS-20	4.44
Prep Room	1 @ 150 asf	150	NA	TS-21	4.46
Geology Lab (Built-In Cabinetry)	1 @ 1,300 asf	1,300	30 Students	TS-22	4.48
Geology Storage / Prep	1 @ 150 asf	150	NA	TS-23	4.50
Tutorial Center	1 @ 1,000 asf	1,000	30 Students	TS-24	4.52
Science Spaces		12,400			
Subtotal for Teaching Spaces		**35,175**			
Faculty Spaces					
STEM Advising Suite					
Chair Office	2 @ 180 asf	360	1 + 4 Guests	FS-01	4.56
Admin Assitants	2 @ 64 asf	128	1	FS-02	4.57
Associated Student Waiting	1 @ 100 asf	100	4	FS-03	4.58
Faculty Office	22 @ 110 asf	2,420	1 + 1 Guest	FS-04	4.59
Conference Room	2 @ 400 asf	800	15 Guests	FS-05	4.60
Shared Workroom	1 @ 300 asf	300	NA	FS-06	4.61
Adjunct Faculty Office	1 @ 400 asf	400	10 to 12	FS-07	4.62
Subtotal for Faculty Spaces		4,508			
Suite Circulation		1,127			
Subtotal for Faculty Spaces and Circulation		**5,635**			

Detailed Building Space List (Continued)

Note: Detailed information for each space is provided in Chapter 4.

Alamo Colleges - Northeast Lakeview College STEM Education Building Final Space List	Proposed Spaces No. and Size of Space(s)	ASF	Number of Occupants	Space Type	Page No.
Shared Building Spaces					
Meeting Spaces					
Flexible Meeting Room	1 @ 4,400 asf	4,400	200 Guests	BS-01	4.64
Associated Storage Room	1 @ 250 asf	250	NA	BS-02	4.68
Catering Area	1 @ 250 asf	250	NA	BS-03	4.69
AV Control Room	1 @ 100 asf	100	NA	BS-04	4.70
Student Sticky Spaces	10 @ 75 asf	750	2 to 3 Students	BS-05	4.71
Private Meeting / Consultation Spaces	4 @ 100 asf	400	2 to 4 Persons	BS-06	4.72
Meeting Spaces		6,150			
Support Spaces					
Faculty Breakroom	1 @ 400 asf	400	20 Faculty / Staff	BS-07	4.74
Student Breakroom	1 @ 200 asf	200	10 to 15 Students	BS-08	4.76
Lactation Room	1 @ 120 asf	120	1 Guest	BS-09	4.77
Family / Unisex Restroom	2 @ 60 asf	120	NA	BS-10	4.78
Loading Dock / Delivery Bay	1 @ 500 asf	500	NA	BS-11	4.79
Support Spaces		1,340			
Subtotal for Shared Building Spaces		**7,490**			
Total Assignable Square Footage of Building Spaces		**48,300**			
Total Building Spaces (GSF @ 60% Efficiency)		**80,500**			

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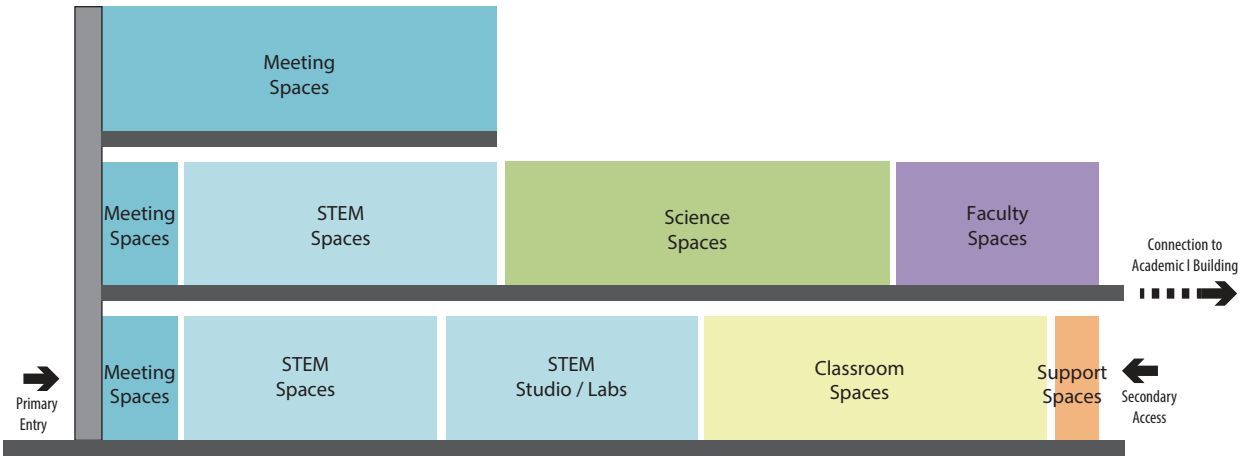
Building Stacking Diagram

The diagram below depicts one possible vertical relationship of the spaces outlined in the program document. The proposed STEM Education Building is envisioned as a three-story facility, with the third level serving a Flexible Meeting Room. A public exterior entry shall be provided in close proximity to campus pedestrian traffic and convenient visitor parking to allow ease of access for visitors, students, faculty, and outside guests. A secondary entry shall be planned for service, loading, and deliveries. It shall be located away from pedestrian traffic and blocked from public view. The building shall have multiple elevators to support vertical movement through the building.

It is recommended that all Science Labs and associated spaces be located on the second floor and in close proximity to the service elevator to facilitate deliveries and maintenance of equipment and materials. STEM Spaces shall be located in close proximity to the primary building entry. The Theatre Style Classroom for STEM will utilize a higher ceiling height than a typical floor-to-floor ceiling height and will need to be accommodated within the design. General Classrooms shall be located on the first floor. The third floor of the facility shall be dedicated to the Meeting Spaces, including the Flexible Meeting Room and its associated support spaces. Both a service and a guest elevator shall be directly accessible to the Flexible Meeting Room to allow easy wayfinding and access for visitors.



KEY
- General Classrooms
- STEM Spaces
- Science Spaces
- Faculty Spaces
- Meeting Spaces
- Support Spaces

Adjacencies

Images below provide examples of retractable, movable, and collapsible wall partitions which are suitable for use within the STEM Flexible Classroom. The users' desire is to create smaller meeting rooms within the large space to allow accommodating various user capacities and presentation / lecture styles.

The following list describes key adjacencies and concepts for the organization of spaces required in the design of the STEM Education Building at Northeast Lakeview College (NLC).

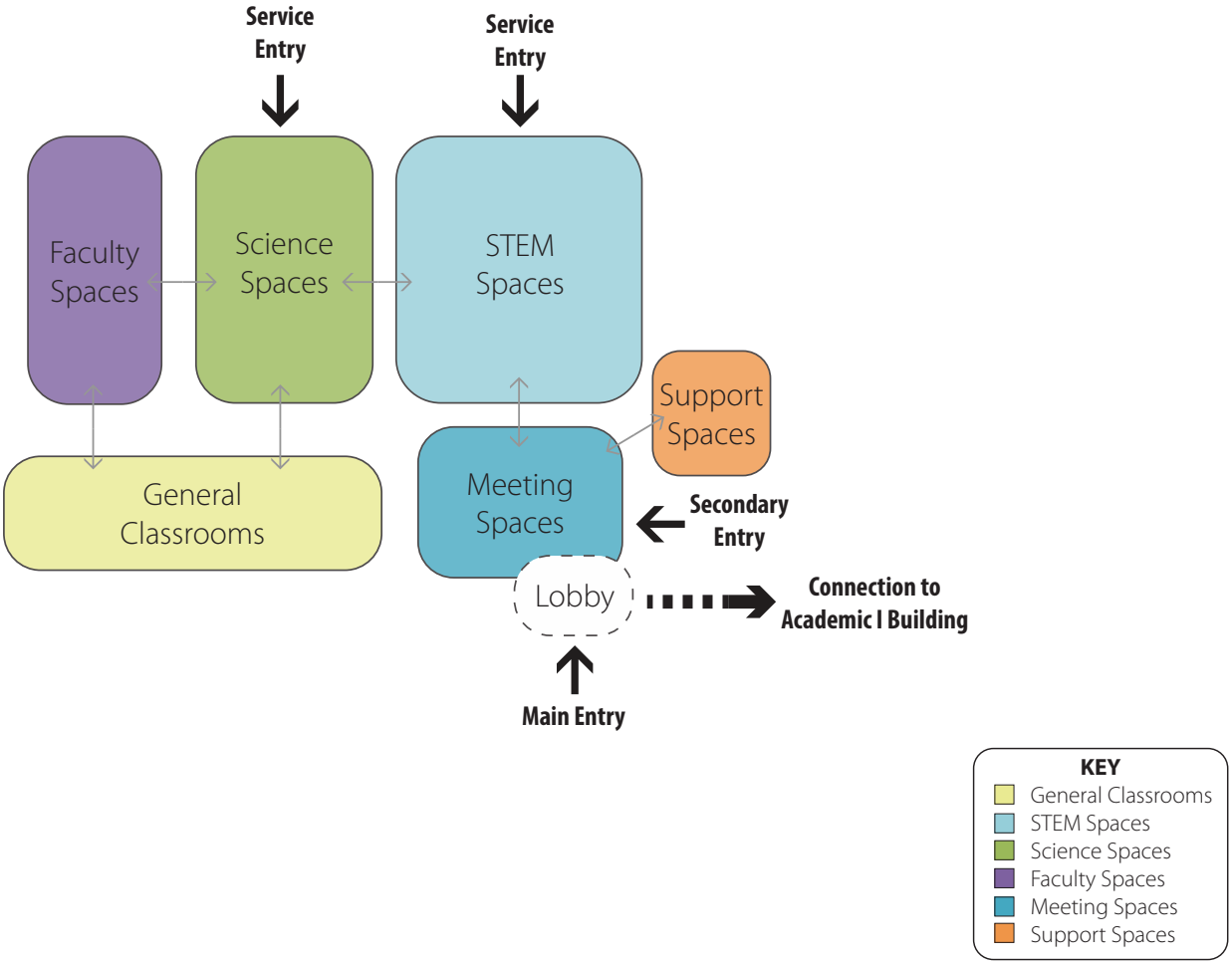
- The building should have a main lobby at the primary building entrance from the exterior. The building shall also have a secondary lobby / connection to the existing Academic I Building.
- The Flexible Meeting Room and associated support spaces shall be adjacent to the main building elevator which directly connects to the first floor entry. If desired, space may have a dedicated elevator / stairwell for ease of access by users during events on evenings and weekends. Users' preference is to locate the meeting spaces on the upper floor of the facility to maximize views of the campus. The final location will be determined during the design phase.
- The Theatre Style Classroom will be designed as a double height space to accommodate a tiered seating arrangement. The Theatre Style Classroom should be located on the first floor along a main building corridor. The Flexible Classroom should utilize retractable, movable, or collapsible, sound-attenuating wall partitions to allow the space to be divisible into (4) smaller spaces.
- The Science Spaces will accommodate a variety of classroom laboratories. To facilitate the movement of lab equipment, furniture, and materials, Science Spaces shall be located directly adjacent to the service elevator at the Loading Dock / Delivery Bay.
- If feasible, the STEM Technical Studio Lab Spaces should also have easy access to the Loading Dock.
- Views to the Loading Dock / Delivery Bay shall be blocked from public spaces. Coordination is required to locate the Loading Dock in an location that is accessible from vehicular circulation but does not disturb the campus pedestrian paths or major campus vehicular corridors.
- The Faculty Spaces shall be located on the Second Floor of the facility. The Faculty Breakroom shall be located in close proximity to the office suite to allow ease of access for faculty and staff utilizing the building.
- The Private Meeting / Consultation Spaces and the Student Sticky Spaces shall be dispersed evenly throughout the building. Spaces will be located directly off a main building corridor.
- For each Lab Space, its associated Prep Space shall be directly accessible from the main Laboratory.
- The majority of General Classrooms shall be located on the first floor of the building.

Adjacencies

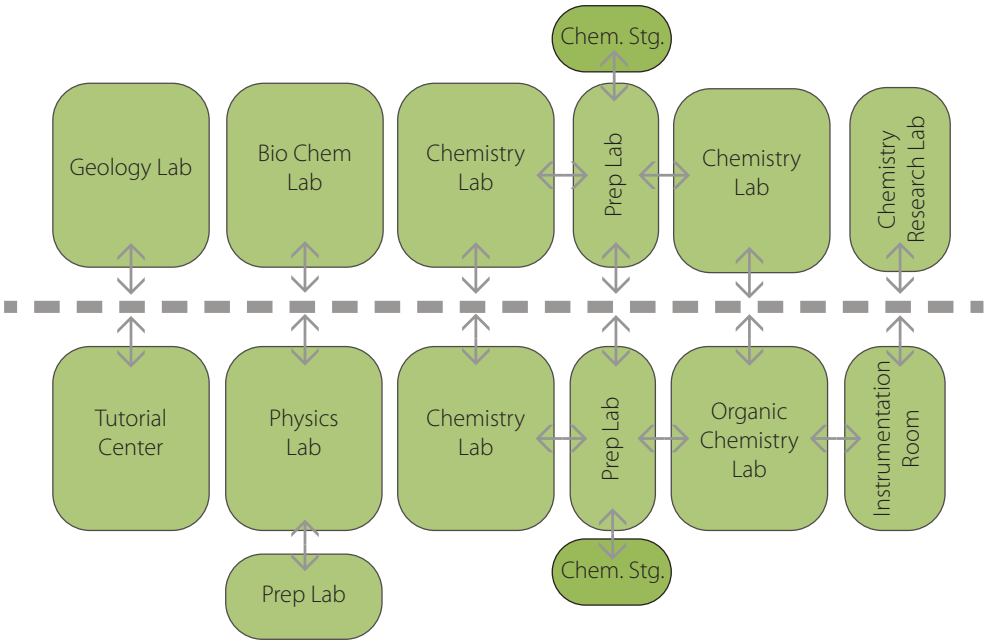
Adjacency Diagrams

The diagrams below and on the following pages depict preferred relationships of spaces for the new building. The diagrams are conceptual only and are not intended to represent a floor plan. Final design layout and adjacencies will be determined by the users with the design architect during the design and construction phases.

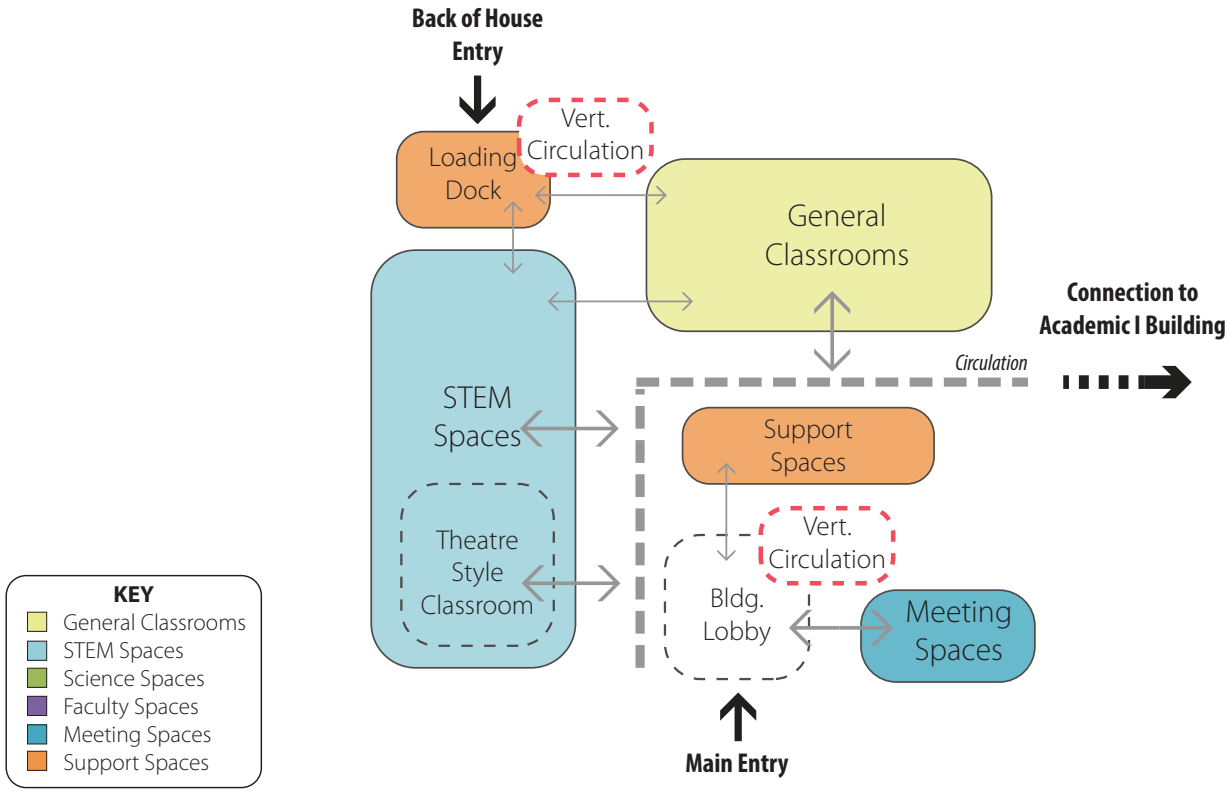
Overall Building Adjacency Diagram



Science Laboratory Adjacency Diagram

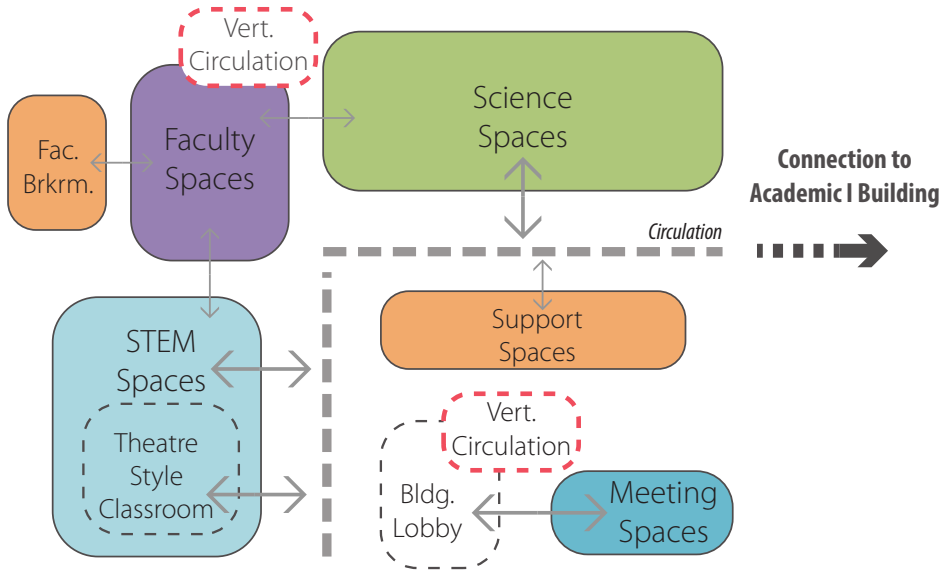


First Floor Adjacency Diagram

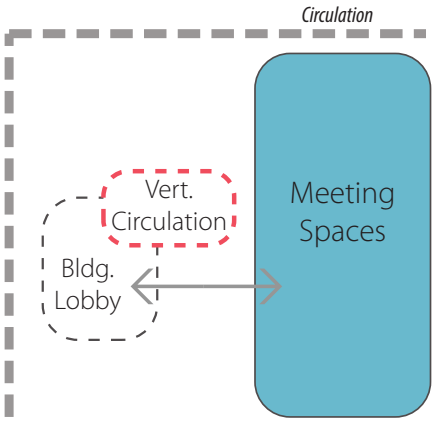


Adjacencies

Second Floor Adjacency Diagram

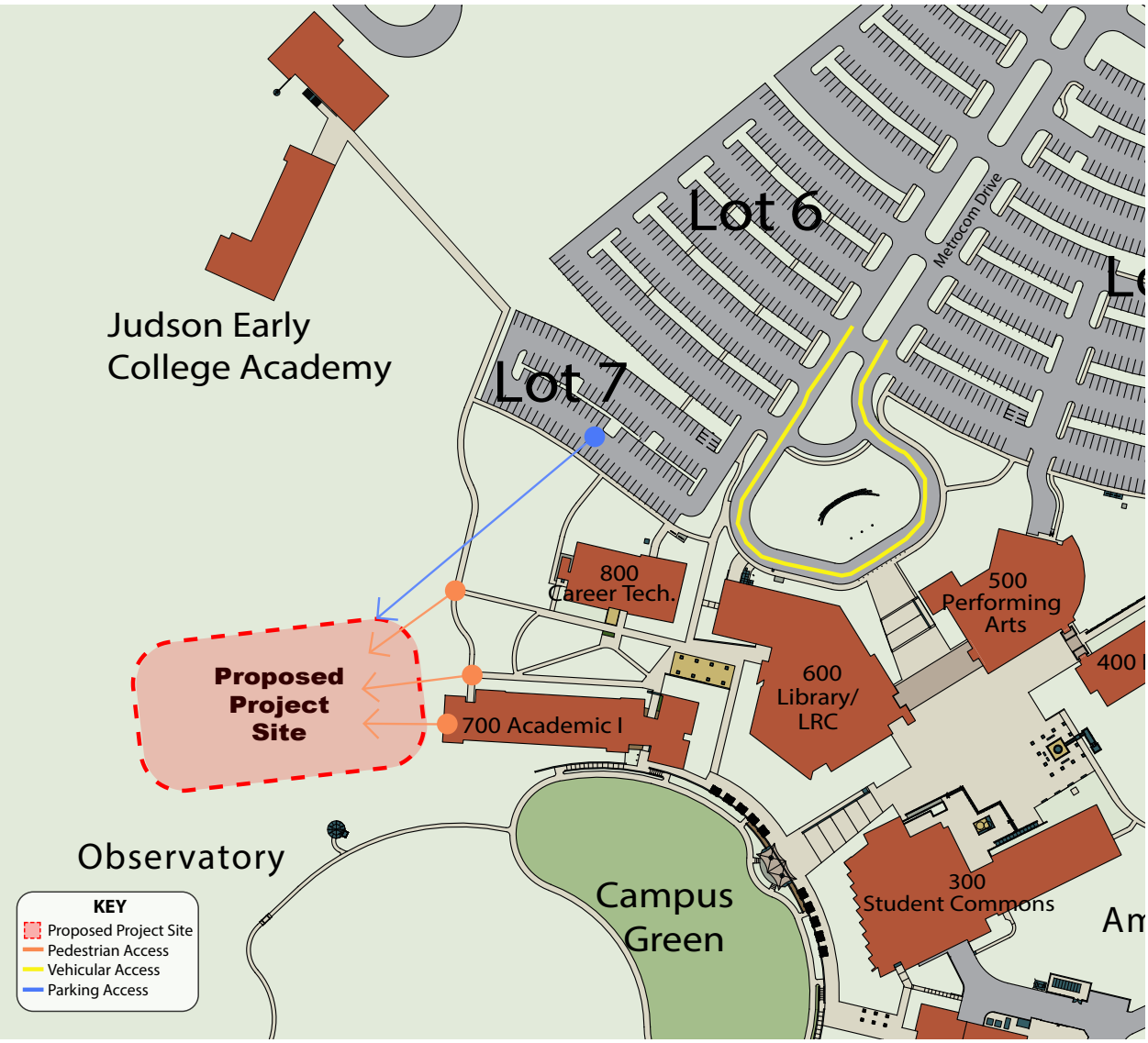


Third Floor Adjacency Diagram



Site Flow Diagram

The STEM Education Building will be accessed from the campus pedestrian corridors which currently serve Academic I. The building is envisioned to be located just west of Academic I. Due to the current site's undeveloped state, vehicular access has not been determined at this time. The nearest vehicular circulation is indicated on the image below. It is recommended that the future vehicular circulation serving the new STEM Education Building be connected to the existing roads to provide continuous unobstructed passage of traffic. Associated parking has not been planned to serve the building. However, Parking Lots 6 and 7 are within walking distance of the proposed site.



Non-Assignable Spaces

Several required functional spaces must be included in the building, though they are not considered "assignable" as defined by the Texas Higher Education Coordinating Board (THECB). These spaces include general circulation and lobby areas (including stairs and elevators), mechanical spaces, restrooms, utility/telephone/network closets and housekeeping closets, as well as any other infrastructure and support spaces which may result from the building's design.

In addition to the assignable spaces described earlier in this chapter, the following non-assignable spaces shall be provided:

- Housekeeping/Custodial Closets
- Data/Telephone Closet
- Loading and Service
- IDF/MDF Rooms
- Unisex (family) Restrooms
- Elevators

District Standards shall also be reviewed for detailed information concerning these spaces. Additional technical requirements may be found in Chapter 4.

Technical Requirements 4

Introduction

This chapter includes the initial technical requirements (architectural, structural, mechanical, electrical, etc.), finishes and illumination and furnishing, fixtures and equipment lists required for proper design and construction of the individual spaces listed in the previous chapter. In addition, where applicable, specific regulations or requirements of local, state and national codes are also included on these sheets. The information in these sheets is intended as a guideline for preliminary design purposes and neither includes all regulations and requirements for proper design and function nor omits the need for a full code review by the design architect.

The chapter is organized into the following sections:

- General Requirements
  - Codes and Regulations
  - Design Considerations
- Detailed room-by-room requirements including technical requirements, finishes and illumination, and furnishings, fixtures, and equipment lists are organized as follows:
  - Teaching Spaces
  - Faculty Spaces
  - Shared Building Spaces

Spaces are detailed as indicated in the previous chapter; requirements are applicable to all spaces of the same type, unless noted otherwise.

The Alamo Colleges District has developed design standards which are to be applied to all new construction and renovation projects district-wide. These standards shall be reviewed in conjunction with this document and applied throughout the design and construction process:

- Staff Lounge Addendum (updated January 2018)
- Housekeeping Closet (August 2010)
- Exterior Graphic Standards Best Practices Manual (May 2010)
- Telecommunications Infrastructure Standards (December 2016)
- Standard Hardware Specification (January 2012)

The standards applicable at the time of publication of this may be accessed via the web at:

https://www.dropbox.com/sh/3rs4napwnkwza84/AABIk8M7FMl4fYrvHQs1AFBwa?dl=0

General Requirements

The information which follows is to be applied to the building design and construction as a whole. Code and / or design-related requirements specific to a particular space are included in the individual data sheets which follow later in this section.

Codes and Regulations

The design team shall prepare a written code and standards analysis for the project. Assure all applicable codes are reviewed; where there is a discrepancy, the more stringent shall apply.

At minimum, the following codes and regulations shall apply:

- International Building Code (IBC)
- International Mechanical Code
- National Electrical Code
- International Plumbing Code
- International Energy Conservation Code (IECC)
- National Fire Protection Association (NFPA) Codes, with emphasis on NFPA 101 Life Safety Codes and including all referenced standards
- Texas Department of Licensing and Regulation, Elimination of Architectural Barriers Act
- Americans with Disabilities Act
- City of Live Oak Unified Development Code

Other organizations with possible jurisdiction include:

- Environmental Protection Agency (EPA)
- Texas Commission on Environmental Quality (TCEQ)
- Occupational Safety and Health Administration (OSHA)

Design Considerations

Reference the 2005 ACCD Standards Volume IV for additional design guidelines to those which are outlined below.

Note: Any variance from the Alamo Colleges Standards will require approval by Facilities Operations and Maintenance. A sample of the "Request for Variance" form is included in the "Preliminary Project Checklist" chapter of this document.

Overall Building Design

1. Per District direction (January 2011), at this time, NO projects are LEED certified unless the design team is otherwise notified in writing and purchase orders are issued for this additional service. However, the design team should apply the LEED checklist to

General Requirements

all projects and apply "common sense" in selecting construction materials, etc. Reference the Preliminary Project Checklist chapter of this document for more information.

2. The building(s) shall be accessible to the physically handicapped and shall comply with applicable ADA Guidelines for new construction.
3. Design should incorporate low maintenance and energy efficient features.
4. For security purposes, all occupied rooms (offices, workstations, etc.) and associated workspaces shall be provided with visual access from the building corridors or adjacent spaces via a window, side lite, or vision lite in the door.
5. Doorways shall have a minimum clear opening of 32 inches as measured between the face of the door and the opposite stop when the door is open 90 degrees.
6. Doors should be located within a space so as to minimize congestion.
7. All occupied rooms (offices, workstations, etc.) shall have natural light.
8. Windows shall be provided with blinds or shades to control natural light.
9. One (1) public unisex restroom shall be provided on each floor of the building.

Landscape Design Considerations

1. Screening and buffering of the site activities shall be in compliance with the materials, distances and guidelines specified in the City of Live Oak Unified Development Code (UDC).
2. Landscape buffers and areas shall be planned to present a visually pleasing appearance.
3. Materials which are native to the region and which are both drought-resistant and require low water use requirements are encouraged.
4. Vegetation which will require low maintenance is preferred. The primary goal is "zero"-scaping: landscaping that requires zero, or as close to zero, maintenance as possible.
5. Care should be taken to protect any existing vegetation which is surrounding the proposed building location that may be susceptible to damage during construction.
6. Mow strips located at the building perimeter shall be impervious cover. Decomposed granite is not allowed on any campus.

7. Exterior gathering spaces should be integrated within the building design to create additional gathering spaces. Additionally, explore the idea of creating covered walking paths to connect adjacent buildings.

Fire Protection

1. Fire protection systems shall be installed, repaired, operated and maintained in accordance with all applicable codes.
2. The fire alarm system shall be an integrated alarm and event notification Communications System utilizing a LAN/WAN. Provide signals required to interface with the existing automation software in the existing Administrative System PC (contact Kevin Cormier at APi systems 210-822-0560). All of the equipment to be provided with 24 hour battery backup.
3. Fire alarm panels to be voice compatible. Tyco Simplex Grinnell 4100ES, or approved equal, to be utilized. Note: Fire alarm system is currently sole source to Tyco Simplex Grinnell.
4. An automatic sprinkler system shall be designed and installed in accordance with the IBC and all applicable codes.

Structural Design Considerations

1. View of the projection screen, whiteboard and / or presentation area shall not be obstructed in conference and training rooms by building structural elements.

Mechanical Design Considerations

1. Per District direction (January 2011), all design teams are required to coordinate with Texas Engineering Experiment Station (TEES) on building automation and controls, HVAC systems and sensors and controls, IAQ instrumentation and controls and MEP instrumentation and controls.
2. Condensing units shall be located and/or screened in a manner which minimizes visual impact.
3. Consider the use of passive heating and cooling methods to increase energy conservation.
4. Fresh air shall be supplied and spaces ventilated in accordance with the International Mechanical Code.
5. A dedicated HVAC unit that is part of the building's main system, must maintain a constant 24/7 cooled environment between 68° and 75° F with humidity of 41.9° F Dew Point to 60% RH and 59° F Dew Point. Minimum HVAC load shall be designed to displace

General Requirements

12KW of power, or 3.5 Tons. Maintain temperature and humidity in the event of building power outages or main unit failure.

6. Design HVAC system so that excessive air flow or equipment noise within one space shall not intrude into adjacent spaces.

7. Building Automation System (BAS) controls and sensors are currently sole source to Schneider Electric. Coordinate locations of sensors with Energy Systems Laboratory (ESL).

Electrical Design Considerations

1. Per District direction (January 2011), all design teams are required to meet with CPS Energy to determine the best way to optimize (not maximize) Alamo College's CPS energy rebate and to complete, prepare and submit the forms and documentation to CPS. Reference the Preliminary Project Checklist chapter of this document for more information.

2. The power systems serving computers, copiers, and other equipment with switching mode power supplies shall be segregated from other loads where possible and designed to cope with the harmonic content of the load. The use of K-rated transformers and oversized neutrals are recommended but other approaches may be considered if deemed economically viable over the entire life cycle of the building. To be considered economically viable the life cycle cost of the equipment, including any reasonable energy savings, maintenance costs and first cost must be evaluated.

3. Adequate site lighting shall be provided at the project site perimeter, within parking areas and at building entrances to maintain a comfortable level of security.

4. Emergency and exit lighting shall be provided per NFPA 101 requirements.

5. Provide controlled security access system (i.e. key cards or card reader) at all building entrances, MDF/IDF rooms (network closets) and as directed per the Alamo Colleges Standards. All interior doors shall also utilize the same lock system, unless noted otherwise. Reference the *Alamo Colleges Standard Hardware Specifications* for additional information related to door hardware.

   - Alamo Colleges specified electronic door hardware (Schlage AD-300 CY70 MT SPA JD 626) shall be installed on all interior doors in all buildings, except restroom doors.
   - If there are funding constraints that limit the installation of the locks specified by the Alamo Colleges, then, at minimum, the appropriate rough in (conduit, blocking, etc.) should be installed.

- Provide Alamo Colleges specified closers (Ingersoll Rand LCN 4040XP AL) and panic hardware (Von Duprin 99L 26D) on interior doors, where required and/or as directed per Alamo Colleges Standards.

6. (2) dedicated 208-volt 3-phase 150 amp circuits, with 4-wire (2PH+N+G) hardwired to the UPS(s) shall be installed to serve the electrical requirements. The originating electrical panel will be equipped with (2) 150 AMP breakers, minimum of (1) APC Symmetra LX 16kVA scalable to 16kVA N+1 Ext. Run Tower. 208/240V, to provide 30 minutes of run time at full load.

7. A duplex receptacle shall be spaces at least one foot from an adjacent wall and every 6' thereafter. Minimum of (1) duplex receptacle shall be placed on each wall.

8. Convenience power and data outlets shall be provided along the perimeter walls, in accordance with all current applicable codes. When locating outlets, special attention should be paid to the possible location of office equipment and furniture.

9. Provide adequate power and data outlets, as required, to serve equipment in all conference and training rooms. Additional power should be provided to center of room or potential conference table location to allow for connection of laptops or other equipment.

10. The STEM Technical Lab / Studio teaching spaces should be located near a main electrical supply service point which provides additional power capabilities to support future equipment and needs.

11. Minimum of 50 foot candles at 2 feet above the floor must be provided in each space. Spaces shall be equipped with emergency lighting to keep the space lit during power outages. Fixtures shall be installed 18" above the top of the highest rack or cable runway.

12. Spaces which require / utilize projection equipment, such as conference rooms, shall be designed as follows:

    - Where wall-mounted monitors are designated, provide required electrical and data outlet(s). Televisions shall have computer inputs as they will be used for presentations / projection. Conference rooms shall have a minimum 65" flat screen television (by Toshiba, unless noted otherwise). Large conference rooms (30+ individuals) shall be provided with two (or four) 60-inch to 70 –inch monitors installed. Number and size to be determined by the size and shape of the room.

    - When a ceiling-mounted projector is designated, an electrical outlet shall be located at the ceiling. Outlet location to be coordinated with projector location. Use of ceiling-mounted projector shall require completion and approval of the Request

for Variance Form. See the Preliminary Project Checklist chapter for more information.

- Where media cabinets are utilized, lighting controls shall be either located within close proximity to or controlled from it.
- Lighting shall be zoned in order to allow for the proper viewing of projected images. Room shall be zoned in a manner which allows for light fixtures at / near the projection screen to remain off so as not to impede viewing of images on the screen.

13. Lighting controls shall be located within close proximity to the entry door(s) of individual spaces.
14. LED lighting to be utilized in all interior and exterior applications.

Plumbing Design Considerations

1. All roof drains shall be connected below grade to a storm water collection system such as a French drain, sump pump or City storm sewer which carries storm water away from the building foundation. Consideration should be given to the design of a system which allows the collection / harvesting of this rain water for landscape irrigation use.
2. Where applicable, fixtures which utilize water conservation features shall be installed, per Alamo Colleges standards.
3. Floor drains are strictly prohibited, except within approved science laboratories.

Furniture, Fixtures and Equipment

1. All furniture shall comply with the Americans with Disabilities Act and all current applicable codes.
2. Refrigerators in common areas shall be "refrigerator / freezer with ice-maker."
3. The District has expressed its preference for the use of Racks on Tracks within all storage areas provided in the building. Storage areas within the building shall be shared, to the extent possible, with multiple departments to provide one large centralized storage area per floor that accommodates space for the storage of furniture, equipment, supplies, and files for various users.
4. Users have expressed interest in utilizing double sided hoods, if / when the building design and final room configuration of laboratory spaces allow it feasible. Design architect shall consider its use within the laboratory spaces in order to minimize the cost of furnishings and equipment and provide a collaborative lab environment.

5. Users have expressed interest in the installation of hooks and shelving within the bathrooms for personal belongings while washing hands. These shall be located outside of the bathroom stalls, near the sinks.

6. Cubbies used for students' personal belongings shall be placed along perimeter wall cabinets. Avoid locating cubbies within teaching area.

Additional Design Considerations

1. The District has been moving towards utilization of a modular wall system, in lieu of traditional interior partition wall construction, to allow for the greatest flexibility in reconfiguration of buildings in the future as program needs change. With this in mind, the use of modular wall systems should be considered and utilized to the extent possible, as building code, funding, and room function will allow. In general, core areas, including, but not limited to, restrooms, mechanical rooms, corridors, and vertical circulation (stairs and elevators) will be constructed with traditional building materials. Non-structural partition walls will be constructed utilizing a modular wall system for the majority of the remaining spaces. Some of the Science Labs may require the use of traditional interior partition walls, as they store chemicals, utilize fume hoods, or have additional safety requirements.

2. Speech in conference areas and offices shall be intelligible without amplification.

3. To the greatest extent possible, conference rooms, offices and workstations shall not share common walls with restrooms, mechanical equipment rooms, loading docks, mailrooms and other similar noise-producing areas.

4. With the exception of restrooms, mechanical spaces, and other areas as identified by the user in the data sheets which follow, flooring shall be either polished or sealed concrete. Sealed concrete shall be typical in all unoccupied spaces. Coordinate final flooring specifications with user during design process for all other locations.

Data Cabling Standards

1. All data cable shall be installed per the Alamo Colleges District *Telecommunications Infrastructure Standards* and as directed by the Department of Information Technology Services.

2. Building shall be equipped with wireless technology and infrastructure.

3. Offices sized at or **below** 140 SF shall be provided (2) 2-port data outlets on two opposite perimeter walls, unless noted otherwise. No data outlets shall be placed on the entry wall.

4. Offices sized **above** 140 SF shall be provided (2) 2-port data outlets per wall, unless noted otherwise. No data outlets shall be placed on the entry wall.

5. Conference rooms shall include a minimum (2) 2-port data outlets in each room oriented in the front and back of each room.

6. Where wall-mounted monitors are designated, provide required electrical and data outlet(s). Televisions shall have computer inputs as they will be used for presentations / projection. Conference rooms shall have a minimum 65" flat screen television (by Toshiba, unless noted otherwise). Large conference rooms (30+ individuals) shall be provided with two (or four) 60-inch to 70 –inch monitors installed. Number and size to be determined by the size and shape of the room.

7. When a ceiling-mounted projector is designated, a data outlet shall be located at the ceiling. Outlet location to be coordinated with projector location. Use of ceiling-mounted projector shall require completion and approval of the Requests for Variance Form. See the Preliminary Project Checklist chapter for more information.

Room Data Sheets

Teaching Spaces

CLASSROOMS (TS-01)

ROOM FUNCTION

This space will provide a general classroom for courses, lectures, and presentations given by faculty or staff. All classrooms should be flexible and provide multiple walls of whiteboard surfaces.

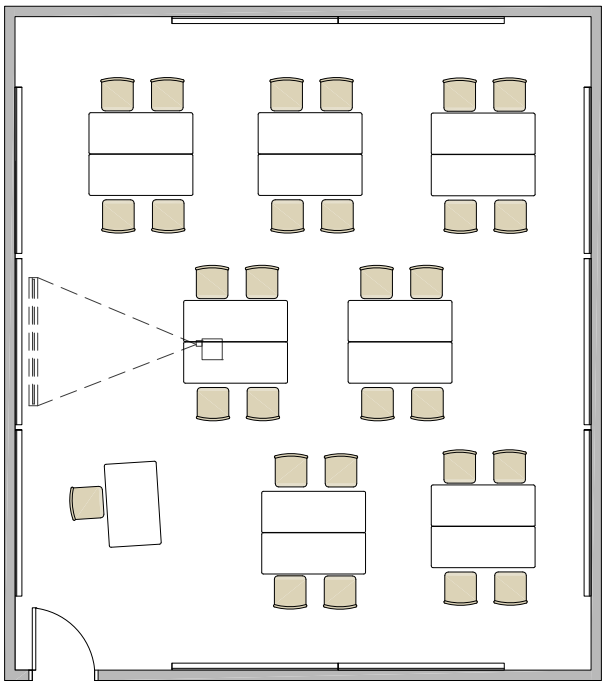
ROOM DATA

Net Square Feet (ASF)	875 ASF
Avg. No. of Occupants	28 (Option A) or 30 (Option B) Students + 1 Faculty
No. of Spaces by Type	9

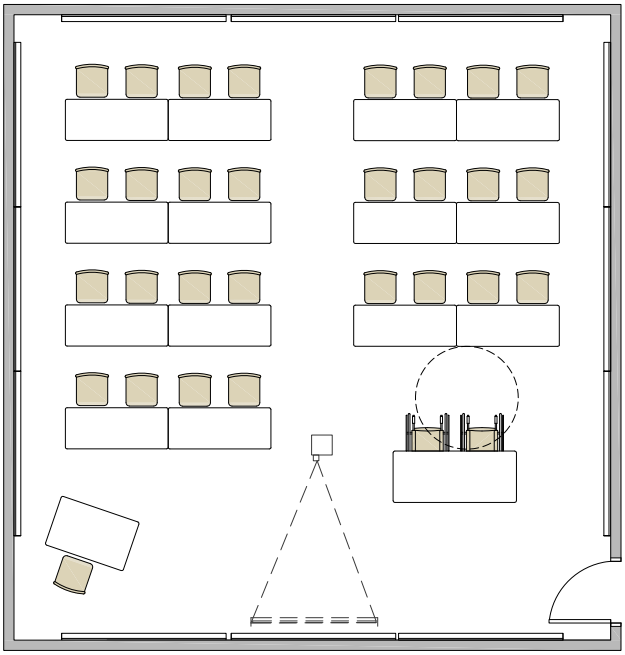
SAMPLE ROOM LAYOUT

The diagrams below are included as planning tools to ensure that the space will function as the users require within the assigned square feet. They are not intended to dictate the final design or configuration of the space.

Option A



Option B



CLASSROOMS (TS-01)

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Modular Walls
Ceiling	Acoustical Tile System
Lighting	LED, See Notes 8, 9

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Notes 12,13
Dedicated Circuits	Stand-by Power
Data	See Note 11
Other	

FURNISHINGS, FIXTURES & EQUIPMENT

(1) Recessed Drop-Down Motorized Projection Screen	CFCI
OR Wall Mounted Video Screen	OFCI
(1) Ceiling-Mounted Projector	CFCI
Whiteboard Surface - 24 Linear Feet (Min.) or (3) Perimeter Walls	CFCI
(14) OR (15) Movable Tables (18" x 48")	OFOI
(1) Rolling Chair (At Instructor's Area)	OFOI
(1) Fixed Podium w/ Lockable Media Cabinet (At Instructor's Area - District Standard)	CFCI
(28) OR (30) Movable Chairs	OFOI
(1) Classroom Technology (Located Inside Cabinet)	OFOI
Tackable Surface - 4 Linear Feet (Min.)	CFCI

Note: Quantity of FF&E listed above is dependent on the final layout and configuration selected by the users.

General discussions during uses meetings suggest one or two classrooms should be designed in a similar fashion to Option A, while the majority of the classrooms should be designed similar to Option B. For all options, users desire a large amount of whiteboard surface on perimeter walls.

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be accessible from a main building corridor and in close proximity to other Teaching Spaces.
3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Doors to be 36" wide (min.).
4. Locate door(s) within space to minimize congestion.
5. Wall and ceiling assemblies should minimize sound transmission. Speech within space shall be intelligible without amplification.
6. View of the projection screen, video monitors, whiteboards and / or instructor's area shall not be obstructed by building structural elements.
7. Whiteboard surface should not have dual purpose as a projection screen.
8. All lighting shall have motion sensors. Provide 50 to 55 footcandle (fc) for general illumination; 20fc (min.) for note taking during projection.
9. Lighting controls shall be located within close proximity to the entry door. Controls shall also be either located within close proximity to or controlled from the instructor's area. Provide dimmable switching in order to allow proper viewing of projected images and/or images on the screens.
10. Classroom technology utilized within this space shall be stored in the lockable media cabinet located at the instructor's area inside the media cabinet. (District Standard)
11. Provide (1) 2-port data outlet (min.) along each perimeter wall. Additional data outlets may be required at instructor's area. Building shall be equipped with wireless technology and infrastructure.
12. Convenience duplex power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. Additional power outlets should be placed at instructor's are and along (2) perimeter walls for the charging of student devices. When locating power and data outlets, special attention should be paid to the possible location of equipment and furniture.
13. Locate data and electrical outlets at ceiling for projection equipment and/or along upper portion of walls for video screens. Coordinate outlet with projector and motorized projection screen locations.
14. Natural light into the space is desired. Where applicable, windows shall be provided with blinds or shades to control natural light.

SHARED STORAGE ROOM (TS-02)

ROOM FUNCTION

This space will provide a shared area for the storage of furniture, equipment, and supplies utilized within the General Classrooms, Theatre Style Classroom, and the Computer Labs.

ROOM DATA

Net Square Feet (ASF)	500 ASF
Avg. No. of Occupants	N/A
No. of Spaces by Type	1

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Painted Gypsum Wallboard
Ceiling	Acoustical Tile System
Lighting	LED, See Note 7

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110V/20A/1-phase, See Note 6
Dedicated Circuits	Stand-by Power
Data	See Note 5
Other	

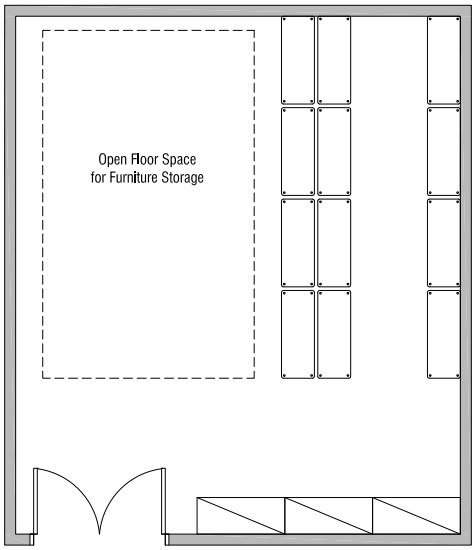
FURNISHINGS, FIXTURES AND EQUIPMENT

Racks on Tracks	CFCI
Open Floor Space for Furniture Storage	OFOI

Note: Design architect shall confirm type, quantity, and requirements of storage preferred by users. Install and maintain according to manufacturer's specifications.

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space shall be located directly adjacent or in close proximity to the General Classrooms, Theatre Style Classroom, and the Computer Labs which it serves.

NOTES (CONTINUED)

3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Door to be 36" wide (min.). Double doors are recommended.
4. Wall material should minimize sound transmission.
5. Provide (2) 2-port data outlets (min.) per wall. No data outlet shall be placed on the entry wall. Building shall be equipped with wireless technology and infrastructure.
6. Convenience power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power and data outlets, pay special attention to the possible location of equipment and furniture.
7. Provide 50 to 55 footcandle (fc) for general illumination. Lighting shall have motion sensors; controls shall be located within close proximity to the entry door. Natural light is not required.

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THEATRE STYLE CLASSROOM (TS-03)

ROOM FUNCTION

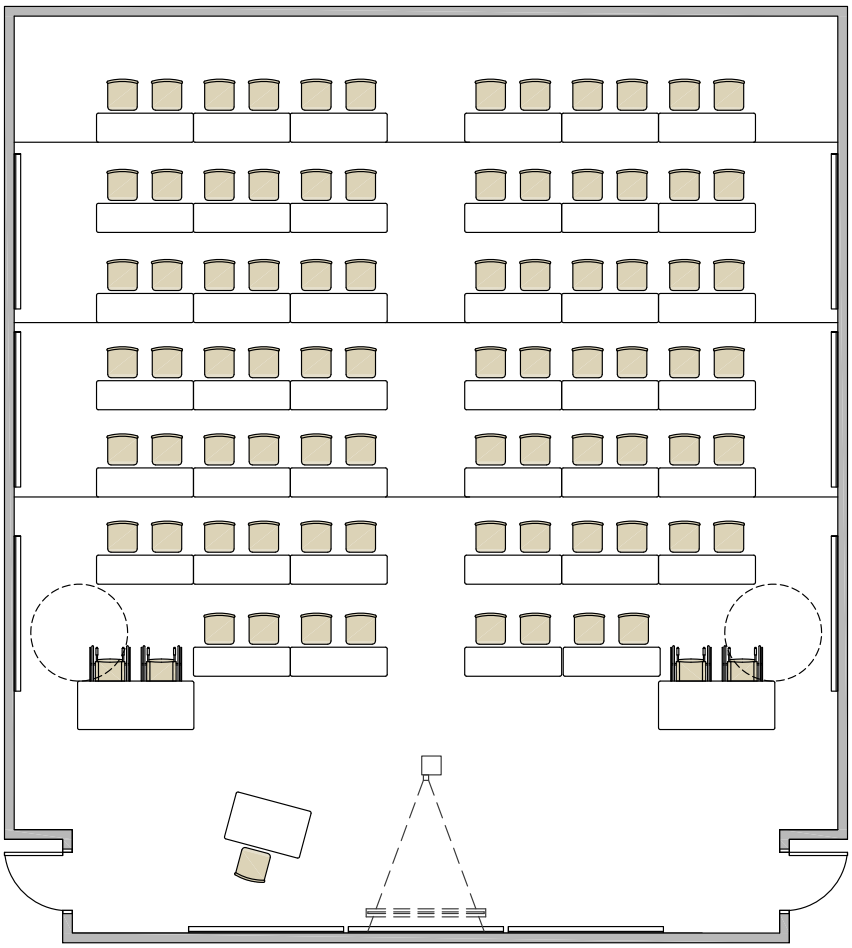
This space will provide a theatre style classroom for the new STEM program within the proposed building.

ROOM DATA

Net Square Feet (ASF)	2,000 ASF
Avg. No. of Occupants	1 Faculty / Staff + 84 Students
No. of Spaces by Type	1

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



THEATRE STYLE CLASSROOM (TS-03)

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Modular Walls
Ceiling	Suspended Acoustical Ceiling
Lighting	LED, See Notes 7, 8

MECHANICAL / PLUMBING

Temperature/Humidity	72°F ±2°F @ 50%RH ±20%
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 11
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 10
Other	See Note 12

FURNISHINGS, FIXTURES & EQUIPMENT

(40) Movable Tables (18" x 60")	OFOI
(2) ADA Movable Tables (30" x 72")	OFOI
(84) Movable Chairs	OFOI
(1) Fixed Podium (At Instructor's Area - District Standard)	CFCI
(1) Tall Rolling Chair (At Instructor's Area)	OFOI
(1) Lockable Media Cabinet (Located within Podium)	CFCI
(1) Recessed Ceiling Mounted Drop-Down Motorized Projection Screen OR Wall Mounted Video Screen	CFCI
(1) Ceiling Mounted Projector	CFCI
(1) Classroom Technology (Located Inside Cabinet)	OFOI
Whiteboard Surface -32 Linear Feet (Min.) OR (2) Perimeter Walls	OFCI
Tackable Surface -4 Linear Feet (Min.)	CFCI

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be centrally located within the building and adjacent to main building corridors.
3. Layout arrangement of furniture and equipment shall be accommodated to allow adequate sightlines from all seats to the projection screen and/or instructor's podium.
4. View of the projection screens or video monitors shall not be obstructed by building structural elements. Size and type of projection screen shall be coordinated with users.
5. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Doors to be 36" wide (min.). Locate doors at opposite walls to avoid congestion.
6. Whiteboard surfaces should not have dual purpose as a screen.
7. All lighting shall have motion sensors. Provide 50 to 55 foot-candle (fc) for general illumination; 20fc (min.) for note taking during projection.
8. Lighting controls shall be located within close proximity to the entry door. Controls shall also be either located within close proximity to or controlled from the instructor's area. Provide dimmable switching in order to allow proper viewing of projected images and/or images on the screens.
9. Classroom technology utilized within this space shall be stored in the lockable media cabinet located at the instructor's area inside the media cabinet (District Standard).
10. Provide (1) 2-port data outlet (min.) along perimeter walls at regular intervals. Additional data outlets may be required at instructor's area. Building shall be equipped with wireless technology and infrastructure.
11. Convenience duplex power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. Additional power outlets should be placed at instructor's are and along (2) perimeter walls for the charding og student devices. When locating power and data outlets, special attention should be paid to the possible location of equipment and furniture.
12. Locate data and electrical outlets at ceiling for projection equipment and/or along upper portion of walls for video screens. Coordinate outlet with projector and motorized projection screen locations.
13. Natural light into the space is desired. Where applicable, windows shall be provided with blinds or shades to control natural light.
14. Design architect to coordinate projection equipment and screens with University and IT Consultant to determine appropriate requirements for this space.
15. If desired, tables may be provided with integrated power and data outlets.

COMPUTER LAB (TS-04)

ROOM FUNCTION

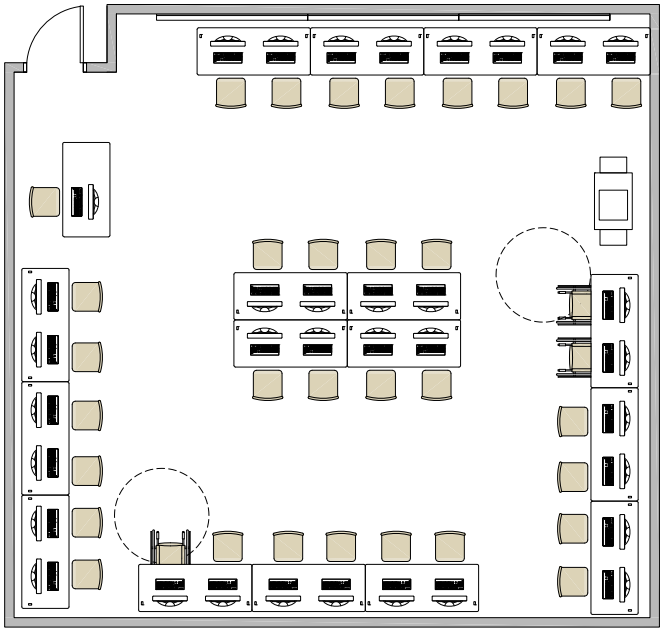
This space will provide a computer lab / classroom for the STEM Program. Space shall provide a flexible environment for various teaching styles.

ROOM DATA

Net Square Feet (ASF)	1,000 ASF
Avg. No. of Occupants	1 Staff + 34 (Option A) to 36 (Option B) Students
No. of Spaces by Type	4

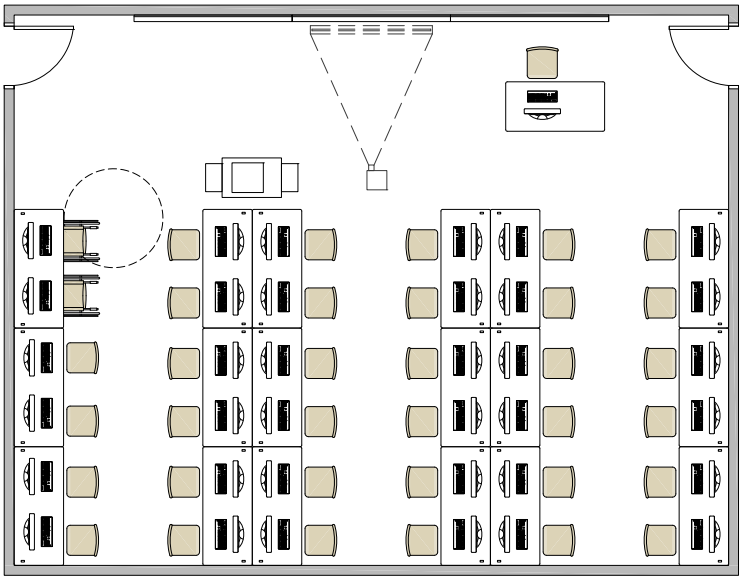
SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



Option A

Option B



COMPUTER LAB (TS-04)

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Painted Gypsum Wallboard
Ceiling	Acoustical Tile System
Lighting	LED, See Notes 6, 7

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 10
Dedicated Circuits	Stand-by Power
Data	See Note 9
Other	See Notes 11, 12

FURNISHINGS, FIXTURES & EQUIPMENT

(17) OR (18) Standard Movable Tables (24" x 72")	OFOI
(34) OR (36) Standard Movable Chairs	OFOI
(34) OR (36) Computers and Monitors	OFOI
(1) Recessed Drop-Down Motorized Projection Screen (Option B) OR Wall Mounted Video Screen	CFCI
(1) Ceiling-Mounted Projector (Option B)	CFCI
Whiteboard Surface - 8 Linear Feet (Min.)	CFCI
(1) Fixed Instructor's Podium (District Standard)	CFCI
(1) Tall Rolling Chairs	OFOI
(1) Lockable Media Cabinet (Inside Podium)	CFCI
(1) Network Printer	OFOI

Note: Quantity of FF&E listed above is dependent on the final layout and configuration selected by the users.

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be accessible from a building corridor and shall be located in close proximity to other spaces serving the STEM Program.

NOTES (CONTINUED)

3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Locate doors within space to minimize congestion. Entry door to space shall be key card access. Door to be 36" wide (min.).
4. Wall and ceiling assemblies should minimize sound transmission. Speech within space shall be intelligible without amplification.
5. View of the projection screen , video monitor, and whiteboards shall not be obstructed by building structural elements. Motorized projection screen may not be required if whiteboard surface is designed to also be utilized as a projection surface. Coordinate with user's preference.
6. All lighting shall have motion sensors. Provide 50 to 55 footcandle (fc) for general illumination; 20fc (min.) for note taking during projection.
7. Lighting controls shall be located within close proximity to the entry door. Zone in order to allow proper viewing of projected images and in a manner which allows for light fixtures at / near the projection screen to remain off so as not to impede viewing of images on the screen.
8. Teaching equipment and technology utilized within this space shall be stored in the lockable media cabinet located at the instructor's media cabinet (District Standard).
9. Provide (1) 2-port data outlet (min.) along each perimeter wall. Building shall be equipped with wireless technology and infrastructure.
10. Convenience duplex power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. Additional power outlets should be placed at instructor's area and along (2) perimeter walls for the charding of student devices. When locating power and data outlets, special attention should be paid to the possible location of equipment and furniture.
11. Locate data and electrical outlets at ceiling for projection equipment and/or along upper portion of walls for video monitor. Coordinate outlet with projector and motorized projection screen locations.
12. Additional power and data outlets shall be provided at the location of the printer. Verify power requirements with manufacturer's specifications.
13. Natural light into the space is desired. Windows shall be provided with blinds or shades to control natural light.

FLEXIBLE CLASSROOM (TS-05)

ROOM FUNCTION

This space will provide a flexible classroom for the STEM Program. Space will provide the capability to be divided into (4) separate spaces to allow various capacities and seating configurations.

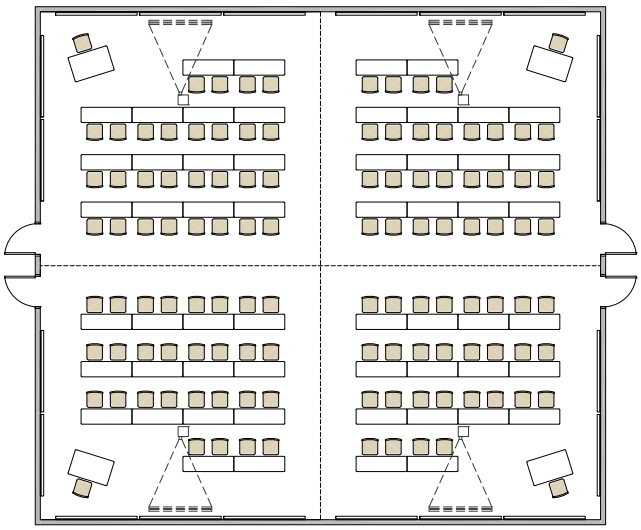
ROOM DATA

Net Square Feet (ASF)	2,700 ASF
Avg. No. of Occupants	112 (Option A), 96 (Option B / C) OR 128 (Option D) Students + 4 Faculty
No. of Spaces by Type	1

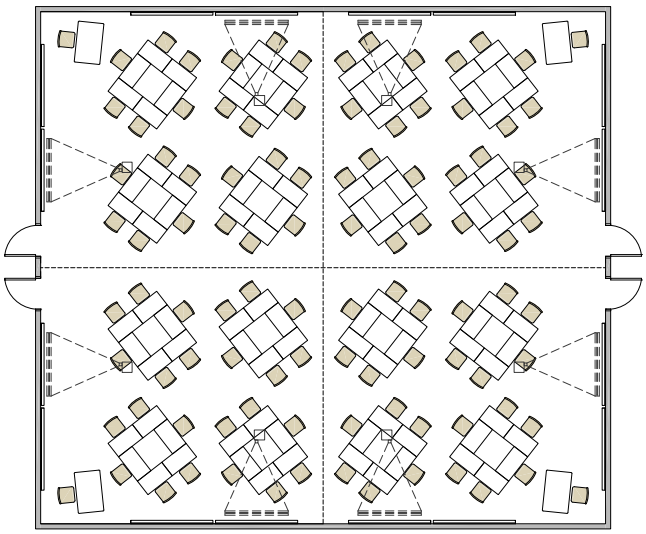
SAMPLE ROOM LAYOUT

The diagrams below are included as planning tools to ensure that the space will function as the users require within the assigned square feet. They are not intended to dictate the final design or configuration of the space.

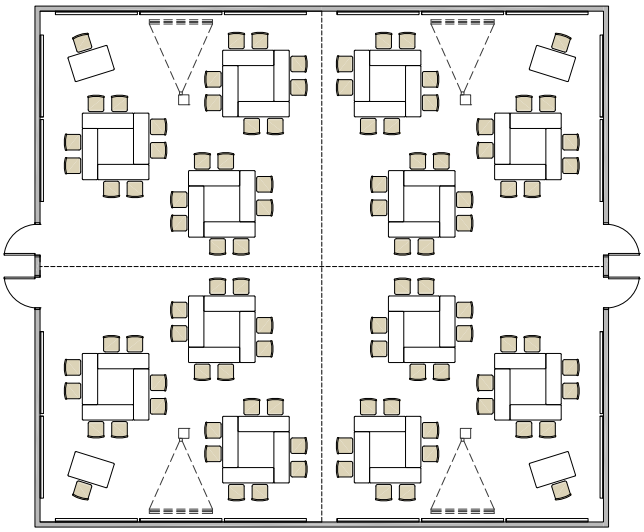
Option A



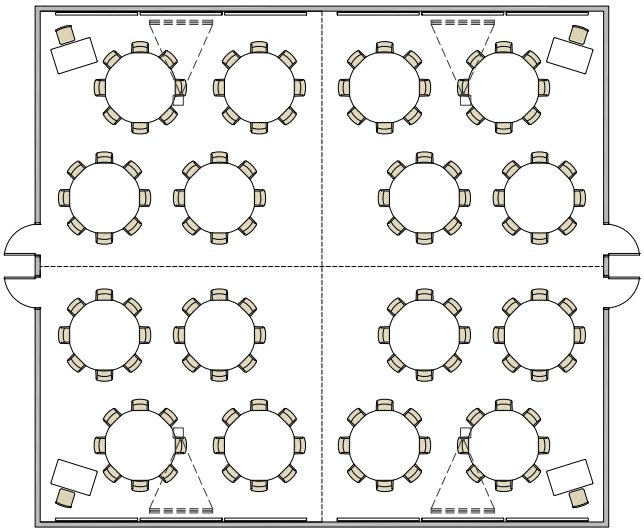
Option C



Option B



Option D



FLEXIBLE CLASSROOM (TS-05)

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Painted Gypsum Wallboard
Ceiling	Acoustical Tile System
Lighting	LED, See Notes 9, 10

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 13
Dedicated Circuits	Stand-by Power
Data	See Note 12
Other	See Note 14

FURNISHINGS, FIXTURES & EQUIPMENT

(4) OR (8) Recessed Drop-Down Motorized Projection Screen OR Wall Mounted Video Screens	CFCI
(4) OR (8) Ceiling-Mounted Projector	CFCI
Whiteboard Surface - 60 Linear Feet (Min.)	CFCI
(56) OR (48) Movable Tables (18" x 48") (Option A / B)	OFOI
(96) Movable Tables (18" x 30") (Option C)	OFOI
(16) Movable Round Tables for 8 (Option D)	OFOI
(4) Rolling Chairs (At Instructor's Area)	OFOI
(4) Fixed Podiums w/ Lockable Media Cabinets (At Instructor's Area - District Standard)	CFCI
(96) to (128) Movable Chairs	OFOI
Classroom Technology (Located Inside Cabinet)	OFOI
Tackable Surface - 32 Linear Feet (Min.)	CFCI
Retractable Wall Partitions (As Required)	CFCI

Note: Quantity of FF&E listed above is dependent on the final layout and configuration selected by the users.

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be accessible from a main building corridor and in close proximity to other STEM Teaching Spaces.

NOTES (CONTINUED)

3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Doors to be 36" wide (min.). Provide multiple entry points on two perimeter walls (min.).
4. Locate door(s) within space to minimize congestion.
5. Wall and ceiling assemblies should minimize sound transmission. Speech within space shall be intelligible without amplification.
6. Space shall have the capabilities to be divisible into (4) smaller, independently functional classrooms. Coordinate with users and provide the desired solution for retractable wall partitions.
7. View of the projection screens, video monitors, whiteboards and / or instructor's areas shall not be obstructed by building structural elements.
8. Whiteboeard surfaces should not have a dual purpose as a screen.
9. All lighting shall have motion sensors. Provide 50 to 55 foot-candle (fc) for general illumination; 20fc (min.) for note taking during projection. Accent lighting may be provided at instructor's area, if desired.
10. Lighting controls shall be located within close proximity to the entry door. Controls shall also be either located within close proximity to or controlled from the instructor's area. Provide dimmable switching in order to allow proper viewing of projected images and/or images on the screens.
11. Classroom technology utilized within this space shall be stored in the lockable media cabinets located at the instructor's areas inside the media cabinets (District Standard).
12. Provide (1) 2-port data outlets (min.) along each perimeter wall. Additional data outlets may be required at instructor's areas. Building shall be equipped with wireless technology and infrastructure.
13. Convenience duplex power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. Additional power outlets should be placed at instructor's area and along (2) perimeter walls for the charging of student devices. When locating power and data outlets, special attention should be paid to the possible location of equipment and furniture.
14. Locate data and electrical outlets at ceiling for projection equipment and/or along upper portion of walls for video sceens. Coordinate outlets with projector and motorized projection screen locations.
15. Natural light into the space is desired. Where applicable, windows shall be provided with blinds or shades to control natural light.

FLEXIBLE CLASSROOM STORAGE (TS-06)

ROOM FUNCTION

This space will provide an area for the storage of furniture, equipment, and supplies utilized within the Flexible Classroom.

ROOM DATA

Net Square Feet (ASF)	200 ASF
Avg. No. of Occupants	N/A
No. of Spaces by Type	1

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Painted Gypsum Wallboard
Ceiling	Acoustical Tile System
Lighting	LED, See Note 7

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110V/20A/1-phase, See Note 6
Dedicated Circuits	Stand-by Power
Data	See Note 5
Other	

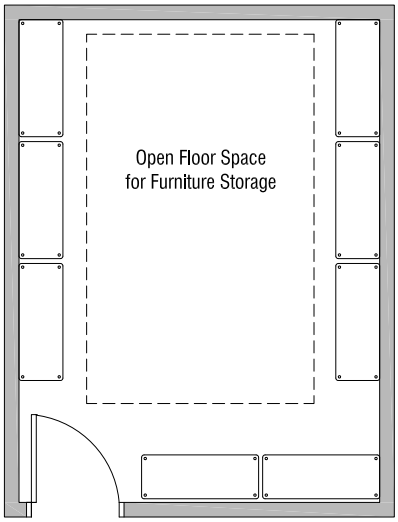
FURNISHINGS, FIXTURES AND EQUIPMENT

Racks on Tracks	CFCI
Open Floor Space for Furniture Storage	OFOI

Note: Design architect shall confirm type, quantity, and requirements of storage preferred by users. Install and maintain according to manufacturer's specifications.

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space shall be located directly adjacent to the Flexible Classroom.

NOTES (CONTINUED)

3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Door to be 36" wide (min.). Double doors are recommended.
4. Wall material should minimize sound transmission.
5. Provide (2) 2-port data outlets (min.) per wall. No data outlet shall be placed on the entry wall. Building shall be equipped with wireless technology and infrastructure.
6. Convenience power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power and data outlets, pay special attention to the possible location of equipment and furniture.
7. Provide 50 to 55 footcandle (fc) for general illumination. Lighting shall have motion sensors; controls shall be located within close proximity to the entry door. Natural light is not required.

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TECHNICAL LAB / STUDIO (TS-07)

ROOM FUNCTION

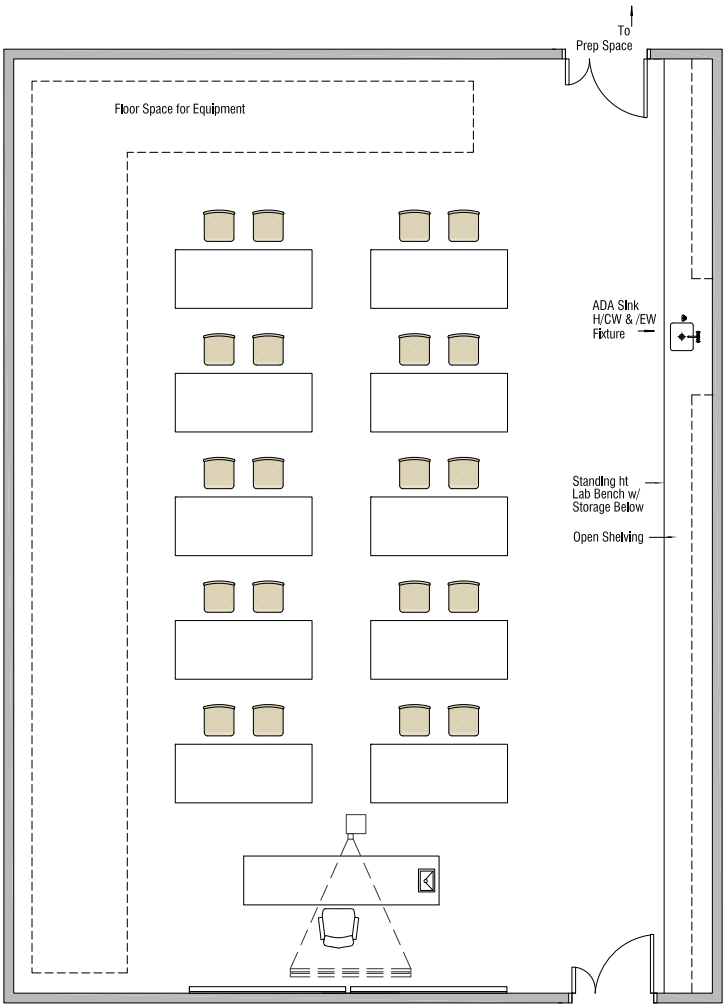
This space will provide a Lab / Studio for the groups involved in STEM courses.

ROOM DATA

Net Square Feet (ASF)	1,700 ASF
Avg. No. of Occupants	1 Staff + 20 Students
No. of Spaces by Type	2

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



LAB PREP SPACE (TS-08)

ROOM FUNCTION

This space will provide a prep space to support the adjacent Technical Lab / Studio. Space should be accessible from the associated Technical Lab / Studio.

ROOM DATA

Net Square Feet (ASF)	400 ASF
Avg. No. of Occupants	10 to 12
No. of Spaces by Type	1

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Partition Walls
Ceiling	Acoustical Tile System
Lighting	LED

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 5, 6
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 4
Other	

FURNISHINGS, FIXTURES AND EQUIPMENT

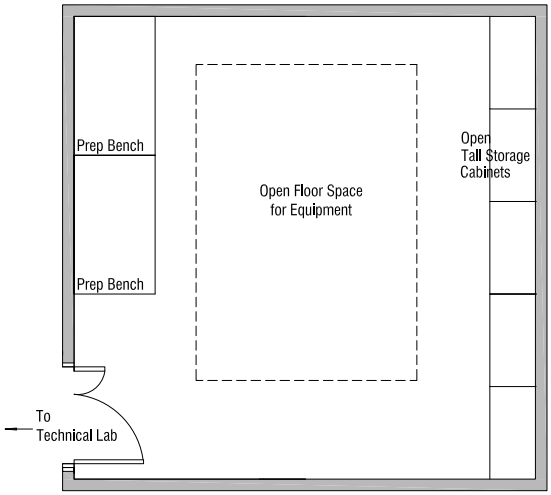
(2) Movable Prep Benches (42" x 84")	OFOI
(5) Open Tall Storage Cabinets	OFCI
Whiteboard Surface - 4 Linear Feet (min.)	CFCI
Open Floor Space for Equipment	

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be accessible from or directly adjacent to the associated Technical Lab / Studio.
3. Provide vision lite in entry door for visual access from the teaching space. Entry door to space shall be key card access. Door opening to be 48" wide (min.) with active leaf.

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



NOTES (CONTINUED)

4. Building shall be equipped with wireless technology and infrastructure.
5. Convenience power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power and data outlets, pay special attention to the possible location of equipment and furniture.
6. Additional power outlets may be necessary to support additional equipment utilized within this space. Verify power requirements with manufacturer's specifications and users.

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TECHNICAL LAB / STUDIO (TS-09)

ROOM FUNCTION

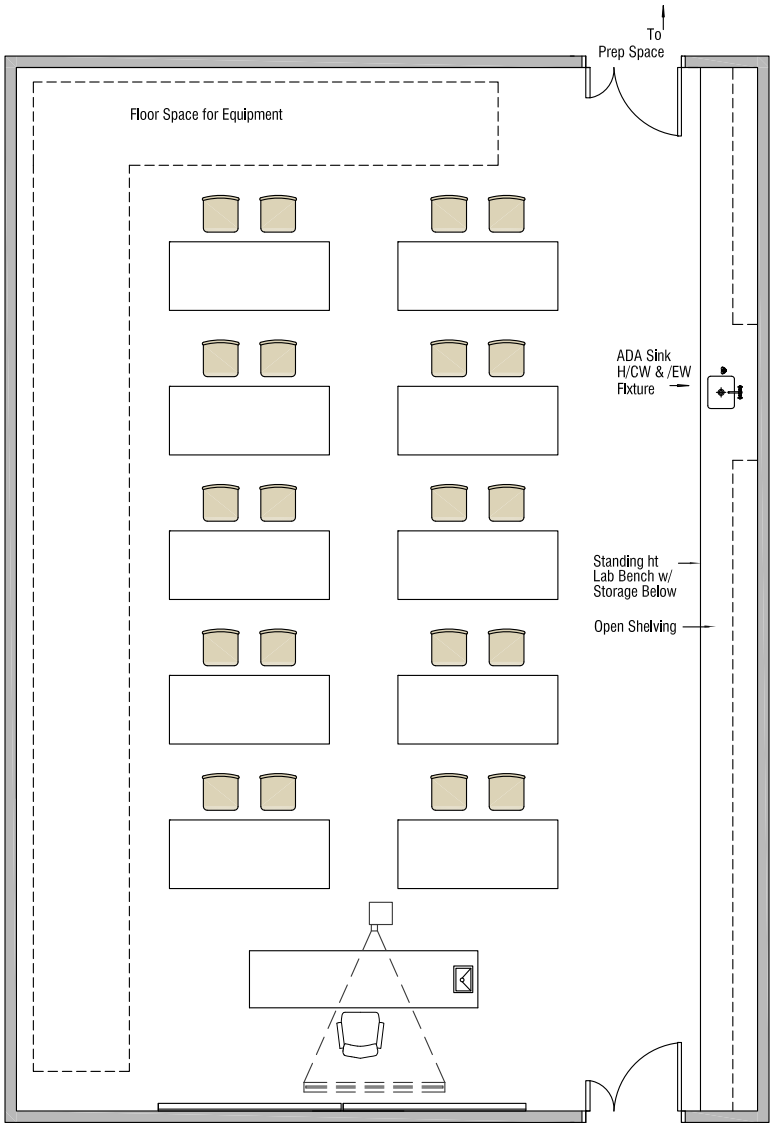
This space will provide a Lab / Studio for the groups involved in STEM courses.

ROOM DATA

Net Square Feet (ASF)	1,500 ASF
Avg. No. of Occupants	1 Staff + 20 Students
No. of Spaces by Type	1

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



LAB PREP SPACE (TS-10)

ROOM FUNCTION

This space will provide a prep space to support the adjacent Technical Lab / Studio. Space should be accessible from the associated Technical Lab / Studio.

ROOM DATA

Net Square Feet (ASF)	200 ASF
Avg. No. of Occupants	4 to 6
No. of Spaces by Type	1

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Partition Walls
Ceiling	Acoustical Tile System
Lighting	LED

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Notes 5, 6
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 4
Other	

FURNISHINGS, FIXTURES AND EQUIPMENT

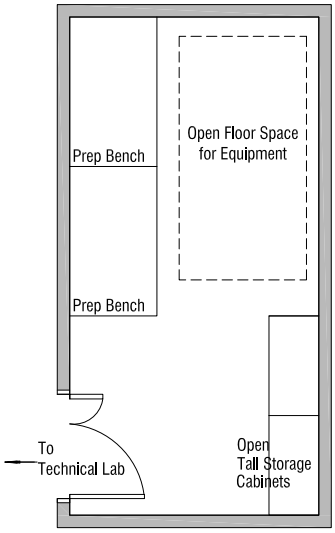
(2) Movable Prep Benches (42" x 84")	OFOI
(2) Open Tall Storage Cabinets	OFCI
Open Floor Space for Equipment	

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be accessible from or directly adjacent to the associated Technical Lab / Studio.
3. Provide vision lite in entry door for visual access from the teaching space. Entry door to space shall be key card access. Door opening to be 48" wide (min.) with active leaf.

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



NOTES (CONTINUED)

4. Building shall be equipped with wireless technology and infrastructure.
5. Convenience power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power and data outlets, pay special attention to the possible location of equipment and furniture.
6. Additional power outlets may be necessary to support additional equipment utilized within this space. Verify power requirements with manufacturer's specifications and users.

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CHEMISTRY LAB (ORGANIC) (TS-11)

ROOM FUNCTION

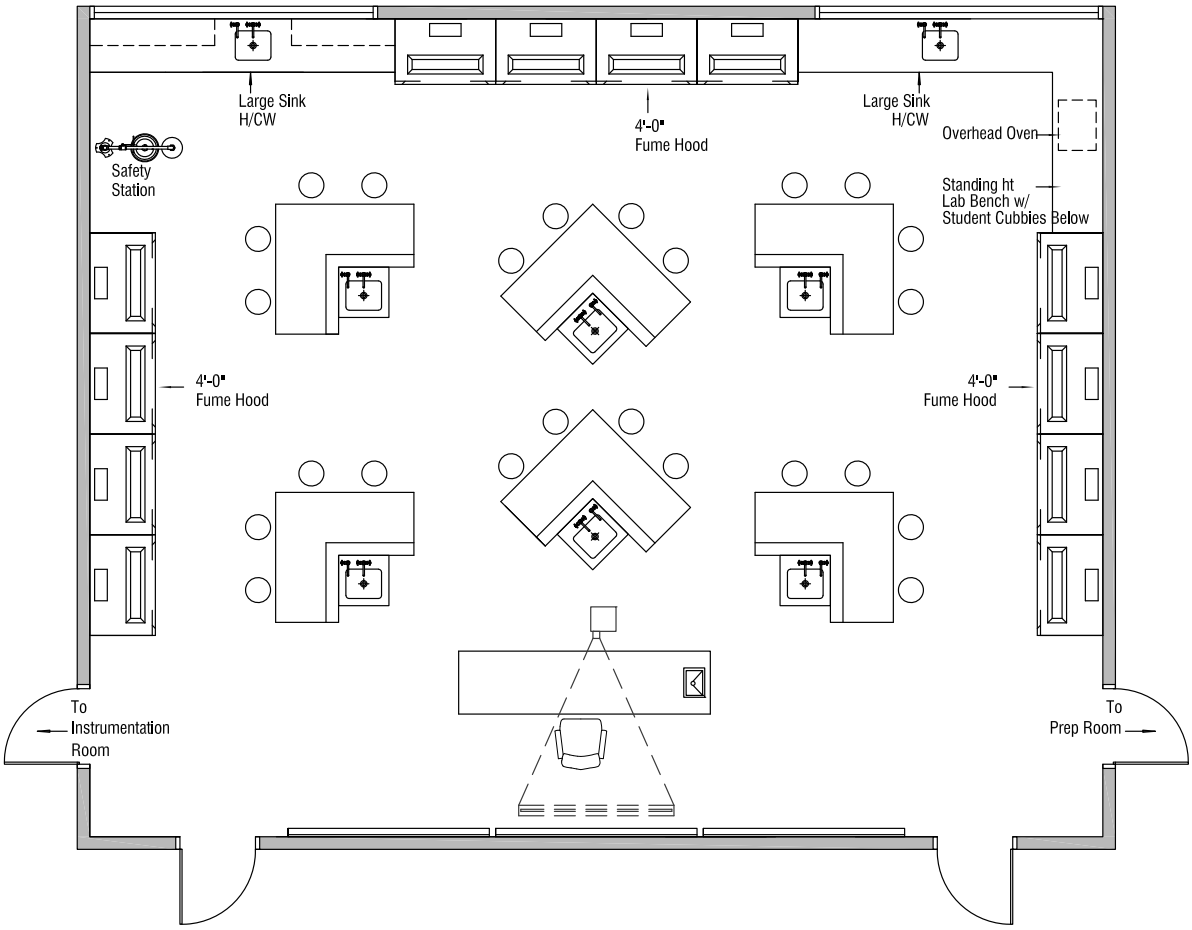
This space will provide a Chemistry Lab for the students, faculty, and staff involved in the Science curriculum. A total of (1) Organic Chemistry Labs should be provided.

ROOM DATA

Net Square Feet (ASF)	1,300 ASF
Avg. No. of Occupants	1 Staff + 24 Students
No. of Spaces by Type	1

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



CHEMISTRY LAB (ORGANIC) (TS-11)

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Painted Gypsum Wallboard
Ceiling	Acoustical Tile System
Lighting	LED, See Notes 5, 6

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	X Cold Water (CW) X
Other	See Notes 7 thru 11

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Notes 13, 14
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 12
Other	See Note 15

FURNISHINGS, FIXTURES & EQUIPMENT

(6) Fixed "V" Shaped Benches / Stations w/ Built-In Storage Drawers and Sink	CFCI
(2) Walls Built-In Standing Height Lab Bench w/ Student Cubbies	CFCI
(2) Single Compartment Large Sinks	CFCI
(2) Automatic Soap and Paper Towel Dispensers	CFCI
(12) Fume Hoods (4'-0")	CFCI
(1) Overhead Scientific Oven	CFCI
(24) Movable Stools w/ Backs	OFOI
(1) Fixed Instructor's Work Bench w/ Technology and Hand Sink	CFCI
(1) Instructor's Rolling Stool w/ Back	OFOI
(1) Recessed Drop-Down Motorized Projection Screen	CFCI
(1) Ceiling-Mounted Projector OR Video Monitor	CFCI
Whiteboard Surface - 12 Linear Feet (Min.)	CFCI
(1) Safety Station with Floor Drain	CFCI

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.

NOTES (CONTINUED)

2. Space should be accessible from a building corridor. Associated prep room shall also be located directly adjacent to/or accessible from this space.
3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Locate doors within space to minimize congestion. Entry door to space shall be key card access. Door to be 36" wide (min.).
4. Wall and ceiling assemblies should minimize sound transmission. Speech within space shall be intelligible without amplification.
5. All lighting shall have motion sensors. Provide 50 to 55 footcandle (fc) for general illumination.
6. Lighting controls shall be located within close proximity to the entry door. Lighting should have dimmable controls.
7. Provide plumbing and drain lines to support the use of sinks within the lab. Hot and cold water should be provided to all sinks within the lab. One sink should be provided with dedicated DI water served by a centralized building system.
8. Fume hoods shall be ducted to vent to the building exterior.
9. Fume hoods shall be provided along the perimeter walls. Each hood will require air, gas, and vacuum services.
10. Provide (2) air lines, (2) gas lines, and (2) vacuum lines per student bench/ station.
11. Space will be utilized for experiments and testing of chemicals and other substances which may release hazardous gases and fumes. Design HVAC system accordingly.
12. Building shall be equipped with wireless technology and infrastructure.
13. Convenience duplex power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power and data outlets, special attention should be paid to the possible location of equipment and furniture.
14. Power outlets along the walls of the built-ins shall be at counter height.
15. Instructor's station and student stations should have multiple integrated power outlets on side walls of the benches.
16. Natural light is not required. Windows along adjacent corridors shall be provided to allow visibility into the space from adjacent spaces. Provide blinds to control vision lite.
17. Designate a location for the storage of students' belongings. Storage shall be fixed. Users desire storage location under perimeter countertops.

CHEMISTRY LAB (INTRO and INORGANIC) (TS-12)

ROOM FUNCTION

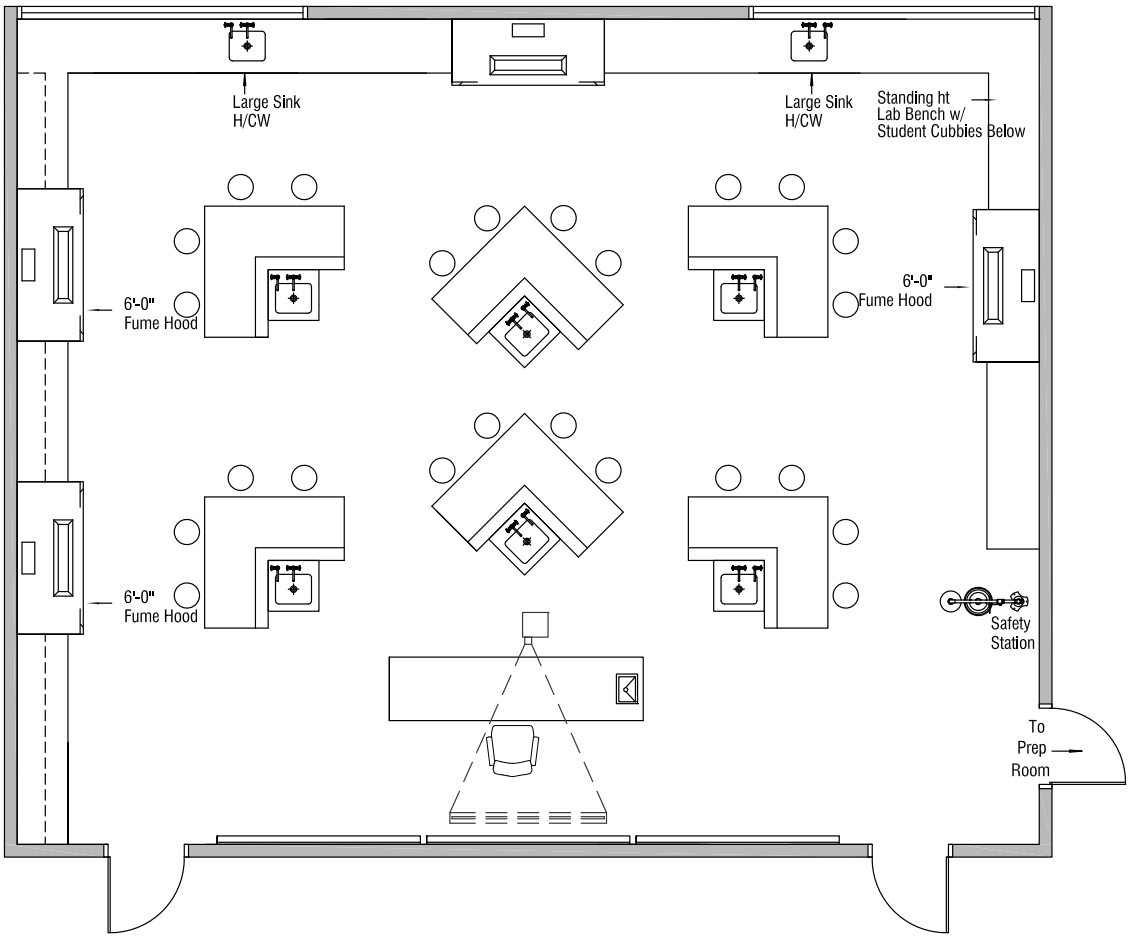
This space will provide a Chemistry Lab for the students, faculty, and staff involved in the Science curriculum. A total of (3) Chemistry Labs should be provided: (1) for Intro, and (2) for General / Inorganic Chemistry.

ROOM DATA

Net Square Feet (ASF)	1,300 ASF
Avg. No. of Occupants	1 Staff + 24 Students
No. of Spaces by Type	3

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



CHEMISTRY LAB (INTRO and INORGANIC) (TS-12)

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Painted Gypsum Wallboard
Ceiling	Acoustical Tile System
Lighting	LED, See Notes 5, 6

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH		
Air Changes/Hour	min. per Code		
Hot Water (HW)	X	Cold Water (CW)	X
Other	See Notes 7 thru 11		

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Notes 13, 14		
Dedicated Circuits		Stand-by Power	
Data	Wireless Technology, See Note 12		
Other	See Note 15		

FURNISHINGS, FIXTURES & EQUIPMENT

(6) Fixed "V" Shaped Benches / Stations w/ Built-In Storage Drawers and Sink	CFCI
(3) Walls Built-In Standing Height Lab Bench w/ Student Cubbies Below (One Wall Upper Cabinets)	CFCI
(2) Single Compartment Large Sinks	CFCI
(2) Automatic Soap and Paper Towel Dispensers	CFCI
(4) Fume Hoods (6'-0")	CFCI
(24) Movable Stools w/ Backs	OFOI
(1) Fixed Instructor's Work Bench w/ Technology and Hand Sink	CFCI
(1) Instructor's Rolling Stool w/ Back	OFOI
(1) Recessed Drop-Down Motorized Projection Screen	CFCI
(1) Ceiling-Mounted Projector OR Video Monitor	CFCI
Whiteboard Surface - 12 Linear Feet (Min.)	CFCI
(1) Safety Station with Floor Drain	CFCI

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be accessible from a building corridor. Associated Prep Room shall also be located directly adjacent to/or accessible from this space.

NOTES (CONTINUED)

3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Locate doors within space to minimize congestion. Entry door to space shall be key card access. Door to be 36" wide (min.).
4. Wall and ceiling assemblies should minimize sound transmission. Speech within space shall be intelligible without amplification.
5. All lighting shall have motion sensors. Provide 50 to 55 footcandle (fc) for general illumination.
6. Lighting controls shall be located within close proximity to the entry door. Lighting should have dimmable countrols.
7. Provide plumbing and drain lines to support the use of sinks within the lab. Hot and cold water should be provided to all sinks within the lab. One sink should be provided with dedicated DI water served by a centralized building system.
8. Fume hoods shall be ducted to vent to the building exterior.
9. Fume hoods shall be provided along the perimeter walls. Hoods will require gas, air, and vacuum services.
10. Provide (2) gas lines and (2) vacuum lines per student bench / station.
11. Space will be utilized for experiments and testing of chemicals and other substances which may release hazardous gases and fumes. Design HVAC system accordingly.
12. Building shall be equipped with wireless technology and infrastructure.
13. Convenience duplex power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power and data outlets, special attention should be paid to the possible location of equipment and furniture.
14. Power outlets along the walls of the built-ins shall be at counter height.
15. Instructor's station and student stations should have multiple integrated power outlets on side walls of the benches.
16. Natural light is not required. Windows along adjacent corridors shall be provided to allow visibility into the space from adjacent spaces. Provide blinds to control vision lite.
17. Designate a location for the storage of students' belongings. Storage shall be fixed. Users desire storage location under perimeter countertops.

INSTRUMENTATION ROOM (TS-13)

ROOM FUNCTION

This space will provide an instrumentation room to support the Chemistry Labs. Space should be adjacent to the Organic, Inorganic, and Intro Labs.

ROOM DATA

Net Square Feet (ASF)	400 ASF
Avg. No. of Occupants	10 to 12
No. of Spaces by Type	1

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Painted Gypsum Wallboard
Ceiling	Acoustical Tile System
Lighting	LED

MECHANICAL / PLUMBING

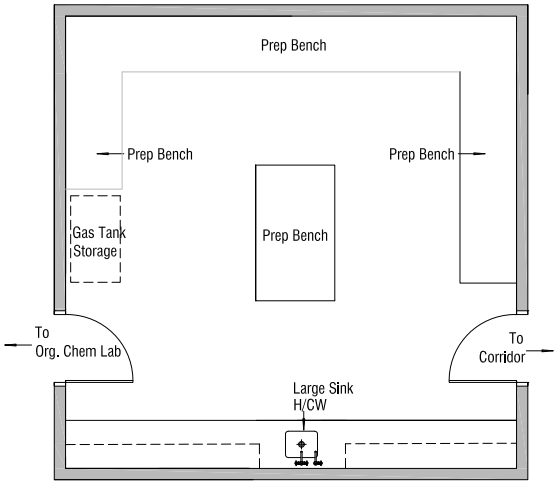
Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	X Cold Water (CW) X
Other	See Notes 5 thru 7

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 9
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 8
Other	See Notes 10, 11

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



FURNISHINGS, FIXTURES AND EQUIPMENT

(1) Wall Built-In Standing Height Lab Bench w/ Undercounter Storage and Upper Cabinets	CFCI
(1) Single Compartment Large Sink	CFCI
(1) Automatic Soap and Paper Towel Dispenser	OFCI
(1) Fixed Prep Bench (42" x 84")	CFCI
(2) Walls Built-In Standing Height Lab Bench w/ Undercounter Storage	CFCI
(1) Open Floor Space for Gas Tank Storage	OFOI
(1) Gas Cylinder Straps	CFCI

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be located directly adjacent to the Organic Chemistry Lab and building circulation.
3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Door to be 36" wide (min.). Main door from hallway should be 48" wide (min.)

NOTES (CONTINUED)

4. Wall material should minimize sound transmission.
5. Provide plumbing and drain lines to support the use of sink and safety station. Hot and cold water should be provided. DI water shall be provided from the central building system.
6. Fixed prep bench shall be provided with (1) gas line, (1) air line, and (1) vacuum line.
7. Space will accommodate chemicals and other substances which may release hazardous gases and fumes. Design HVAC system accordingly.
8. Building shall be equipped with wireless technology and infrastructure.
9. Convenience power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power outlets, pay special attention to the possible location of equipment and furniture.
10. Power outlets along the walls of built-ins shall be at counter height.
11. Additional power outlets may be necessary to support additional equipment utilized within this space. Verify power requirements with manufacturer's specifications.

CHEMICAL STORAGE (TS-14)

ROOM FUNCTION

This space will provide an area to store all chemicals utilized within the Chemistry Laboratories.

ROOM DATA

Net Square Feet (ASF)	100 ASF
Avg. No. of Occupants	N/A
No. of Spaces by Type	2

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Painted Gypsum Wallboard
Ceiling	Acoustical Tile System
Lighting	LED

MECHANICAL / PLUMBING

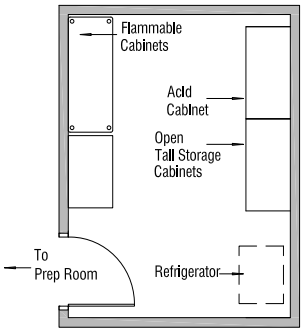
Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	See Note 5

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 7
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 6
Other	

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



FURNISHINGS, FIXTURES AND EQUIPMENT

(2) Lockable Tall Storage Cabinets	OFCI
(1) Flammable Cabinet	CFCI
(1) Acids / Corrosive Storage Cabinet	CFCI
(1) Workstation	OFOI
(1) Explosion-Proof Refrigerator	CFCI

Note: Design architect shall confirm type, quantity, and requirements of storage preferred by users. Install and maintain according to manufacturer's specifications.

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be located adjacent to the associated Chemistry Laboratories and Prep Room.
3. Provide vision lite in entry door for visual access from the Prep Room. Entry door to space shall be key card access. Door to be 36" wide (min.).

NOTES (CONTINUED)

4. Wall material should minimize sound transmission.
5. Space will store chemicals and other substances which may release hazardous gases and fumes. Design HVAC system accordingly.
6. Building shall be equipped with wireless technology and infrastructure.
7. Convenience power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power outlets, pay special attention to the possible location of equipment and furniture.

CHEMISTRY RESEARCH LAB (TS-15)

ROOM FUNCTION

This space will provide a space for Chemistry Research. The lab should be adjacent to the other Chemistry Laboratories and support spaces. Student work areas shall be provided directly adjacent to the lab, within the building corridor. Work areas are not accounted for in the room ASF.

ROOM DATA

Net Square Feet (ASF)	300 ASF
Avg. No. of Occupants	8 to 10
No. of Spaces by Type	1

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Painted Gypsum Wallboard
Ceiling	Acoustical Tile System
Lighting	LED

MECHANICAL / PLUMBING

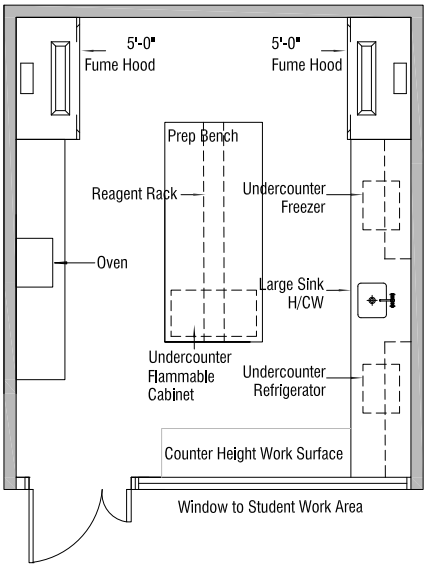
Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	X Cold Water (CW) X
Other	DI Water, See Notes 4 thru 6

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 8
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 7
Other	See Notes 9, 10

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



FURNISHINGS, FIXTURES AND EQUIPMENT

(1) Wall Built-In Standing Height Lab Bench w/ Undercounter Storage and Open Shelving	CFCI
(1) Single Compartment Large Sink	CFCI
(1) Automatic Soap and Paper Towel Dispenser	OFCI
(1) Fixed Prep Bench (9' x 4') with Reagant Rack	CFCI
(1) Undercounter Flammable Cabinet	CFCI
(2) Fume Hoods (5'-0")	CFCI
(1) Countertop Oven	OFOI
(1) 4°C Refrigerator (Undercounter)	CFCI
(1) -20°C Freezer (Undercounter)	CFCI

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be located directly adjacent to the building corridor and the Student Work Area. Window shall provide visual connection to the adjacent Student Work Area.

NOTES (CONTINUED)

3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Door to be 48" wide (min.) with operable leaf.
4. Provide plumbing and drain lines to support the use of sink. Hot and cold water should be provided.
5. Fume hood shall be ducted to vent to the building exterior.
6. Space shall be provided with DI water, (1) gas line, (1) vacuum line, and (1) air line.
7. Building shall be equipped with wireless technology and infrastructure.
8. Convenience power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power outlets, pay special attention to the possible location of equipment and furniture.
9. Power outlets along the walls of built-ins shall be at counter height.
10. Additional power outlets shall be provided to support the use of the oven, refrigerator, and freezer. Verify power requirements with manufacturer's specifications.

CHEMISTRY RESEARCH LAB STUDENT WORK AREA (TS-16)

ROOM FUNCTION

This space will serve as a student work space for students utilizing the adjacent Chemistry Research Lab and need to visually monitor or supervise their work while outside of the lab.

ROOM DATA

Net Square Feet (ASF)	80 ASF
Avg. No. of Occupants	2 Students
No. of Spaces by Type	1

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Painted Gypsum Wallboard
Ceiling	Acoustical Tile System
Lighting	LED

MECHANICAL / PLUMBING

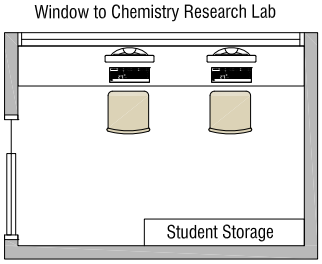
Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 6
Dedicated Circuits	Stand-by Power
Data	Wireless Technology , See Note 5
Other	

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



FURNISHINGS, FIXTURES AND EQUIPMENT

(1) Wall Built-In Desk for (2)	CFCI
(2) Rolling Chairs	OFOI
(2) Computers and Monitors	OFOI
(1) Student Storage Area (Open Floor Space)	OFOI

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be located directly adjacent to the building corridor and the Chemistry Research Lab. Window shall provide visual connection to the adjacent Chemistry Research Lab.

NOTES (CONTINUED)

3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Door is not required. Entry opening to space shall be 36" wide (min.).
4. Wall material should minimize sound transmission.
5. Building shall be equipped with wireless technology and infrastructure.
6. Convenience power outlets shall be provided along the built-in desk and along the perimeter walls at regular intervals, in accordance with Code. When locating power and data outlets, pay special attention to the possible location of equipment and furniture.
7. Provide 50 to 55 footcandle (fc) for general illumination. Lighting shall have motion sensors; controls shall be located within close proximity to the entry door. Natural light is preferred. Where applicable, windows shall be provided with blinds or shades to control natural light.

BIO CHEM LAB (TS-17)

ROOM FUNCTION

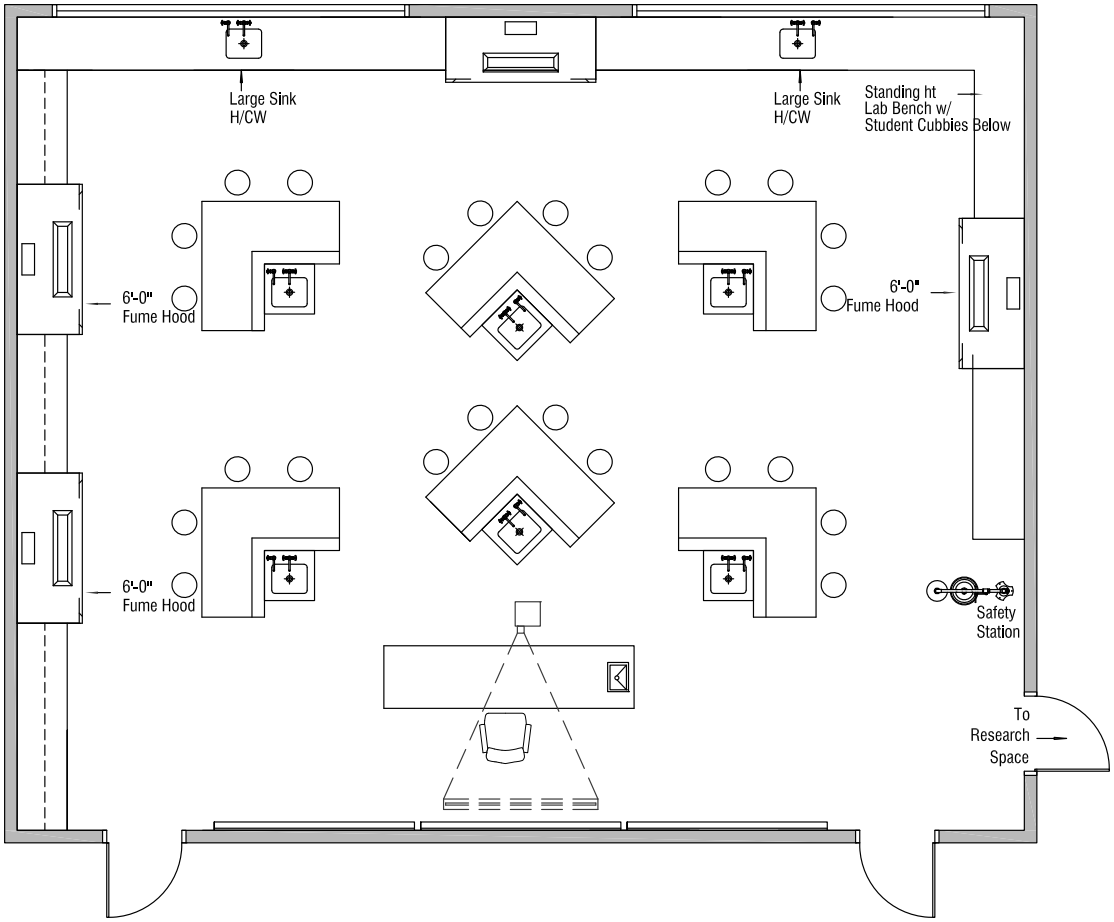
This space will provide a science lab for multiple purposes. Space will be shared among disciplines of the Science Department.

ROOM DATA

Net Square Feet (ASF)	1,300 ASF
Avg. No. of Occupants	1 Staff + 24 Students
No. of Spaces by Type	1

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



BIO CHEM LAB (TS-17)

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Painted Gypsum Wallboard
Ceiling	Acoustical Tile System
Lighting	LED, See Notes 7, 8

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH		
Air Changes/Hour	min. per Code		
Hot Water (HW)	X	Cold Water (CW)	X
Other	See Notes 7 thru 11		

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 13
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 12
Other	See Note 14

FURNISHINGS, FIXTURES & EQUIPMENT

(6) Fixed "V" Shaped Benches / Stations w/ Built-In Storage Drawers and Sink	CFCI
(3) Walls Built-In Standing Height Lab Bench w/ Student Cubbies Below	CFCI
(2) Single Compartment Large Sinks	CFCI
(2) Automatic Soap and Paper Towel Dispensers	CFCI
(4) Fume Hoods (6'-0")	CFCI
(24) Movable Stools w/ Backs	OFOI
(1) Fixed Instructor's Work Bench w/ Technology	CFCI
(1) Instructor's Rolling Stool w/ Back	OFOI
(1) Recessed Drop-Down Motorized Projection Screen	CFCI
(1) Ceiling-Mounted Projector OR Large Video Monitor	OFCI
Whiteboard Surface - 12 Linear Feet (Min.)	CFCI
(1) Safety Station w/ Floor Drain	CFCI

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be accessible from a building corridor. The associated prep room shall be located directly adjacent or in close proximity to the space.

NOTES (CONTINUED)

3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Locate doors within space to minimize congestion. Entry door to space shall be key card access. Door to be 36" wide (min.).
4. Wall and ceiling assemblies should minimize sound transmission. Speech within space shall be intelligible without amplification.
5. All lighting shall have motion sensors. Provide 50 to 55 footcandle (fc) for general illumination.
6. Lighting controls shall be located within close proximity to the entry door.
7. Provide plumbing and drain lines to support the use of sinks within the lab. Hot and cold water should be provided to all sinks within the lab. DI Water shall also be provided.
8. Provide (2) gas lines and (2) vacuum lines per student bench / station.
9. Fume hoods shall be ducted to vent to the building exterior.
10. Fume hoods shall be provided along the perimeter walls. Hoods will require gas, air, and vacuum services.
11. Space will be utilized for experiments and testing of chemicals and other substances which may release hazardous gases and fumes. Design HVAC system accordingly.
12. Building shall be equipped with wireless technology and infrastructure.
13. Convenience duplex power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power and data outlets, special attention should be paid to the possible location of equipment and furniture.
14. Power and data outlets along the walls of the built-ins shall be at counter height.
15. Instructor's station and student stations should have multiple integrated power outlets on side walls of the benches.
16. Natural light is not required. Windows along adjacent corridors shall be provided to allow visibility into the space from adjacent spaces. Provide blinds to control vision lite.
17. Designate a location for the storage of students' belongings. Storage shall be fixed. Users desire storage location under perimeter countertops.

SHARED SCIENCE PREP ROOM (TS-18)

ROOM FUNCTION

This space will provide a prep space to support the Science Labs located within this building. Space will be shared among departments under Science.

ROOM DATA

Net Square Feet (ASF)	400 ASF
Avg. No. of Occupants	6 to 10
No. of Spaces by Type	2

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Painted Gypsum Wallboard
Ceiling	Acoustical Tile System
Lighting	LED

MECHANICAL / PLUMBING

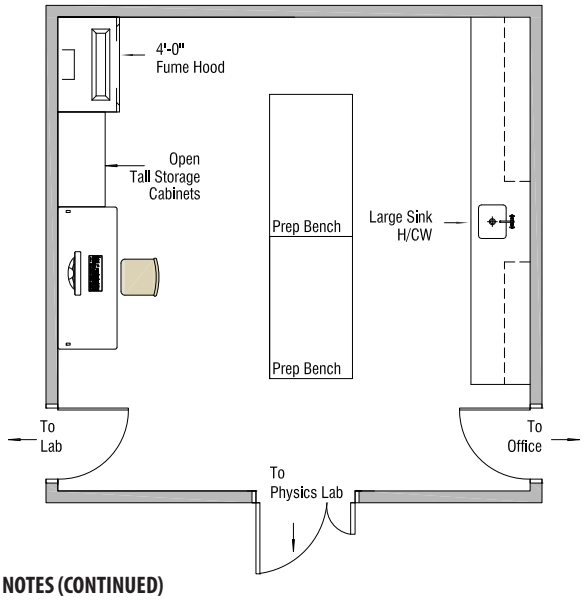
Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	X Cold Water (CW) X
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 6
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 5
Other	See Note 7

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



FURNISHINGS, FIXTURES AND EQUIPMENT

(1) Wall Built-In Standing Height Lab Bench w/ Undercounter Storage and Open Shelving	CFCI
(1) Single Compartment Large Sink	CFCI
(1) Automatic Soap and Paper Towel Dispenser	OFCI
(2) Fixed or Movable Prep Benches (42" x 84")	CFCI
(1) Open Tall Storage Cabinet	OFCI
(1) Fume Hood (4'-0")	CFCI
(1) Movable Workstation and Chair	OFOI

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be directly adjacent to or in close proximity to associated Science Labs which it will serve and to the Lab Tech's Office.
3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Door to be 48" wide (min.).

NOTES (CONTINUED)

4. Wall material should minimize sound transmission.
5. Provide plumbing and drain lines to support the use of sink and safety station. Hot and cold water should be provided.
6. Fume hood shall be ducted to vent to the building exterior.
7. Space will accommodate chemicals and other substances which may release hazardous gases and fumes. Design HVAC system accordingly.
8. Building shall be equipped with wireless technology and infrastructure.
9. Convenience power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power and data outlets, pay special attention to the possible location of equipment and furniture.
10. Power and data outlets along the walls of built-ins shall be at counter height.
11. Additional power outlets may be necessary to support additional equipment utilized within this space. Verify power requirements with manufacturer's specifications.

LAB TECH'S OFFICE (TS-19)

ROOM FUNCTION

This space will serve as a work space for the Lab Technician appointed to oversee the adjacent Shared Science Prep Room.

ROOM DATA

Net Square Feet (ASF)	110 ASF
Avg. No. of Occupants	1 + 2 Guests
No. of Spaces by Type	2

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Partition Walls
Ceiling	Acoustical Tile System
Lighting	LED

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 6
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 5
Other	

FURNISHINGS, FIXTURES AND EQUIPMENT

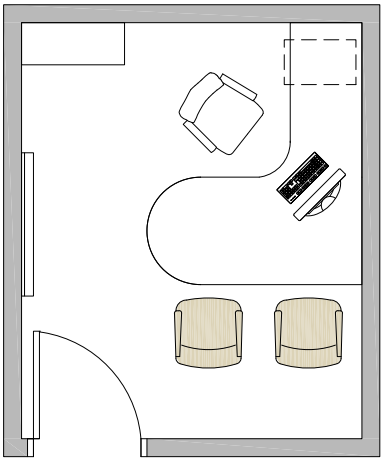
(1) Standard Modular Desk	OFOI
(1) Standard Rolling Chair	OFOI
(2) Standard Movable Chairs	OFOI
(1) Bookshelf	OFOI
(1) Undercounter File Cabinet	OFOI
Whiteboard Surface - 4 Linear Feet (min.)	CFCI
(1) Computer and Monitor	OFOI
(1) Telephone	OFOI
Access to Shared Network Printer	OFOI

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



NOTES (CONTINUED)

2. Space shall be located accessible from and directly adjacent to the Shared Science Prep Room.
3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Door to be 36" wide (min.).
4. Wall material should minimize sound transmission.
5. Building shall be equipped with wireless technology and infrastructure.
6. Convenience power outlets shall be provided at workstation and along the perimeter walls at regular intervals, in accordance with Code. When locating power outlets, pay special attention to the possible location of equipment and furniture.
7. Provide 50 to 55 footcandle (fc) for general illumination. Lighting shall have motion sensors; controls shall be located within close proximity to the entry door. Natural light is preferred. Where applicable, windows shall be provided with blinds or shades to control natural light.

PHYSICS LAB (TS-20)

ROOM FUNCTION

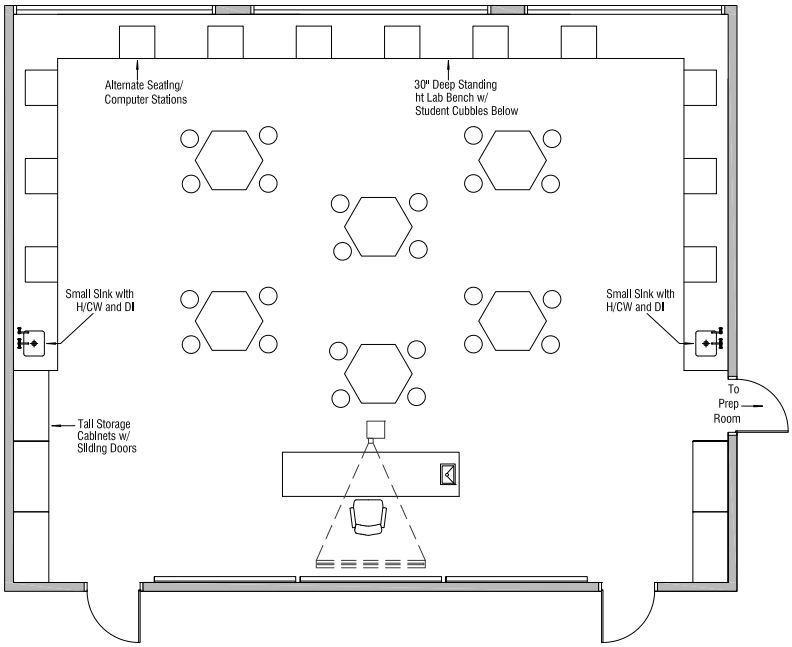
This space will provide a physics lab for the students, faculty, and staff involved in the physics curriculum.

ROOM DATA

Net Square Feet (ASF)	1,300 ASF
Avg. No. of Occupants	1 Staff + 36 Students
No. of Spaces by Type	1

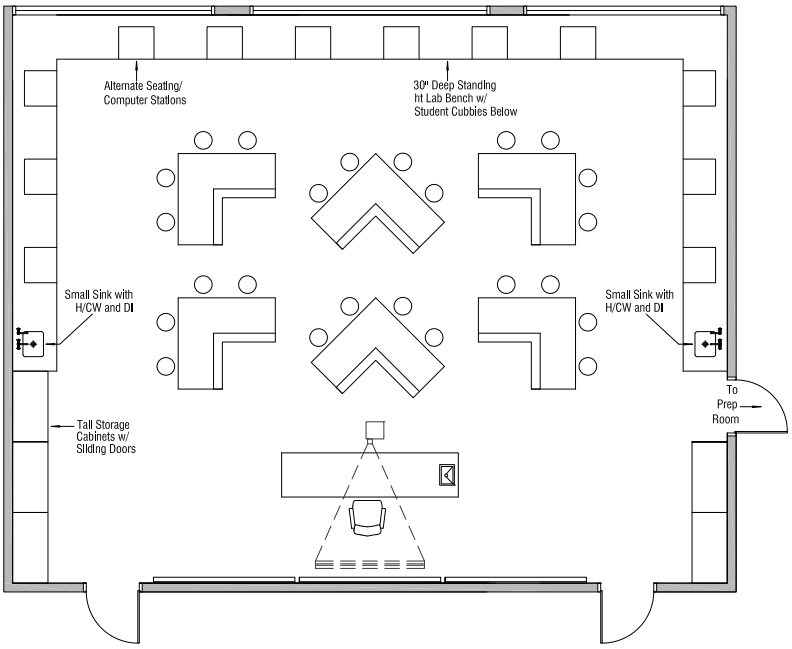
SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



Option A

Option B



PHYSICS LAB (TS-20)

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Painted Gypsum Wallboard
Ceiling	Acoustical Tile System
Lighting	LED, See Notes 7, 8

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH		
Air Changes/Hour	min. per Code		
Hot Water (HW)	X	Cold Water (CW)	X
Other	See Notes 7 thru 9		

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 11		
Dedicated Circuits		Stand-by Power	
Data	Wireless Technology, See Note 10		
Other	See Notes 12, 13		

FURNISHINGS, FIXTURES & EQUIPMENT

(6) Fixed "V" Shaped Benches / Stations w/ Built-In Storage (Option B)	CFCI
(6) Fixed Hexagon Benches / Stations w/ Built-In Storage (Option A)	CFCI
(3) Walls Built-In Standing Height Lab Bench w/ Student Cubbies Below (30" Deep)	CFCI
(2) Single Compartment Small Sinks	CFCI
(2) Automatic Soap and Paper Towel Dispensers	OFCI
(3) Walls Built-In Seating / Computer Stations (Alt.)	CFCI
(24) Movable Stools w/ Back	OFOI
(1) Fixed Instructor's Work Bench w/ Technology	CFCI
(1) Instructor's Rolling Stool w/ Back	OFOI
(1) Recessed Drop-Down Motorized Projection Screen	CFCI
(1) Ceiling-Mounted Projector OR Large Monitor	OFCI
Whiteboard Surface - 12 Linear Feet (Min.)	CFCI
(1) Safety Station	CFCI

Note: Quantity of FF&E listed above is dependent on the final layout and configuration selected by the users.

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be accessible from a building corridor. The associated Physics Lab Prep Room shall be accessible from this space.
3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Locate doors within space to minimize congestion. Entry door to space shall be key card access. Door to be 36" wide (min.).
4. Wall and ceiling assemblies should minimize sound transmission. Speech within space shall be intelligible without amplification.
5. All lighting shall have motion sensors. Provide 50 to 55 foot-candle (fc) for general illumination.
6. Lighting controls shall be located within close proximity to the entry door.
7. Provide plumbing and drain lines to support the use of sinks within the lab. Hot and cold water, with dedicated DI water system should be provided to all sinks within the lab.
8. Each student station shall be integrated with (1) air line and (1) vacuum line service.
9. Space will be utilized for experiments and testing of substances which may release hazardous gases and fumes. Design HVAC system accordingly.
10. Building shall be equipped with wireless technology and infrastructure.
11. Convenience duplex power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power and data outlets, special attention should be paid to the possible location of equipment and furniture.
12. Power and data outlets along the walls of the built-ins shall be at counter height. Additional power and data shall be placed at locations of built-in seating / computer stations.
13. Instructor's station and student stations should have multiple integrated power outlets on side walls of the benches.
14. Natural light is not required. Windows along adjacent corridors shall be provided to allow visibility into the space from adjacent spaces. Provide blinds to control vision lite.
15. Designate a location for the storage of students' belongings. Storage shall be fixed. Users desire storage location under perimeter countertops.

PHYSICS PREP / STORAGE ROOM (TS-21)

ROOM FUNCTION

This space will provide a prep space to support the adjacent Physics Lab. Space should be accessible from the associated Physics Lab.

ROOM DATA

Net Square Feet (ASF)	150 ASF
Avg. No. of Occupants	N/A
No. of Spaces by Type	1

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Painted Gypsum Wallboard
Ceiling	Acoustical Tile System
Lighting	LED

MECHANICAL / PLUMBING

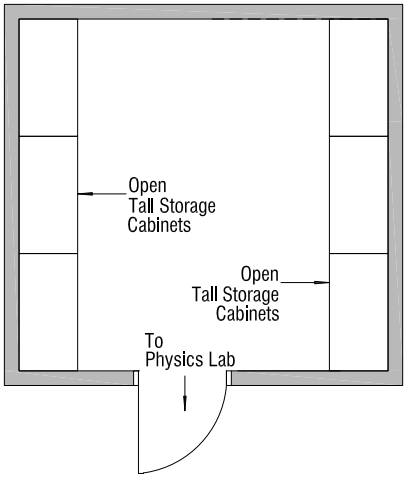
Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 6
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 5
Other	See Note 7

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



FURNISHINGS, FIXTURES AND EQUIPMENT

(6) Open Tall Storage Cabinets — CFCI

Note: Design architect to verify and confirm desired storage solution with users.

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be accessible from the Physics Lab.
3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Door to be 48" wide (min.).

NOTES (CONTINUED)

4. Wall material should minimize sound transmission.
5. Space may accommodate substances which may release hazardous gases and fumes. Design HVAC system accordingly.
6. Building shall be equipped with wireless technology and infrastructure.
7. Convenience power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power outlets, pay special attention to the possible location of equipment and furniture.

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GEOLOGY LAB (TS-22)

ROOM FUNCTION

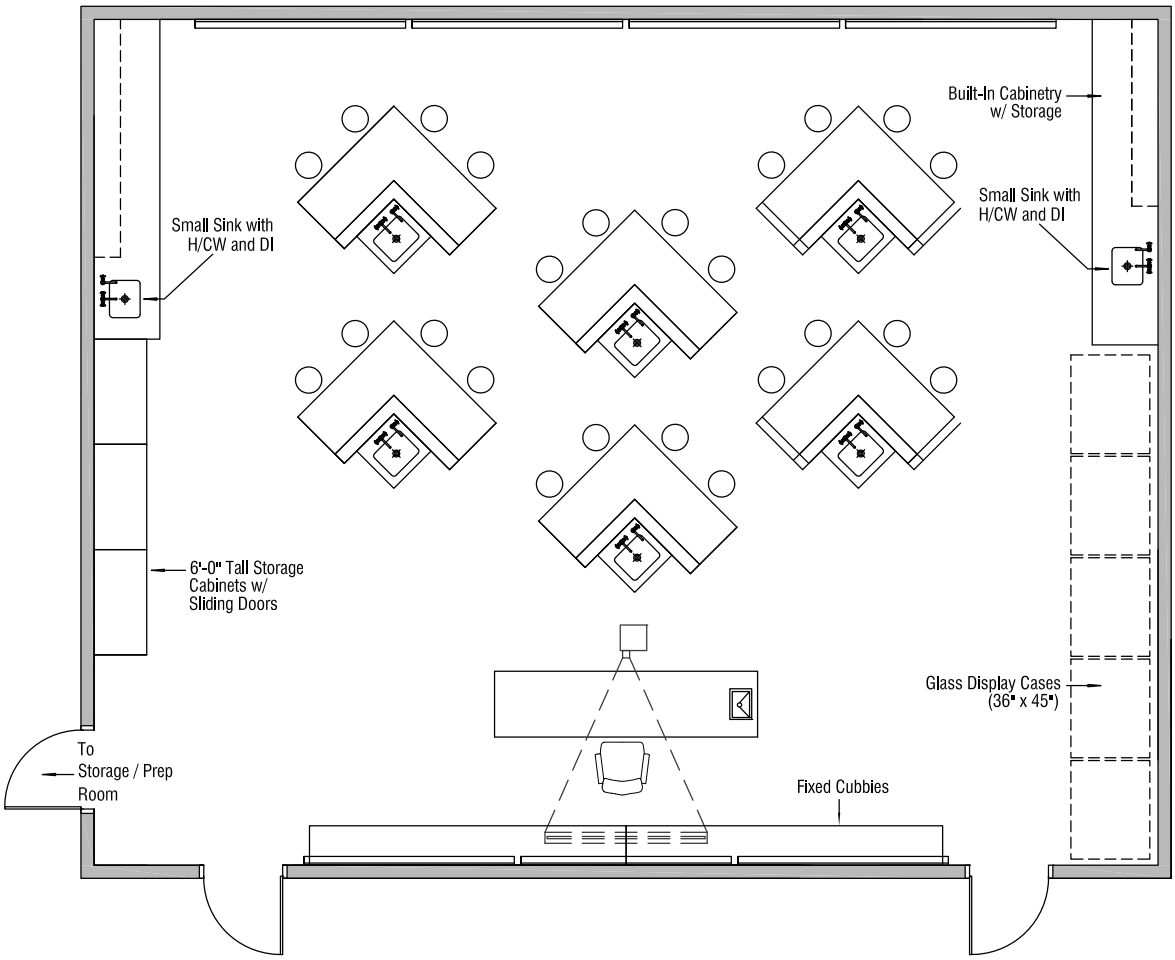
This space will provide a Geology Lab for the students, faculty, and staff involved in the Geology curriculum.

ROOM DATA

Net Square Feet (ASF)	1,300 ASF
Avg. No. of Occupants	1 Staff + 36 Students
No. of Spaces by Type	1

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



GEOLOGY LAB (TS-22)

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Painted Gypsum Wallboard
Ceiling	Acoustical Tile System
Lighting	LED, See Notes 7, 8

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH		
Air Changes/Hour	min. per Code		
Hot Water (HW)	X	Cold Water (CW)	X
Other	See Notes 7, 8		

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 10		
Dedicated Circuits		Stand-by Power	
Data	Wireless Technology, See Note 9		
Other	See Notes 11, 12		

FURNISHINGS, FIXTURES & EQUIPMENT

(6) Fixed "V" Shaped Benches / Stations w/ Built-In Storage	CFCI
(2) Walls Built-In Standing Height Cabinetry w/ Undercounter Storage	CFCI
(2) Single Compartment Small Sinks	CFCI
(1) Automatic Soap and Paper Towel Dispenser	CFCI
(5) Tall Storage Cabinets w/ Sliding Doors (6'-0" H, 24" D)	CFCI
(5) Heavy-Duty Glass Display Cases (36" x 45")	CFCI
(24) Movable Stools w/ Backs	OFOI
(1) Fixed Instructor's Work Bench w/ Technology	CFCI
(1) Instructor's Rolling Stool w/ Back	OFOI
(1) Recessed Drop-Down Motorized Projection Screen	CFCI
(1) Ceiling-Mounted Projector	CFCI
Whiteboard Surface - 12 Linear Feet (Min.)	CFCI
(1) Wall of Fixed Student Cubbies*	CFCI

*Note: The exact location of student cubbies shall be determined during design and shall be confirmed with users.

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be accessible from a building corridor. The associated prep room shall be located directly adjacent or in close proximity to this space.
3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Locate doors within space to minimize congestion. Entry door to space shall be key card access. Door to be 36" wide (min.).
4. Wall and ceiling assemblies should minimize sound transmission. Speech within space shall be intelligible without amplification.
5. All lighting shall have motion sensors. Provide 50 to 55 foot-candle (fc) for general illumination.
6. Lighting controls shall be located within close proximity to the entry door.
7. Provide plumbing and drain lines to support the use of sinks within the lab. Hot and cold water should be provided to all sinks within the lab.
8. Space will be utilized for experiments and testing of substances which may release hazardous fumes and particles. Design HVAC system accordingly.
9. Building shall be equipped with wireless technology and infrastructure.
10. Convenience duplex power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power and data outlets, special attention should be paid to the possible location of equipment and furniture.
11. Power and data outlets along the walls of the built-ins shall be at counter height.
12. Additional power may be necessary at the location of the Glass Display Cases, to provide accent lighting for showcasing student's research.
13. Natural light is not required. Windows along adjacent corridors shall be provided to allow visibility into the space from adjacent spaces. Provide blinds to control vision lite.
14. Designate a location for the storage of students' belongings. Storage shall be fixed. Users desire storage location under perimeter countertops.

GEOLOGY STORAGE / PREP ROOM (TS-23)

ROOM FUNCTION

This space will provide a prep and storage space to support the adjacent Geology Lab. Space should be accessible from the associated Geology Lab.

ROOM DATA

Net Square Feet (ASF)	150 ASF
Avg. No. of Occupants	N/A
No. of Spaces by Type	1

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Painted Gypsum Wallboard
Ceiling	Acoustical Tile System
Lighting	LED

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 6
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 5
Other	See Note 7

FURNISHINGS, FIXTURES AND EQUIPMENT

(6) Open Tall Storage Cabinets CFCI

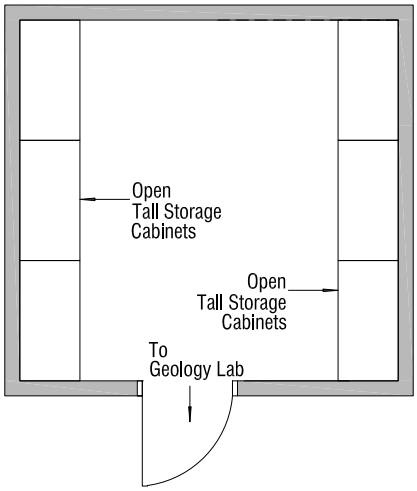
Note: Design architect to verify and confirm desired storage solution with users.

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be accessible from the Geology Lab.
3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Door to be 48" wide (min.).

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



NOTES (CONTINUED)

4. Wall material should minimize sound transmission.
5. Space may accommodate substances which may release hazardous gases and fumes. Design HVAC system accordingly.
6. Building shall be equipped with wireless technology and infrastructure.
7. Convenience power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power outlets, pay special attention to the possible location of equipment and furniture.

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TUTORIAL CENTER (TS-21)

ROOM FUNCTION

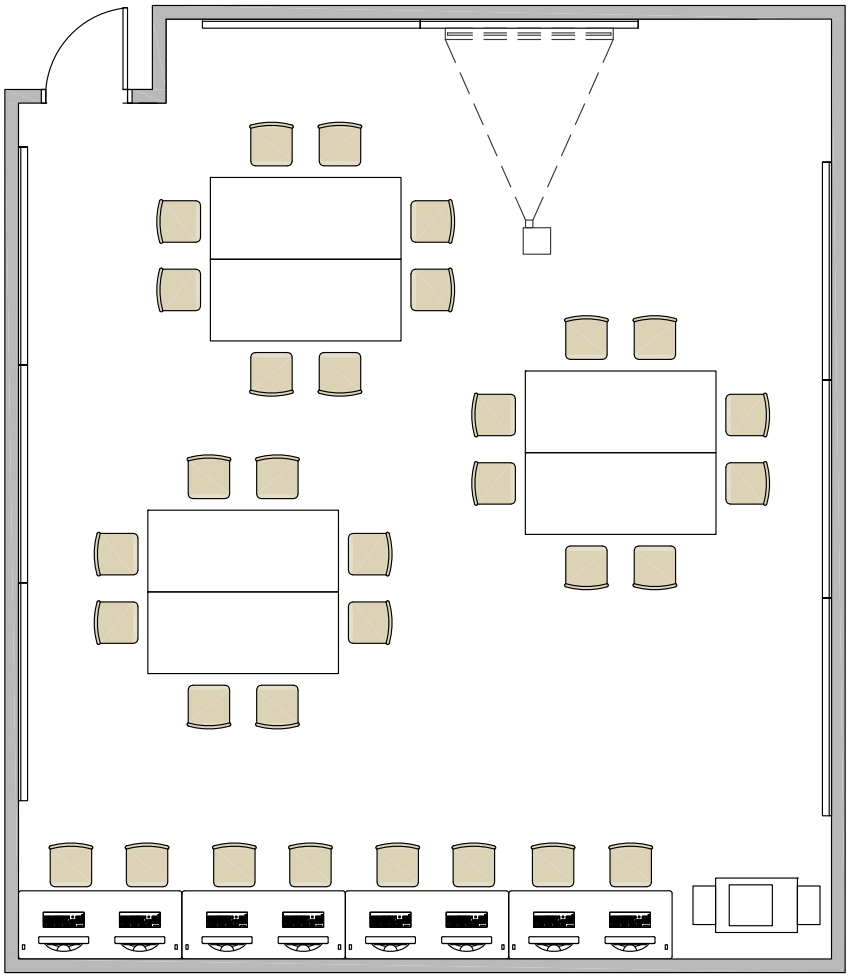
This space will provide a tutoring center for the students involved in the Science curriculum.

ROOM DATA

Net Square Feet (ASF)	1,000 ASF
Avg. No. of Occupants	32 Students
No. of Spaces by Type	1

SAMPLE ROOM LAYOUT

The diagrams below are included as planning tools to ensure that the space will function as the users require within the assigned square feet. They are not intended to dictate the final design or configuration of the space.



TUTORIAL CENTER (TS-21)

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Partition Walls
Ceiling	Acoustical Tile System
Lighting	LED, See Notes 6, 7

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 9
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 8
Other	See Note 10

FURNISHINGS, FIXTURES & EQUIPMENT

(6) Movable Tables (7' x 3')	OFOI
(4) Movable Tables (18" x 48")	OFOI
(32) Movable Chairs	OFOI
(8) Computers and Monitors	OFOI
(1) Network Printer	OFCI
(1) Ceiling Mounted Drop-Down Projection Screen	CFCI
(1) Ceiling Mounted Projector	CFCI
Tackable Surface - 24 Linear Feet (Min.)	CFCI
Whiteboard Surface - 16 Linear Feet (Min.)	CFCI

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be accessible from a main building corridor and in close proximity to other spaces serving the Science Department.
3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Doors to be 36" wide (min.).
4. Locate door(s) within space to minimize congestion.
5. Wall and ceiling assemblies should minimize sound transmission. Speech within space shall be intelligible without amplification.
6. All lighting shall have motion sensors. Provide 50 to 55 foot-candle (fc) for general illumination; 20fc (min.) for note taking during projection.
7. Lighting controls shall be located within close proximity to the entry door.
8. Provide (1) 2-port data outlet (min.) along perimeter walls at regular intervals. Additional data outlets may be required along the wall of computer stations. Building shall be equipped with wireless technology and infrastructure.
9. Convenience duplex power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. Additional power outlets may be required along the computer stations. When locating power and data outlets, special attention should be paid to the possible location of equipment and furniture.
10. Additional power and data outlets will be required at decided locations of ceiling mounted projector and printer. Verify power requirements with manufacturer's specifications.
11. Natural light into the space is desired. Where applicable, windows shall be provided with blinds or shades to control natural light.

Room Data Sheets

Faculty Spaces

CHAIR OFFICE (FS-01)

ROOM FUNCTION

This space will serve as a private office for the Chairs for the STEM Advising Suite.

ROOM DATA

Net Square Feet (ASF)	180 ASF
Avg. No. of Occupants	1 + 4 Guests
No. of Spaces by Type	2

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Partition Walls
Ceiling	Acoustical Tile System
Lighting	LED

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 6
Dedicated Circuits	Stand-by Power
Data	Wireless Technology , See Note 5
Other	

FURNISHINGS, FIXTURES AND EQUIPMENT

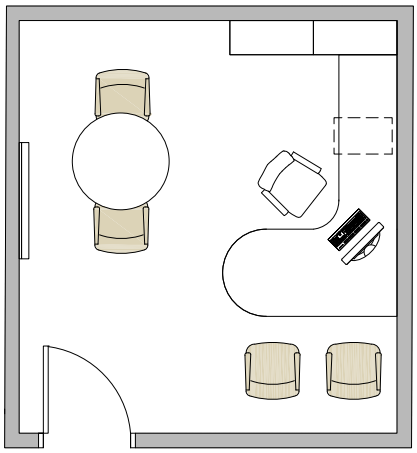
(1) Standard Modular Desk	OFOI
(1) Standard Rolling Chair	OFOI
(4) Standard Movable Chairs	OFOI
(1) Round Table for (2) to (4)	OFOI
(1) Undercounter File Cabinet	OFOI
Whiteboard Surface - 4 Linear Feet (min.)	CFCI
(1) Computer, Monitor, and Telephone	OFOI
(2) Bookshelves	OFOI
Access to Shared Network Printer	OFOI

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space shall be located within the STEM Advising Suite and adjacent to other spaces serving the department suite.

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



NOTES (CONTINUED)

3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Door to be 36" wide (min.).
4. Wall material should minimize sound transmission.
5. Building shall be equipped with wireless technology and infrastructure.
6. Convenience power outlets shall be provided at workstation and along the perimeter walls at regular intervals, in accordance with Code. When locating power and data outlets, pay special attention to the possible location of equipment and furniture.
7. Provide 50 to 55 footcandle (fc) for general illumination. Lighting shall have motion sensors; controls shall be located within close proximity to the entry door. Natural light is preferred. Where applicable, windows shall be provided with blinds or shades to control natural light.

ADMIN ASSISTANT (FS-02)

ROOM FUNCTION

This space will serve as the primary workstation for the Admin Assistants monitoring the student waiting area of the STEM Advising Suite.

ROOM DATA

Net Square Feet (ASF)	64 ASF
Avg. No. of Occupants	1 Staff + 2 Visitors
No. of Spaces by Type	2

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Partition Walls
Ceiling	Acoustical Tile System
Lighting	LED, See Note 7

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110V/20A/1-phase, See Note 6
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 5
Other	

FURNISHINGS, FIXTURES & EQUIPMENT

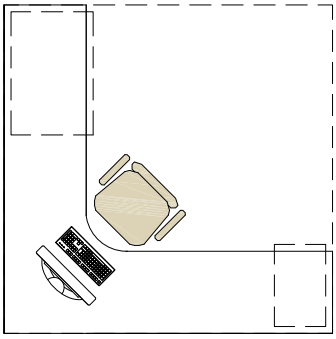
(1) Standard Modular Workstation	OFOI
(2) Undercounter File Cabinets (1 Full Size)	OFOI
(1) Standard Rolling Chairs	OFOI
(1) Computer and Monitor	OFOI
Access to Shared Network Printer	

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space shall be located adjacent to the associated Student Waiting area.

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



NOTES (continued)

4. Wall material should minimize sound transmission. Speech shall be intelligible.
5. Building shall be equipped with wireless technology and infrastructure.
6. Convenience power outlets shall be integrated within workstation. In addition, power outlets shall be provided along the perimeter walls of the larger space at regular intervals, in accordance with Code. When locating power outlets, special attention should be paid to the location of equipment and furniture.
7. Provide 50 to 55 footcandle (fc) for general illumination. Lighting controls shall be located within close proximity to entry door of larger space. Lighting shall have motion sensors.
8. Flooring and wall finishes of this space shall be coordinated to match those utilized for the overall space in which the workstation is located.

ASSOCIATED STUDENT WAITING (FS-03)

ROOM FUNCTION

This space will serve as a waiting area for the students, faculty and guests visiting the STEM Advising Suite and may have administrative personnel within the adjacent area.

ROOM DATA

Net Square Feet (ASF)	100 ASF
Avg. No. of Occupants	5 to 8
No. of Spaces by Type	1

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Partition Walls
Ceiling	Suspended Acoustical Ceiling
Lighting	LED, See Note 7

MECHANICAL / PLUMBING

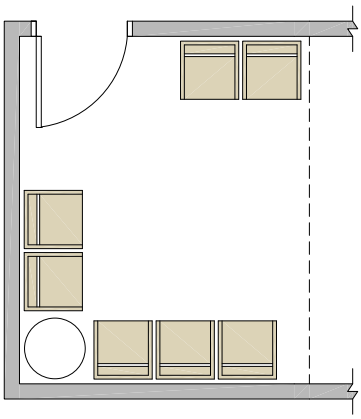
Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 6
Dedicated Circuits	Stand-by Power
Data	Wireless Technology
Other	

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



FURNISHINGS, FIXTURES & EQUIPMENT

(7) Movable Lounge Chairs	OFOI
(1) Coffee / End Table	OFOI

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space shall be located directly adjacent to a main building corridor and within the STEM Advising Suite.
3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Door to be 36" wide (min.).

NOTES (continued)

4. Consideration should be given to the upgrade of finishes in this area since it will represent the department to the public. Finishes should be tasteful, durable, and appropriate.
5. Wall material should minimize sound transmission.
6. Convenience power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power outlets, pay special attention to the possible location of equipment and furniture.
7. Movable furniture shall be provided to maximize flexibility and adaptability.
8. Provide 50 to 55 footcandle (fc) for general illumination. Lighting shall have motion sensors; controls shall be located within close proximity to the entry door. Natural light is preferred. Where applicable, windows shall be provided with blinds or shades to control natural light.

PRIVATE OFFICE (FS-04)

ROOM FUNCTION

This space will serve as a private office for the faculty indicated on the space list included in Chapter 3. One of the private offices will be occupied by the Professional and Technical Dean.

ROOM DATA

Net Square Feet (ASF)	110 ASF
Avg. No. of Occupants	1 + 2 Guests
No. of Spaces by Type	22

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Partition Walls
Ceiling	Acoustical Tile System
Lighting	LED

MECHANICAL / PLUMBING

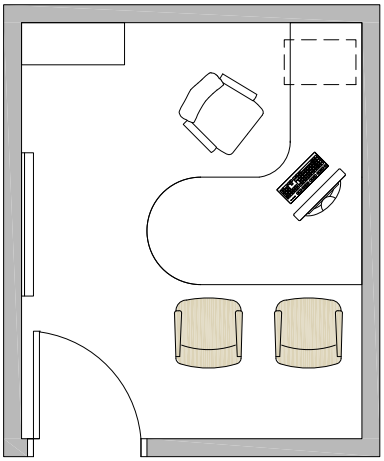
Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 6
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 5
Other	

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



FURNISHINGS, FIXTURES AND EQUIPMENT

(1) Standard Modular Desk	OFOI
(1) Standard Rolling Chair	OFOI
(2) Standard Movable Chairs	OFOI
(1) Bookshelf	OFOI
(1) Undercounter File Cabinet	OFOI
Whiteboard Surface - 4 Linear Feet (min.)	CFCI
(1) Computer and Monitor	OFOI
(1) Telephone	OFOI
Access to Shared Network Printer	OFOI

Note: The office space for the Professional and Technical Dean shall be provided with Dean's Furniture, in lieu of the standard furnishings utilized for the remainder of the office spaces.

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.

NOTES (CONTINUED)

2. Space shall be located within the STEM Advising Suite.
3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Door to be 36" wide (min.).
4. Wall material should minimize sound transmission.
5. Building shall be equipped with wireless technology and infrastructure.
6. Convenience power outlets shall be provided at workstation and along the perimeter walls at regular intervals, in accordance with Code. When locating power outlets, pay special attention to the possible location of equipment and furniture.
7. Provide 50 to 55 footcandle (fc) for general illumination. Lighting shall have motion sensors; controls shall be located within close proximity to the entry door. Natural light is preferred. Where applicable, windows shall be provided with blinds or shades to control natural light.

CONFERENCE ROOM (FS-05)

ROOM FUNCTION

This space will provide a conference room for the STEM Advising Suite and building users.

ROOM DATA

Net Square Feet (ASF)	400 ASF
Avg. No. of Occupants	15 to 20
No. of Spaces by Type	2

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Partition Walls
Ceiling	Acoustical Tile System
Lighting	LED

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110V/20A/1-phase, See Note 6
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 5
Other	See Note 7

FURNISHINGS, FIXTURES AND EQUIPMENT

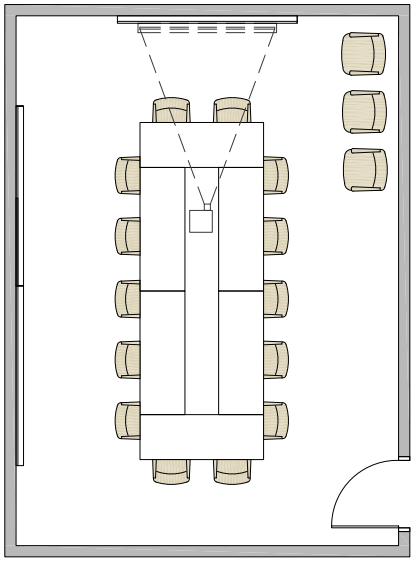
(4) Movable Tables (30" x 72")	OFOI
(2) Movable Tables (30" x 48")	OFOI
(15) to (20) Movable Chairs	OFOI
Tackable Wall Surface - 4 Linear Feet (min.)	CFCI
Whiteboard Surface - 8 Linear Feet (min.)	CFCI
(1) Recessed Drop-Down Motorized Projection Screen OR Large Video Monitor	CFCI OFCI
(1) Ceiling-Mounted Projector (if screen is selected)	CFCI

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space shall be centrally located within the STEM Advising Suite or adjacent to the suite with access to the main building corridor.

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



NOTES (CONTINUED)

3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Door to be 36" wide (min.).
4. Wall material should minimize sound transmission.
5. Building shall be equipped with wireless technology and infrastructure.
6. Convenience power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power outlets, pay special attention to the possible location of equipment and furniture.
7. Provide power and data outlets at ceiling to support the use of motorized projector, projection screen, and/or video monitor.
8. Provide 50 to 55 footcandle (fc) for general illumination. Lighting shall have motion sensors; controls shall be located within close proximity to the entry door. Natural light is preferred. Where applicable, windows shall be provided with blinds or shades to control natural light.

SHARED WORKROOM (FS-06)

ROOM FUNCTION

This space will provide an area to house shared equipment (copy, fax, scanner) and storage space for the STEM Advising Suite.

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Partition Walls
Ceiling	Acoustical Tile System
Lighting	LED

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 6
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 5
Other	See Note 7

FURNISHINGS, FIXTURES AND EQUIPMENT

Wall Built-In Upper and Lower Cabinets w/ Work Surface and Storage	CFCI
(2) Movable Work Tables (30" x 84")	OFOI
(6) Standard Movable Chairs	OFOI
(1) File Cabinet (Optional)	OFOI
(2) Adjustable Metal Shelving	OFOI
(1) Copier / Scanner / Fax Machine	OFOI
Tackable Wall Surface - 4 Linear Feet (min.)	CFCI
Access to Shared Network Printer	OFOI

NOTES

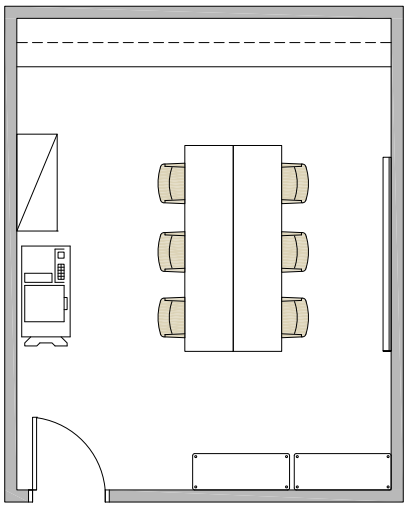
1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space shall be centrally located within the STEM Advising Suite.
3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Door to be 36" wide (min.).

ROOM DATA

Net Square Feet (ASF)	300 ASF
Avg. No. of Occupants	8 to 10
No. of Spaces by Type	1

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



NOTES (CONTINUED)

4. Wall material should minimize sound transmission.
5. Building shall be equipped with wireless technology and infrastructure.
6. Convenience power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power outlets, pay special attention to the possible location of equipment and furniture.
7. Power outlets along the walls of built-ins shall be at counter height. Additional power and data outlets may be required at location of printer. Verify power requirements with manufacturer's specifications.
8. Provide additional power at location of work table to allow flexibility when utilizing office equipment and tools.
9. Provide 50 to 55 footcandle (fc) for general illumination. Lighting shall have motion sensors; controls shall be located within close proximity to the entry door. Natural light is preferred. Where applicable, windows shall be provided with blinds or shades to control natural light.

ADJUNCT FACULTY OFFICE (FS-07)

ROOM FUNCTION

This space will serve as a shared adjunct faculty office for the faculty associated with the STEM programs.

ROOM DATA

Net Square Feet (ASF)	400 ASF
Avg. No. of Occupants	Varies
No. of Spaces by Type	1

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Partition Walls
Ceiling	Acoustical Tile System
Lighting	LED

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 6, 7
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 5
Other	

FURNISHINGS, FIXTURES AND EQUIPMENT

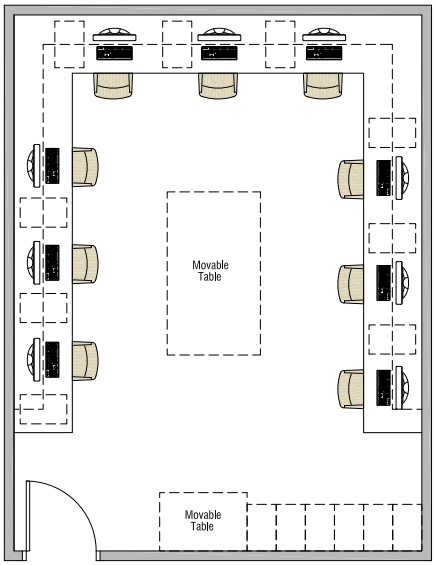
(3) Walls Built-In Work Surfaces	CFCI
(9) Standard Movable Chairs	OFOI
(9) Computers and Monitors	OFOI
Stackable Mail Boxes (As Required)	OFOI
(2) Movable Work Tables (Size Variable)	OFOI
(1) Telephone	OFOI
(9) Undercounter Lockable File Cabinets	OFOI
(3) Walls of Upper Lockable Cabinets	CFCI

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space shall be located near the STEM Advising Suite.
3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Door to be 36" wide (min.).

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



NOTES (CONTINUED)

4. Wall material should minimize sound transmission. Speech shall be intelligible.
5. Building shall be equipped with wireless technology and infrastructure.
6. Convenience power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power and data outlets, pay special attention to the possible location of equipment and furniture.
7. Additional power and data outlets shall be provided at counter height along the walls of built-ins.
8. Provide additional power and data at location of printer. Verify power requirements with manufacturer's specifications.
9. Provide 50 to 55 footcandle (fc) for general illumination. Lighting shall have motion sensors; controls shall be located within close proximity to the entry door. Natural light is preferred. Where applicable, windows shall be provided with blinds or shades to control natural light.

Room Data Sheets

Shared Building Spaces

FLEXIBLE MEETING ROOM - OPTION A (BS-01)

ROOM FUNCTION

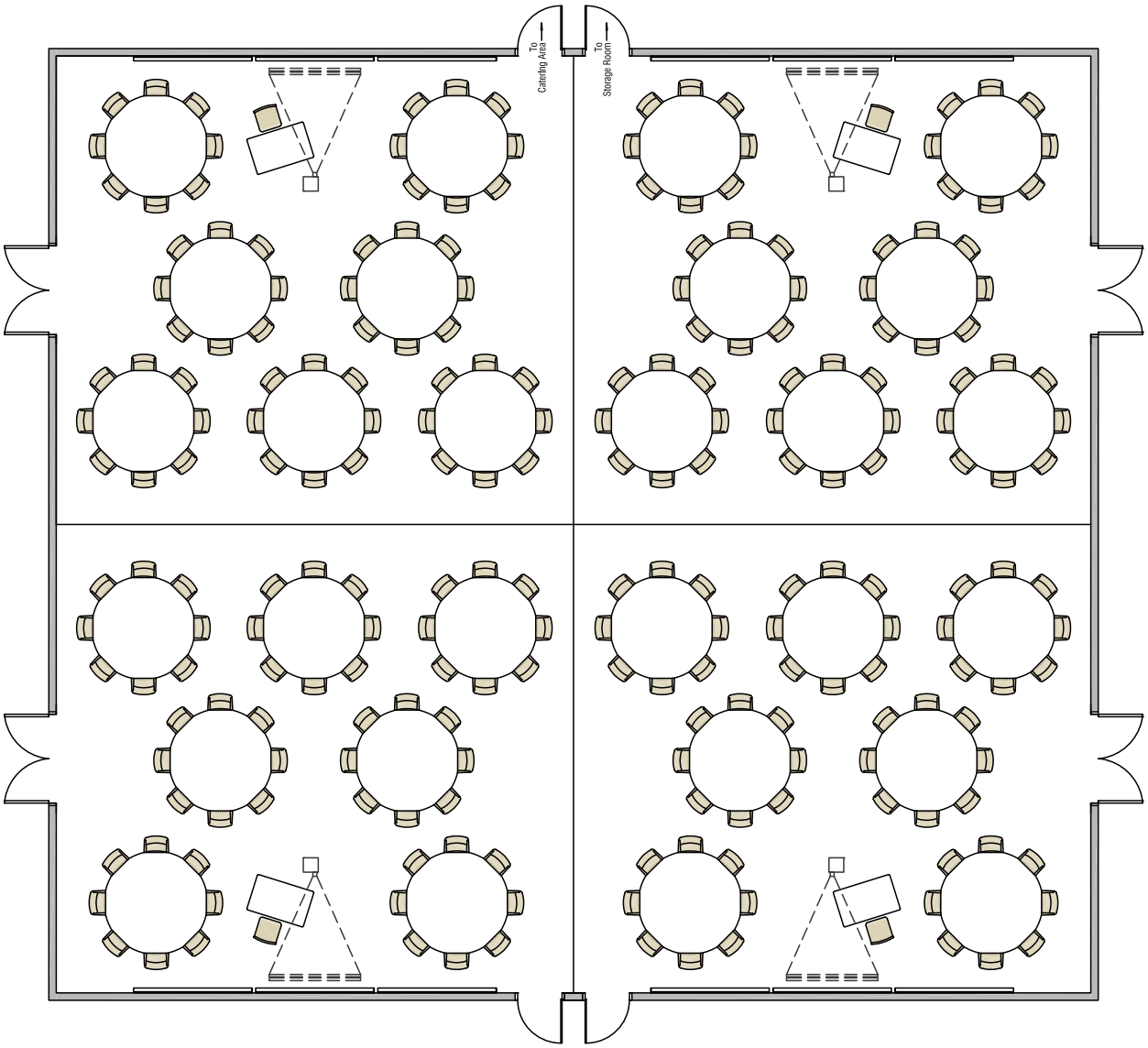
This space will provide a shared meeting room for the building occupants. Space will be utilized for formal and informal lectures, events, and functions. It shall provide the capabilities to be divided into (4) smaller spaces.

ROOM DATA

Net Square Feet (ASF)	4,400 ASF
Avg. No. of Occupants	224 Visitors + 4 Presenters
No. of Spaces by Type	1 (Total)

SAMPLE ROOM LAYOUT

The diagrams below are included as planning tools to ensure that the space will function as the users require within the assigned square feet. They are not intended to dictate the final design or configuration of the space.



FLEXIBLE MEETING ROOM - OPTION B (BS-01)

ROOM FUNCTION

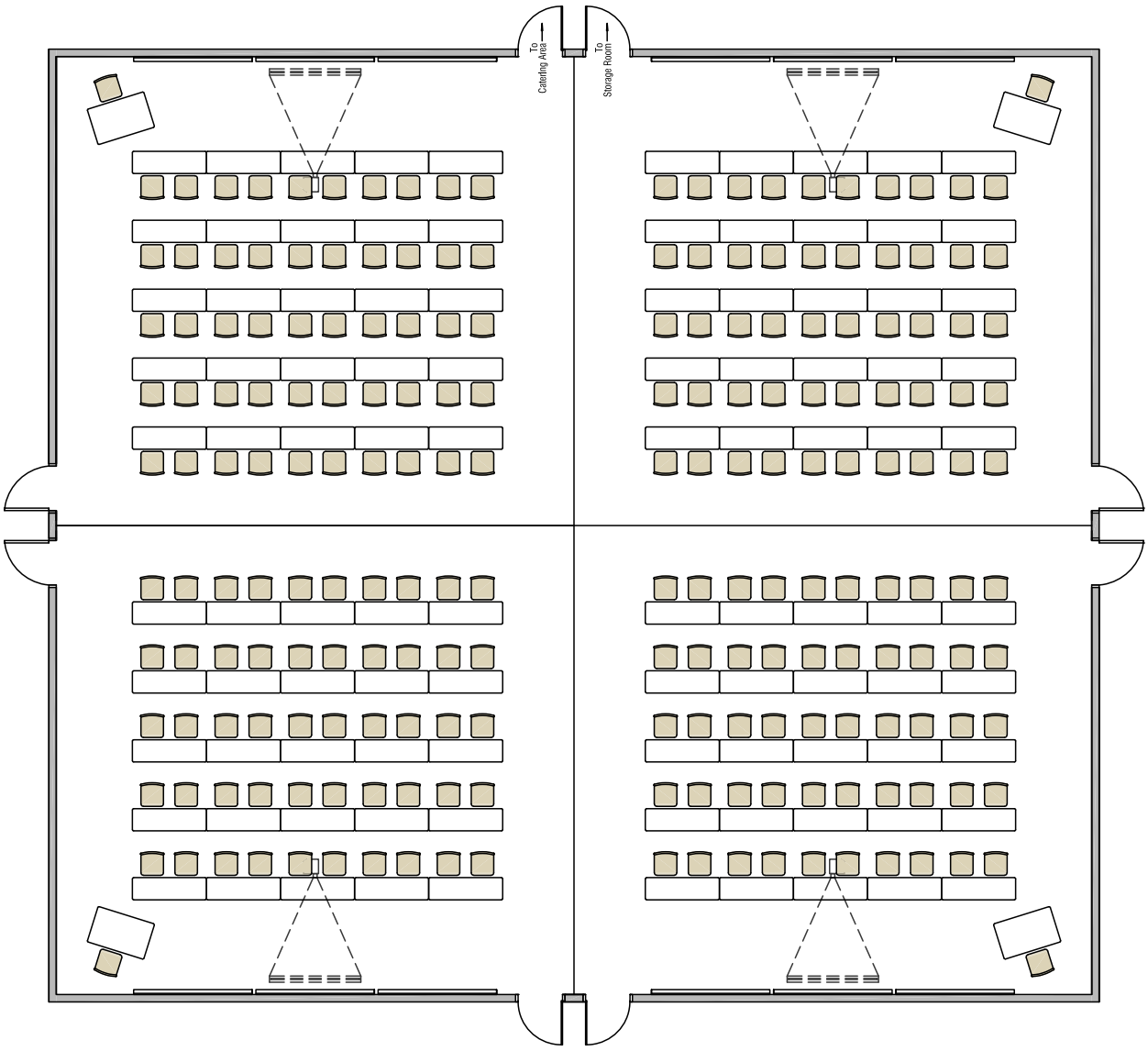
This space will provide a shared meeting room for the building occupants. Space will be utilized for formal and informal lectures, events, and functions. It shall provide the capabilities to be divided into (4) smaller spaces.

ROOM DATA

Net Square Feet (ASF)	4,400 ASF
Avg. No. of Occupants	200 Visitors + 4 Presenters
No. of Spaces by Type	1 (Total)

SAMPLE ROOM LAYOUT

The diagrams below are included as planning tools to ensure that the space will function as the users require within the assigned square feet. They are not intended to dictate the final design or configuration of the space.



FLEXIBLE MEETING ROOM - OPTION C (BS-01)

ROOM FUNCTION

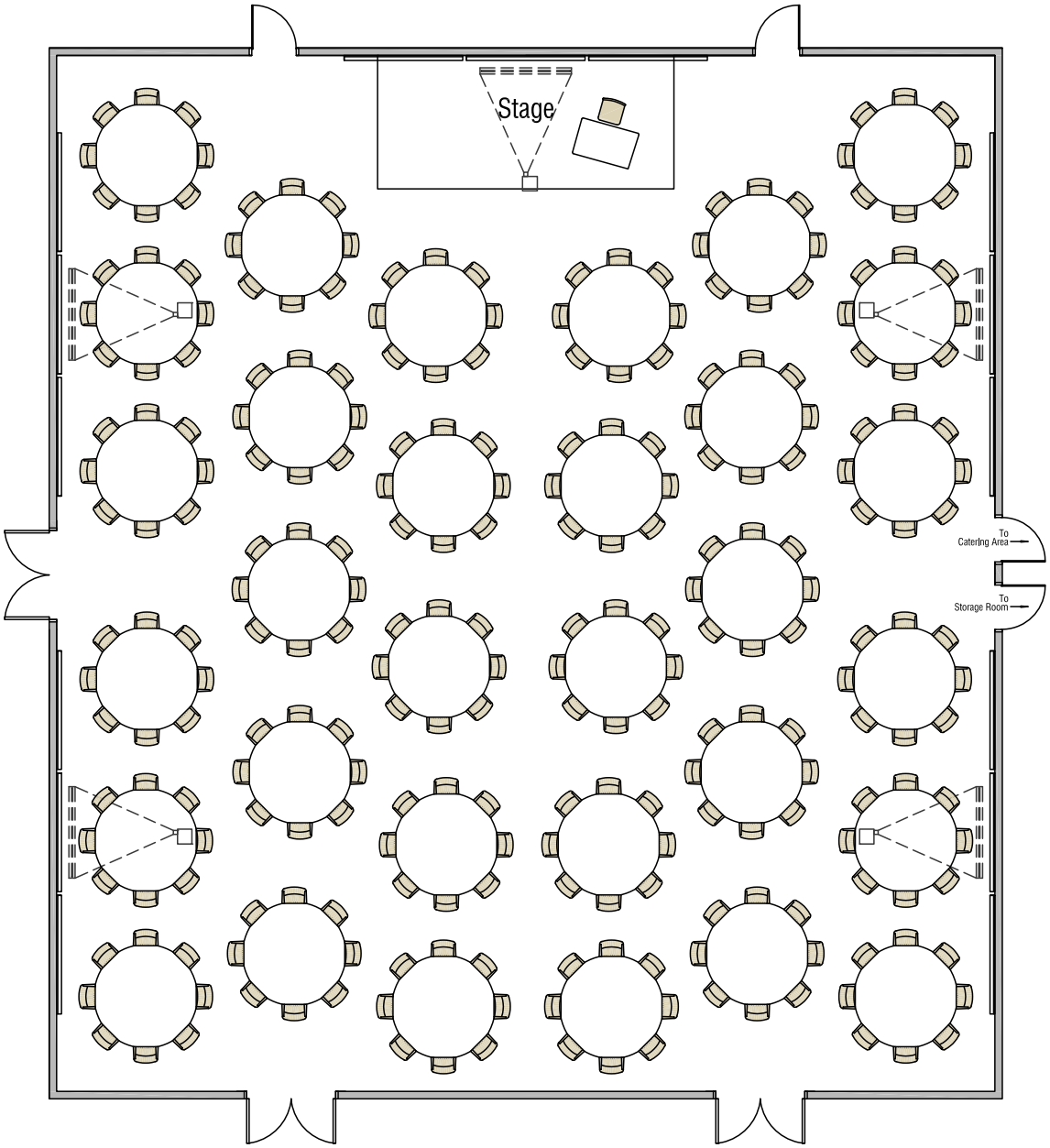
This space will provide a shared meeting room for the building occupants. Space will be utilized for formal and informal lectures, events, and functions. It shall provide the capabilities to be divided into (4) smaller spaces.

ROOM DATA

Net Square Feet (ASF)	4,400 ASF
Avg. No. of Occupants	256 Visitors + 1 Presenter
No. of Spaces by Type	1 (Total)

SAMPLE ROOM LAYOUT

The diagrams below are included as planning tools to ensure that the space will function as the users require within the assigned square feet. They are not intended to dictate the final design or configuration of the space.



FLEXIBLE MEETING ROOM (OPTION A / B / C) (BS-01)

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Painted Gypsum Wallboard and/ or Movable Partition Walls
Ceiling	Acoustical Tile System
Lighting	LED, See Notes 8, 9

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Notes 12,13
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 11
Other	See Note 10

FURNISHINGS, FIXTURES & EQUIPMENT

(4) Recessed Drop-Down Motorized Projection Screen or Large Video Monitor	CFCI
(4) Ceiling Mounted Projector (Optional)	CFCI
(4) Rolling Whiteboard Surfaces - 8 Linear Feet (Min.)	OFCI
(28) OR (32) Movable Round Tables for (8) (Opt. A/B)	OFOI
(100) Movable Tables (18" x 48") (Option B)	OFOI
(4) OR (1) Rolling Chairs (At Presenter's Area)	OFOI
(4) OR (1) Movable Podiums w/ Lockable Media Cabinets (At Presenter's Area)	CFCI
(224) / (200) / (256) Movable Chairs (Opt. A/B/C)	OFOI
Audio Visual Technology (Located Inside Cabinet)	CFCI
Presentation Stage (20' x 9') (Option C)	CFCI
Retractable Wall Partitions (As Required)	CFCI

Note: Quantity of FF&E listed above is dependent on the final layout and configuration selected by the users.

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be accessible from a main building corridor and have an exterior entry / exit.

NOTES (CONTINUED)

3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Doors to be 36" wide (min.). Provide multiple entry points on each perimeter wall.
4. Locate door(s) within space to minimize congestion and to allow space to be subdivided by (4).
5. Wall and ceiling assemblies should minimize sound transmission. Speech within space shall be intelligible without amplification. Retractable wall partitions shall be provided with sound attenuation.
6. Space shall have the capabilities to be divisible into (4) smaller, independently functional meeting rooms. Coordinate with users and provide the desired solution for retractable wall partitions.
7. View of the projection screens or video monitors, and presenter's areas shall not be obstructed by building structural elements.
8. All lighting shall have motion sensors. Provide 50 to 55 footcandle (fc) for general illumination; 20fc (min.) for note taking during projection. Accent lighting may be provided at presenter's area, if desired. Additional lighting may be required for events. Verify all space usage and lighting needs with users.
9. Lighting controls shall be located within close proximity to the entry door. Controls shall also be either located within close proximity to or controlled from the presenter's area.
10. Audio Visual technology utilized within this space shall be stored in the lockable media cabinets located at the presenter's areas or within adjacent A/V Control Room.
11. Data outlets may be required at presenter's areas. Building shall be equipped with wireless technology and infrastructure.
12. Convenience duplex power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. Additional power outlets may be required at presenter's area. When locating power and data outlets, special attention should be paid to the possible location of equipment and furniture.
13. Locate data and electrical outlets at ceiling for projection equipment. Coordinate outlets with projector and motorized projection screen locations.
14. Natural light into the space is desired. Where applicable, windows shall be provided with blinds or shades to control natural light.

FLEXIBLE MEETING ROOM STORAGE (BS-02)

ROOM FUNCTION

This space will provide an area for the storage of furniture, equipment, and supplies utilized within the Flexible Meeting Room.

ROOM DATA

Net Square Feet (ASF)	250 ASF
Avg. No. of Occupants	N/A
No. of Spaces by Type	1

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Painted Gypsum Wallboard or Partition Walls
Ceiling	Acoustical Tile System
Lighting	LED, See Note 7

MECHANICAL / PLUMBING

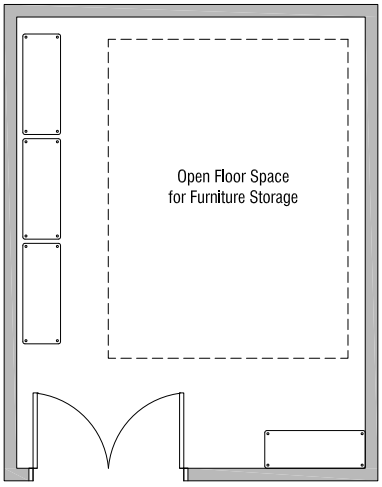
Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110V/20A/1-phase, See Note 6
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 5
Other	

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



FURNISHINGS, FIXTURES AND EQUIPMENT

Racks on Tracks (If Required)	CFCI
Open Floor Space for Furniture Storage	OFOI

Note: Design architect shall confirm type, quantity, and requirements of storage preferred by users. Install and maintain according to manufacturer's specifications.

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space shall be located directly adjacent to the Flexible Meeting Room.

NOTES (CONTINUED)

3. Do not provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Door to be 36" wide (min.). The use of double doors is recommended to allow proper and easier movement of furniture and equipment.
4. Wall material should minimize sound transmission.
5. Building shall be equipped with wireless technology and infrastructure.
6. Convenience power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power and data outlets, pay special attention to the possible location of equipment and furniture.
7. Provide 50 to 55 footcandle (fc) for general illumination. Lighting shall have motion sensors; controls shall be located within close proximity to the entry door. Natural light is not required.

CATERING AREA (BS-03)

ROOM FUNCTION

This space will provide a catering kitchen for the prepping and queuing of foods served within the Flexible Meeting Room during events.

ROOM DATA

Net Square Feet (ASF)	250 ASF
Avg. No. of Occupants	Varies
No. of Spaces by Type	1

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Painted Gypsum Wallboard or Partition Walls
Ceiling	Suspended Acoustical Ceiling
Lighting	LED, See Note 5

MECHANICAL / PLUMBING

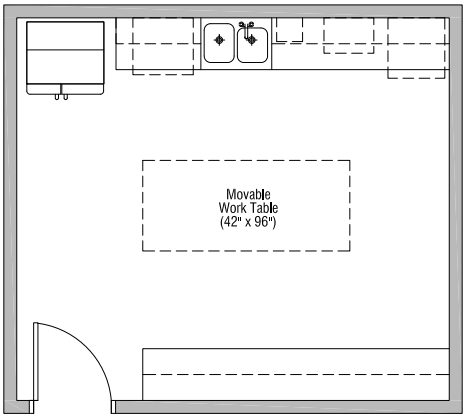
Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	X Cold Water (CW) X
Other	See Note 9

ELECTRICAL / COMMUNICATIONS

Power	110V/20A/1-phase, See Notes 7, 8
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 6
Other	See Note 10

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



FURNISHINGS, FIXTURES & EQUIPMENT

(1) Movable Work Table (42" x 96")	OFOI
(2) Walls of Built-In Counter w/ Upper and Lower Cabinets	CFCI
(1) Two-Compartment Sink	CFCI
(1) Refrigerator / Freezer w/ Ice Maker	CFCI
(1) Automatic Soap and Hand Dryer	OFCI
(1) Microwave	CFCI
(1) Dishwasher	CFCI

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be located directly adjacent to the Flexible Meeting Room or other associated spaces.
3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Door to be 36" wide (min.). Space may also be accessible from the building corridor.

NOTES (continued)

4. Wall material should minimize sound transmission.
5. All lighting shall have motion sensors. Provide 50 to 55 foot-candle (fc) for general illumination. Lighting controls shall be located within close proximity to entry door. Natural light is not required.
6. Building shall be equipped with wireless technology and infrastructure.
7. Convenience power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power outlets, special attention should be paid to the location of equipment and furniture.
8. Power outlets along the wall(s) of built-ins shall be at counter height.
9. Provide necessary plumbing and drain lines to support sink, refrigerator, and dishwasher.
10. Provide additional power outlets at location of refrigerator, microwave, and dishwasher. Verify power requirements with the manufacturer's specifications.

A/V CONTROL ROOM (BS-04)

ROOM FUNCTION

This space will provide an area for the location of equipment related to audiovisual technology. Space shall be directly accessible from the Flexible Meeting Room.

ROOM DATA

Net Square Feet (ASF)	100 ASF
Avg. No. of Occupants	N/A
No. of Spaces by Type	1

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Painted Gypsum Wallboard or Partition Walls
Ceiling	Suspended Acoustical Ceiling
Lighting	LED, See Notes 5, 6

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 8
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 7
Other	See Note 9

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.

No Test Fit has been Provided for this Space

FURNISHINGS, FIXTURES & EQUIPMENT

Consultation with an A/V consultant is highly recommended to analyze the best possible configuration for this space. Quantities and types of equipment shall be confirmed by users and the A/V consulting team.

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space shall be located adjacent to the Flexible Meeting Room and other associated spaces.

NOTES (continued)

3. Do not provide vision lite in entry door from the building corridors or adjacent spaces. Entry door to space shall be key card access. Door to be 36" wide (min.).
4. Wall material should minimize sound transmission.
5. All lighting shall have motion sensors. Provide 50 to 55 foot-candle (fc) for general illumination. Lighting controls shall be located within close proximity to entry door.
6. Natural light is not required.
7. Building shall be equipped with wireless technology and infrastructure.
8. Convenience power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power outlets, special attention should be paid to the location of equipment and furniture.
9. Verify power requirements of A/V equipment with manufacturer's specifications and A/V consultant

STUDENT STICKY SPACES (BS-05)

ROOM FUNCTION

This space will provide a space for student study, reading, and gathering. Spaces shall be provided at various locations throughout the building.

ROOM DATA

Net Square Feet (ASF)	75 ASF
Avg. No. of Occupants	2 (Option A) OR 4 (Option B)
No. of Spaces by Type	10

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	See Note 3
Base	Rubber
Walls	Partition Walls
Ceiling	Acoustical Tile System
Lighting	LED

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 6
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 5
Other	See Note 7

FURNISHINGS, FIXTURES AND EQUIPMENT

(1) Movable Table for (2) or (4)	OFOI
(2) OR (4) Movable Chairs	OFOI
Movable or Fixed Whiteboard Surface - 4 Linear Feet (min.)	OFCI

Note: Quantity of FF&E listed above is dependent on the final layout and configuration selected by the users.

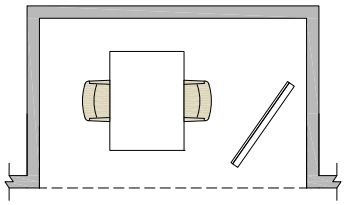
NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space shall be located off the main corridor directly accessible from building circulation.
3. Flooring and wall finishes of this space shall be coordinated to match those utilized for the adjacent circulation space.

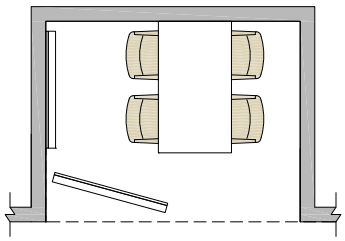
SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.

Option A



Option B



NOTES (CONTINUED)

4. Space shall be open to the circulation area and will not require a door. However, if door is preferred, glass partition walls shall be utilized along entry wall for visual access from the building corridors. Door to be 36" wide (min.).
5. Wall material should minimize sound transmission.
6. Building shall be equipped with wireless technology and infrastructure.
7. Convenience power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power and data outlets, pay special attention to the possible location of equipment and furniture.
8. Movable furniture shall be provided to maximize flexibility and adaptability. Consider the use of power and data integrated tables.
9. Provide 50 to 55 footcandle (fc) for general illumination. Lighting shall have motion sensors. Controls shall be located in conjunction with corridor lighting. Natural light is preferred. Where applicable, windows shall be provided with blinds or shades to control natural light.

PRIVATE MEETING / CONSULTATION SPACES (BS-06)

ROOM FUNCTION

This space will provide a dedicated space for meetings, interviews, and discussions between building users.

ROOM DATA

Net Square Feet (ASF)	100 ASF
Avg. No. of Occupants	4 (max.)
No. of Spaces by Type	4

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Partition Walls
Ceiling	Acoustical Tile System
Lighting	LED

MECHANICAL / PLUMBING

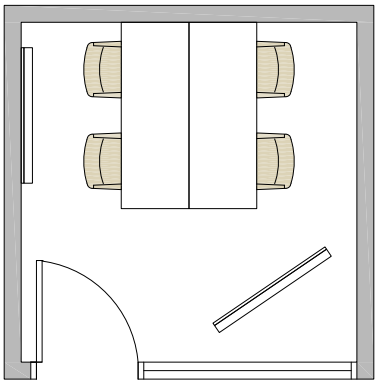
Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 6
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 5
Other	See Note 7

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



FURNISHINGS, FIXTURES AND EQUIPMENT

(2) Movable Tables (24" x 60")	OFOI
(4) Movable Chairs	OFOI
Movable or Fixed Whiteboard Surfaces - 8 Linear Feet (min.)	OFCI

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space shall be centrally located in close proximity to other meeting spaces and directly adjacent to a main building corridor for ease of access.

NOTES (CONTINUED)

3. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door shall not lock. Door to be 36" wide (min.).
4. Wall material should minimize sound transmission.
5. Building shall be equipped with wireless technology and infrastructure.
6. Convenience power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power and data outlets, pay special attention to the possible location of equipment and furniture.
7. Movable furniture shall be provided to maximize flexibility and adaptability. Consider the use of power integrated tables.
8. Provide 50 to 55 footcandle (fc) for general illumination. Lighting shall have motion sensors; controls shall be located within close proximity to the entry door. Natural light is preferred. Where applicable, windows shall be provided with blinds or shades to control natural light.

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FACULTY BREAKROOM (BS-07)

ROOM FUNCTION

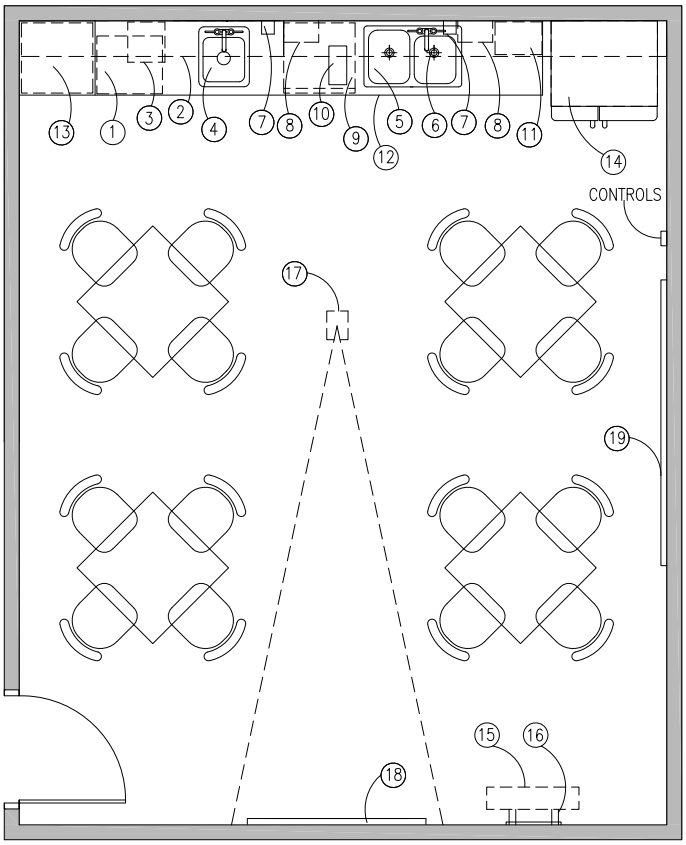
This space will be provide a faculty lounge for the faculty and staff who utilize the building. Space shall be located directly accessible from a main building corridor.

ROOM DATA

Net Square Feet (ASF)	400 ASF
Avg. No. of Occupants	16 to 20
No. of Spaces by Type	1

SAMPLE ROOM LAYOUT

The diagrams are included as planning tools to ensure that the space will function as the users require within the assigned square feet. They are not intended to dictate the final design or configuration of the space.



FACULTY BREAKROOM (BS-07)

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Painted Gypsum Wallboard / Partition Walls
Ceiling	Acoustical Tile System
Lighting	LED, See Notes 5, 6

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	X Cold Water (CW) X
Other	See Note 7

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Notes 9, 11
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 8
Other	See Notes 10, 12

FURNISHINGS, FIXTURES & EQUIPMENT

(1) Microwave (Undercounter Optional) - #1	CFCI
(1) Wall Cabinets - #2	CFCI
(1) Coffee Maker (Mounted Under Cabinet) - #3	CFCI
(1) ADA Compliant One-Compartment Sink - #4	CFCI
(1) Two-Compartment Sink - #5	CFCI
(1) Garbage Disposal - #6	CFCI
(2) Soap Dispensers- #7	OFCI
(2) Paper Towel Dispensers - #8	OFCI
(1) Dishwasher - #9	CFCI
(1) Toaster - #10	OFOI
(1) Countertop Toaster Oven (Optional) - #11	OFOI
(1) Base / Floor Cabinets - #12	CFCI
(1) Undercounter Refrigerator (Optional ADA) - #13	CFCI
(1) Refrigerator / Freezer w/ Water / Ice Dispenser - #14	CFCI
(1) 26" Flat Screen TV / DVD - #15	OFCI
(1) TV Wall Mount - #16	CFCI
(1) Ceiling Mounted Projector - #17	CFCI
(1) Smart Board (Team Board) - #18	CFCI
(1) Tackable Surface (8 Linear Feet) - #19	CFCI
Movable Tables and Chairs for (16)	OFOI

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Provide vision lite in entry door for visual access from the building corridors or adjacent spaces. Entry door to space shall be key card access. Doors to be 42" wide (min.). Locate doors within space to minimize congestion.
3. Wall and ceiling assemblies should minimize sound transmission. Speech within space shall be intelligible without amplification.
4. All lighting shall have motion sensors. Provide 50 to 55 foot-candle (fc) for general illumination. Lighting controls shall be located within close proximity to entry door.
5. Lighting controls shall be located within close proximity to the entry door. Lighting shall have motion sensors; controls shall be located within close proximity to the entry door. Natural light is preferred. Where applicable, windows shall be provided with blinds or shades to control natural light.
6. Provide plumbing and drain lines to support the use of two sinks, refrigerator, dishwasher, and ice maker within the space.
7. Provide (1) 2-port data outlet (min.) along perimeter walls at regular intervals. Building shall be equipped with wireless technology and infrastructure.
8. Convenience duplex power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power and data outlets, special attention should be paid to the possible location of equipment and furniture.
9. Power and data outlets along the wall of built-ins shall be GFCI and located at counter height.
10. Additional power should be provided at location of refrigerator, microwaves, dishwasher, and other kitchen appliances. Verify power requirements with manufacturer's specifications.
11. Provide power and data at wall to support the use of the wall mounted TV / DVD.

STUDENT BREAKROOM (BS-08)

ROOM FUNCTION

This space will provide a shared breakroom for students utilizing the building.

ROOM DATA

Net Square Feet (ASF)	200 ASF
Avg. No. of Occupants	8 to 10
No. of Spaces by Type	1

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Partition Walls and Glass
Ceiling	Suspended Acoustical Ceiling
Lighting	LED, See Notes 5, 6

MECHANICAL / PLUMBING

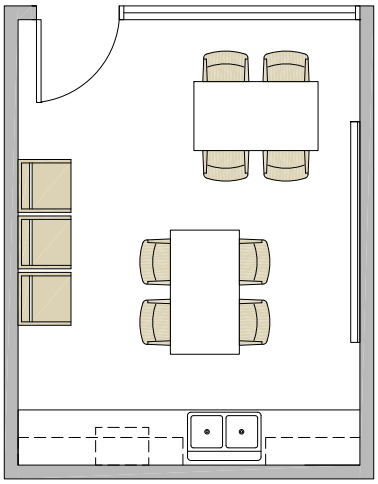
Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	X Cold Water (CW) X
Other	See Note 9

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 7, 8
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 6
Other	See Note 10

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



FURNISHINGS, FIXTURES & EQUIPMENT

(2) Movable Tables for (4)	OFOI
(1) Wall of Built-In Counter w/ Upper and Lower Cabinets	CFCI
(1) Two-Compartment Sink	CFCI
(1) Automatic Soap and Paper Towel Dispenser	OFCI
(1) Microwave	CFCI
(8) Movable Chairs	OFOI
(3) Lounge Chairs	OFOI
Whiteboard Surface - 8 Linear Feet (min.)	CFCI

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be located directly off of a main building corridor.
3. Provide vision lite in entry door and windos or glass partition to corridor for visual access. Entry door to space shall not lock. Opening to be 36" wide (min.).

NOTES (continued)

4. Wall material should minimize sound transmission and provide a visual connection to the building corridor.
5. All lighting shall have motion sensors. Provide 50 to 55 footcandle (fc) for general illumination. Lighting controls shall be located within close proximity to entryway.
6. Provide (2) 2-port data outlets (min.) on perimeter walls. Building shall be equipped with wireless technology and infrastructure.
7. Convenience power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power outlets, special attention should be paid to the location of equipment and furniture.
8. Power and data outlets along the wall(s) of built-ins shall be at counter height.
9. Provide necessary plumbing and drain lines to support sink.
10. Provide additional power outlet at location of microwave. Verify power requirements with the manufacturer's specifications.

LACTATION ROOM (BS-09)

ROOM FUNCTION

This space will provide a room for nursing infants. It shall be located adjacent to a building corridor. Room shall create a comfortable and private atmosphere.

ROOM DATA

Net Square Feet (ASF)	120 ASF
Avg. No. of Occupants	1 Person
No. of Spaces by Type	1

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Partition Walls
Ceiling	Acoustical Tile System
Lighting	LED, Note 6, 7

MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH		
Air Changes/Hour	min. per Code		
Hot Water (HW)	X	Cold Water (CW)	X
Other	See Note 9		

ELECTRICAL / COMMUNICATIONS

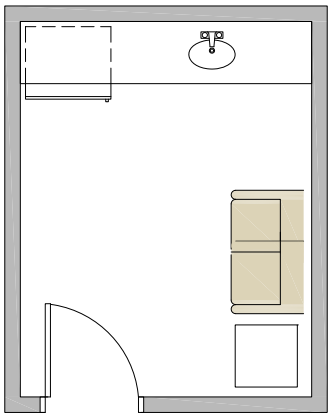
Power	110v/20A/1-phase, See Note 4, 7		
	See Note 8		
Dedicated Circuits		Stand-by Power	
Data	Wireless Technology, See Note 5		

FURNISHINGS, FIXTURES AND EQUIPMENT

(2) Comfortable Lounge Chairs OR (1) Sofa	OFOI
(1) Movable End / Side Table	OFOI
(1) Wall Built-In Counter	CFCI
(1) Single Compartment Sink	CFCI
(1) Automatic Soap and Paper Towel Dispenser	OFCI
(1) Undercounter Refrigerator	CFCI
(1) Countertop Diaper Changing Station	CFCI

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Door shall not have vision lite. Provide an indicator light outside door in hallway to indicate when room is in use. Door shall not have key lock.
3. Wall material should minimize sound transmission from this space to adjacent spaces.
4. Convenience duplex power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code.
5. Provide (2) 2-port data outlets (min.) on perimeter walls at regular intervals. Building shall be equipped with wireless technology and infrastructure.
6. Provide additional power at counter height and at location of refrigerator.
7. Lighting controls shall be located within close proximity to the main entry door. Lighting shall have motion sensors.
8. Windows/natural light is not preferred.
9. Provide necessary plumbing and drain lines to support sink.

FAMILY / UNISEX RESTROOM (BS-10)

ROOM FUNCTION

This space provides a restroom for shared use with building occupants. Space shall be directly accessible from a main building corridor.

ROOM DATA

Net Square Feet (ASF)	60 ASF
Avg. No. of Occupants	1 Person
No. of Spaces by Type	2

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Epoxy Flooring or Ceramic Tile
Base	Ceramic Tile
Walls	Epoxy Coated GWB / CMU; Ceramic Wainscot at Wet Walls
Ceiling	Suspended Acoustical Ceiling
Lighting	LED

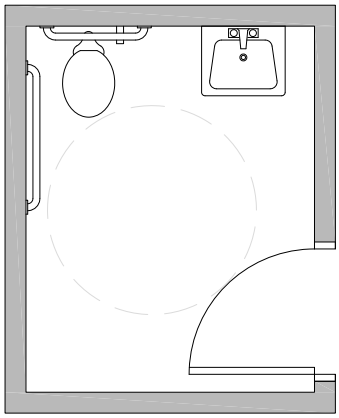
MECHANICAL / PLUMBING

Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	min. per Code
Hot Water (HW)	X Cold Water (CW) X
Other	Floor Drain, See Note 8 and 9

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 1
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note 10

SAMPLE ROOM LAYOUT



FURNISHINGS, FIXTURES AND EQUIPMENT

(1) Floor Mounted ADA Toilet	CFCI
(1) Sink w/ Solid Surface Counter Top	CFCI
Grab Bars (Per TAS; as Required)	CFCI
(1) Vanity Mirror (Per TAS; at Sink Location)	CFCI
(1) Wall Mounted Soap Dispenser	OFCI
(1) Wall Mounted Toilet Paper Dispenser (Per TAS)	OFCI
(1) Wall Mounted Hand Dryer	OFCI

NOTES

1. Provide convenience GFCI duplex outlets along perimeter.
2. Provide sound attenuation in walls.
3. Door leading into the restroom shall be 36" and ADA accessible.
4. Provide full height wet walls (tile).
5. All plumbing fixtures to be low water use fixtures.
6. Restroom should meet ADA and TAS standards.
7. Provide passive switch and energy conservation controls.
8. Provide plumbing and drains lines to support the use of hot and cold water at sink. Sink fixtures should be temperature adjustable.
9. Install a floor drain at the center of the space. Floor drains shall provide capability to capture water and waste particles. Flooring should provide a slight slope to control excess surface water and moisture. Drains shall be connected to the main sewer lines for the building.
10. Building shall be equipped with wireless technology and infrastructure.

LOADING DOCK / DELIVERY BAY (BS-11)

ROOM FUNCTION

This space will provide a loading, delivery and service area for the building.

ROOM DATA

Net Square Feet (ASF)	500 ASF
Avg. No. of Occupants	N/A
No. of Spaces by Type	1

TECHNICAL REQUIREMENTS

ARCHITECTURAL

Floor	Polished Concrete
Base	Rubber
Walls	Masonry
Ceiling	Exposed Structure
Lighting	LED, See Note 5

MECHANICAL / PLUMBING

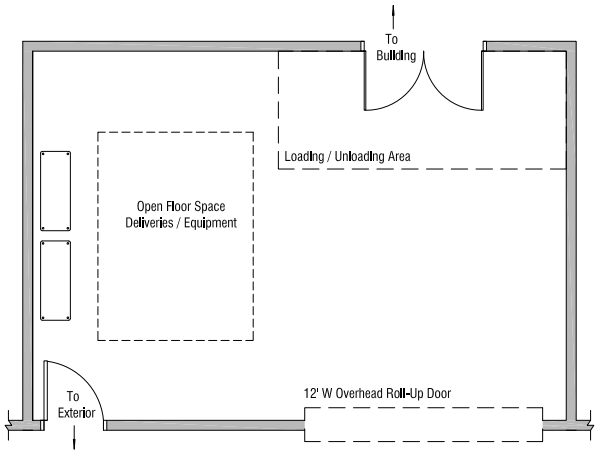
Temperature/Humidity	Variable 68°F to 75°F @ 50%RH
Air Changes/Hour	
Hot Water (HW)	Cold Water (CW)
Other	

ELECTRICAL / COMMUNICATIONS

Power	110v/20A/1-phase, See Note 6
Dedicated Circuits	Stand-by Power
Data	Wireless Technology, See Note
Other	See Note

SAMPLE ROOM LAYOUT

This diagram is included as a planning tool to ensure that the space will function as the users require within the assigned square feet. It is not intended to dictate the final design or configuration of the space.



FURNISHINGS, FIXTURES & EQUIPMENT

(1) Automatic Overhead Roll-Up Door (12' W)	CFCI
Adjustable Metal Shelving Units (As Necessary)	OFOI
Open Floor Space for Deliveries and Equipment	

Note: Design architect shall confirm type, quantity, and requirements of storage preferred by users. Install and maintain according to manufacturer's specifications.

NOTES

1. Reference the General Requirements described earlier in this chapter for information regarding additional design requirements of this space which may not be listed here.
2. Space should be accessible from the building exterior and a main building corridor. Corridor entry/exit point shall be adjacent to freight elevator.

NOTES (continued)

3. Provide vision lite in entry door for visual access from the building corridor or adjacent spaces. Entry door to space shall be key card access. Doors to be 72" wide (min.).
4. All lighting shall have motion sensors. Provide 50 to 55 foot-candle (fc) for general illumination. Lighting controls shall be located within close proximity to entry door.
5. Natural light is not required.
6. Convenience power outlets shall be provided along the perimeter walls at regular intervals, in accordance with Code. When locating power outlets, special attention should be paid to the location of equipment and furniture.
7. Building shall be equipped with wireless technology and infrastructure.
8. Coordinate necessary power connections to support overhead door.

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Site Studies

5

Site Studies

The following is a brief analysis of the property which has been identified as the recommended site for the New STEM Education Building on the Northeast Lakeview College (NLC) campus. Among the topics discussed are:

- Project Location
- Adjacent Land Use
- Public Services
  - Police Department, Fire Station, Hospital, and Post Office
  - Educational Facilities
- Traffic Impact
- Site Improvements
- Greenspace / Landscaped Areas
- Land Impact
- Utilities Infrastructure
- Preliminary Site Master Plan Concept

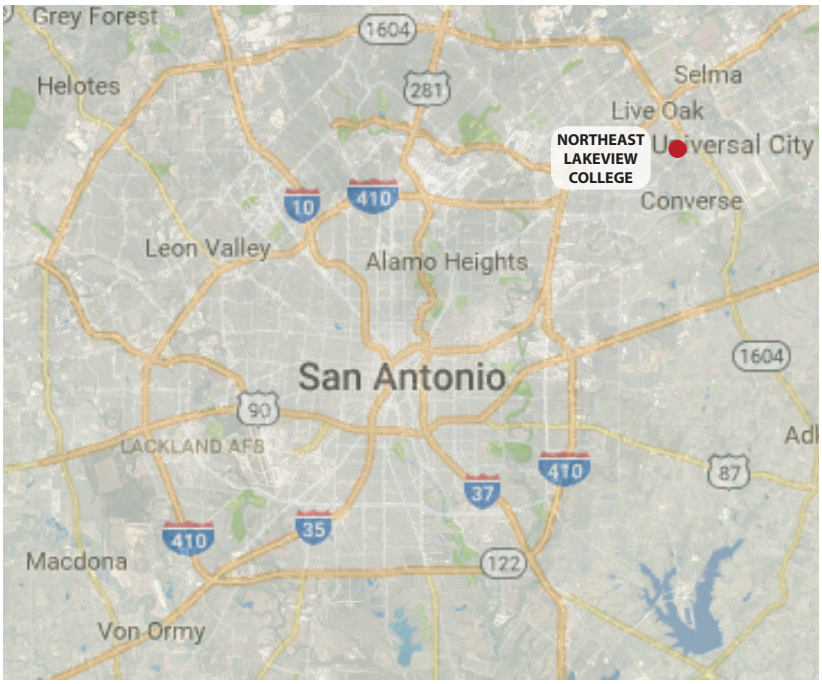

Figure 1 - Project Location within Bexar County.

Project Location

The proposed project is located on the Northeast Lakeview College (NLC) campus, along the northwestern edge, directly west of Academic I, north of the Observatory, and south of the Judson Early College Academy. The site is currently undeveloped. The construction of the proposed facility will require development of the site and its surroundings, including the development of campus pedestrian circulation, public vehicular circulation and access, as well as service and delivery access for the proposed building. New circulation patterns should be developed as an expansion of the current network, and shall be continuous to promote seamless flow of traffic. The development of the site should carefully consider its surroundings, so that minimum damage, impact and modifications are caused to the vegetation and natural features on the site.

The image below indicates the proposed site of the New STEM Education Building within the NLC campus.

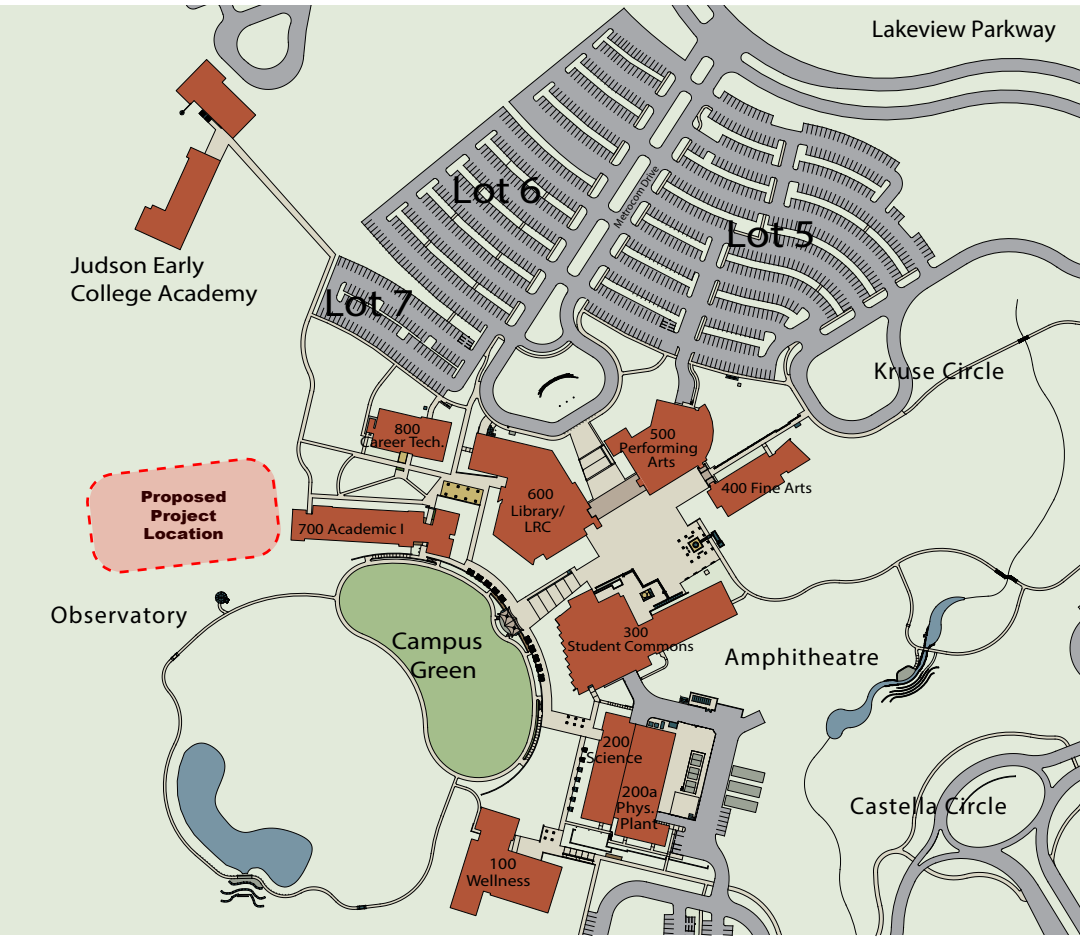

Figure 2 - Map of the Northeast Lakeview College campus highlighting the proposed location of the New STEM Education Building.

Adjacent Land Use

The areas surrounding the Northeast Lakeview College (NLC) campus are identified on the zoning map on the following page. The campus is located outside the San Antonio city limits, within the City of Live Oak. The site of the proposed project is classified as B-3, Business District.

The areas surrounding the campus are identified by the city zones described below:

North

The entire northern boundary of the NLC campus is bounded by Highway 1604, which mostly consists of residential housing, both single-family and multi-family. This area belongs to Universal City, and is outside the Live Oak city limits. The Universal City zoning map indicates retail and commercial services are dominant along Pat Booker Road. Adjacent surrounding areas are low to medium density residential lots. The Coronado Village Elementary School, located just north of Highway 1604, serves families in this area.

South

The southern edge of campus is bordered by Kitty Hawk Drive. This area is also part of Universal City and contains some commercial uses, as well as residential. The residential areas are considered medium density and are served by the Kitty Hawk Middle School located on Kitty Hawk Drive, just south of the NLC campus. A portion of the land south of the campus is dedicated to public green / open space.

East

The intersection of Highway 1604 and Kitty Hawk Drive create the eastern boundary of the campus parcel. These properties belong to Universal City and consist mostly of commercial, residential, and open space uses. Commercial land use is dominant along Highway 1604 and at the intersection of Kitty Hawk Drive. A great amount of open undeveloped land is also present within this area. Residential housing is located away from major vehicular traffic surrounding the area.

West

The western portion of the NLC campus is within the City of Live Oak city limits. A large portion of this land consists of residential single family housing, with the exception of parcels located along Pat Booker Road and Interstate 35. Other zoning classifications within this area include business and open area uses. Live Oak's Main City Park is located directly west of the campus.

Zoning Map

The map below indicates the zoning classifications for the City of Live Oak.
The proposed site for the STEM Education Building is indicated below.

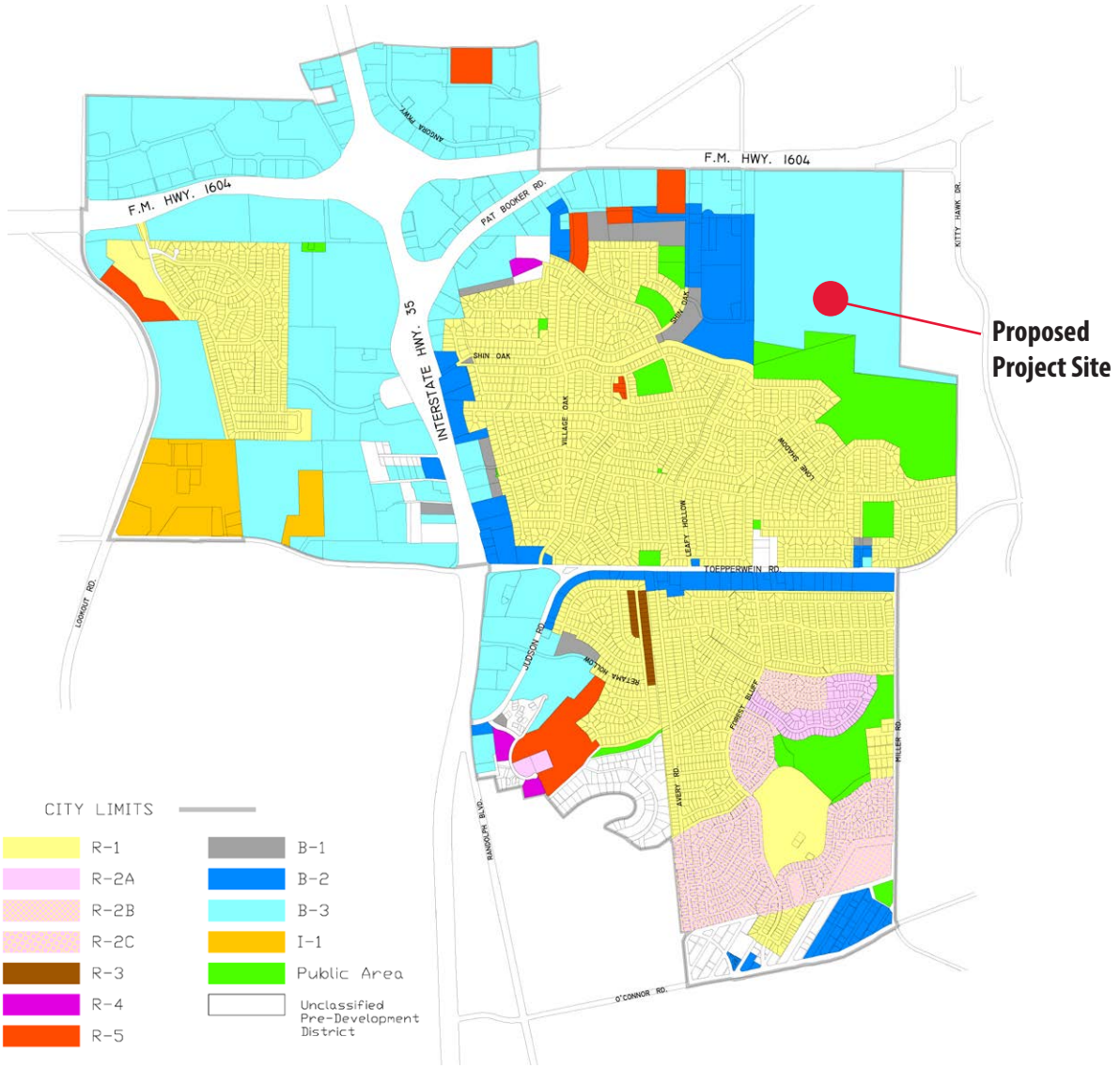

Figure 3 - Zoning Map from the Planning and Zoning Commission for the City of Live Oak.

Public Services

Police Departments, Fire Stations, Hospital, and Post Office

City Police Department

The Live Oak Police Department is located at 8022 Shin Oak Drive and will be the nearest city police station to the property. This police station is approximately one mile north of the campus. The current campus police substation is located within the Physical Plant Building. The Student Commons Building is conveniently located south of the proposed project site, adjacent to the Science Building.

Fire Station

The Live Oak Fire Department is the fire station closest to the campus and would serve as the first responders to emergencies at this location. It is approximately one mile away from the campus, at 8001 Shin Oak Drive, directly north of the Police Department.

Hospital

The Northeast Methodist Hospital at 12412 Judson Road, is the nearest hospital at approximately 2.5 miles from the property.

Post Office

The US Post Office has a location at 11119 Landmark 35 Drive. The post office is approximately 4 miles from the campus. Northeast Lakeview College has a UPS Store on campus, inside the Student Commons Building.

Educational Facilities

Northeast Lakeview College is located within the Judson Independent School District. The closest schools and library are listed below:

High School

Judson Early College Academy, 8230 Palisades Drive, is approximately half a mile north of the proposed project site. The Early College is located on an adjacent property, with shared vehicular access and circulation with NLC.

Library

The Universal City Library, located at 100 Northview Drive, is the nearest library from the campus. The NLC campus library is located in the Library/ Learning Resources Center.

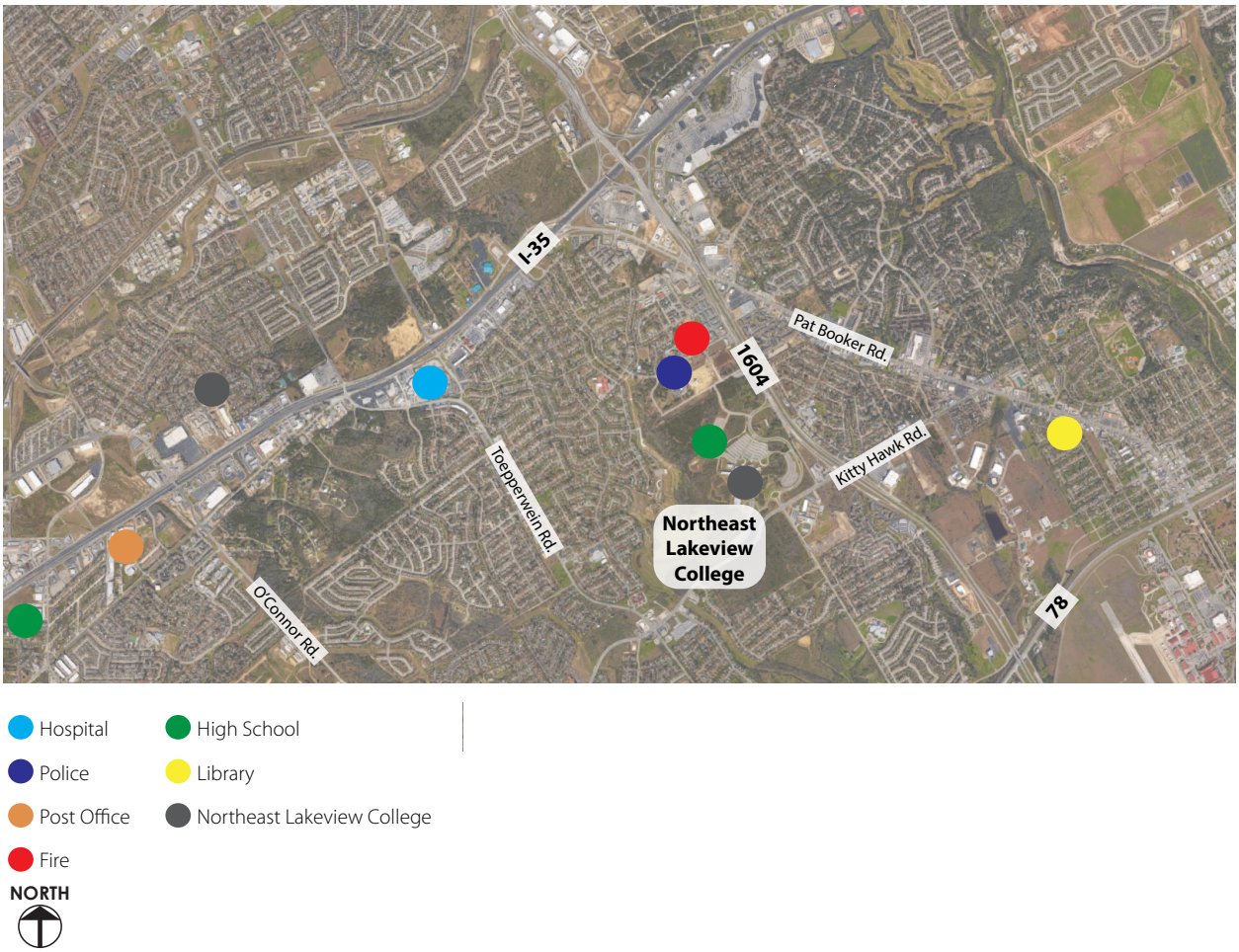

Figure 4 - Map indicating location of city services and high schools near Northeast Lakeview College.

Traffic Impact

Access/Egress

Most of the Northeast Lakeview College (NLC) campus buildings are arranged around the Campus Green, one of the campus' main vegetative areas. The proposed building is planned to be located directly west of the existing Academic I and in close proximity to the Campus Green and the vegetative pedestrian walkway.

The proposed project will require development and modifications of the surrounding site, including the extension of the existing pedestrian path currently serving Academic I. The future pedestrian path and access into the new building should provide continuous and uninterrupted flow of pedestrian traffic to and from the proposed facility.

The existing campus vehicular circulation does not provide access to the proposed building site. Modifications to the current vehicular network should be considered to allow general vehicular access, service and delivery access, and emergency vehicle access to the building.

Parking

The proposed project does not include the development of new parking facilities. However, Lots 6 and 7 are located within walking distance from the proposed building location. The current surface parking provided on campus should account for the added demand the new building will create.

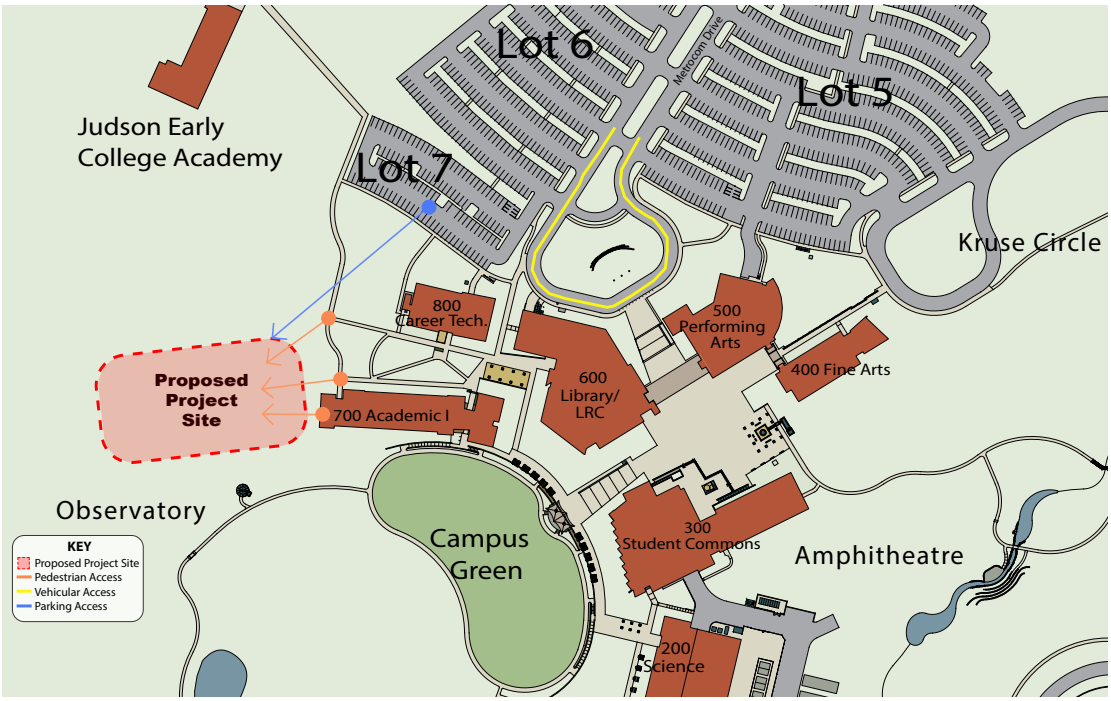

Figure 5 - Map indicating egress, access, and parking locations near the proposed building site.

Public Transportation

The public bus service routes located near the project site are provided by Via Metropolitan Transit Route No. 21. The nearest bus stop is located west of the campus, at the intersection of Toepperwein Road and Kitty Hawk Road. The bus stop is approximately 1.5 miles away from the campus. The map below indicates the current Via Metropolitan Transit Route No. 21 map servicing the surrounding areas of the New STEM Education Building.

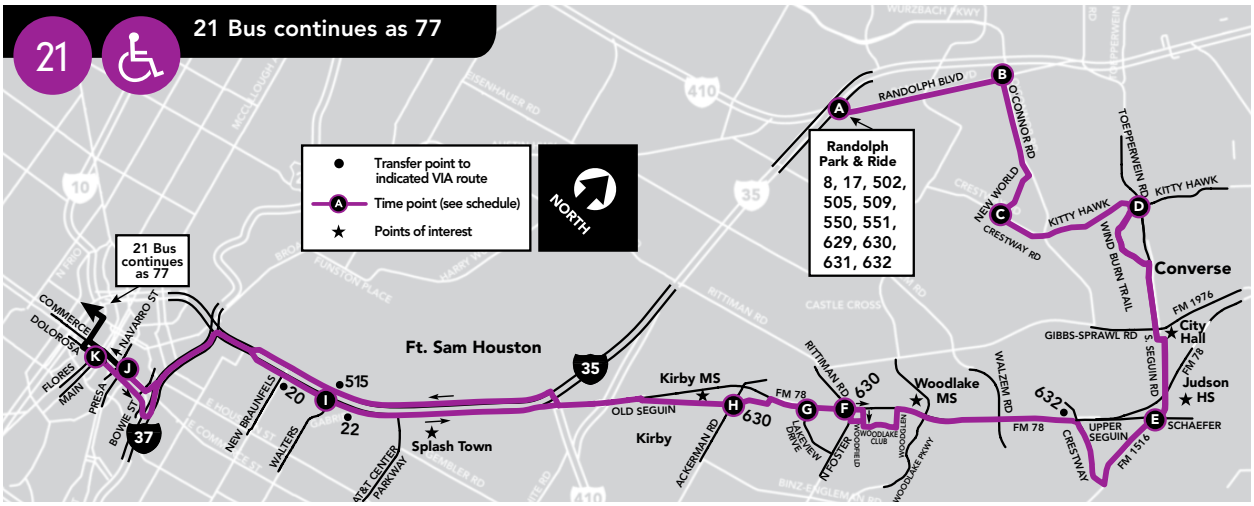

Figure 6 - Via Metropolitan Transit Route No. 21.

Site Improvements

The design of the New STEM Education Building will require extensive site modifications and improvements to allow for an efficient circulation to and from the facility. The surrounding site should be adequately designed to provide capacity for large volumes of pedestrian traffic year round.

Currently, the area west of Academic I are pristine and undeveloped. New vehicular and pedestrian traffic patterns will need to be developed during the design of the building and site to facilitate circulation for students, faculty, staff, and visitors.

Greenspace / Landscaped Areas

Landscaped areas shall be integrated to enhance the overall building and site appearance. Exterior areas adjacent to the building should be further developed and considered an extension of the interior space to be utilized as student space. Minimal disturbance to the existing natural site features is encouraged. Removal of trees and other native plants should be minimized. To the extent possible, the existing pedestrian walkway around the Campus Green should remain in its existing condition.

The image below indicates the vegetated areas which surround the proposed project site.

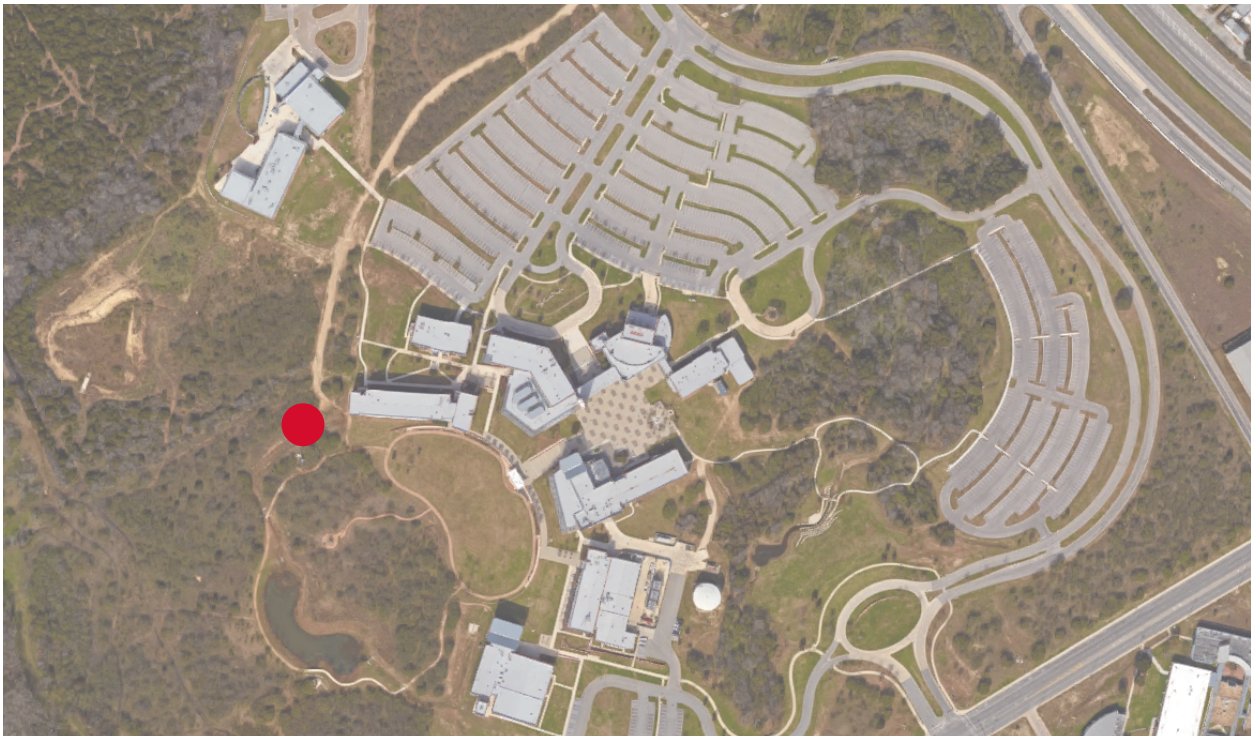

Figure 7 - Aerial map of the NLC campus and its surrounding vegetation.

Land Impact

Landscape Ordinance and Tree Preservation

Development, modifications, and improvements made to the proposed project site and its surroundings should disturb the existing natural features as minimally as possible. The landscape around the STEM Education Building should follow the guidelines prescribed by Alamo Colleges in Volume IV: Architectural Standards from 2005.

Topography

A topographic survey was not conducted as part of this report. The proposed site is currently undeveloped. A USGS map of the City of San Antonio indicates the proposed property is situated at an approximate elevation of 850 feet to 840 feet above mean sea level. The diagram below shows the existing topography based on the available USGS map. The red dot indicates the site of the proposed STEM Education Building within the Northeast Lakeview College campus.

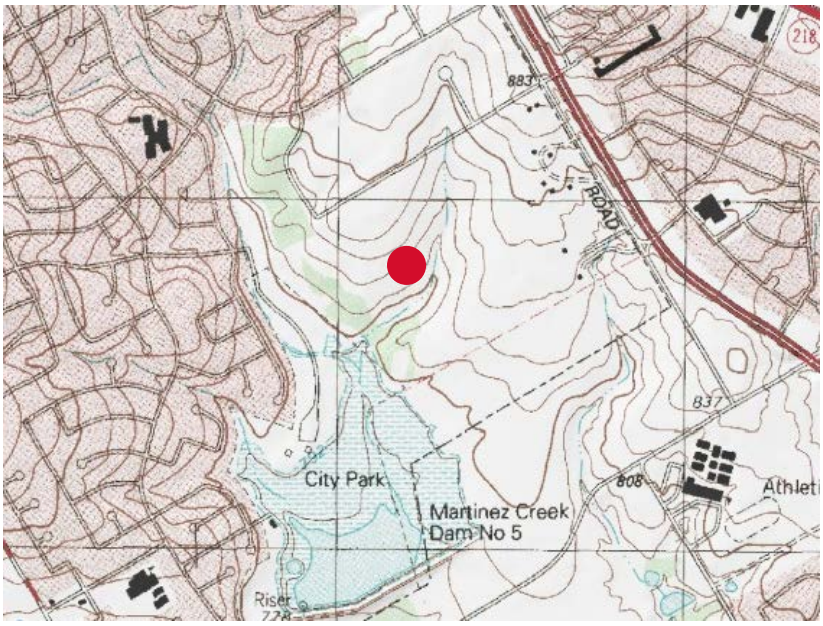

Figure 8 - Topographic map of NLC and its surroundings.

Utilities Infrastructure

The proposed site is currently undeveloped with no utility services. Water, sewer, electricity, storm water, and gas are available on the adjacent areas east of the project location. The development of utility networks will be required prior to the construction of the facility. A detailed utility study will be required during the design process of the project by engineering consultants to confirm the required and services and their locations.

Preliminary Site Master Plan Concept

The diagram below is the initial site planning concept for the Northeast Lakeview College Master Plan prepared by Ford, Powell, & Carson Architects. The Master Plan was issued to the District in April 2013. This layout is purely conceptual and for informational purposes only and may not represent the final site design or layout. The proposed project is identified on this concept diagram as Building A.

Figure 9 - Northeast Lakeview College campus Master Plan provided by Ford, Powell & Carson (2013).

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Introduction

This chapter is an analysis of the gain and/or loss of square footage, capacity, and staffing that will occur with the construction of the new STEM Education Building on the Northeast Lakeview College campus. The space list below and on the following page details the current space allocated to the Science Department within the existing Science Building. The second space list indicates the space allocations within the new STEM Education Center. The square footages are based on Alamo College District Standards and staff / users' requests.

Detailed Space Analysis - Existing Spaces

Alamo Colleges - Northeast Lakeview College Science Building Existing Space List	Existing Spaces No. and Size of Space(s)	ASF
First Floor		
Teaching Spaces		
General Classroom (Room #108)	1 @ 814 asf	814
General Classroom (Room #110)	1 @ 785 asf	785
General Classroom (Room #107)	1 @ 795 asf	795
General Classroom (Room #109)	1 @ 779 asf	779
Open Study and Tutoring Center (Room #112)	1 @ 1,563 asf	1,563
Physics / Astronomy Classroom (Room #111)	1 @ 784 asf	784
Teaching Spaces		5,520
Office Suite		
Reception (Room #113C)	1 @ 65 asf	65
Conference Room (Room #113B)	1 @ 212 asf	212
Office (Room #113C)	1 @ 97 asf	97
Office (Room #113D)	1 @ 97 asf	97
Office (Room #113E)	1 @ 97 asf	97
Office (Room #113F)	1 @ 101 asf	101
Faculty Workroom (Room #113G)	1 @ 265 asf	265
Adjunct Shared Office (Room #113H)	1 @ 255 asf	255
Storage Closet (Room #113I)	1 @ 46 asf	46
Shared Office (Room #113J)	1 @ 150 asf	150
Office (Room #113L)	1 @ 93 asf	93
Office (Room #113M)	1 @ 94 asf	94
Office (Room #113N)	1 @ 97 asf	97
Office (Room #113O)	1 @ 97 asf	97
Office (Room #113P)	1 @ 154 asf	154
Office (Room #113Q)	1 @ 106 asf	106
Office (Room #113R)	1 @ 108 asf	108
Office (Room #113S)	1 @ 114 asf	114
Office Suite		2,248
Total First Floor ASF		**7,768**

Detailed Space Analysis - Existing Spaces (Continued)

Alamo Colleges - Northeast Lakeview College Science Building Existing Space List	Existing Spaces No. and Size of Space(s)	ASF
Second Floor		
Biology Lab (Room #213)	1 @ 1,053 asf	1,053
Geology Lab (Room #212)	1 @ 771 asf	771
Biology Lab (Room #211)	1 @ 1,039 asf	1,039
Chemistry Lab (Room #210)	1 @ 1,031 asf	1,031
Biology Prep Lab (Room #209)	1 @ 599 asf	599
Chemical Storage (Room #209D)	1 @ 153 asf	153
Chemistry Prep Lab (Room 208)	1 @ 600 asf	600
Chemical Storage (Room #208A)	1 @ 151 asf	151
Biology Lab (Room #207)	1 @ 1,049 asf	1,049
Chemistry Lab (Room #206)	1 @ 1,029 asf	1,029
Total Second Floor ASF		**7,475**
Building Total ASF		**15,243**

Detailed Space Analysis - Proposed Spaces

Alamo Colleges - Northeast Lakeview College STEM Education Building Final Space List	Proposed Spaces No. and Size of Space(s)	ASF	Number of Occupants	Space Type	Page No.
Teaching Spaces					
General Classrooms					
Classrooms	9 @ 875 asf	7,875	35 Students	TS-01	4.12
Classroom and Computer Lab Shared Storage Room	1 @ 500 asf	500	NA	TS-02	4.14
General Classroom Spaces		8,375			
STEM					
Theatre Style Classroom	1 @ 2,000 asf	2,000	75 Students	TS-03	4.16
Associated Storage Room (Shared with Classroom Storage)	0 @ 0 asf	0	NA	TS-02	4.14
Computer Labs	4 @ 1,000 asf	4,000	35 Students	TS-04	4.18
Associated Storage Room (Shared with Classroom Storage)	0 @ 0 asf	0	NA	TS-02	4.14
Flexible Classroom (Divisible by 4)	1 @ 2,700 asf	2,700	100	TS-05	4.20
Associated Storage Room (A&M)	1 @ 200 asf	200	NA	TS-06	4.22
Technical Lab/ Studio	2 @ 1,700 asf	3,400	20 Students	TS-07	4.24
Lab Prep Space	1 @ 400 asf	400	NA	TS-08	4.26
Technical Lab/ Studio	1 @ 1,500 asf	1,500	20 Students	TS-09	4.28
Lab Prep Space	1 @ 200 asf	200	NA	TS-10	4.30
STEM Spaces		14,400			
Science					
Chemistry Labs (Organic, Intro, Gen 1 & Gen 2)	4 @ 1,300 asf	5,200	24 Students	TS-11/TS-12	4.32/4.34
Instrumentation Room	1 @ 400 asf	400	NA	TS-13	4.36
Chemical Storage	2 @ 100 asf	200	NA	TS-14	4.37
Chemistry Research Lab	1 @ 300 asf	300	NA	TS-15	4.38
Adjacent Student Work Area	1 @ 80 asf	80	NA	TS-16	4.39
Bio Chem Lab	1 @ 1,300 asf	1,300	NA	TS-17	4.40
Shared Science Prep Rooms	2 @ 400 asf	800	NA	TS-18	4.42
Lab Tech Office	2 @ 110 asf	220	NA	TS-19	4.43
Physics Lab	1 @ 1,300 asf	1,300	24 Students	TS-20	4.44
Prep Room	1 @ 150 asf	150	NA	TS-21	4.46
Geology Lab (Built-In Cabinetry)	1 @ 1,300 asf	1,300	30 Students	TS-22	4.48
Geology Storage / Prep	1 @ 150 asf	150	NA	TS-23	4.50
Tutorial Center	1 @ 1,000 asf	1,000	30 Students	TS-24	4.52
Science Spaces		12,400			
Subtotal for Teaching Spaces		**35,175**			
Faculty Spaces					
STEM Advising Suite					
Chair Office	2 @ 180 asf	360	1 + 4 Guests	FS-01	4.56
Admin Assitants	2 @ 64 asf	128	1	FS-02	4.57
Associated Student Waiting	1 @ 100 asf	100	4	FS-03	4.58
Faculty Office	22 @ 110 asf	2,420	1 + 1 Guest	FS-04	4.59
Conference Room	2 @ 400 asf	800	15 Guests	FS-05	4.60
Shared Workroom	1 @ 300 asf	300	NA	FS-06	4.61
Adjunct Faculty Office	1 @ 400 asf	400	10 to 12	FS-07	4.62
Subtotal for Faculty Spaces		4,508			
Suite Circulation		1,127			
Subtotal for Faculty Spaces and Circulation		**5,635**			

Detailed Space Analysis - Proposed Spaces (Continued)

Alamo Colleges - Northeast Lakeview College STEM Education Building Final Space List	Proposed Spaces No. and Size of Space(s)	ASF	Number of Occupants	Space Type	Page No.
Shared Building Spaces					
Meeting Spaces					
Flexible Meeting Room	1 @ 4,400 asf	4,400	200 Guests	BS-01	4.64
Associated Storage Room	1 @ 250 asf	250	NA	BS-02	4.68
Catering Area	1 @ 250 asf	250	NA	BS-03	4.69
AV Control Room	1 @ 100 asf	100	NA	BS-04	4.70
Student Sticky Spaces	10 @ 75 asf	750	2 to 3 Students	BS-05	4.71
Private Meeting / Consultation Spaces	4 @ 100 asf	400	2 to 4 Persons	BS-06	4.72
Meeting Spaces		6,150			
Support Spaces					
Faculty Breakroom	1 @ 400 asf	400	20 Faculty / Staff	BS-07	4.74
Student Breakroom	1 @ 200 asf	200	10 to 15 Students	BS-08	4.76
Lactation Room	1 @ 120 asf	120	1 Guest	BS-09	4.77
Family / Unisex Restroom	2 @ 60 asf	120	NA	BS-10	4.78
Loading Dock / Delivery Bay	1 @ 500 asf	500	NA	BS-11	4.79
Support Spaces		1,340			
Subtotal for Shared Building Spaces		**7,490**			
Total Assignable Square Footage of Building Spaces		**48,300**			
Total Building Spaces (GSF @ 60% Efficiency)		**80,500**			

Space Comparison

The space comparison below compares the existing spaces in the Science Building to the proposed spaces for location in the new STEM Education Building. The proposed building will provide an additional 31,160 ASF for the STEM and Science Departments.

Note: The Biology component of the Science Department is expected to remain at the existing Science Building. Its space allocation within the existing building will be determined at a later time.

Space Category	Existing Space in Science Building (ASF)	Proposed Space in New STEM Building (ASF)
General Classrooms	3,173	8,375
STEM	0	14,400
Chemistry Lab	2,964	6,180
Physics Lab	784	1,600
Geology Lab	771	1,300
Biology Lab	3,740	0
Shared Lab Spaces	0	2,100
Tutorial Center	1,563	1,000
Faculty Spaces	1,983	4,728
Meeting Spaces	0	6,150
Faculty Breakroom / Workroom	265	400
Student Breakroom	0	200
Totals	**15,243**	**46,403**

Note: Upon completion of the New STEM Education Building, the spaces allocated to STEM and Science will total 61,646 ASF.

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Preliminary Project Check List 7

Introduction

The following check list shall be completed upon the completion of the project to determine the building's compliance with the District's standards.

This chapter is organized into the following checklists:

- City of Live Oak
  - General Information regarding Permits and Inspections
  - Building Permit Submittal and Review Process
  - Building Permit Application Form
- The Alamo Colleges District
  - Campus MDF Room Requirements Checklist
  - Request for Variance Form
- LEED Checklist (New Construction and Major Renovations)
- CPS Energy Commercial Rebates

City of Like Oak

Note: The following information was extracted from the City of Live Oak online web page. Additional information regarding building permits and applications within the City of Live Oak can be found at the following website:

http://www.liveoaktx.net/departments/development-services

General Information regarding Permits and Inspections

All permit applications require submittal of plans, specifications and any other additional information required to completely describe the work to be undertaken. In all cases, Planning and Zoning issues should be resolved before applying for a permit. Our department can assist in determining whether your project will require review by the Planning and Zoning department.

Permit applications will be reviewed on a first come, first serve basis by the Building Official and / or the Fire Marshall for code compliance. State of Texas law requires that all permit applications receive a response within (45) days of submittal. Plan review can be completed as quickly a few days or it can take as long as a couple of weeks. The time plan review will take, depends on the size of the project and the volume of other plans awaiting review. You should probably plan for a minimum of one week for plan review. Review of Fire Alarm and Fire Sprinkler plans typically take approximately (14) business days.

Kitchen - Health reviews will be completed by our third party Health and Safety manager. We require a CD or PDF of your plan so we can electronically get it to our Health and Safety manager for a plan review. The fee for this review will be reflected on the permit issued.

You will be contacted should the submittal require revision. Once a permit application is approved, a permit will be issued. We will contact you when the permit is ready for pick up and let you know the permit fee. The permit must be signed and paid for before a permit is considered valid. Our department can assist in determining a permit fee prior to submittal of a permit application so that you are aware of the fee as you begin planning your project.

Plan Review and Applications Information

Time Frame for:

New Residential Plan Permits 1 – 2 weeks

All Commercial Plan Permits 2 – 4 weeks

All Other Permits 1 – 2 days

Hours of Operation:

Monday through Friday 8:00 AM to 5:00 PM Closed for lunch between the hours of 12:00 to 1:00 PM.

Building Permit Submittal and Review Process

Application Process:

A Permit submittal should consist of:

1. All permit applications are available as fillable pdf's and pdf downloads.
2. Letter from your Home Owners Association indicating approval of any alterations to the exterior of your home or property. This item is only submitted for those properties located within an HOA.
3. Any supplemental information which describes your project. Provide one hard copy of all supplemental information. In addition, provide one electronic version of the supplemental information in the form of a PDF. In some cases, we may be able to create the PDF file for you provided that your submitted information is no larger than an 11" x 17" size paper.

Plan Review and Applications Information:

Time Frame for:

New Residential Plan Permits 1- 2 weeks

All Commercial Plan Permits 2 - 4 weeks

All Other Permits 1-2 days

Can I do the work myself or should I hire a contractor?

Your project can be done yourself, with no outside contractors needed if:

The house you are working on is your own residence and you are living in it with a homestead exemption.

The work is done by you yourself and not by anyone else.

Although doing the work yourself may sound like a great deal, make sure you are not biting off more than you can chew. In addition, you should be aware that your home owner's insurance will be responsible for coverage should anything go awry due to your work. If you hire a contractor to do the work, and something goes awry, you have a source of recourse via the contractor's Liability Insurance.

Supplemental Information:

Depending upon the type of permit for which you are applying, the supplemental information might include some, or all, of the following items:

Plot Plan:

A plot plan shows property lines, easements, fences, existing structures and all proposed additions and/or removal of structures shall be submitted for planning and Zoning setbacks. Plans shall be to scale and accurately dimensioned.

Foundation Plan:

A foundation plan shows measurements, sizes, and locations of footings, reinforcement, attachments to existing structures, elevations and vapor barriers shall be submitted. Engineer stamp, signed and dated will be required on large additions. Cut, removal and replacement for underground plumbing and electric shall require plans and inspections. If a foundation exists with no vapor barrier and conditioned addition will be constructed on said foundation, an appropriate sealing method shall be submitted to prevent all moisture problems.

Floor Plans:

Floor plans with all dimensions, door and window details, etc. Each room or area shall be identified. Proposed areas shall be identified for future use. Example: "Patio slab to be covered/enclosed at a later date" or "Warehouse to be remodeled for future office space at a later date".

Framing/Structural Drawings:

Framing/structural drawing, showing locations, sizes, wood grades and types, steel grades and types, header sizes, door and window locations, attachment to existing structure, floor joist, roof trusses and hangers, shall be submitted. Pre-engineered floor joists and roof trusses shall have engineer letters and shop drawings.

Building Elevations:

Building elevations of all exterior sides of the house indicating locations of windows, doors or other building features. Elevations should also include references to the materials which will be utilized. Samples of materials may be requested for review by the Building Official.

Energy Compliance:

Energy Compliance Certificate according to the International Energy Conservation Code adopted by the City -OR- Proof that window, door and insulation submittals satisfy Energy Conservation Codes.

HVAC, Electrical and Plumbing Plans:

Electric, Plumbing and HVAC (heat, vent, air condition) plans shall be submitted. New systems shall be engineered. These three trades are required to pull separate permits.

Flatwork, Sidewalk and Driveway Plans:

Drawings showing location, dimensions and size of rebar or wire mesh. For instances when you are expanding beyond existing paving, please indicate how the new paving will be tied into the existing structure or paving.

Retaining Walls:

Retaining walls measuring four feet or more from bottom of footing to top of wall shall require plans and permit.

Fire Suppression/Fire Alarm:

If Fire Suppression and/or Fire Alarm present or required, plans shall be submitted (before the frame inspection will be performed).

Commercial Knox Box:

All businesses shall have a Knox Box at front door or gate. Applications are available at the Live Oak Fire Department.

Demolition Plans:

Demolition plans may be submitted with the Build plans or separate as a demolition plan only. A demolition permit may be issued before building plans are submitted.

Building Permit Application Form

The Building Permit Application Form for buildings constructed within the City of Live Oak is presented on the following page. Additional applications and information regarding permits can be found at the following website:

http://www.liveoaktx.net/departments/development-services/permit-information

DEVELOPMENT SERVICES DEPARTMENT
INSPECTION DIVISION
8001 SHIN OAK DRIVE
LIVE OAK, TEXAS 78233
(210) 653-9140 EXT. 2244 or 2386 FAX (210) 653-0935

BUILDING PERMIT APPLICATION

PLEASE TYPE OR PRINT CLEARLY

JOB ADDRESS:		BUILDING PERMIT #
FIRST AND LAST NAME OF OWNER:	ADDRESS, CITY, ST, ZIP	PHONE:
CONTRACTOR:	ADDRESS, CITY, ST, ZIP:	PHONE: FAX:
USE OF BUILDING OR STRUCTURE:		

CLASS OF WORK: NEW ☐ ADDITION ☐ ALTERATION ☐ REPAIR ☐ MOVE ☐ REMOVE ☐

DESCRIBE WORK:				
VALUE OF WORK: $				

NOTICE

SEPARATE PERMITS ARE REQ UIRED FOR ELECTRICAL, PLUMBING; HVAC, THIS PERMIT BECOMES NULL AND VOID WITHIN 1 YEAR OF ISSUANCE. PERMITS ARE NON-TRANSFERABLE FROM ONE PERSON TO ANOTHER. ANYONE HOLDING AN UNEXPIRED PERMIT MAY APPLY FOR AN EXTENSION, IN WRITING.

I HEREBY C ERTIFY THAT I HAVE RE AD AND EXAMINED THIS APPLICATION AND KNOW THE SAME TO BE TRUE AND CORR ECT. ALL PROVISIONS OF LAWS AND ORDINANCES GOVERNING THIS TYPE OF WOR K WILL BE COMPLIED WITH WHETHER SPECIFIED HEREIN OR NOT. THE GRANTING OF A PERMIT DOES NOT PRESUME TO GIVE AUTHORITY TO VIOLATE OR CANCEL THE PROVISIONS OF ANY OTHER STATE OF LOCAL LAW REGULATING CONSTRUCTION OR PERFORMANCE OF CONSTRUCTION.

SIGNATURE OF CONTRACTOR OR AUTHORIZED AGENT DATE

SIGNATURE OF OWNER (IF OWNER IS BUILDER) DATE

02-01-2018 Reviewed

FOR DEPARTMENT USE ONLY

PERMIT FEE: $_____

APPLICATION ACCEPTED BY DATE

APPROVED BY DATE

PERMIT FEES

Less than $1,000.00----------$50.00
$1,000.01 to $50,000.00----------$50.00 plus-----$6.00 per $1,000.00
$50,000.01 to $100,000.00----------$265.00 plus----$5.00 per $1,000.00
$100,000.01 to $500,000.00----------$465.00 plus----$4.00 per $1,000.00
Greater that $500,000.00----------$1,665.00 plus---$3.00 per $1,000.00

To figure permit cost: Cost of job ÷1,000.00 x multiplier + base amount = permit cost

Example: $3,200.00 ÷1,000.00 x $6.00 + $50.00 = $69.20

ALL APPLICATIONS MUST HAVE A SIGNED CONTRACT BY BOTH PARTIES ATTACHED
IF HOMESTEAD AND HOMEOWNER WILL BE DOING WORK NO CONTRACT REQUIRED

The Alamo Colleges District

Campus MDF Room Requirements Checklist

CAMPUS MDF		SD	CD	100%
ARCHITECTURAL				
A.C-MDF.1	Minimum of 600 square feet, minimum clear lineal wall length 30 feet	☐	☐	☐
A.C-MDF.2	Walls to deck	☐	☐	☐
A.C-MDF.3	Floor sealed bare concrete	☐	☐	☐
A.C-MDF.4	No windows	☐	☐	☐
A.C-MDF.5	Exterior wall within 50 feet of building exterior	☐	☐	☐
A.C-MDF.6	Not be located adjacent to or below restrooms or other water-based facilities	☐	☐	☐
A.C-MDF.7	Not be located near or sources of EMI and mechanical vibration	☐	☐	☐
A.C-MDF.8	All walls covered with plywood	☐	☐	☐
A.C-MDF.9	Without a ceiling or a lift-out tile ceiling	☐	☐	☐
A.C-MDF.10	Minimum 42-inch by 80-inch clear door opening	☐	☐	☐
A.C-MDF.11	Door not open to the exterior of the building	☐	☐	☐
A.C-MDF.12	Proximity card reader and electrified door hardware	☐	☐	☐
A.C-MDF.13	At least (1) camera	☐	☐	☐
A.C-MDF.14	Sprinkler system, consider pre-action	☐	☐	☐
HVAC				
H.C-MDF.1	Dedicated unit that is part of the building's main system	☐	☐	☐
H.C-MDF.2	Maintain a constant 24/7 cooled environment between 68° and 75° F	☐	☐	☐
H.C-MDF.3	Humidity of 41.9°F Dew Point to 60% RH and 59°F Dew Point	☐	☐	☐
H.C-MDF.4	Minimum HVAC load shall be designed to displace 20KW of power, or 6 Tons	☐	☐	☐
H.C-MDF.5	Maintain temp and humidity in the event of building power outages or main unit failure	☐	☐	☐
LIGHTING				
L.C-MDF.1	Minimum of 40 foot candles at 2 feet above the floor in the entire space	☐	☐	☐
L.C-MDF.2	Equipped with emergency lighting to keep the space lit during power outages	☐	☐	☐
L.C-MDF.3	Fixtures 18 inches above top of the highest rack or cable runway	☐	☐	☐
ELECTRICAL				
E.C-MDF.1	(2) dedicated 208 volt 3-phase 150 Amp circuits, 4-wire (2PH + N +G), hardwired to the UPS(s)	☐	☐	☐
E.C-MDF.2	Originating electrical panel will be equipped with (2) 150 AMP breakers	☐	☐	☐
E.C-MDF.3	Minimum of (1) APC Symmetra LX 16kVA Scalable to 16kVA N+1	☐	☐	☐
E.C-MDF.4	Ext. Run Tower, 208/240V to provide 30 minutes of run time at full load	☐	☐	☐
RACKS AND CABLE MANAGEMENT				
R.C-MDF.1	(4) Standard Equipment Racks	☐	☐	☐
R.C-MDF.2	Vertical cable manager on both sides of the rack	☐	☐	☐
R.C-MDF.3	Horizontal wire manager above and below each horizontal patch panel	☐	☐	☐
R.C-MDF.4	(2) Server Cabinets	☐	☐	☐
R.C-MDF.5	Space shall be allocated for an additional (7) future Server Cabinets	☐	☐	☐
R.C-MDF.6	Space equivalent to (2) Server Cabinets shall be allocated for service provider equipment	☐	☐	☐
R.C-MDF.7	Cable runway encircling the room at 86 inches above the finished floor	☐	☐	☐
R.C-MDF.8	Cable runway crossing the room parallel to the rack rows (3) times	☐	☐	☐
R.C-MDF.9	Vertical section of cable runway from the entrance conduits to the overhead cable runway	☐	☐	☐

Request for Variance Form

REQUEST FOR VARIANCE
FROM THE ALAMO COLLEGES
DESIGN AND CONSTRUCTION STANDARDS

Project: _____
Campus: College Name Here
Consultant with AC: Architect Firm Here
Agreement: Architect Firm Address Here
San Antonio, TX

Consultant submitting request : _____
_____
_____

Date: _____

To: Alamo Colleges
Facilities Operations & Maintenance / Construction Management
7990 Pat Booker Road
Live Oak, Texas 78233

Attention: John W. Strybos, P.E. Associate Vice Chancellor of Facilities Operation and Construction

AC's Standards Ref(s): _____

Subject: _____

Description/Message : _____
_____
_____
_____
_____

Submitted By: _____ Please reply on or before: _____

Program Manager Recommendation:
_____
_____
_____

cc: By: _____
Date: _____

AC Reply:
_____
_____
_____

cc: By: _____
Date: _____

1/31/2011

LEED Checklist

Per District direction (January 2011), at this time, NO projects are LEED certified unless the design team is otherwise notified in writing and purchase orders are issued for this additional service. However, the design team should apply the LEED checklist to all projects and apply "common sense" in selecting construction materials, etc.

LEED 2009 for New Construction and Major Renovations

Project Checklist

Project Name

Date

Y	?	N			
			Sustainable Sites	**Possible Points: 26**	
Y			Prereq 1	Construction Activity Pollution Prevention	
			Credit 1	Site Selection	1
			Credit 2	Development Density and Community Connectivity	5
			Credit 3	Brownfield Redevelopment	1
			Credit 4.1	Alternative Transportation–Public Transportation Access	6
			Credit 4.2	Alternative Transportation–Bicycle Storage and Changing Rooms	1
			Credit 4.3	Alternative Transportation–Low-Emitting and Fuel-Efficient Vehicles	3
			Credit 4.4	Alternative Transportation–Parking Capacity	2
			Credit 5.1	Site Development–Protect or Restore Habitat	1
			Credit 5.2	Site Development–Maximize Open Space	1
			Credit 6.1	Stormwater Design–Quantity Control	1
			Credit 6.2	Stormwater Design–Quality Control	1
			Credit 7.1	Heat Island Effect–Non-roof	1
			Credit 7.2	Heat Island Effect–Roof	1
			Credit 8	Light Pollution Reduction	1
			Water Efficiency	**Possible Points: 10**	
Y			Prereq 1	Water Use Reduction–20% Reduction	
			Credit 1	Water Efficient Landscaping	2 to 4
			Credit 2	Innovative Wastewater Technologies	2
			Credit 3	Water Use Reduction	2 to 4
			Energy and Atmosphere	**Possible Points: 35**	
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
			Credit 1	Optimize Energy Performance	1 to 19
			Credit 2	On-Site Renewable Energy	1 to 7
			Credit 3	Enhanced Commissioning	2
			Credit 4	Enhanced Refrigerant Management	2
			Credit 5	Measurement and Verification	3
			Credit 6	Green Power	2
			Materials and Resources	**Possible Points: 14**	
Y			Prereq 1	Storage and Collection of Recyclables	
			Credit 1.1	Building Reuse–Maintain Existing Walls, Floors, and Roof	1 to 3
			Credit 1.2	Building Reuse–Maintain 50% of Interior Non-Structural Elements	1
			Credit 2	Construction Waste Management	1 to 2
			Credit 3	Materials Reuse	1 to 2

Y	?	N			
			Materials and Resources, Continued		
			Credit 4	Recycled Content	1 to 2
			Credit 5	Regional Materials	1 to 2
			Credit 6	Rapidly Renewable Materials	1
			Credit 7	Certified Wood	1
			Indoor Environmental Quality	**Possible Points: 15**	
Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
			Credit 1	Outdoor Air Delivery Monitoring	1
			Credit 2	Increased Ventilation	1
			Credit 3.1	Construction IAQ Management Plan–During Construction	1
			Credit 3.2	Construction IAQ Management Plan–Before Occupancy	1
			Credit 4.1	Low-Emitting Materials–Adhesives and Sealants	1
			Credit 4.2	Low-Emitting Materials–Paints and Coatings	1
			Credit 4.3	Low-Emitting Materials–Flooring Systems	1
			Credit 4.4	Low-Emitting Materials–Composite Wood and Agrifiber Products	1
			Credit 5	Indoor Chemical and Pollutant Source Control	1
			Credit 6.1	Controllability of Systems–Lighting	1
			Credit 6.2	Controllability of Systems–Thermal Comfort	1
			Credit 7.1	Thermal Comfort–Design	1
			Credit 7.2	Thermal Comfort–Verification	1
			Credit 8.1	Daylight and Views–Daylight	1
			Credit 8.2	Daylight and Views–Views	1
			Innovation and Design Process	**Possible Points: 6**	
			Credit 1.1	Innovation in Design: Specific Title	1
			Credit 1.2	Innovation in Design: Specific Title	1
			Credit 1.3	Innovation in Design: Specific Title	1
			Credit 1.4	Innovation in Design: Specific Title	1
			Credit 1.5	Innovation in Design: Specific Title	1
			Credit 2	LEED Accredited Professional	1
			Regional Priority Credits	**Possible Points: 4**	
			Credit 1.1	Regional Priority: Specific Credit	1
			Credit 1.2	Regional Priority: Specific Credit	1
			Credit 1.3	Regional Priority: Specific Credit	1
			Credit 1.4	Regional Priority: Specific Credit	1
			Total	**Possible Points: 110**	

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

CPS Energy Commercial Rebates

Per District direction (January 2011), all design teams are required to meet with CPS Energy to determine the best way to optimize (not maximize) Alamo College's CPS energy rebate and to complete, prepare and submit the forms and documentation to CPS. Rebates are currently available in the following areas:

- Heating and Cooling Equipment
- Reflective Roof Products
- Commercial Lighting
- Outdoor Lighting
- Solar Photovoltaic Systems
- Commercial Kitchen

In addition, CPS Energy offers special custom rebates for those businesses that implement state-of-the-art, energy efficient technology. Following is information on the application process as provided by CPS Energy.

How to Apply for a Commercial Rebate

To apply for a rebate as part of CPS Energy's Commercial Rebate Program, follow these steps to complete the application process:

1. Complete and submit the online CPS Energy Rebate Application Form for the proposed project. All commercial rebate applications must be completed online. Fill out all required fields in Part I (Note: Contact E-mail address is required for final verification and issuance of credit). Designate one person at your company as the primary contact. Final verification must be given by the primary contact with the authority to sign on behalf of the company.

2. After completing all necessary information, an electronic confirmation will be sent to the Primary Contact e-mail address provided. CPS Energy will not complete customer-required documentation. If no confirmation is received, please call 210-353-2SAV.

3. Upon completion of the on-line application, call the number provided on the confirmation to arrange for pre-inspection. MOST projects require at least one inspection. CPS Energy will complete a pre-inspection on MOST existing projects to verify existing equipment. The pre-inspection and the application do not guarantee or reserve funds.

4. After completion of the project, complete any unfinished portions of the online application and request the post inspection from CPS Energy. CPS Energy only rebates for costs actually incurred and paid by the customer. All sale prices and discounts must be included in the invoice submitted for rebate processing.

5. Submit copies of invoices via the "web application" upload functionality. Other documentation may be requested before final approval of the rebate amount is given. FOR ALL SUBMITTALS: Please include the following information when submitting hard copies of information:
   - Commercial Rebate Application
   - Business Name
   - CPS Energy Contract Account Number
   - Contact Person Name
   - Contact Person Telephone Number
   - Contact Person E-mail Address
   - Confirmation Number
6. Hard copies of the information listed above may either be mailed at the address below or faxed to (210) 353-2909. If mailing, please submit correspondence to:

   CPS Energy

   C and I Rebates

   Mail Drop 340113

   P.O. Box 1771

   San Antonio, TX 78296-1771

Once the online application is finalized, pre and post inspections are completed and all the hard copy information listed above is received, CPS Energy will review the information and calculate the final rebate.

Example CPS Energy Commercial Rebate Online Application Form

Part I Complete prior to start of project

Business Name	Contact Name	CPS Energy Account Number	
Address of Installation	City	State	Zip Code
Mailing Address **Same as Installation** ☐	City	State	Zip Code
Phone Number ( ) ( ) -	Fax Number ( ) ( ) -		

Customer Email	
Re-type Email	

Contractor Name		License #
Phone Number ( ) ( ) -	Fax Number ( ) ( ) -	Email
Contact Name		Permit #

Type of rebate
HVAC ☐ Lighting ☐ Roof Coatings ☐ Custom ☐
How did you hear about this program?
Contractor ☐ CPS Energy representative ☐ Contact at another company ☐ Newspaper ☐
Projected Completion Date click icon for calendar--> Account Manager, if known None

Appendix 8

The appendix of this document provides information related to Alamo Colleges standards and additional design guidelines / constraints. The document includes the following:

- *Appendix A:* Section 28 31 00: Fire Alarm and Smoke Detection System
- *Appendix B:* Alamo Colleges Telecommunications Infrastructure Standards (Version 2016.12.15)
- *Appendix C:* High Density Storage Spec Sheets and Information
- *Appendix D:* DIRTT Walls and Systems Furniture Spec Sheets and Information

The Alamo Colleges District has developed design standards which are to be applied to all new construction and renovation projects district-wide. These standards shall be reviewed in conjunction with this document and applied throughout the design and construction process:

- Staff Lounge Addendum (updated January 2018)
- Housekeeping Closet (August 2010)
- Exterior Graphic Standards Best Practices Manual (May 2010)
- Standard Hardware Specification (January 2012)

The above referenced standards applicable at the time of publication of this report may be accessed via the web at:

https://www.dropbox.com/sh/3rs4napwnkwza84/AABIk8M7FMl4fYrvHQs1AFBwa?dl=0

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Appendix A

SECTION 28 31 00

FIRE ALARM AND SMOKE DETECTION SYSTEM

PART 1 GENERAL

1.01 WORK INCLUDED

A. The Contractor shall provide, install, and program a functionally complete, integrated alarm and event notification Communications System utilizing a LAN/WAN (local or wide area network) or the Internet per Manufacturer's guidelines, codes described, and these specifications. Provide signals required to Interface with the existing automation software in the existing Administrative System PC (contact Kevin Cormier @ APi systems 210-822-0560). All of the equipment to be provided with 24 hour battery backup. Quantities and locations as indicated on the drawings.

1. Work permit required for fire alarm system repair work.

2. Required batteries, and associated accessories

3. System acceptance testing and commissioning

4. System output signals required to interface with the graphic representations of the connected building on the existing college campuses central station graphics belonging to ACCD and programmed by ACCD staff.

5. The following signals are to be provided:

a. For buildings with Fire alarm panels that have Digital Communicator ports, provide:
1. ALR – Alarm - 1
2. ARS – Alarm Restore
3. CST – CS Test Signal
4. ERR – Code Error
5. FIR – Fire Alarm
6. PTB – Phone Trouble
7. PTR – Phone Trouble Restore
8. SDR – System Restore
9. SDS – System Disabled
10. TRB – Trouble
11. TST – Test Signal
12 The inherent supervisory signal incorporated into the Bosch system

b. For buildings with Fire alarm panels that do not have Digital Communicator ports provide a Bosch D2071 Digital Alarm Communicating Transmitter (DAC) to provide as much of the items listed in 5.a. as possible but at a minimum provide:
1. FIR – Fire Alarm
2. TRB – Trouble
3. The inherent supervisory signal incorporated into the Bosch system

1.02 REFERENCES

A. NFPA 101 – Safety to Life from Fire in Buildings and Structures

B. NFPA 13 – Installation of Sprinkler Systems

C. NFPA 20 – Installation of Stationary Pumps

D. NFPA 70 – National Electric Code

E. NFPA 72 – National Fire Alarm Code

F. NFPA 90A – Installation of Air-Conditioning and Ventilating Systems

G. NFPA 92A – Smoke- Control Systems

H. UL 864 – Control Units for Fire Protective Signaling Systems

I. ADA Accessibility Guidelines (ADAAG)

J. Texas State Insurance Code

K. Texas Accessibility Standards (TAS)

L. Local-city Ordinances

M. International Building Code

N. All electronic equipment shall comply with all FCC limits governing radio frequency electromagnetic interference and be so labeled.

O. None of the terms or provisions of this specification shall be constructed as waiving any of the rules, regulations or requirements of Codes.

1.03 SYSTEM DESCRIPTION

A. The System supports data network communications. The system allows the Central Station Receiver to connect to Alarm Control Panels using LAN/WAN data networks and UDP/IP protocol. The System description is based on the Conettix IP manufactured by Bosch and shall consist of five basic components, with the following capabilities:

1. Network connection of Alarm Control Panels with digital dialer support is implemented through the use of Dialer Capture Modules (1).

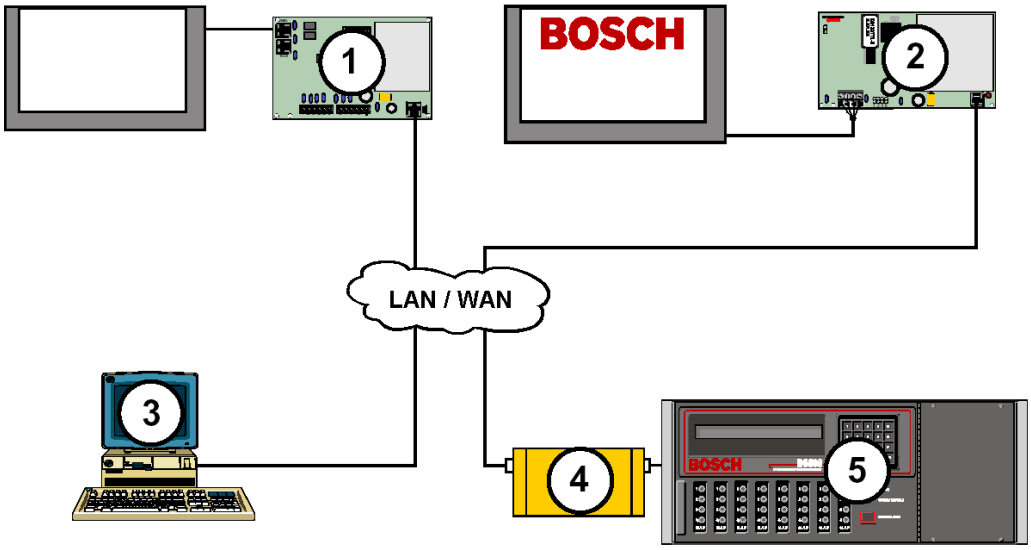
2. Network connection of Alarm Control Panels with either SDI Bus or Option Bus support is implemented through the use of Network Interface Modules (2).

3. Network enabled Alarm Control Panels can be monitored, configured, and programmed by Administrative Systems (3) with a connection to the network.

4. The Central Station Receiver (5) network connection is implemented through the use of the Network Adapter (4).

5. Alarm Control Panel reports from are sent to the Central Station Receiver (5), and on to the central station automation software (3).

B. The Central Station Receiver (5) is optionally monitored, configured, and programmed by Administrative Systems (3) with a connection to the network.



C. Data communication transmission shall use the owners existing LAN/WAN data networks with the owners existing PBX system as Alternate communications.

1.04 QUALITY ASSURANCE

A. The system shall be installed by competent mechanics, regularly employed by a Fire Alarm contractor with full responsibility for proper operation of the system including debugging and proper calibration of each component in the entire system. The Contractor shall be with 3 years or more experience with installation of this type. The fire alarm technician shall be licensed by State Fire Marshal in order to install, certify and service the fire alarm system. Supplier shall be licensed by State Fire Marshal in order to sell fire alarm product, and shall have an in-place support facility within 50 miles of the site with technical staff, spare parts inventory and all necessary test and diagnostic equipment.

B. The complete System installation shall be in strict accordance to the national and local electrical codes and the electrical Section of these specifications. The equipment shall be manufactured by a manufacturer who has been engaged in this type of production (both hardware and software) for at least ten years. The product shall be UL listed under standards 864 (Control Units for Fire Protective Signaling Systems).

1.05 SUBMITTALS

A. Provide submittals for the following information in addition to and in accordance with 26 00 00., Basic Electrical Requirements, and Division 01 for submittal requirement.

B. Complete Plan Drawings showing all devices, panels, and conduit runs.

C. Project specific system interconnection (riser) diagrams. (System Architecture.)

D. Dimensional Drawings/manufacturer's specification data for each component.

E. Complete elementary and/or Schematic Drawings for all Fire Alarm System electrical and electronic circuits.

F. Typical component connection and interconnection diagrams.

G. Complete system wiring diagrams for all components and interfaces to equipment supplied by others.

H. Calculations of all batteries and UPS system sizing to accommodate 24 hours of backup operation.

I. Complete sequence of operations of all functions of the system. A fire alarm typical input/output functional matrix clearly defining fire alarm event and action, which is recommended by NFPA 72 A.10.6.2.3 (9), shall be submitted to the Owner for review and approval.

J. Graphic penetration tree showing all graphics and all points.

K. Detailed color conventions proposed for all graphics and graphic elements and states.

L. Data entry forms for initial parameters. Contractor shall provide a listing of all analog points with columnar blanks for high and low warning limits and high and low alarm limits, and samples of proposed text for points and messages (for at least two systems of at least 30 points total). All text and graphics shall be approved prior to data entry.

M. Recommended Spare Parts. The Contractor shall include a listing of their recommended spare parts.

N. Manufacturer's Representatives. The Contractor shall submit a listing of the manufacturer’s representatives responsible for installation coordination and service.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver fire alarm system components in factory-fabricated containers.

B. Store in a clean, dry space and protected from the weather.

C. Handle control and annunciator panels carefully to avoid damage to material components, enclosure and finish.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Bosch

B. Other manufacturers equal in design and function will be considered upon A/E approval following substitution procedure in Section 26 00 00 and Division 1 for substitution requirement.

2.02 DIALER CAPTURE MODULE (DCM)

A. Dialer Capture Module System Description: The Dialer Capture Module specified herein shall connect an alarm panel’s digital dialer to a LAN/WAN or The Internet with an

Ethernet topology. The DCM shall connect between the alarm panel's digital dialer and an Ethernet Hub via a RJ45 connector.

B. Dialer Capture Module Feature/Capability Summary: The following indicates system software/hardware capabilities, capacities and formats:

1. Operation of the Dialer Capture Module (DCM):

   a. When the dialer has something to report, the DCM shall provide the signals and voltages necessary to cause the dialer to operate as though it was connected to a central station digital receiver through a PSTN.
   b. The DCM shall decode the transmitted dialer message and present the information via the network to the central monitoring receiver.
   c. The DCM shall provide modular jacks for the following connections:
      1) PANEL: intended for connection to a dialer via a modular telephone cord
      2) TELCO: intended for connection to an RJ31X jack
      3) ETHERNET: intended for connection to the data network Ethernet HUB.
   d. The DCM shall provide two operational modes as described below:
      1) Intercept Mode: the DCM shall connect the premises phone directly to the telephone line and connect the dialer to the DCM's internal electronics. An internal "watchdog" circuit shall assure that Intercept Mode is maintained only if the DCM is functioning correctly and in contact with the central monitoring receiver.
      2) Fallback Mode: the DCM shall connect the premises phones to the dialer and the dialer to the telephone line, removing itself from the telephone circuit. Fallback Mode will occur in the event that the DCM loses connection to the central monitoring receiver, loses power or stops operating correctly.
   e. The DCM shall communicate with the central monitoring receiver via LAN/WAN or The Internet using Ethernet communications.
   f. The DCM shall transmit at least one message to the central monitoring receiver every 75 seconds as a default, or every 240 seconds without special programming tools.
   g. The central monitoring receiver shall be required to respond to each received message with an ACK message.

2. Each DCM shall provide 3 inputs with the following functions:

   a. Input 1 shall be designated as an EOLR supervised loop that will report any voltage above 3.33 VDC as an open condition to the central monitoring receiver if status reports are enabled. Any voltage below 1.66 VDC shall be reported as a short.
   b. Input 2 shall be used for intercept inhibit. If Input 2 goes above 5.5 VDC, then the DCM shall be immediately forced into Fallback Mode for a minimum of two minutes. This input must go low for at least five seconds to be considered low.
   c. Input 3 shall be used for intercept override. If Input 3 goes above 5.5 VDC for five seconds, then the DCM shall enter Fallback Mode. If the input goes low, then the DCM shall return to Intercept Mode.

3. Each DCM shall provide 4 outputs with the following functions:

a. Output 1 shall be active (open) as long as the DCM is functioning normally. If the DCM fails to operate, or if it loses power, this input will be closed.
b. Output 2 shall be active (open) as long as the central monitoring receiver interface is working properly, and closed when the central monitoring receiver communications has failed.
c. Output 3 shall be active (open) whenever the DCM is in Intercept Mode.
d. Output 4 shall be controlled by a command from the Programming Software or Receiver/Gateway. The default is active (open).

4. The following LED indicators shall appear on the DCM:

a. Two dual-colored LEDs that indicate status: (SYSTEM Status LED and DIALER Status LED)
b. Two LEDs on the Ethernet connector that indicate the status of the network connection.

C. Dialer Capture Module Hardware Description: The Dialer Capture Module (DCM) shall be Bosch model C900V2. Each DCM shall be provided, at minimum, with the following components. Additional accessories shall be provided based on the quantities and features required for the application.

1. C900V2 DCM

2. Mounting plate and hardware

3. Manuals

2.07 SYSTEM OPERATION

A. Supervision: Conettix IP shall provide control panel supervision using periodic heartbeats (polling, typically one every 75 seconds or longer) in order to monitor the continuity of the network link. Control panels that are connected to the Central Station Receiver by way of he Network Interface Module (NIM) are responsible for their own polling. Control panels that connect via the Dialer Capture Module (DCM) rely on the DCM to monitor polling.

1. The Central Station Receiver will be programmed to monitor each network account and assure that the heartbeats from each account are received on a regular basis.

2. The Central Station Receiver will return an ACK message for each heartbeat or other message received from an account that is registered in the Central Station Receiver database.

3. The Central Station Receiver will ignore any message from a device that is not registered.

4. The periodic heartbeat, and the corresponding ACK, shall both have an average UDP packet size of 64 bytes.

5. If the programmable time window for a specific network account expires without a valid message being received, the Central Station Receiver shall generate a trouble message, indicating a loss of supervision for the indicated control panel.

a. If a valid message is subsequently received, the Central Station Receiver shall generate a message indicating a restoration of supervision for the indicated control panel.

6. If the DCM sends ten successive heartbeat messages to the Central Station Receiver without receipt of an ACK, the DCM will fall into a "network communication failure" condition (Fallback Mode).

   a. While in Fallback Mode, the DCM will disconnect the control panel from the network.
   b. The DCM can be configured to connect the control panel to a PSTN line when the DCM is in Fallback Mode.
   c. While in Fallback Mode, the DCM will continue to poll the Central Station Receiver using periodic heartbeats.
   d. The DCM will exit Fallback Mode when an ACK is received from the Central Station Receiver.

7. If the control panel sends, by way of the NIM, a programmable number of successive heartbeat messages to the Central Station Receiver without receipt of an ACK, the control panel will fall into a "network communication failure" condition.

   a. After a network communication failure, the control panel will continue to poll the Central Station Receiver using periodic heartbeats.
   b. The control panel will indicate the restoration of supervision after an ACK is received from the Central Station Receiver.

B. Anti-Substitution/Anti-Replay: Conettix IP shall protect against the substitution of a valid control panel with a fraudulent one. Conettix IP shall also protect against the interception and retransmission of authentic control panel messages, preventing an attack in which a valid data transmission is recorded and fraudulently repeated by an adversary who intercepts the data and retransmits it.

   Control panels that are connected to the Central Station Receiver by way of the Network Interface Module (NIM) are responsible for their own Anti-Substitution/Anti-Replay protection. Control panels that connect via the Dialer Capture Module (DCM) rely on the DCM to provide Anti-Substitution/Anti-Replay protection.

   At startup of each control panel or DCM, Conettix IP shall coordinate the synchronization of messages between the network modules and the Central Station Receiver. Once synchronized, all subsequent communication sessions numerically validate the authenticity of the sender and receiver, which protects against the replay of authentic sessions, or the substitution of the original control panel or DCM.

   If Anti-Substitution/Anti-Replay protection is enabled, the Central Station Receiver must receive a valid synchronization key within a programmable number of messages, or a Substitution Alarm message will be generated. Unless the Central Station Receiver receives a valid key within a programmable additional number of messages, the control panel account will be disabled.

C. Encryption: Conettix IP shall support communications using the Advanced Encryption Standard (AES) 128-bit Rijndael encryption algorithm.

1. Communications between control panels and the Central Station Receiver can be encrypted between the Dialer Capture Module (DCM) and the Central Station Receiver Network Adapter, or between the Network Interface Module (NIM) and the Central Station Receiver Network Adapter.

2. Communications between administrative system software and the Central Station Receiver, or between automation software and the Central Station Receiver, can be encrypted between a Network Adapter at the remote computer hosting the administrative or automation software and the Central Station Receiver Network Adapter.

The Conettix IP shall support up to two simultaneous and independent encrypted communications channels.

D. Multiple Control Panels: Conettix IP shall support multiple control panels on a LAN that connect to the Central Station Receiver through a router/firewall that uses Network Address Translation (NAT) tables. The NAT table insures that the returning messages for a control panel are forwarded back to the panel that sent out the first message.

1. The Dialer Capture Module (DCM) shall support this through Datagram 01.

2. The Central Station Receiver Network Adapter shall support this through Datagram 02.

3. The Network Interface Module (NIM) shall support this through either Datagram 02 or 07.

E. Dialer Capture Module Override: Conettix IP shall allow some basic functionalities of the Dialer Capture Module (DCM) to be overridden by the administrative system software. Changes are effective the next time the Central Station Receiver acknowledges a message from the DCM.

1. Message Transmission Rate: The Poll Rate and Retry Count of the DCM can be adjusted as desired. The new settings shall remain effective until they are changed again, or until the DCM is power-cycled and reset.

2. Intercept/Fallback Mode: The DCM can be manually ordered into either Intercept or Fallback mode. After 30 minutes in Fallback mode, the Central Station Receiver will generate a "Fallback reminder" message. After 60 minutes in Fallback mode, the DCM will automatically switch back to Intercept mode.

3. Output Status: Output 4 can be manually turned on or off.

PART 3 EXECUTION

3.01 INSPECTION

A. Contractor shall examine the areas and conditions under which the system is to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install system and materials in accordance with the manufacturer's written instructions, Drawing set, and details, the applicable requirements of the NEC and NFPA 72, and specifications in Division 26.

B. Junction boxes used as back boxes for fire alarm system field devices shall be 4-inch square with 2 1/8-inch minimums in depth. Install adapter plates and extension rings where required. Junction boxes for concealed conduit system shall be flush mounted.

C. Each conductor shall be identified as shown on the Shop Drawings by attaching permanent alphanumeric wire markers within 2 inches of the wire termination at both ends. Marker legends shall be visible. Junction box and pull box covers shall be painted yellow or have embossed adhesive tape labeling that is minimum 1/4-inch white letters over a yellow background with text “Fire Alarm.” Install end-of-line device in box with text “End-of-Line” or “EOL.” Number-code or color-code conductors, appropriately and permanently for identification and servicing of system.

D. Splices shall only be made on terminal strips. All fire alarm wring shall be installed in raceways as per Drawing. All external wiring shall be color-coded and shall not be installed in the same outlet box, junction box, or conduit with conductors of lighting or power systems.

E. Install all non-desk mounted equipment in stand alone enclosed rack with locking doors and cooling fans as indicated on plans

F. Coordinate the instillation by the owner of communications lines (2 data and 2 voice); give the owner 20 days notice to install the communications lines.

3.03 PROGRAMMING

A. Programming System Configuration Parameters (hardware and software, zone/circuit numbers, communication parameters)

B. Programming Operational Parameters (time periods, time profiles, access groups, divisional access groups, departments, workgroups, holiday periods and profiles, automatic lock/unlock schedules, and input/output event responses)

C. Input and Programming User/Visitor Databases

D. Other System Programming Tasks required by the Owner. These additional programming requirements shall be submitted by the Owner to the Contractor prior to system programming

3.03 TESTING

A. The entire system shall be field tested in accordance with NFPA standards and other applicable standards in the presence of the Construction Inspector. Inspection and test method shall be in compliance with NFPA 72. Inspection and test record forms that are recommended by NFPA 72 shall be utilized. Results of such testing shall be recorded on forms approved for the purpose, certified and submitted to the Construction Inspector prior to final acceptance.

B. All test equipment; instruments, tools, and labor that required conducting the system tests shall be provided by the Contractor. The following equipment, but not limited to, shall be a minimum for conducting such tests.

1. Ladders and scaffolds as required for access all field devices.

2. Multi-meter for reading voltage, current and resistance.

3. Intelligent device programmer/tester.

4. Laptop computer with programming software for any required program revisions.

5. Two-way radios, flashlights, smoke generation devices and supplies.

6. Spare printer paper.

7. Decibel meter.

C. Perform all electrical and mechanical tests required by the equipment manufacturer's certification form. In addition, measure and adjust each of the ionization detectors to the maximum stable sensitivity setting. This must be performed with the detector at its operational environmental conditions in the area. Bench settings are not acceptable. All test and report costs shall be in the contract price. A checkout report shall be prepared by the installation technicians and submitted in triplicate, of which one copy will be registered with the equipment manufacturer. The report shall include, but not be limited to:

1. A complete list of equipment installed and wired.

2. Indication that all equipment is properly installed and functions and conforms to these Specifications.

3. Wiring runs shall be tested for continuity, short circuits and ground before system is energized. Resistance, current and voltage reading shall be made as work progresses.

   a. A systematic record shall be maintained for all readings using schedules or charts of tests and measurements. Areas shall be provided on the logging form for readings, dates, and witnesses.
   b. The Owner shall be notified before the start of the required tests. All items found at variance with the applicable Drawings and/or specifications during testing and inspection by the Owner, shall be corrected by Contractor at no additional cost to the Owner.
   c. Test reports shall be delivered to the Owner when completed.

D. Final Acceptance Test (FAT)

1. The FAT shall be conducted in the presence of the Owner and under the supervision of the Manufacturer. Prior to FAT, the Owner shall be provided Drawings showing the correct address for all addressable alarm initiation devices. The address shall be shown in their respective locations for the device on Drawings. Signals shall be sequentially numbered as the address of the controlling module.

2. System wiring shall be tested to demonstrate correct system response and correct subsequent system operation in the event of:

   a. Open, short, and ground fault for intelligent analog signaling circuit.
   b. Open, short, and ground fault for intelligent digital signaling circuit.
   c. Open, short, and ground fault for network signaling circuit.

d. Intelligent device removal.
e. Primary power or battery disconnected.
f. Type of device miss-match the address ID.
g. Polarity check.
h. Printer trouble, off line or out of paper.

3. System indications shall be demonstrated as follows.

a. Correct message display for each alarm input at the remote control panel, central control panel and operator's workstation graphic display.
   1) Correct annunciator light for each alarm input at each annunciator and color graphic of operator's workstation.
   2) Correct printer logging for all system activity.
b. Secondary power capacities shall be demonstrated as follows.
   1) System primary power shall be disconnected for a period of 8 hours. At the end of that period, an alarm condition shall be created and the system shall perform as specified for a period of 5 minutes.
   2) System primary power shall be restored 48 hours and system charging current shall be normal trickle charge for a fully charges battery pack.
   3) System battery voltages and charging currents shall be checked at the fire alarm control panel using the test code and displayed on the LCD display.

4. In the event of system failure to perform as specified and programmed during the FAT, the test shall be terminated at the discretion of the Owner.

a. The Contractor shall retest the system correcting all deficiencies and providing test documentation to the Owner without additional cost to the Owner.
b. In the event that software changes are required during the FAT, a utility program shall be provided by the system manufacturer to compare the edited program with the original. The utility shall field a printed list of the changes and all system functions, inputs and outputs affected by the changes. The items listed by the program shall be the minimum acceptable to be retested before calling for resumption of the FAT. The printed list and the printer log of the retesting shall be submitted before scheduling of the FAT.
c. The Owner may elect to require the complete FAT to be performed again if, in their opinion, modifications to the system hardware or software warrant complete retesting.

3.04 MANUFACTURER'S FIELD SERVICES

A. Include services of factory-certified technicians to supervise installation, adjustments, calibrations, final connections, and system testing. A representative of the manufacturer shall instruct the Owner and demonstrate the system after the Owner has occupied the building.

B. Formal training for the operation and maintenance of fire alarm equipment and the systems specified herein shall be provided by manufacturer trained and certified personnel. The formal training shall consist of a minimum of five-day eight-hour training sessions or the number of hours as indicated per Contract Document. The timing of the training shall coincide with the schedule for the manufacturer's representatives to be on site for testing and start-up of each building fire alarm system. The formal training shall

be provided at a location designated or provided by the Owner for number of personnel selected by the Owner, in addition to any informal on-site orientation and training.

C. A formal training proposal shall be submitted with curriculum material, schedule, instructor's qualification for the Owner's approval at least 60 days prior to formal training. The trainer shall provide approved training material manuals at the time of training with quantity of copies per Owner's instruction.

D. As-Built Drawings shall be provided upon acceptance of the system with quantities per Contract Document.

END OF SECTION

Appendix B

Alamo Colleges

Telecommunications Infrastructure Standards

For

New Facility Construction, Renovations or Technology Refreshes

Version 2016.12.15

Prepared By:

Austin – Waco - Houston
512-451-5445
www.tncg.com

REVISION LOG

REVISION LOG					UPDATE WITH EACH PUBLICATION	
VERSION	**TITLE**	**OWNER**	**DIRECTOR OF INFORMATION TECHNOLOGY SERVICES**	**ASSOCIATE VICE CHANCELLOR OF FACILITIES OPERATION AND CONSTRUCTION MANAGEMENT**	**SUMMARY OF CHANGES FROM PREVIOUS VERSIONS**	**DATE PUBLISHED**
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PART 1 DOCUMENT PURPOSE

1.01 The Alamo Colleges Telecommunications Infrastructure Standard is a guideline for structured cabling infrastructure systems and spaces to be applied by the design team for new or renovated facilities. Information herein is applicable to the technical designer, Architect, MEP, and contractors, and shall be taken into account for each project by all team members.

A. The standard sets forth parameters for the technical system, in addition to the site and building requirements, to facilitate a properly-installed standards-compliant cabling plant, organized as follows:

1. Telecommunications Spaces; Architectural, HVAC, Power, Entrance Pathways and Conduits

2. Pathways; Cable Management in Telecommunications Spaces, Cable Support in Pathways

3. System Requirements; Backbone Cabling, Horizontal Cabling, Grounding, Labeling, Testing, and As-Built Documentation.

4. Telecommunications Diagrams; Backbone, Building MDF/IDF configuration, MFD/IDF layouts & Rack elevations

1.02 The standard addresses infrastructure for non-specialty campus buildings and is not intended for the design of data centers or specialty facilities, of which should be considered on a case-by-case basis.

1.03 Designers shall not deviate from this standard without explicit written approval from the owner.

1.04 Design team shall coordinate and schedule meeting with Alamo College's Technology Department to review the following:

A. Overall standards document.

B. Technology specifications document.

C. MDF/IDF layout.

D. Horizontal cabling design.

E. Backbone and Uplink cabling design.

F. Electrical power needs within MDF/IDF spaces.

G. HVAC design within MDF/IDF spaces.

H. Telecom grounding system design.

1.05 Any deviations shall immediately be brought to the attention of the owner's representative in writing for resolution.

1.06 Where specific product brands are mentioned, an equal equivalent will be considered following an official submission of product literature and acceptance by the Alamo Colleges Information Technology Services (ITS) Department.

1.07 Where means, methods, and best practices are mentioned, contractor shall follow the manufacturers' and owner's requirements, industry standards, or code, whichever is most stringent.

1.08 Basic contractor qualifications are set forth, but may be made more stringent as applicable to each project based upon size and scope.

PART 2 DOCUMENT HISTORY

2.01 This document supersedes all previous standards which have been fully reevaluated and described herein by the Alamo Colleges Information Technology Services Department, and Facilities Operations and Construction Management Department.

2.02 The contents of the standard were derived by the assembly and input from ITS and Facilities Operations and Construction Management members.

PART 3 INDUSTRY STANDARDS

3.01 The following industry standards shall be adhered to, unless specifically directed otherwise, by Alamo Colleges. The list is not all-inclusive and does not alleviate compliance with applicable standards, codes, and best practices:

A. TIA-568-C.0 Generic Telecommunications Cabling for Customer Premises

B. TIA-568-C.1 Commercial Building Telecommunication Cabling Standards – Part 1 General Requirements (2008)

C. TIA-568-C.2 Balanced Twisted-Pair Telecommunications Cabling and Components Standard (2009)

D. TIA-568-C.3 Optical Fiber Cabling Components Standard (2009)

E. TIA-569-B Commercial Building Standard for Telecommunications Pathways and Spaces - (October 2004)

F. TIA-598-C Optical Fiber Cable Color Coding - (January 2005)

G. TIA/EIA-606-A Administration Standard for Commercial Telecommunications Infrastructure - (May 2002)

H. ANSI J-STD-607-A Commercial Building Grounding and Bonding Requirements for Telecommunications - (October 2002)

I. TIA-758-A Customer-owned Outside Plant Telecommunications Infrastructure Standard - (August 2004)

J. TIA-598-C Optical Fiber Cable Color Coding - (January 2005)

K. TIA-526-7 Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant – OFSTP-7 - (February 2002)

L. TIA-526-14-A Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant – OFSTP-14 - (August 1998)

1. ADA – Americans with Disabilities Act of 2010
   www.ada.gov/2010ADAstandards_index.htm

2. AIA – American Institute of Architects
   www.aia.org

3. ANSI – American National Standards Institute
   www.ansi.org

4. ASHE – American Society of Healthcare Engineering (delete if not healthcare)
   www.ashe.org

5. ASTM – American Society of Testing and Materials
   www.astm.org

6. BICSI – Building Industry Consulting Service International, Inc.
   (RCDD Standards)
   www.bicsi.org

7. CFR – Code of Federal Regulations
   www.gpo.gov/fdsys/browse/collectionCfr.action?collectionCode=CFR
   (Available from the Government Printing Office)
   (Material is usually first published in the Federal Register)

8. U.S. Copyright Law, December 2011
   www.copyright.gov/title17

9. ECIA – Electronic Components Industry Association
   ESC – EIA Standards Council
   www.eciaonline.org

10. IACS – International Annealed Copper Standard
    www.ndt-ed.org/GeneralResources/IACS/IACS.htm

11. IEC – International Electrotechnical Commission
    www.iec.ch

12. IEEE – Institute of Electrical and Electronics Engineers
    standards.ieee.org

13. ISO – International Organization for Standardization
    www.iso.org

14. ITU-T – International Telecommunication Union – Telecommunication
    www.itu.int

15. NEC – National Electrical Code (NFPA 70)
    maintained by NFPA – National Fire Protection Association
    www.nfpa.org

16. NECA – National Electrical Contractors Association
    www.necanet.org

17. NEMA – National Electrical Manufactures' Association
    www.nema.org

18. OSHA – Occupational Safety and Health Administration
    (U.S. Department of Labor, OSHA)
    www.osha.gov

19. TIA – Telecommunications Industry Association
    www.tiaonline.org/standards

20. UL – Underwriters' Laboratories
    www.ul.com

M. Applicable Flame Test: UL 910 (NFPA 262 1990).

PART 4 CONTRACTOR QUALIFICATIONS

4.01 The designer shall include the following Contractor Minimum Qualifications with each project specification:

A. Contractor shall be certified by the manufacturer of all products to furnish a 15-year performance certification for cabling and connectivity, and applicable manufacturer warranties for the remaining products.

4.02 Specific project contractual documents and or requirements developed by the A/E design team for construction shall supersede this standards document.

4.03 Company has the required Prior Project Experience: At least 5 years of installation of structured cabling systems. My company can provide a minimum of three (3) project references that have/had a similar scope and each project equal at least 80% of the base bid price for this project.

4.04 References must include contact name, phone number, email address, brief description of project, date of completion, and contract amount.

4.05 Company meets all of the following minimum qualifications in order to be considered qualified to perform this contract. My company certifies that it:

A. Maintain installers/technicians, certified in the solution being proposed herein.

B. Can respond on-site to standard service calls within 8 hours (business hours) time. Can respond on-site to emergency service calls within 4 hours (business hours) time.

PART 5 NOMENCLATURE

5.01 In many cases, industry nomenclature is used, but is blended with district-specific terms to best suit the College's needs.

A. Industry Specific

1. MDF – Main Distribution Frame, the main point of connection for service providers, houses the backbone terminations and telecommunications equipment for cross-connection and distribution to Intermediate Distribution Frames, and cross-connection to user workstations.

2. IDF – Intermediate Distribution Frame, houses the backbone terminations and telecommunications equipment for cross-connection and distribution to user workstations.

B. Alamo Colleges Specific

1. Campus MDF – MDF that serves the entire campus by distributing backbone connections to the first IDF in each other building on campus and to the IDF-2s of the building in which it resides, and cross-connection to user workstations.

2. Building MDF – MDF that that distributes backbone cables to the IDF-2s in the building in which it resides, and cross-connection to user workstations. Applies to stand alone single-buildings.

3. IDF-1 – the first IDF in every other campus building that distributes backbone cabling to the IDF-2s of the building in which it resides, and cross connects to user workstations. Does not apply to the building with the Campus MDF or stand-alone single buildings with a Building MDF.

4. IDF-2 – IDFs that are not serving as an IDF-1, receive backbone cabling from the Campus MDF, Building MDF, or IDF-1, and cross connects to user workstations.

PART 6 DISTRICT INFRASTRUCTURE STANDARDS

6.01 Telecommunications Spaces

A. Campus MDF (does not apply to a stand-alone single-building facility)

1. Description

a. The Campus MDF is a Telecommunications space that serves a multi-building facility or campus. There is only (1) on each campus.

b. The Campus MDF houses the entrance conduits, terminations, and cross connections for all incoming inter-building backbone cabling from the IDF-1s in other buildings on the campus and the intra-building backbone cabling from the IDF-2s of the building in which it resides, and cross connects to user workstations.

c. Wall and floor space shall be reserved for service provider demarcation equipment and incoming infrastructure terminations.

d. Campus distribution network equipment, servers, and other centralized telecommunications related equipment will reside in the Campus MDF; the Campus MDF is not intended to support academic or district servers, which will reside in separate space.

e. The Campus MDF may share space with other systems such as security panels, fire alarm panels, paging systems, CATV, and building control panels.

f. The Campus MDF shall not be used for storage, serve as a mechanical or electrical distribution space, nor shall it have, within its space, main electrical feeds, water or sprinkler main lines.

g. The layout of racks, cabinets, wall fields, and cable management shall be as indicated on the attached diagrams.

2. Architectural (Campus MDF)

a. The Campus MDF shall me a minimum of 600 square feet with a minimum clear lineal wall length of at least 30 feet; all walls shall go to deck. Refer to MDF diagram for dimensions as minimum depth and wide are critical to proper front/rear rack clearances.

b. The floor is not required to be raised; floor finish shall be sealed bare concrete.

c. The Campus MDF shall not contain windows.

d. Campus MDF shall have an exterior wall that is within 50 feet of the building exterior, and not be located adjacent to or below restrooms or other water-based facilities, or sources of EMI and mechanical vibration.

e. All walls of the Campus MDF shall be covered with AC Grade ¾” Fire Retardant Plywood, aligned vertically starting at 18 inches above finished floor extending to 114” above finished floor. The plywood shall be painted, but contractor shall take care to cover fire rating stamps on each piece of plywood. Contractor shall ensure fire-rated stamp is not painted or covered.

f. The room shall be without a ceiling, if possible, or a lift-out tile ceiling, when required. Cables or devices penetrating the ceiling tiles shall not pass

through a bare ceiling tile but shall be routed through adequately sized bushings. The ceiling shall be a minimum of 24 inches above the highest rack or cable runway; 36 inches is recommended.

g. Entry to the space shall be through a minimum 42-inch by 80-inch clear door opening that swings outward. Door shall be solid core or steel with no window. The door shall securely lock and access shall only be by Alamo Colleges - approved personnel. The door shall open to an interior hallway or space; it is not recommended that the door open to the exterior of the building.

h. When an access control security system is available, the entrance to the Campus MDF shall be equipped with a proximity card reader and electrified door hardware. When a surveillance system is available, the Campus MDF shall be equipped with at least (1) camera.

i. Fire suppression for the Campus MDF shall be sprinklers in the MDF when the remainder of the building is equipped with a sprinkler system.

    i. A pre-action fire suppression system shall be considered by the design team on a case-by-case basis. For each project, the design team (architect, MEP and technology consultant) shall coordinate meeting with the Owner to discuss full MEP design including pre-action fire suppression system needs.

3. HVAC (Campus MDF)

    a. The Campus MDF shall be serviced by a dedicated air conditioning unit that is part of the building's main system and managed and monitored by the building management system. The unit shall maintain a constant 24/7 cooled environment between 68° and 75° F with humidity of 41.9°F Dew Point to 60% RH and 59°F Dew Point, or the current ASHRAE recommendations at the time of construction.

    b. Typically, the minimum HVAC load shall be designed to displace 20KW of power, or 6 Tons, and shall be designed to load, if the known load is greater at the time of design. For each project, the design team (architect, MEP and technology consultant) shall coordinate a meeting with the Owner to discuss full MEP design including HVAC system needs.

    c. It is recommended that the Campus MDF maintain the stated temperature and humidity in the event of building power outages or primary HVAC system failure.

    d. Air delivery shall be aligned in the front of the equipment rows and returns at the rear of the equipment rows.

4. Lighting (Campus MDF)

    a. Fluorescent light fixtures shall be at least 12 inches above the top of the highest rack or cable runway, 18 inches is recommended. Lighting shall be a minimum of 50-foot candles measured at 3 feet above the floor in the entire space.

    b. The Campus MDF shall be equipped with emergency lighting to keep the space lit during power outages.

5. Power (Campus MDF)

   a. Power for the Campus MDF shall be in two categories: dedicated and convenience.

   b. Dedicated

      i. The Campus MDF shall be equipped with (2) dedicated 208 volt 3-phase 150 Amp circuits, 4-wire (2PH + N +G), hardwired to the UPS(s). The originating electrical panel will be equipped with (2) 150 AMP breakers. Conductors shall be routed from the panel in conduit to the UPS wiring terminals. Each outlet shall be labeled with circuit and panel.

      ii. The Campus MDF shall be equipped with a minimum of (1) APC Symmetra LX 16kVA, Scalable to 16kVA N+1 Ext. Run Tower, 208/240V, to provide 30 minutes of run time at full load. An additional circuit and space shall be allocated should the load exceed 16kVA and a second UPS be required.

      iii. Additional power circuits to be allocated to security, fire alarm, CATV, building controls, and service provider equipment shall be considered and coordinated at the time of building design.

      iv. Power distribution to the racks and cabinets shall be achieved by installing PDUs which are not within the scope of this document and are to be provided by the Alamo Colleges network department.

      v. <u>For each project, the design team (architect, MEP, and technology consultant) shall coordinate a meeting with the Owner to discuss full MEP design including HVAC system needs.</u>

   c. Convenience

      i. The Campus MDF shall be equipped with 20 Amp Duplex NEMA 5-20R receptacles, with maximum (6) receptacles on each circuit. The originating electrical panel shall be equipped with a 20 Amp breaker per circuit.

      ii. A Duplex receptacle shall be spaced at least 1 foot from an adjacent wall and every 6 feet thereafter. A minimum of (1) Duplex receptacle shall be placed in each wall and be flush mounted to the finished wall surface at 18 inches above finished floor.

      iii. Refer to MDF layout diagrams for outlet locations.

6. Racks and Cable Management (Campus MDF)

   a. The Campus MDF shall be equipped with four (4) Standard 2-post Equipment Racks.

      i. Each rack shall be equipped with a vertical cable manager on both sides of the rack. Adjacent racks may share a vertical wire manager between them.

      ii. Each rack shall be equipped with a horizontal wire manager above and below each horizontal patch panel.

   b. The Campus MDF shall be equipped with (2) Server Cabinets. Cabinets shall be bayed together with removable side panels when mounted adjacently. The fronts of the cabinets shall face the front of the future cabinet row to allow for a hot row cold row configuration.

i. Space shall be allocated for an additional (7) future Server Cabinets.

ii. Space equivalent to (2) Server Cabinets shall be allocated for service provider equipment.

c. The Campus MDF shall be equipped with cable runway encircling the room at 86 inches above the finished floor, and crossing the room parallel to the rack rows (3) times.

i. Cable runway shall attach to the tops of Standard Equipment Racks utilizing rack-to-runway hardware kits.

ii. Cable runway shall suspend above Server Cabinets and be supported overhead by all thread to the building structure utilizing manufacturer-approved hardware and methods.

iii. A vertical section of cable runway shall be attached to the wall board to manage backbone and service provider cables as they transition from the entrance conduits to the overhead cable runway.

7. Fiber Routing System

a. In each MDF, Design shall include a Fiber Routing System horizontally adjacent to above rack tray system. All fiber cables shall be placed in Fiber Routing System.

b. Duct shall be made of 6”x4” yellow PVC material. All straight sections, corners and drop out shall be part of a complete manufactured system.

B. Building MDF (does not apply to a multi-building campus facility)

1. Description

a. The Building MDF is a Telecommunications space that serves a single stand-alone building that is not part of a multi-building campus. There is only (1) in each stand-alone building.

b. The Building MDF houses the entrance conduits, terminations, and cross connections for all incoming intra-building backbone cabling from the IDF-2s of the building in which it resides, and cross connects to user workstations.

c. Wall and floor space shall be reserved for service provider demarcation equipment and incoming infrastructure terminations.

d. Building distribution network equipment, servers, and other telecommunications related equipment will reside in the Building MDF.

e. The Building MDF may share space with other systems such as security panels, fire alarm panels, paging systems, CATV, and building control panels.

f. The Building MDF shall not be used for storage, serve as a mechanical or electrical distribution space, nor shall it have within its space main electrical feeds, water or sprinkler main lines.

g. The layout of racks, cabinets, wall fields and cable management shall be as indicated on the attached diagram.

2. Architectural (Building MDF)

   a. The Building MDF shall me a minimum of 400 square feet with a minimum clear linear wall length of at least 25 feet; all walls shall go to deck.

   b. The floor is not required to be raised; floor finish shall be sealed bare concrete.

   c. The Building MDF shall not contain windows.

   d. Building MDF shall have an exterior wall that is within 50 feet of the building exterior, and not be located adjacent to or below restrooms or other water-based facilities, or sources of EMI and mechanical vibration.

   e. Fluorescent light fixtures shall be at least 12 inches above the top of the highest rack or cable runway, 18 inches is recommended. Lighting shall be a minimum of 50-foot candles measured at 3 feet above the floor in the entire space.

   f. The room shall be without a ceiling if possible or a lift-out tile ceiling when required. Cables or devices penetrating the ceiling tiles shall not pass through a bare ceiling tile but shall be routed through adequately sized bushings. The ceiling shall be a minimum of 24 inches above the highest rack or cable runway, 36 inches is recommended.

   g. Entry to the space shall be through a minimum 42-inch by 80-inch clear door opening that swings outward. Door shall be solid core or steel with no window. The door shall securely lock, and access shall only be by Alamo Colleges approved personnel. The door shall open to an interior hallway or space; it is not recommended that the door open to the exterior of the building.

   h. When an access control security system is available, the entrance to the Campus MDF shall be equipped with a proximity card reader and electrified door hardware. When a surveillance system is available, the Building MDF shall be equipped with at least (1) camera.

   i. Fire suppression for the Building MDF shall be sprinklers in the MDF when the remainder of the building is equipped with a sprinkler system.

      i. A pre-action fire suppression system shall be considered by the design team on a case-by-case basis.

3. HVAC (Building MDF)

   a. The Building MDF shall be serviced by a dedicated unit that is part of the building's main system. The unit shall maintain a constant 24/7 cooled environment between 68° and 75° F with humidity of 41.9°F Dew Point to 60% RH and 59°F Dew Point, or the current ASHRAE recommendations at the time of construction.

   b. The HVAC load shall be designed to displace a minimum of 12KW of power, or 3.5 Tons, and shall be designed to load, if the known load is greater at the time of design.

   c. It is recommended that the Building MDF maintain the stated temperature and humidity in the event of building power outages or primary HVAC system failure.

   d. Air delivery shall be aligned in the front of the equipment rows and returns at

the rear of the equipment rows.

4. Lighting (Building MDF)

   a. Fluorescent light fixtures shall be at least 12 inches above the top of the highest rack or cable runway, 18 inches is recommended. Lighting shall be a minimum of 50-foot candles measured at 3 feet above the floor in the entire space.

   b. The Building MDF shall be equipped with emergency lighting to keep the space lit during power outages.

5. Power (Building MDF)

   a. Power for the Building MDF shall be in two categories: dedicated and convenience.

   b. Dedicated

      i. The Building MDF shall be equipped with (2) dedicated 208 volt 3-phase 150 Amp circuits, 4-wire (2PH + N +G), hardwired to the UPS(s). The originating electrical panel will be equipped with (2) 150 AMP breakers. Conductors shall be routed from the panel in conduit to the UPS wiring terminals.

      ii. The Building MDF shall be equipped with a minimum of (1) APC Symmetra LX 16kVA Scalable to 16kVA N+1 Ext. Run Tower, 208/240V, to provide 30 minutes of run time at full load. An additional circuit and space is allocated should the load exceed 16kVA and a second UPS be required.

      iii. Additional power circuits to be allocated to security, fire alarm, CATV, building controls, and service provider equipment shall be considered and coordinated at the time of building design.

      iv. Power distribution to the racks and cabinets shall be achieved by installing PDUs which are not within the scope of this document and are to be provided by the Alamo Colleges network department.

   c. Convenience

      i. The Building MDF shall be equipped with 20 Amp Duplex NEMA 5-20R receptacles, with maximum (6) receptacles on each circuit. The originating electrical panel shall be equipped with a 20 Amp breaker per circuit.

      ii. A Duplex receptacle shall be spaced at least 1 foot from an adjacent wall and every 6 feet thereafter. A minimum of (1) Duplex receptacle shall be placed in each wall and be flush mounted to the finished wall surface at 18 inches above finished floor.

6. Racks and Cable Management (Building MDF)

   a. The Building MDF shall be equipped with (4) Standard Equipment Racks.

      i. Each rack shall be equipped with a vertical cable manager on both sides of the rack. Adjacent racks may share a vertical wire manager between them.

      ii. Each rack shall be equipped with a horizontal wire manager above and below each horizontal patch panel.

b. The Building MDF shall be equipped with (1) Server Cabinet. The fronts of the cabinets shall face the row of equipment racks.

i. Space shall be allocated for an additional (3) future Server Cabinets.

a) Cabinets shall be bayed together with sides removed when mounted adjacently.

ii. Wall space at the back of the Building MDF shall be allocated for service provider equipment.

c. The Building MDF shall be equipped with cable runway encircling the room at 86 inches above the finished floor, and crossing the room parallel to the rack rows (2) times.

i. Cable runway shall attach to the tops of Standard Equipment Racks utilizing rack-to-runway hardware kits.

ii. Cable runway shall suspend above Server Cabinets and be supported overhead by all thread to the building structure utilizing manufacturer-approved hardware and methods.

iii. A vertical section of cable runway shall be attached to the wall board to manage backbone and service provider cables as they transition from the entrance conduits to the overhead cable runway.

C. IDF-1 and IDF-2

1. Description

a. IDF-1

i. An IDF-1 is a Telecommunications space that resides in each building that is part of a multi-building campus. There is only (1) in each building that is part of a multi-building campus (other than the building housing the Campus MDF.)

ii. An IDF-1 houses the entrance conduits, terminations, and cross connections for all incoming inter-building cabling from the Campus MDF and all intra-building backbone cabling from the IDF-2s of the building in which it resides.

iii. An IDF-1 houses the terminations and cross connections for the horizontal user workstation cabling in the area of the building that it serves.

iv. An IDF-1 does not exist in a single stand-alone building.

b. IDF-2

i. An IDF-2 is a Telecommunications space that resides in each building that requires more than a single closet from which to terminate horizontal workstation cables. There may be multiple IDF-2s in each building as required to maintain horizontal cable distances of 295 feet for the permanent link.

ii. An IDF-2 houses the terminations, and cross connections for all incoming intra-building cabling from the MDF or IDF-1 of the building in which it resides.

iii. An IDF-2 houses the terminations and cross connections for the horizontal user workstation cabling in the area of the building that it serves.

c. Building workstation access network equipment will reside in the IDFs.

d. The IDF may share space with other systems such as security panels, CATV cabling, and paging system cabling.

e. The IDF shall not be used for storage, serve as a mechanical or electrical distribution space, nor shall it have within its space main electrical feeds, water or main sprinkler lines.

f. The layout of racks, wall fields, and cable management shall be as indicated on the attached diagrams.

2. Architectural (IDF-1 and IDF-2s)

a. The IDF shall be a minimum of 108 square feet with minimum clear lineal wall lengths of at least 9 feet by 12 feet; all walls shall go to deck.

b. Floor finish shall be bare concrete.

c. Windows are not recommended.

d. IDFs shall be arranged in a stacked formation in multi-story buildings, and not be located near sources of EMI and mechanical vibration.

e. All walls of the IDF shall be covered with AC Grade ¾" Fire Retardant Plywood, aligned vertically starting at 12 inches above the finished floor. The plywood shall not be painted. Contractor sall ensure fire-rated stamp is not painted or covered.

f. The room shall be without a ceiling.

g. Entry to the space shall be through a minimum 36-inch by 80-inch clear door opening that swings outward. Door shall be solid core or steel with shatter-proof window if equipped. The door shall securely lock and access shall only be by Alamo Colleges-approved personnel.

h. When an access control security system is available, the entrance to the IDF shall be equipped with a proximity card reader and electrified door hardware. When a surveillance system is available an IDF shall be equipped with at least (1) camera.

3. HVAC (IDF-1 and IDF-2s)

a. The IDF shall be serviced by the building HVAC system and be equipped with Split DX system through the wall above the door which cools only when the building HVAC is inadequate or not running. The system or unit shall maintain a constant 24/7 cooled environment between 68° and 75° F with a humidity of 40% to 55%.

b. The minimum HVAC load shall be designed to displace 2KW of power, or 0.6 of a Ton, and be designed to load if the load is greater and known at the time of design.

4. Lighting (IDF-1 and IDF-2s)

a. Fluorescent light fixtures shall be at least 12 inches above the top of the highest rack or cable runway, 18 inches is recommended. Lighting shall be a minimum of 40-foot candles at 2 feet above the floor in the entire space.

5. Power (IDF-1 and IDF-2s)
    a. Power for the IDF shall be in two categories: dedicated and convenience.
    b. Dedicated
        i. The IDF shall be equipped with (2) dedicated 120 volt 20 Amp circuits, each with a simplex NEMA L5-20R receptacle. The originating electrical panel will be equipped with 20 AMP breakers. Conductors shall be routed from the panel in conduit along the cable runway to a metallic back box clipped to the rail of the Cable Runway, facing the rear of the racks.
        ii. The IDF shall be equipped with (1) APC Symmetra SmartUPS 2200 SUA2200R2X106 with a single NEMA L5-20P power cord to provide 5 minutes of run time at full load.
        iii. Additional power circuits to be allocated to security and CATV shall be considered and coordinated at the time of building design.
        iv. Power distribution shall be achieved by the installation of PDUs which are outside the scope of this document and furnished by the network department.
    c. Convenience
        i. The IDF shall be equipped with 20 Amp Duplex NEMA 5-20R receptacles, maximum (6) per circuit. The originating electrical panel shall be equipped with a 20 Amp breaker per circuit.
        ii. A Duplex receptacle shall be spaced at least 1 foot from an adjacent wall and every 6 feet thereafter. A minimum of (1) Duplex receptacle shall be placed in each wall and be flush mounted to the finished wall surface at 18 inches above finished floor.
6. Racks and Cable Management (IDF-1 and IDF-2s)
    a. The IDF shall be equipped with (2) Standard Equipment Racks.
        i. Each rack shall be equipped with a vertical cable manager on both sides of the rack. Adjacent racks may share a vertical wire manager between them.
        ii. Each rack shall be equipped with a horizontal wire manager above and below each horizontal patch panel. An equal number of horizontal wire managers shall be furnished for the network switches and installed as directed by the owner.
            a) Space shall be reserved for an additional rack and vertical wire manager
            b) A third rack and vertical wire manager shall be installed in IDFs that serve equipment racks located in Lab(s).
    b. The IDF shall be equipped with cable runway encircling the room at 90 inches above the finished floor, and crossing the room parallel to the rack rows (1) time.
        i. Cable runway shall attach to the tops of Standard Equipment Racks utilizing rack-to-runway hardware kits.

ii. A vertical section of cable runway shall be attached to the wall board to manage backbone cables as they transition from floor sleeves to the overhead cable runway.

6.02 Entrance Pathways and Conduits

A. Design Principles

1. Pathways and conduits are described herein with regard to capacity, function, and basic design principles and shall be designed by the MEP in accordance with NEC and EIA/TIA-758, Customer Owned Outside Plant Telecommunications Cabling.

2. Telecommunications Conduit Systems shall:

a. Contain no more than the equivalent (2) 90 degree bends between pull boxes.

b. Maintain a minimum bend radius of 10 times the diameter of the conduit.

c. Not exceed 40 percent fill ratio for multiple cables.

d. Be placed at a minimum depth of 24 inches from the top of the conduit to the finished grade.

e. Be interrupted by an adequately sized pull box at least every 600 feet for sections containing up to (1) 90 degree of bend, and at least every 350 feet for sections with the equivalent of (2) 90 degree bends.

i. Pull boxes shall be of adequate depth for conduits to enter from the side of the pull box and not be required to sweep up into the box.

f. Stub up into the MDF between 1 and 3 inches above the finished floor.

g. Contain a pulling tape, be fitted with bushings, and sealed appropriately at both ends.

B. Service Provider Conduits

1. Minimum of (4) 4-inch conduits shall route underground from the MDF to the edge of the property Right of Way and terminate as required by the service provider. Additional conduits shall be added as required.

2. Manholes and pull boxes shall be utilized as required for a telecommunications-compliant conduit distribution system.

3. Where the service provider termination location is unidentified at the time of design, the conduits shall route from the MDF to an adequately-sized pull box or manhole at least 30 feet from the building edge.

C. Campus Serving Conduits

1. Minimum of (2) 4-inch conduits shall route underground from the Campus MDF to the IDF-1 of each additional building on the campus. Additional conduits shall be added as required if fill capacity exceeds 40 percent.

2. Manholes and pull boxes shall be utilized as required for a Telecommunications-compliant conduit distribution system.

3. Where only the first building of a campus is being designed, two (2) 4-inch conduits for each additional future building shall route from the campus MDF to an adequately-sized pull box or manhole at least 30 feet from the building edge.

D. Building Entrance for Large Campus

1. For large campuses, the MEP and Structural Engineer shall consider a conduit entrance vault as part of the Campus MDF sub floor.

6.03 Cable Management in Telecommunications Spaces

A. Racks

1. Racks shall be black aluminum Standard Equipment Racks with EIA 19-inch rails, 84-inch (45 RMU) overall height, 3-inch rail depth, dual floor mounting flanges, and rack mount unit markings engraved on the rails.

2. Racks shall be bolted to the concrete floor and the overhead cable runway utilizing manufacturer-recommended hardware and methods.

B. Server Cabinets

1. Server Cabinets shall be 24 inches by 42 inches by 84 inches with adjustable front and rear EIA 19” rail kits, enclosed with ventilated front and rear locking doors, adjustable leveling feet, vertical cable manager for one rail, and grounding kit.

2. Cabinets shall be set directly on the finished floor but not bolted unless set on a raised floor. Adjacent cabinets shall be bayed together with the sides removed.

C. Overhead Cable Management

1. Overhead Cable Management shall be 18-inch (MDF) or 12-inch (IDF) Universal Cable Runway made of 3/8” x 1-1/2” x .065” wall rectangular steel tubing with cross members welded at 12-inch intervals.

a. Cable Runway shall be installed utilizing appropriate hardware to support, join, or attach sections to structures, and shall be supported at a minimum of 5 foot intervals.

D. Vertical Cable Managers

1. Vertical cable managers shall be black double-sided, 6 inches wide, 12.75 inches deep, and 84 inches tall, no doors, and include formed cabling sections, lockable cabling latches at 12-inch intervals, and protective edge guards.

a. Bolt vertical cable managers to the racks with included hardware kit.

E. Horizontal Cable Managers.

1. Attach horizontal cable managers to the rack rails with included screws.

2. Contractor shall provide managers above and below each patch panel and sufficient managers for additional owner provided LAN Switches. For each horizontal patch panel, the contractor shall provide 1 horizontal cable manager for LAN switches.

6.04 Cable Support in Pathways

A. Main Cable Pathway

1. Main cable pathway shall be designed by the MEP, shown on the electrical drawings, and be installed by the Division 26 electrical contractor. Cable Tray shall be Electro Zinc Wire Mesh Basket Tray, minimum 12 inches wide by 2 inches tall; size shall be scaled to the application not to exceed 40 percent fill ratio.

2. Basket Tray shall be installed utilizing appropriate hardware to support, join, or attach sections to structures, shall be supported at a minimum of 5-foot intervals, and grounded as a single-conductor system. Tray manufacturer recommendations shall be followed.

B. Sleeves and Penetrations and EZ Path

1. Sleeves and Penetrations are described herein with regard to capacity, function, and basic design principles and shall be designed by the MEP in accordance with NEC and EIA/TIA-569-B, Commercial Building Standard for Telecommunications Pathways and Spaces.

2. All sleeves shall be equipped with nylon bushings.

3. Scale the quantities of sleeves to maintain a 40 percent fill ratio (or less) in each sleeve.

4. Above MDFs or IDFs install minimum of (4) 4” EMT sleeves through the partition wall between the MDF or IDF overhead space and the main cabling pathway.

5. Between directly aligned vertically stacked MDF and IDFs install minimum of (2) 4” EMT sleeves into bored penetrations through the upper floor structure.

6. Between slightly skewed vertically stacked MDF and IDFs install minimum of (2) continuous 4” EMT conduits from the outside wall of the upper to the outside wall of the lower IDF.

7. Between completely skewed MDFs and IDFs on adjacent floors, install minimum of (2) 4” EMT sleeves through the floor the upper IDF into the accessible ceiling space below and utilize above-ceiling pathways to route cabling into the IDF or MDF on the lower floor.

    a. Pathways thru Fire rated walls of each MDF & IDF shall be STI EZ Path cable pathway devices shall be used in fire-rated construction for ALL low-voltage, video, data and voice cabling, optical fiber raceways and certain high-voltage cabling where frequent cable moves, adds and changes may occur. Pathways required for high voltage cabling will be detailed on the prints. Such devices shall: Meet the hourly fire-rating of fire rated wall and or floor penetrated.

    b. Be tested for the surrounding construction and cable types involved.

    c. Have UL Systems permitting cable loads from; “Zero to 100% Visual Fill.” This requirement eliminates the need for fill-ratio calculations to be made by cable technicians to ensure cable load is within the maximum allowed by UL System.

    d. Not have inner fabric liner that tightens around and compresses cables tightly together encouraging potential cable damage or interference.

e. Removal and or replacement of any material such as, but not limited to, firestop caulk, putty, pillows, bags, foam muffins, foam, foam plugs, foam blocks, or foam closures of any sort.

f. Pathways shall be engineered such that two or more devices may be ganged together for larger cable capacities.

g. Pathways shall be engineered to be re-enterable so they can be retrofitted and removed from around existing cables without cutting and re-splicing them.

h. Cable Pathway Devices passing vertically through floors shall have equal F & T Rating. (See UL System # F-A-3037, Item #4 “EZ-PATH Grid T-Rating Kit” Part # TRK444)

i. Affix adhesive wall label immediately adjacent to devices to communicate to future cable technicians, authorities having jurisdiction and others the manufacturer of the device and the corresponding UL System number installed.

C. Workstation Rough-ins and local power

1. At each wall-mounted workstation location, install a 4 inch by 4 inch by 2-1/8 inch double-gang back box with double-gang mud ring at 18 inches above the finished floor, at 42 inches for emergency wall phones, 6 inches below the ceiling grid for wireless access points and IP cameras, and at appropriate height for above-counter and millwork locations.

   a. Install a 1-inch conduit from the rough-in box to the cable tray.

   b. Terminate the conduit above the edge of the cable tray and install nylon bushings and pull string, the conduit is not required to be bonded to the cable tray.

      i. Conduit shall be installed in accordance with EIA/TIA-569-B, contain no more than the equivalent of (2) 90 degree bends and or 98.4 feet between pull boxes, and maintain a bend radius of 6 times the diameter of the conduit.

2. At floor-mounted workstation locations, install a floor box or poke-thru specifically designed for the application and environment adequately sized to accommodate the quantity of installed horizontal data cables.

   a. Install (1) 1 inch conduit for every (6) cables from the floor box to the cable tray.

      i. For poke-thrus, route the conduit to the cable tray in the floor below.

      ii. Floor-mounted outlets should be avoided and all other possible design solutions shall be considered.

3. For modular furniture workstations, a rough-in pathway shall be considered and designed according to the furniture type, quantity of cables, and location as required for each furniture system.

   a. The use of power poles shall be considered only on a case-by-case basis.

4. For above ceiling-mounted outlets such as Wireless Access Points or IP Cameras, no rough-in is required, the data cable will terminate into a surface-mount box secured to the structure above the ceiling grid. Install cable outlet ID on ceiling grid within 3’ of the outlet in the ceiling.

5. The electrical engineer shall design at a minimum (1) duplex NEMA 5-15R receptacle within 18” of each workstation outlet location.

6.05 Backbone Cabling

A. Inter-building Backbone Cabling (Campus)

1. Copper

a. Inter-building Backbone Copper Cabling shall be 50-pair PE-39 24 AWG flooded UTP from the Campus MDF to the IDF-1 in each of the buildings on the campus. Provide a 10-foot service loop at both ends of each cable stored on the wall above or below the cable runway. Provide a 30-foot service loop in each manhole or pull box. Cables shall be secured with Hook-and-loop Velcro tie-wraps in the MDF or IDF.

b. Inter-building Backbone Copper Cabling shall terminate on UL-listed 50-pair 110 IDC in/out lightning protection panels equipped with UL-listed 5-pin solid state quick-acting protector modules. The secondary side of the panel shall be connected to a 50-Pair 110 Block with legs. Panels and blocks shall be wall mounted.

2. Fiber

a. Inter-building Backbone Fiber Optic Cabling shall be loose tube outdoor-rated composite 12-Strand Single Mode / 24-Strand 50 micron OM3 (up to 300 meters) or OM4 (over 300 meters) Multi Mode from the Campus MDF to the IDF-1 in each of the buildings on the campus, installed in 1-inch outdoor-rated innerduct, and dressed with fan-out kits as required. Provide a 10-foot service loop at both ends of each cable stored on the wall above or below the cable runway. Provide a 30-foot service loop in each manhole or pull box. Cables shall be secured with Hook-and- loop Velcro tie-wraps in the MDF or IDF.

b. Terminate all strands of each fiber optic cable on LC connectors. Connect terminated LC connectors to the back of coupler panels placed into 19 inch rack-mounted fiber optic termination housings.

B. Intra-building Backbone Cabling

1. Copper

a. Intra-building Backbone Copper Cabling shall be 25-pair Category 3 plenum rated 24 AWG UTP from the MDF or IDF-1 to each of the IDF-2s in the building. Provide a 10-foot service loop at both ends of each cable stored on the wall above or below the cable runway. Cables shall be secured with Hook-and- loop Velcro tie-wraps in the MDF or IDF.

b. Intra-building Backbone Copper Cabling shall terminate on a 110 Block with legs; blocks shall be wall mounted.

2. Category 6A Network Uplinks

a. Category 6A network uplinks shall be (2) Category 6A UTP plenum rated blue sheath, between the Special Systems patch panels in MDF and IDFs on adjacent floors that are vertically stacked, and between IDF-2s on the same floor, where the permanent link of the Category 6A cable does not exceed 314 feet (allowing a total of 14’ of patch cables while not exceeding a 328’ channel length).

3. Fiber

   a. Intra-building Backbone Fiber Optic Cabling shall be tight buffered plenum-rated composite 6-Strand Single Mode / 12-Strand 50 micron OM3 (up to 300 meters) or OM4 (over 300 meters) Multi-Mode, encased in orange interlocking armor. Provide a 10-foot service loop at both ends of each cable stored on the wall above or below the cable runway. Cables shall be secured with Hook-and-loop tie-wraps in the MDF or IDF and in the cable tray.

   b. Terminate all strands of each fiber optic cable on LC connectors. Connect terminated LC connectors to the back of coupler panels placed into 19-inch rack-mounted fiber optic termination housings.

6.06 Horizontal Cabling

A. Workstation Cable

1. Horizontal Data Cabling shall be Category 6/6A UTP, minimum factory sweep tested to 550 MHz, plenum rated, blue sheath, installed from the patch panel in the MDF or IDF to the workstation location not to exceed 295 feet for the permanent link. Provide a 10’ service loop in the MDF or IDF, and 1-foot of slack behind the faceplate. Cable bundles shall be secured with Hook-and- loop Velcro tie-wraps in the MDF or IDF and in the cable tray.

2. At the workstation, each Category 6/6A cable shall be terminated in a gray Category 6/6A modular jack insert and snapped into a 2-gang, furniture, floor box or poke-thru faceplate. Faceplates shall be equipped with desi-windows for labeling and blank inserts in unused ports. Wall phone workstations shall be equipped with a studded wall phone faceplate capable of accepting a modular jack insert. All faceplate colors shall be coordinated with the Architect or owner at the time of installation.

3. In the MDF or IDF, each Category 6/6A cable shall be terminated on the back of Category 6/6A 48-port IDC patch panels which are mounted in the 19-inch racks.

4. Category 6/6A cable shall be terminated with the EIA-568B sequence.

5. Horizontal cabling shall be manufactured by:

   a. BerkTek

   b. General

   c. Hitachi

B. Patch Panels

1. Horizontal cables shall be terminated at the MDF/IDF rooms on high-density integrated patch panels incorporating Category 6/6A jacks (non-keyed 8-pin), meeting the specifications for the telecommunications outlet detailed in the section above.

2. Patch panel configuration shall be 48 ports.

3. Standard Data Cable patch panel shall exceed ANSI/TIA/EIA 568-C.2-1 Category 6/6A component compliance standard. All pair combinations shall be considered, with the worst-case measurement being the basis for compliance.

4. Special Systems (WAP & Uplink) Data Cable patch panel shall exceed ANSI/TIA/EIA 568-C.2-1 Category 6A component compliance standard. All pair combinations shall be considered, with the worst-case measurement being the basis for compliance.

5. The patch panels shall be interoperable and backwards compatible to lower performing cabling systems.

6. Panels shall incorporate cable support and/or strain relief mechanisms to secure the horizontal cables at the termination block and to ensure that all manufacturers' minimum bend radius specifications are adhered to.

7. The patch panel shall have color-coded designation strips to identify cable count.

8. Patch panels shall be manufactured by Leviton.

C. Patch Cords

1. In each MDF or IDF, furnish to the owner at the time of final inspection (1) Category 6 modular non-booted patch cord for each terminated horizontal data cable plus 25 percent, 50 percent of the total quantity shall be blue and the other 50 percent shall be green in the following proportions:

   a. Blue – Cat 6 [Standard data/phone]

      i) 33% 7-foot

      ii) 33% 10-foot

      iii) 33% 14-foot

   b. Green – Cat 6 [Standard data/phone]

      i) 33% 7-foot

      ii) 33% 10-foot

      iii) 33% 14-foot

   c. Yellow - Cat 6A [Wireless APs)

      i) Two (2) 7-foot for each WAPs

   d. Red – Cat 6 [Fire Alarm or Security Equipment]

      i) Two (2) 10-foot for each cable installed

   e. Orange – Cat 6A [Copper Backbone Uplinks]

      i) Four (4) 7-foot for each IDF

2. For outlets, furnish to the owner at the time of final inspection (1) Category 6 modular non-booted patch cord for each terminated horizontal data cable plus 25 percent, 50 percent of the total quantity shall be blue and the other 50 percent shall be green in the following proportions:

   a. Blue – Cat 6

      i) 50% 10-foot

      ii) 50% 14-foot

b. Black

i) 50% 10-foot

ii) 50% 14-foot

3. Fiber optic patch cables shall be furnished by the ITS Network Department.

D. Workstation Configurations (data outlets)

1. Modular Jack

a. Data jacks shall be non-keyed 8-pin modular jacks.

b. Termination components shall be designed to maintain the cable's pair twists as closely as possible to the point of mechanical termination.

c. Jacks shall utilize a four-layer printed circuit board to control NEXT.

d. Jack housings shall fully encase and protect printed circuit boards and IDC fields.

e. Modular jack contacts shall accept 2500 plug insertions.

f. Modular jack contacts shall be formed flat for increased surface contact with mated plugs. These contacts shall be arranged on the PC board in two staggered arrays of four to maximize contact spacing and minimize crosstalk.

g. Jacks shall terminate 22-26 AWG stranded or solid conductors.

h. Jacks shall terminate insulated conductors with outside diameters up to .050".

i. Jacks shall be compatible with EIA/TIA 606 color code labeling and accept snap on icons for identification or designation of applications.

j. Jacks shall be marked as either T568A or T568B wiring.

2. Category 6/6A jacks shall be manufactured by Leviton.

E. Office Workstation

1. Install (2) Category 6 cables terminated on gray jack inserts into a double gang flush faceplate.

a. Furnish a minimum of (1) 2-port workstation on each of (3) walls in each office.

b. Modular furniture clusters shall be designed to accommodate the user requirements at the time of construction.

2. Category 6 jacks shall be manufactured by Leviton to match District standards

F. Classroom Instructor Workstation

1. Install (2) Category 6 cables terminated on gray jack inserts into a double gang flush faceplate.

2. Furnish a minimum of (2) 2-port instructor workstations in each classroom oriented in the front and back of each room.

3. Category 6 jacks shall be manufactured by Leviton to match District standards

G. High-Density Workstation

1. Install up to (6) Category 6 cables terminated on gray jack inserts into a double gang flush faceplate.

2. Category 6 jacks shall be manufactured by Leviton to match District standards

H. Emergency Wall-Phone Outlet

1. Install (2) Category 6 cables terminated on a gray jack insert into a double gang faceplate mounted at the Architect's designated height for emergency phones

2. Category 6 jacks shall be manufactured by Leviton to match District standards.

I. Ceiling-mounted Projector Outlet

1. Install (2) Category 6 cables terminated on a gray jack insert into a single gang faceplate at the projector plate.

2. Category 6 jacks shall be manufactured by Leviton to match District standards

J. Wireless Access Point Outlet

1. Install (2) Category 6A cables with 20-foot slack loops at each workstation, terminated on gray jack inserts into a double gang flush faceplate or surface mount box secured to the building structure when mounted above the ceiling.

2. When a Wireless Access Point workstation is installed above the ceiling grid, a label identical to the label on the surface mount box shall be permanently attached to the ceiling grid directly below the surface mount box.

3. At the time of construction, the designer shall take into account the user requirements for wireless coverage and include a sufficient quantity of WAP workstations to enable said coverage.

K. IP Camera Outlet

1. Install (2) Category 6 cable with 20-foot slack loop at each workstation, terminated on a gray jack insert into a double gang flush faceplate or surface mount box when mounted above the ceiling.

2. When a Wireless Access Point workstation is installed above the ceiling grid, a label identical to the label on the surface mount box shall be permanently attached to the ceiling grid directly below the surface mount box.

3. The designer shall coordinate with the security engineer to determine quantities and locations of IP Cameras.

L. Emergency Stanchion (Blue Light/Phone)

1. Install (1) Category 6 4-pair voice-grade PE-39 flooded 22 AWG UTP cable from the closest MDF or IDF to each stanchion-mounted blue light phone location. Terminate the cable on a 4-pair lighting protection module at each end.

6.07 Grounding

A. Grounding shall be designed and installed in accordance with ANSI-J-STD-607-A.

B. Install a Telecommunications Main Grounding Busbar (TMGB) (per building) in the MDF and IDF-1s, and a Telecommunications Grounding Busbar (TGB) in each IDF-2.

C. Install a Telecommunications Bonding Backbone (TBB), #3/0 AWG stranded green insulated copper conductor in a star topology between the TMGB and each TGB in each building. When IDFs are stacked a single TBB can be daisy-chained between TGBs back to the TMGB.

D. Install an Equipment Bonding Conductor (EBC), #6 AWG green insulated conductor from the TMGB or TGB as applicable to each cable runway system, equipment rack, cabinet, lightning protector, or multi-pair cable with a metallic element.

1. Install a #3/0 AWG stranded green insulated copper conductor from the TMGB to the main building electrical service ground in each building.

2. In a metal frame (structural steel) building, where the steel framework is readily accessible within or external to the room; each TGB and TMGB shall be bonded to the vertical steel metal frame using a minimum #6 AWG conductor. The connection to building steel does not eliminate the requirement for the TBB or BC to the service ground.

E. Install a Grounding Equalizer Conductor, #3/0 AWG stranded green insulted copper conductor to interconnect multiple TBBs on the top floor and every 3rd floor when required by ANSI J-STD-607-A.

F. When exceeding 13 feet the conductors shall be sized at 2 kcmil per linear foot of conductor length up to a maximum of 3/0 AWG.

6.08 Labeling

A. Verify room numbers and confirm the final room numbering scheme prior to generating labels.

B. Backbone Fiber and Copper Cables shall be labeled within 12 inches of the visible end of the jacket.

C. Fiber Innerduct shall be labeled within 12 inches of the point of entry of the fiber optic enclosure.

D. Cables shall be labeled identically at both ends.

E. MDFs and IDFs Room shall be labeled (signage) with the permanent room designations that match the final building signage for cable labeling.

F. Equipment racks in each MDF or IDF shall be labeled in sequential numeric order. Labels shall be centered on the top front of the equipment rack.

G. Fiber optic backbone cable labels shall contain the cable origin room number, the cable destination room number, fiber strand numbers, and type (i.e. MDFA150-IDFC126-50MM001-024/SM001-012).

H. Fiber optic enclosures shall be labeled alpha-numeric starting with the 1st fiber optic enclosure in the top of the 1st equipment rack. A label for each terminated strand shall be securely placed inside each fiber optic enclosure.

I. Fiber optic couplers panels in fiber enclosures shall be labeled at each end by strand denoting MDF and/or IDF the cable comes from, and Strand number to and from respectively (i.e. IDFC126-50MM001-012).

J. Copper backbone cable labels shall contain the cable origin room number, the cable destination room number, and cable pairs (i.e. MDFA150-IDFC126/001-025).

K. Patch panels in each closet shall be uniquely alphabetically labeled sequentially starting with the first Patch Panel in the top of the first equipment rack (i.e. A, B, C, D, E, etc.). Each MDF or IDF starts with A and shall not repeat a letter. Any MDF/IDF room with more than 26 patch panels shall start with AA,BB,CC…

L. 110-type blocks shall contain the origin room number, destination room number, and pair numbers, under each pair termination. (i.e. MDFA150-IDFC126-PR 1-25). 110-type block labels shall be printed on product-specific label strips and placed into label holders.

M. Workstation Faceplates shall be labeled denoting origin MDF/IDF Room Number, patch panel, and port number (i.e. IDFC126-B5).

1. When a Wireless Access Point or IP Camera workstation is installed above the ceiling grid, a label identical to the label on the surface mount box shall be permanently attached to the ceiling grid directly below the surface mount box.

6.09 Testing

A. Terminated fiber optic strands shall be tested bi-directionally end to end be and certified in accordance with applicable industry standards with a light meter and OTDR field tester(s) that are within their calibration period.

B. Terminated backbone copper cable links shall be tested in accordance with applicable industry standards for attenuation, continuity, and pin-mapping with approved field tester(s) that are within their calibration period.

C. Terminated Category 6/6A UTP cable shall be tested as a Permanent Link in accordance with applicable industry standards for Category 6 compliance with approved field tester(s) that are within their calibration period.

6.10 As-Built Documentation

A. Produce drawings depicting the condition of the Structured Cabling System as installed produced in AutoCAD 2007 or higher and provided in hardcopy, electronically in .DWG and .PDF format, and a laminated set in each MDF or IDF-1. Include the exact dimensions and locations of MDF and IDF layouts, wall elevations, equipment rack elevations, cable runways, cable tray, sleeves, backbone and horizontal cable pathways, workstation locations, and numbering and labeling scheme.

B. Produce cable records for the Structured Cabling System as installed to include a list of all horizontal and backbone cables produced in an Excel format and provided in hardcopy and electronic format indicating cable number, unique cable label, cable type, origin and destination, length, termination method, and pass/fail result.

C. Produce (3) hard copies of all test results for each cable, to include technician's name and date stamp, a list of tested cables, and the individual results for each cable tested. Test results shall be furnished on CD ROM to include native file format and .PDF format.

PART 7 SUMMARY and SYNOPSIS OF STANDARDS

7.01 Summary

A. All aspects of this Alamo Colleges Telecommunications Infrastructure Standards shall be applied to the design process for both new and renovated facilities.

B. A Division 27 10 00 specification and T-Series drawings shall be commissioned and issued by the Architect during the design phases for each facility or project.

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C. Facility Standards

SPACE	CAMPUS MDF	BUILDING MDF	IDF-1 AND IDF-2
ARCHITECTURAL	• Minimum of 600 square feet, minimum clear lineal wall length 30 feet, walls to deck, floor sealed bare concrete, no windows, exterior wall within 50 feet of building exterior, not be located adjacent to or below restrooms or other water-based facilities, or sources of EMI and mechanical vibration, all walls covered with plywood, without a ceiling or a lift-out tile ceiling, minimum 42-inch by 80-inch clear door opening, door not open to the exterior of the building, proximity card reader and electrified door hardware, sprinkler system, consider pre-action.	• Minimum of 400 square feet, minimum clear lineal wall length 25 feet, all walls to deck, floor sealed bare concrete, no windows, exterior wall that is within 50 feet of the building exterior, not be located adjacent or below restrooms or other water-based facilities, or sources of EMI and mechanical vibration, all walls covered with plywood, without a ceiling or a lift-out tile ceiling, minimum 42-inch by 80-inch clear door opening, door not open to the exterior of the building, proximity card reader and electrified door hardware, sprinkler system, consider pre-action.	• Minimum of 108 square feet, minimum clear lineal wall lengths of at least 9 feet by 12 feet, all walls to deck, floor sealed bare concrete, windows are not recommended, IDFs shall be arranged in a stacked formation in multi-story buildings, and not be located near sources of EMI and mechanical vibration, all walls covered with plywood, the room shall be without a ceiling, minimum 36-inch by 80-inch clear door, proximity card reader and electrified door hardware.
HVAC	• Dedicated unit that is part of the building's main system, maintain a constant 24/7 cooled environment between 68° and 75° F with humidity of 41.9°F Dew Point to 60% RH and 59°F Dew Point, minimum HVAC load shall be designed to displace 20KW of power, or 6 Tons, maintain temp and humidity in the event of building power outages or main unit failure.	• Dedicated unit that is part of the building's main system, maintain a constant 24/7 cooled environment between 68° and 75° F with humidity of 41.9°F Dew Point to 60% RH and 59°F Dew Point, minimum HVAC load shall be designed to displace 12KW of power, or 3.5 Tons, maintains temp and humidity in the event of building power outages or main unit failure.	• Serviced by the building HVAC system and equipped with Split DX system that cools only when the building HVAC is inadequate, maintain a constant 24/7 cooled environment between 68° and 75° F with humidity of 40% to 55%, minimum HVAC load shall be designed to displace 2KW of power, or 0.6 of a Ton.
LIGHTING	• Minimum of 50 foot candles at 2 feet above the floor in the entire space. Equipped **with emergency lighting** to keep the space lit during power outages, fixtures 18 inches above top of the highest rack or cable runway.	• Minimum of 50 foot candles at 2 feet above the floor in the entire space. **Equipped with emergency lighting** to keep the space lit during power outages, fixtures 18 inches above top of the highest rack or cable runway.	• Minimum of 40 foot candles at 2 feet above the floor, fixtures 18 inches above top of the highest rack or cable runway. Equiiped **with emergency lighting**.
POWER	• (2) dedicated 208 volt 3-phase 150 Amp circuits, 4-wire (2PH + N +G), hardwired to the UPS(s), originating electrical panel will be equipped with (2) 150 AMP breakers, minimum of (1) APC Symmetra LX 16kVA Scalable to 16kVA N+1 Ext. Run Tower, 208/240V, to provide 30 minutes of run time at full load.	• (2) dedicated 208 volt 3-phase 150 Amp circuits, 4-wire (2PH + N +G), hardwired to the UPS(s). The originating electrical panel will be equipped with (2) 150 AMP breakers, minimum of (1) APC Symmetra LX 16kVA Scalable to 16kVA N+1 Ext. Run Tower, 208/240V, to	• (2) dedicated 120 volt 20 Amp circuits, each with a simplex NEMA L5-20R receptacle. The originating electrical panel will be equipped with 20 AMP breakers. Conductors shall be routed from the panel in conduit along the cable runway to a metallic back box clipped to the rail of

	• A Duplex receptacle shall be spaced at least 1 foot from an adjacent wall and every 6 feet thereafter, minimum of (1) Duplex receptacle shall be placed in each wall.	provide 30 minutes of run time at full load. • A Duplex receptacle shall be spaced at least 1 foot from an adjacent wall and every 6 feet thereafter, minimum of (1) Duplex receptacle shall be placed in each wall.	the Cable Runway, facing the rear of the racks, minimum (1) APC Symmetra SmartUPS 2200 SUA2200R2X106 with a single NEMA L5-20P power cord to provide 5 minutes of run time at full load. • A Duplex receptacle shall be spaced at least 1 foot from an adjacent wall and every 6 feet thereafter, minimum of (1) Duplex receptacle shall be placed in each wall.
RACKS AND CABLE MANAGEMENT	• (4) Standard Equipment Racks, vertical cable manager on both sides of the rack, horizontal wire manager above and below each horizontal patch panel. • (2) Server Cabinets, space shall be allocated for an additional (7) future Server Cabinets. • Space equivalent to (2) Server Cabinets shall be allocated for service provider equipment. • Cable runway encircling the room at 86 inches above the finished floor, and crossing the room parallel to the rack rows (3) times, vertical section of cable runway from the entrance conduits to the overhead cable runway.	• (4) Standard Equipment Racks, vertical cable manager on both sides of the rack, horizontal wire manager above and below each horizontal patch panel. • (1) Server Cabinet, space shall be allocated for an additional (3) future Server Cabinets. • Wall space at the back of the Building MDF shall be allocated for service provider equipment. • Cable runway encircling the room at 86 inches above the finished floor, and crossing the room parallel to the rack rows (2) times, vertical section of cable runway from the entrance conduits to the overhead cable runway.	• (2) Standard Equipment Racks, vertical cable manager on both sides of the rack, horizontal wire manager above and below each horizontal patch panel, an equal number of horizontal wire managers shall be furnished for the network switches. • Space reserved for additional rack and vertical wire manager, a third rack and vertical wire manager IDFs that serve equipment racks located in Lab(s). • Cable runway encircling the room at 84-86 inches above the finished floor, and crossing the room parallel to the rack rows (1) time, vertical section of cable runway from floor sleeves to the overhead cable runway.

D. Technical Standards

TECHNOLOGY	STANDARDS
ENTRANCE PATHWAYS AND CONDUITS	• Service Provider Conduits; Minimum of (4) 4-inch conduits from the MDF to the edge of the property Right of Way. • Campus Serving Conduits: Minimum of (2) 4-inch conduits shall route underground from the Campus MDF to the IDF-1 of each additional building on the campus. • Building Entrance for Large Campus: MEP and Structural Engineer shall consider a conduit entrance vault.
CABLE MANAGEMENT IN TELECOM SPACES	• Racks black aluminum Standard Equipment Racks with EIA 19-inch rails, 84-inch (45 RMU) overall height, 3-inch rail depth, dual floor mounting flanges, and rack mount unit markings engraved on the rails. • Server Cabinets 24 inches by 42 inches by 84 inches with adjustable front and rear EIA 19” rail kits, enclosed with ventilated front and rear locking doors, adjustable leveling feet, vertical cable manager for one rail, and grounding kit. • Overhead Cable Management 18-inch (MDF) or 12-inch (IDF) Universal Cable Runway made of 3/8” x 1-1/2” x .065” wall rectangular steel tubing with cross members welded at 12 inch intervals. • Vertical cable managers black double-sided, 6 inches wide, 12.75 inches deep, and 84 inches tall, no doors, and include formed cabling sections, lockable cabling latches at 12-inch intervals, and protective edge guards. • Horizontal cable managers black double-sided, 19 inches wide, 11.73 inches deep, and 2 RMU, cable guide fingers at 1.75” intervals, flanged pass-through slots, and snap-on, hinged door/cover.
CABLE SUPPORT IN PATHWAYS AND LOCAL POWER	• Main cable pathway support shall be Electro Zinc Wire Mesh Basket Tray • Above MDFs or IDFs install minimum of (4) 4” EMT sleeves through the partition wall. • Between MDF and IDFs install minimum of (2) 4” EMT sleeves • Wall-mounted workstation location, double-gang back box with double-gang mud ring,1-inch conduit from the rough-in box to the cable tray, terminate the conduit above the edge of the cable tray, conduit not required to be bonded to the tray. • At floor-mounted workstation locations (1) 1 inch conduit for every (6) cables from the floor box to the cable tray. For poke-thrus, route the conduit to the cable tray in the floor below. For modular furniture workstations, a rough-in pathway shall be considered and designed according to the furniture type, quantity of cables, and location as required for each furniture system. • The electrical engineer shall design a duplex NEMA 5-15R receptacle within 18” of each workstation outlet location. • EZ Path Sleeves or Fire rated cable pathway devices shall be used in fire-rated construction for ALL low-voltage, video, data and voice cabling, optical fiber raceways and certain high-voltage cabling where frequent cable moves, adds and changes may occur. Pathways required for high voltage cabling will be detailed on the prints
INTER-BUILDING BACKBONE CABLING	• Copper Cabling 50-pair PE-39 24 AWG flooded UTP from the Campus MDF to the IDF-1 in each of the buildings on the campus, terminate on lightning protection and 110 blocks • Fiber Optic Cabling loose tube outdoor-rated composite 12-Strand Single Mode / 24-Strand 50 micron OM3 Multi Mode from the Campus MDF to the IDF-1 in each of the buildings on the campus, installed in 1-inch outdoor-rated innerduct, terminate with LC connectors.
INTRA-BUILDING BACKBONE CABLING	• Copper Cabling 25-pair Category 3 plenum rated 24 AWG UTP from the MDF or IDF-1 to each of the IDF-2s in the building, terminate on 110 blocks. • Category 6A network uplinks (2) Category 6 UTP plenum rated blue sheath, between the Special Systems patch panels in MDF and IDFs on adjacent floors that are vertically stacked, and between IDF-2s on the same floor, where the permanent link of the Category 6A cable does not exceed 328 feet. • Fiber Optic Cabling shall be tight buffered plenum-rated composite 6-Strand Single Mode / 12-Strand 50 micron OM3 or OM4 Multi Mode, encased in orange interlocking armor, terminate with LC connectors.
HORIZONTAL CABLING	• Horizontal Data Cabling shall be Category 6/6A UTP Berktek, General Cables, Hitachi or approved equal, minimum factory sweep tested to 550 MHz, plenum rated, blue sheath, terminated in a gray Category 6/6A modular jack insert and snapped into a 2-gang, furniture, floor box or poke-thru faceplate, terminated on Category 6/6A 48-port IDC patch panels with the EIA-568B sequence, Category 6/6A modular non-booted patch cords. • Category 6/6A jacks shall be manufactured by Leviton

HORIZONTAL CABLING	• Office Workstation: (2) Category 6 cables terminated on gray jack inserts into a double gang flush faceplate. • Classroom Instructor Workstation: (2) Category 6 cables terminated on gray jack inserts into a double gang flush faceplate. • High-Density Workstation: up to (6) Category 6 cables terminated on gray jack inserts into a double gang flush faceplate. • Emergency Wall-Phone Outlet: (2) Category 6 cables terminated on a gray Leviton jack insert into a double gang faceplate. • Ceiling-mounted Projector Outlet: (2) Category 6 cables terminated on a gray Leviton jack insert into a single gang faceplate. • Wireless Access Point Outlet: (2) Category 6A cables with 20-foot slack loops at each workstation, terminated on gray jack inserts into a double gang flush faceplate or surface mount box when mounted above the ceiling. • IP Camera Outlet: (2) Category 6 cable with 20-foot slack loop at each workstation, terminated on a gray jack insert into a double gang flush faceplate or surface mount box when mounted above the ceiling. IP Camera cabling shall be on separate Category 6 patch panels in each MDF/IDF. • Emergency Stanchion (Blue Light/Phone): (1) Category 6 4-pair voice-grade PE-39 flooded 22 AWG UTP cable from the closest MDF or IDF to each stanchion-mounted blue light phone location. Terminate the cable on a 4-pair lighting protection module at each end.
GROUNDING	• Grounding shall be designed and installed in accordance with ANSI-J-STD-607-A. • Install a Telecommunications Main Grounding Busbar (TMGB) (per building) in the MDF and IDF-1s, and a Telecommunications Grounding Busbar (TGB) in each IDF-2. • Install a Telecommunications Bonding Backbone (TBB), #3/0 AWG stranded green insulated copper conductor in a star topology between the TMGB and each TGB in each building. When IDFs are stacked a single TBB can be daisy-chained between TGBs back to the TMGB. • Install an Equipment Bonding Conductor (EBC), #6 AWG green insulated conductor from the TMGB or TGB as applicable to each cable runway system, equipment rack, cabinet, lightning protector, or multi-pair cable with a metallic element. • Install a #3/0 AWG stranded green insulated copper conductor from the TMGB to the main building electrical service ground in each building. • In a metal frame (structural steel) building, where the steel framework is readily accessible within or external to the room; each TGB and TMGB shall be bonded to the vertical steel metal frame using a minimum #6 AWG conductor. • Install a Grounding Equalizer Conductor, #3/0 AWG stranded green insulted copper conductor to interconnect multiple TBBs on the top floor and every 3rd floor when required by ANSI J-STD-607-A.
LABELING	• Verify room numbers and confirm the final room numbering scheme prior to generating labels. • Backbone Fiber and Copper Cables shall be labeled within 12 inches of the visible end of the jacket. • Fiber Innerduct shall be labeled within 12 inches of the point of entry of the fiber optic enclosure. • Cables shall be labeled identically at both ends. • MDFs and IDFs Room shall be labeled (signage) with the permanent room designations that match the final building signage for cable labeling. • Equipment racks in each MDF or IDF shall be labeled in sequential numeric order. Labels shall be centered on the top front of the equipment rack. • Fiber optic backbone cable labels shall contain the cable origin room number, the cable destination room number, fiber strand numbers, and type (i.e. MDFA150-IDFC126-50MM001-024/SM001-012). • Fiber optic enclosures shall be labeled alpha-numeric starting with the 1st fiber optic enclosure in the top of the 1st equipment rack. A label for each terminated strand shall be securely placed inside each fiber optic enclosure. • Fiber optic couplers panels in fiber enclosures shall be labeled at each end by strand denoting MDF and/or IDF the cable comes from, and Strand number to and from respectively (i.e. IDFC126-50MM001-012). • Copper backbone cable labels shall contain the cable origin room number, the cable destination room number, and cable pairs (i.e. MDFA150-IDFC126/001-025). • Patch panels in each closet shall be uniquely alphabetically labeled sequentially starting with the first Patch Panel in the top of the first equipment rack (i.e. A, B, C, D, E, etc.). Each MDF or IDF starts with A and shall not repeat a letter. Any MDF/IDF room with more than 26 patch panels shall start with AA,BB,CC… • 110-type blocks shall contain the origin room number, destination room number, and pair numbers, under each pair termination. (i.e. MDFA150-IDFC126-PR 1-25). 110-type block labels shall be printed on product-specific label strips and placed into label holders.

LABELING	• Workstation Faceplates shall be labeled denoting origin MDF/IDF Room Number, patch panel, and port number (i.e. IDFC126-B5). • When a Wireless Access Point or IP Camera workstation is installed above the ceiling grid, a label identical to the label on the surface mount box shall be permanently attached to the ceiling grid directly below the surface mount box.
TESTING	• Terminated fiber optic strands shall be tested bi-directionally end to end be and certified in accordance with applicable industry standards with a light meter and OTDR field tester(s) that are within their calibration period. • Terminated backbone copper cable links shall be tested in accordance with applicable industry standards for attenuation, continuity, and pin-mapping with approved field tester(s) that are within their calibration period. • Terminated Category 6/6A UTP cable shall be tested as a Permanent Link in accordance with applicable industry standards for Category 6/6A compliance with approved field tester(s) that are within their calibration period.

PART 8 TELECOMMUNICATIONS DIAGRAMS

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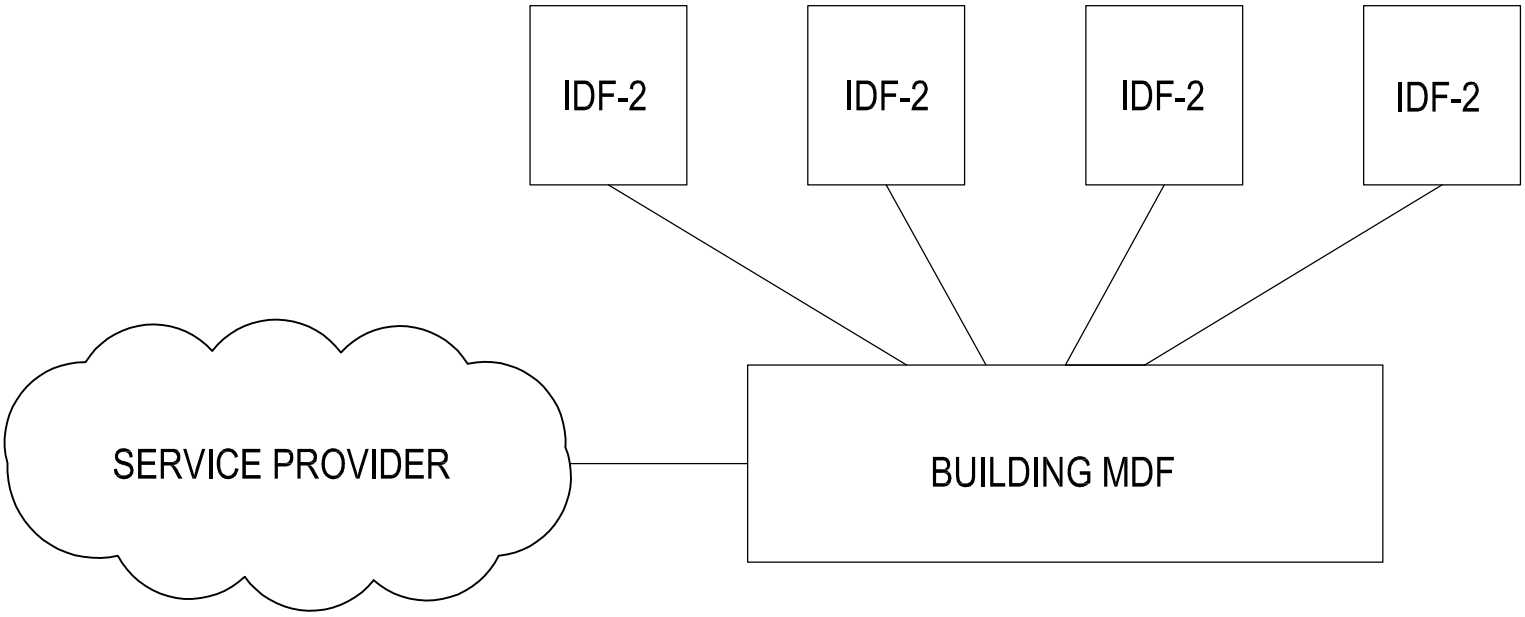

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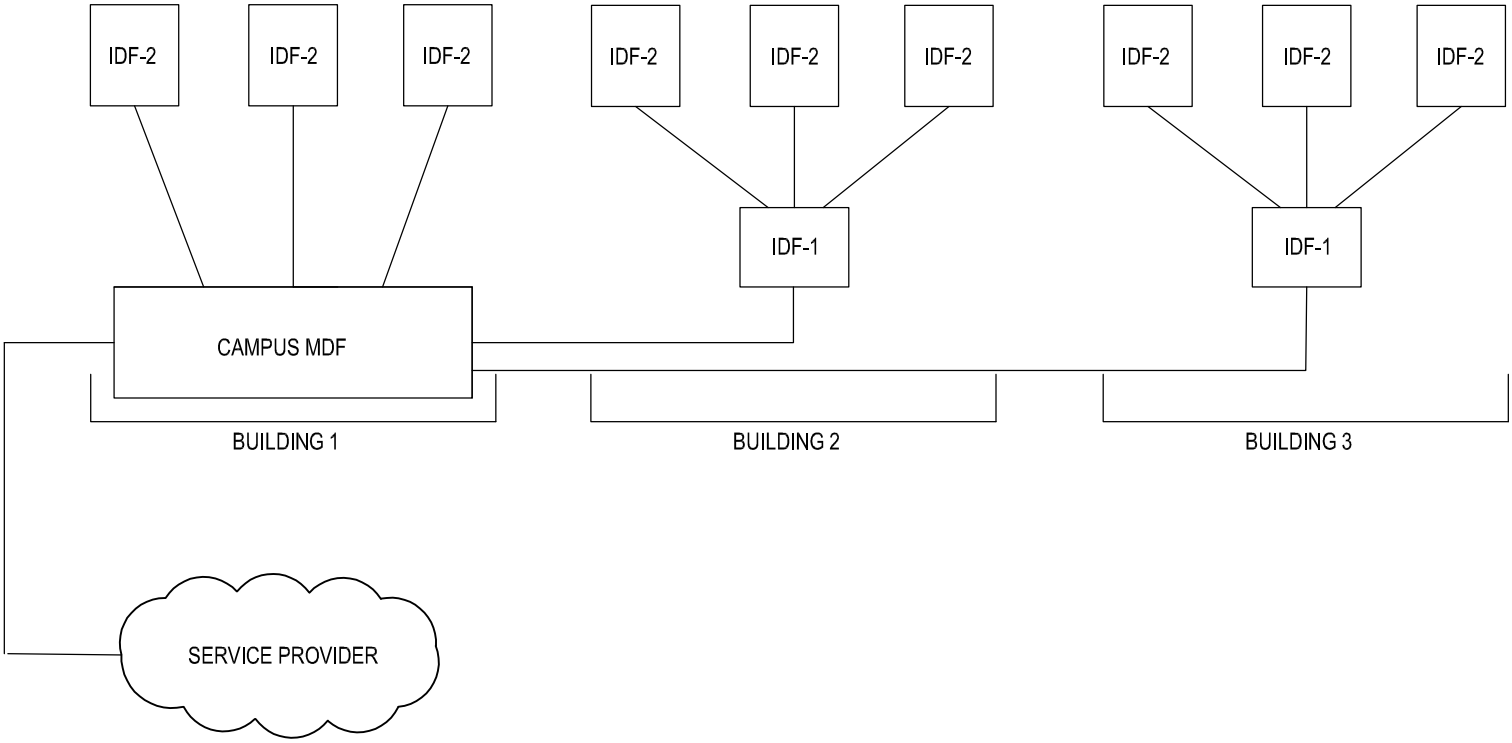
Project Title: ALAMO COLLEGES
TECHNOLOGY STANDARDS AND SPECIFICATIONS

Drawing Title: SINGLE STAND ALONE BUILDING TOPOLOGY AND BLOCK DIAGRAM

Sheet: **T-500**



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Project Title: ALAMO COLLEGES
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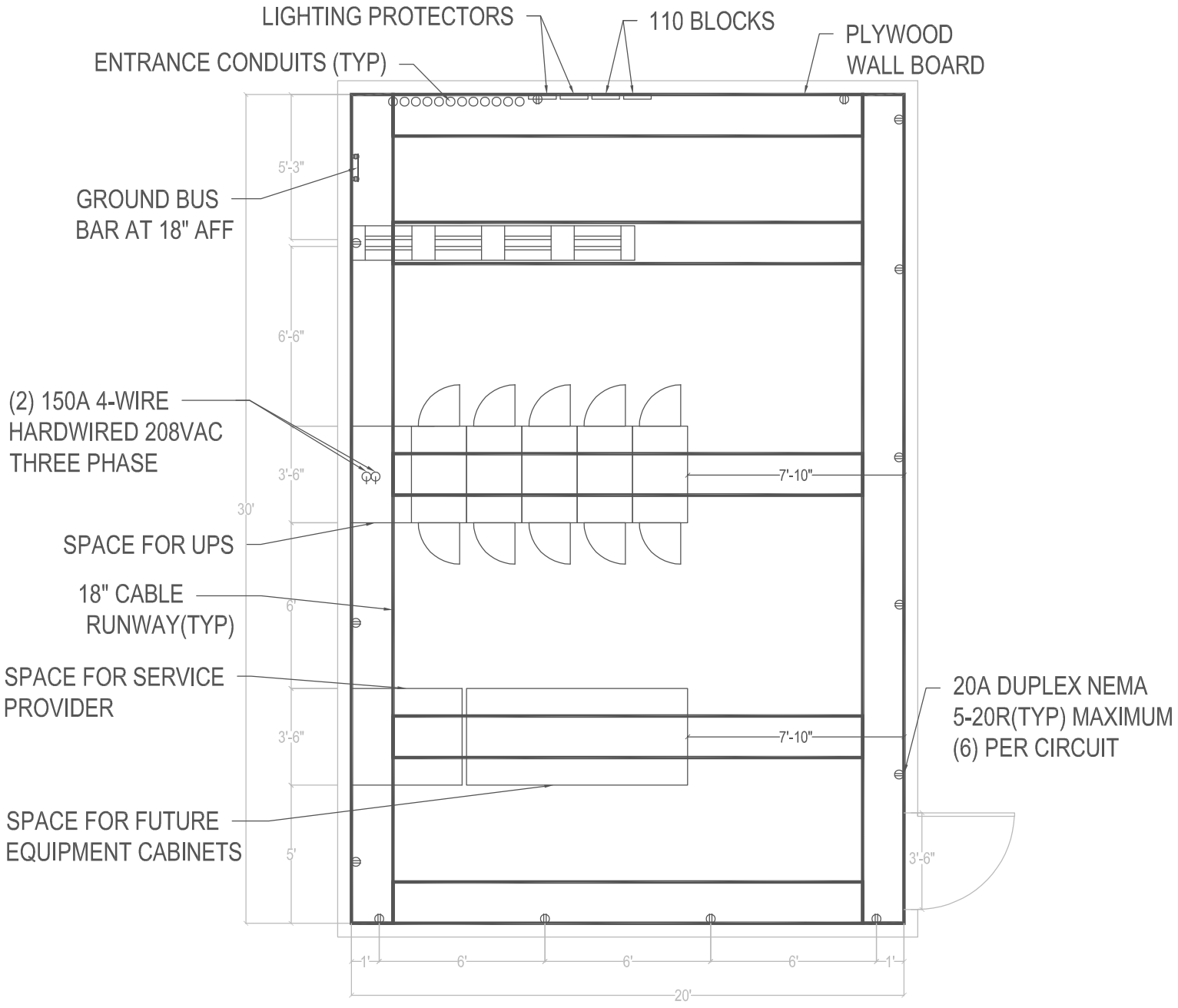
Drawing Title: CAMPUS TOPOLOGY AND BLOCK DIAGRAM

Sheet: T-501



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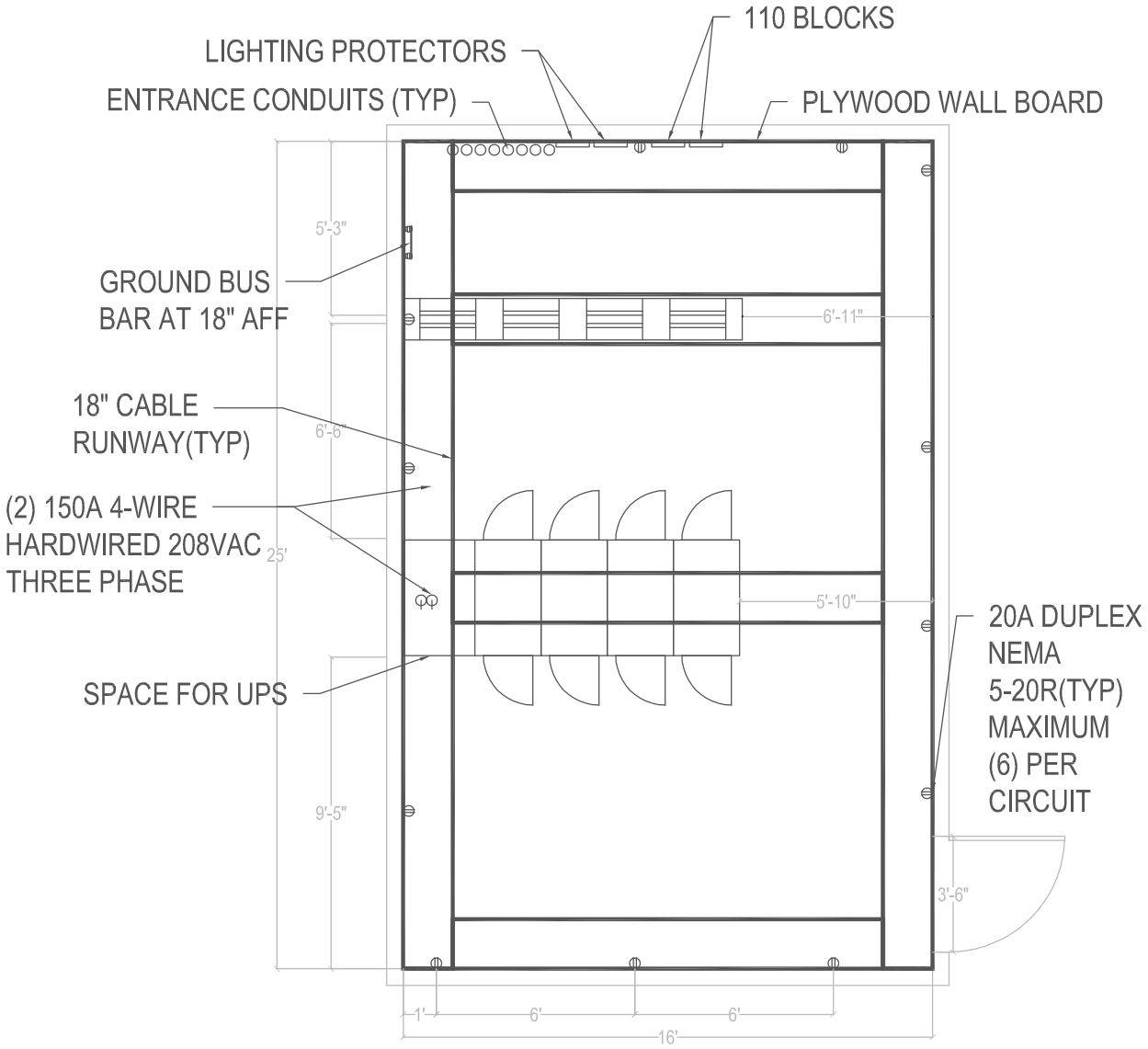
Project Title: ALAMO COLLEGES TECHNOLOGY STANDARDS AND SPECIFICATIONS

Drawing Title: TYPICAL CAMPUS MDF ROOM LAYOUT

Sheet: T-502



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Project Title: ALAMO COLLEGES
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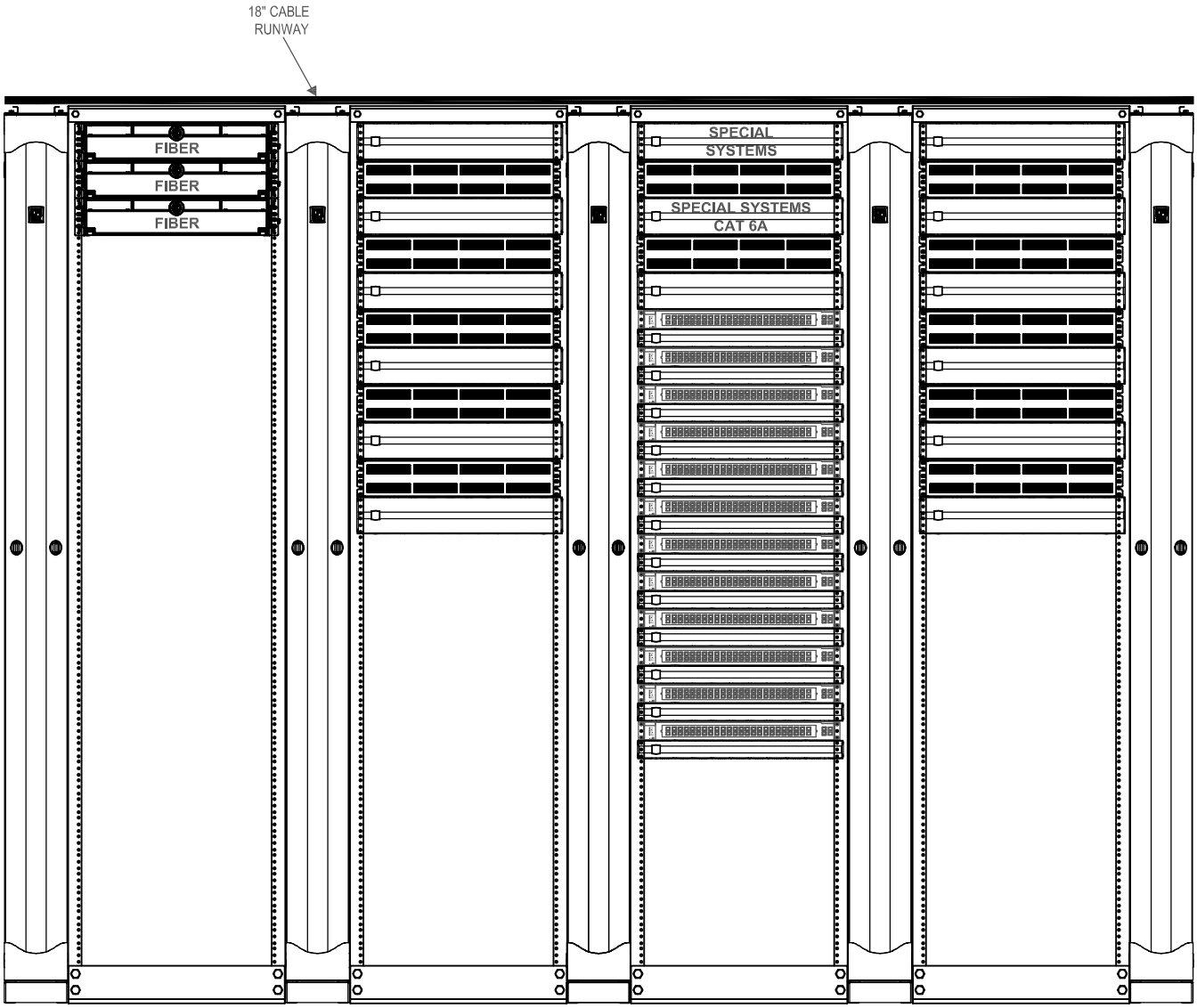
Drawing Title: TYPICAL BUILDING MDF ROOM LAYOUT

Sheet: T-503



NOTE: 1. SPECIAL SYSTEM SECURITY, BMS, AV, CAMERAS, HVAC, FIRE ALARM, DIGITAL SIGNAGE
2. SPECIAL SYSTEM CAT 6A WAPS,UPLINK

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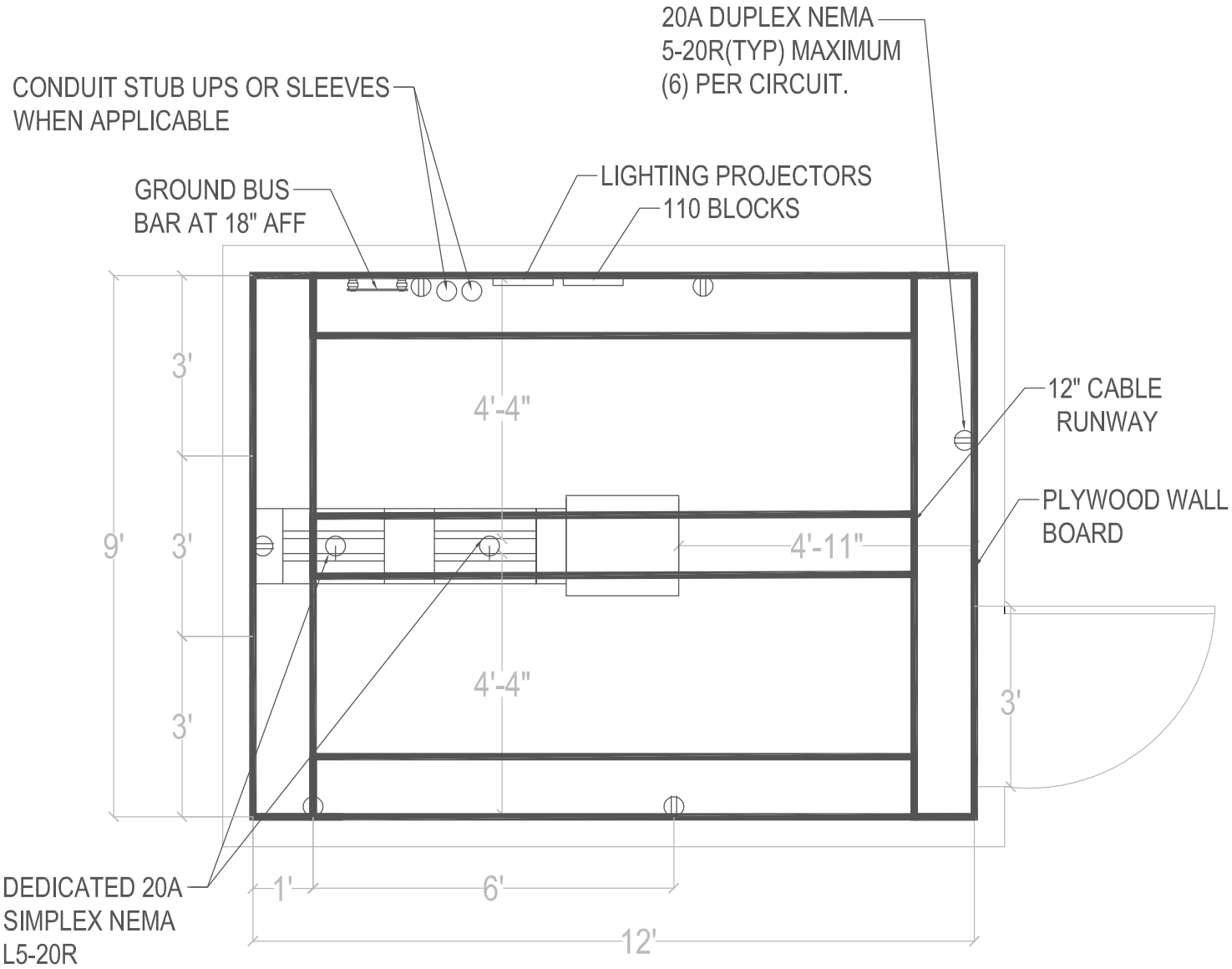
Project Title: ALAMO COLLEGES
TECHNOLOGY STANDARDS AND SPECIFICATIONS

Drawing Title: TYPICAL MDF RACK ELEVATION

Sheet: T-504



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Project Title: ALAMO COLLEGES
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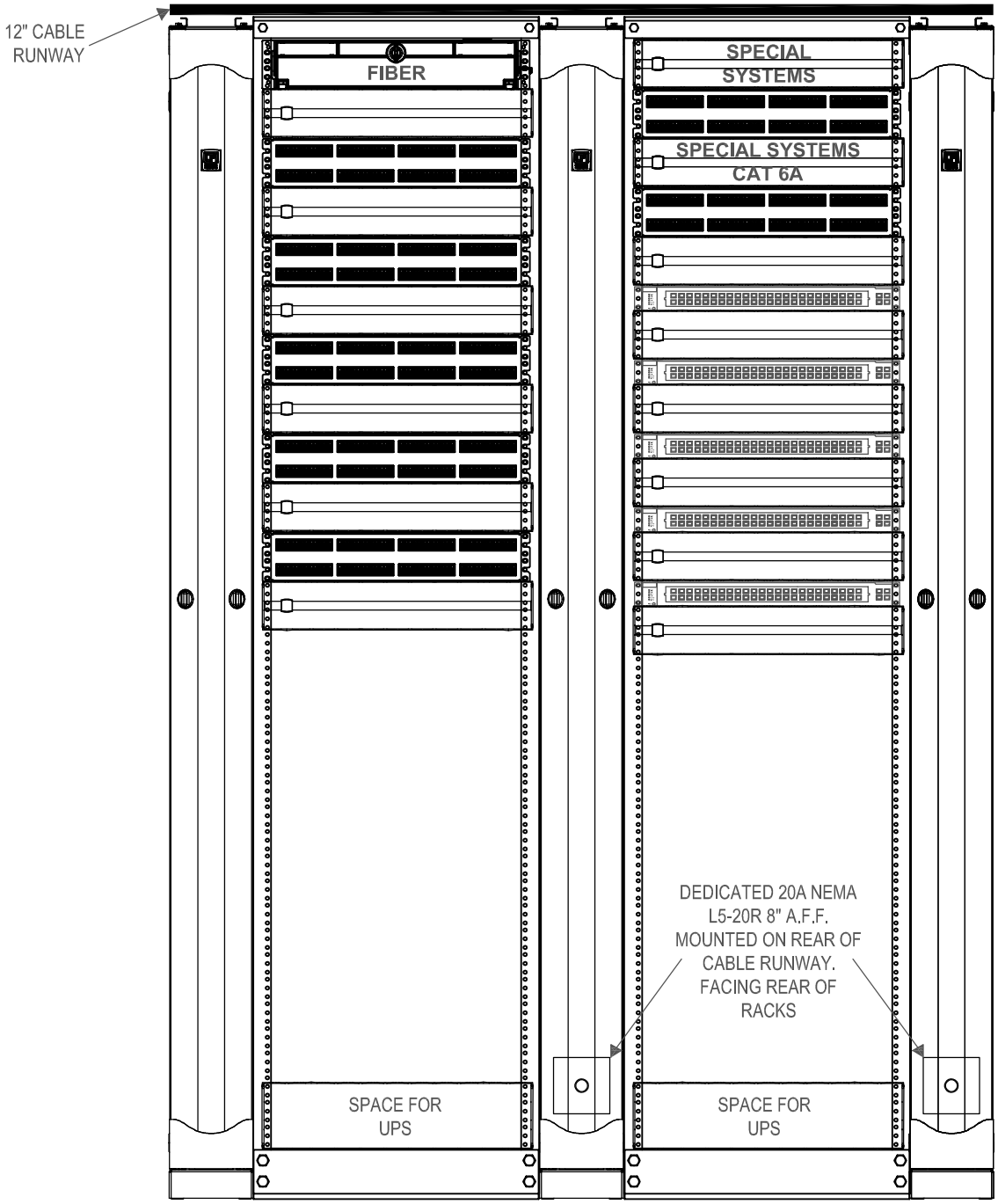
Drawing Title: TYPICAL BUILDING IDF ROOM LAYOUT

Sheet: T-505



NOTE: 1. SPECIAL SYSTEM SECURITY, BMS, AV, CAMERAS, HVAC, FIRE ALARM, DIGITAL SIGNAGE
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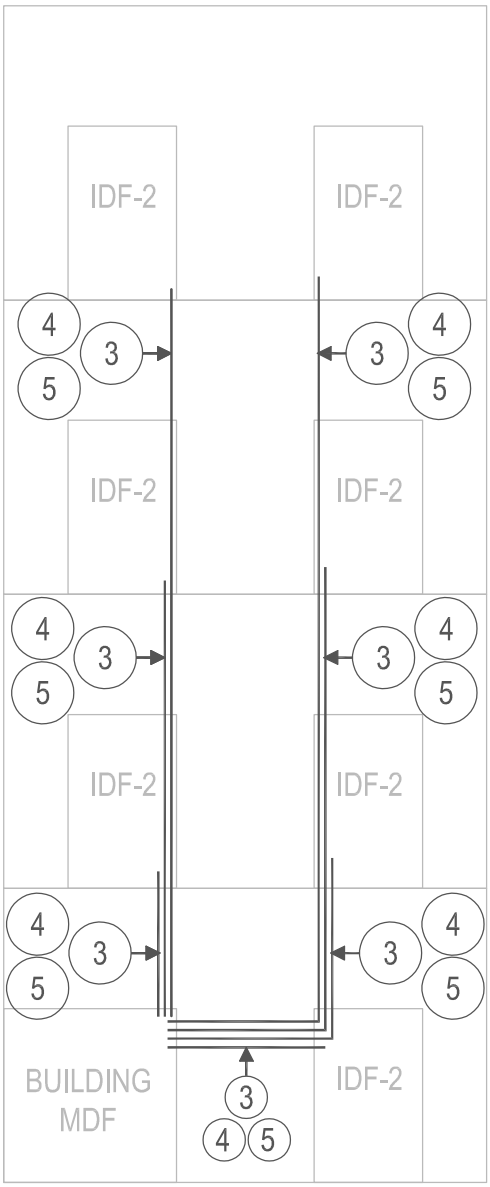
Drawing Title: TYPICAL IDF ROOM LAYOUT

Sheet: T-506



1 24-STR 50 MICRON OM3 MULTI-MODE/12-STR 9 MICRON SINGLE MODE FIBER

2 50-PAIR PE-39 OSP COPPER UTP

3 12-STR 50 MICRON OM3 MULTI-MODE/6-STR 9 MICRON SINGLE MODE ARMORED

4 25-PAIR CATEGORY 3 UTP

5 (2) CATEGORY 6A UTP, PATCH PANEL TO PATCH PANEL

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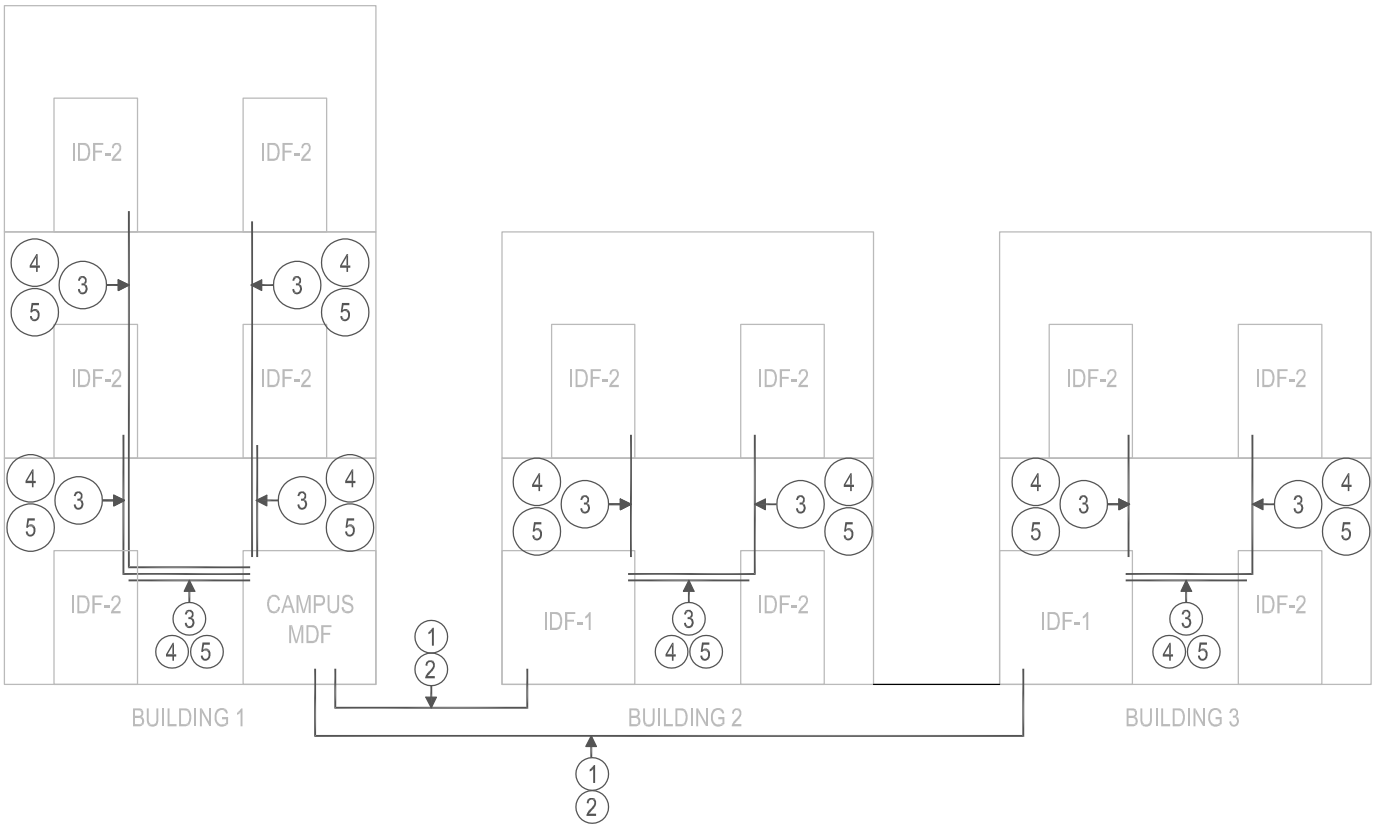
Project Title: ALAMO COLLEGES
TECHNOLOGY STANDARDS AND SPECIFICATIONS

Drawing Title: SINGLE STAND-ALONE BUILDING UPLINK AND RISER DIAGRAM

Sheet: T-507



1 24-STR 50 MICRON OM3 MULTI-MODE/12-STR 9 MICRON SINGLE MODE FIBER

2 50-PAIR PE-39 OSP COPPER UTP

3 12-STR 50 MICRON OM3 MULTI-MODE/6-STR 9 MICRON SINGLE MODE ARMORED

4 25-PAIR CATEGORY 3 UTP

5 (2) CATEGORY 6A UTP, PATCH PANEL TO PATCH PANEL

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Project Title: ALAMO COLLEGES
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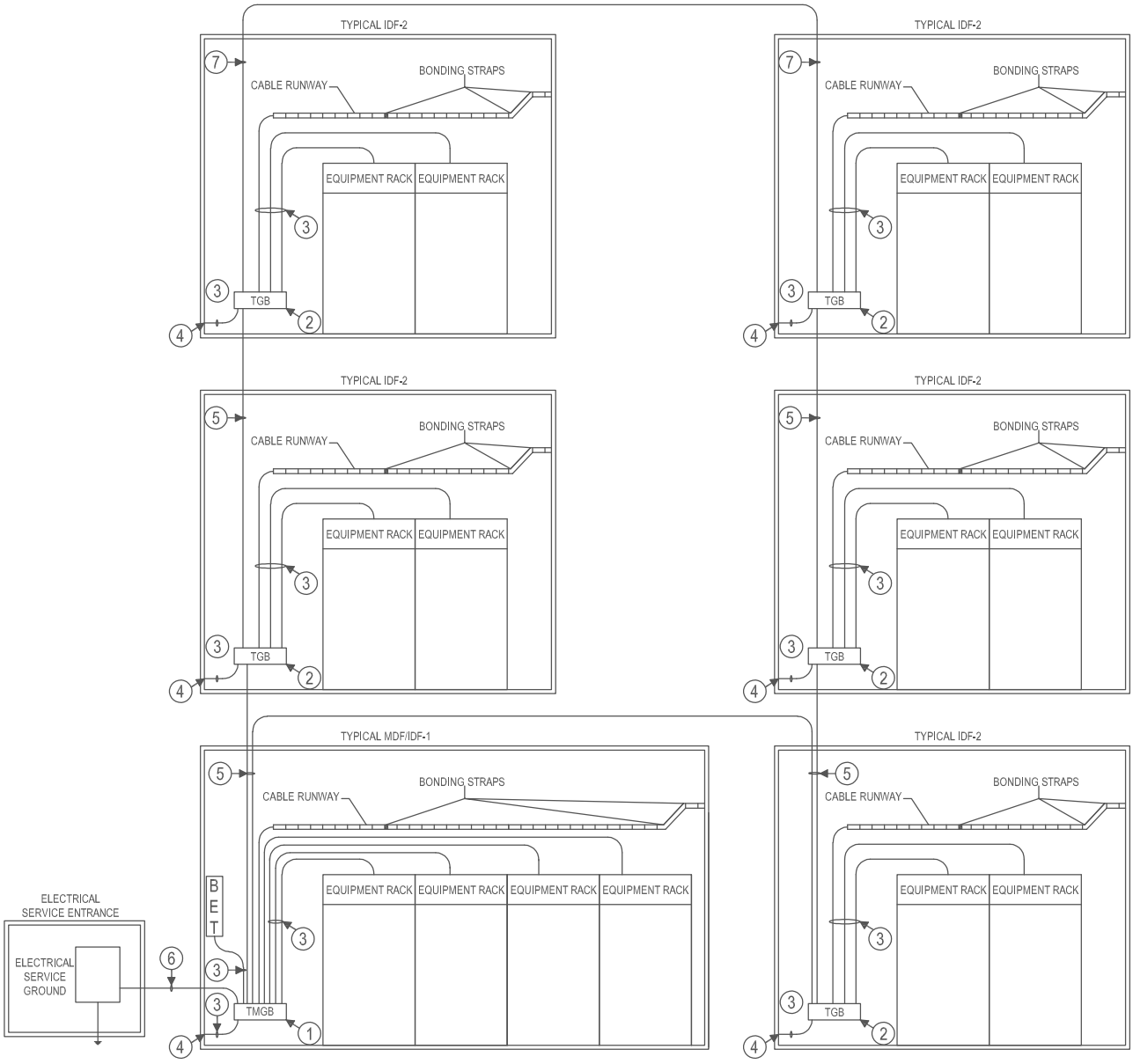
Drawing Title: CAMPUS UPLINK AND RISER DIAGRAM

Sheet: T-508



1. TELECOMMUNICATIONS MAIN GROUNDING BUS BAR (TMGB)
2. TELECOMMUNICATIONS GROUNDING BUS BAR (TGB)
3. TELECOMMUNICATIONS BONDING CONDUCTOR (TBC) #6 AWG
4. CONNECT TO GROUNDED BUILDING STEEL WHEN EXPOSED IN ROOM.
5. TELECOMMUNICATIONS BONDING BACKBONE (TBC) #3/0 AWG
6. TELECOMMUNICATIONS BONDING CONDUCTOR (TBC) #3/0 AWG BY ELECTRICAL CONTRACTOR
7. GROUNDING EQUALIZER CONDUCTOR (GEC) #3/0 AWG

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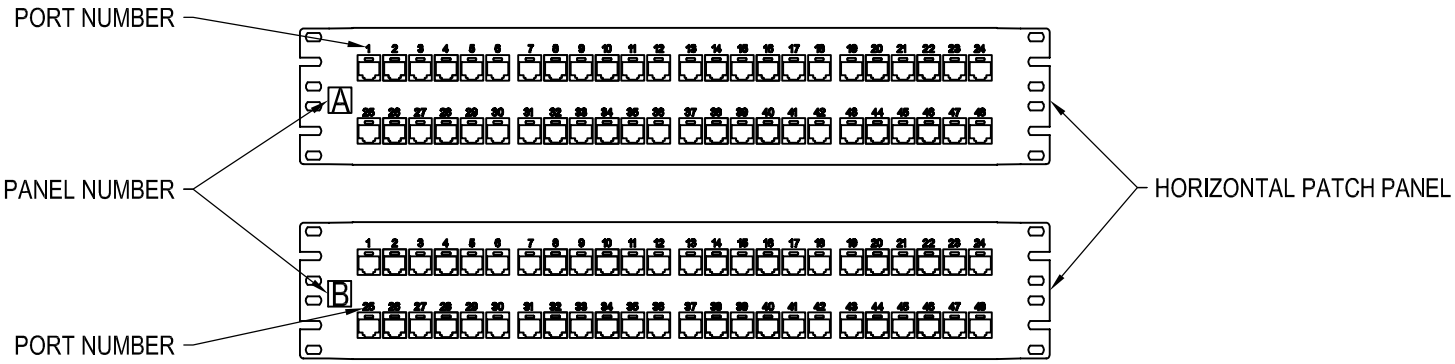
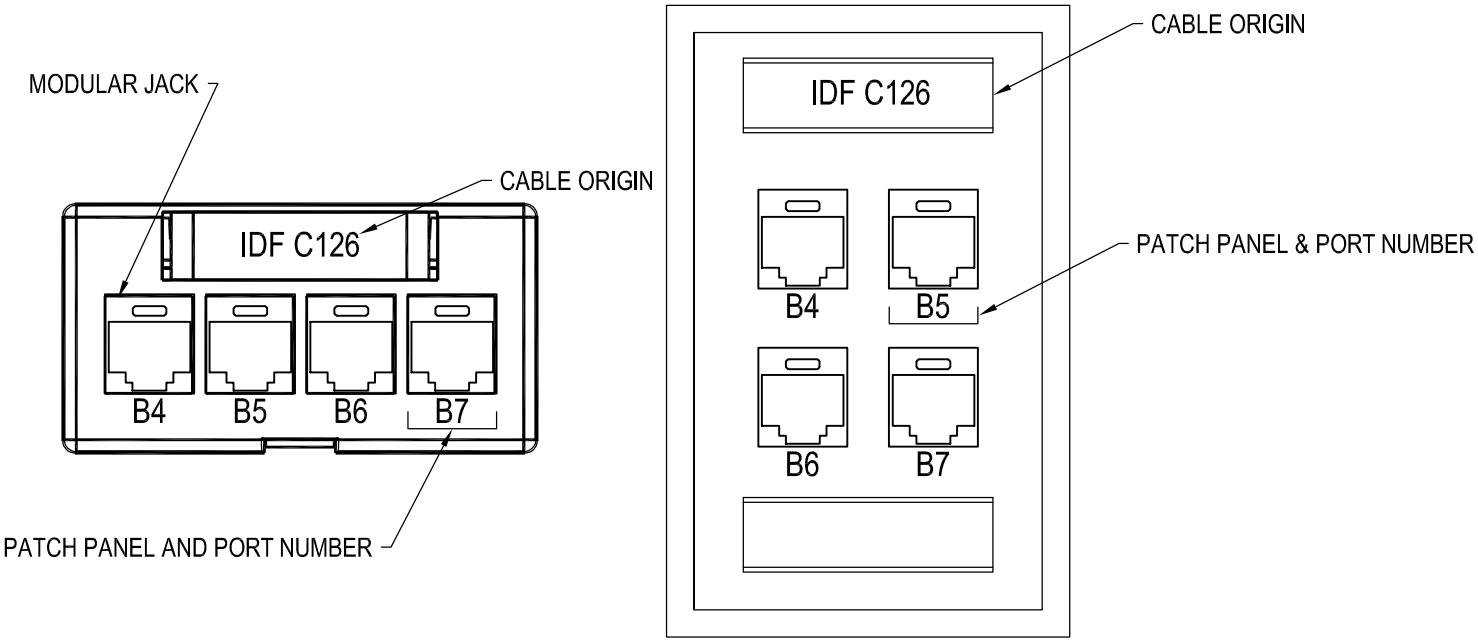
Project Title: ALAMO COLLEGES TECHNOLOGY STANDARDS AND SPECIFICATIONS

Drawing Title: TYPICAL GROUNDING DIAGRAM PROVIDED BY CABLING CONTRACTOR U.N.O.

Sheet: T-509





NOTE: 1) CABLE SHALL HAVE IDENTICAL LABEL AT BOTH ENDS
2) EACH PATCH PANEL SHALL BE UNIQUELY LABELED ALPHABETICALLY IN EACH MDF OR IDF

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Project Title: ALAMO COLLEGES
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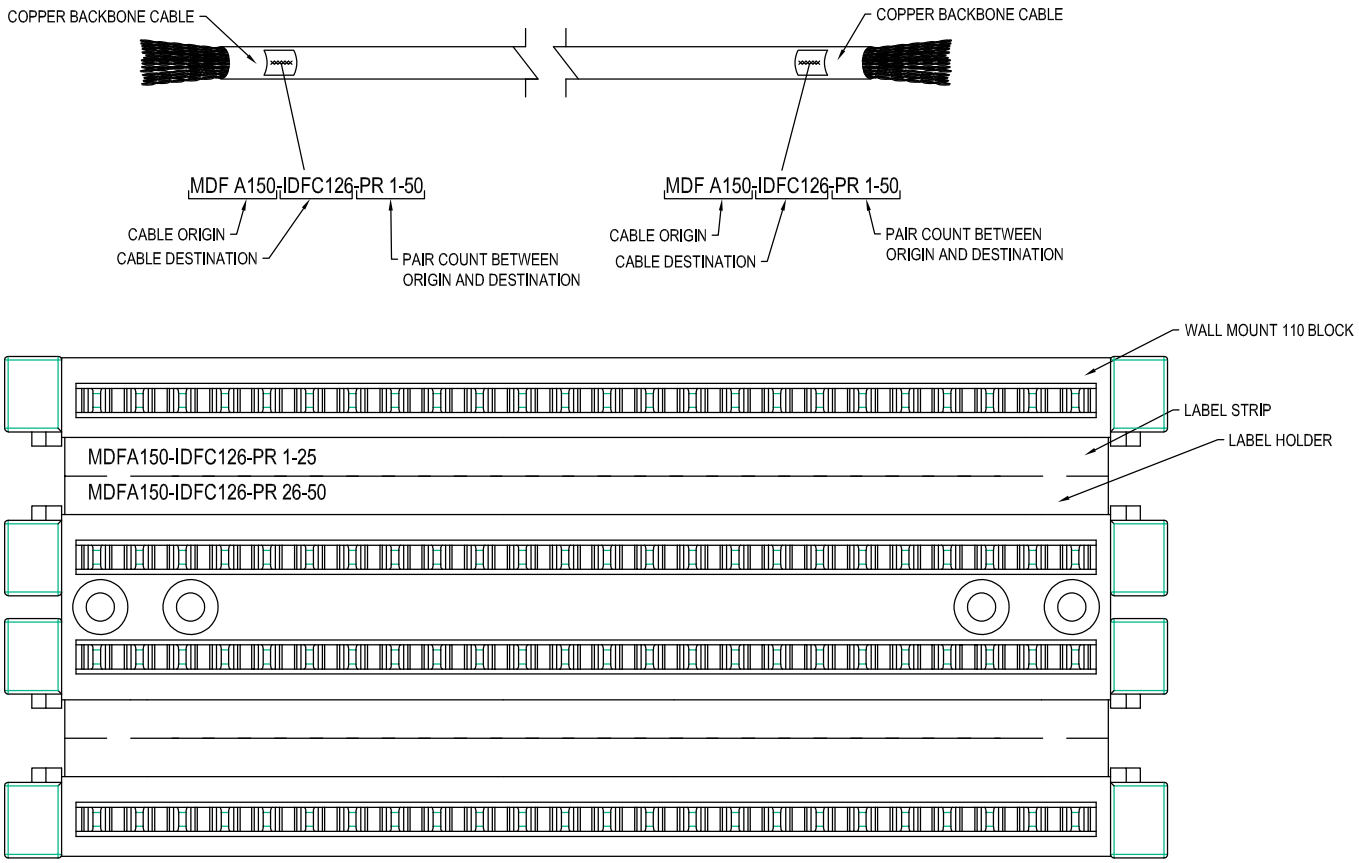
Drawing Title: HORIZONTAL DATA CABLE LABELING SCHEME

Sheet: T-510



NOTE: 1) CABLE AND 110 BLOCK SHALL HAVE IDENTICAL LABEL AT BOTH ENDS

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Project Title: ALAMO COLLEGES
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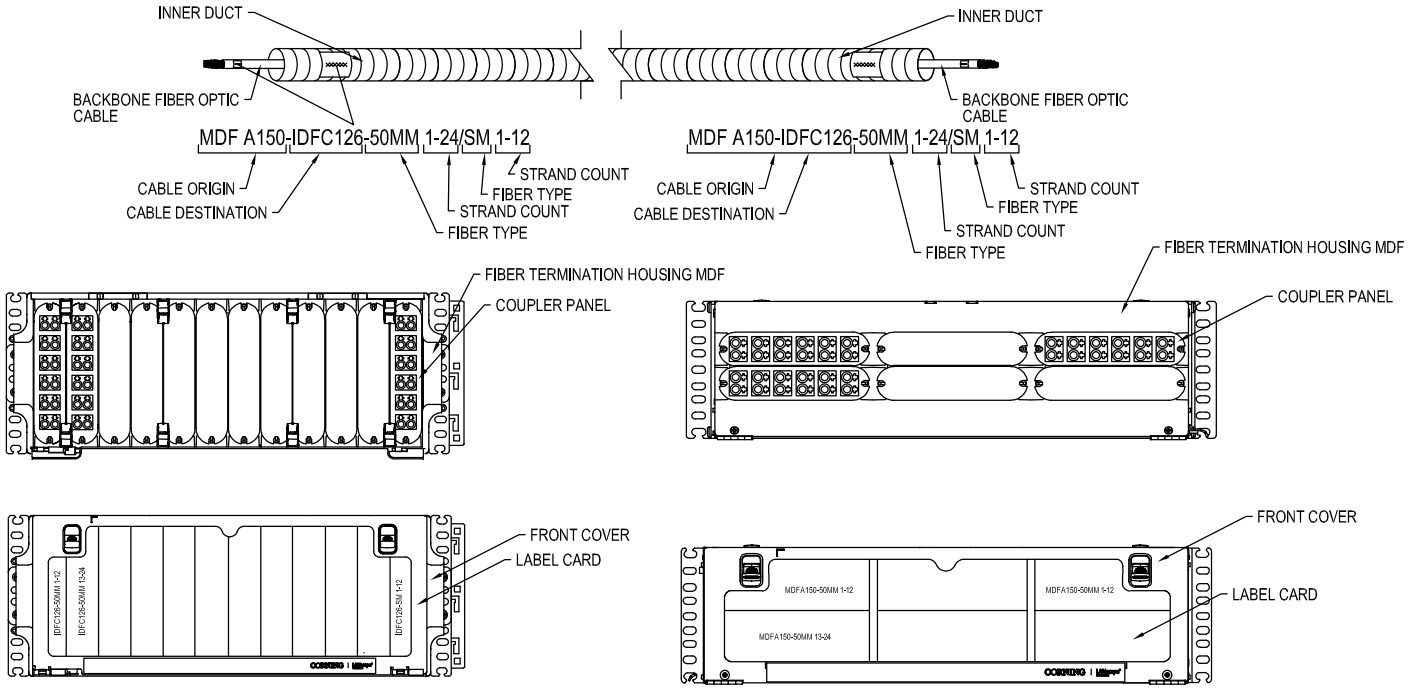
Drawing Title: COPPER BACKBONE LABELING SCHEME

Sheet: T-511



NOTE: 1) CABLE AND INNERDUCT SHALL HAVE IDENTICAL LABEL AT BOTH ENDS

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Drawing Title: FIBER BACKBONE LABELING SCHEME

Sheet: T-512

Appendix C

PART 1 - RACKS ON TRACKS BY SOUTHWEST SOLUTIONS / SPACESAVER

PART 2 - GENERAL

2.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

2.2 SUMMARY

A. This Section includes the following:

1. Electric, carriage mounted high-density mobile storage units, support rails, fabrication, and installation including leveling of support rails.

B. Related Work, Not Furnished:

1. Structural floor system capable of supporting live and dead loads required by prevailing building codes, including loads of storage units to be installed.
2. Finish floor covering and edging materials and installation on raised floors and ramps, or when on concrete with recessed rail installation.
3. Power wiring to units from adequate power supply. Final connections to units shall be provided by electrician.
4. Fire suppression system is by others.

C. Related Sections:

2.3 REFERENCES

A. American Library Association (when applicable)

1. Cantilever Bracket Type Metal Library Bookstacks; Library Technology Reports.

B. American National Standards Institute (ANSI) Standards:

1. Applicable standards for fasteners used for assembly.

C. American Society for Testing and Materials (ASTM) Standards:

1. Applicable standards for steel sheet materials used for fabrication.

D. American Institute of Steel Construction (AISC) Standards:

1. Applicable standards for steel materials used for fabrication.

E. Underwriters' Laboratories (C-UL US):

1. Listings for electrical equipment and devices described in this specification.

2.4 SYSTEM DESCRIPTION

A. General: The system consists of Spacesaver storage units mounted on manufacturer's track-guided carriages to form a compact storage system. System design permits access to any single aisle by moving units until the desired aisle is opened. The manufacturer's proprietary unit interlock

system prevents units from being moved while the open aisle is occupied. The carriage/rail system provides uniform carriage movement along the total length of travel, even with unbalanced loads.

B. Carriage System Design and Features: The carriage system consists of a formed structural steel frame with wheels riding on steel rails recessed into the floor. Rails shall be types selected by the manufacturer to ensure smooth operation and self-centering of mobile storage units during travel without end play or binding. Rail types, quantities and spacing shall be selected by the manufacturer to suit installation conditions and requirements. All bearings used in the drive mechanism shall be permanently shielded and lubricated.

C. Movement Controls: Provide a carriage control panel on the accessible (open) end of each moveable carriage, located 44 inches (1118 MM) above the base, centered on the face panel. Minimum controls shall include directional control buttons, STOP/RESET push-button and a red reset light.

1. System controls shall start motors on each movable carriage “sequentially” to minimize power demands and shall provide dynamic braking to provide smooth operation
2. Maximum running speed shall be limited to 3.3 inches (84 mm) per second.
3. Provide solid state controls and indicator lights for a visual indication of safety system operation. Provide each aisle with a programmable distance sensor to ensure proper timing for start/stop operation.
4. Pushing the directional control button on any moveable carriage adjacent to the desired aisle location in the direction away from the desired aisle location opens the system at the desired aisle. The selected aisle shall open automatically regardless of the position of the carriages. [Manual Reset: The carriage control head will display a flashing red reset light at the newly opened aisle indicating that the aisle is locked open and requires resetting before another aisle can be opened. Provide for automatic lockout and manual reset of controls if selected aisle is not moved within a preset period of time.
5. Controls shall feature back lit message indicating which aisle is in use (i.e. “Right Aisle in use” or “Left Aisle in use”).

D. Drive System: The system shall be designed with a positive type motorized drive which minimizes end play and that carriages will stop without drifting. All system components shall be selected to ensure a smooth, even movement along the entire carriage length.

1. Each electric carriage shall be provided with a current limited fractional horsepower gear motor, connected to drive wheel assembly with a roller chain.
2. System shall include a chain sprocket drive system to ensure that carriages move uniformly along the total length of travel, even with unbalanced loads.
3. A tensioning device shall be provided on each chain drive (when applicable).
4. All bearings used in the drive mechanism shall be permanently shielded and lubricated.
5. System shall operate on 115 V.A.C. 50/60 hertz, 20 amp dedicated circuit provided by others, one per module.
6. Overhead mounted power pantograph distribution system shall conceal all interconnecting wiring.

E. Safety Features:

1. Visual indicators shall provide verification that carriages are in the locked or unlocked mode.
2. One safety sweep shall be provided in each aisle. A full-length infrared photoelectric safety sweep shall be provided to stop carriage movement if the sweep contacts an obstruction while in motion. Sweep must be equipped with OSHA approved safety demarcation tape.
3. Entire system shall be C-UL US system listed.
4. Infrared photoelectric aisle entry sensor system shall be provided to stop carriage movement if the system detects persons entering a closing aisle.

5. A handheld rechargeable power pack shall be provided for emergency operations in case of primary power failure.]

F. Finishes:

1. Fabricated Metal Components And Assemblies: Manufacturer’s standard powder coat paint finish.

2. End Panels, Accessible Ends: [Plastic laminate, manufacturer’s standard available textures and patterns.] [Manufacturer’s standard powder coat paint finish in standard available colors.]

2.5 PERFORMANCE REQUIREMENTS

A. Design Requirements:

1. See Drawings

2.6 SUBMITTALS

A. Product Data: Submit manufacturer's product literature and installation instructions for each type of shelving, track and installation accessory required. Include data substantiating that products to be furnished comply with requirements of the contract documents.

B. Shop Drawings: Show fabrication, assembly, and installation details including descriptions of procedures and diagrams. Show complete extent of installation layout including clearances, spacings, and relation to adjacent construction in plan, elevation, and sections. Indicate clear exit and access aisle widths; access to concealed components; assemblies, connections, attachments, reinforcement, and anchorage; and deck details, edge conditions, and extent of finish flooring within area where units are to be installed.

1. Show installation details at non-standard conditions. Furnish floor layouts, technical and installation manuals for every unit shipment with necessary dimensions for rail layout and system configuration at the project site. Include installed weight, load criteria, furnished specialties, and accessories.

2. Provide layout, dimensions, and identification of each unit corresponding to sequence of installation and erection procedures. Specifically include the following:

a. Location, position and configuration of tracks on all floors.

b. Plan layouts of positions of carriages, including all required clearances.

c. Details of shelving, indicating method and configuration of installation in carriages.

3. Provide location and details of anchorage devices to be embedded in or fastened to other construction.

4. Provide installation schedule and complete erection procedures to ensure proper installation.

5. Show locations of wiring and disconnects required for operating movable carriage units.

C. Samples: Provide minimum 3 inch (76MM) square example of each color and texture on actual substrate for each component to remain exposed after installation.

D. Selection Samples: For initial selection of colors and textures, submit manufacturer's color charts consisting of actual product pieces, showing full range of colors and textures available.

E. Warranty: Submit draft copy of proposed warranty for review by the Architect.

F. Reference List: Provide a list of recently installed mobile storage systems (5 minimum) to be visited by owner, architect, and contractor. Intent of list is to aid in verifying the suitability of manufacturer's products and comparison with materials and product specified in this section.

2.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Engage an experienced manufacturer who is ISO 9001 certified for the design, production, installation and service of motorized, carriage mounted high-density mobile storage units and support rails. Furnish manufacturer's ISO 9001 quality system registration certificate.

B. Installer Qualifications: Engage an experienced installer who is a manufacturer's authorized representative for the specified products for installing carriages and anchoring shelving units to carriages.

1. Minimum Qualifications: 1-year experience installing systems of comparable size and complexity to specified project requirements.

2. Guaranteed 24 hour minimum response time to service call.

2.8 DELIVERY, STORAGE AND HANDLING

A. Follow manufacturer's instructions and recommendations for delivery, storage and handling requirements.

2.9 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions before fabrication. Indicate verified measurements on Shop Drawings. Coordinate fabrication and delivery to ensure no delay in progress of the Work.

B. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating mobile storage units without field measurements. Coordinate construction to ensure actual dimensions correspond to established dimensions.

2.10 SEQUENCING AND SCHEDULING

A. Sequence storage shelving system installation with other work to minimize possibility of damage and soiling during remainder of construction period.

B. Schedule installation of specified products and accessories after finishing operations, including painting have been completed.

C. Provide components, which must be built in at a time which causes no delays general progress of the Work.

D. Pre-installation Conference: Schedule and conduct conference on project site to review methods and procedures for installing mobile storage units including, but not limited to, the following:

1. Review project conditions and levelness of flooring and other preparatory work performed under other contracts.

2. Review and verify structural loading limitations.

3. Recommended attendees include:

a. Owner's Representative.

b. Prime Contractor or representative.

c. The Architect.

d. Manufacturer's representative.

e. Subcontractors or installers whose work may affect, or be affected by, the work of this section.

2.11 WARRANTY

A. Provide a written warranty, executed by Contractor, Installer, and Manufacturer, agreeing to repair or replace units which fail in materials or workmanship within the established warranty period. This warranty shall be in addition to, and not a limitation of, other rights the Owner may have under General Conditions provisions of the Contract Documents.

B. Warrant the entire movable compact shelving installation against defects in materials and workmanship for a period of five years from date of acceptance by the Owner.

2.12 MAINTENANCE

A. Provide manufacturer's extended maintenance agreement OPTION for __1__ year, commencing on the day the standard maintenance warranty ends.

PART 3 - PRODUCTS

3.1 MANUFACTURERS

A. General: Products are based upon mobile shelving system products manufactured by Spacesaver Corporation. Contingent on meeting specification requirements, other acceptable manufacturers may be included.

3.2 BASIC MATERIALS

A. General: Provide materials and quality of workmanship which meet or exceed established industry standards for products specified. Use furniture grade sheet metal for component fabrication unless indicated otherwise. Material thickness/gauges are manufacturer's option unless indicated otherwise.

B. Plastic Laminates: NEMA LD-3, GP-28, Vertical Grade.

C. Electrical Devices and Controls: C-UL US System Listed for type of application and service.

3.3 GROUT

A. General: Provide non-shrink, non-staining hydraulic cement compound conforming to the following requirements, based on the performance of the test specimens at room temperature and in laboratory air, as stated by the grout manufacturer.

1. Linear Movement: No shrinkage while setting; maximum expansion limited to .002 inches per linear inch.
2. Compressive Strength: Based on two inch cubes made following ASTM standards, tested on a Balding-Southward machine of 60,000 pounds capacity, meet or exceed the following:

   a. Age: 1 hour ---- 4,500 psi
   7 days ---- 8,000 psi

3.4 MANUFACTURED COMPONENTS

A. Rails:

1. General: Provide manufacturer's proprietary design units with the following properties:
2. Material: ASTM/AISI Type 1035 or 1045 steel, manufacturer's selection.
3. Capacity: 1,000 pounds per lineal foot (1385kg/M) of carriage.
4. Minimum Contact Surface: 5/8 inch (16MM) wide.

5. Provide rail sections in minimum 6 foot (1.83M) lengths.

6. Rail configuration shall permit attachment to top of structural floor system with provision for leveling rails to compensate for variations in floor surface level.

7. Provide rail connections designed to provide horizontal and vertical continuity between rail sections, to gradually transfer the concentrated wheel point load to and from adjoining rail sections. Butt joints without connections are not permitted.

8. Once rails are leveled, they shall be supported the full length with the specified grout.

B. Carriages:

1. Provide manufacturer's design movable carriages fabricated of welded steel construction. Galvanized structural components and/or riveted carriages are unacceptable. 1,000 pound per foot (1385kg/M) minimum capacity.

2. Provide fixed carriages of same construction and height as the movable carriages, anchored to rails. Setting fixed shelving directly on floors is not permitted.

3. When required, provide bolted carriage splices designed to maintain proper unit alignment and weight load distribution.

4. Design carriages to allow the shelving uprights to recess and interlock into the carriages a minimum of 3/4 inch (19MM). Top mount carriages are unacceptable.

5. Provide each carriage with two wheels per rail.

C. Drive / Guide System:

1. Design: Provide drive system which prevents carriage whipping, binding and excessive wheel/rail wear under normal operation.

   a. If line shafts are used, all wheels on one side of carriage shall drive.

   b. If synchronized drives are used, a minimum of one wheel assembly driving both sides of carriage at center location required. Drive shaft shall exhibit no play or looseness over the entire length of that assembly.

2. Shafts: Solid steel rod or tube.

3. Shaft Connections: Secured couplings.

4. Bearing Surfaces: Provide rotating load bearing members with ball or roller bearings. Provide shafts with pillow block or flanged self-aligning type bearings.

D. Wheels:

1. Materials: Type 1045 solid steel

2. Minimum load capacity per wheel: 3200 lbs. (1455kg).

3. Size: Minimum 5 inches (127MM)] 3 inches (76 MM), outside diameter drive wheels.

4. Guides: CENTER FLANGE; minimum 2 locations.

E. Motors:

1. Type: 90VDC

F. Face Panels:

1. Materials: Plastic laminate clad particleboard with plastic edging on vertical edges.

2. Finishes: Selected from manufacturer’s standard available colors and patterns. Selected by the Architect.

3. End panels must cover the full height and width of shelving.

G. Shelving: Case-Type

3.5 ACCESSORIES

A. Dual Controls: Provide additional control panel at end of each motorized carriage.

B. System controls shall start motors on each movable carriage “sequentially” to minimize power demands and shall provide dynamic braking to provide smooth operation. No additional hardware shall be required to change between “sequential” and “block” movement.

C. Power Pack Override: Provide one handheld rechargeable battery pack units to operate modules in case of main power failure.

D. Plug-In-The-Wall Power: Provide a plug-in-the-wall power option, if permitted by local building code.] (In lieu of permanent power connection.

General: Coordinate fabrication and delivery to ensure no delay in progress of the Work.

E. Wheels: Provide precision ground and balanced units with permanently shielded and lubricated bearings.

F. Carriages: Fabricate to ensure no more than 1/4 inch (6MM) maximum deviation from a true straight line. Splice and weld to ensure no permanent set or slippage in any spliced or welded joint when exposed to forces encountered in normal operating circumstances.

G. Shelving, Supports and Accessories: See individual descriptions in “Shelving” paragraphs.

3.6 FINISHES

A. Colors: [Selected from manufacturer’s standard available colors.] [Provide in custom colors as selected by [Architect] [Architect/Engineer] [Engineer.]

B. Paint Finish: Provide factory applied electrostatic powder coat paint. Meet or exceed specifications of the American Library Association.

C. Laminate Finish: Provide factory applied laminate panels at locations indicated on approved shop drawings.

D. Edgings: Provide preformed edging, color-matched to unit colors selected.

E. [(Optional) (Describe finish materials)]

PART 4 - EXECUTION

4.1 EXAMINATION

A. Examine floor surfaces with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance of mobile storage units.

B. Verify that building structural system is adequate for installing mobile storage units at locations indicated on approved shop drawings.

1. [In new construction, ensure that recesses for rails in floors are at proper spacing and depths, with allowance for grouting.]

2. [For installations on existing floors, ensure that rail spacings indicated on shop drawings are in proper locations so existing load-bearing structural members are not over stressed.]

C. Verify that intended installation locations of mobile storage units will not interfere with, nor block established required exit paths or similar means of egress once units are installed.

D. Verify that adequate capacity permanent power sources have been installed at locations indicated on approved shop drawings.

E. Prepare written report, endorsed by Installer, listing conditions detrimental to proper performance of mobile storage units, once installed.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

4.2 INSTALLATION

A. Rails:

1. Lay out rails using full-length units to the maximum extent possible. Use cut lengths only at ends to attain total length required. Locate and position properly, following dimensions indicated on approved shop drawings. Verify thickness of finished floor materials to be installed (by others) and install level 1/16 inch (1.6MM) above finished floor surfaces.
2. Verify level, allowing for a minimum 1/4 inch (6MM) of grout under high points. Position and support rails so that no movement occurs during grouting.
3. Set rails in full grout bed, completely filling any voids entire length of all rails including rail connectors. Trim up sides flush with rails to ensure proper load transfer from rail to supporting floor. Using shims in lieu of full grouting is not permitted.
4. Installation Tolerances: Do not exceed levelness of installed rails listed below:
   a. Maximum Variation From True Level Within Any Module: 3/32 inch (2.4MM).
   b. Maximum Variation Between Adjacent (Parallel) Rails: 1/16 inch (1.6MM), perpendicular to rail direction.
   c. Maximum Variation In Height: 1/32 inch (.8MM), measured along any 10 foot (3.05M) rail length.
5. Verify rail position and level; anchor to structural floor system with anchor type and spacings indicated on approved shop drawings.

B. Floors/Ramps:

1. General: Finished elevation shall be 1/16 inch (1.6MM) below top of rails.
2. Place floors and ramps to the extent indicated on approved shop drawings. Extend ramps under all movable and stationary ranges. Do not extend ramps beyond the ends of carriages.
3. Construct floors and ramps to prevent warping or deformation of floor panels in a normal operating environment. Support panels on levelers at maximum 16 inches (406MM) on center.
4. Ramp Slope: Do not exceed the following:
   a. ADA Accessible Ramps: Maximum 1:12 slope (4.76 degrees).
   b. Other Ramps: Maximum 9 degree slope (1.9:12).
   c. Vertical Transition, Ramp edge to floor: Maximum 1/8 inch (3MM).

C. Shelving Units Installation:

1. General: Follow layout and details shown on approved shop drawings and manufacturer's printed installation instructions. Position units level, plumb; at proper location relative to adjoining units and related work.
2. Carriages:
   a. Place movable carriages on rails. Ensure that all wheels track properly and centering wheels are properly seated on centering rails. Fasten multiple carriage units together to form single movable base where required.

b. Position fixed carriage units to align with movable units; make final leveling adjustments with leveling screws.

3. Shelving Units:

a. Permanently fasten shelving units to fixed and movable carriages with vibration-proof fasteners.

b. Stabilize shelving units following manufacturer's written instructions. Reinforce shelving units to withstand the stress of movement where required and specified.

4. Wiring:

a. Make final control wiring connections between modules under single control.

b. Test wiring for continuity and proper connections with regulated field power supply before making final power connections.

c. Make final wiring connections to permanent power source. Connection to power source by others.

d. Test system operation by cycling all units through complete operations sequences.

4.3 FIELD QUALITY CONTROL

A. Verify shelving unit alignment and plumb after installation. Correct if required following manufacturer's instructions.

B. Remove components which are chipped, scratched, or otherwise damaged and which do not match adjoining work. Replace with new, undamaged, matching units.

4.4 ADJUSTING

A. Adjust components and accessories to provide smoothly operating, visually acceptable installation.

4.5 CLEANING

A. Immediately upon completion of mobile shelving installation, clear components and surfaces. Remove surplus materials, rubbish and debris resulting from mobile shelving installation upon completion of work and leave areas of installation in neat, clean condition.

4.6 DEMONSTRATION/TRAINING

A. Schedule and conduct demonstration of installed equipment and features with Owner's personnel.

B. Schedule and conduct maintenance training with Owner's maintenance personnel. Training session should include lecture and demonstration of all maintenance and repair procedures that end user personnel would normally perform.

4.7 PROTECTION

A. Advise Owner of additional protection needed to ensure that system will be without damage or deterioration at time of substantial completion.

4.8 SCHEDULES

A. Equipment Schedules, See next page.

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RACKS ON TRACKS BY SOUTHWEST SOLUTIONS / SPACESAVER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Mechanically assisted, carriage mounted high-density mobile storage units, support rails, fabrication, and installation including leveling of support rails.

B. Related Work, Not Furnished:

1. Structural floor system capable of supporting live and dead loads required by prevailing building codes, including rolling loads of storage units to be installed.
2. [Power wiring to units from adequate power supply. Final connections to units shall be provided by installer.]

C. Related Sections:

1. [Section 03300 – Concrete Work]
2. [Sections in Division 9 – Finishes, relating to finish floor and base materials.]

D. Allowances:

E. Alternates:

1.3 REFERENCES

A. American Library Association (when applicable)

1. Cantilever Bracket Type Metal Library Bookstacks; Library Technology Reports.]

B. American National Standards Institute (ANSI) Standards:

1. Applicable standards for fasteners used for assembly.

C. American Society for Testing and Materials (ASTM) Standards:

1. Applicable standards for steel materials used for fabrication.

D. American Institute Of Steel Construction (AISC) Standards:

1. Applicable standards for steel materials used for fabrication.

1.4 SYSTEM DESCRIPTION

A. General: The system consists of [manufactured][owner furnished] storage units mounted on manufacturer's track-guided carriages to form a compact storage system. System design permits access to any single aisle by manually moving units until the desired aisle is opened. The carriage/rail system provides uniform carriage movement along the total length of travel, even with unbalanced loads.

B. Carriage System Design and Features: The carriage system consists of a formed structural steel frame with machined and balanced wheels riding on steel rails [recessed][surface] mounted to the floor. Rails shall be types selected by the manufacturer to ensure smooth operation and self-centering of mobile storage units during travel without end play or binding. Rail types, quantities and spacing shall be selected by the manufacturer to suit installation conditions and requirements. All bearings used in the drive mechanism shall be permanently shielded and lubricated.

C. Movement Controls: Triple or single arm operating wheels with rotating hand knobs shall be provided on the accessible (drive) ends of shelf units, centered on the end panel, located 40 inches (1051MM) from the base of each unit to permit units to be moved to create a single aisle opening. Turning the handle transmits power through chain drive to drive wheels on each carriage.

D. Drive System: The system shall be designed with a positive type mechanically-assisted drive which minimizes end play, ensures there is no play in the drive handle, and that carriages will stop without drifting.

1. System shall include a chain sprocket drive system for each movable carriage to ensure that carriages move uniformly along the total length of travel, even with unbalanced loads. All system components shall be selected to ensure a smooth, even movement along the entire carriage length. Drive system gearing shall be designed to permit 1 lb. of force applied to the drive handle to move a minimum of 4,000 lbs. of load.

2. A tensioning device shall be provided on each chain drive with provision for adjusting tension without removing end panels.

3. All bearings used in the drive mechanism shall be permanently shielded and lubricated.

E. Safety Features:

1. Color-coded visual indicators shall provide verification that carriages are in a locked or unlocked mode.

2. A single safety lock button, mounted on each operating wheel hub, will permit moving a carriage in either direction to create a new access aisle when pulled out (unlocked), or locking the carriage when pushed in.

3. [Optional safety sweep system, automatic disk locks, and electric braking devices are available; see "Accessories" under Part 2.]

F. Finishes:

1. Fabricated Metal Components And Assemblies: Manufacturer's standard powder coat paint finish.

2. End Panels, Accessible Ends: [Plastic laminate, manufacturer's standard textures and patterns.] [Manufacturer's standard powder coat paint finish.]

1.5 PERFORMANCE REQUIREMENTS

A. Design Requirements:

1. Limit overall height to [____] inches [____] MM.
2. Limit overall length to [____] inches [____] MM.

B. Ease of Movement: Provide mechanically assisted units capable of being moved by exerting a maximum horizontal force of 5 pounds on the operating wheel.

C. [Seismic Performance: Provide mobile storage units capable of withstanding the effects of earthquake movement when required by applicable building codes.]

1.6 SUBMITTALS

A. Product Data: Submit manufacturer's product literature and installation instructions for each type of shelving, track and installation accessory required. Include data substantiating that products to be furnished comply with requirements of the contract documents.

B. Shop Drawings: Show fabrication, assembly, and installation details including descriptions of procedures and diagrams. Show complete extent of installation layout including clearances, spacings, and relation to adjacent construction in plan, elevation, and sections. Indicate clear exit and access aisle widths; access to concealed components; assemblies, connections, attachments, reinforcement, and anchorage; and deck details, edge conditions, and extent of finish flooring within area where units are to be installed.

1. Show installation details at non-standard conditions. Furnish floor layouts, technical and installation manuals for every unit shipment with necessary dimensions for rail layout and system configuration at the project site. Include installed weight, load criteria, furnished specialties, and accessories.
2. Provide layout, dimensions, and identification of each unit corresponding to sequence of installation and erection procedures. Specifically include the following:
   a. Location, position and configuration of tracks on all floors.
   b. Plan layouts of positions of carriages, including all required clearances.
   c. Details of shelving, indicating method and configuration of installation in carriages.
3. Provide location and details of anchorage devices to be embedded in or fastened to other construction.
4. Provide installation schedule and complete erection procedures to ensure proper installation.

C. Samples: Provide minimum 3 inch (76MM) square example of each color and texture on actual substrate for each component to remain exposed after installation.

D. Selection Samples: For initial selection of colors and textures, submit manufacturer's color charts consisting of actual product pieces, showing full range of colors and textures available.

E. Warranty: Submit draft copy of proposed warranty for review by the [Architect] [Architect/Engineer] [Engineer] [Designer].

F. Maintenance Data: Provide in form suitable for inclusion in maintenance manuals for mobile storage units. Data shall include operating and maintenance instructions, parts inventory listing, purchase source listing, emergency instructions, and related information.

1. Submit manufacturer's instructions for proper maintenance materials and procedures.

2. Submit manufacturer's printed instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under anticipated use conditions. Include precautions against using materials and methods which may be detrimental to finishes and performance.

G. [Reference List: Provide a list of recently installed mobile storage units to be visited by owner, architect, and contractor. Intent of list is to aid in verifying the suitability of manufacturer's products and comparison with materials and product specified in this section.]

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Engage an experienced manufacturer who is ISO 9001 certified for the design, production, installation and service of carriage mounted high-density mobile storage units and support rails. Furnish certificate attesting manufacturer’s ISO 9001 quality system registration.

B. Installer Qualifications: Engage an experienced installer who is a manufacturer's authorized representative for the specified products for installing carriages and anchoring shelving units to carriages.

1. Minimum Qualifications: 1-year experience installing systems of comparable size and complexity to specified project requirements.

2. Guaranteed 24-hour service response time.

1.8 DELIVERY, STORAGE AND HANDLING

A. Follow manufacturer’s instructions and recommendations for delivery, storage and handling requirements.

1.9 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions before fabrication. Indicate verified measurements on Shop Drawings. Coordinate fabrication and delivery to ensure no delay in progress of the Work.

B. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating mobile storage units. Coordinate construction to ensure actual dimensions correspond to established dimensions.

1.10 SEQUENCING AND SCHEDULING

A. Sequencing: Coordinate storage shelving system installation with other work to minimize possibility of damage and soiling during remainder of construction period.

B. Scheduling: Plan installation to commence after finishing operations, including painting have been completed.

C. Built-In Items: Provide components which must be built in at a time which causes no delays general progress of the Work.

D. Pre-installation Conference: Schedule and conduct conference on project site to review methods and procedures for installing mobile storage units including, but not limited to, the following:

1. Review project conditions and levelness of flooring and other preparatory work performed under other contracts.
2. Review and verify structural loading limitations.
3. Recommended attendees include:
   a. Owner's Representative.
   b. Prime Contractor or representative.
   c. The [Architect] [Architect/Engineer] [Engineer/Architect] [Engineer] [Designer].
   d. Manufacturer's representative.
   e. Subcontractors or installers whose work may affect, or be affected by, the work of this section.

1.11 WARRANTY

A. Provide a written warranty, executed by Contractor, Installer, and Manufacturer, agreeing to repair or replace units which fail in materials or workmanship within the established warranty period. This warranty shall be in addition to, and not a limitation of, other rights the Owner may have under General Conditions provisions of the Contract Documents.

B. Warrant the entire movable compact shelving installation against defects in materials and workmanship for a period of five years from date of acceptance by the Owner.

1.12 [MAINTENANCE]

A. [Provide manufacturer’s extended maintenance agreement for [____] [years] [months], commencing on the day the standard maintenance warranty ends.]

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. General: Products are based upon mobile shelving system products manufactured by Spacesaver Corporation. Contingent on meeting specification requirements, other acceptable manufacturers may be included.

2.2 BASIC MATERIALS

A. General: Provide materials and quality of workmanship which meet or exceed established industry standards for products specified. Material thicknesses/gauges are manufacturer’s option unless indicated otherwise.

B. Plastic Laminates: NEMA LD-3, GP-28, Vertical Grade.

C. [Other]

2.3 GROUT

A. General: Provide non-shrink, non-staining hydraulic cement compound conforming to the following requirements, based on the performance of the test specimens at room temperature and in laboratory air.

1. Linear Movement: No shrinkage while setting; maximum expansion limited to .002 inches per linear inch.
2. Compressive Strength: Based on two inch cubes made following ASTM standards, tested on a Balding-Southward machine of 60,000 pounds capacity, meet or exceed the following:

   a. Age: 1 hour ---- 4,500 psi
   7 days ---- 8,000 psi

2.4 MANUFACTURED COMPONENTS

A. Rails:

1. Material: ASTM/AISI Type 1035 or 1045 steel, manufacturer’s selection.
2. Capacity: 1,000 pounds per lineal foot (1385kg/M) of carriage.
3. Minimum Contact Surface: 5/8 inch (16MM) wide.
4. Provide rail sections in minimum 6 foot (1.83M) lengths.
5. Rail configuration shall permit attachment to top of structural floor system with provision for leveling rails to compensate for variations in floor surface level.
6. Provide rail connections designed to provide horizontal and vertical continuity between rail sections, to gradually transfer the concentrated wheel point load to and from adjoining rail sections. Butt joints are not permitted.
7. [Anti-Tip Rail Form Covers: Manufacturer shall provide for protection if required [to prevent damage to rails during concrete back pours.] [when anti-tip devices are installed].

B. Floor / Ramp:

1. Floor/Ramp Sheathing: Minimum 3/4 inch (19MM), 5-ply underlayment grade plywood. Particle board sheathing materials are not permitted.
2. Provide fire retardant treated floor/ramp materials when required by code.
3. Finished flooring materials shall be provided by [the Owner] [others].

C. Carriages:

1. Provide manufacturer's design movable carriages fabricated of welded or bolted steel construction. Galvanized structural components and/or riveted carriages are unacceptable.
2. Provide fixed carriages of same construction and height as the movable carriages, anchored to rails. Setting fixed shelving directly on floors is not permitted.
3. When required, provide bolted carriage splices designed to maintain proper unit alignment and weight load distribution.

4. Design carriages to allow the shelving uprights to recess and interlock into the carriages a minimum of 3/4 inch (19MM). Top mount carriages are unacceptable.

5. Provide each carriage with two wheels per rail.

D. Drive / Guide System:

1. Design: Provide drive system which prevents carriage whipping, binding and excessive wheel/rail wear under normal operation.

   a. If line shafts are used, all wheels on one side of carriage shall drive.

   b. If synchronized drives are used, a minimum of one wheel assembly driving both sides of carriage at center location required. Drive shaft shall exhibit no play or looseness over the entire length of that assembly.

2. Shafts: Solid steel rod or tube.

3. Shaft Connections: Secured couplings.

4. Bearing Surfaces: Provide rotating load bearing members with ball or roller bearings. Provide shafts with pillow block or flanged self-aligning type bearings.

E. Wheels:

1. Capacity: Minimum load capacity per wheel: 3200 lbs (1455kg).

2. Size: Minimum 5 inches (127MM), outside diameter drive wheels.

3. Guides: Determined by manufacturer; minimum 2 locations.

F. Face Panels:

1. Materials: Plastic laminate clad particle board with plastic edging on vertical edges.

2. Finishes: [Selected from manufacturer's standard available colors and patterns.] [(Optional) Selected by the [Architect] [Architect/Engineer] [Engineer] [Designer].

G. Accessories:

1. [(Optional) Dual Control: Provide operating handle at each end of movable carriages.]

2. [(Optional) Anti-Tip Devices: Provide manufacturer's standard fixtures.]

3. [(Optional) Waist High Carriage Locks: Provide manufacturer's standard.]

4. [(Optional) Carriage Mount Locks: Provide manufacturer's standard.]

5. [(Optional) Photo Sweep Scanning and Safety Stop (Line Powered).]

6. [(Optional) Mechanical Sweep and Safety Stop (Line Powered).]

7. [(Optional) Mechanical Sweep and Safety Stop (Battery Powered).]

8. [(Optional) Mechanical Sweep and Safety Stop (Non-Powered).]

   Every potential aisle shall be protected with a 3" (76 mm) high extruded aluminum safety sweep, hinged from the carriage using spring steel leaf springs, with the base edge maximum ¾" (19mm) from the floor. The carriage(s) shall stop when depressed at any location along the leading edge of the sweep surface. Activated safety sweep shall engage an impact- absorbing friction disk brake to protect occupants, stored media and the carriage system itself via a sheathed cable system comprised of aircraft-grade 3/64" (1.2mm) stainless steel core cables housed inside lined conduit. Safety sweep shall have bright, red and white safety identification tape applied full length marking its location. Safety sweep shall run the full length of both

sides of each moveable carriage for full aisle coverage.

Mechanical safety sweep shall automatically reset to enable mobile system users to freely and safely back carriages away from aisle obstructions simply by reversing the direction of the rotating handle.

Safety sweep shall be operational when the carriages are not moving. Should a sweep be activated in an open aisle, the carriage with the activated sweep will not close on that aisle. Safety sweep shall automatically reset if activated and then released when the carriages are not moving.

Safety sweep shall require no electrical power or batteries to operate.

9. [(Optional) Automatic Aisle Locks.]

2.5 FABRICATION

A. General: Coordinate fabrication and delivery to ensure no delay in progress of the Work.

B. Wheels: Provide precision machined and balanced units with permanently shielded and lubricated bearings.

C. Carriages: Fabricate to ensure no more than 1/4 inch (6MM) maximum deviation from a true straight line. Splice and weld to ensure no permanent set or slippage in any spliced or welded joint when exposed to forces encountered in normal operating circumstances.

D. Shelving, Supports and Accessories: See individual descriptions in “Shelving” paragraphs.

2.6 FINISHES

A. Colors: [Selected from manufacturer’s standard available colors.] [Provide in custom colors as selected by [Architect] [Architect/Engineer] [Engineer.]

B. Paint Finish: Provide factory applied electrostatic powder coat paint. Meet or exceed specifications of the American Library Association.

C. Laminate Finish: Provide factory applied laminate panels at locations indicated on approved shop drawings.

D. Edgings: Provide preformed edging, color-matched to unit colors selected.

E. [(Optional) (Describe finish materials)]

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine floor surfaces with Installer present for compliance with requirements for installation tolerances and other conditions affecting performance of mobile storage units.

B. Verify that building structural system is adequate for installing mobile storage units at locations indicated on approved shop drawings.

1. [In new construction, ensure that recesses for rails in floors are at proper spacing and depths, with allowance for grouting.]
2. [For installations on existing floors, ensure that rail spacings indicated on shop drawings are in proper locations so existing load-bearing structural members are not over stressed.]

C. Verify that intended installation locations of mobile storage units will not interfere with nor block established required exit paths or similar means of egress once units are installed.

D. Prepare written report, endorsed by Installer, listing conditions detrimental to proper performance of mobile storage units, once installed.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Rails:

1. Lay out rails using full length units to the maximum extent possible. Use cut lengths only at ends to attain total length required. Locate and position properly, following dimensions indicated on approved shop drawings. Verify thickness of finished floor materials to be installed (by others) and install level 1/16 inch (0.6MM) above finished floor surfaces.
2. Verify level, allowing for a minimum 1/4 inch (6MM) of grout under high points. Position and support rails so that no movement occurs during grouting.
3. Set rails in full grout bed, completely filling any voids entire length of all rails including rail connectors. Trim up sides flush with rails to ensure proper load transfer from rail to supporting floor. Using shims in lieu of full grouting is not permitted.
4. Installation Tolerances: Do not exceed levelness of installed rails listed below:
   a. Maximum Variation From True Level Within Any Module: 3/32 inch (2.4MM).
   b. Maximum Variation Between Adjacent (Parallel) Rails: 1/16 inch (1.6MM), perpendicular to rail direction.
   c. Maximum Variation In Height: 1/32 inch (.8MM), measured along any 10 foot (3.05M) rail length.
5. Verify rail position and level; anchor to structural floor system with anchor type and spacings indicated on approved shop drawings.

B. Floors/Ramps:

1. General: Finished elevation shall be 1/16 inch (1.6MM) below top of rails.
2. Place floors and ramps to the extent indicated on approved shop drawings. Extend ramps under all movable ranges. [Extend under stationary ranges if dual control access is required.] Provide ramp at both ends of mobile system. Do not extend ramps beyond the ends of carriages.
3. Construct floors and ramps to prevent warping or deformation of floor panels in a normal operating environment. Support panels on levelers at maximum 16 inches on center.
4. Ramp Slope: Do not exceed the following:
   a. ADA Accessible Ramps: Maximum 1:12 slope (4.76 degrees).

b. Other Ramps: Maximum 9 degree slope (1.9:12).

c. Vertical Transition, Ramp edge to floor: Maximum 1/8 inch (3MM).

C. Shelving Units Installation:

1. General: Follow layout and details shown on approved shop drawings and manufacturer's printed installation instructions. Position units level, plumb; at proper location relative to adjoining units and related work.

2. Carriages:

a. Place movable carriages on rails. Ensure that all wheels track properly and centering wheels are properly seated on centering rails. Fasten multiple carriage units together to form single movable base where required.

b. Position fixed carriage units to align with movable units.

3. Shelving Units:

a. Permanently fasten shelving units to fixed and movable carriages with vibration-proof fasteners.

b. Stabilize shelving units following manufacturer's written instructions. Reinforce shelving units to withstand the stress of movement where required and specified.

3.3 FIELD QUALITY CONTROL

A. Verify shelving unit alignment and plumb after installation. Correct if required following manufacturer’s instructions.

B. Remove components which are chipped, scratched, or otherwise damaged and which do not match adjoining work. Replace with new matching units, installed as specified and in manner to eliminate evidence of replacement.

3.4 ADJUSTING

A. Adjust components and accessories to provide smoothly operating, visually acceptable installation.

3.5 CLEANING

A. Immediately upon completion of installation, clear components and surfaces. Remove surplus materials, rubbish and debris resulting from installation upon completion of work and leave areas of installation in neat, clean condition.

3.6 DEMONSTRATION/TRAINING

A. Schedule and conduct demonstration of installed equipment and features with Owner's personnel.

B. Schedule and conduct maintenance training with Owner's maintenance personnel. Training session should include lecture and demonstration of all maintenance and repair procedures that end user personnel would normally perform.

3.7 PROTECTION

A. Protect system against damage during remainder of construction period. Advise Owner of additional protection needed to ensure that system will be without damage or deterioration at time of substantial completion.

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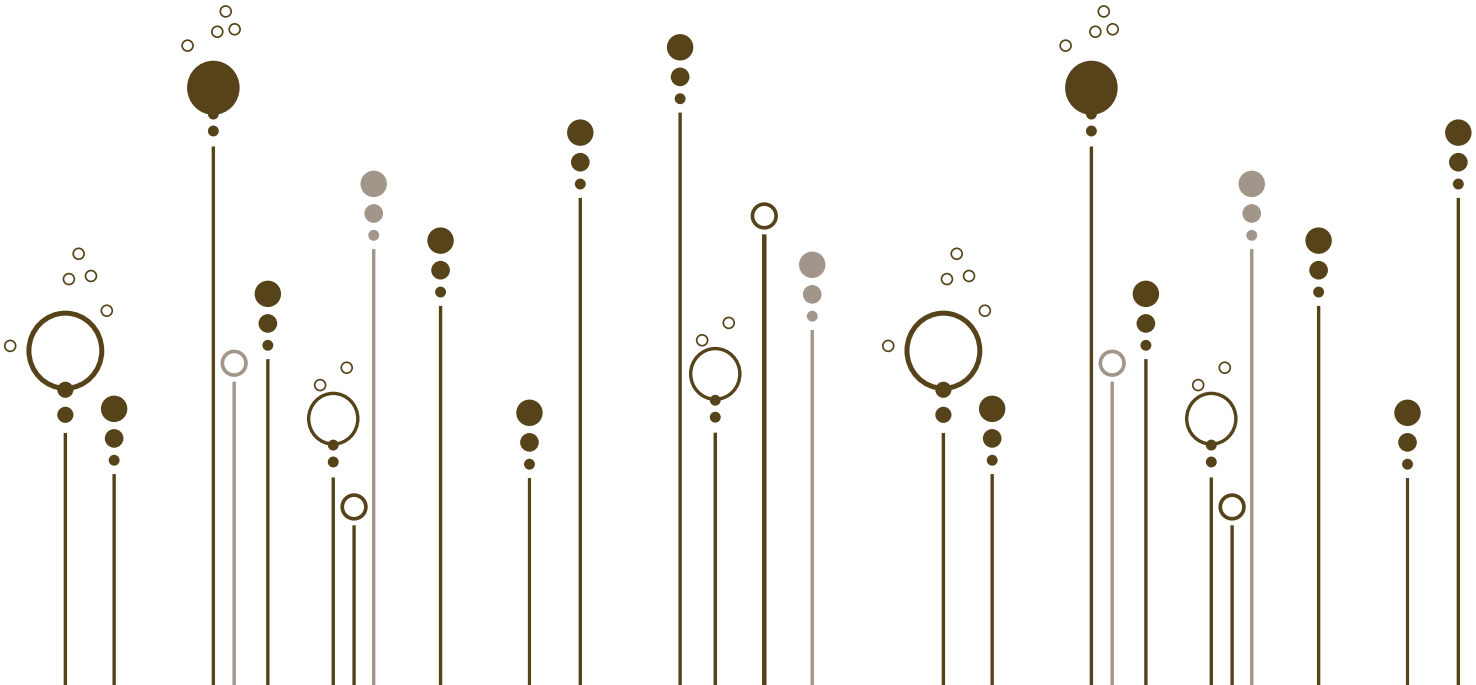
Appendix D

DIRTT



GOOD IS NOT GOOD, WHEN BETTER IS EXPECTED.

- Thomas Fuller

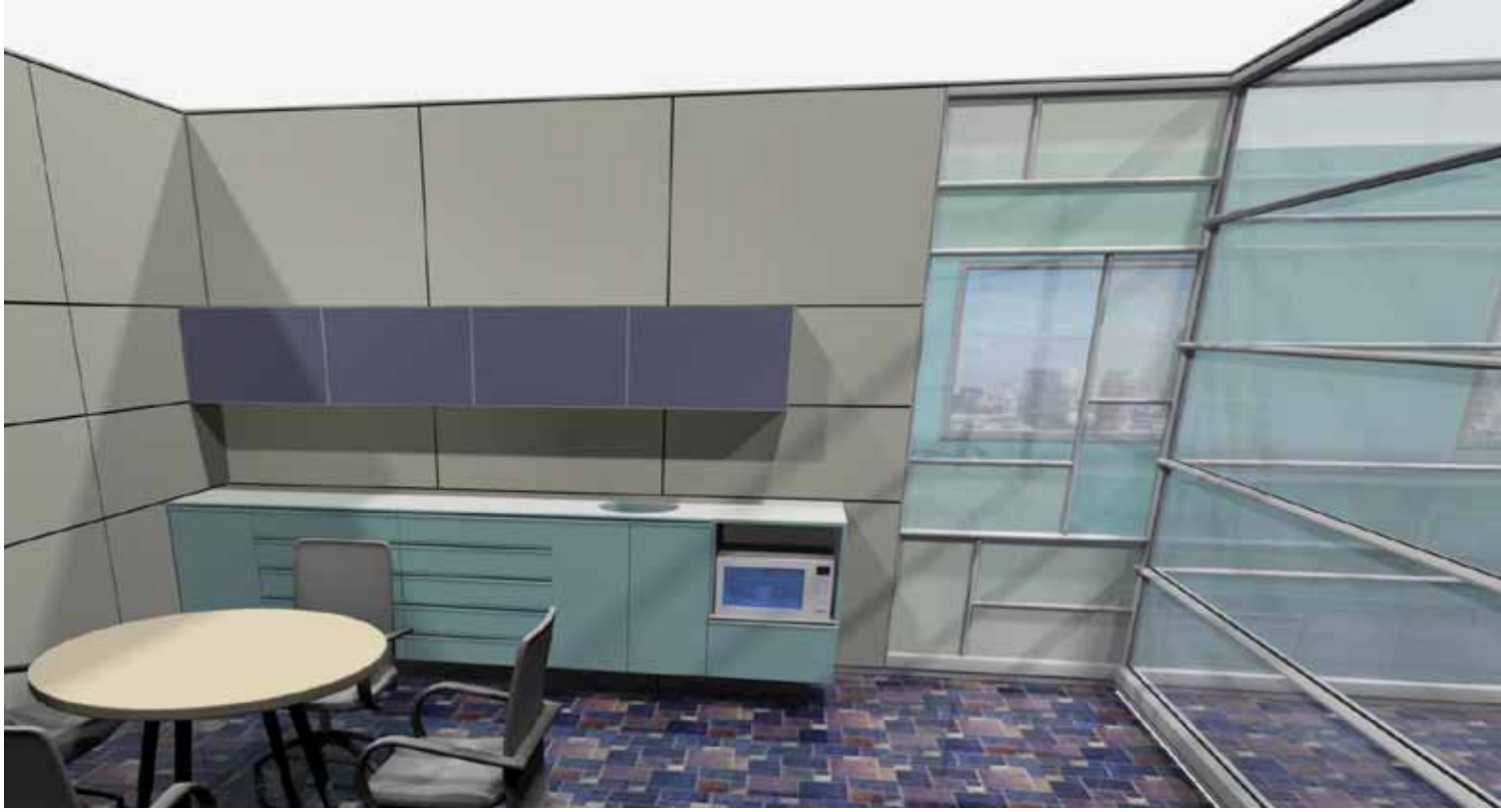
In Doing It Right This Time, DIRTT's mission is to radically and profitably modernize the multi-billion dollar construction industry. Previously unimagined mass-custom modular solutions offer speed, design, performance and environmental sustainability for the built environment. The result is a powerful investment for our Clients initially and operationally.

Clients are our First Priority

Everything we do, right up to developing innovation in our own solutions, is in response to our Clients' desires. A construction site is the land of 'anything can happen.' DIRTT prides itself in being the first to step up to dig into challenges, find solutions and stand beside our Client until the project is a success.

Being the change we wish to see

Every level of DIRTT reflects our devotion to the environment. Our solutions mitigate waste, energy and sprawl for our Clients. Our manufacturing methods, our marketing tools and our people are continually lessening the waste stream, carbon footprint and energy use. Equally important, every day we prove environmental sustainability is a profitable enterprise that does not cost our Clients more and in fact can improve their own efficiencies.



DIRTT ENVIRONMENTAL SOLUTIONS

Harnessing technology

By making ICE® software our platform, DIRTT is the first company in the world able to manufacture custom solutions as a standard practice using fewer resources than typical manufacturers. The patented combination of a videogame experience, with the intelligence of engineering and design, means ICE gives Clients a full understanding of their construction project. Simultaneously ICE delivers the design as a barcode directly to the factory floor — no matter where that factory is in the world.

Making Projects, Not Products

DIRTT's parametric solutions mean they are open to being designed within very wide parameters: Sizes, shapes, angles, finishes, supports are up to your team to design for the best integration in your space and culture. We do not have a warehouse of inventory. We have a factory at the ready to create what you want and need. Everything we produce is 'product neutral' so you can keep up with technology and use any new or legacy furniture, DIRTT solutions will support them now and in the future.

These guideposts combined with our team of passionate DIRTTbags helped make DIRTT the most successful company in the modular interior construction industry. Our methods and tools are first-of-their-kind innovations and are proving to be exactly the remedy for the ills of the construction industry, helping it move into the 21st century.

Part 1 General

1.1 SECTION INCLUDES

.1 Single source for movable partitions, inclusive of frames, glass, doors, door hardware, and electrical components were specified.

.2 Moveable partitions includes [sliding] [butt hinge] [pivot] [aluminum with glass lite] [wood with optional glass lite] [frameless glass] doors and glazing, manufactured and installed with demountable partitions.

.3 Supply and coordination of conduit, boxes and electrical duplexes into electrical and communication components where specified.

.4 Integration of voice data and security system components (supplied by others) into demountable partitions.

1.2 RELATED SECTIONS

.1 Section 06 40 00 - Architectural Woodwork: Architectural millwork suspended from wall [and] [_____].

.2 Section [08 14 16] [_____] - Doors.

.3 Section [08 71 00] [_____] - Door Hardware: Door hardware.

.4 Section [08 80 50] [_____] - Glass and Glazing: Glazing for glass panels and doors.

.5 Section 10 11 00 - Visual Display Surfaces: [Whiteboards] [Projection screens] mounted on wall.

.6 Section [_____ – _____]: Audio Visual equipment mounted on wall.

.7 Division 26 – Electrical: Electrical materials, installation, and connections.

.8 Division 27 – Communications: Communication system materials, installation and connection (supplied by others).

.9 Division 28 - Electronic Safety and Security: Security system materials, installation, and connections (supplied by others).

1.3 REFERENCES

.1 AAMA 611-98 - Voluntary Standards for Anodized Architectural Aluminum.

.2 ANSI/BIFMA X5.6-2003 - American National Standard for Office Furnishings.

.3 ASCE 7-05 - Minimum Design Loads for Buildings and Other Structures.

.4 ASTM E72-04- Method for Conducting Strength Tests of Panels for Building Construction.

.5 ASTM E84-05 - Test Method for Surface Burning Characteristics of Building Materials.

.6 ASTM E90-97- Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

.7 ASTM E413-87- Classification for Rating Sound Insulation.

.8 CAN/CSA-C22.2 No. 203-M91 (R2005 - Modular Wiring Systems for Office Furniture.

.9 Limited Production Certification (LPC), Report No. LPCE 75090-1.

.10 NFPA 70 – National Electrical Code, 2008 Edition.

.11 UL 1286-2008 – Office Furnishings.

1.4 PERFORMANCE REQUIREMENTS

.1 Structural Performance: Provide demountable partitions capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

.1 Transverse-Load Capacity of Wall System: Lateral deflection of not more than 1/120 (solid Wall) and 1/175 (glass wall) of the overall span when tested under a uniformly distributed load of 0.24 kN/m^2 (5 psf) in accordance with ASTM E72 or calculated by registered engineer.

.2 Seismic Performance: Provide demountable partitions capable of withstanding effects of earthquake motions determined according to ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

.1 Spectral Accelerations for Short Periods (S_S): Site specific.

.2 Spectral Accelerations for a 1-Second Period (S_1): Site specific.

.3 Provide miscellaneous bracing not shown on drawings which is required to satisfy seismic criteria.

.3 Sound Transmission Loss for Moveable Solid Wall: ASTM E90, STC [37] [44].

.4 Fire-Test-Response Characteristics:

.1 Surface-Burning Characteristics: Provide demountable partitions in accordance with ASTM E84, with the following maximum characteristics:

.1 Chromacoat MDF Panels: Meets Class B.

.2 Fire Rated Chromacoat MDF: Meets Class A.

.3 Pre-Finished Veneer on MDF: Meets Class C.

.4 Fabric Wrapped MDF: Meets Class C.

.5 FSC Chain of Custody Certification number is SCS-COC-00848.

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Section 01 31 00: Project management and coordination procedures.

.2 Coordination:

.1 Coordinate other work having a direct bearing on work of this section, including other work required to be installed within or next to Work of this section.

.3 Schedule:

.1 Coordinate delivery of product in accordance with construction schedule to avoid storage and double handling of the wall system.

.2 Installation of wall system in conjunction with other trades after completion of HVAC equipment, fire suppression, ceiling grid, finished drywall ceiling, floor covering, and lighting fixtures. Final electrical connection, voice data/communications, ceiling tiles, can be completed during or after installation of the wall systems.

1.6 SUBMITTALS

.1 Product Data: Provide product information for each type of product indicated in this specification.

.2 Shop Drawings: Provide Shop Drawings for demountable partitions.

.1 Include plans, elevations, sections, connection details, and attachment details to other work.

.2 Include critical field measurements for [standard] [custom] modular installation, including finished width and height of partitions.

.3 Provide structural analysis data for installed products indicated to comply with design loads, signed and sealed by licensed professional engineer responsible for their preparation.

.3 Coordination Drawings:

.1 Provide all final engineered drawings relevant to material inclusions within, or connections to the moveable wall product.

.2 Provide architectural plans locating movable wall products, including wall finishes and construction of surfaces with which the moveable wall system interfaces with or connects to.

.3 Provide reflected ceiling plans, drawn to scale, on which penetrations and ceiling mounted items are shown and coordinated with demountable partitions.

.4 Electrical Drawings: Coordinate electrical provisions to be included in moveable partitions with final circuited electrical engineering drawings and schedules.

.4 Samples: Provide samples for verification of each type of exposed finish required, in sample size indicated below.

.1 Panel Finish Face and Extrusion Components: Manufacturer's standard size unit, but not less than 75 mm (3 inches) square.

.2 Linear Trim: 300 mm (12 inches) long.

.3 Door Face Finish: Manufacturer's standard sized unit, but not less than 75 mm (3 inches) square.

.4 Glazing: Manufacturer's standard sized unit, but not less than 75 mm (3 inches) square.

.5 LEED Submittals:

.1 Credit MR 4.1 and Credit MR 4.2: Product Data indicating percentages by weight of postconsumer and preconsumer recycled content for demountable partitions.

.1 Include statement indicating costs for each product having recycled content.

.2 Credit MR 5.1 and Credit MR 5.2: Product Data indicating percentages by weight of demountable partition materials that have been extracted and manufactured within 500 miles of the project site.

.1 Include statement indicating costs for each material extracted and manufactured within 500 miles of project site.

.3 Credit MR 7: Offer FSC Certified MDF, UF Free FSC Certified MDF and FSC Certified Cherry and Oak Veneer.

.4 Credit EQ 4.1: Product data for adhesives used to laminate gypsum board panels to substrates and for interior sealants, including printed statement of VOC content.

.5 Credit EQ 4.2: Manufacturers' product data for paints and coatings, including printed statement of VOC content and chemical components.

.6 Credit EQ 4.4: Product data for the following:

.1 Each composite-wood product used indicating that bonding agent contains no urea formaldehyde.

.2 Each adhesive used indicating that adhesive contains no urea formaldehyde.

.6 Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of demountable partition.

.7 Evaluation/Certification Reports:

.1 LARR (Los Angeles Research Report) – 25604, based on ICC ESR (Evaluation Service Report).

.2 ESR-1947 (reissued 2007): Provide evidence of compliance with structural performance requirements and the building code.

.3 Limited Production Certification (LPC), Report No. LPCE 75090-1: Provide evidence of compliance with CAN/CSA-C22.2 No. 203 and UL 1286 for modular wiring systems for office furniture.

.8 Maintenance Data: Provide maintenance data for demountable partitions for incorporation into operation and maintenance manuals.

1.7 QUALITY ASSURANCE

.1 Sound Transmission Characteristics:

.1 Where STC ratings are indicated, provide partitions with STC rating determined by testing an identical system to ASTM E90 and classified in accordance with ASTM E413.

.2 Testing to be done by a qualified independent testing agency.

.2 Electrical Components, Devices, and Accessories: Listed and labelled in accordance with NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

.3 Mechanical Strength of Demountable Partitions: Provide demountable partitions capable of withstanding static loads in accordance with ANSI/BIFMA X5.6.

.4 Mock-Up:

.1 Prior to installation of demountable partitions, build mock-up to verify selections made under sample submittals.

.2 Mock-up will demonstrate aesthetic effects and set quality standards for materials and execution.

.3 Locate [where directed by Consultant.] [_____.]

.4 Approved mock-up may [not] remain as part of the completed Work if undisturbed at time of Substantial Completion.

1.8 REGULATORY REQUIREMENTS

.1 Conform to [ADA Guidelines] [_____] for accessibility requirements.

1.9 PROJECT CONDITIONS

.1 Environmental Limitations: Do not deliver or install demountable partition components until building is enclosed and finishing operations are complete, including ceiling and floor-covering installation and painting.

Part 2 Products

2.1 MANUFACTURERS

.1 DIRTT Environmental Solutions; Moveable [Solid] [and] [Glass] Walls.

.2 Other acceptable manufacturers offering functionally [and aesthetically] equivalent products.

.1 [_____].

.2 [_____].

.3 Substitutions: [Refer to Section [01 62 00].] [Not permitted.]

2.2 DEMOUNTABLE UNITIZED PANEL PARTITIONS

.1 Solid Panels

.1 Aluminum Framing: Aluminum extrusions, 6063-T54 or 6061-T6 aluminum alloy.

.2 Face Mounted Tile Attachment: Provide unitized frame assembly to accept face mounted tiles with orientation and module increments as specified.

.3 Frame Accessibility: Provide up to 75 mm (3 inches) clear wall cavity for distribution of utilities accessible from either side of wall by removable face panels.

.4 Face Panels:

.1 Thicknesses: 13 mm (1/2 inch).

.2 Width and Height: As indicated.

.3 Face Tile Type: [_____]

.1 Paint Finish (CP-2): Factory-applied paint finish as follows:

.1 Series: [Standard.] [Paint match.]

.2 Color: [_____].

.3 Paint Match - Manufacturer: [_____].

.4 Paint Match - Description: [_____].

.5 Paint Match - Color number: [_____].

.2 Wood Veneer Finish (WD-2): Factory-applied wood veneer finish as follows:

.1 Series: Standard.

.2 Wood Veneer Species: [_____].

.3 Wood Veneer Cut: [_____].

.4 Stain Finish: [_____].

.3 Upholstered Fabric Finish [_____]: Factory-applied Fabric as follows:

.1 Series: [Standard.] [COM.]

.2 Pattern: [_____].

.3 Color: [_____].

.4 Direction: [Standard.] [Railroaded.]

.5 Tile Type: [Solid fabric wrapped] [Tack-able].

.4 Frameless Back Painted Glass [_____]: Factory-applied paint finish on frameless glass as follows:

.1 Series: [Standard.] [Paint match.]

.2 Color: [_____].

.3 Paint Match - Manufacturer: [_____].

.4 Paint Match - Description: [_____].

.5 Paint Match - Color number: [_____].

.5 Frameless Magnetic Back Painted Glass [_____]: Factory-applied paint finish on frameless glass as follows:

.1 Series: [Standard.] [Paint match.]

.2 Color: [_____].

.3 Paint Match - Manufacturer: [_____].

.4 Paint Match - Description: [_____].

.5 Paint Match - Color number: [_____].

.6 Frameless Laminated Glass [_____]: Factory-applied centre mount paint finish on frameless glass as follows:

.1 Series: [Standard.] [Paint match.]

.2 Color: [_____].

.3 Paint Match - Manufacturer: [_____].

.4 Paint Match - Description: [_____].

.5 Paint Match - Color number: [_____].

.7 Solid Write Away Tile (for dry eraser): Factory-applied finish on tiles as follows:

.1 Series: [Standard.] [Paint match.]

.2 Color: [_____].

.3 Paint Match - Manufacturer: [_____].

.4 Paint Match - Description: [_____].

.5 Paint Match - Color number: [_____].

.8 Magnetic Whiteboard [_____]: [_____].

.9 Slat Wall 150 mm (6 inch) Accessory [_____]: Factory-applied powdercoat to match paint finish as follows:

.1 Series: [Standard.] [Paint match.]

.2 Color: [_____].

.3 Paint Match - Manufacturer: [_____].

.4 Paint Match - Description: [_____].

.5 Paint Match - Color number: [_____].

.5 Electrical, Communications, and Security System Requirements: Provide for installation of electrical, communications, and security system items arranged so that wiring can be readily removed and replaced.

.1 Conduit: Provide option for metal conduit in cavity of demountable partitions, from outlet and device boxes to top or bottom of demountable partitions to permit wiring installation and connections as specified in Division 26, 27, and 28.

.1 Refer to Division 26, 27, and 28 Sections for metal conduit raceway and pull wire requirements.

.2 Boxes: Provide outlet and device boxes in cavity of demountable partitions for all outlets and devices indicated. Provide metal junction and pull boxes where indicated or required.

.3 Electrical, Communications, and Security System Components: Provide all cutouts and reinforcements required for demountable partitions to accept electrical, communications, and security system components.

.2 Glass Panels

.1 Aluminum Glazing Framing: Aluminum extrusions, 6063-T54 or 6061-T6 aluminum alloy.

.1 Frame Finishes: [Clear-anodized aluminum] [Powdercoat (paint match)] [Wood Veneer Wrapped].

.1 Clear Anodized aluminum; AAMA 611, AA-M12C22A31, Class II.

.2 Powdercoat Color: Factory-applied powdercoat to match paint finish as follows:

.1 Series: [Standard.] [Paint match.]

.2 Color: [_____].

.3 Paint Match - Manufacturer: [_____].

.4 Paint Match - Description: [_____].

.5 Paint Match - Color number: [_____].

.3 Wood Veneer Wrapped Finish (WD-2): Factory-applied wood veneer finish as follows:

.1 Series: Standard.

.2 Wood Veneer Species: [_____]

.3 Wood Veneer Cut: [_____].

.4 Stain Finish: [_____].

.2 Glazing: Glass type indicated complying with Section [08 80 50] [_____] - Glazing.

.1 Glass Type GL-[_]: As specified in Section [08 80 50] [_____] – Glazing.

.2 Glass Type GL-[_]: As specified in Section [08 80 50] [_____] – Glazing.

.3 Glass Type GL-[_]: As specified in Section [08 80 50] [_____] – Glazing.

.3 Frame Bases:

.1 Provide frame bases with provisions for height adjustment to accommodate floor slab variances.

.2 Provide a leveling mechanism for making fine adjustment in height over adjustment range of the product.

.4 Connections and Supports: Manufacturer's standard connections and supports that connect and release from floor and ceiling without damage using carpet grippers and ceiling track clips, with exception of the following conditions: bulkhead (drywall ceiling), seismic conditions, electrical or service feeds, physical connections to base building (where required).

.5 Panel Joint Closure: Manufacturer's standard, capable of closing up to a 25 mm (1 inch) gap between demountable partitions and base building elements.

.6 Trim: Continuous and modular, factory-finished, snap-on type; adjustable for variations in floor and ceiling levels.

.1 Base Trim Profiles: Recessed; removable to access leveling mechanisms.

.2 Ceiling Trim Profile: Recessed; adjustable to accommodate up to a 12 mm (1/2 inch) gap between demountable partitions and base building elements.

.3 Wall Trim Profile: Recessed; adjustable to accommodate up to a 12 mm (1/2 inch) up to 25 mm (1 inch) gap between demountable partitions and base building elements.

.4 Panel to Panel Profile: As detailed.

.5 Colours: As selected by Architect from manufacturer's full range.

2.3 DOORS

.1 Glazed Aluminum Doors: Manufacturer's standard stiles and rail door, [butt hinge] [pivot] [sliding] operation, glazed aluminum doors.

.1 Door Thickness: 43 mm (1-11/16 inches) thick.

.2 Door Finishes: [Clear anodized aluminum; AAMA 611, AA-M12C22A31, Class II] [and] [_____].

.3 Door Color: As selected by Architect from manufacturer's full range.

.4 Stile Width: [50] [102] [152] mm ([2] [4] [6] inches).

.5 Top Rail Height: [102] [152] mm ([4] [6] inches).

.6 Bottom Rail Height: [200 mm (7-7/8 inches).] [305 mm (12 inches) AFF.]

.7 Door Height: Adjustable base to move in conjunction with wall system.

.8 Glazing: [Tempered] [Laminated] glass, [6] [10] mm ([1/4] [3/8] inch) thick, [_____] custom finish.

[OR]

.9 Glazing: [Type GL [___], as specified in Section [8 80 50].

.10 Hardware Reinforcement: Factory milled to suit hardware.

.11 Security System Components: Coordinated hardware requirements and prep work for security system components. (supplied by others).

.2 Flush Wood Doors: Manufacturer's standard solid core door, [butt hinge] [pivot] [sliding] operation [and glazed].

.1 Door Thickness: 43 mm (1-11/16 inches) thick.

.2 Pressed high density fibreboard skin on both sides of door on particleboard core.

.3 Edging: Solid edging, [veneer finish.] [maple for Chromacoat finish.]

.4 Stile Width for Glazed Door: 157 mm (6-3/16 inch).

.5 Door Height: [2032 mm (6'-8")] [2083 mm (6'-10")] [2134 mm (7'-0")] [_____].

.6 Glazing: [Tempered] [Laminated] glass, [6] [10] mm ([1/4] [3/8] inch) thick, [_____] custom finish.

[OR]

.7 Glazing: Type GL [___], as specified in Section [8 80 50].

.8 Finish: [Chromacoat, [_____] colour.] [Stain grade veneer, [_____] finish.]

[OR]

.3 Flush Wood Doors: As specified in Section [08 14 16] - Flush Wood Doors.

.4 Frameless Glass Pivot Door: Manufacturer’s specified glass with top rail and bottom aluminum rails (CR Laurence top and bottom rails supplied locally by others).

.1 Door Glazing: 13 mm (1/2 inch) tempered glass (supplied locally by others).

.2 Stile Width: None.

.3 Top Rail Height: 59 mm (2-5/16 inch).

.4 Bottom Rail Height: 59 mm (2-5/16 inch).

.5 Hardware Reinforcement: Factory milled to suit hardware. Glass and hardware supplied by others.

.6 Security System Components: Coordinated hardware requirements and prep work for security system components (supplied by others).

.5 Frameless Glass Sliding Door: Manufacturer’s supplied top rail and bottom aluminum rails (glass supplied locally by others).

.1 Door Glazing: 10 mm (3/8 inch) tempered glass (supplied locally by others).

.2 Stile Width: None.

.3 Top Rail Height: 61 mm (2-3/8 inch).

.4 Bottom Rail with Adjustable Base (option) Height: 127mm (5 inch) AFF.

.5 Hardware Reinforcement: Factory milled to suit hardware. Glass supplied by others.

.6 Security System Components: Coordinated hardware requirements and prep work for security system components (supplied by others).

2.4 DOOR FRAMES

.1 Pivot Door Frames: Manufacturer's standard aluminum frame [single door] [double door], reversible, factory milled to receive hardware, for 43 mm (1-11/16 inch) [+/- 1.5mm (1/16inch)] doors. Door frames capable of reconfiguration without part replacement or damage to wall components.

.1 Frame Finishes: [Clear-anodized aluminum; AAMA 611, AA-M12C22A31, Class II] [_____].

.2 Frame Color: As selected by Architect from manufacturer's full range.

.3 Door Module Size: [_____.] [As scheduled.]

.4 Configuration: Header, jambs and pivot hardware. Single door frame width not to exceed 1118 mm (44 inch) wide module.

.5 Hardware Reinforcement: milled, reinforce, drill and tap frames at factory to receive specified hardware in accordance with the contract hardware schedule and templates.

.6 Frame Height: Jambs shipped over length (height) by 50 mm (2 inches), for field cutting to suit opening height for proper alignment with adjacent frames.

.7 Frame Preparation: Factory installed top pivot plate.

.8 Electrical Requirements:

.1 Security System Components: Coordinated hardware requirements and prep work for security system components (supplied by others).

.9 Factory notched and drilled jambs for ceiling track and manufacturer’s standard header attachment.

.10 Extrusion Profile: [Curvilinear] [Rectilinear] [_____] profile to match any adjacent unitized glass frames.

.11 Seals: Manufacturer's standard.

.2 Butt Hinge Frames: Manufacturer's standard aluminum frame [single door] [double door], factory milled to receive hardware, for 43 mm (1-11/16 inch) [+/- 1.5mm (1/16 inch)] doors. Door frames capable of reconfiguration without part replacement or damage to wall components.

.1 Frame Finishes: [Clear-anodized aluminum; AAMA 611, AA-M12C22A31, Class II] [_____].

.2 Frame Color: As selected by Architect from manufacturer's full range.

.3 Door Module Size: [_____.] [As scheduled.]

.4 Configuration: Header, jambs and pivot hardware. Single door frame width not to exceed 1219 mm (48 inch) wide module.

.5 Hardware Reinforcement: milled, reinforce, drill and tap frames at factory to receive specified hardware in accordance with the contract hardware schedule and templates.

.6 Frame Height: Jambs over length 50 mm (2 inches), for field cutting to suit opening height for proper alignment with adjacent frames.

.7 Frame Preparation: Factory milled frame with hinge locations and sizes as determined and set by manufacturer; including factory installed steel backer plates for four (4) hinges (2 pair):

.1 Hinges: 4 1/2 x 4 Stanley BB1409 fastened with 10-24 flat head machine screws.

.2 For C.O.M. Doors Conform to moveable wall manufacturer's standard size, hole pattern and fastener type for hinges to be supplied by others.

.8 Electrical Requirements:

.1 Security System Components: Coordinated hardware requirements and prep work for security system components (supplied by others).

.9 Factory notched and drilled jambs for ceiling track and manufacturer’s standard header attachment.

.10 Extrusion Profile: [Curvilinear] [Rectilinear] profile to match any adjacent unitized glass frames.

.11 Seals: Manufacturer's standard.

.3 Sliding Door Frames: Manufacturer's standard aluminum frame [single door] [double door], single continuous track mounted to demountable wall system and capable of reconfiguration without part replacement or damage to wall components.

.1 Frame Finishes: [Clear-anodized aluminum; AAMA 611, AA-M12C22A31, Class II] [_____].

.2 Frame Color: As selected by Architect from manufacturer's full range.

.3 Door Module Size: [_____.] [As scheduled.]

.4 Configuration: Header, jambs and pivot hardware. Single door frame width not to exceed 1524 mm (60 inch) wide module for Aluminum Doors and 1219mm (48inch) for Wood Doors.

.5 Self-supporting header and track, jambs, sliding door, and trackless at floor between jambs.

.6 Frame Height: Jambs shipped over length by 50 mm (2 inches) in height, for field cutting to suit opening height for proper alignment with adjacent frames.

.7 Factory notched and drilled jambs for ceiling track and manufacturer’s standard header attachment.

.8 Extrusion Profile: [Curvilinear] [Rectilinear] [_____] profile to match any adjacent unitized glass frames.

.9 Frame and Track Construction:

.1 Continuous extruded frame supported or drywall header section with concealed track mechanism.

.2 Guide and alignment hardware for stabilization of door bottom.

.3 Door secured in closed position on strike side of door.

.4 Anti rack / lift hardware included in track assembly.

.10 Operation: Pneumatic slow down mechanism in door assembly mechanism to reduce travel velocity to near zero as door approaches its open and closed limit. Adjust as required after door installation.

.11 Seals: Manufacturer's standard.

.12 Operation and configuration ADA compliant in both clear opening and opening force in accordance with [ADA Guidelines] [current applicable building code].

.4 Hardware: Manufacturer's standard [top and bottom pivot] [butt hinge] [sliding door] hardware, with [lever] [passage sets] [locksets] [_____] and [_____] pulls.

[OR]

.5 Hardware: As specified in Section [08 71 00] – Door Hardware.

2.5 ACCESSORIES

.1 Accessories and Brackets:

.1 Manufacturer's brackets, supports and accessories for complete installation of system's furniture components, architectural millwork, audio visual equipment, and paper accessories.

.2 Provide bracket design to enable other system furniture to mount to DIRTT walls, on or off module.

2.6 FABRICATION

.1 Demountable Unitized Panels:

.1 Factory-Assembled frames with 25 mm (1inch) insulation, base track and levellers; face mounted tiles installed to frames on site.

.2 Fabricate panels for installation with concealed fastening devices and pressure-fit components that will not damage ceiling or floor covering exceptions.

.3 Fabricate panels with continuous light-and-sound seals at floor, ceiling, and other locations where panels abut fixed construction.

.4 Factory glaze panels to the greatest extent possible.

.2 Components:

.1 Fabricate components for installation with concealed fastening devices and pressure-fit members that will not damage ceiling or floor coverings.
Exceptions: Drywall ceiling, seismic applications and doors against base building require screw holes in base building for proper fastening.

.2 Fabricate for installation with continuous seals at floor and other locations where partition assemblies abut fixed construction and for installation of sound attenuation insulation in partition cavities.

.3 Electrical, Communications, and Security System Components: Fabricate demountable partitions to accept electrical, communications, and security systems components specified in Division 26, 27, and 28.

2.7 FINISHES

.1 Protect finishes on exposed surfaces from damage during shipping.

.2 Appearance of Finished Work:

.1 Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved samples.

.2 Noticeable variations in the same piece are not acceptable.

.3 Variations in appearance of other components are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.

Part 3 Execution

3.1 INSTALLATION

.1 Install demountable partition systems to manufacturer's written instructions.

.2 Install system rigid, level, plumb, and aligned.

.3 Apply finished face mounted tiles to framing.

.4 Install continuous insulation in base trim cavity.

.5 Install seals to prevent light and sound transmission at connections to floors, ceilings, fixed walls, and abutting surfaces.

.6 Install doors and frames, glazing, and glazing frame assemblies securely anchored to partitions and with doors aligned and fitted.

.7 Install and adjust door hardware for proper operation.

3.2 DEMONSTRATION

.1 Engage a factory-authorized service representative to demonstrate and train Owner's maintenance personnel to adjust, operate, and maintain demountable partitions.

.2 Refer to Section [_____] – [Demonstration and Training].

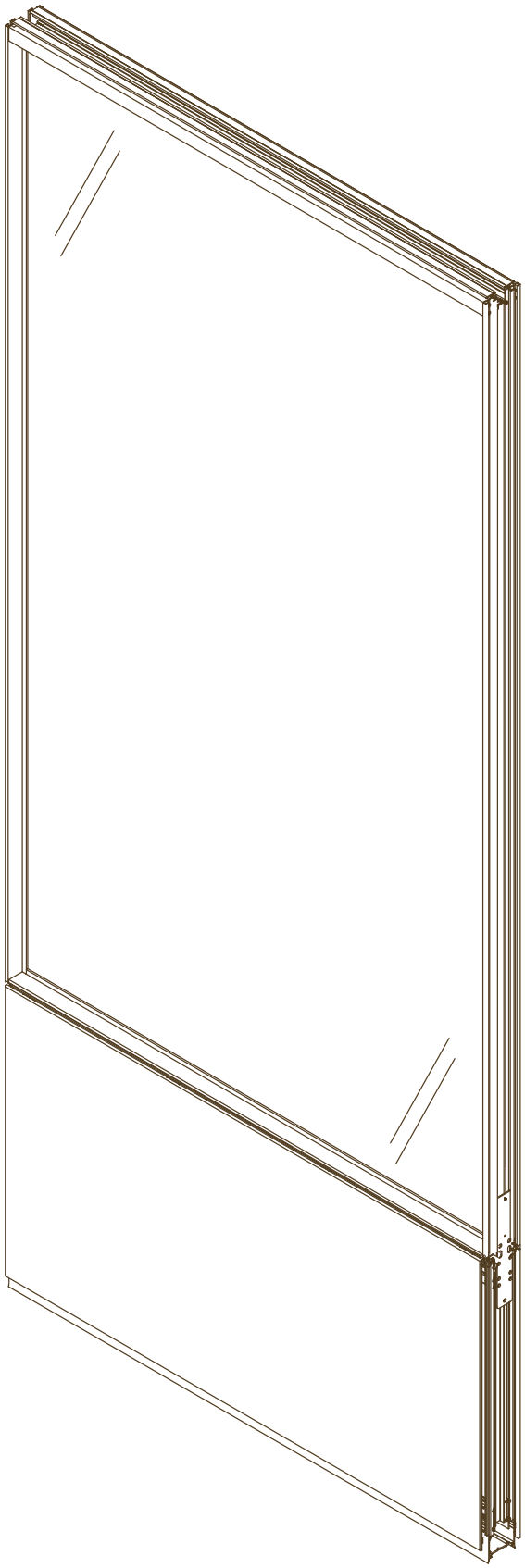
END OF SECTION

DIRTT

OVERVIEW - TECH SHEET

COMBINATION WALL (STACK WALL)

V2 LOW PROFILE BASE



COMPONENTS & MATERIALS

Aluminum Extrusions

Architectural Grade and Structural Aluminum Alloys
Vertical & Horizontal Extrusions, Base Track

Horizontal Sections

Partially exposed Horizontal Support Member for dividing tiles and hanging components; heights user defined.
Hidden Horizontal Member for additional support of face mounted tiles; heights user defined as required.

Insulation

1" (25mm) Thick Fiber Glass – Formaldehyde-free, factory installed in frame. Base Insulation to be field installed in base cavity prior to base trim or scribed tiles.

Base Track

Aluminum Base Track
Steel Leveler Assembly with vertical adjustment
Carpet Grippers
Optional Two Sided Tape for hard flooring
Optional Seismic Base Track

Base Trim

Santoprene Base Trim
Oversized Solid Tiles scribed to floor on site

Face Mount Tile Options

Chroma-coat (painted) Tiles
Wood Veneer on MDF Tiles
Magnetic Whiteboard Tiles
Dry Erase Film on MDF Tiles
Fabric Tiles
Frameless Back Painted Glass Tiles
Slat Wall Tiles (Accessory Rail)
DIRTT Approved Custom Finishes

Center Mount Tile Options

Glass in ¼" (6mm) and ⅜" (10mm) thickness
- Clear Tempered Glass
- Etched Glass
- Laminated Glass
- Berman Glass
- Back Painted Glass

Chroma-coat (painted) Tiles
Veneer Tiles
Dry Erase Film on MDF Tiles
Fabric Tiles
DIRTT Approved Custom Finishes

PVC Components

Frame Connections	Rigid/Flex Co-extrusion
Ceiling Trim/Wall Start	Rigid/Flex Co-extrusion
Glass Retainer	Rigid/Flex Co-extrusion
PVC Color Options	Black, Charcoal, Silver, Custom as required

DIMENSIONS & DETAILS

Frame

Standard Wall Thickness	4" (102mm) with Tiles
Minimum Module Width	6" (152mm)
Maximum Module Width	48" (1219mm)
Standard Ceiling Height	Up to 120" (3048mm)*
Vertical Height Adjustment	
Standard Base	– ⅜" (9.5mm) and +1 ⅜" (35mm)

**Wall Heights above 120" (3048mm) must be validated by DIRTT to confirm walls do not exceed the maximum allowable deflection per IBC.*

Frame Connections

Hidden Links	Frame alignment and gap control
Visible PVC Zipper	At frame connection between frames

Trim Components

Ceiling Trim	Flexible trim from top of wall to ceiling
Wall Trim	Rigid connection from Frame to Base Building; combined with flexible Wall Trim

Other Component Connections to Solid Walls

Glass Panels
Door Frames
Corner Connectors
Various Base Building Connections
Modular Electrical
Conventional Electrical

Other Options

Stacking Configurations	Glass over Solid Solid over Glass Glass over Solid over Glass Solid over Glass over Solid Glass Segment spanning multiple solid frames

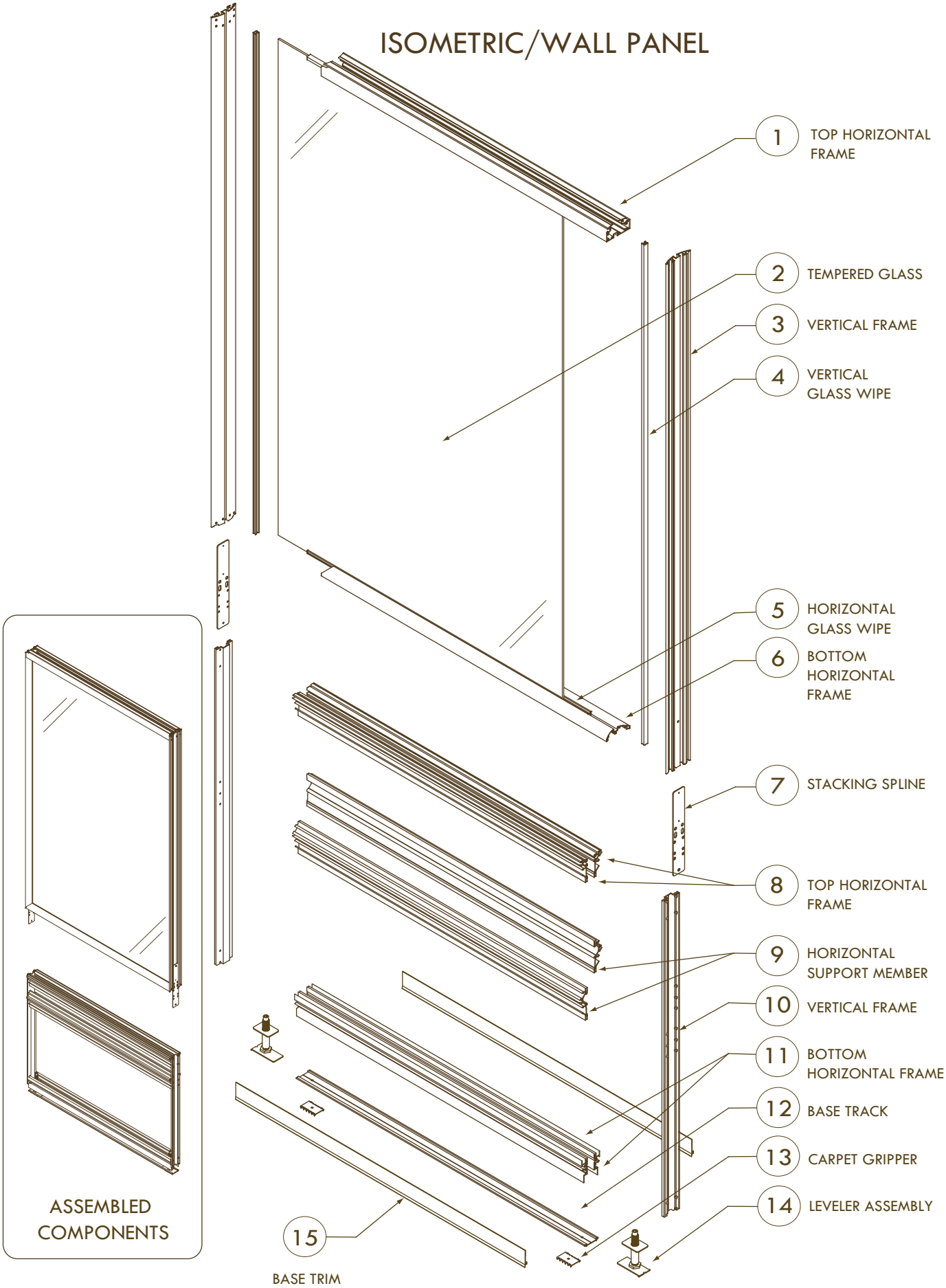
Low Wall
Cornice Height Wall
Center Steel Septum
Mitered Corner Joint
Extended Levelers for additional leveling capability
Seismic
DIRTT Approved Custom Solutions (Bespoke)
NAUF MDF
Fire Retardant MDF

TESTING & APPROVALS

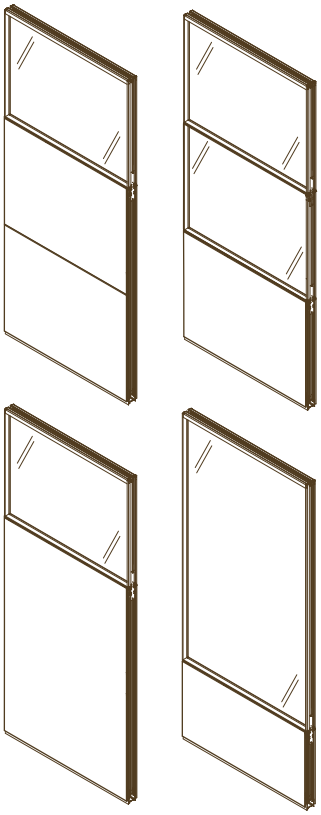
QPS UL/CSA Level 3, Office Electrical	LPCE-75090-1
Los Angeles Research Report (Seismic)	LARR-25604
Seismic Engineering Calculations	
Seismic Engineering Details	

Testing Reports, Details and Approvals are available upon request.

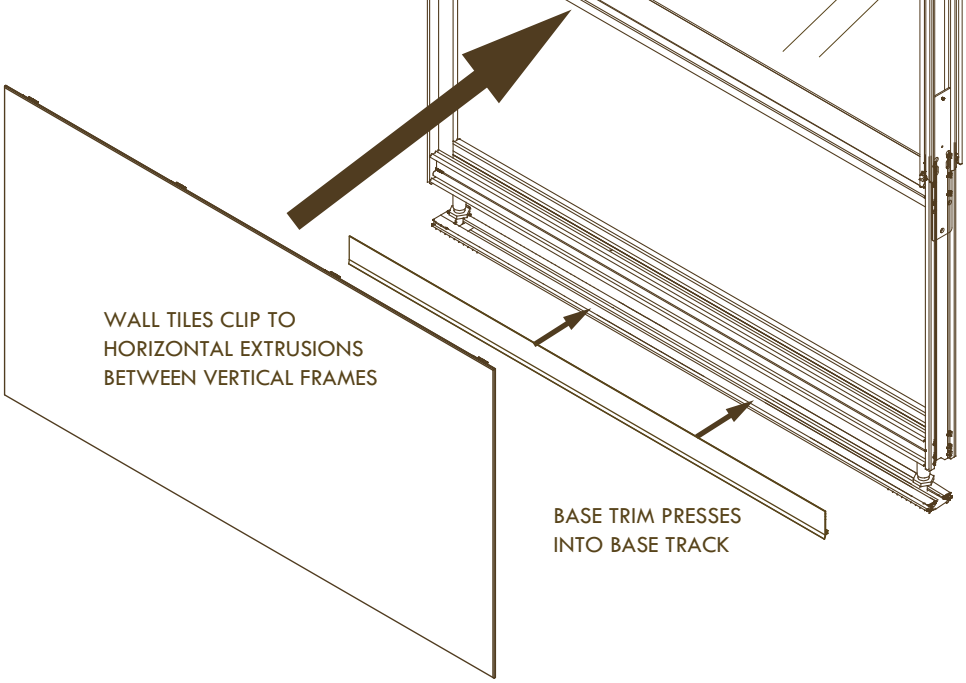
ISOMETRIC/WALL PANEL

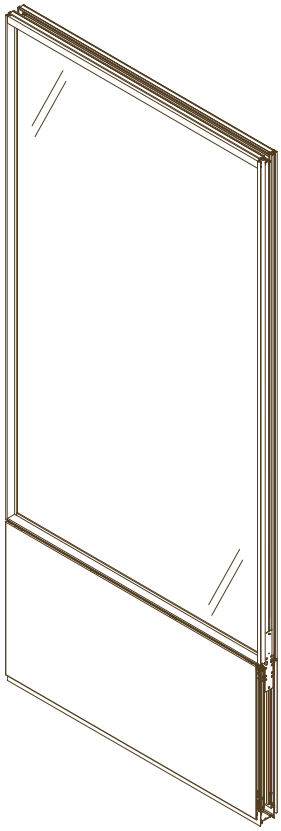


ISOMETRIC/WALL PANEL

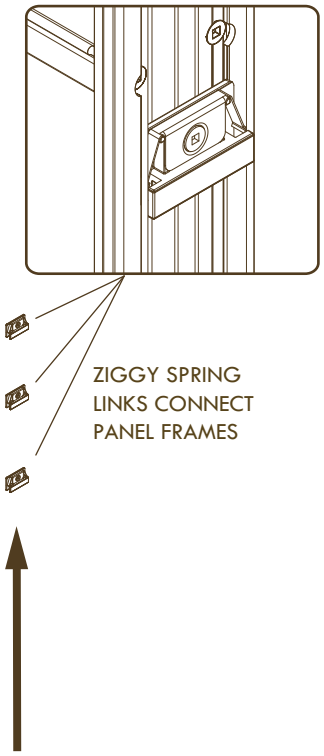


USER DEFINED
CONFIGURATIONS





ASSEMBLED

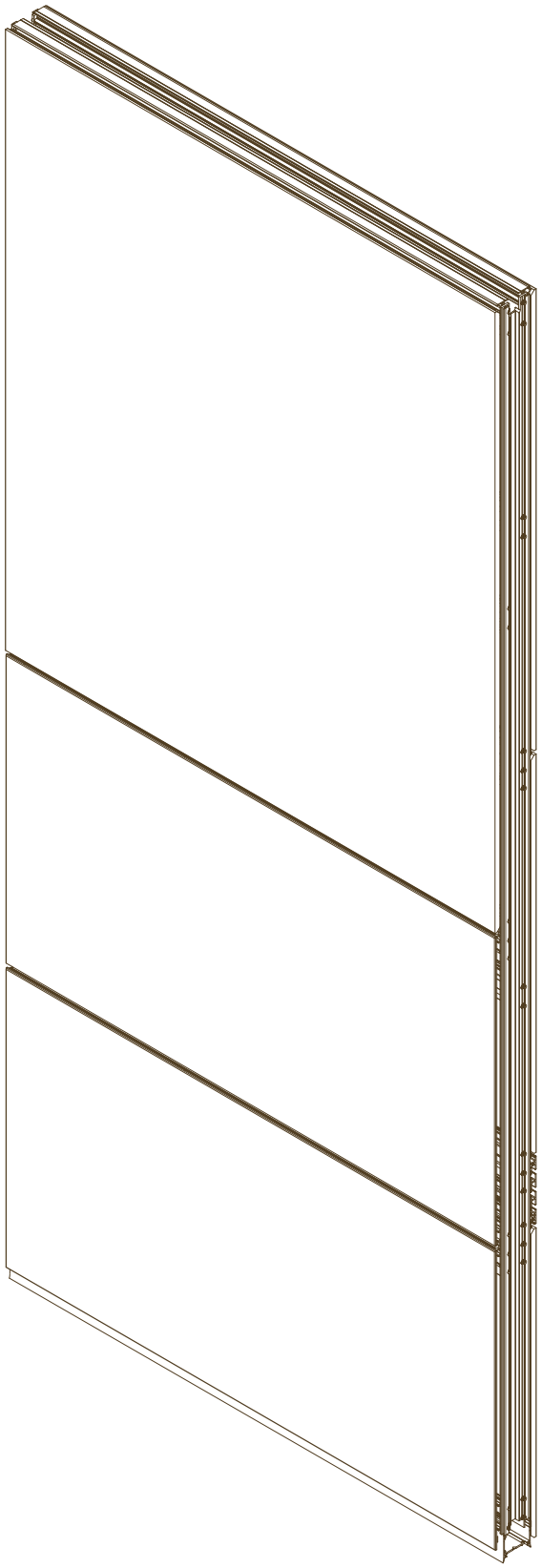


DIRTT

OVERVIEW - TECH SHEET

FACE TILED WALL (SOLID WALL)

V2 LOW PROFILE BASE



COMPONENTS & MATERIALS

Aluminum Extrusions

Architectural Grade and Structural Aluminum Alloys
Vertical & Horizontal Extrusions, Base Track

Horizontal Sections

Partially exposed Horizontal Support Member for dividing tiles and hanging components; heights user defined.
Hidden Horizontal Member for additional support of face mounted tiles; heights user defined as required.

Insulation

1" (25mm) thick Insulation, factory installed in frame. Base Insulation to be field installed in base cavity prior to base trim or scribed tiles.

Base Track

Aluminum Base Track
Steel Leveler Assembly with vertical adjustment
Carpet Grippers
Optional Two Sided Tape for smooth flooring
Optional Seismic Base Track

Base Trim

Santoprene Base Trim
Oversized Solid Tiles scribed to floor on site

Face Mount Tile Options

Chroma-coat (painted) Tiles
Wood Veneer on MDF Tiles
Magnetic Whiteboard Tiles
Dry Erase Film on MDF Tiles
Fabric Tiles; tackable and non-tackable
Frameless Back Painted Glass Tiles
Slat Wall Tiles (Accessory Rail)
DIRTT Approved Custom Finishes

PVC Components

Frame Connections	Rigid/Flex Co-extrusion
Ceiling Trim/Wall Start	Rigid/Flex Co-extrusion
PVC Color Options	Black ,Charcoal, Silver, Custom as required

DIMENSIONS & DETAILS

Frame

Standard Wall Thickness	4" (102mm) with Tiles
Minimum Module Width	6" (152mm)
Maximum Module Width	48" (1219mm)
Standard Ceiling Height	Up to 120" (3048mm)*
Vertical Height Adjustment	
Standard Base	– ⅜" (9.5mm) and +3 ⅞" (98mm)

**Wall Heights above 120" (3048mm) must be validated by DIRTT to confirm walls do not exceed the maximum allowable deflection per IBC.*

Frame Connections

Hidden Links	Frame alignment and gap control
Visible PVC Zipper	At frame connection between frames

Trim Components

Ceiling Trim	Flexible trim from top of wall to ceiling
Wall Trim	Rigid connection from Frame to Base Building; combined with flexible Wall Trim

Other Component Connections to Solid Walls

Glass Panels
Door Frames
Corner Connectors
Various Base Building Connections
Modular Electrical
Conventional Electrical

Other Options

Combination Wall	Combined Face Tile Wall with Glass Wall
Curtain Wall	Installed in front of Base Building Wall Tiled one side only

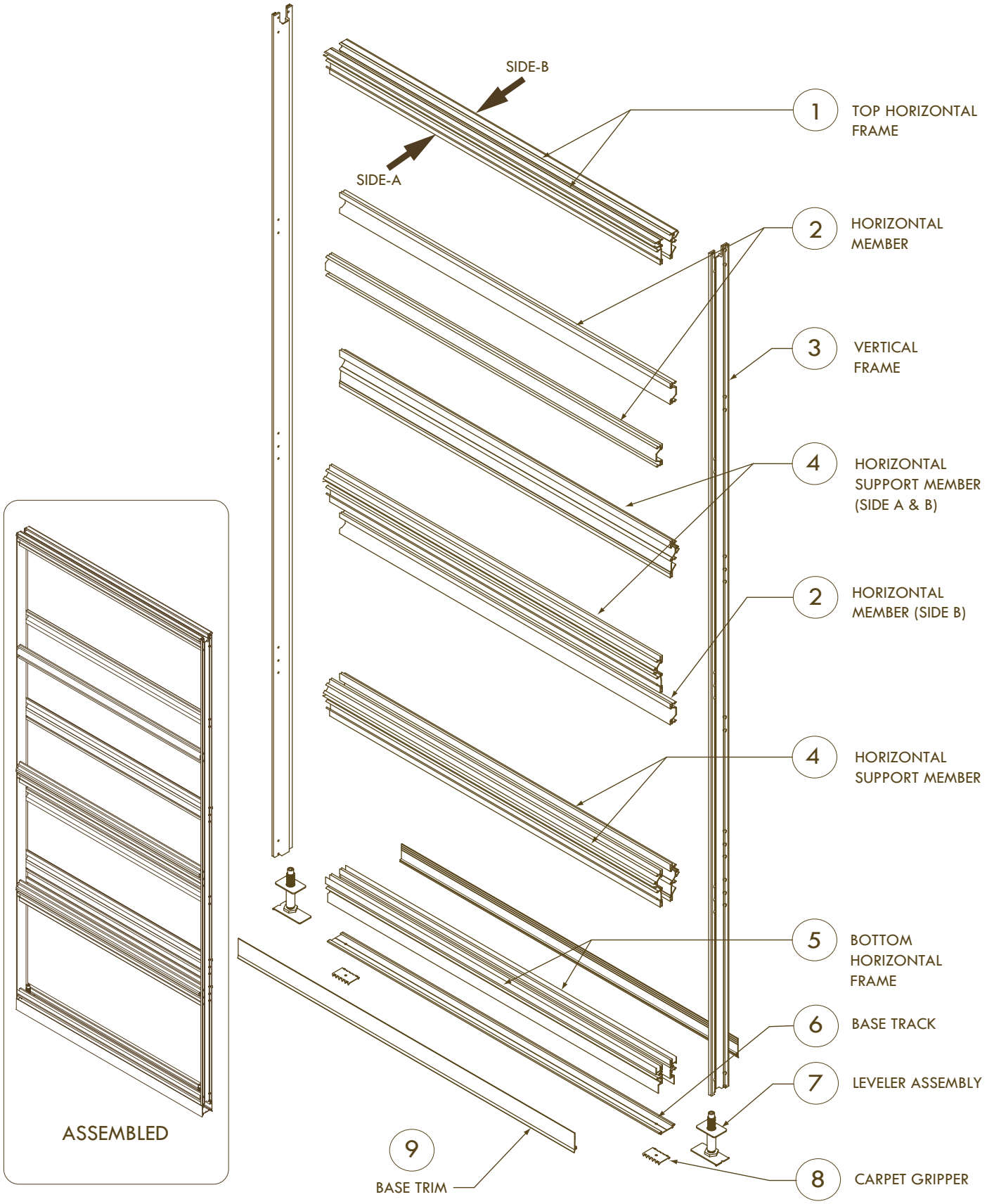
Low Wall
Cornice Height Wall
Center Steel Septum
Mitered Corner Joint
Extended Levelers for additional leveling capability
Seismic
Enhanced STC Performance
DIRTT Approved Custom Solutions (Bespoke)
NAUF/NAF MDF
Fire Retardant MDF

TESTING & APPROVALS

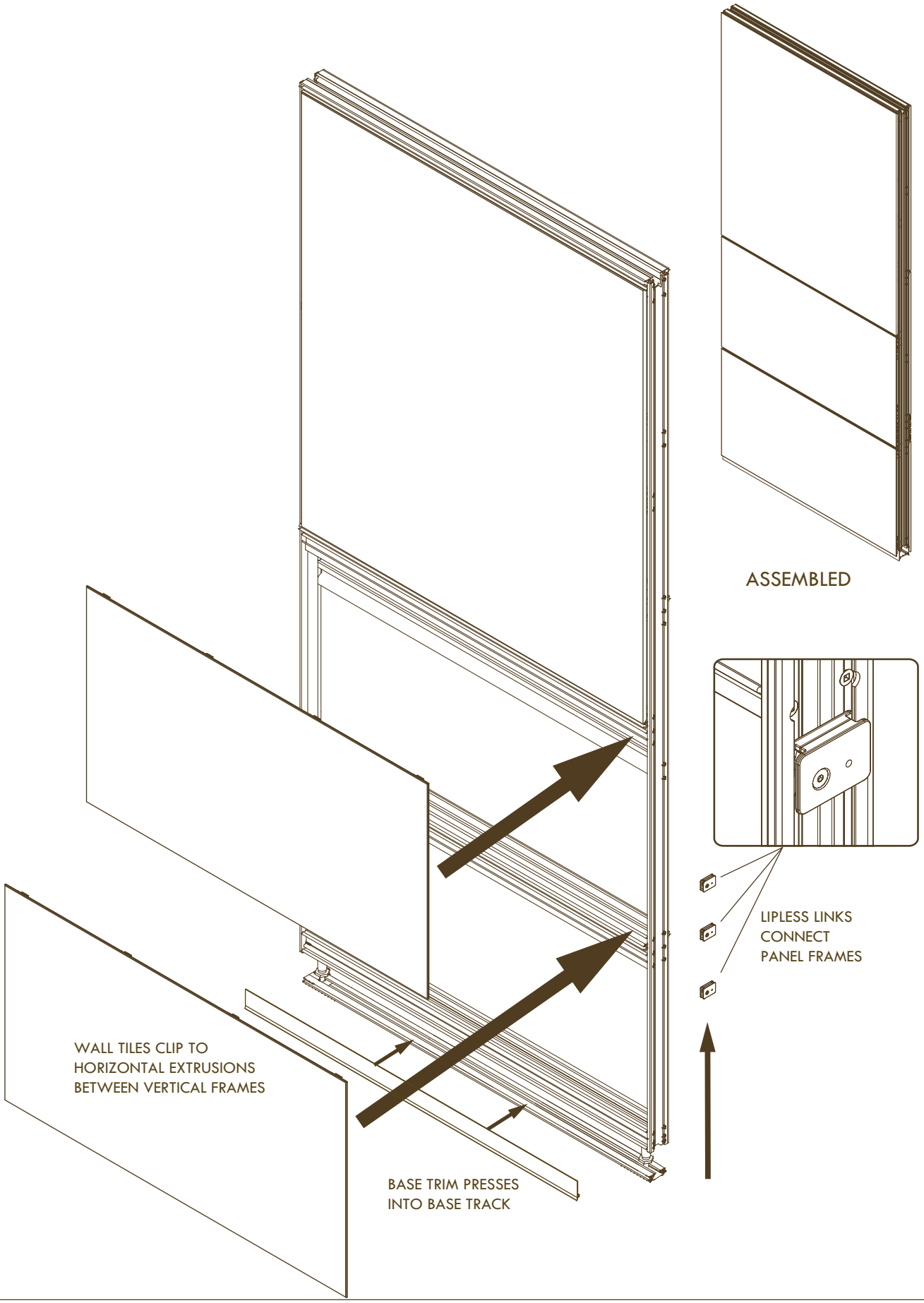
ICC-ES Evaluation Report	ESR-1947
ANSI/BIFMA	X5.6-2003
Traverse Load	ASTM E72
Flame Spread	ASTM E84
STC Rating 37-50 *(Dependent on wall construction)*	ASTM E90
QPS UL/CSA Level 3, Office Electrical	LPCE-75090-1
Los Angeles Research Report (Seismic)	LARR-25604
OSHPD	OPA-2275-07
Seismic Engineering Calculations	
Seismic Engineering Details	

Testing Reports, Details and Approvals are available upon request.

ISOMETRIC/WALL STRUCTURE



ISOMETRIC/WALL PANEL

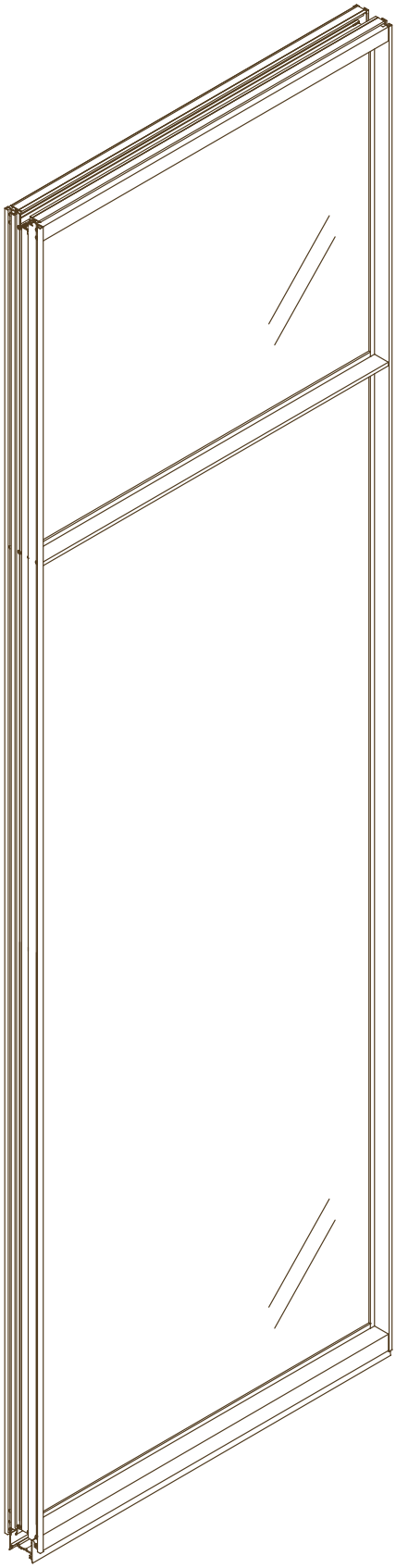


DIRTT

OVERVIEW - TECH SHEET

CENTER MOUNT GLASS WALL

V2 LOW PROFILE BASE



COMPONENTS & MATERIALS

Aluminum Extrusions

Architectural Grade and Structural Aluminum Alloys
- Vertical & Horizontal Extrusions, Base Track

Standard Frame Profiles
- Rectilinear Profile
- Curvilinear Profile
- Blade Profile
- Double Glass Profile

Custom Frame Profiles

Frame Finish Options
- Clear Anodized (5 micron standard)
- Powder Coated
- Veneer Wrapped (Curvilinear and Rectilinear Profiles Only)
- Custom as required

Horizontal Sections

Exposed Horizontal Members in Blade and Curvilinear profiles for dividing and supporting Center Mount Glass or Tiles.

Center Mount Glass and Tiles are received in PVC Glass Wipes fitted in center groove of horizontal extrusions

Horizontal Member heights user defined

Base Track

Aluminum Base Track

Steel Leveler Assembly with vertical adjustment

Carpet Grippers

Two sided tape for hard flooring

Optional Seismic Base track

Optional Low Profile Base

Base Trim

Santoprene Base Trim

Center Mount Tile Options

Glass in ¼" (6mm) and ⅜" (10mm) thickness
- Clear Tempered Glass
- Etched Glass
- Laminated Glass
- Berman Glass
- Back Painted Glass

Chroma-coat (painted) Tiles

Veneer Tiles

Dry Erase Film on MDF Tiles

Fabric Tiles

DIRTT Approved Custom Finishes

PVC Components

Frame Connections	Rigid/Flex Co-extrusion
Ceiling Trim/Wall Start	Rigid/Flex Co-extrusion
Glass Retainer	Rigid/Flex Co-extrusion
PVC Color Options	Black, Charcoal, Silver, Custom as required

DIMENSIONS & DETAILS

Frame

Standard Wall Thickness	4" (102mm)
Minimum Module Width	6" (152mm)
Maximum Module Width	60" (1524mm)
Standard Ceiling Height	Up to 120" (3048mm)*
Vertical Height Adjustment	
Standard Base	– ⅜" (9.5mm) and +1 ⅜" (35mm)

**Wall Heights above 120" (3048mm) must be validated by DIRTT to confirm walls do not exceed the maximum allowable deflection per IBC.*

Frame Connections

Hidden Links	Frame alignment and gap control
Visible PVC Zipper	At frame connection between frames

Trim Components

Ceiling Trim	Flexible trim from top of wall to ceiling
Wall Trim	Rigid connection from Frame to Base Building; combined with flexible Wall Trim

Other Component Connections to Glass Walls

Glass Panels

Door Frames

Corner Connectors

Various Base Building Connections

Other Options

Combination Wall	Combined Glass with Solid Wall
Stick Built Wall	Multiple Butt Joint Glass Segments within same frame; site assembled

Cornice Height Wall

Curved Glass tiles and extrusions

Glass Spandrel Detail

Mitered Corner Joint

DIRTT Approved Custom Solutions

TESTING & APPROVALS

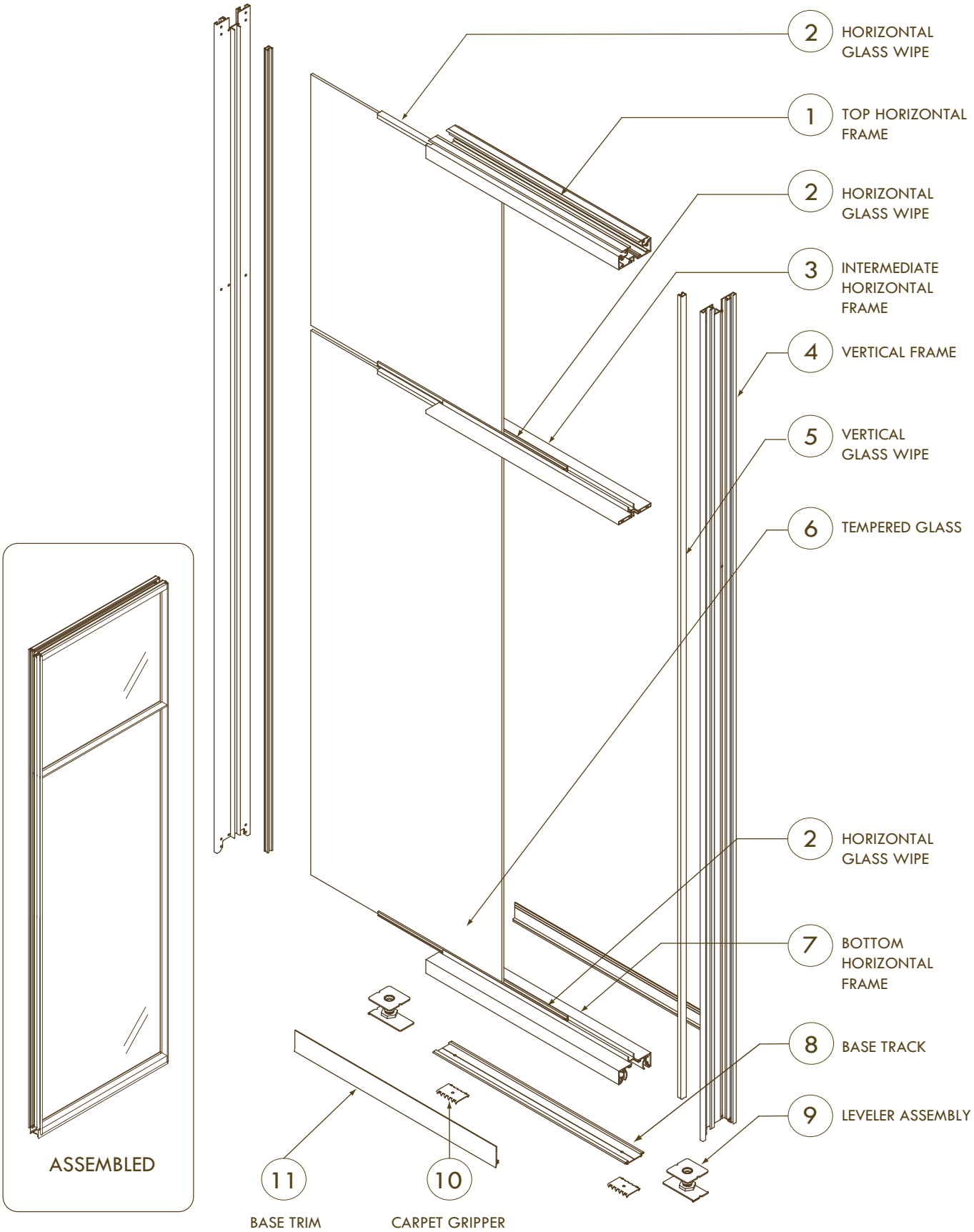
ASTM E72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction

Seismic Engineering Calculations

Seismic Engineering Details

Testing Reports, Details and Approvals are available upon request.

ISOMETRIC/WALL PANEL



OVERVIEW - TECH SHEET
PIVOT DOORS

Frameless Glass *Framed 4 Inch Stile* *Framed 6 Inch Stile* *Solid Core Wood*

COMPONENTS & MATERIALS

Aluminum Extrusions

Door, Door Frame Extrusions
- Architectural Grade and Structural Aluminum Alloys

Finishes

- Clear Anodized Aluminum (5 micron standard)
- Powder Coated Aluminum (Door Frame)
- Architectural Grade Veneer; stained (Door Frame, Framed 4" Stile & Solid Core Wood Doors)
- UV Cured Water Based Finishes Color; selection per manufacturer's standard range (Framed 6" Stile & Solid Core Wood Doors only)
- Custom color matches (client approval required)

PVC Components

Frame Connections
- Rigid/Flex Co-extrusion

Ceiling Trim/Wall Start
- Rigid/Flex Co-extrusion

Glass Retainer
- Rigid/Flex Co-extrusion

PVC Color Options
- Black, Charcoal, Silver,
- Custom as required

Door Seal Components

Aluminum Stop (anodized or powder coat finish only) with PVC door seal

Full Height Continuous strike plate (anodized or powder coat finish only) with PVC door seal.

PVC Color Options – as above in PVC components

Door Glass Components

Standard Tempered Glass ¼" (6mm) – Option ⅜" (10mm)

Standard Laminated Glass ¼" (6mm) – Option ⅜" (10mm)

Approved Custom Finishes

Solid Core Wood Door

Solid Core Wood Slab Door

Optional Door with Glass Lite

Solid Core Wood DIRTT approved Custom Glass Lites

Door Hardware*

Manufacturer's own top and bottom pivot hardware

Non-Locking with Bar Pull; Floor Locking with Bar Pull; Lever Patch

Cylindrical Hardware
- Falcon B series; Schlage AL series; Schlage S series; available in passage and entrance/office functions; Custom

DIRTT standard mounting height for levers is 38" (965mm) Above Finish Floor (AFF) to centerline of lever

Optional Door Hardware

DIRTT Door Pulls

Top flush bolts, roller catches

5 ⅝" (143mm) strike plates

Magnetic Lock Option

DIRTT Approved Custom Hardware (Supplied "By Others")

Compatible Door closers (Supplied "By Others")

DIMENSIONS & DETAILS

Frame

Frame Width (Single Door)	38" - 44" (965 - 1118mm)*
Frame Width (Double Door)	74 ⅛" - 86 ⅛" (1883 - 2188mm)*
Standard Ceiling Height	Up to 120" (3048mm)
Standard Frame Depth	4" (102mm)
Lower Pivot Plate	Locate to adjacent module
Frame Height	Oversized in height; cut down on-site to suit opening

Door

Standard Door Thickness	1 11/16" (43mm)
Door Width (Single Door)	36" - 42" (914 - 1067mm)*
Standard Clear Opening Width	34 ⅛" (867mm) clear (ADA Compliant)
Double Door Clear Opening Width	1 Door Open 34 ¾" (882mm) 2 Doors Open 69 ⅜" (1762mm)
Door Height Adjustment	Adjustable with system
Standard Door Stiles	4" (102mm) and 6" (152mm)

**Maximum size depends on Door Style and Finish; see detailed Tech Sheets.*

Frame Connections (DIRTT Wall and/or Drywall to Frame)

Hidden Links	Frame alignment and gap control
Visible PVC Connectors	At frame connection between the door frame and the adjacent frame

Trim Components

Ceiling Trim	Flexible trim from top of wall to ceiling
Wall Trim	Rigid connection from Door Frame to Base Building; combined with flexible Wall Trim

Other Options

Glass or Solid Transom over door (door frame option)

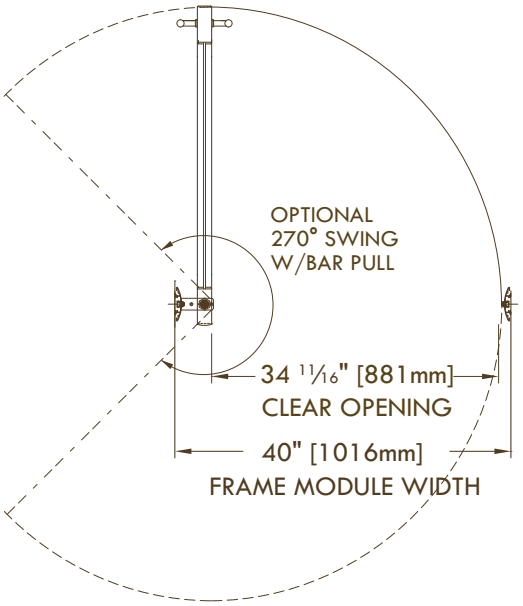
Applied muntins on glass (anodized or powder coat finish only)

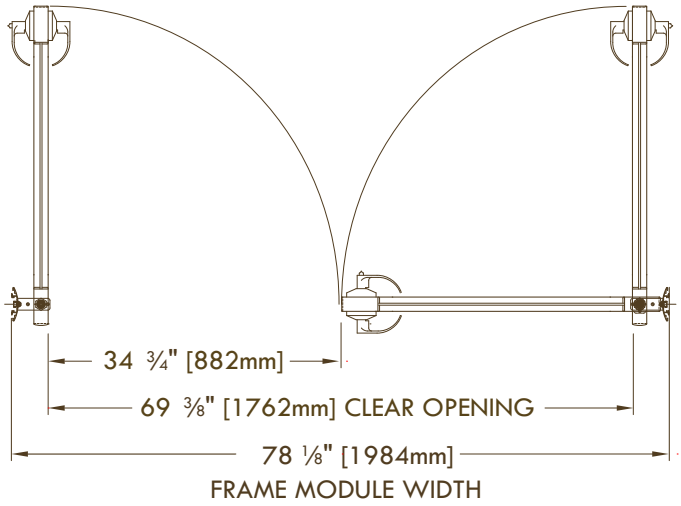
COM Doors - Hardware Prepared to DIRTT Standards

PLAN VIEW/ ELEVATION

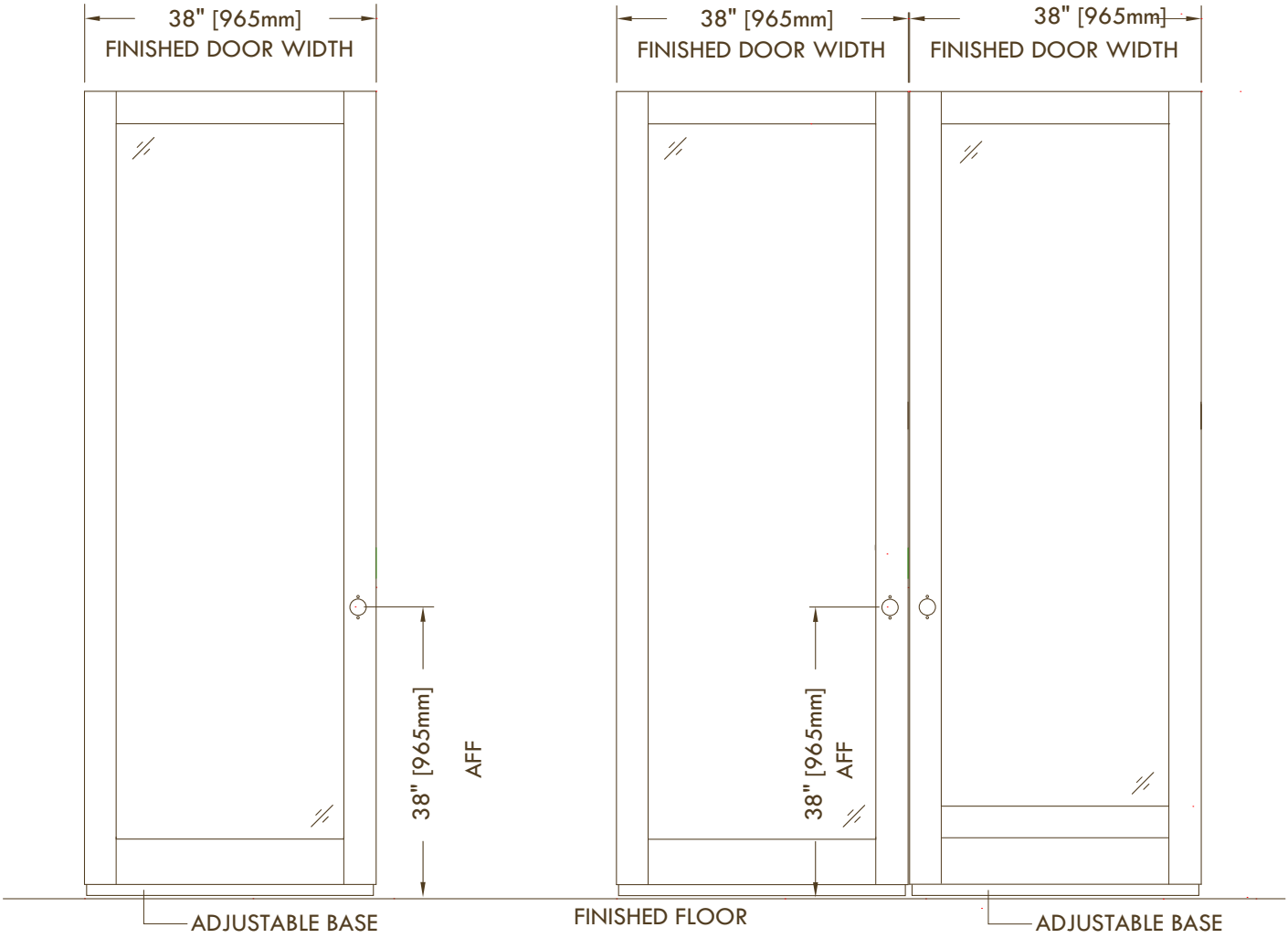
(NTS)

**Refer to Applicable Pivot Door Tech Sheet for Details*





FRAMED PIVOT DOOR



PIVOT DOOR

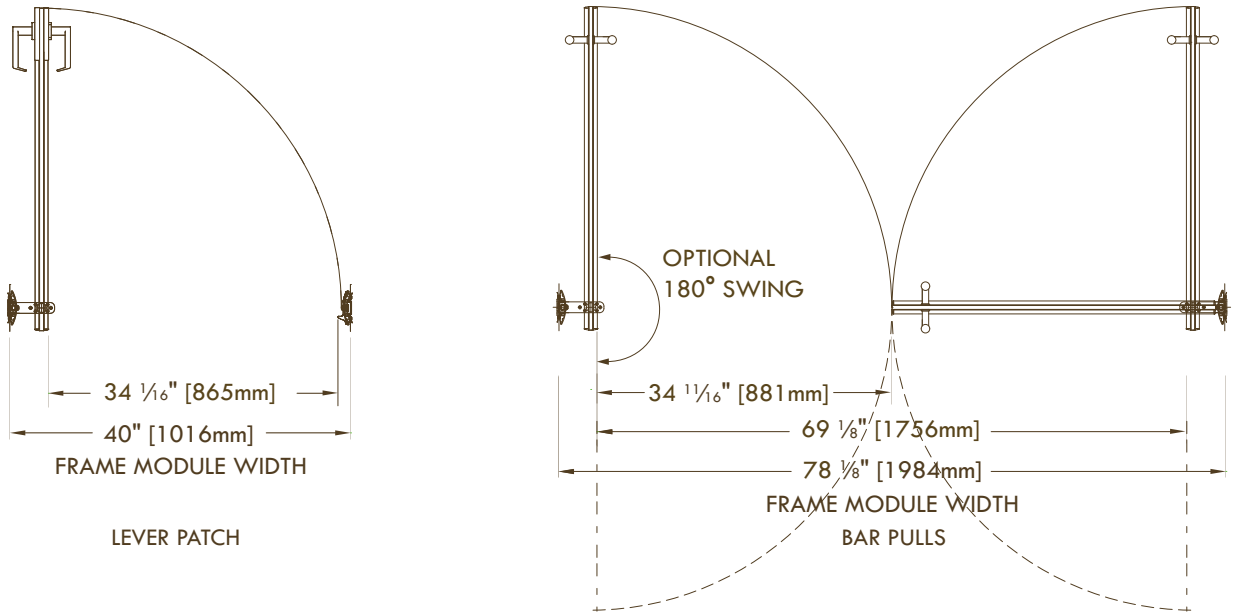
DOUBLE PIVOT DOOR

PIVOT DOOR - ADA

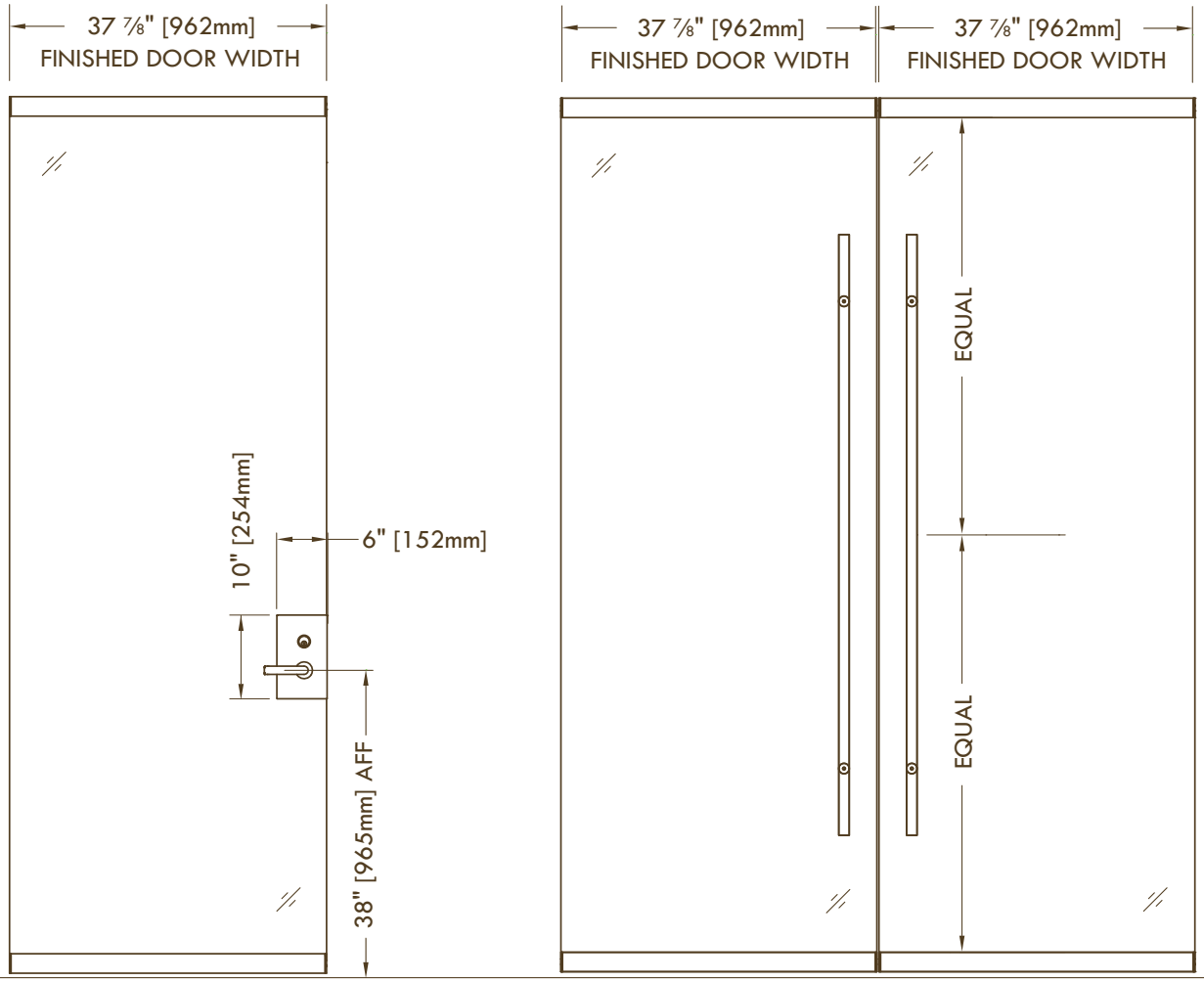
PLAN VIEW/ ELEVATION

(NTS)

**Refer to Applicable Pivot Door Tech Sheet for Details*



FRAMELESS GLASS PIVOT DOOR



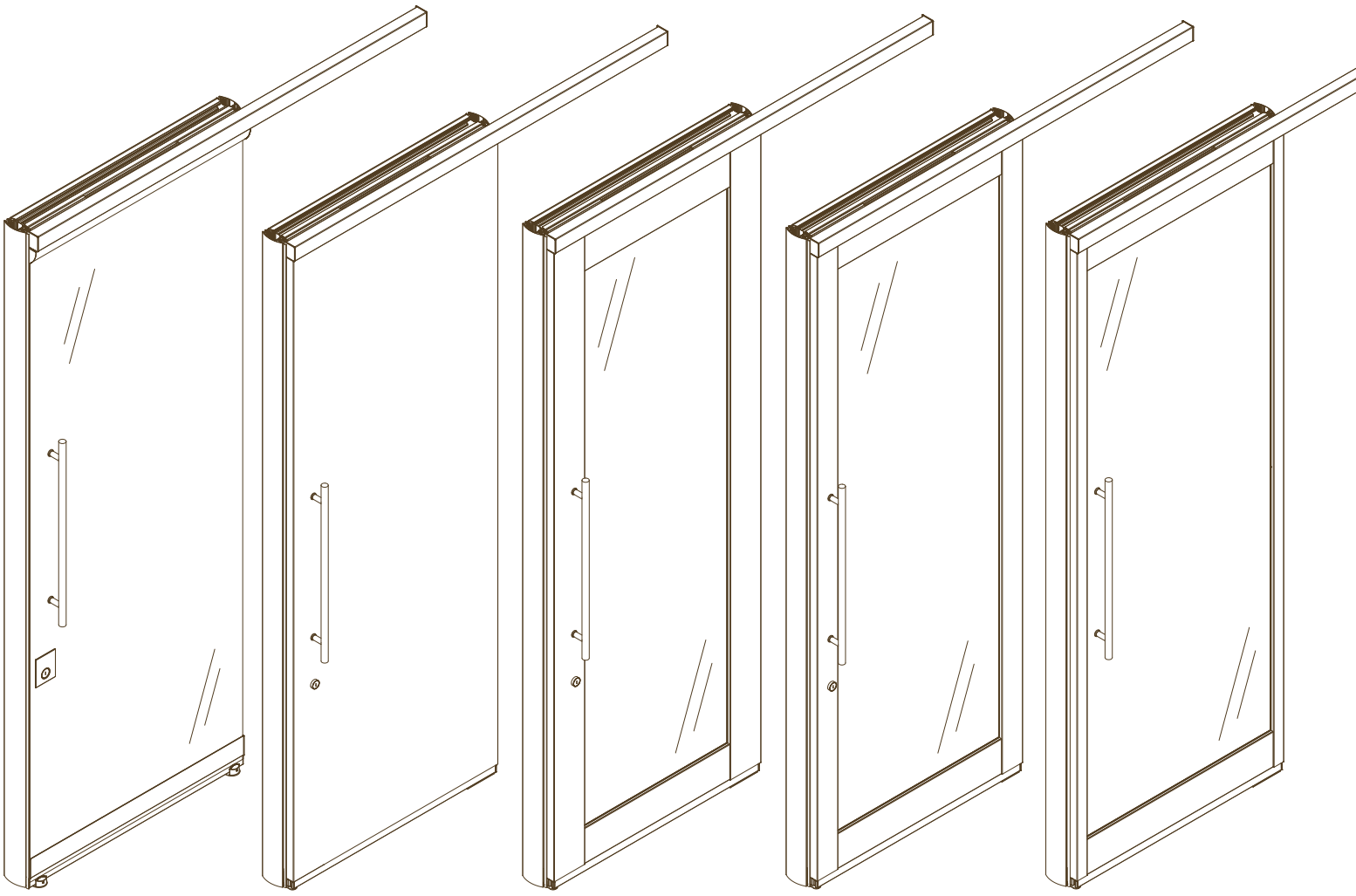
FINISHED FLOOR

FRAMELESS GLASS PIVOT DOOR

DOUBLE FRAMELESS GLASS PIVOT DOOR

DIRTT

OVERVIEW - TECH SHEET
SLIDING DOORS



Frameless Glass *Solid Core Wood* *Framed 6 Inch Stile* *Framed 4 Inch Stile* *Framed 2 Inch Stile*

COMPONENTS & MATERIALS

Aluminum Extrusions

Door, Door Frame, Track and Track Cover Extrusions
Architectural Grade and Structural Aluminum Alloys

Finishes

Clear Anodized Aluminum (5 micron standard)
Powder Coated Aluminum (Door Frame)
Architectural Grade Veneer; stained (Track Cover, Framed 2" & 4" Stile, Solid Core Wood Doors)
UV Cured Water Based Finishes (Framed 6" Stile & Solid Core Wood Doors only) Color selection per manufacturer's standard range
Custom color matches (client approval required)
Sliding Door Track Finish Clear Anodized Only
Frameless Glass

PVC Components

Frame Connections
Rigid/Flex Co-extrusion
Ceiling Trim/Wall Start
Rigid/Flex Co-extrusion
Glass Retainer
Rigid/Flex Co-extrusion
PVC Color Options
Black, Charcoal, Silver
Custom as required

Door Seal Components

Rigid/Flex PVC Co-extrusion (strike and guide side)
PVC Color options – as above in PVC components
For Double Sliding Door – Door Seal Extrusion & PVC Door Seal

Door Glass Components

Standard Tempered Glass ¼" (6mm) – Option ⅜" (10mm)
Standard Laminated Glass ¼" (6mm) – Option ⅜" (10mm)
Approved Custom Finishes

Solid Core Wood Door

Solid Core Wood Slab Door
Optional Door with Glass Lite
Solid Core Wood DIRTT approved Custom Glass Lites

Door Hardware

Manufacturer's own sliding door track, track cover and door roller assembly with alignment pin on floor
Locking Doors with interchangeable cores also available in non-locking functions. See Specific Tech Sheet for details.

Optional Door Hardware

DIRTT Door Pulls
DIRTT Approved Custom Hardware (Supplied "By Others")

Operating Force Testing Results

Does not exceed 5 lbs force (See Engineering Report - Operating Force Test)

DIMENSIONS & DETAILS

Frame

Frame Width (Single Door)	40" - 60" (1016 - 1524mm)*
Frame Width (Double Door)	80" - 120" (2032 - 3048mm)*
Standard Ceiling Height	Up to 120" (3048mm)
Standard Frame Depth	4" (102mm)
Frame Height	Oversized in height; cut down on-site to suit opening

Door

Standard Door Thickness	1 11/16" (43mm)
Door Width (Single Door)	40 ¼" - 60 ¼" (1022 -1530 mm)*
Standard Clear Opening Width	32 5/16" (821mm) clear (ADA Compliant)
Double Door Clear Opening Width	1 Door Open 32 ½" (826mm) 2 Doors Open 67 7/16" (1663mm)
Door Height Adjustment	Adjust in conjunction with DIRTT Moveable System
Standard Door Stiles	2" (51mm); 4" (102mm) and 6" (152mm)wide

**Maximum size depends on Door Style and Finish; see detailed Tech Sheets.*

Track Assembly

Height	1 9/16" (40mm)
Track Depth	1 ⅞" (48mm)
Track Width (standard)	73 ½" (1867mm) includes end caps. Adjusts to suit parametric widths
Double Door Track Width (standard)	146 ¾" (3728mm) 2 tracks joined at middle
Pneumatic Slow Down Mechanism	Attached to door
Installation Includes:	Unique hanger design requiring no fasteners to the DIRTT frame system or drywall

Frame Connections (DIRTT Wall and/or Drywall to Frame)

Hidden Links	Frame alignment and gap control
Visible PVC Connectors	At frame connection between the door frame and the adjacent frame
Over Sized and Double Doors	Must have Seismic brackets installed to support track at middle of joint

Trim Components

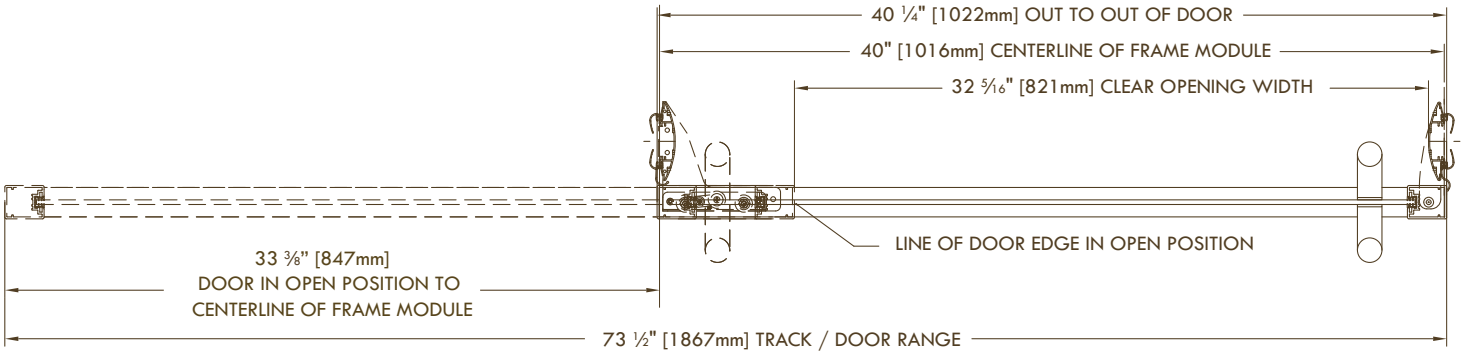
Ceiling Trim	Flexible trim from top of wall to ceiling
Wall Trim	Rigid connection from Door Frame to Base Building; combined with flexible Wall Trim

Other Options

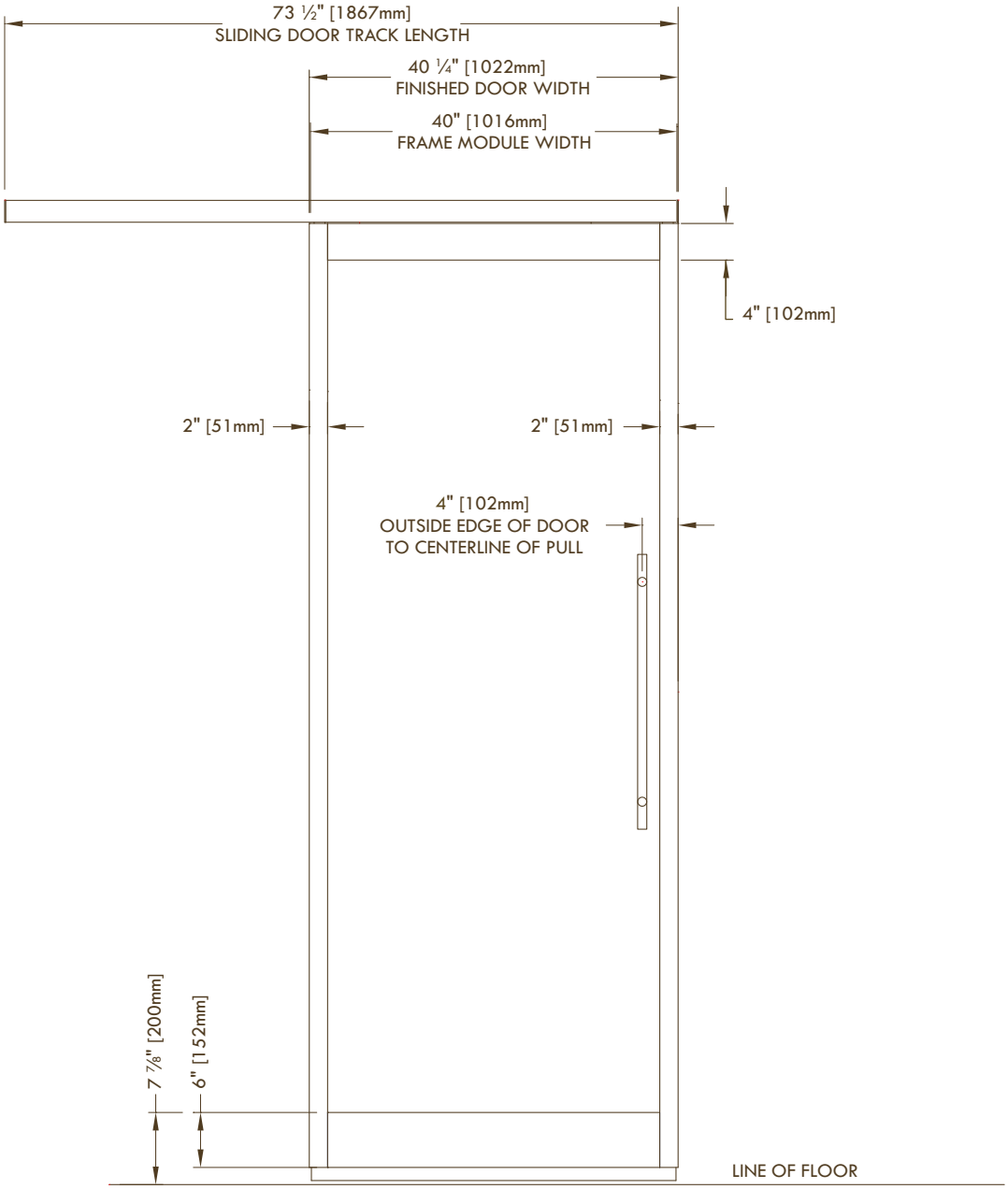
Glass or Solid Transom over door (door frame option)
Applied muntins on glass (anodized or powder coat finish only)
COM Doors - Hardware Prepared to DIRTT Standards
Drywall Face Mounted Sliding Door

CLEARANCE

**For more details, please contact your DIRTT Rep*

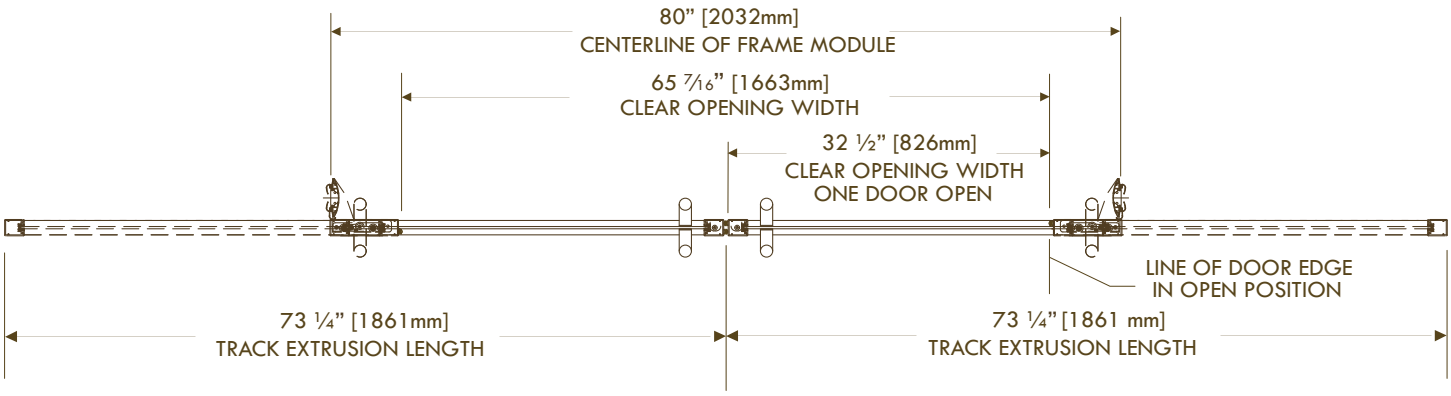


PLAN VIEW/ELEVATION



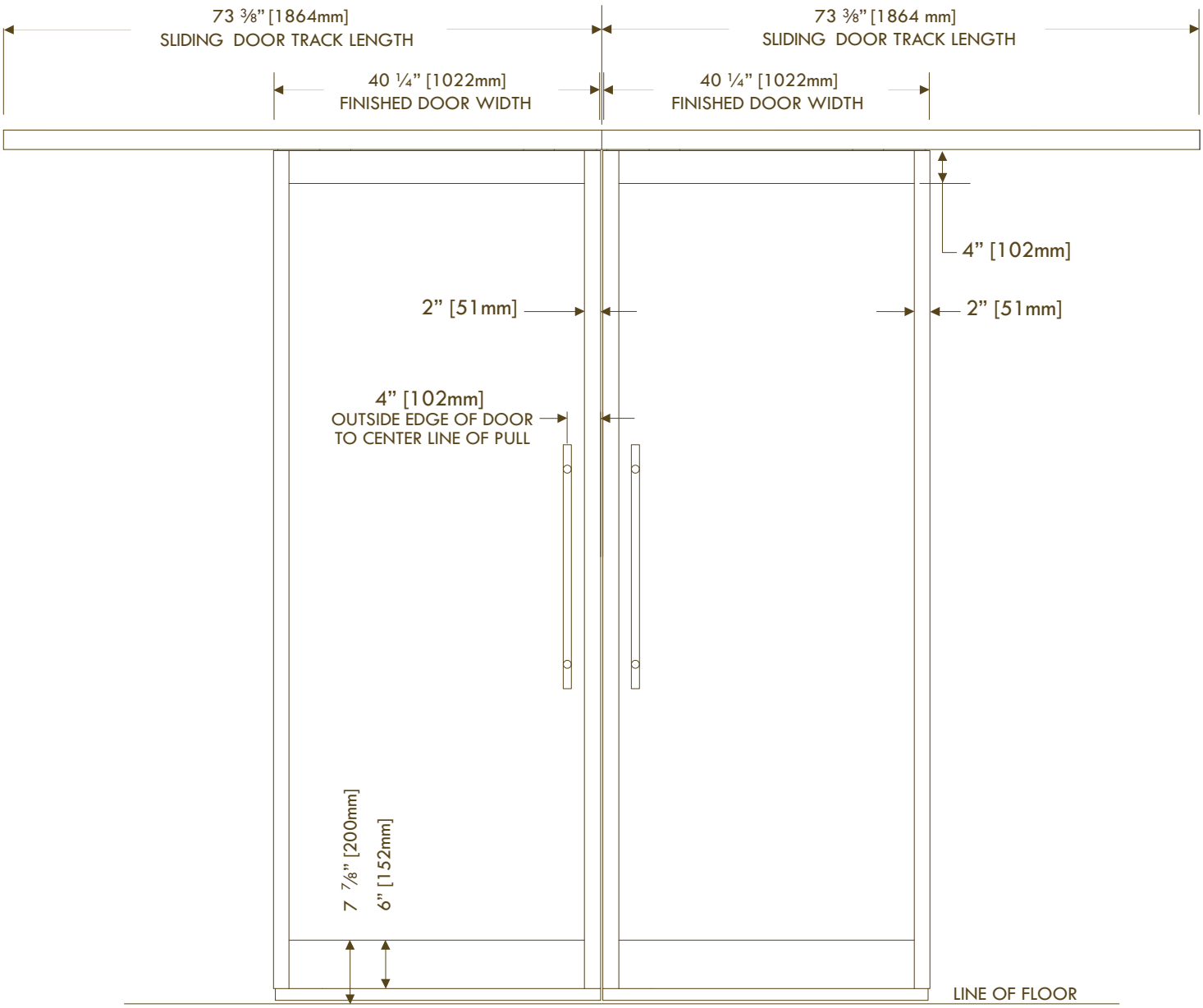
CLEARANCE - DOUBLE DOOR

**For more details, please contact your DIRTT Rep*



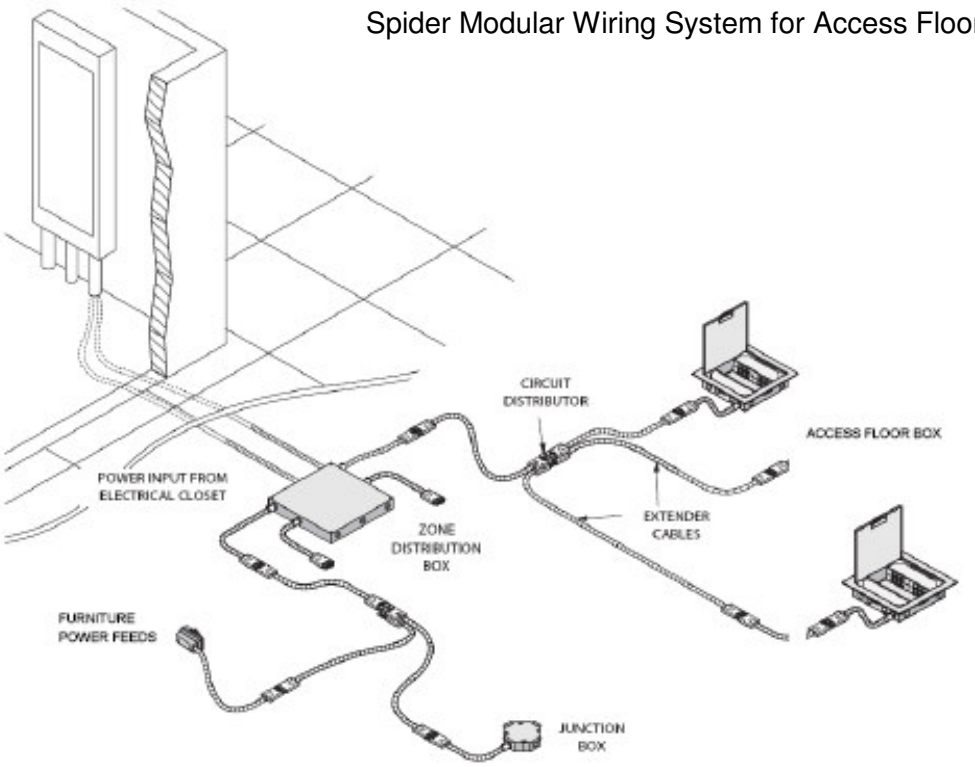
PLAN VIEW/ELEVATION

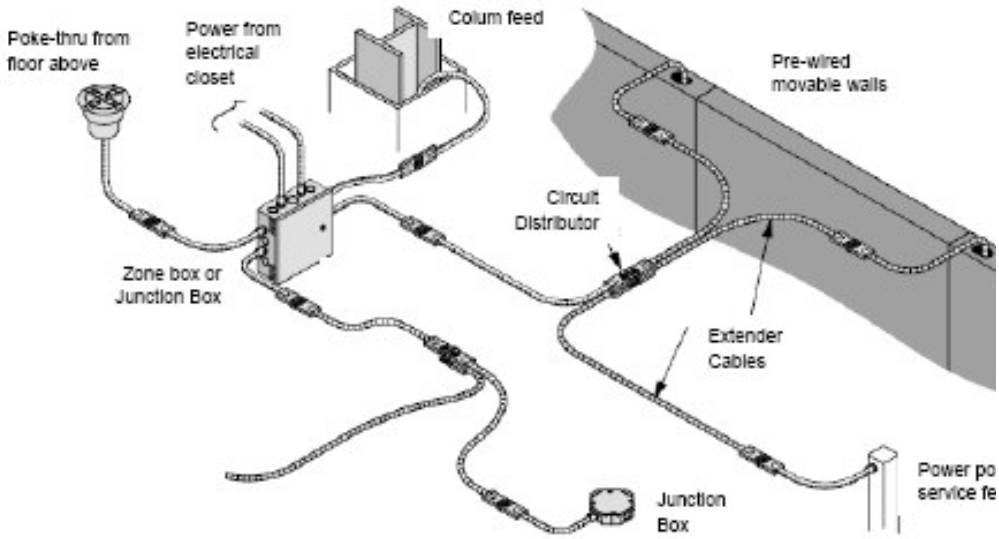
(NTS)



CUTSHEETS

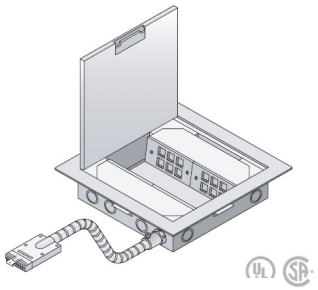
Spider Modular Wiring System for Access Floors



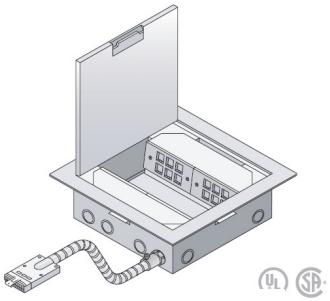


Spider Modular Wiring System for Ceiling Applications

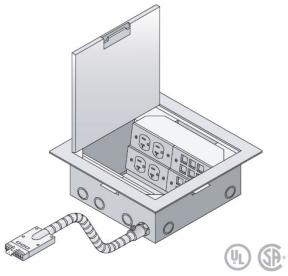
Access Floor Boxes



AFB 401



AFB 301



AFB 501

Technical Specifications

General Specifications

- 20 Amp 120V/208Y 60Hz
- Available empty or pre-wired with a 15" whip and quick connect end (shown above)
- Access Floor Box provided with hinged lid and cord exit hatch
  - Available in:
    - 2 ½" (64mm) deep 4 gang
    - 4" (102mm) deep 4 gang
    - 5" (127mm) deep 8 gang
- 16 gauge galvanized steel construction
- Spider's Patented "QUICK IN" no assembly required installation.
- Durable black or granite powder coat finish on lid and trim ring
  - Also available in brass and aluminum color
- Reversible hinged lid – carpet inlay one side (carpet by others), black or granite powdercoat finish other side
  - Also available in brass and aluminum color
- Pop-up lid handle – acts as a wire/cable entry point
- Faceplates (Black, gray, ivory, white) supplied and installed by Spider
- Specify data face plates when data is specified otherwise the ports will come with a blank cover plate
- Connectors (if specified) have color coded tags and polarity keys to prevent interconnection of 3 and 4 circuit components

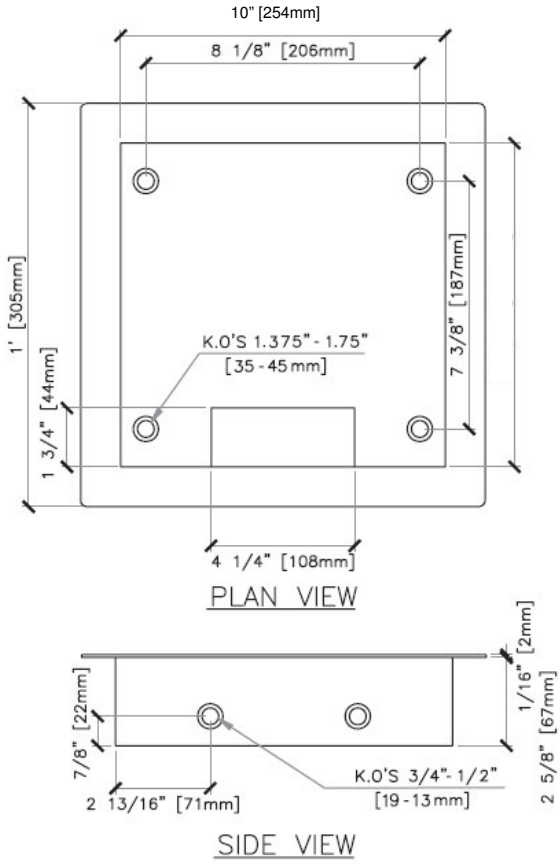
Listings

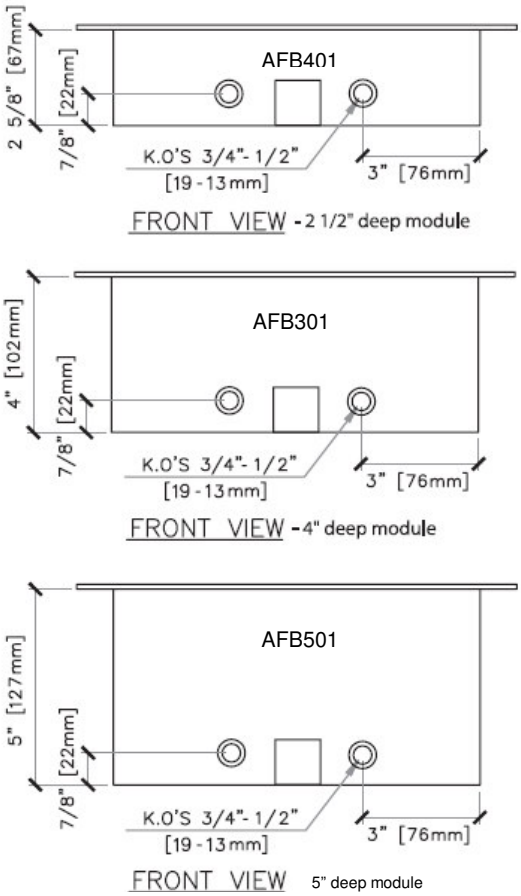
- UL listed. Manufactured wiring system per UL 183.
- CSA Certified to CSA standard C2.2 No 203-M.

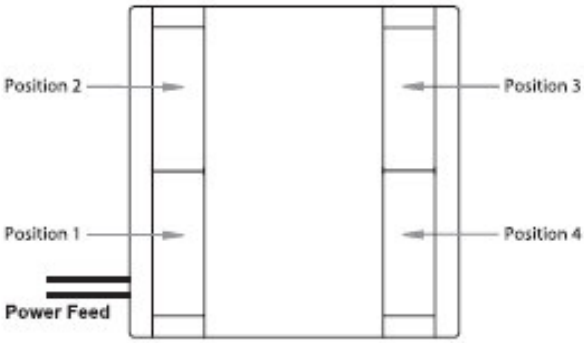
Applicable Codes

- Access Floor boxes must be installed in accordance with the NEC, CEC and local electrical codes.

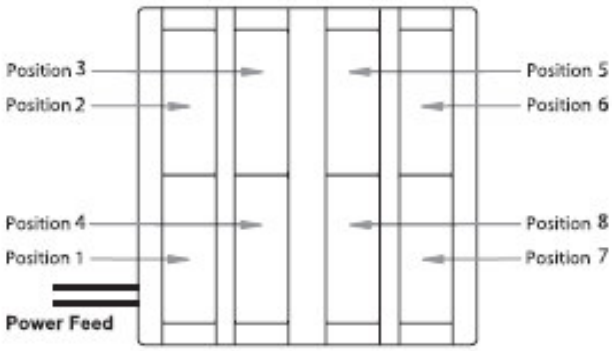
Access Floor Boxes



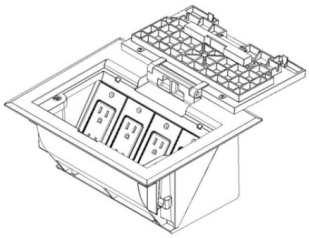


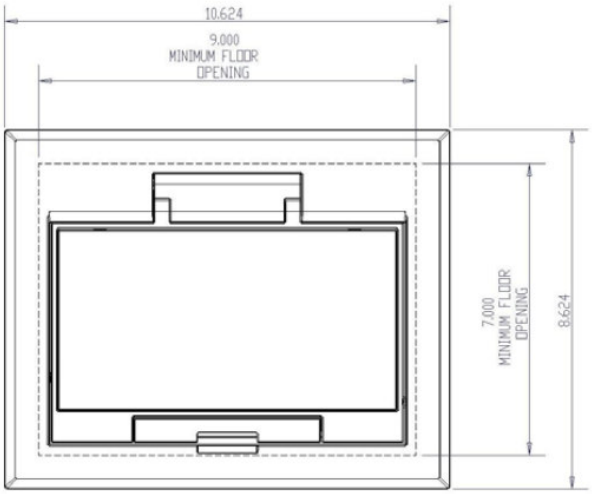


AFB 401 and 301



AFB 501





AFB 101

Technical Specifications

General Specifications

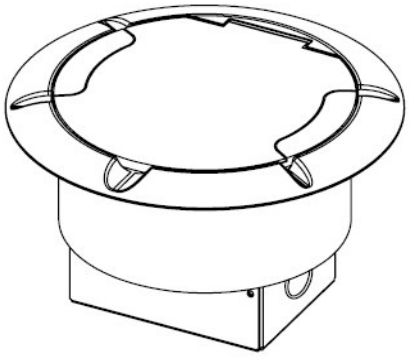
- 20 Amp 120V/208Y 60Hz
- Available empty or pre-wired with a 15" whip and quick connect end
- Access Floor Box provided with Patented double hinged lid (lid lays flat) and cord exit hatch
  - Available in:
    - 6" (152mm) deep 4 gang
    - 10 5/8" X 8 5/8" trim dimension
    - Minimum cutout opening 9" x 7" (229mm x 178mm)
- Spider's Patented "QUICK IN" no assembly required installation
- 16 gauge galvanized steel box trim and wiring chamber
- Durable gray or black plastic lid
- Reversible hinged lid – carpet inlay one side (carpet by others), grey or black finish other side
- Lid provides a hinged cable hatch that snaps to the underside of the lid when in use
- Faceplates (black, gray, ivory, white) supplied and installed by Spider
- Specify data face plates when data is specified otherwise the ports will come with a blank cover plate
- Connectors (if specified) have color coded tags and polarity keys to prevent interconnection of 3 and 4 circuit components

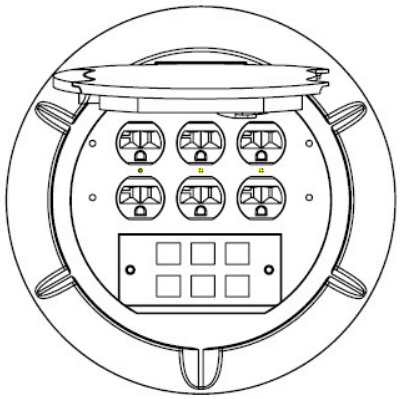
Listings

- UL listed. Manufactured wiring system per UL 183.
- UL listed UL 514A Metallic Outlet Box
- CSA Certified to CSA standard C2.2 No 203-M

Applicable Codes

- Access Floor boxes must be installed in accordance with the NEC, CEC and local electrical codes.





RAFB

Technical Specifications

General Specifications

- 20 Amp 120V/208Y 60Hz
- Available empty or pre-wired with a 15" whip and quick connect end
- Access Floor Box provided with Patented double hinged lid (lid lays flat) and cord exit hatch
  - Available in:
    - 6" (152mm) deep 4 gang
    - Fits inside a standard 7 7/8" (200mm) air diffuser hole
- Spider's Patented "QUICK IN" no assembly required installation
- 16 gauge galvanized steel box trim and wiring chamber
- Durable metal powdercoated lid
- Lid provides a hinged cable hatch that snaps to the underside of the lid when in use
- Faceplates (black, gray, ivory, white) supplied and installed by Spider
- Specify data face plates when data is specified otherwise the ports will come with a blank cover plate
- Connectors (if specified) have color coded tags and polarity keys to prevent interconnection of 3 and 4 circuit components

Listings

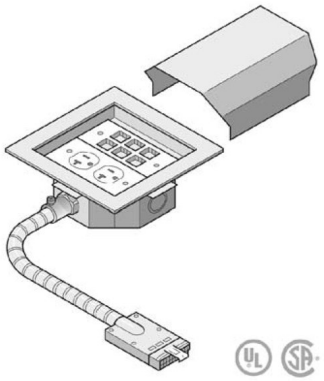
- UL listed. Manufactured wiring system per UL 183.
- UL listed UL 514A Metallic Outlet Box
- CSA Certified to CSA standard C2.2 No 203-M

Applicable Codes

- Access Floor boxes must be installed in accordance with the NEC, CEC and local electrical codes.

Single Service Module

(SSM1)



Technical Specifications

General Specifications

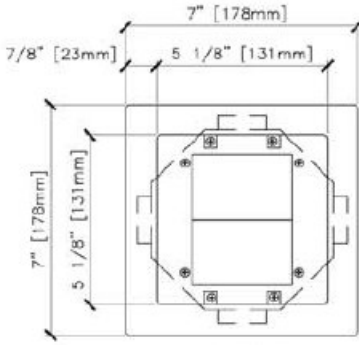
- 20 Amp 120V/208Y 60Hz
- Available empty or pre-wired with a 15" whip and quick connect end
- 16 gauge galvanized steel box trim and wiring chamber
- Durable metal powdercoated snap in hood
- Faceplates (black, gray, ivory, white) supplied and installed by Spider
- Specify data face plates when data is specified otherwise the ports will come with a blank cover plate
- Connectors (if specified) have color coded tags and polarity keys to prevent interconnection of 3 and 4 circuit components

Listings

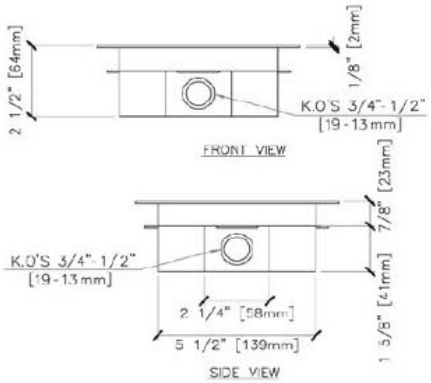
- UL listed. Manufactured wiring system per UL 183.
- UL listed UL 514A Metallic Outlet Box
- CSA Certified to CSA standard C2.2 No 203-M

Applicable Codes

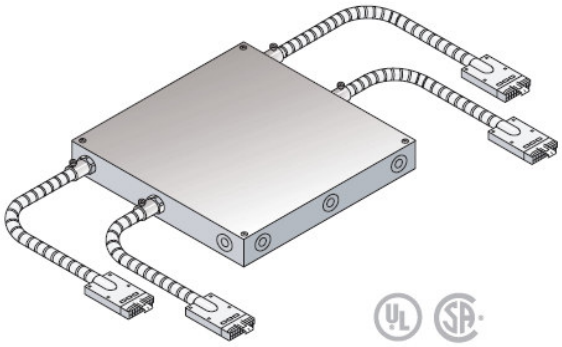
- Service Module boxes must be installed in accordance with the NEC, CEC and local electrical codes.



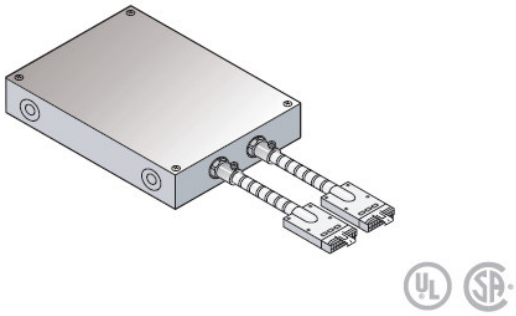
PLAN VIEW



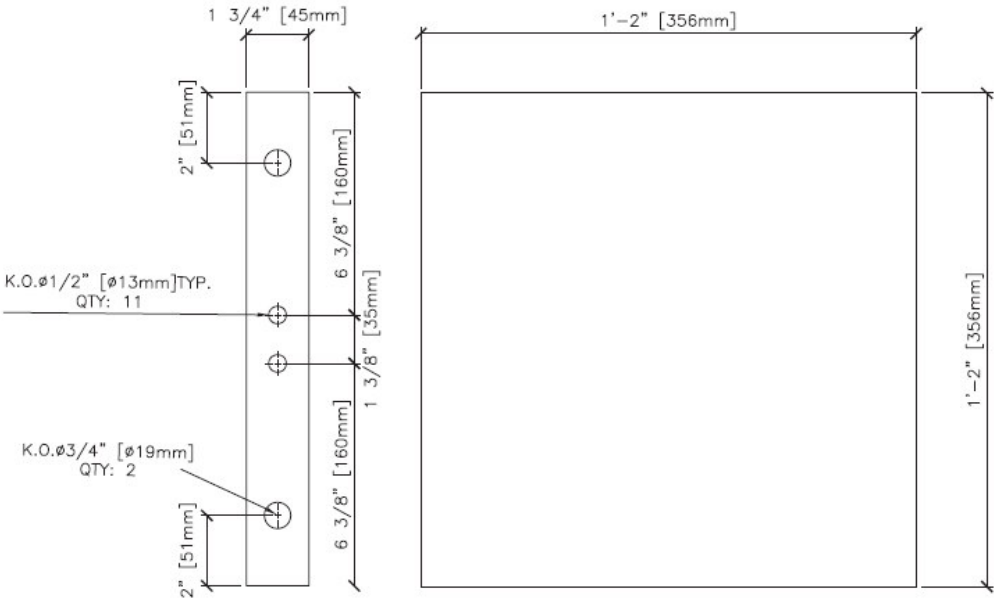
Zone Distribution Box

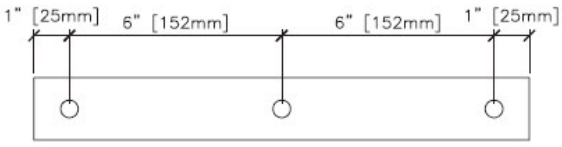


4 Whip Zone Distribution Box



2 Whip Zone Distribution Box

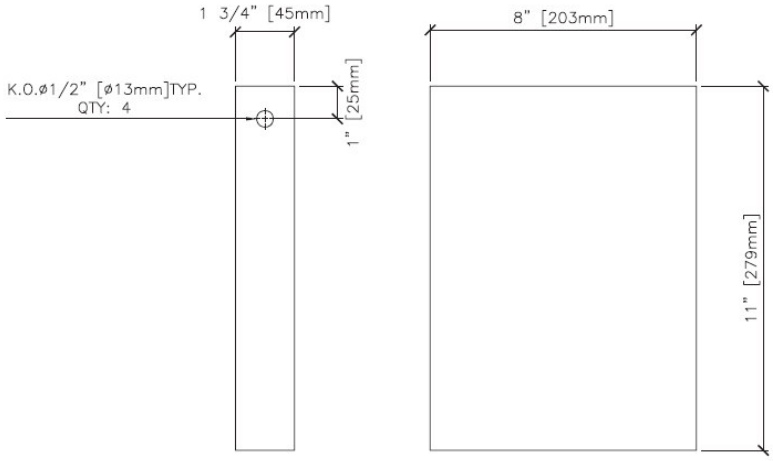




FRONT VIEW

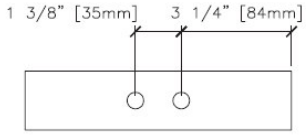
14" Zone Box with 4 whips

CUTSHEETS

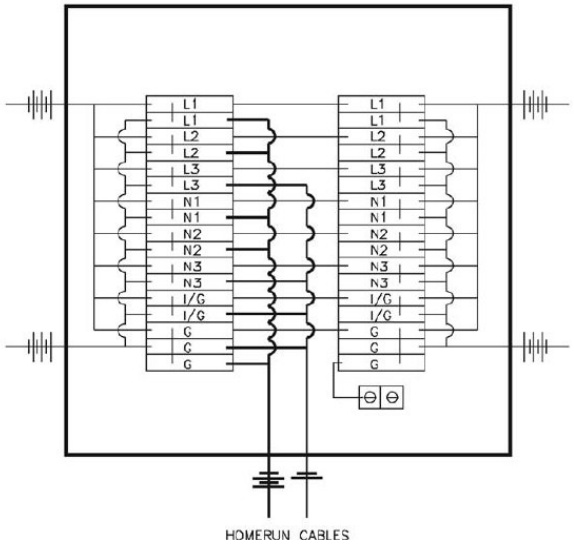


8” Zone Box with 2 whips

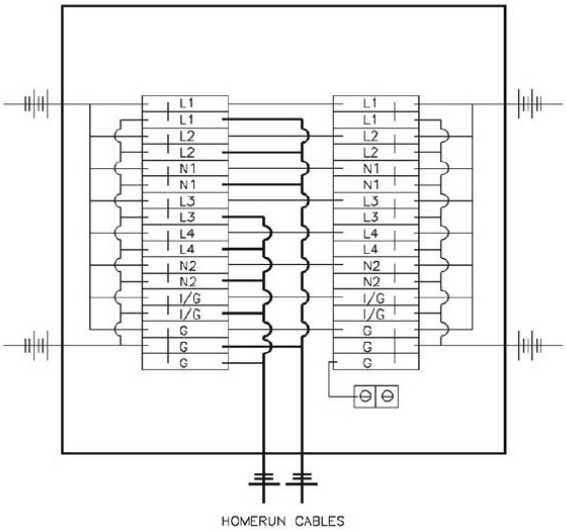
SIDE VIEW PLAN VIEW



FRONT VIEW



Typical 3 circuit wiring diagram



Typical 4 circuit wiring diagram

Technical Specifications

Zone Distribution Box General Specification

- 20 Amp 120V/208Y 60Hz
- 16 gauge galvanized steel construction with 1/2" (12mm) and 3/4" (19mm) knockouts (see schematic)
- Zone Distribution Box supplied by Spider, installed by a licensed electrician
- Box shall be secured to deck as per NEC, CEC and any local electrical codes
- Zone boxes are also available in a design/build configuration
- Modular assemblies are pre-wired to terminal blocks according to specified configurations. The following are available:
- 4 circuit configuration can support 2+2, 3+1, or 1+3 as per building wiring topology
- 3 circuit configuration has separate neutrals which allows support of several building wiring topologies
- 4 circuit system provides 4-12 AWG phase conductors / 2-10AWG neutral conductors / 2-12 AWG ground conductors
- 3 circuit system provides 3-12 AWG phase conductors / 3-12AWG neutral conductors / 2-12 AWG ground conductors
- 4 circuit configuration provides 4 to 16 circuits
- 3 circuit configuration provides 3 to 12 circuits
- Connectors have color coded tags and polarity keys to prevent interconnection of 3 circuit and 4 circuit components.

Listings

- UL listed. Manufactured wiring system per UL 183. CSA Certified to CSA standard C22.2 No.203-M
- Also listed to UL 514A

4 Whip Zone Distribution Box Specifications

- 4 - 15" (356mm) whips w/ male Quick-connect plugs
- Available in 3 circuit and 4 circuit Systems or a design/build.
- Specify 4, 8 or 16 circuit configuration 4 circuit system.
- Specify 3, 6 or 12 circuit configuration 3 circuit system.

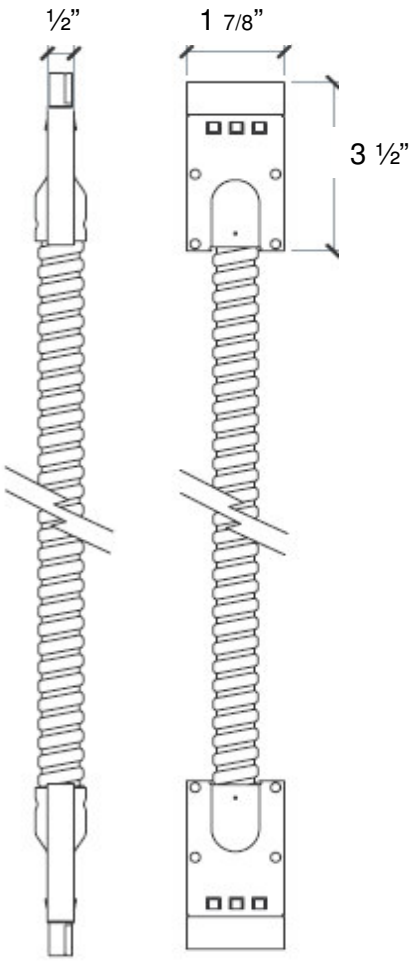
2 Whip Zone Distribution Box Specifications

- 2 - 14" (356mm) whips w/ male Quick-connect plugs
- Available in 3 circuit and 4 circuit Systems or a design/build.
- Specify 4 or 8 circuit configuration 4 circuit system.
- Specify 3 or 6 circuit configuration 3 circuit system.

Applicable Codes

- Zone Distribution Boxes must be installed in accordance with the NEC, CEC and local electrical codes.

Extender Cables



Technical Specifications

General Specifications

- 20 Amp 120V/208Y 60Hz
- Extender Cables comes with
  - 1 Length of cable
  - 2 female quick connect ends
  - Lengths in 5’ increments to 50’
- Available in standard 3 and 4 circuit configurations
  - 4 circuit system provides 4-12 AWG phase conductors / 2-10 AWG neutral conductors / 2-12 AWG ground conductors
  - 3 circuit system provides 3-12 AWG phase conductors / 3-12 AWG neutral conductors / 2-12 AWG ground conductors
- Also available in design/build configurations
- Safety feature – 3 and 4 circuit systems have integral mechanical keys to prevent improper connection
- For modular “Plug and Play” applications only
- Connectors (if specified) have color coded tags and polarity keys to prevent interconnection of 3 and 4 circuit components

Listings

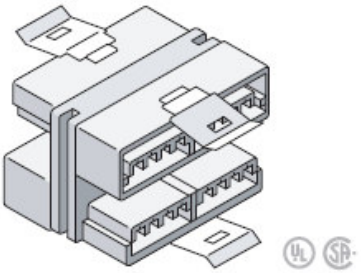
- UL listed. Manufactured wiring system per UL 183.
- CSA Certified to CSA standard C2.2 No 203-M

Applicable Codes

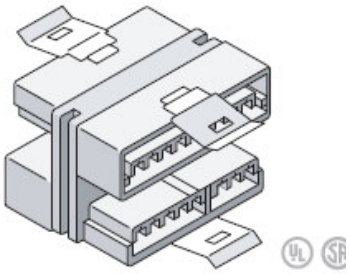
- Access Floor boxes must be installed in accordance with the NEC, CEC and local electrical codes.

Circuit Distributors

(Splitters)



4 Circuit Device



3 Circuit Device

Technical Specifications

General Specifications

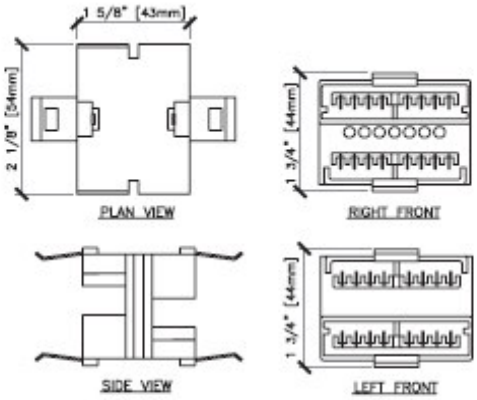
- 20 Amp 120V/208Y 60Hz
- Designed to distribute 4 circuits or 3 circuits
- 4 port device (1 male port receives circuits / 3 male ports distribute circuits out)
- Circuit distributors incorporate polarity keys to prevent interconnection of 3 and 4 circuit components

Listings

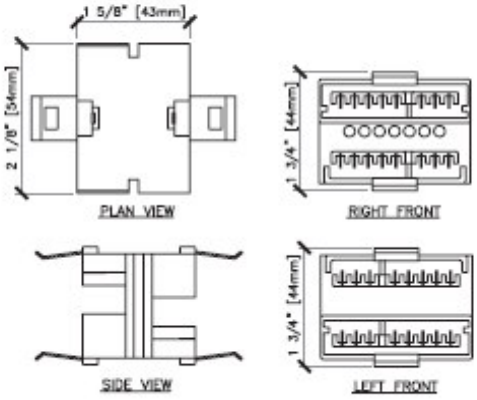
- UL listed. Manufactured wiring system per UL 183.
- CSA Certified to CSA standard C2.2 No 203-M

Applicable Codes

- Access Floor boxes must be installed in accordance with the NEC, CEC and local electrical codes.



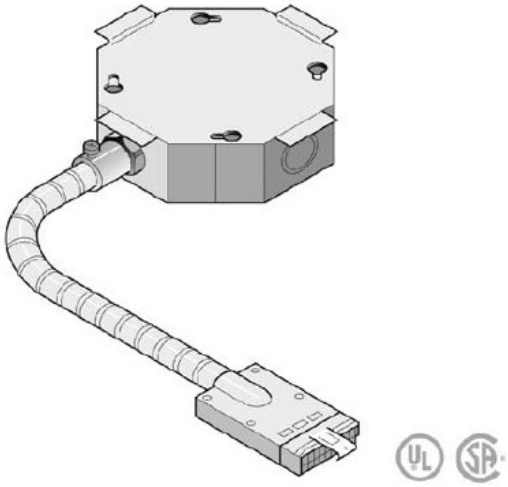
4-2-2 Circuit Distributor



3-3-2 Circuit Distributor

15” Whip with or without Junction Box

(Building interface with movable wall panels or pre-wired drywall boxes)



Technical Specifications

General Specifications

- 20 Amp 120V/208Y 60Hz
- Standard length is 15” but can be specified up to 50ft in length
- Designed to distribute 4 circuits or 3 circuits
- Wiring and circuitry can also be specified in a design build configuration
- Whips incorporate polarity keys to prevent interconnection of 3 and 4 circuit components

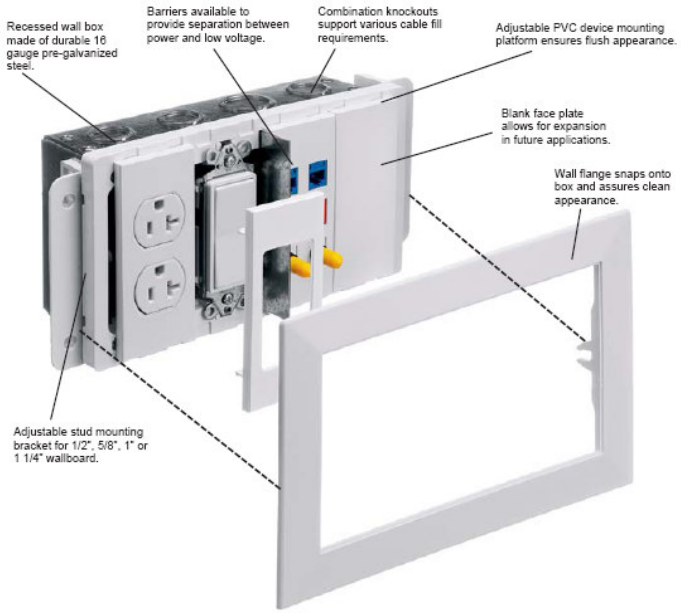
Listings

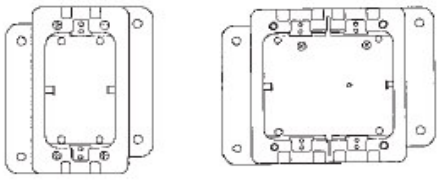
- UL listed. Manufactured wiring system per UL 183.
- CSA Certified to CSA standard C2.2 No 203-M

Applicable Codes

- Access Floor boxes must be installed in accordance with the NEC, CEC and local electrical codes.

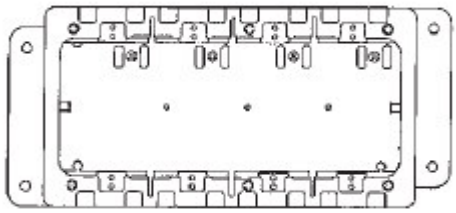
Pre-wired Drywall Boxes





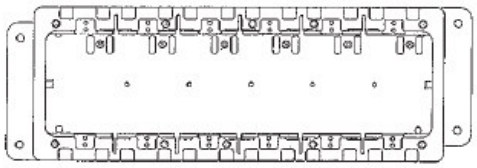
WSCS111 WSCS112

One and Two Gang wall boxes



WSCS114

Four Gang wall box



WSCS116

Six Gang wall box

Spider's prewired drywall boxes, allows the contractor to reduce on-site labor costs and gives the client a low cost option for future expansion.

These boxes can be connected to the buildings electrical with a Spider supplied quick-connect or pigtail.

An adjustable stud mounting bracket accommodates ½", $^{5}/_{8}$", 1" or 1 ¼"

Cover plates can be either snap-in or screw type (see Pg 15)

Pre-wired Drywall Boxes

Technical Specifications

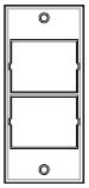
General Specifications

- 20 Amp 120V/208Y 60Hz

Part No.	Height	Width	Depth	Gangs	Knockouts
WSCS 111	4.44" /112.8mm	2.56"/65mm	2.75"/69.8mm	1	½", ¾"
WSCS112	4.44" /112.8mm	4.56"/115.8mm	2.75"/69.8mm	2	½", ¾"
WSCS114	4.44" /112.8mm	8.56"/217.4mm	2.75"/69.8mm	4	½", ¾", 1"
WSCS116	4.44" /112.8mm	12.56"/319mm	2.75"/69.8mm	6	½", ¾", 1"

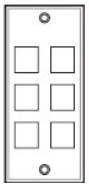
Part No.	Height	Width	Depth	Gangs	
TRIM891	6.75" /171.4mm	4.25"/107.9mm	0.25"/6.3mm	1	
TRIM892	6.75" /171.4mm	6.25"/158.7mm	0.25"/6.3mm	2	
TRIM894	6.75" /171.4mm	10.25"/260.3mm	0.25"/6.3mm	4	
TRIM896	6.75" /171.4mm	13.25"/336.5mm	0.25"/6.3mm	6	

Power and Data Plates – Snap-in or Screw type

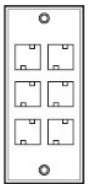

Siemens cat# S1305

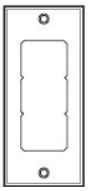
Siemens cat# S1315

AMP Communications cat# AMP303


AMP Communications cat# AMP313

Blank cat# BL300

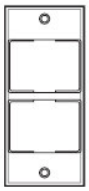

Nordex cat# NO309 (Cat 5 jacks only)

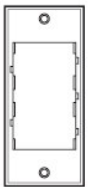

MOD TAP cat# MT316 Field Configuration

Lucent Technology cat# LT 309 Systemmax Series

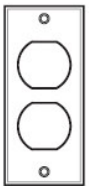
Ortronics cat# OR306 Series 2

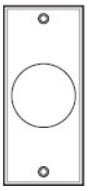
Krone, Leviton, Hubbell, Bryant cat# KR314


Nevada Western cat# NV304 T&B

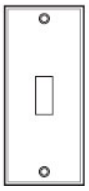

Panduit cat# PA308 Minicom Series

Decora cat# DE301


Standard Duplex Receptacle cat# ST302

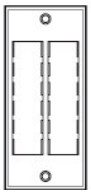

Twistlock 20A cat# TL318

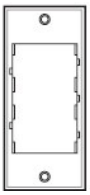
Twistlock 15A cat# TL319


Toggle Switch cat# TO310

Hubbell, Nordex cat# HBL317 (Nordex Cat 6 jacks)

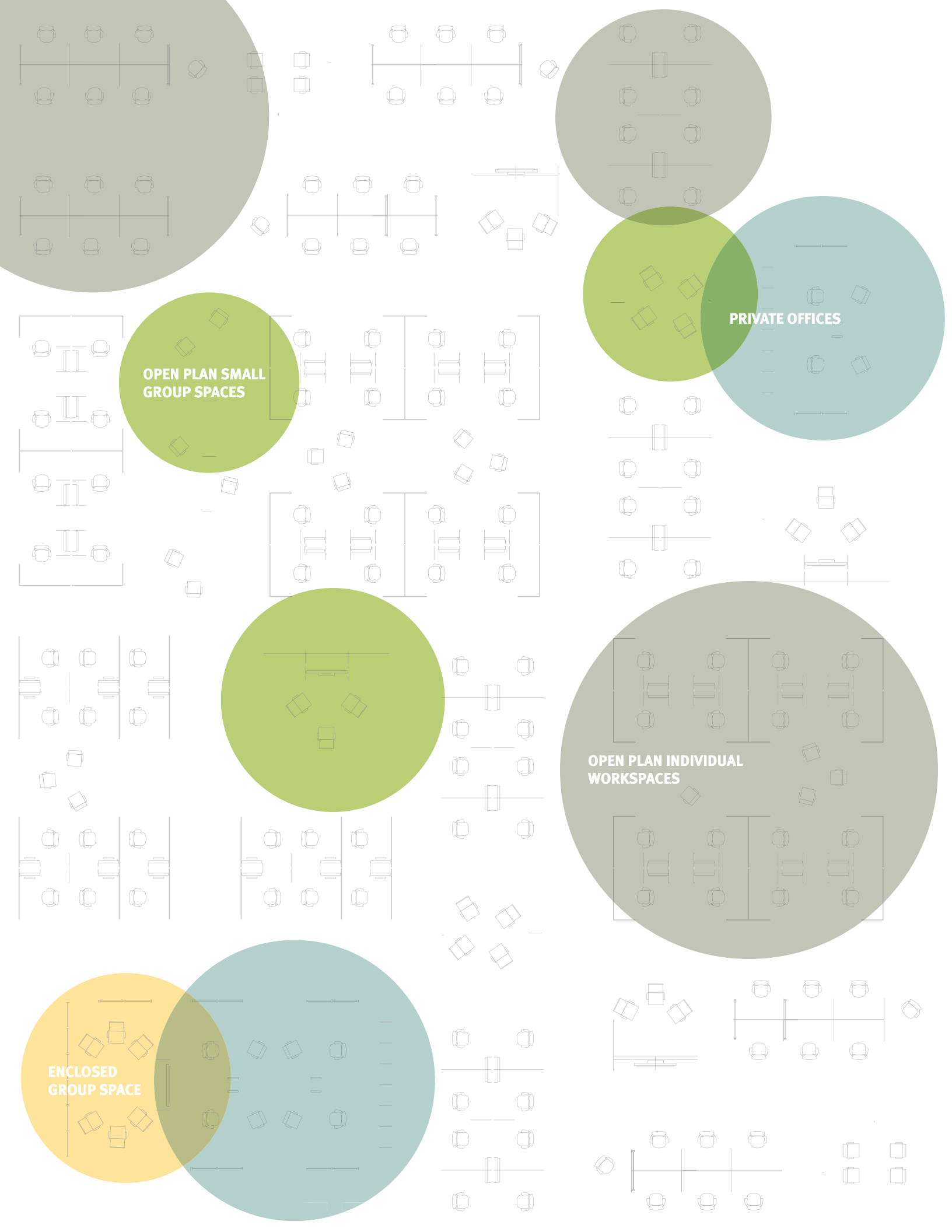
Panduit Dedicated cat# PA321 Minicom Series


Ortronics Track cat# OR322 Jack Series


Interlink cat# IN323

Available in Black, gray, ivory, white

Canvas Office Landscape™


PRIVATE OFFICES
OPEN PLAN SMALL GROUP SPACES
OPEN PLAN INDIVIDUAL WORKSPACES
ENCLOSED GROUP SPACE

A holistic perspective

Canvas is the inspired result of 50 years of Herman Miller research into work environments and the collective experience of work.

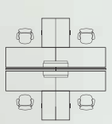
Choice
Harmony
Connection

Choice: Of aesthetics, of elements, of places to work. Give talented people a reason to come to the office and work together.

Harmony: Of design details, of work flow, or organizational identity. Across an entire floorplate, merge places to work with human interaction.

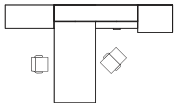
Connection: Among people and their technology. Connect the talent in your organization with technological savvy and organizational performance.

Canvas spans the range of workspaces from private offices to benching and linear planning, meeting the needs of individuals and groups.

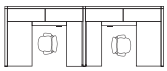


Trim and surface supports in Metallic Silver. Tiles in Gloss/Gunmetal. Work surfaces and organizer in White. Metal low credenza cases in White and fronts/tops in Natural Maple veneer. Aeron® chair base in Titanium, seat/back in Pellicle®/Quartz, and frame/armpads in Smoke.

Trim and surface supports in Metallic Silver. Work surface in White. Metal low credenza cases/fronts in Graphite and tops in White. Center screen in Opal Glaze. SAYL™ chair base/Y-Tower™ in Black, frame in Smoke, and seat/back in Crossing/Black.

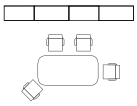


Wood low credenza case/top/front and peninsula surface in Natural Maple veneer. Universal leg support in Graphite/Metallic Silver. Surface support in Metallic Silver. Tackboard and cushion top in Clare/Raven. Eames® Aluminum Group chairs base/frame in Polished Aluminum and seat/back in Cygnus™/Black.



Trim and surface support in Metallic Silver. Tiles in Cord/Summer White. Work surface and upper storage in White. Low credenza in Natural Maple veneer. Aeron chair base in Titanium, seat/back in Pellicle/Quartz, and frame/armpads in Smoke.

Standing screen frames and Everywhere table top/edge in Natural Maple veneer. Standing screen infills in Glaze Acrylic, marker board and Twist/Poppy tackable fabric. Standing screen support in Graphite. Everywhere table base in Polished Aluminum. Setu™ Lounge chairs base in H-Alloy™, frame in Graphite, seat/back in Lyris™/Graphite.



Team wall case and Everywhere table top/edge in Natural Maple veneer. Display shelves and case fronts in White. Wall infills in marker board doors, and Twist/Poppy tackable fabric. Everywhere table base in Polished Aluminum. Eames Soft Pad chairs base/frame in Polished Aluminum, seat/back in Leather/Pearl.

Team wall case, peninsula surface, work surfaces and Everywhere™ table top/edge in Natural Maple veneer. Team wall case front, peninsula support, trim, work surface support, and Tu storage in White. Everywhere table base in Polished Aluminum. Exterior tiles in Cord/Summer White. Interior tiles in Gloss/Gunmetal. Storage cushion top in Jump Rope/Green Apple. SAYL chair base/Y-Tower in Black, frame in Smoke, and seat/back in Crossing/Black. Magis® Stool_One in Aluminum/White.

Signature Screen, Corner Wrap

Signature Screen

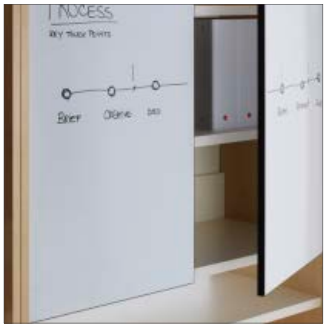
Architectural Trim

Standing Screen Edge

Organizer

Drawer Organizer

Team Wall, Display Shelves



Team Wall, Markerboard Doors

Universal Leg, Frame-Attached

Open Support, Frame-Attached

Universal Leg, Freestanding

Architectural Foot, Frame

Beam End Support

Standing Screen Support

Connect Power/Data Support

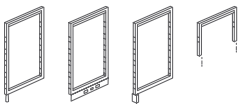
Beam Power/Data Trough

‹ Trim, surface supports, and signature screen frames in Metallic Silver. Tiles in Gloss/Gunmetal. Work surfaces and metal low credenza cases/tops in White. Organizers and metal low credenza fronts in Natural Maple veneer. Signature screen in Tint/Translucent. SAYL chair base/Y-Tower in Black, frame in Smoke, and seat/back in Crossing/Black.

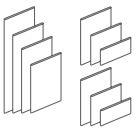
Combine and re-use these elements to surround people
and their technology with structure, surface, storage, and support.
A holistic perspective on workspace in a single kit of parts.

Surround

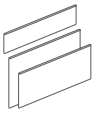
Frames (Base and Stacking)



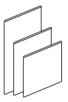
Tiles (Full-Height, Lower, and Upper)



Extended-Width Tiles



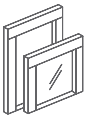
To-the-Floor Tiles



Power/Data Tiles

Upper Rail Tiles

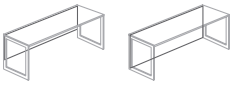
Open and Window Tiles



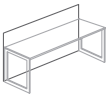
Thin-Profile Stacking Window

Frame Top Screen

Modesty Panels

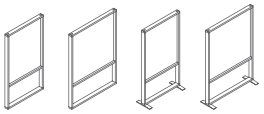


Privacy Panels

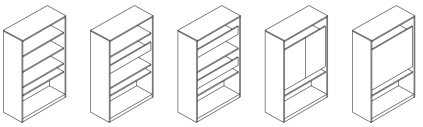


Screens

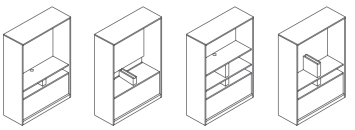
Standing Screens



Team Walls

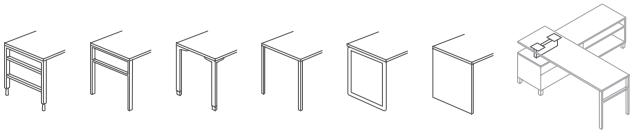


Team Wall, Technology Modules

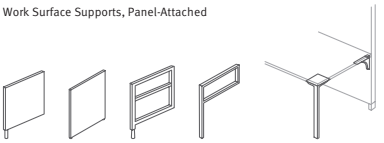


Structure

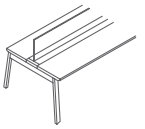
Work Surface Supports, Freestanding



Work Surface Supports, Panel-Attached

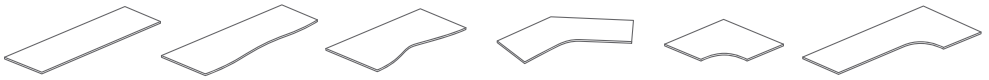


Beam

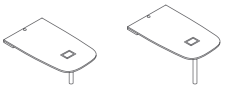


Surface

Work Surface Shapes

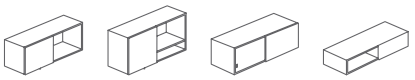


Team Wall, Technology Peninsula

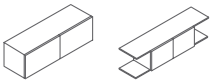


Storage

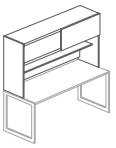
Sliding Door Overhead Storage Units



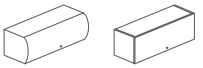
Hinged Door Overhead Storage Units



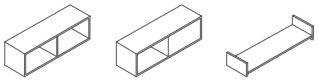
Hutch



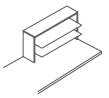
Flipper Door Overhead Storage Units



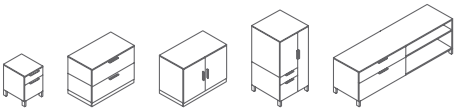
Open Overhead Storage Units and Shelves



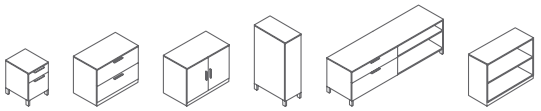
Organizer



Metal Storage



Wood Storage

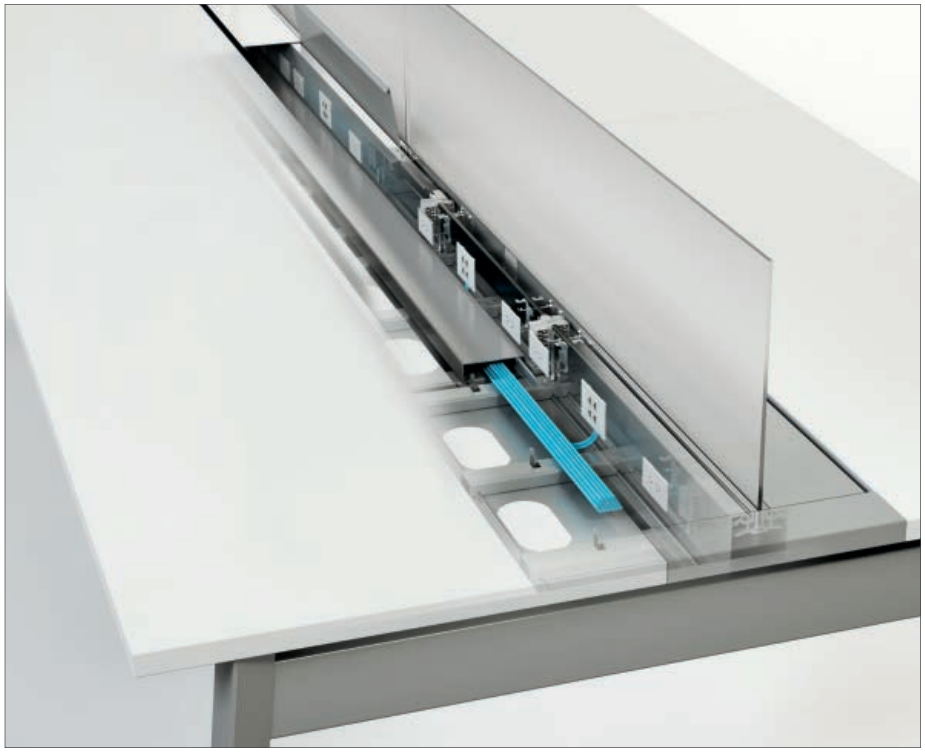


Technology

Technology and the mobility it allows are givens. The elements of Canvas accommodate and support technology now; the design of Canvas provides for the changes you know are just around the corner.

Wall-Based

Modular power and data cables can be routed horizontally and accessed every 11 inches of frame height. Lay-in of cabling in the top channel and base of frames streamlines installation and reconfiguration.



Beam-Based

Power and data cables are routed through separate channels in the beam's smart core. Easy access to outlets and plenty of cord storage within the concealed power/data trough provide added convenience.

Canvas Office Landscape Materials

Versatile Canvas materials combine harmoniously to quietly complement an organization's architecture and brand. Choose your finish, add dimension with accent colors, and complete the space with glass, laminate, veneer, and textile options.

Signature Screen

- Tint Translucent 8101
- Tint Grey 8102
- Hue Pearl 9701
- Hue Champagne 9702
- Hue Silver 9703
- Hue Graphite 9704

Finish

- Metallic Silver MS
- Metallic Champagne CN
- Metallic Bronze EH
- Warm Grey Neutral WN
- Cool Grey Neutral CL
- Graphite G1
- White 91

Accent Finish

- Dune 7L
- Cappuccino ZK
- Mink 7Z
- Blue Ridge 7U
- Gull 8T
- Moonbeam 8Y
- Loden 7V
- Grass 7N
- Chai 7M
- Sedona 7Y
- Napa 7W
- Blue Medium B4

Patterned Laminate

- Desert Zephyr 39
- Canyon Zephr 28
- Twilight Zephyr 38
- Misted Zephyr 29

Solid Laminate

- Sandstone WL
- Warm Grey Neutral WN
- Folkstone Grey 8Q
- Cool Grey Neutral CL
- Soft White LU
- White 91

Woodgrain Laminate

- Natural Maple HM
- Light Anigre HP
- Aged Cherry HX
- Light Brown Walnut 76
- Walnut on Cherry HY

Translucent

- Clear Glass TR
- Opal Glaze Glass 34
- Opal Etch Glass 5A
- Opal Frosted Acrylic J9

Recut Veneer

- Natural Maple DU
- Light Anigre HU
- Aged Cherry JU
- Light Brown Walnut VU
- Walnut on Cherry WU

Veneer

- Natural Maple UL
- Light Anigre EY
- Aged Cherry ED
- Light Brown Walnut 2U
- Dark Brown Walnut 40
- Medium Red Walnut EK
- Walnut on Cherry UX

Visit hermanmiller.com/materials to see our complete textile and materials offering.

Samples are representative of the material to be supplied and may not indicate an exact match; some variation may occur.
For more information about our products and services or to see a list of dealers, please visit us at hermanmiller.com or call (800) 851 1196.

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® GREENGUARD is a registered trademark of the GREENGUARD Environmental Institute.
™ level is a trademark of BIFMA International.

Open-ended development ensures future relevance. Canvas is the work of a group of contributing designers, whose research and work continue. Canvas fits squarely into Herman Miller's commitment to change with grace as our customers move to prepare for future realities.

Contributing Designers:
Jeffrey Bernett
Nicholas Dodziuk
Douglas Ball
Joey Ruiter

Design for the Environment:

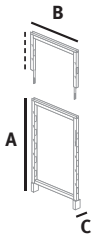
- Wall-Based, Private Office, Beam-Based, and Filing and Storage GREENGUARD® certified
- Wall-Based, Private Office, and Filing and Storage level™ 2 certified
- Wall-Based, Private Office, and Filing and Storage MBDC Cradle to Cradle® Silver certified

For the most current information on Canvas' sustainability, please visit hermanmiller.com/canvas-office-landscape.

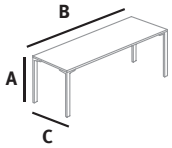
Warranty: 12-year, 3-shift

General Dimensions:

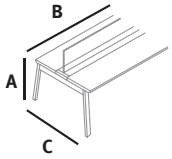
Wall-Based
A height: 35, 42, 46, 57, 68, 79; stackable to 90 inches
B width: 24, 30, 36, 42, 48 inches
C depth: 3 inches



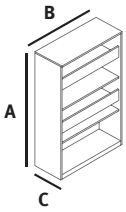
Private Office
A height: 28.5 inches
B width: 36–96 inches
C depth: 24, 30, or 36 inches



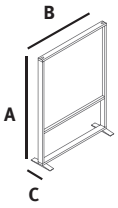
Beam-Based
A height: 28.5 inches
B width: up to 24 feet
C depth: 60 or 72 inches



Group-Based Team Walls
A height: 68 inches
B width: 42 or 48 inches
C depth: 20 inches



Group-Based Standing Screens
A height: 68 inches
B width: 36 or 48 inches
C depth: 3 inches



CANVAS OFFICE LANDSCAPE hermanmiller.com/canvas-office-landscape

- A holistic perspective that brings choice, harmony, and connection to organizations and their workspaces.
- A straightforward, comprehensive set of elements that creates complete and scalable workplaces for groups, teams, and individuals.
- Versatile materials that combine to create aesthetic and functional harmony across an entire floorplate.

statement of line elements can be found inside.

Canvas Office Landscape®

Application Idea Book

Canvas Application Idea Book

About this idea book

The Canvas Application Idea Book was created to provide designers with pre-designed ideas for Canvas layouts. CAD, SIF, and SketchUp files can be downloaded for each application idea by clicking links at the top of each page. SIF files can be saved to your hard drive and imported into Herman Miller specIT or 3rd party specification tools to create a product specification list.

Trends within the workplace are driving different ways that people are working. Since workstations do not follow a one-size-fits all approach, we have developed applications for different worker styles.

This collection of application ideas is organized by the following worker styles: resident, flex, and mobile; and includes ideas for group spaces as well.

The resident worker is someone who has an assigned workstation and spends most of their day at their desk. These workers balance focused work and collaboration within their workstation. They will typically have higher levels of storage and ergonomic tools than other work styles.

The flex worker is someone who typically has an assigned workstation but spends much of their day somewhere else within the building. They are mobile within the office and empowered to not be at their workstation.

The mobile worker is typically on the go and is not assigned a specific workstation. Their work can be done from anywhere and they carry their mobile devices with them.

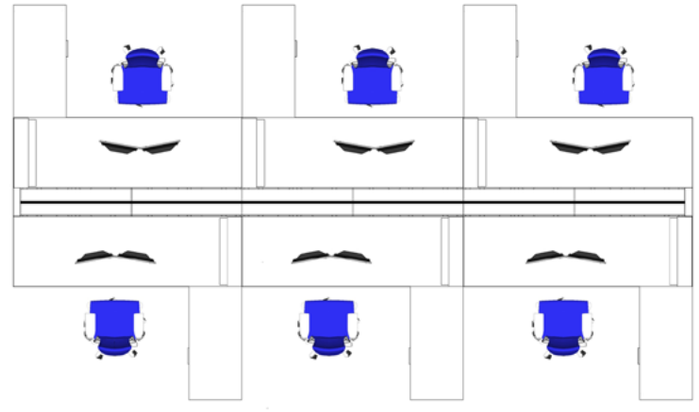
Worker Style:

Resident

Resident Application Ideas

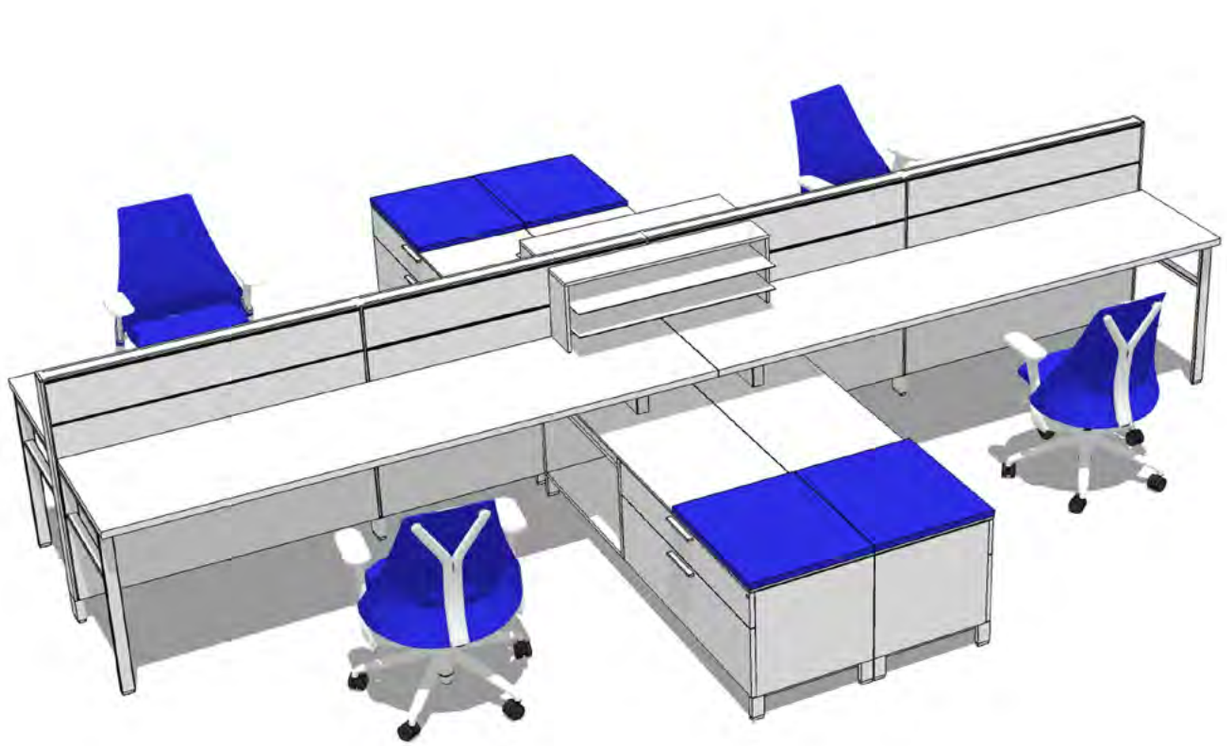
Resident 01 | 6’ x 8’ Workstations

24’-6”-wide Beam

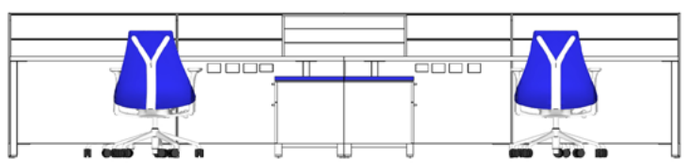


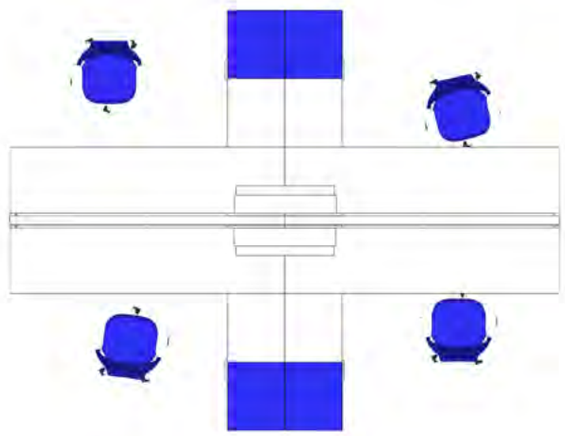
Resident Application Ideas

Resident 02 | 6’ x 8’ Workstations



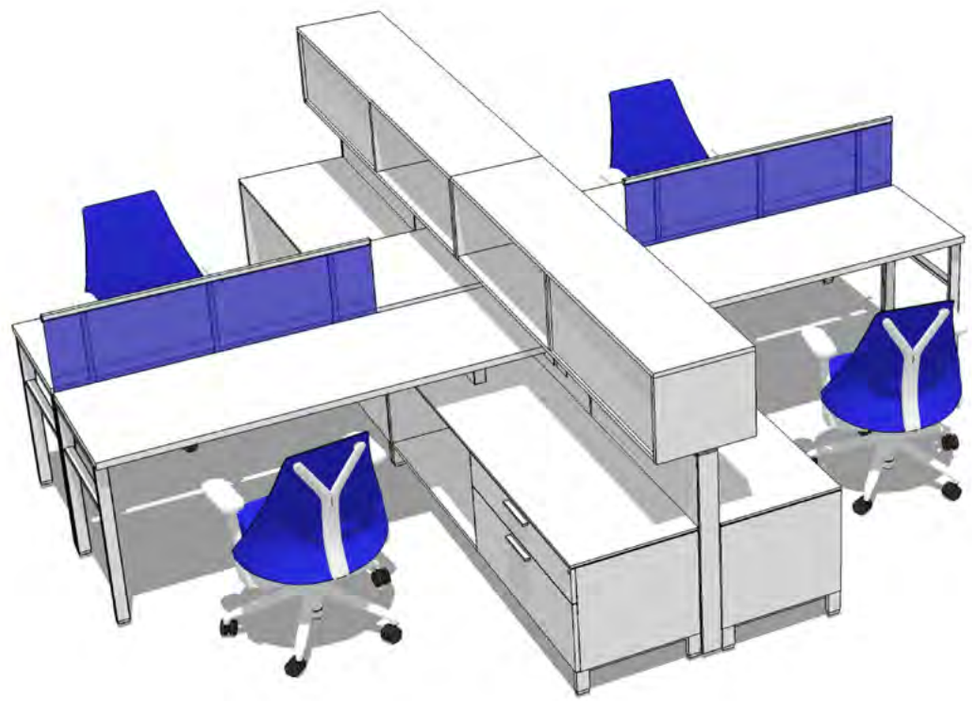
42”-high frames



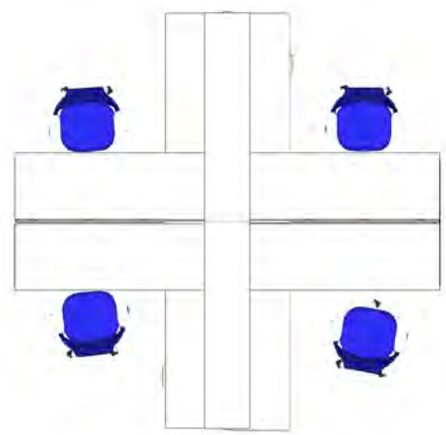


Resident Application Ideas

Resident 03 | 6’ x 6’ Workstations

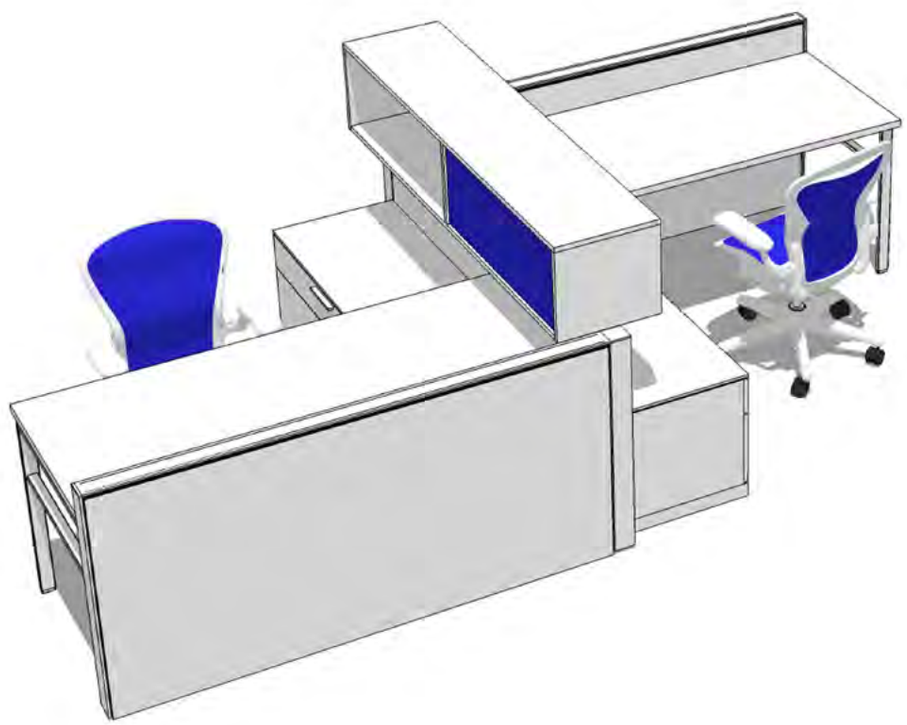


35”-high frames with frame top mounted storage cabinet

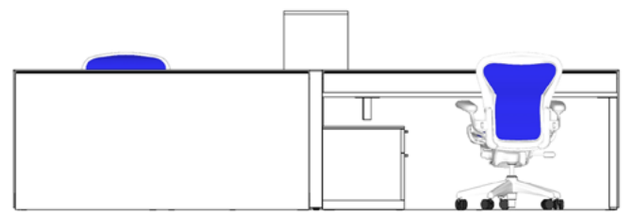


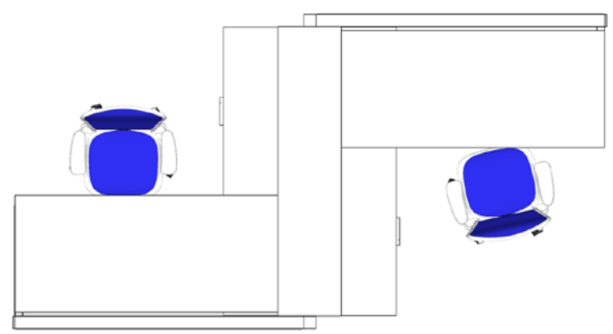
Resident Application Ideas

Resident 04 | 6’ x 6’ Workstations



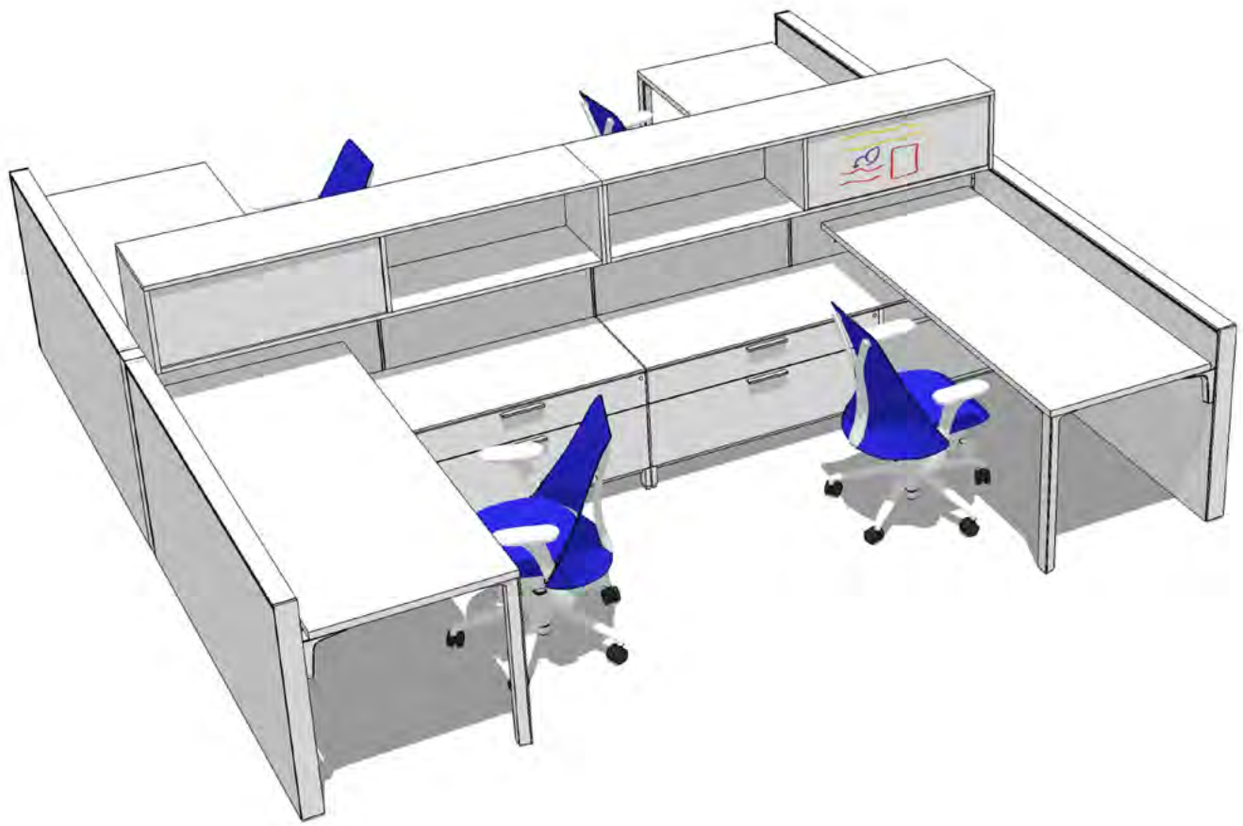
35”-high frames with frame top mounted storage cabinet



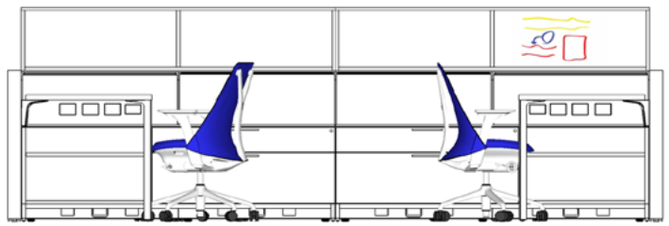


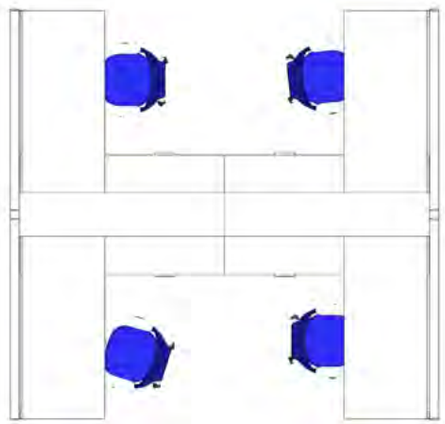
Resident Application Ideas

Resident 05 | 6’ x 6’ Workstations



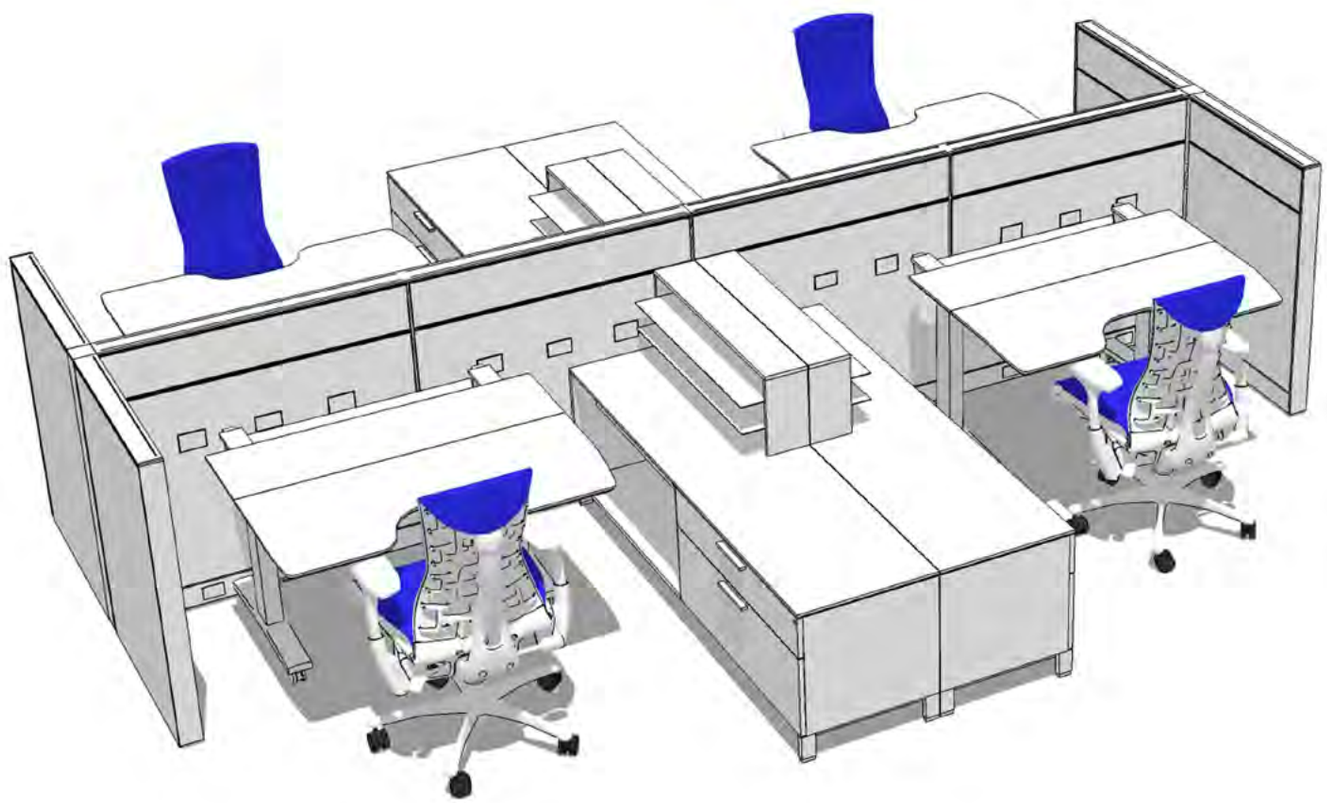
35”-high frames with frame top mounted storage cabinet



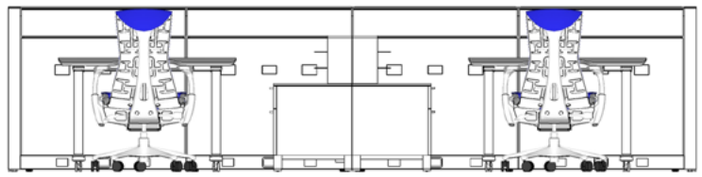


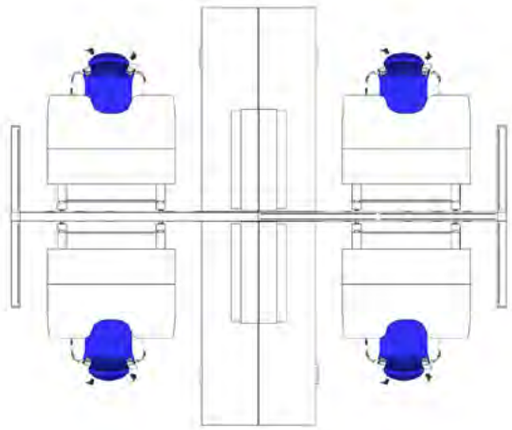
Resident Application Ideas

Resident 06 | 6’ x 7’ Workstations



42”-high frames

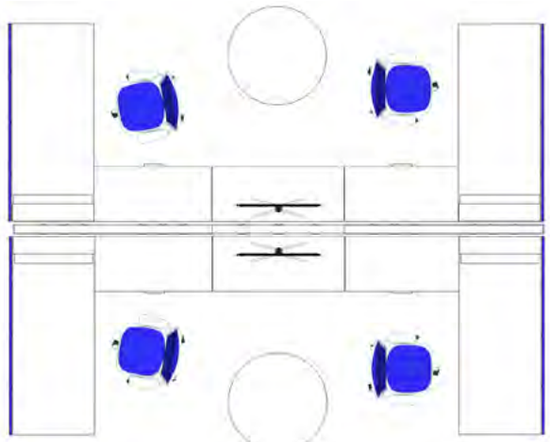




Resident Application Ideas

Resident 07 | 6’ x 8’ Workstations

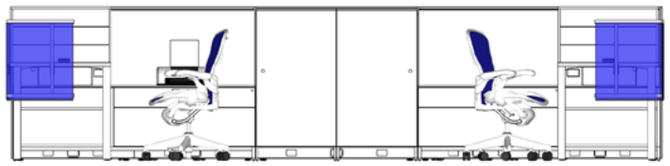
46”-high frames

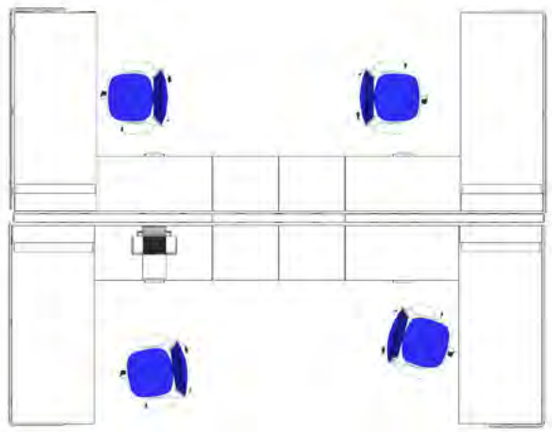


Resident Application Ideas

Resident 08 | 6’ x 8’ Workstations

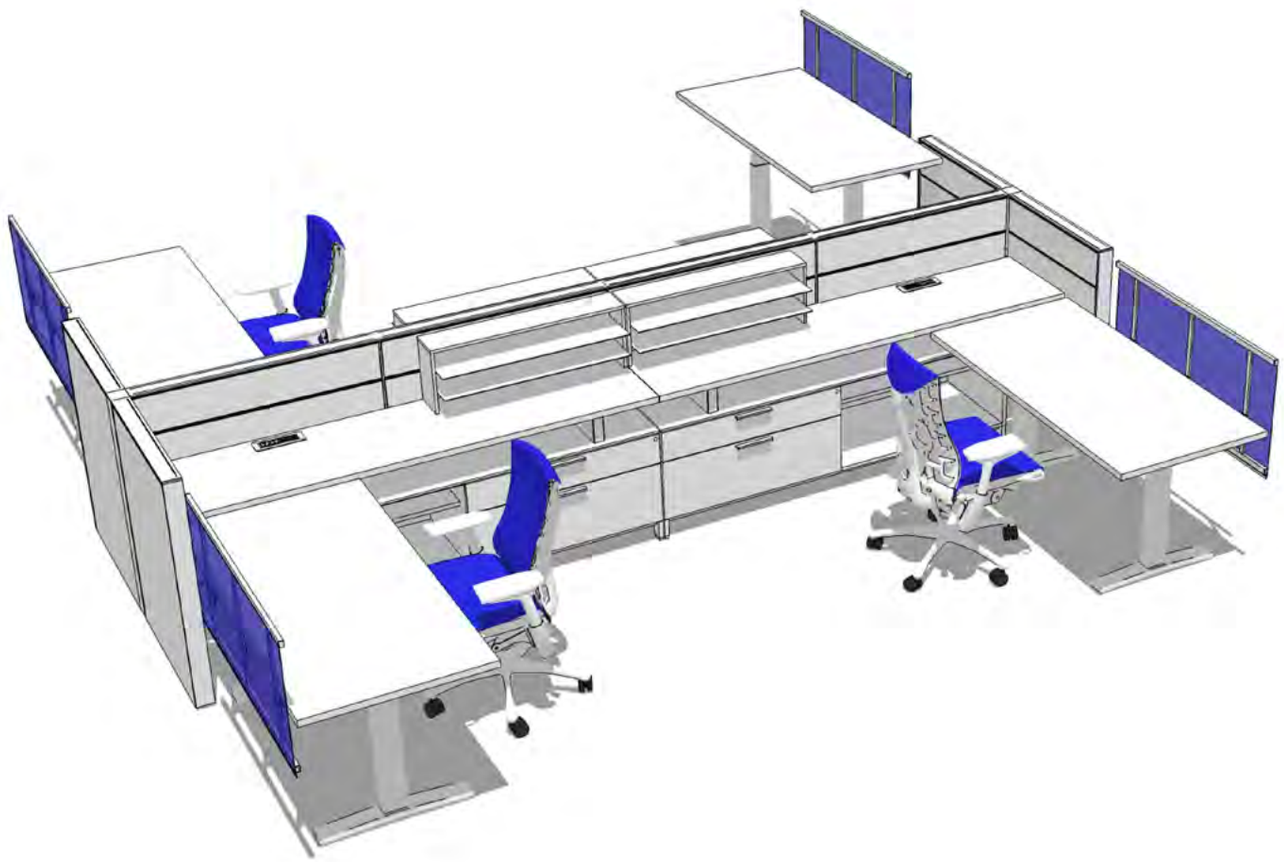
46”-high frames



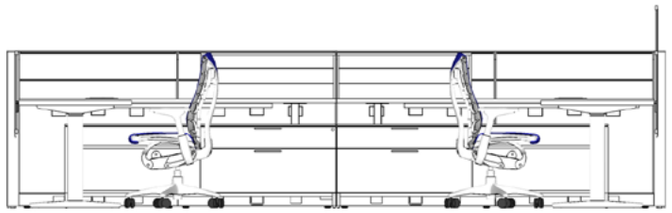


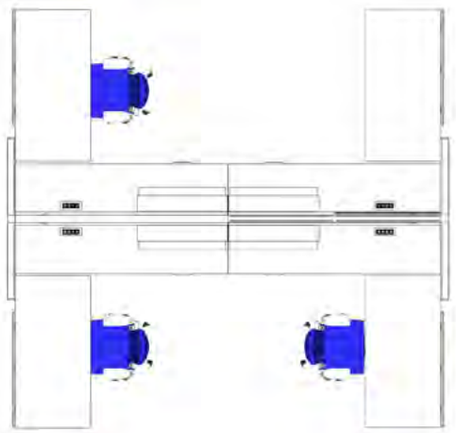
Resident Application Ideas

Resident 09 | 7’ x 7’ Workstations



42”-high frames

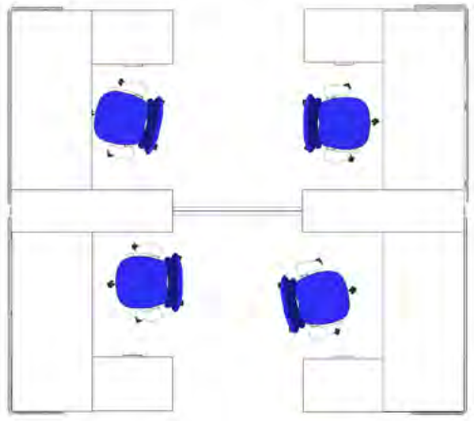




Resident Application Ideas

Resident 10 | 6’ x 7’ Workstations

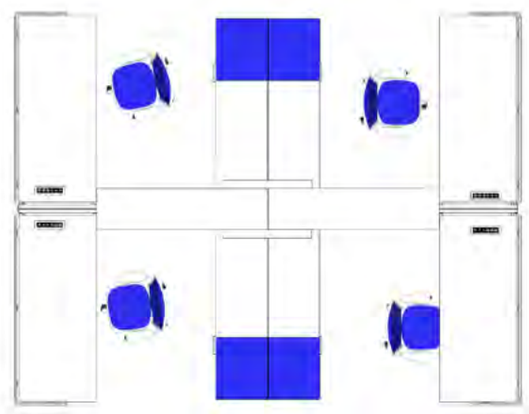
35”-high frames with frame top mounted storage cabinet and frame top screen



Resident Application Ideas

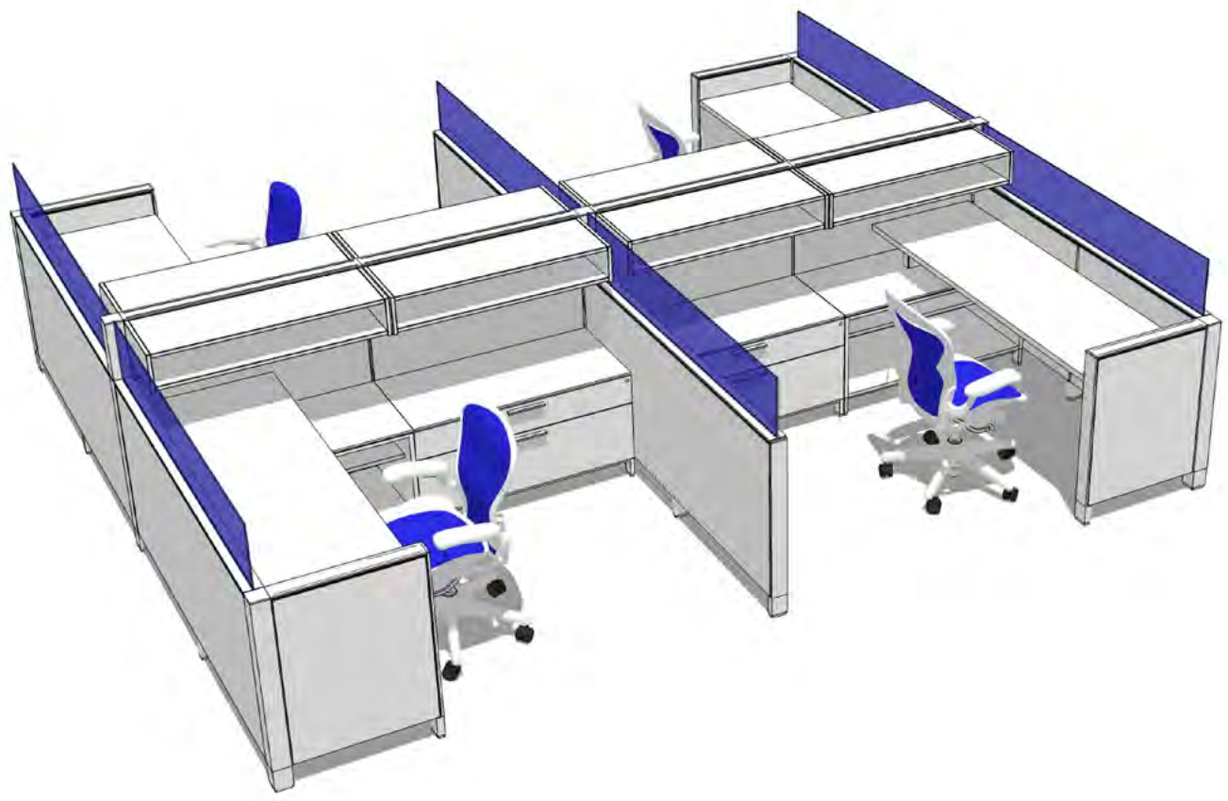
Resident 11 | 6’ x 8’ Workstations

35”-high frames with frame top mounted storage cabinet and frame top screen

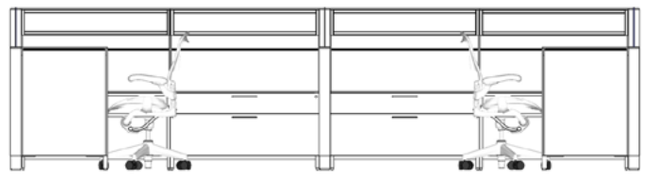


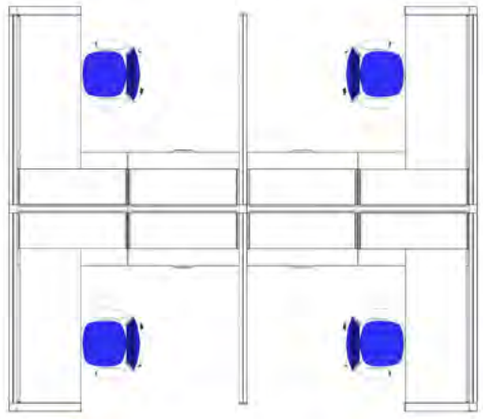
Resident Application Ideas

Resident 12 | 6’ x 7’ Workstations



35”- and 46”-high frames with frame top screen

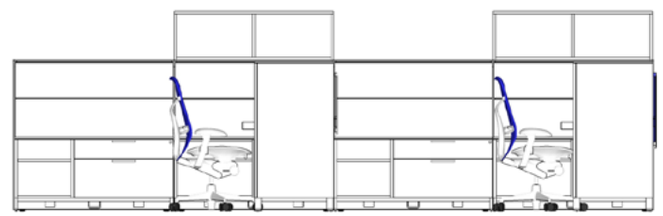


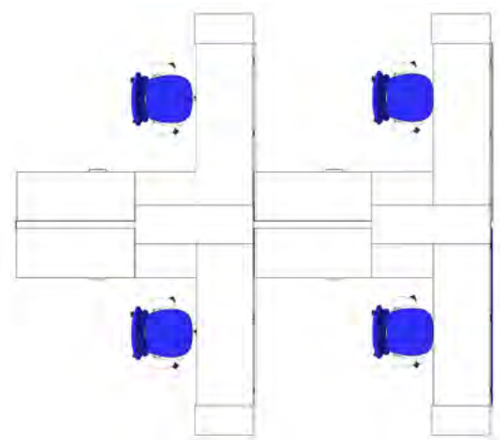


Resident Application Ideas

Resident 13 | 6’ x 8’ Workstations

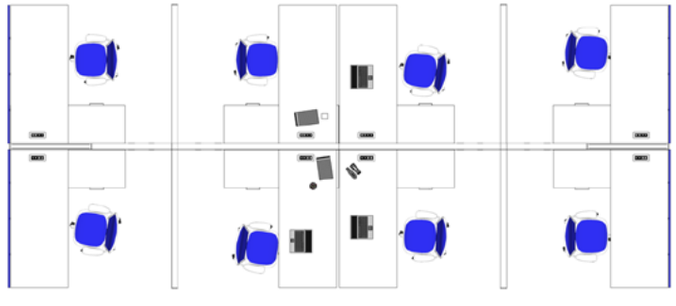
46”-high frames with frame top mounted storage cabinet





Resident Application Ideas

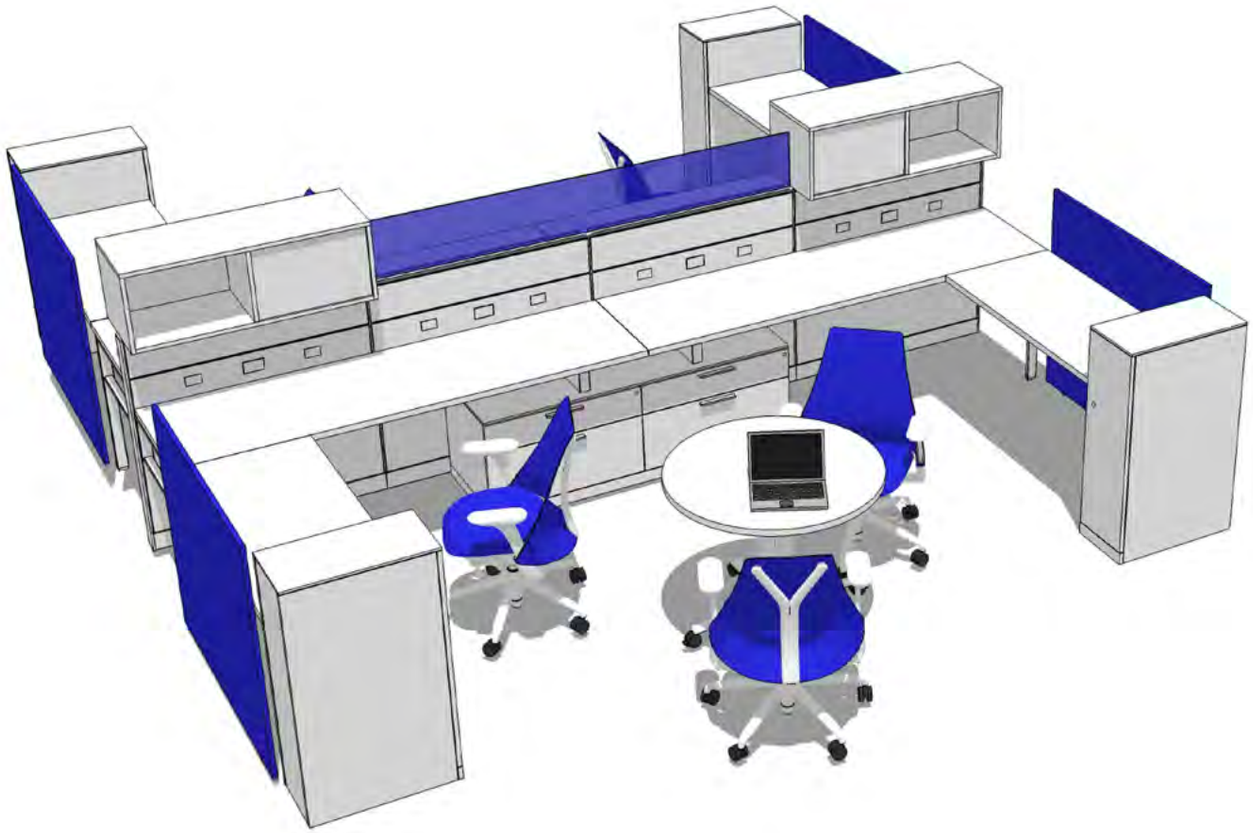
Resident 14 | 6’ x 7’ Workstations



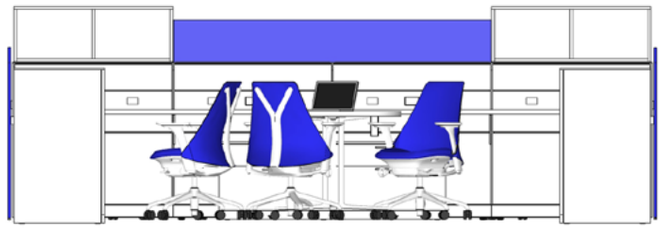
35”- and 46”-high frames with frame top mounted storage cabinet

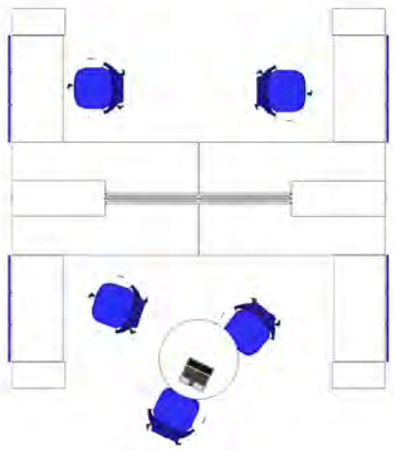
Resident Application Ideas

Resident 15 | 7’ x 7’ Workstations



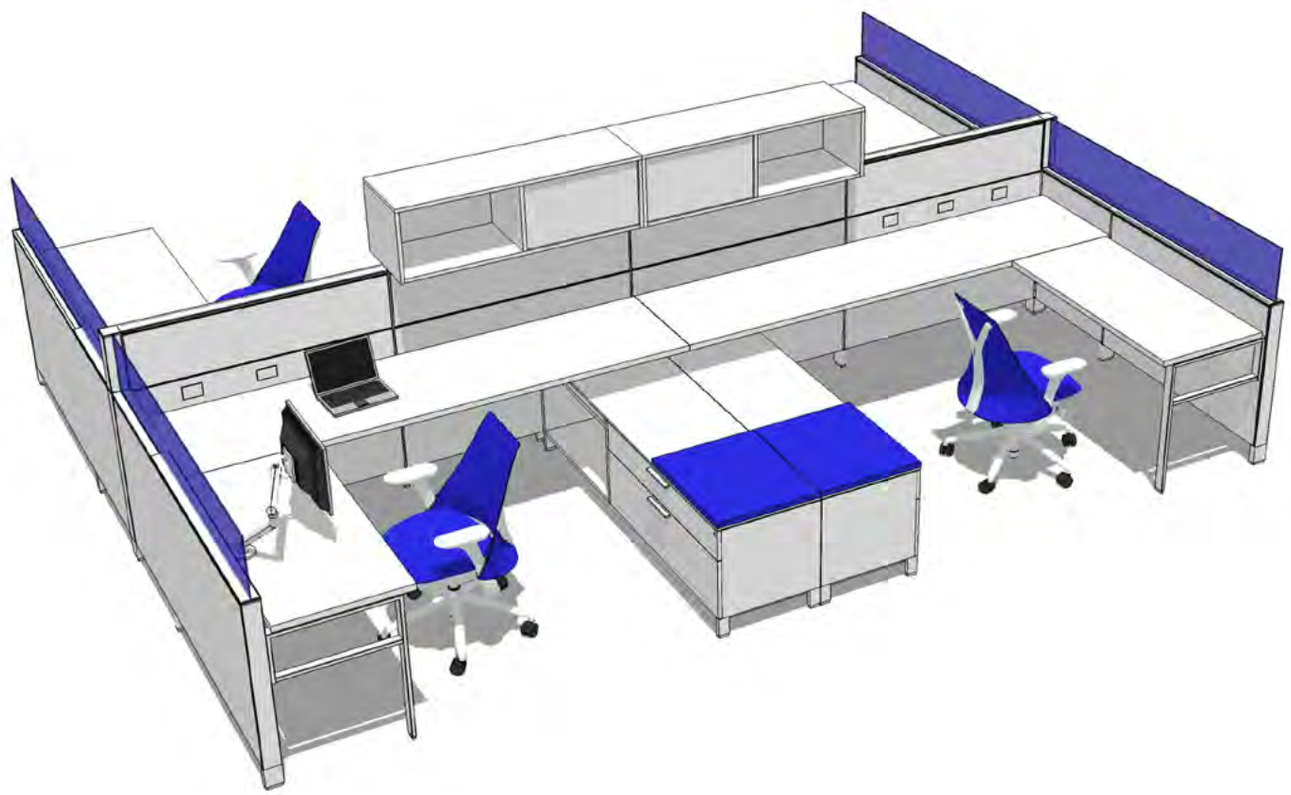
42”-high frames with frame top mounted storage cabinet and frame top screen



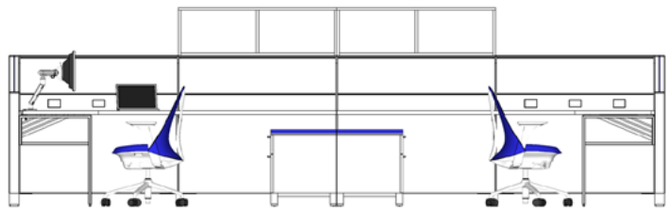


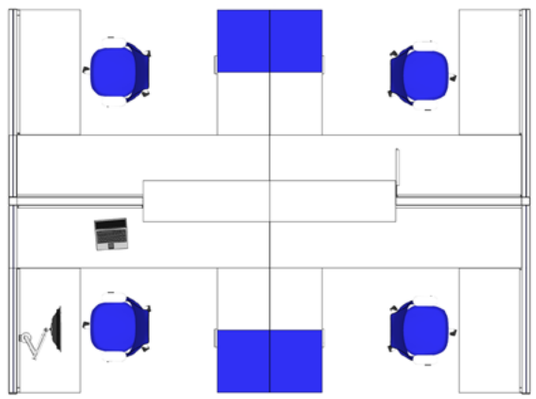
Resident Application Ideas

Resident 16 | 6’ x 8’ Workstations



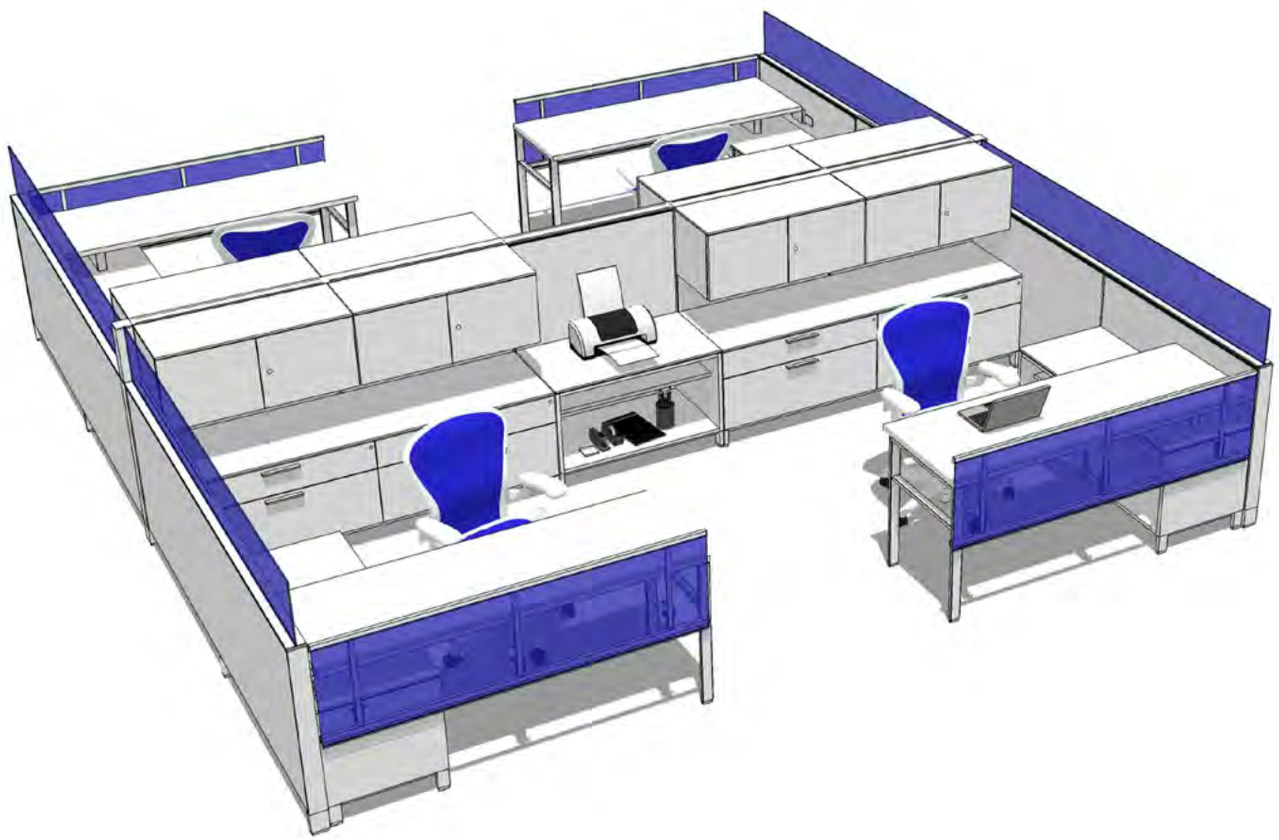
35”- and 46”-high frames with frame top mounted storage cabinet and frame top screen



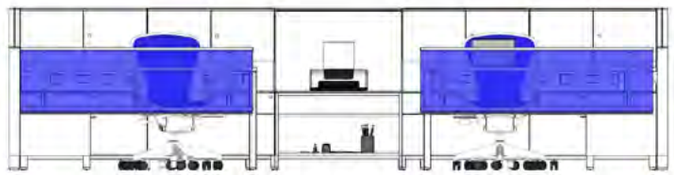


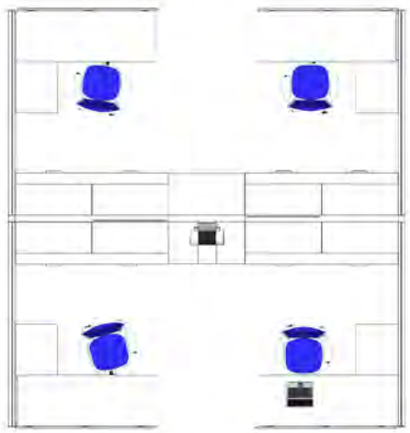
Resident Application Ideas

Resident 17 | 6’ x 8’ Workstations



35”- and 46”-high frames with frame top screen

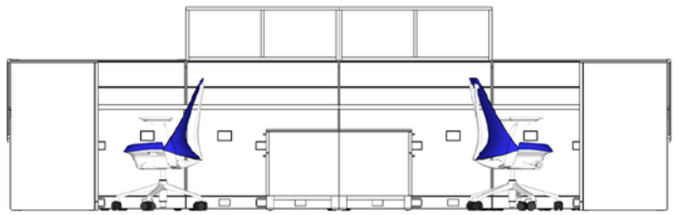


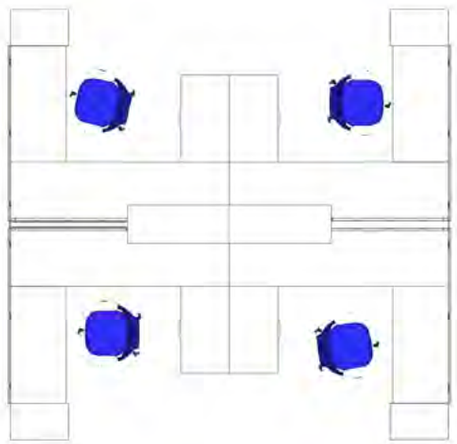


Resident Application Ideas

Resident 18 | 7’ x 8’ Workstations

42”-high frames with frame top mounted storage cabinet

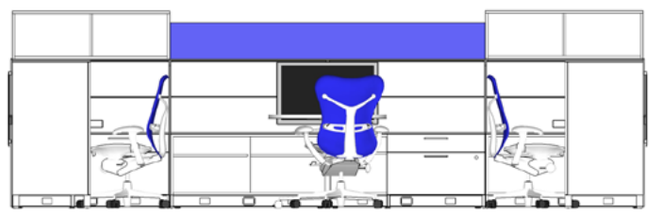


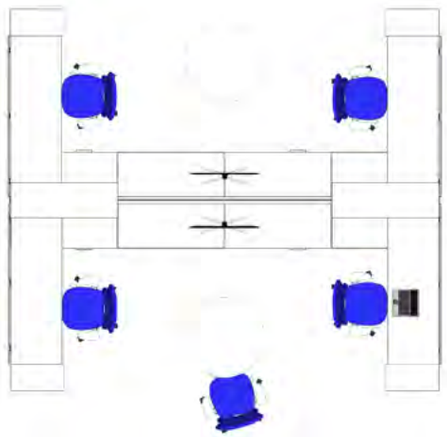


Resident Application Ideas

Resident 19 | 7’ x 8’ Workstations

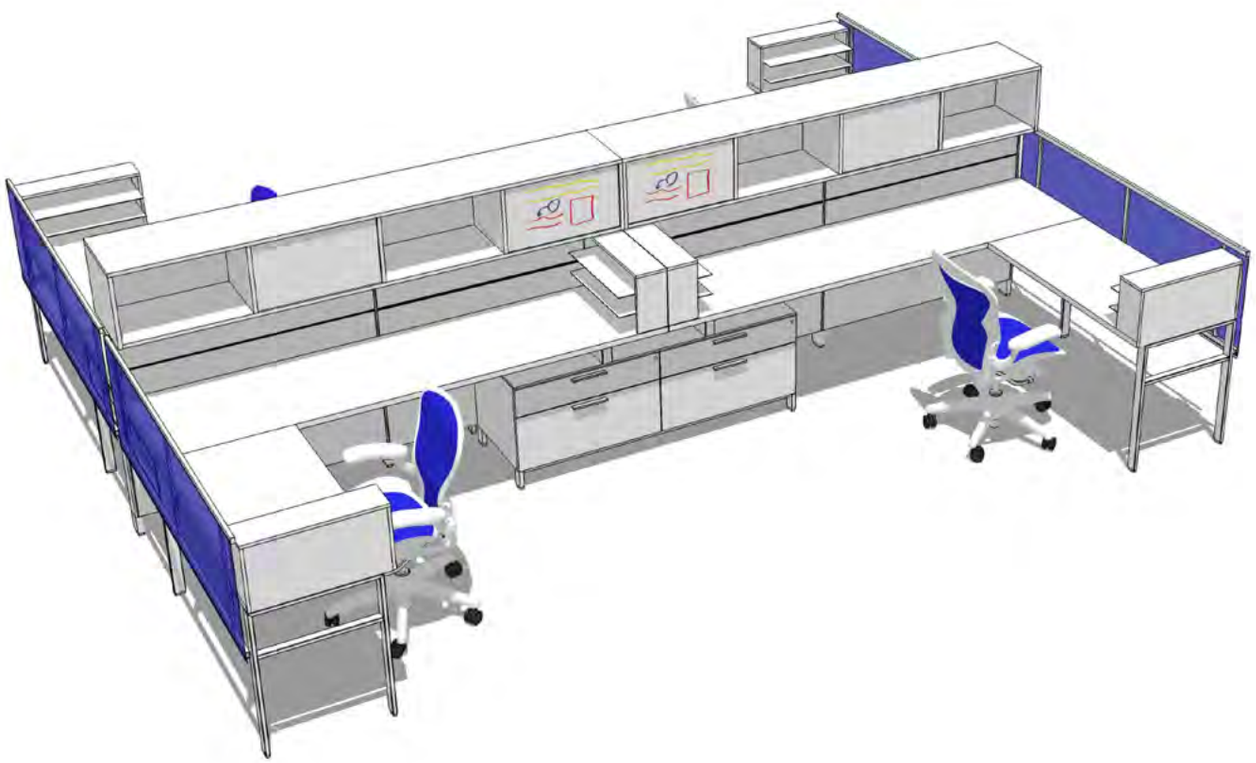
46”-high frames with frame top mounted storage cabinet and frame top screen



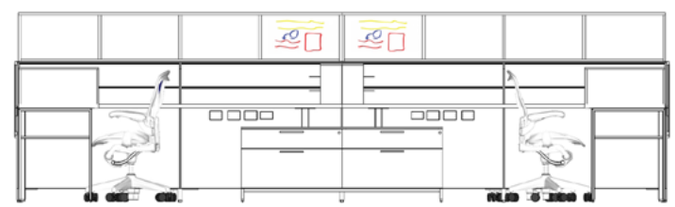


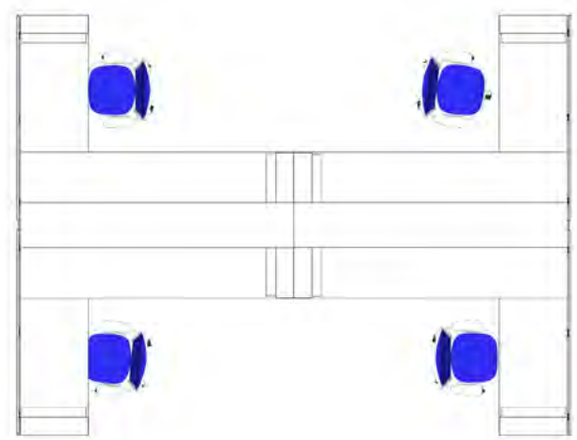
Resident Application Ideas

Resident 20 | 6’ x 8’ Workstations



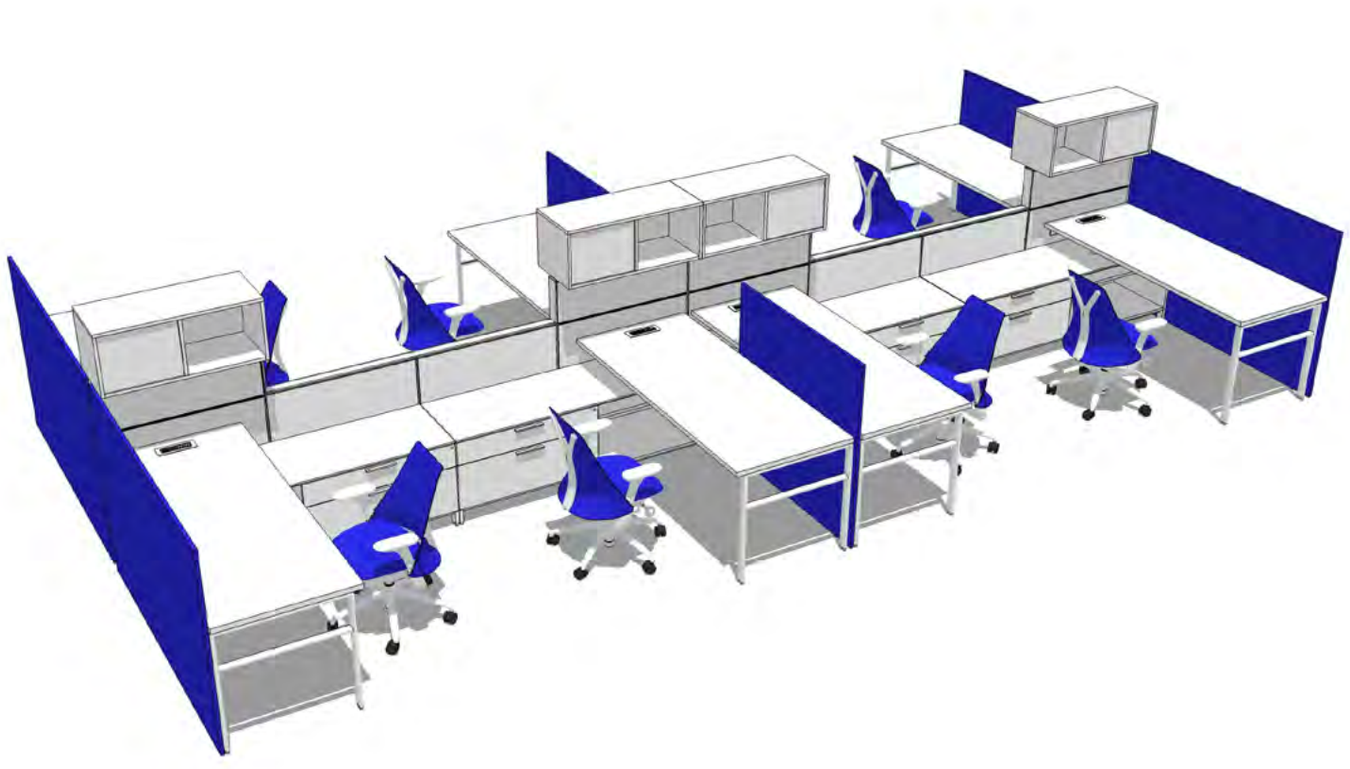
46”-high frames with frame top mounted storage cabinet



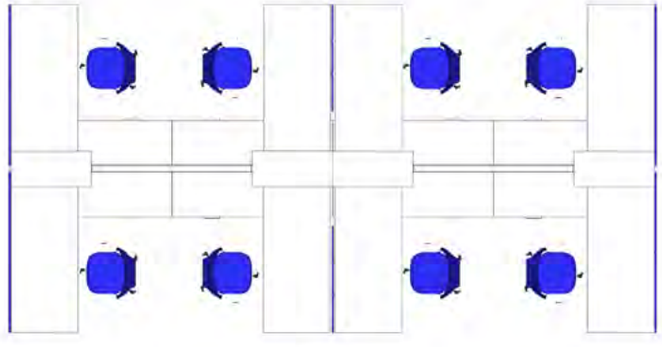


Resident Application Ideas

Resident 21 | 6’ x 6’ Workstations



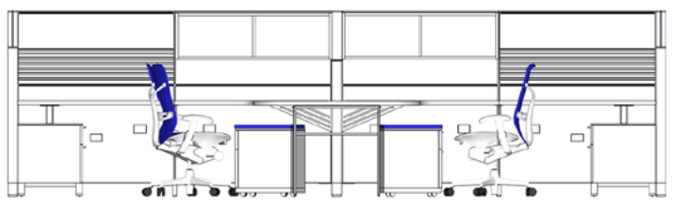
35”- and 46”-high frames with frame top mounted storage cabinet

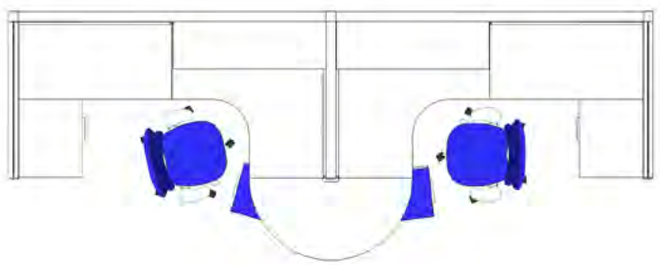


Resident Application Ideas

Resident 22 | 6’ x 8’ Workstations

46”- and 57”-high frames with frame top screen

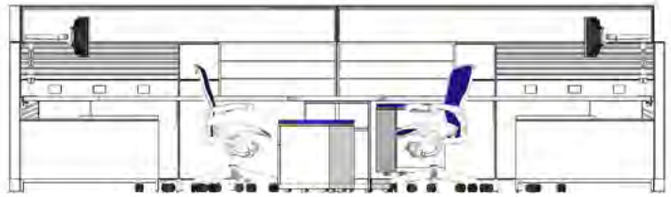


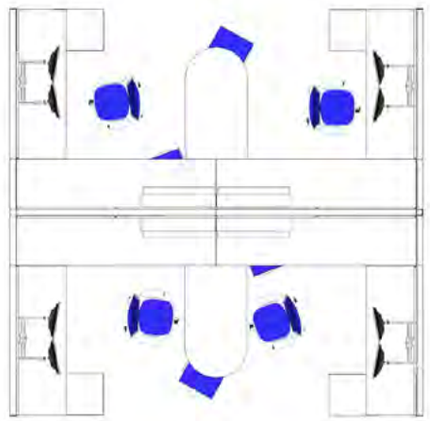


Resident Application Ideas

Resident 23 | 8’ x 8’ Workstations

46”-high frames with thin profile stacking window; overall height 57”

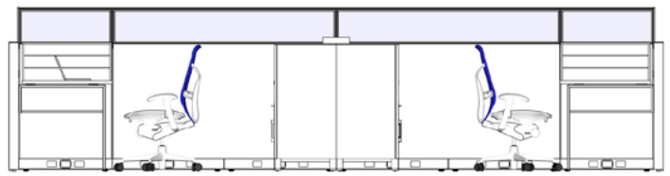


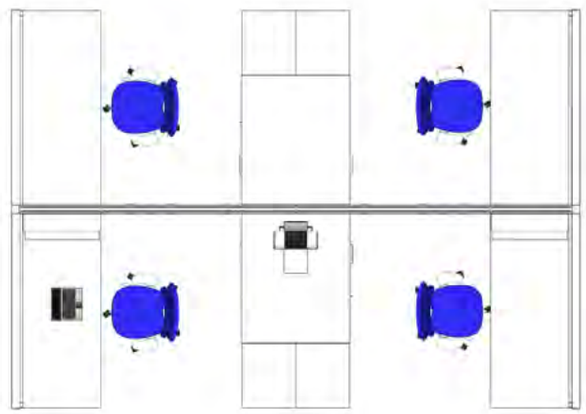


Resident Application Ideas

Resident 24 | 6’ x 8.5’ Workstations

42”-high frames with thin profile stacking window; overall height 57”

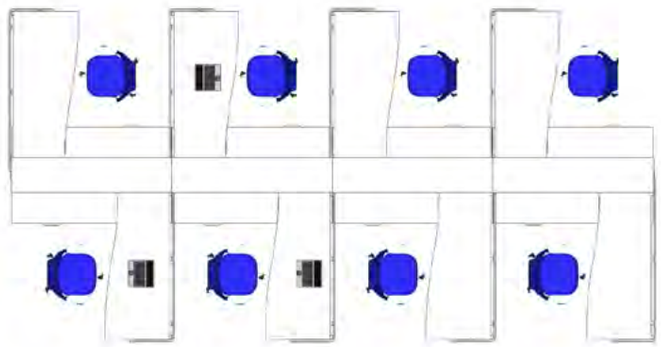




Resident Application Ideas

Resident 25 | 6’ x 6’ Workstations

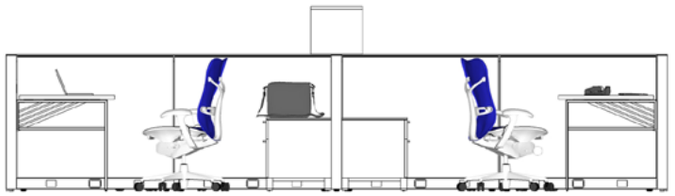
42”-high frames with frame top mounted storage cabinet

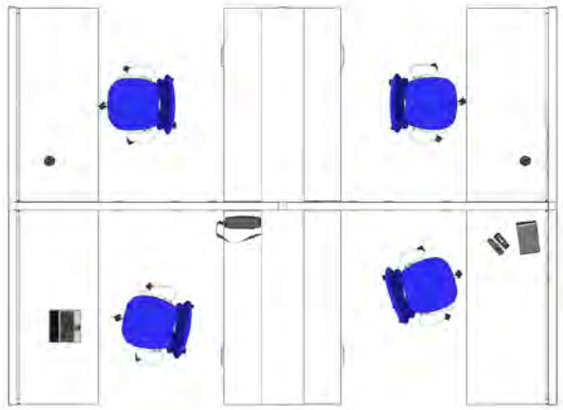


Resident Application Ideas

Resident 26 | 6’ x 8’ Workstations

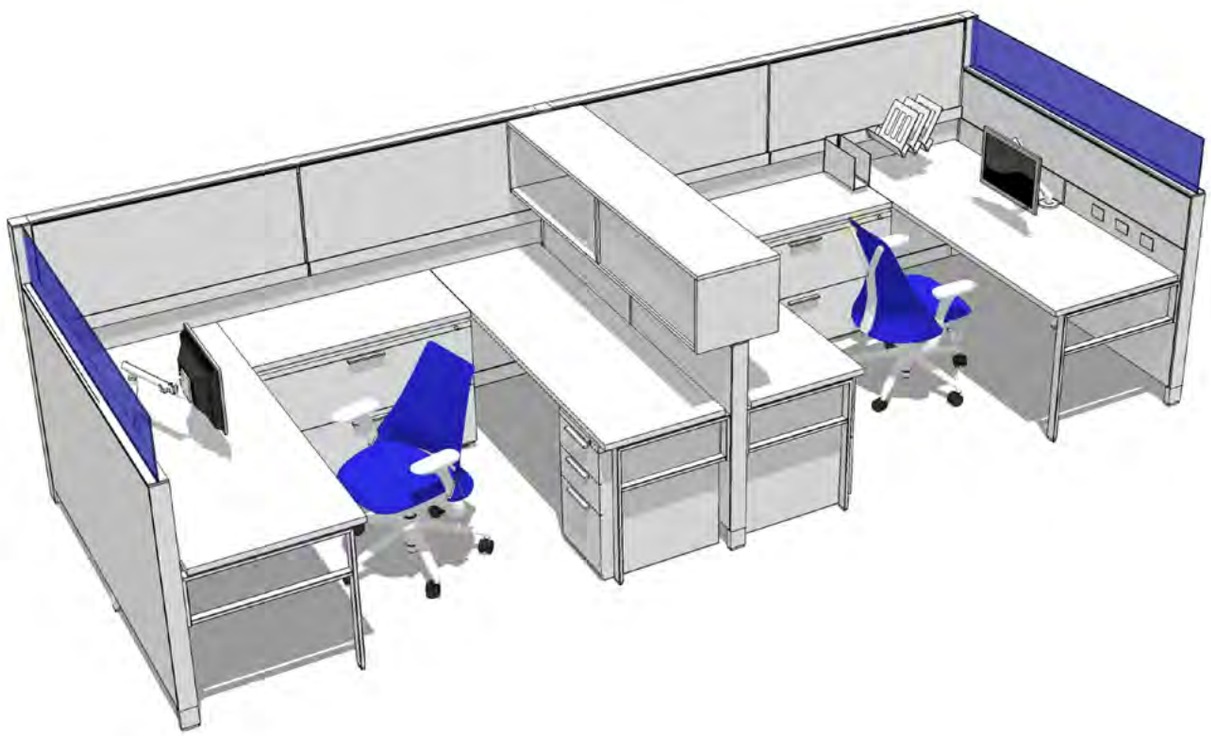
42”-high frames with frame top mounted storage cabinet

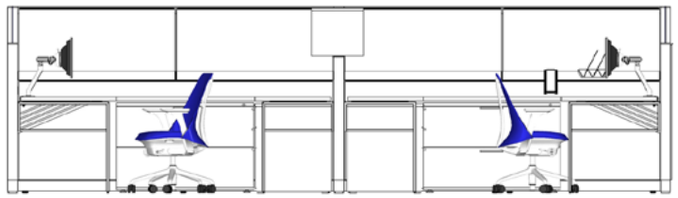


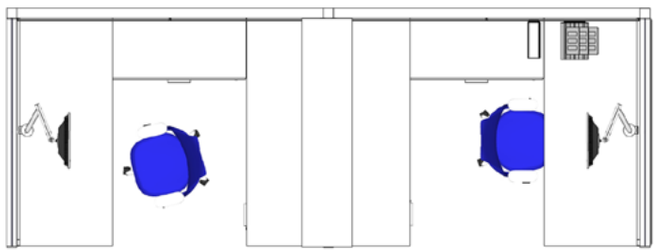


Resident Application Ideas

Resident 27 | 6’ x 8’ Workstations





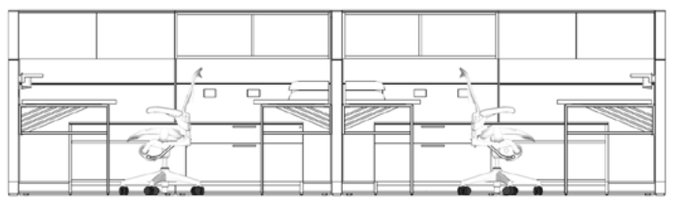


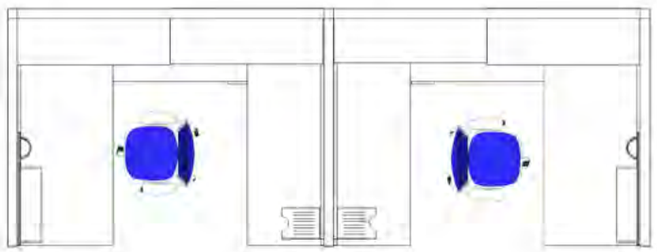
46”- and 57”-high frames with frame top mounted storage cabinet and frame top screen

Resident Application Ideas

Resident 28 | 6’ x 8’ Workstations

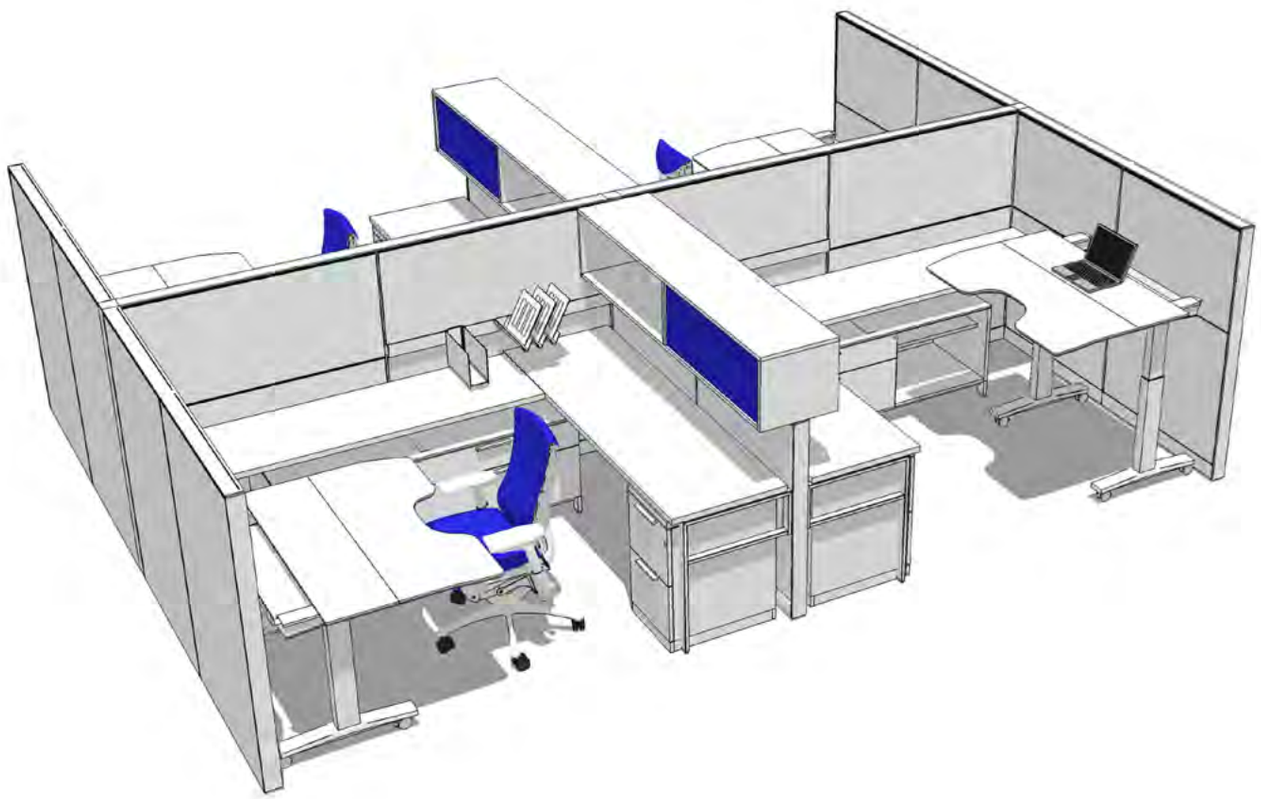
42”- and 57”-high frames



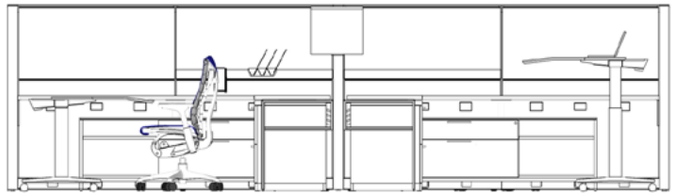


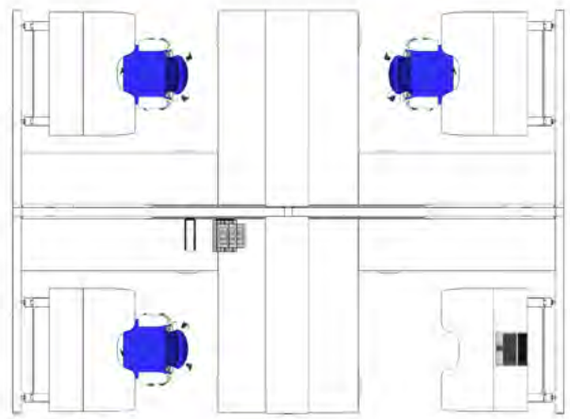
Resident Application Ideas

Resident 29 | 6’ x 8’ Workstations



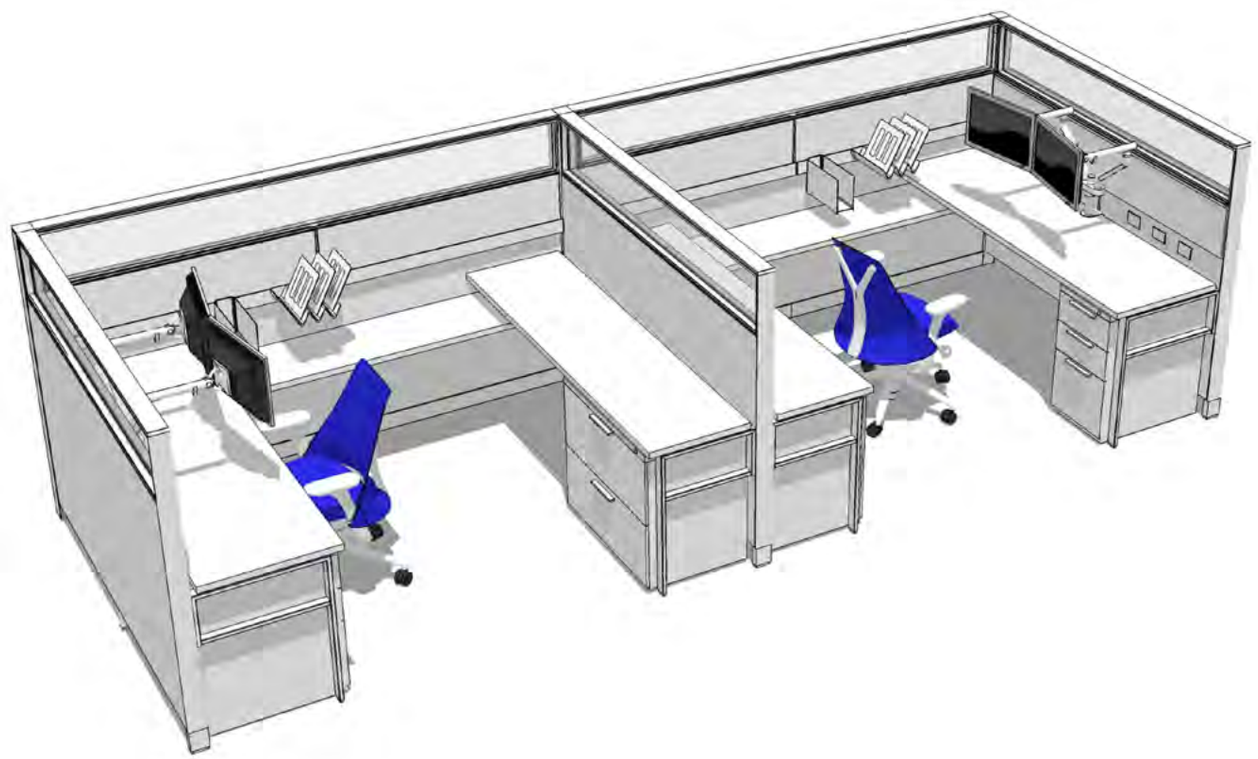
42”-and 57”-high frames with frame top mounted storage cabinet

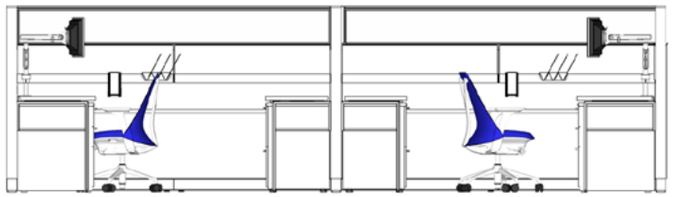


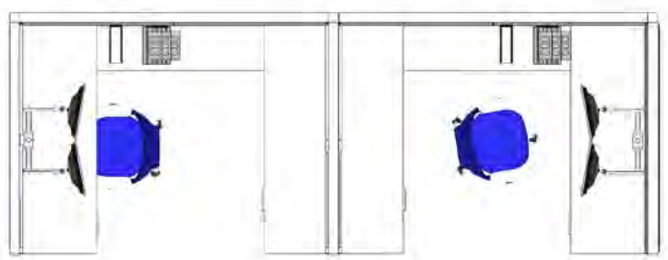


Resident Application Ideas

Resident 30 | 6’ x 8’ Workstations



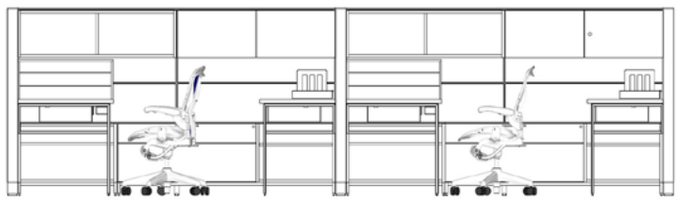


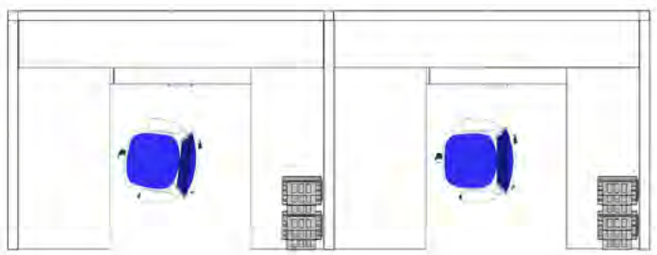


46”-high frames with thin profile stacking window; overall height 57”

Resident Application Ideas

Resident 31 | 6’ x 8’ Workstations



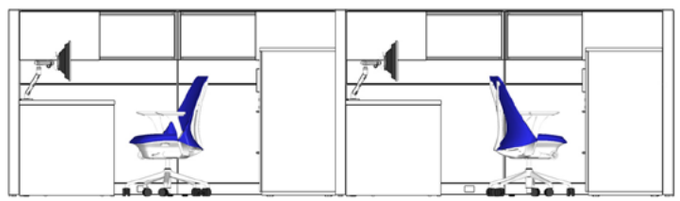


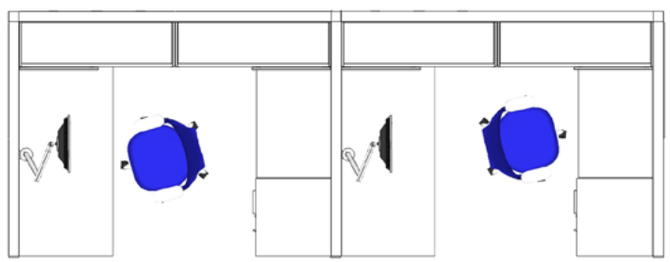
57”-high frames

Resident Application Ideas

Resident 32 | 6’ x 8’ Workstations

57”-high frames

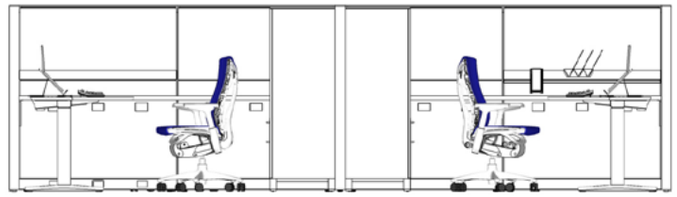


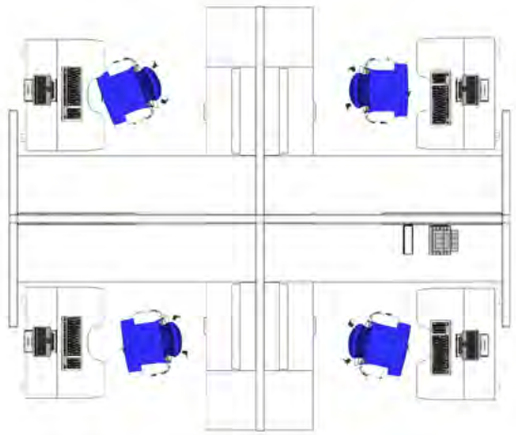


Resident Application Ideas

Resident 33 | 7’ x 8’ Workstations

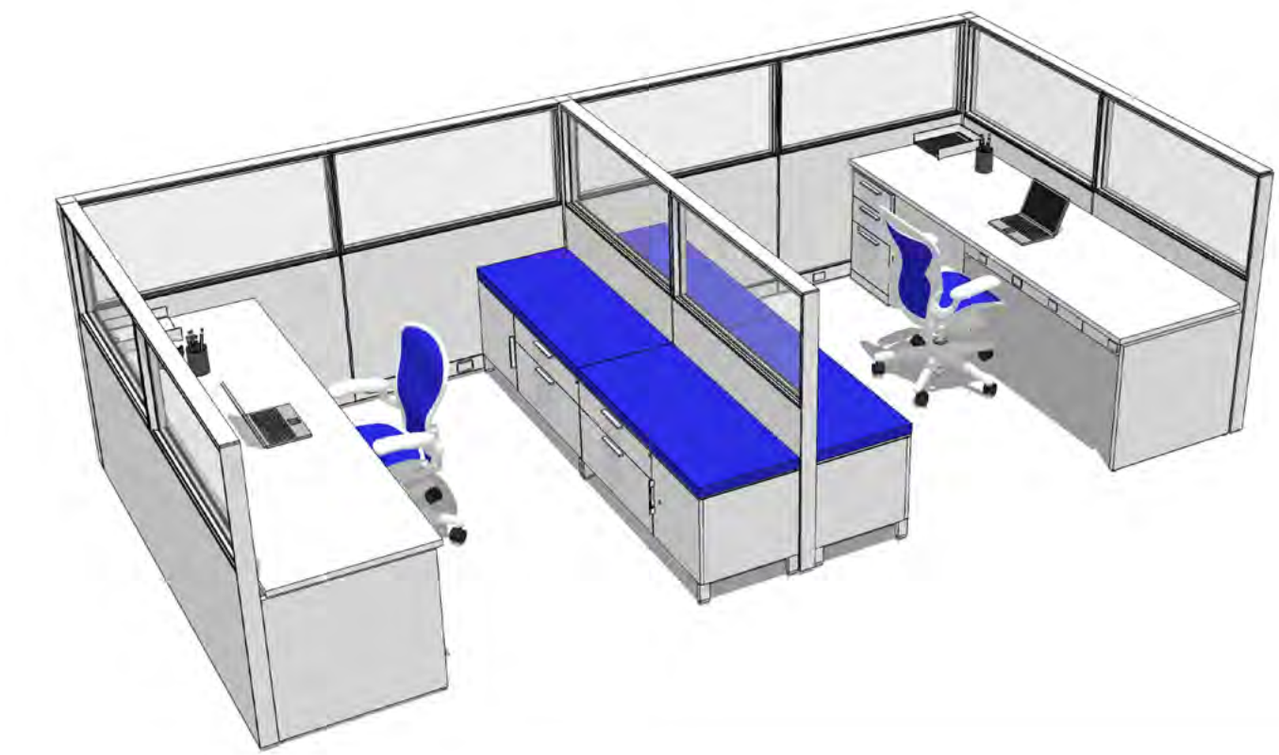
57”-high frames



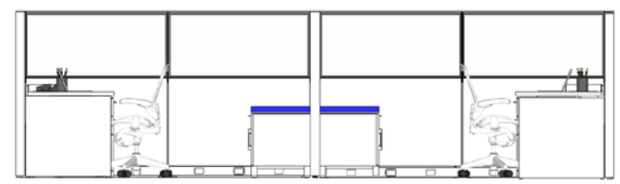


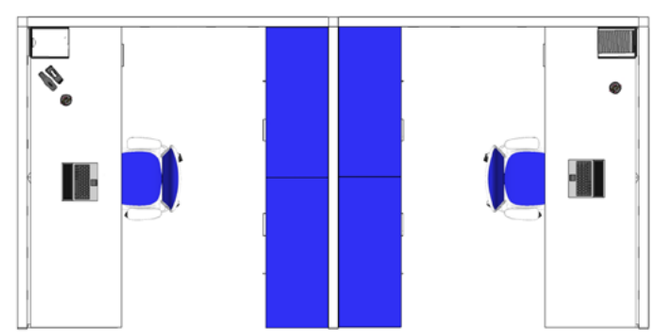
Resident Application Ideas

Resident 34 | 8’ x 8’ Workstations



57”- and 35”-high frames with thin profile stacking windows

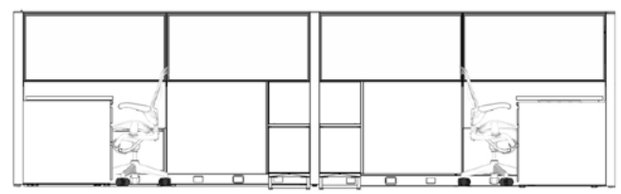


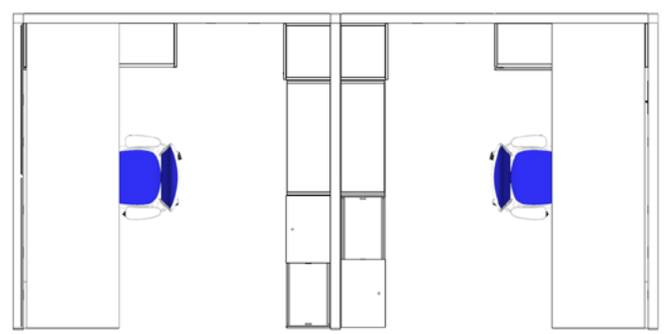


Resident Application Ideas

Resident 35 | 8’ x 8’ Workstations

57”- and 35”-high frames with thin profile stacking windows

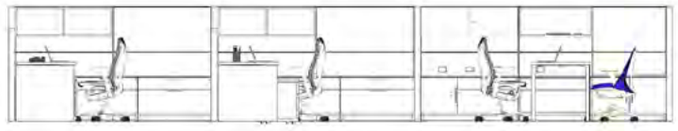


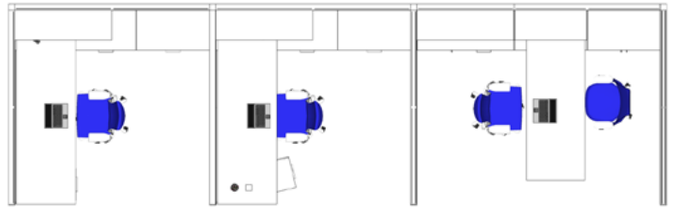


Resident Application Ideas

Resident 36 | 8’ x 8’ Workstations

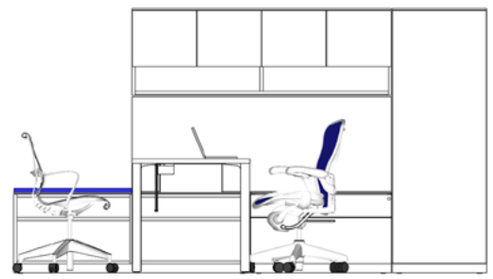
57”- and 35”-high frames with thin profile stacking windows

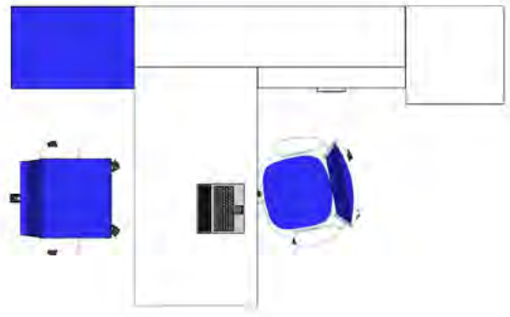




Resident Application Ideas

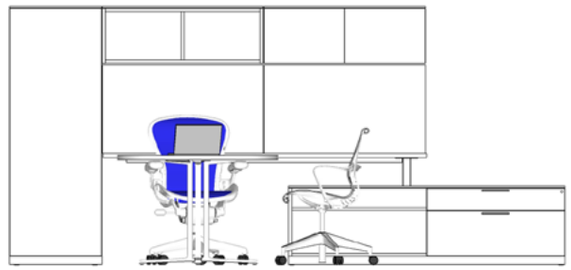
Resident 37 | 6’ x 10’ Private Office

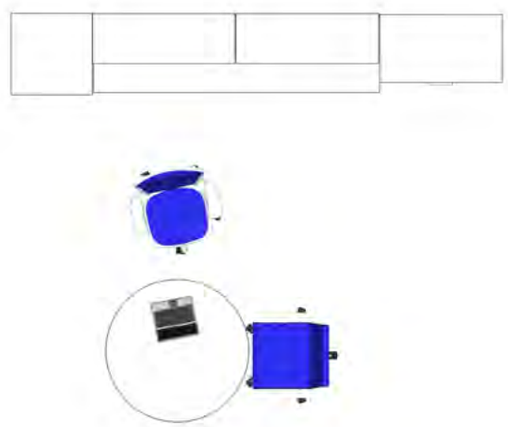




Resident Application Ideas

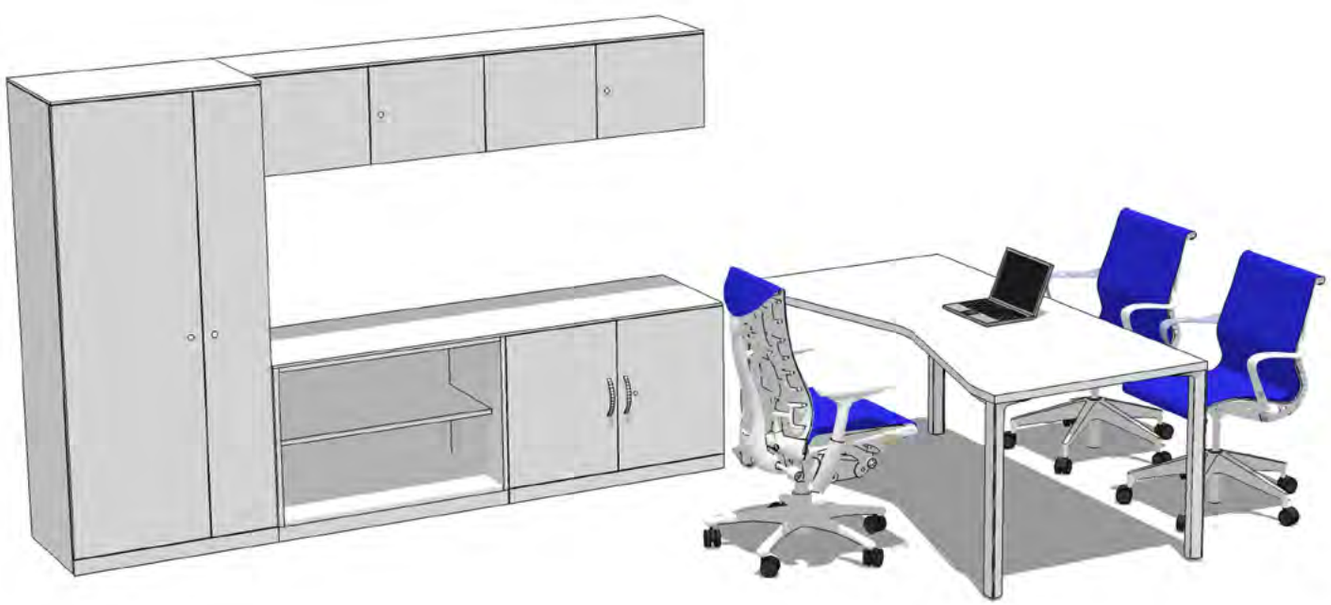
Resident 38 | 10’ x 12’ Private Office

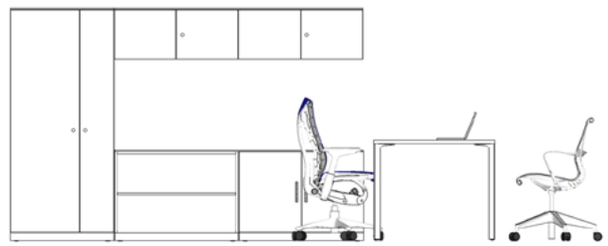


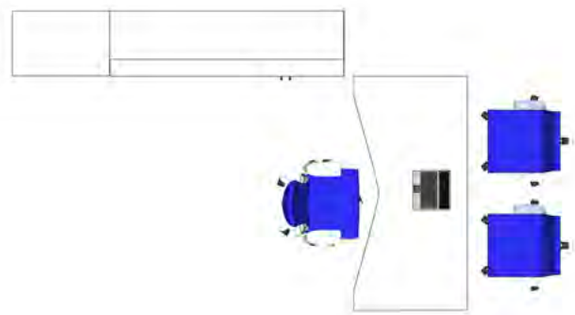


Resident Application Ideas

Resident 39 | 8’ x 14’ Private Office

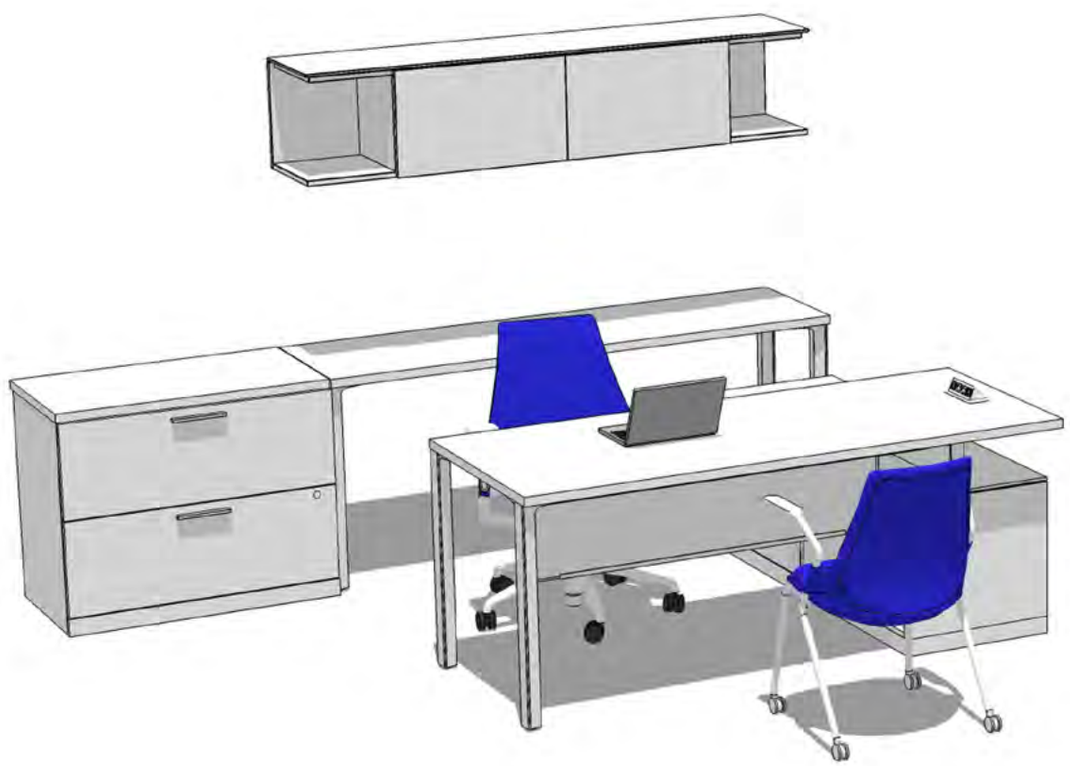


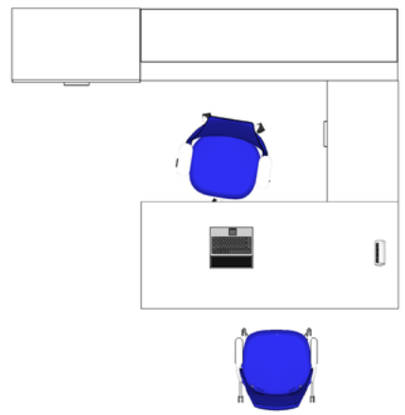




Resident Application Ideas

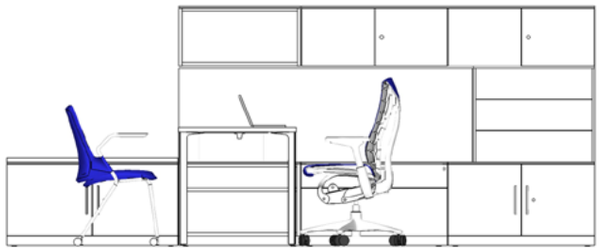
Resident 40 | 9’ x 10’ Private Office

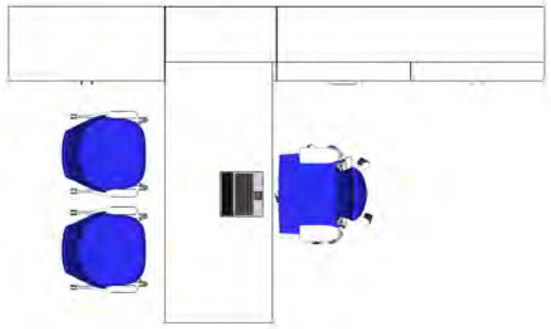




Resident Application Ideas

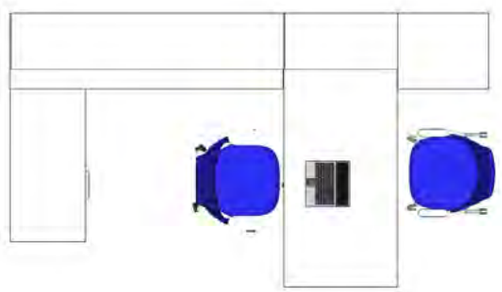
Resident 41 | 7’ x 12’ Private Office





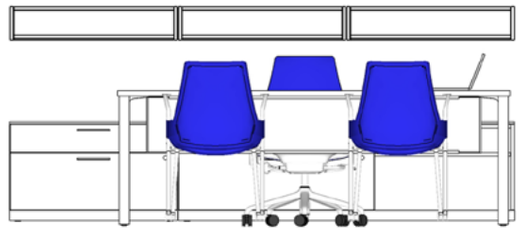
Resident Application Ideas

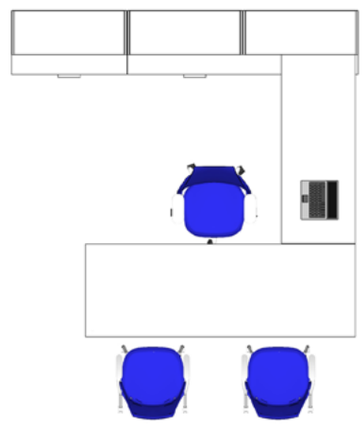
Resident 42 | 6’ x 11’ Private Office



Resident Application Ideas

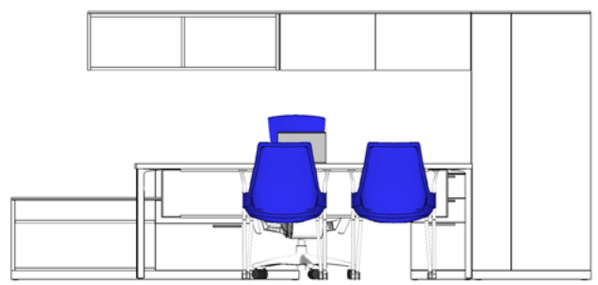
Resident 43 | 8’ x 12’ Private Office

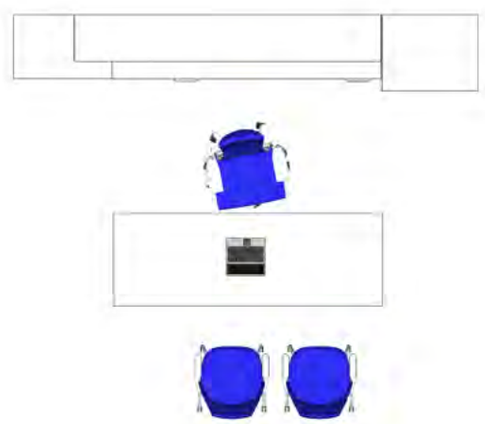




Resident Application Ideas

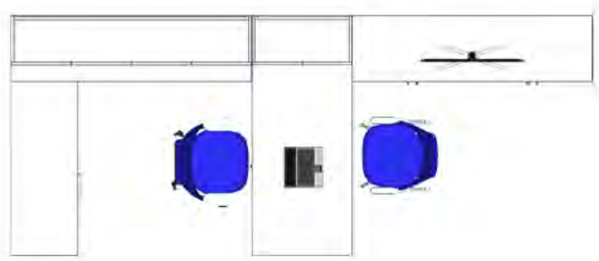
Resident 44 | 10’ x 12’ Private Office





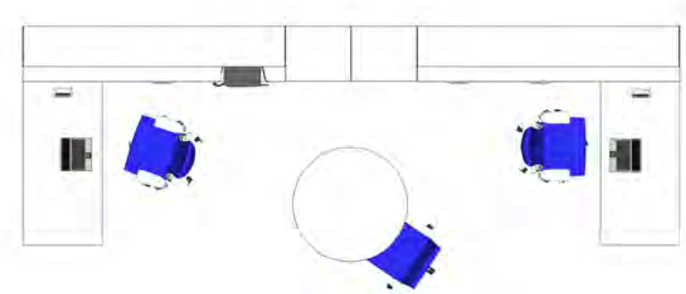
Resident Application Ideas

Resident 45 | 6’ x 15’ Private Office



Resident Application Ideas

Resident 46 | 7’ x 10’ Private Office

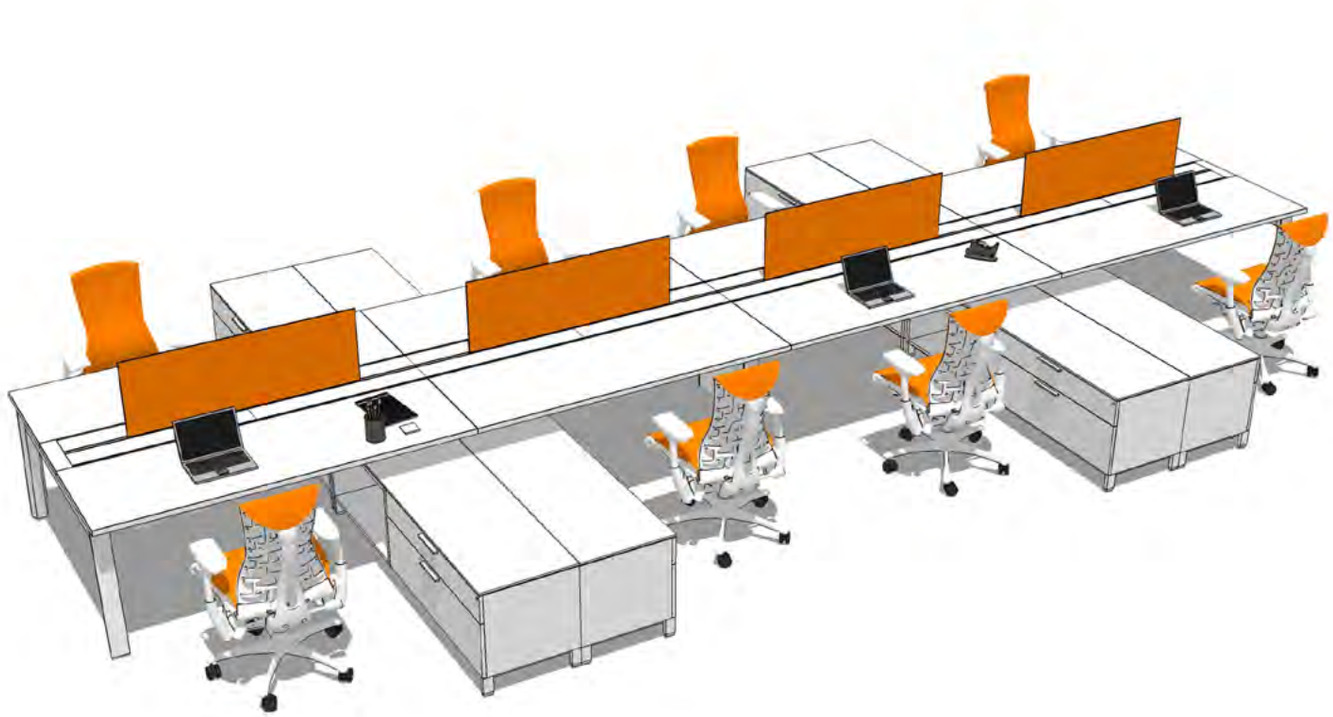


Worker Style:

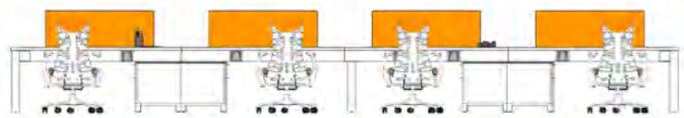
Flex

Flex Application Ideas

Flex 01 | 6’ x 6’ Workstations



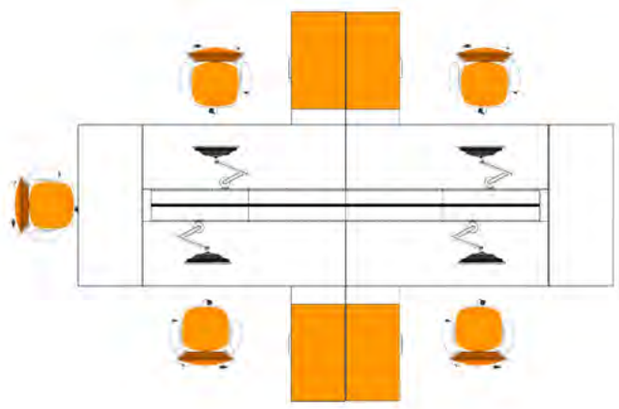
24’-6” Beam



Flex Application Ideas

Flex 02 | 6’ x 6’ Workstations

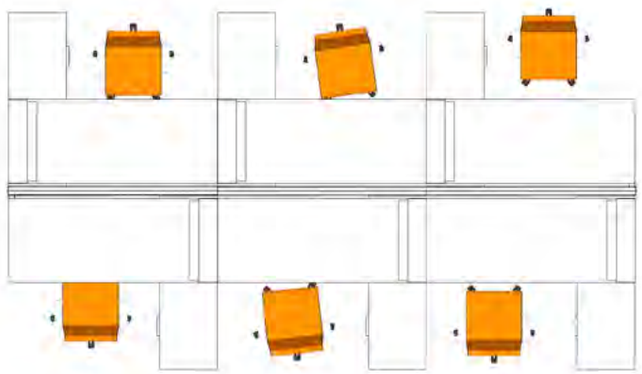
16’-6” Beam including extension surfaces



Flex Application Ideas

Flex 03 | 5’ x 6’ Workstations

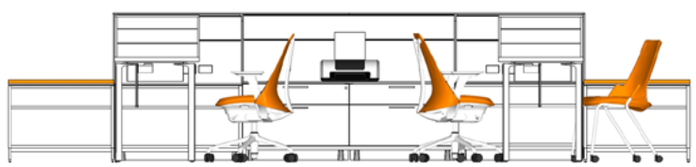
35”-high frames with frame top screen

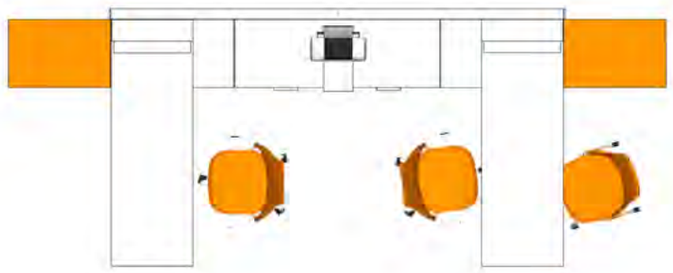


Flex Application Ideas

Flex 04 | 6’ x 8’ Workstations

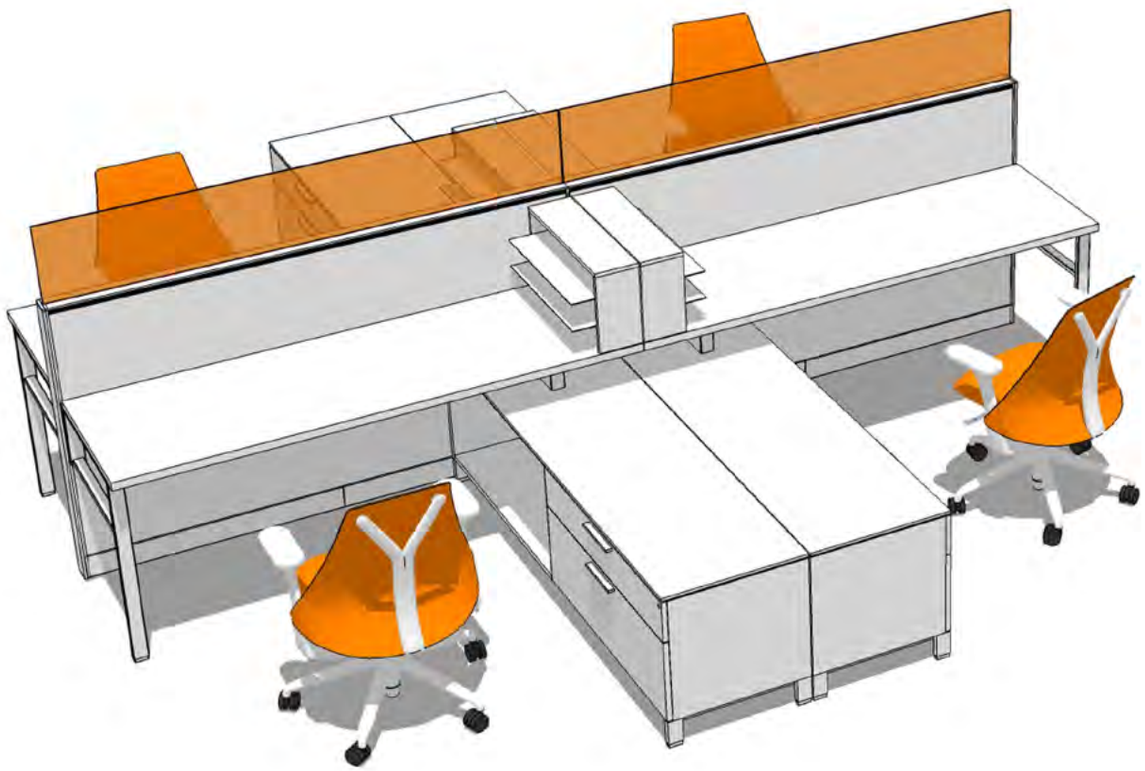
42”-high frames



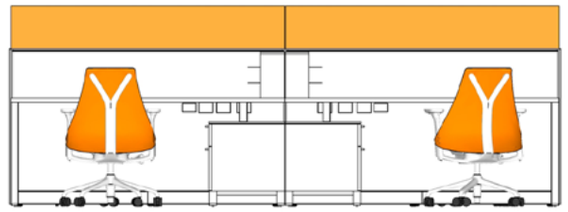


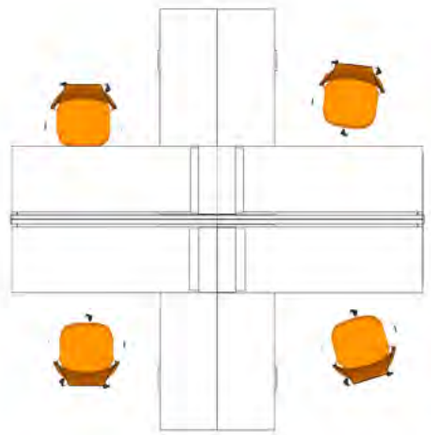
Flex Application Ideas

Flex 05 | 6’ x 6’ Workstations



42”-high frames with frame top screens

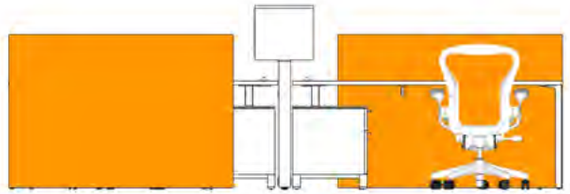


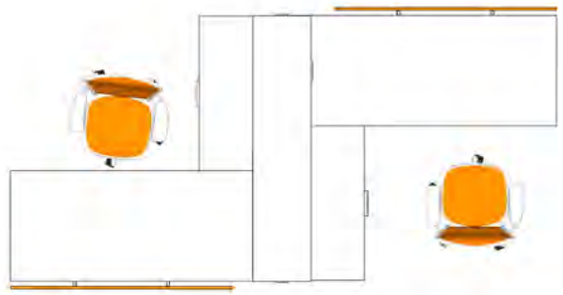


Flex Application Ideas

Flex 06 | 6’ x 6’ Workstations

35”-high frames with frame top mounted storage cabinet

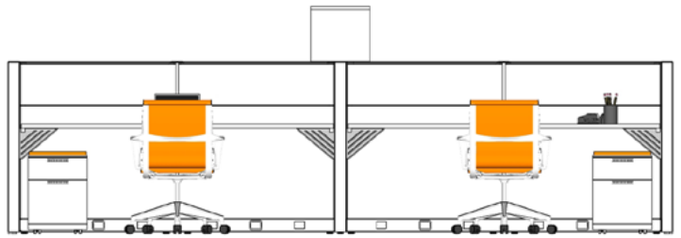


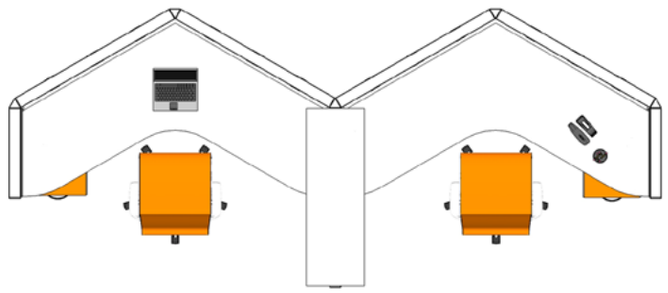


Flex Application Ideas

Flex 07 | 4’ x 4’ x 4’ 120° Workstations

46”-high frames with frame top mounted storage cabinet

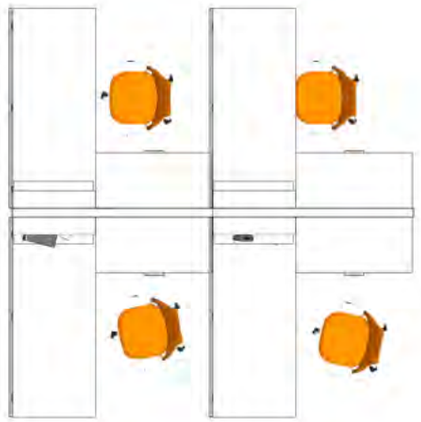




Flex Application Ideas

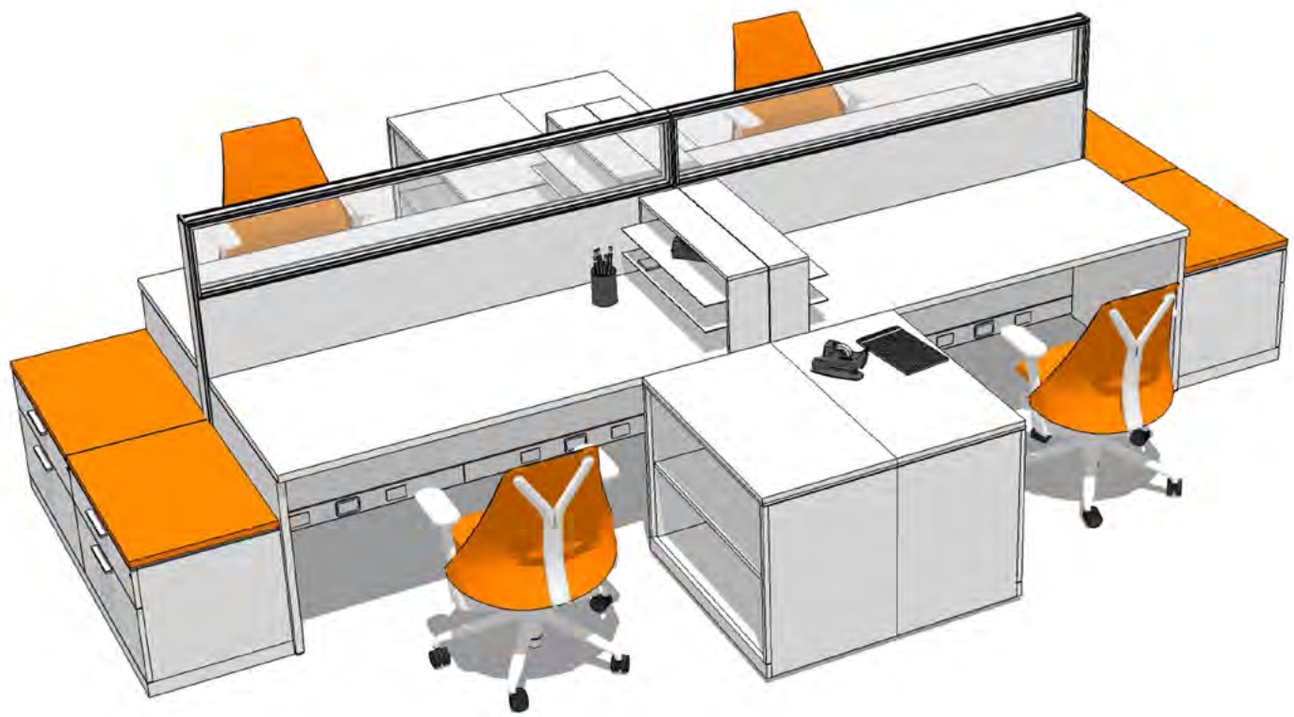
Flex 08 | 6’ x 6’ Workstations

42”-high frames

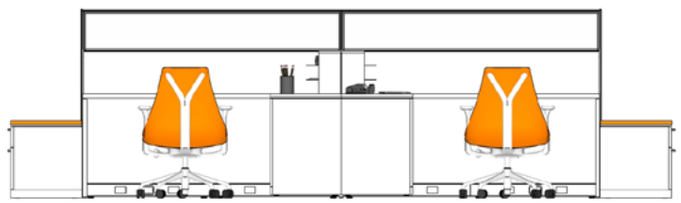


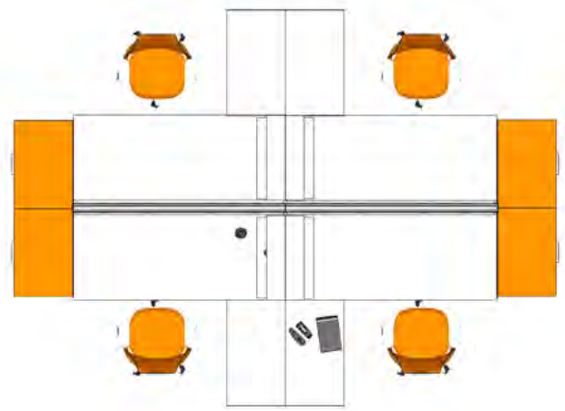
Flex Application Ideas

Flex 09 | 6’ x 6’ Workstations



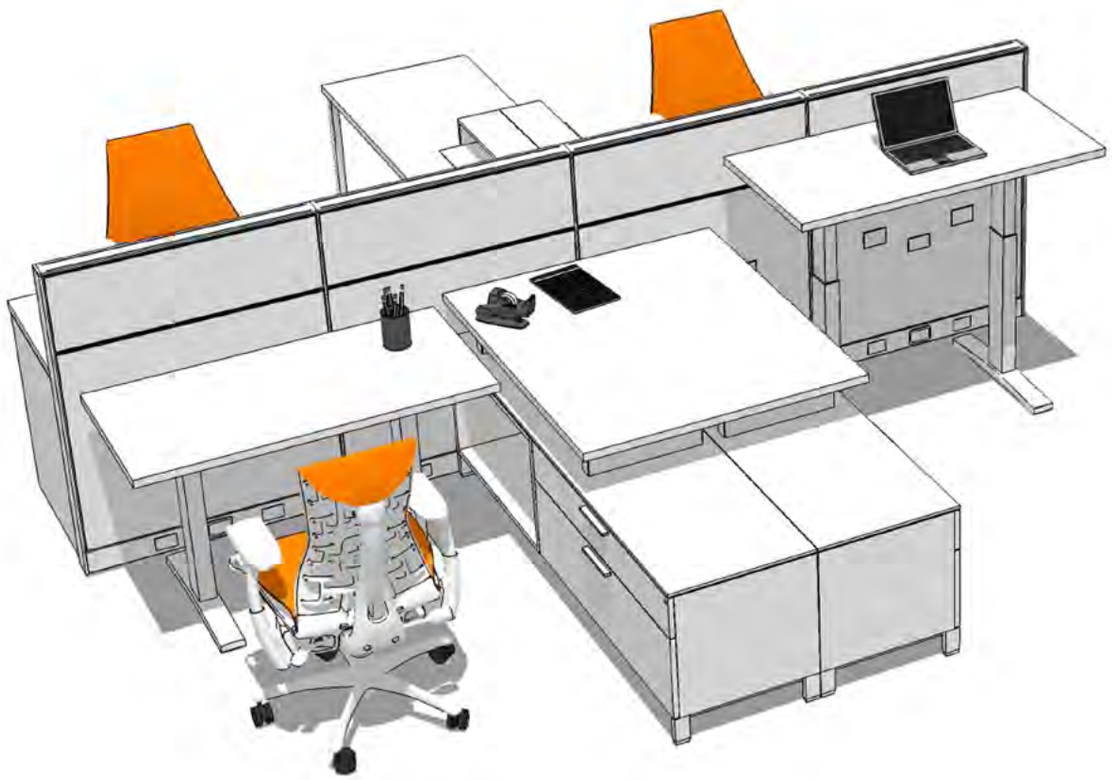
42”-high frames with thin profile stacking windows



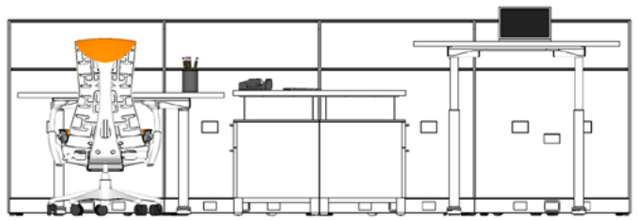


Flex Application Ideas

Flex 10 | 6’ x 6’ Workstations



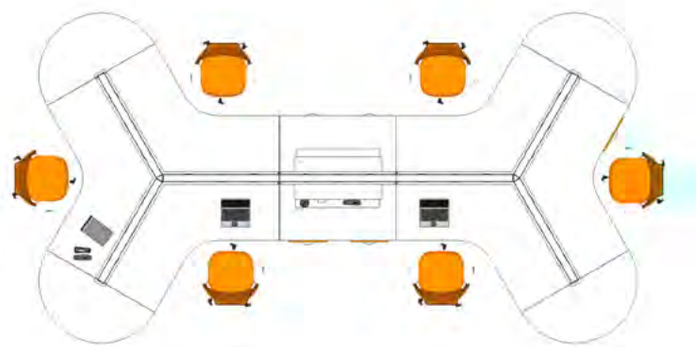
46”-high frames



Flex Application Ideas

Flex 11 | 4’ x 4’ 120° Workstations

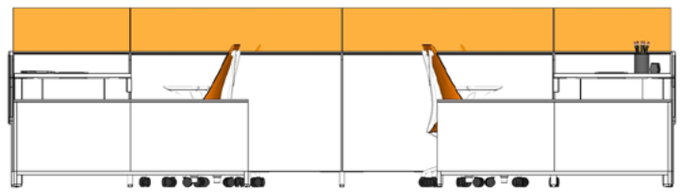
46”-high frames

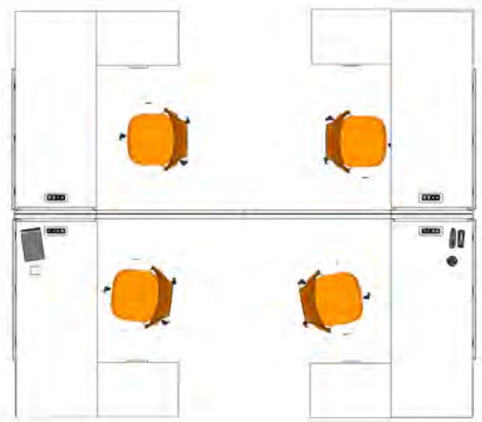


Flex Application Ideas

Flex 12 | 6’ x 7’ Workstations

35”-high frames with frame top screen

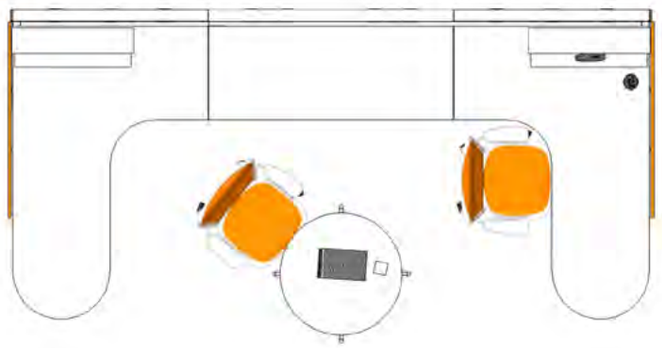




Flex Application Ideas

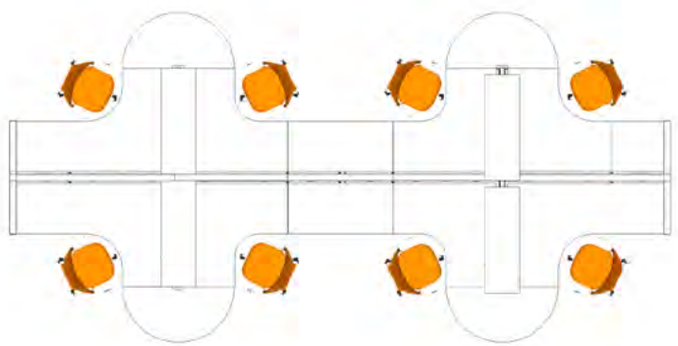
Flex 13 | 6’ x 6’ Workstations

46”-high frames with thin profile stacking windows



Flex Application Ideas

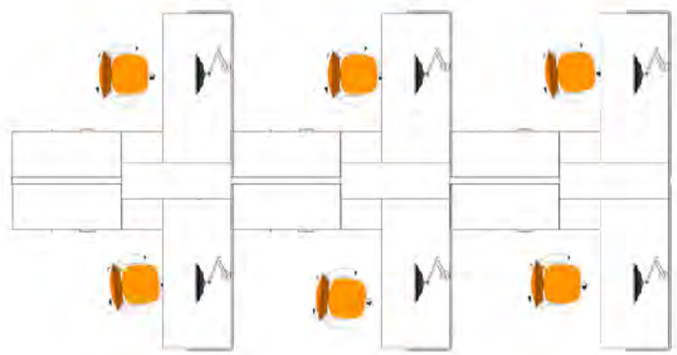
Flex 14 | 6’ x 6’ Workstations



46”-high frames with frame top mounted storage cabinets

Flex Application Ideas

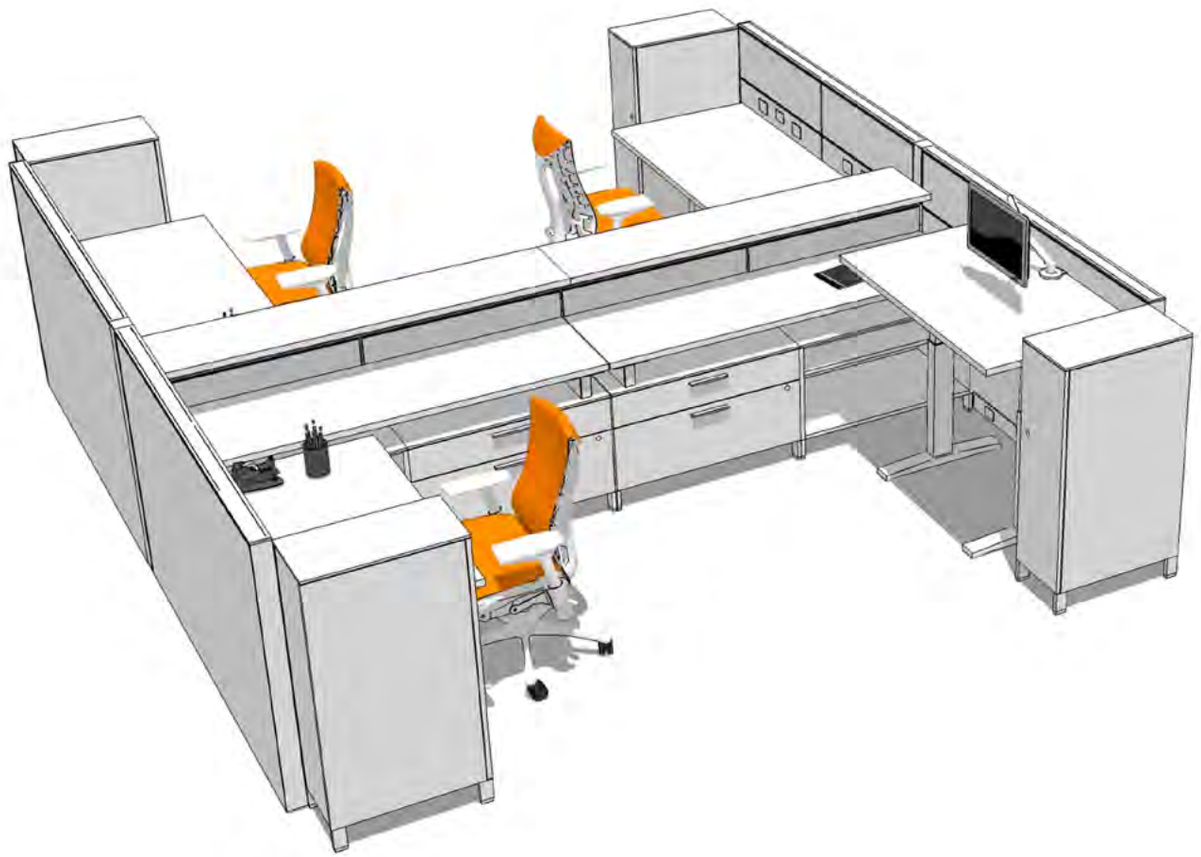
Flex 15 | 6’ x 8’ Workstations



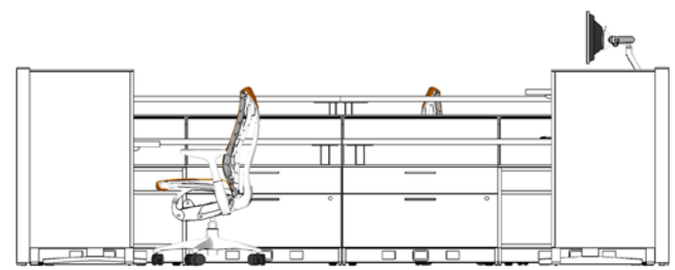
46”-high frames with frame top mounted storage cabinets

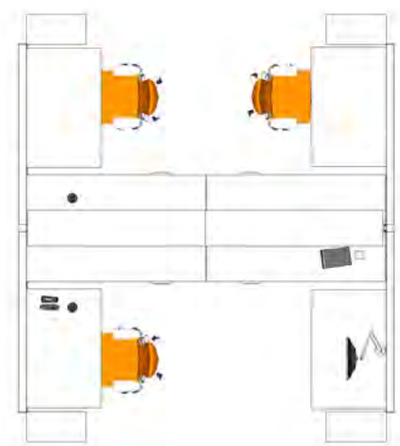
Flex Application Ideas

Flex 16 | 6’ x 7’ Workstations



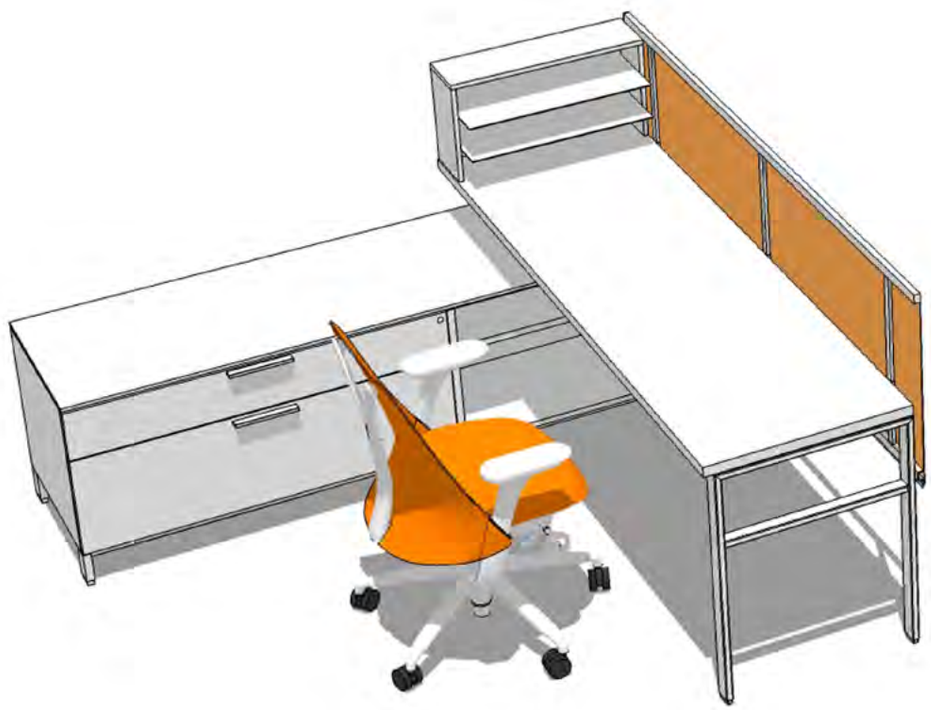
35” and 46”-high frames



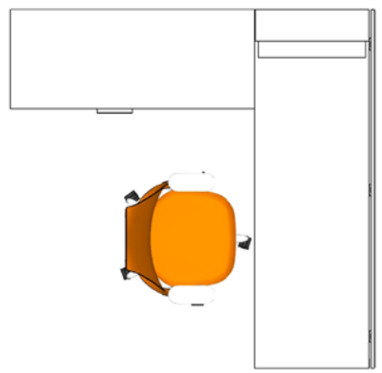


Flex Application Ideas

Flex 17 | 6’ x 6’ Workstations

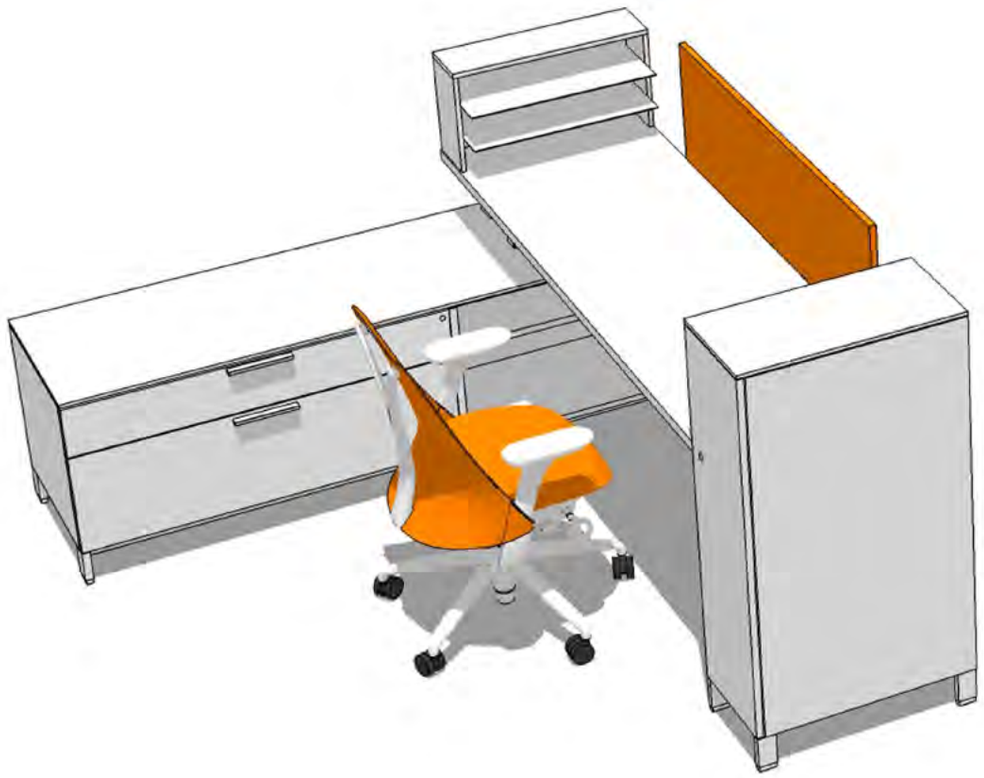


Powered low credenza supports this freestanding application

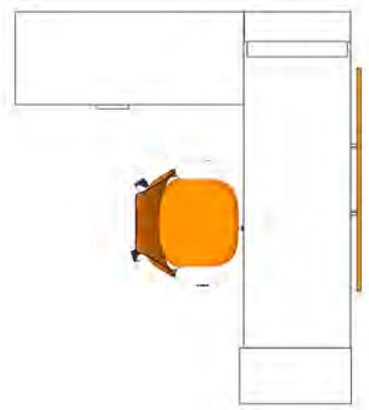


Flex Application Ideas

Flex 18 | 6’ x 6’ Workstations



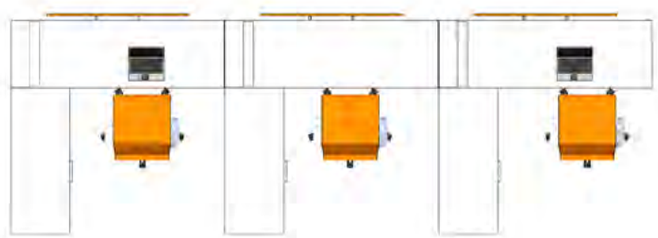
Powered low credenza supports this freestanding application



Flex Application Ideas

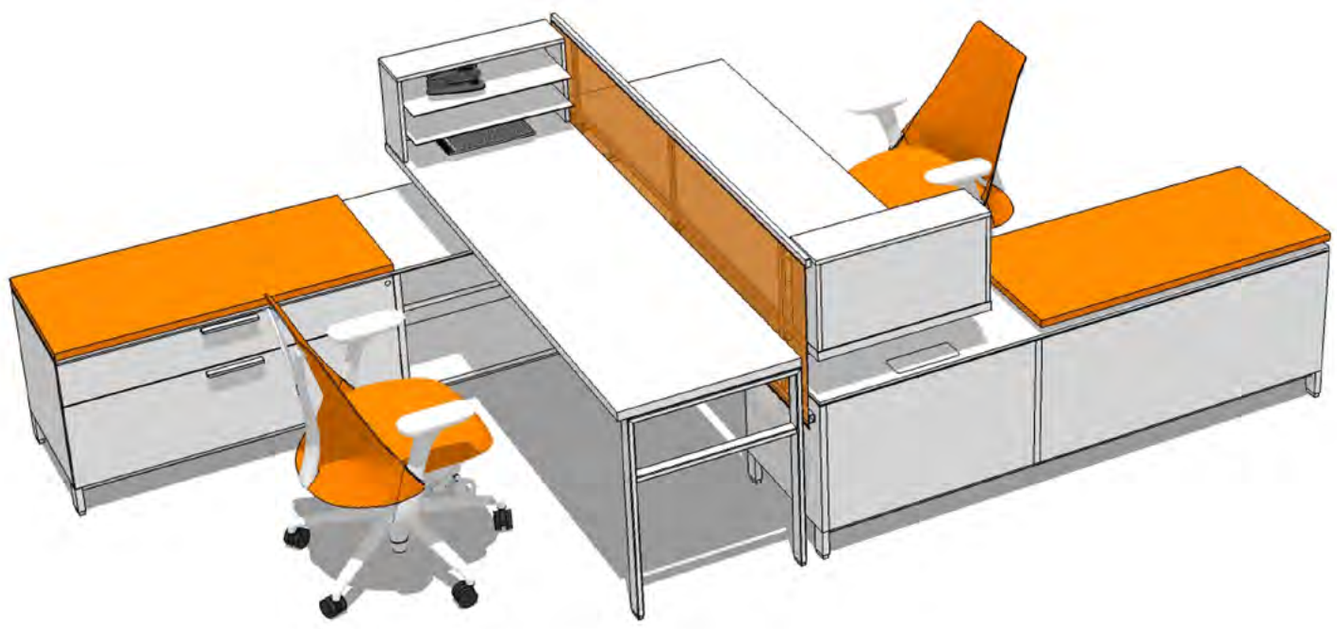
Flex 19 | 6’ x 6’ Workstations

Powered low credenzas support this freestanding application

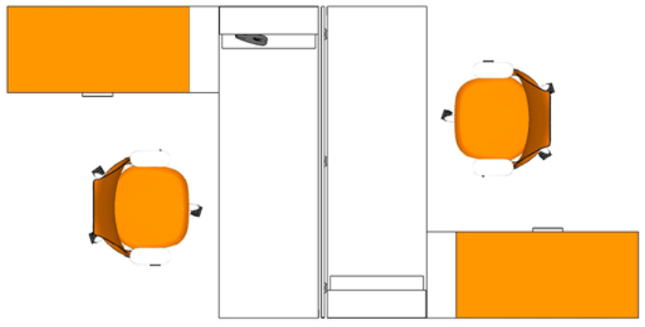


Flex Application Ideas

Flex 20 | 6’ x 6’ Workstations



Powered low credenzas support this freestanding application

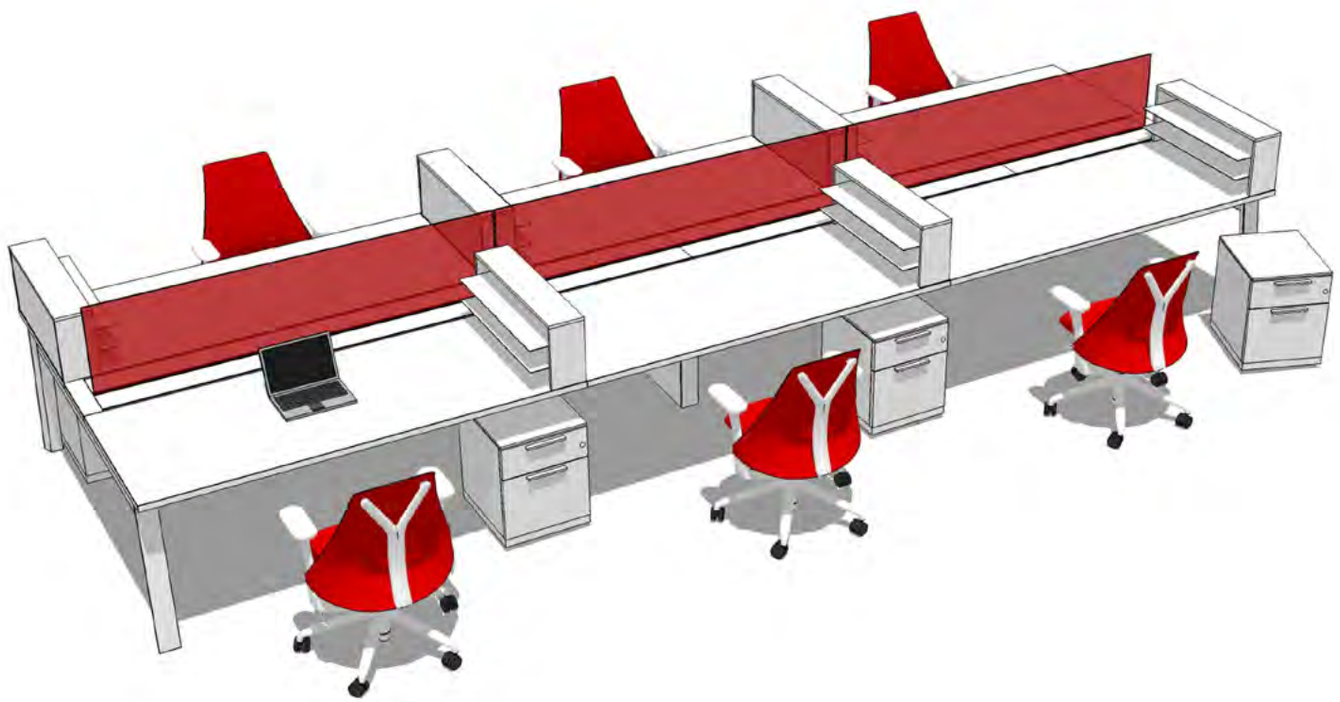


Worker Style:

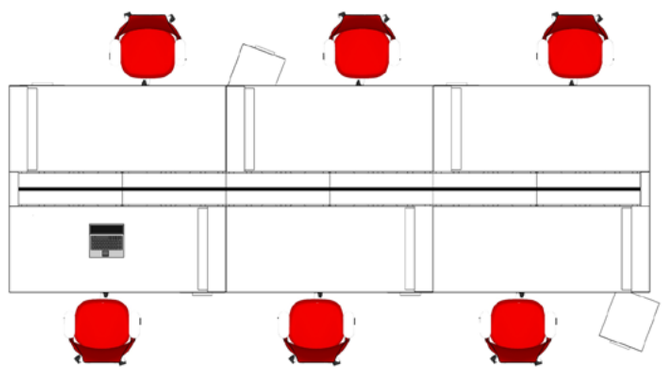
Mobile

Mobile Application Ideas

Mobile 01 | 30” x 5’ Workstations



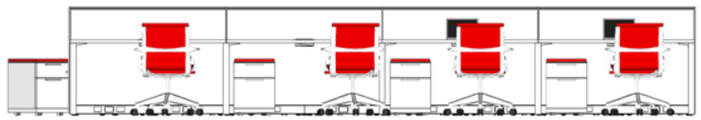
15’-6”-wide Beam

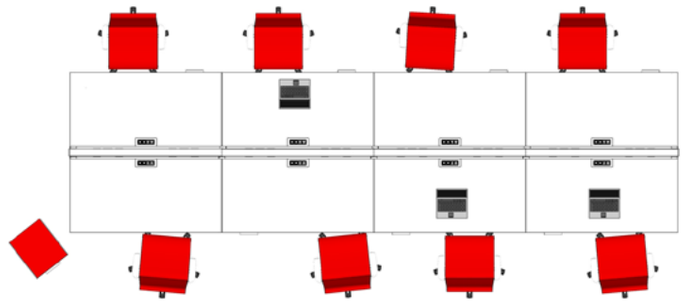


Mobile Application Ideas

Mobile 02 | 24” x 5’ Workstations

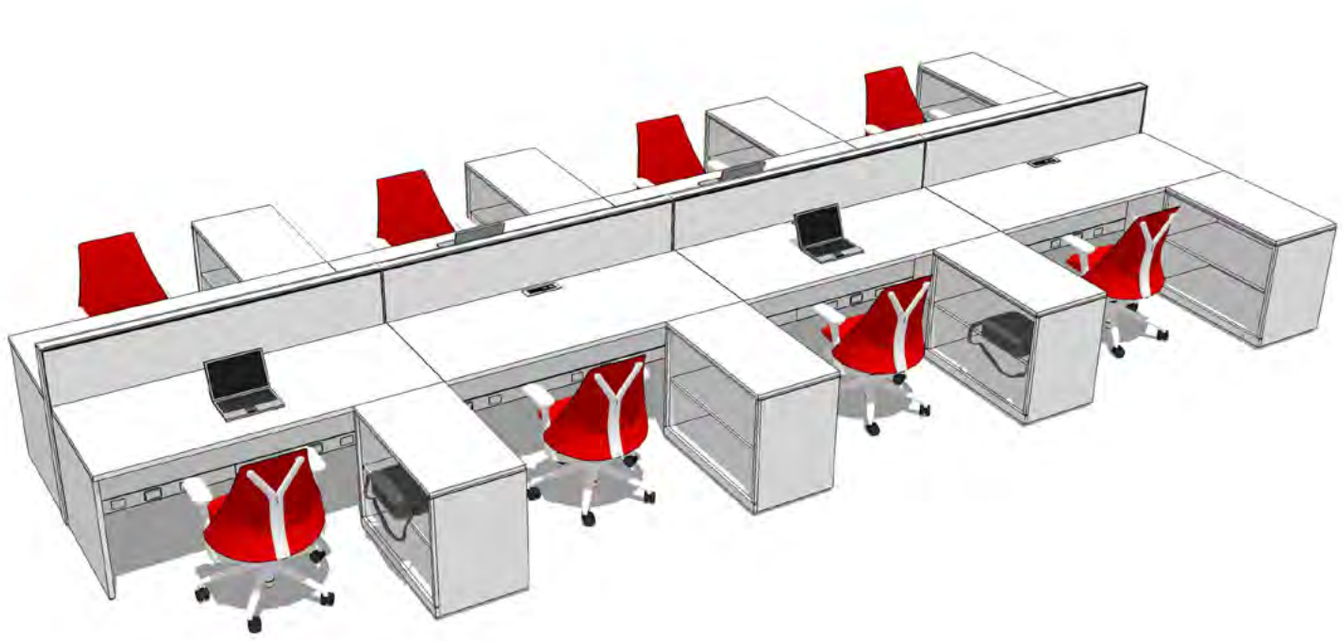
42”-high frames



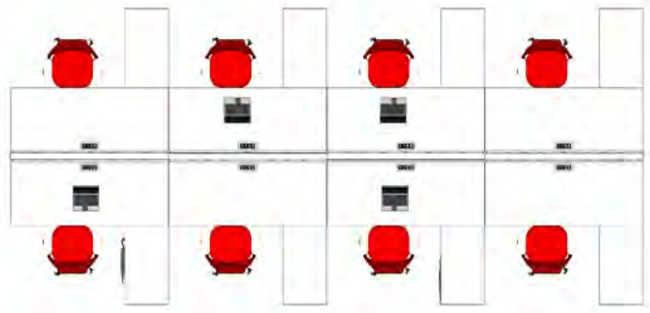


Mobile Application Ideas

Mobile 03 | 6’ x 6’ Workstations



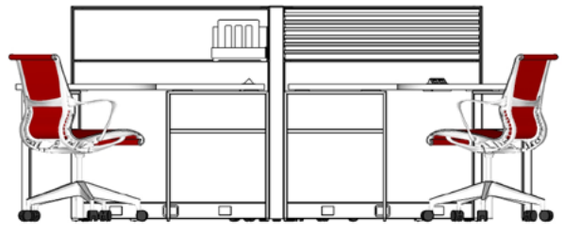
42”-high frames

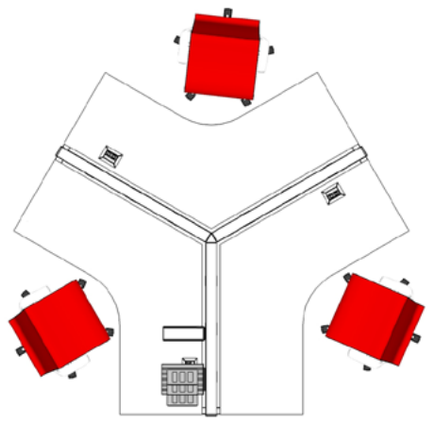


Mobile Application Ideas

Mobile 04 | 4’ x 4’ Workstations

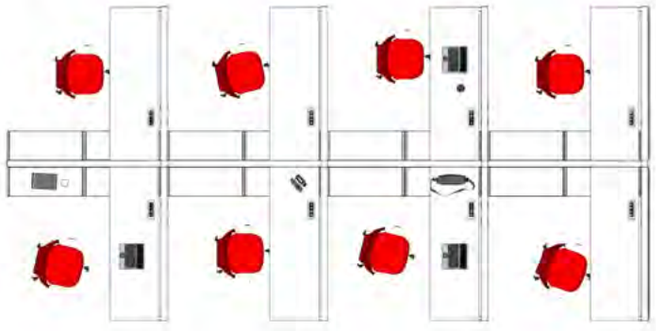
46”-high frames





Mobile Application Ideas

Mobile 05 | 6’ x 6’ Workstations

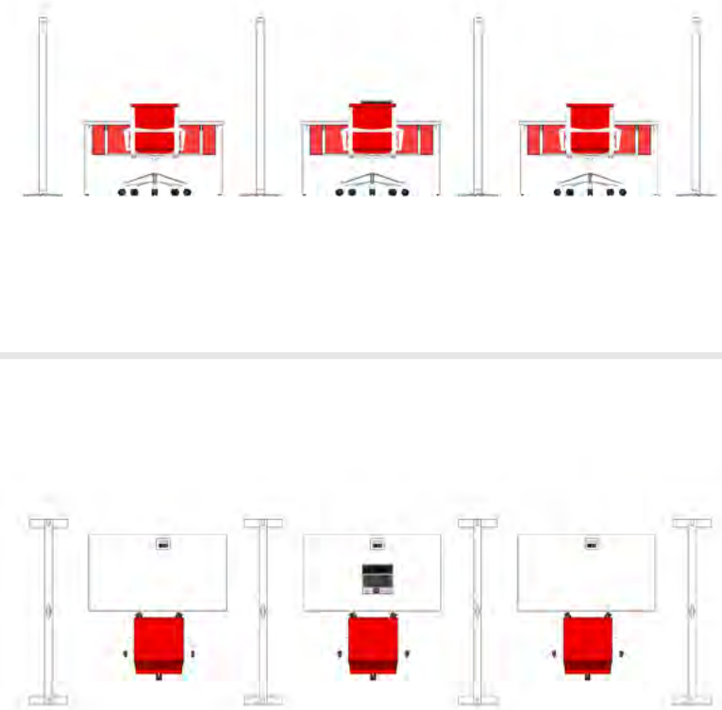


42”-high frames

Mobile Application Ideas

Mobile 06 | 6’ x 7’ Workstations

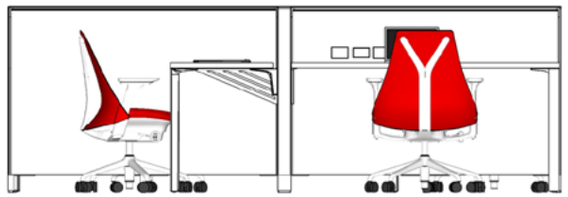
68”-high standing screens with 54”-wide table desks

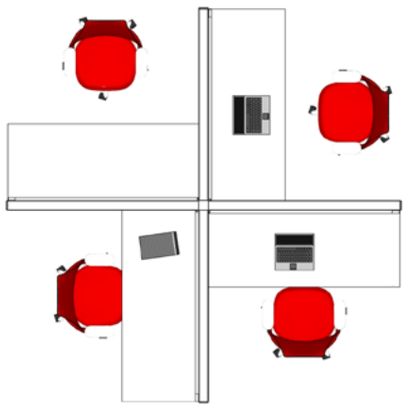


Mobile Application Ideas

Mobile 07 | 5’ x 5’ Workstations

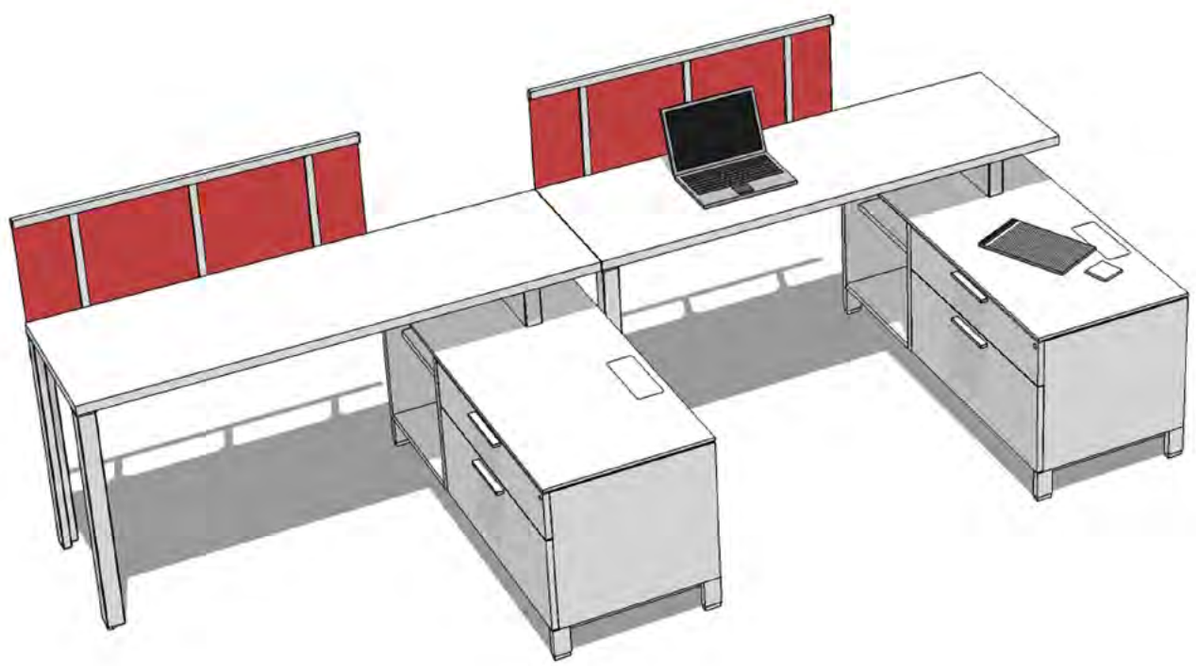
42”-high frames



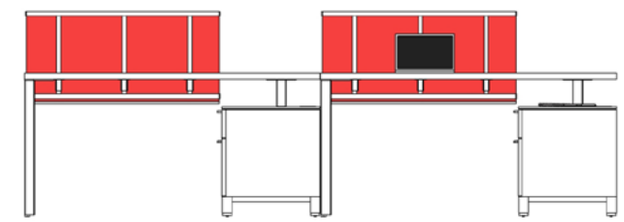


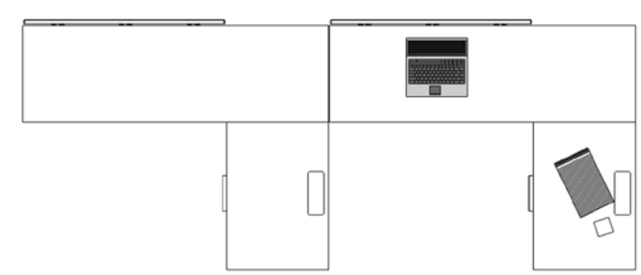
Mobile Application Ideas

Mobile 08 | 4’ x 5’ Workstations



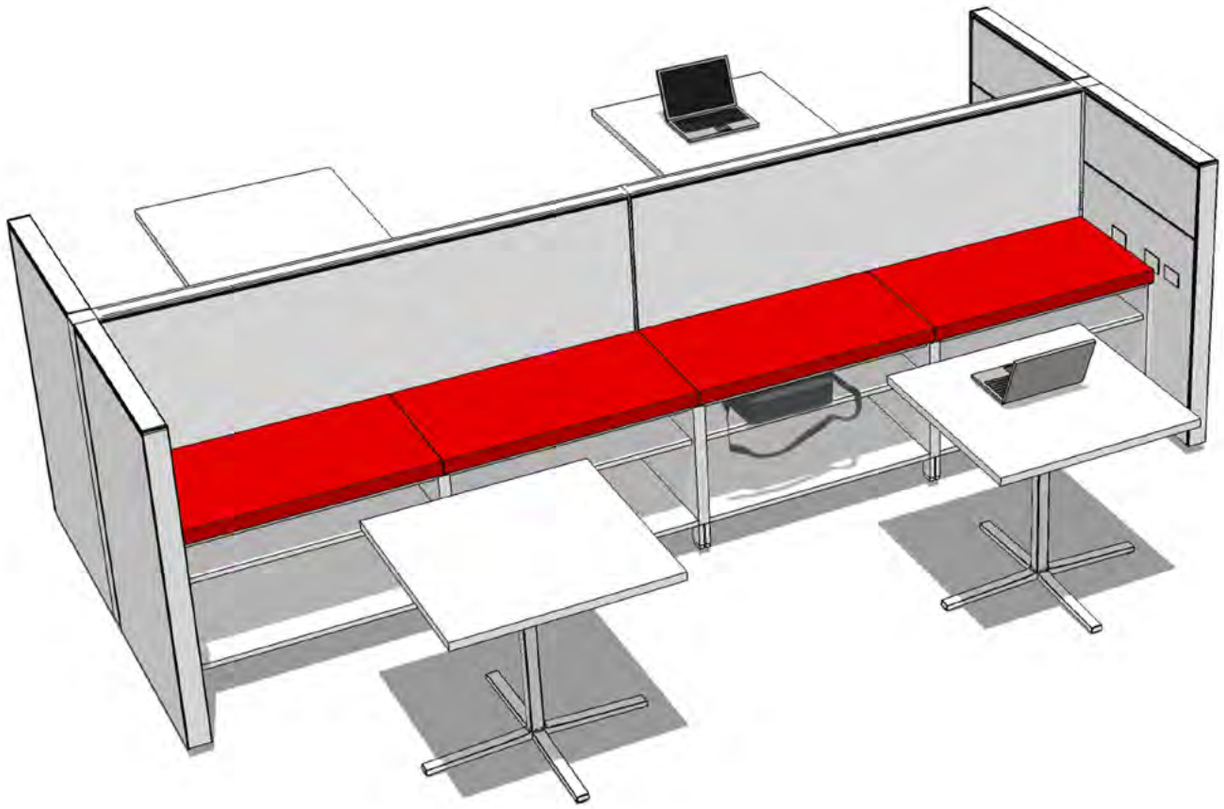
Powered low credenzas support this freestanding application



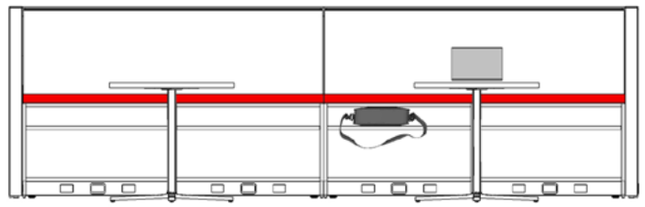


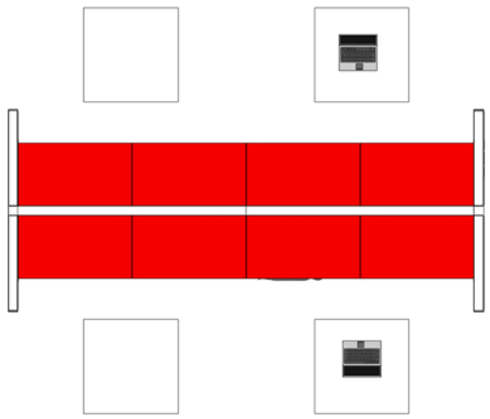
Mobile Application Ideas

Mobile 09 | 5.5’ x 6’ Workstations



46”-high frames

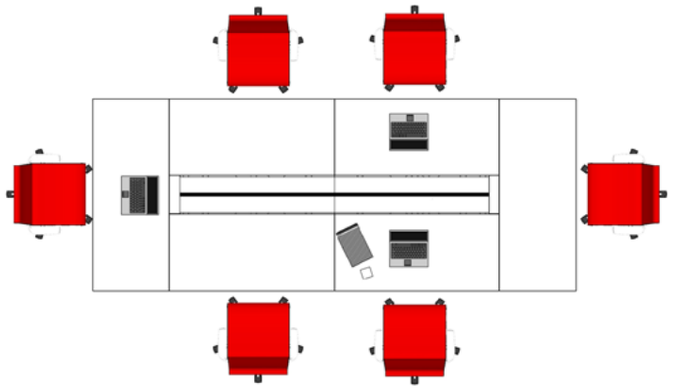




Mobile Application Ideas

Mobile 10 | 4’ & 5’-Wide Workstations

12”-wide Beam

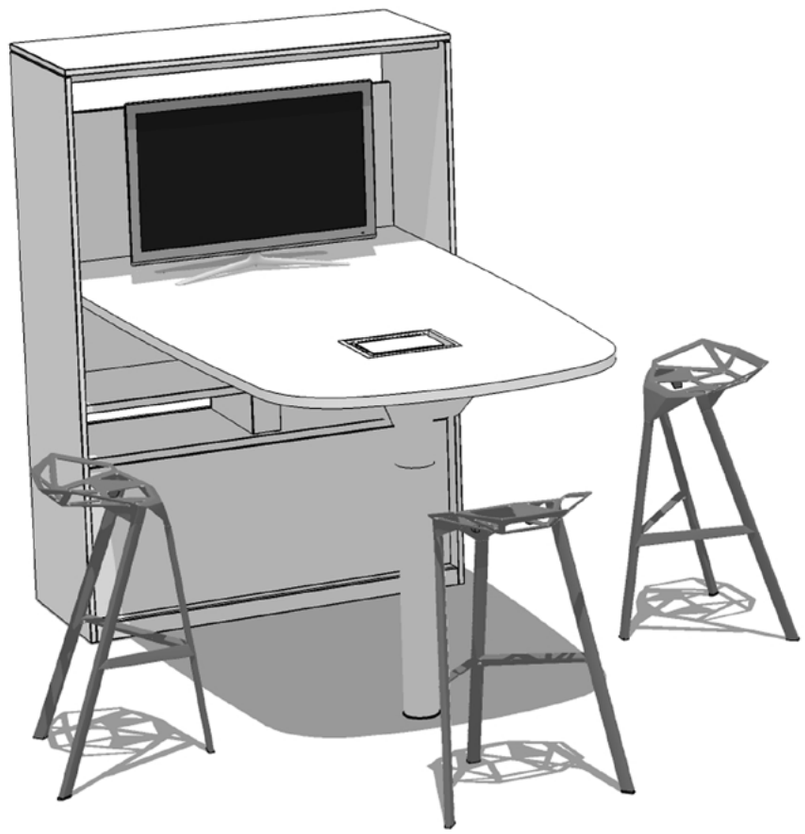


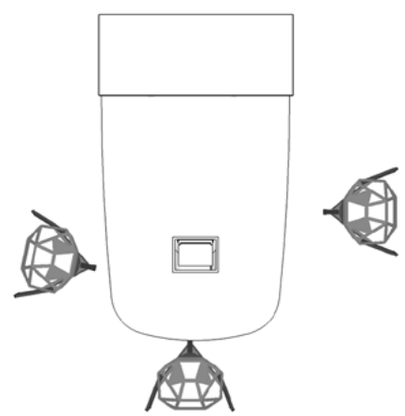
Worker Style:

Group

Group Application Ideas

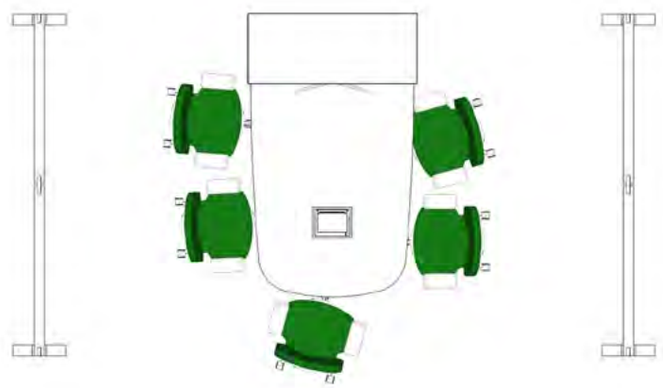
Group 01 | 6’ x 9’ Approximate Area





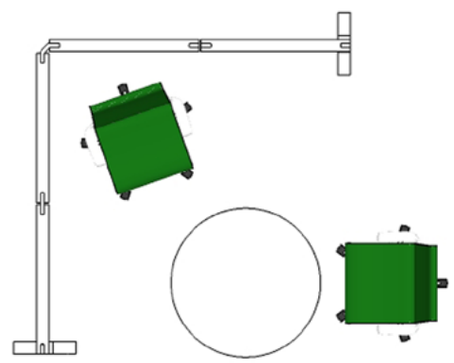
Group Application Ideas

Group 02 | 8’ x 12’ Approximate Area



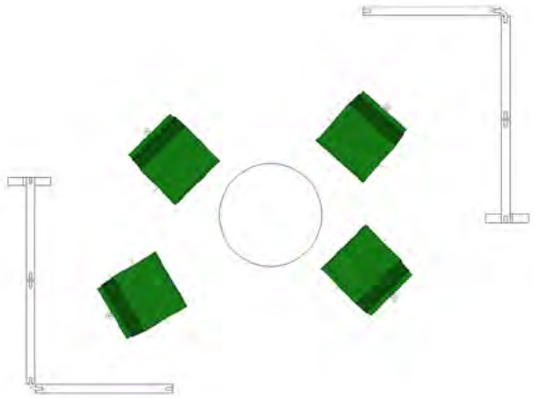
Group Application Ideas

Group 03 | 7’ x 9’ Approximate Area



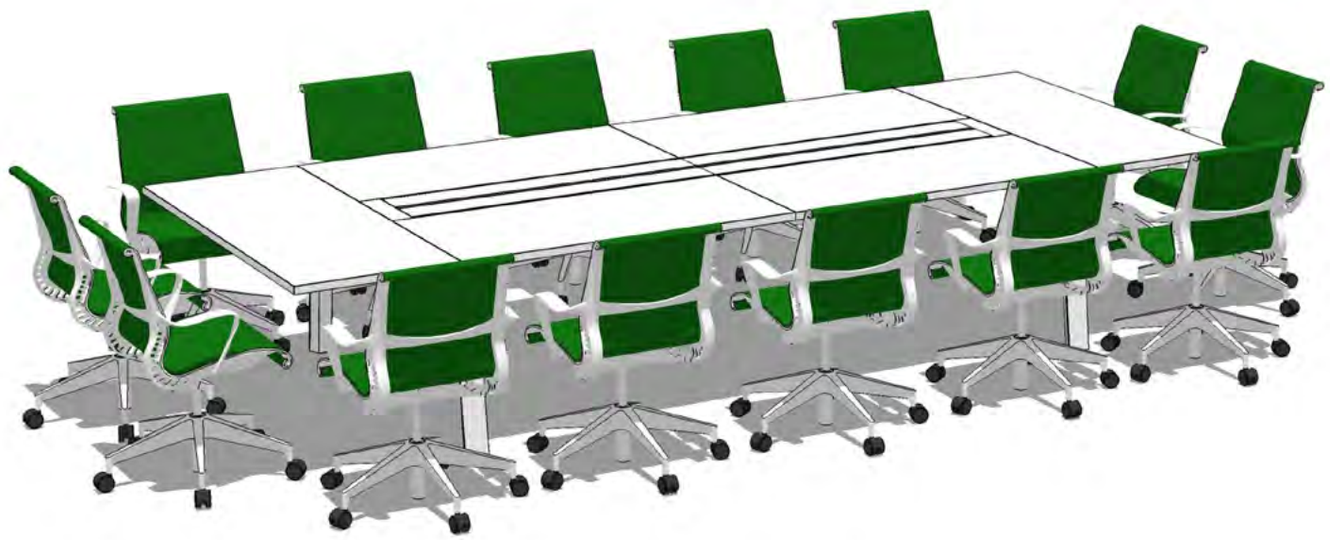
Group Application Ideas

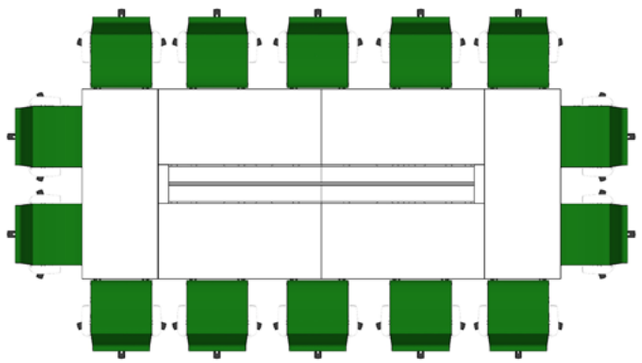
Group 04 | 12’ x 15’ Approximate Area



Group Application Ideas

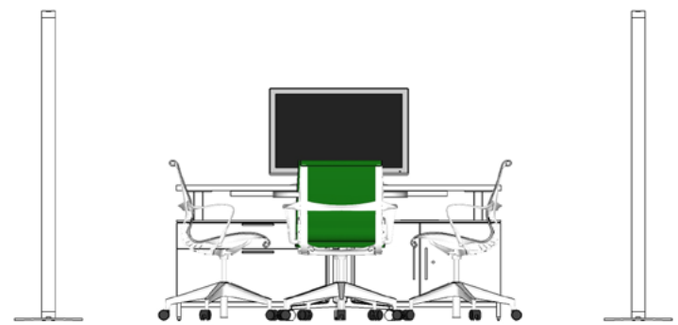
Group 05 | 13’ x 20’ Approximate Area

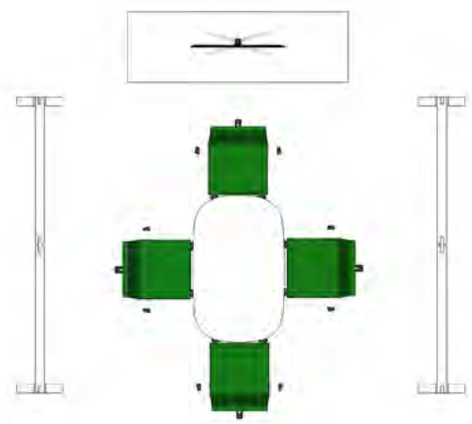




Group Application Ideas

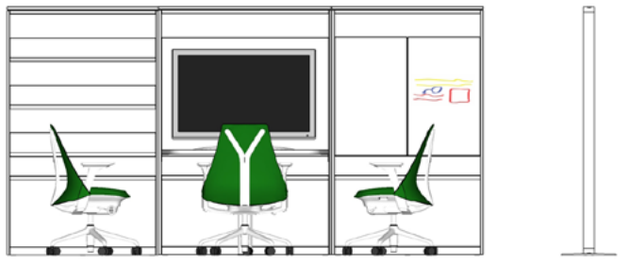
Group 06 | 12’ x 12’ Approximate Area

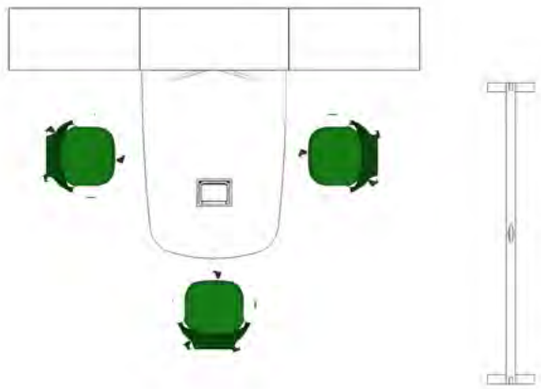




Group Application Ideas

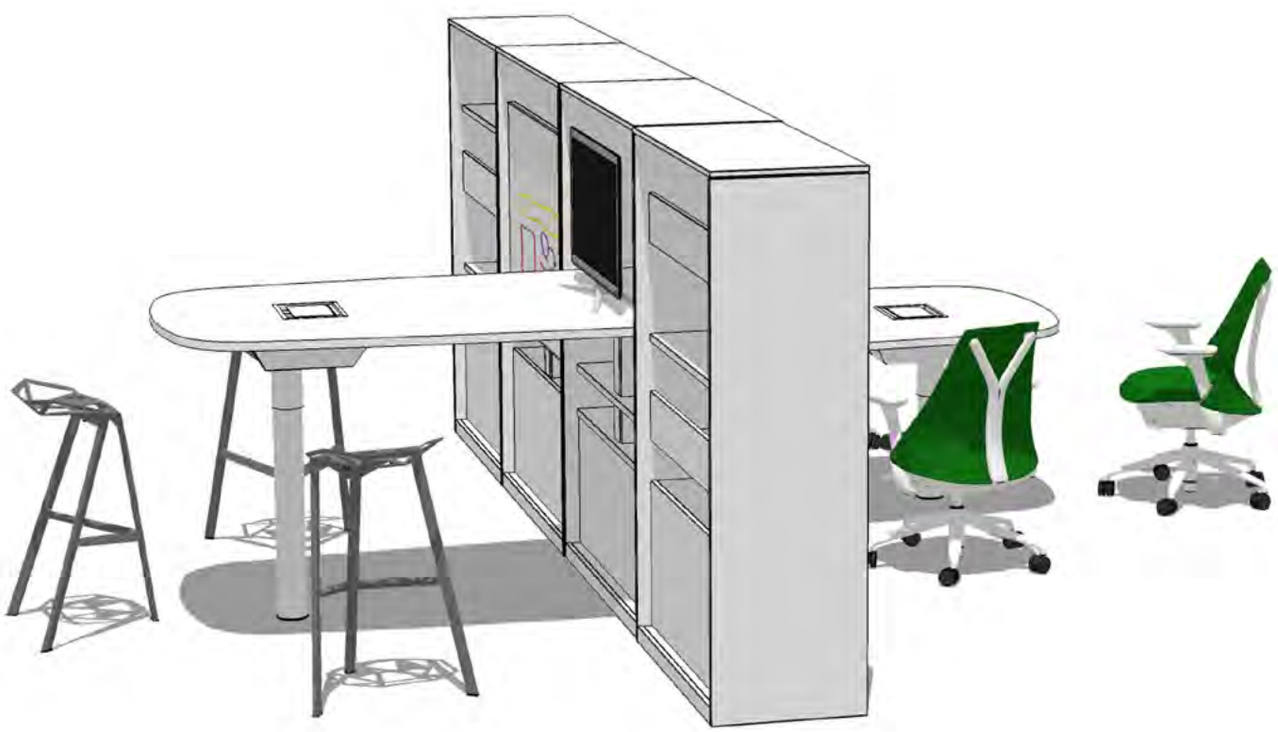
Group 07 | 10’ x 14’ Approximate Area

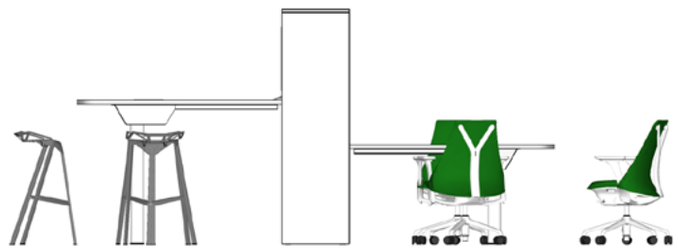


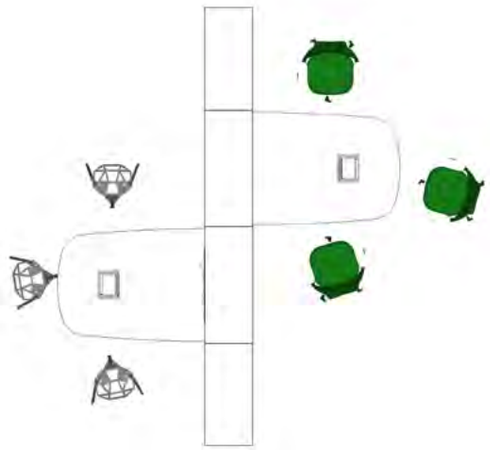


Group Application Ideas

Group 08 | 15’ x 15’ Approximate Area

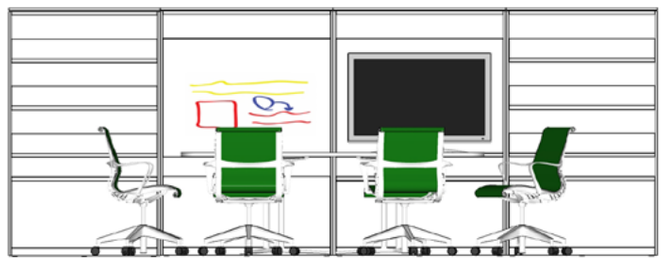


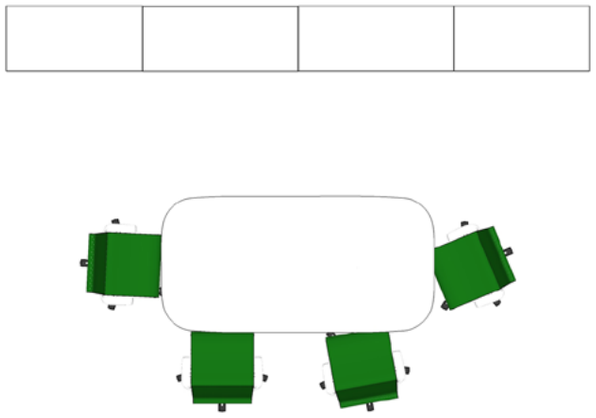




Group Application Ideas

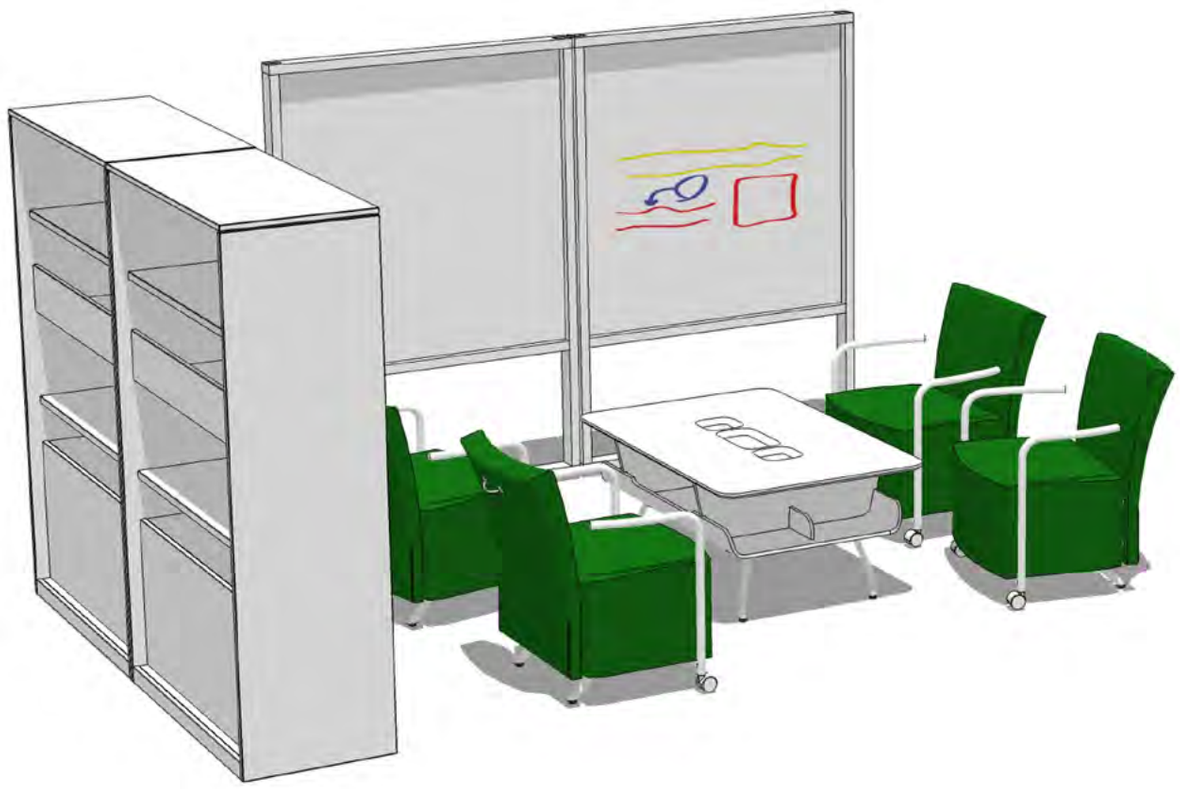
Group 09 | 12’ x 15’ Approximate Area

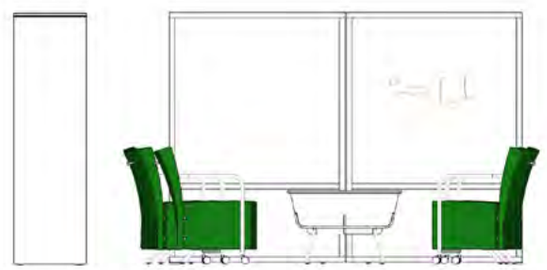


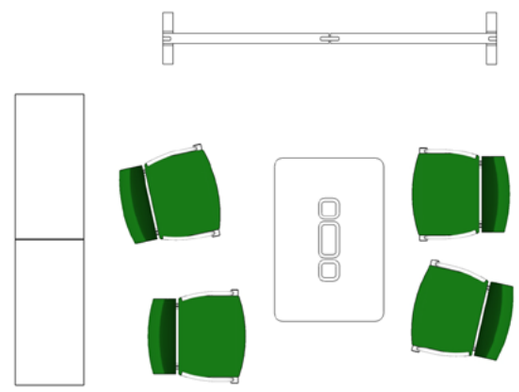


Group Application Ideas

Group 10 | 10’ x 13’ Approximate Area

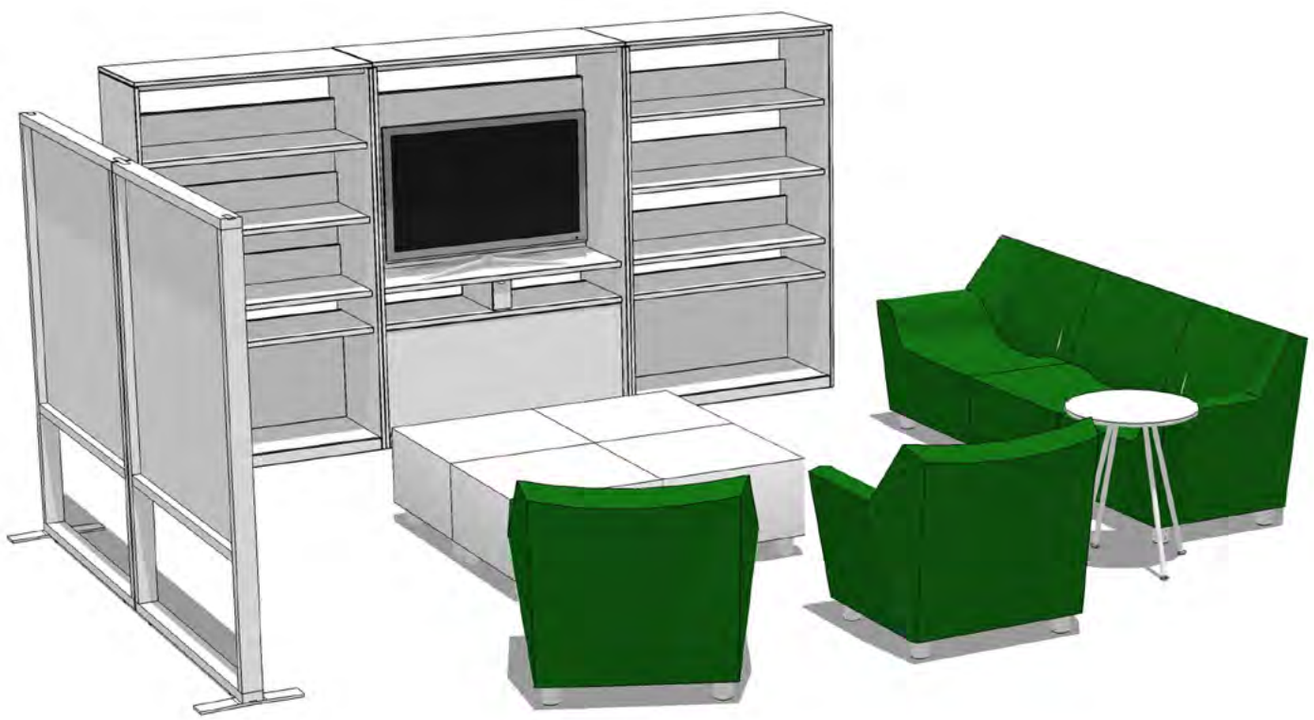


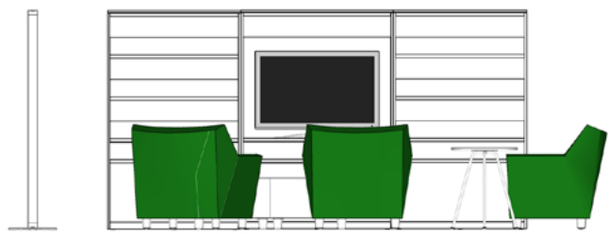


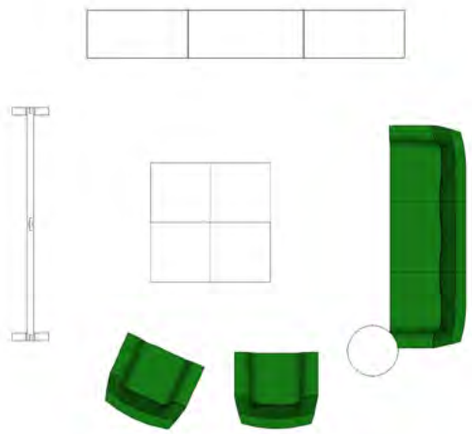


Group Application Ideas

Group 11 | 15’ x 16’ Approximate Area

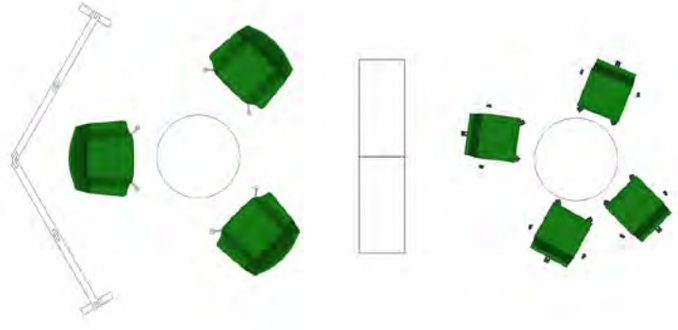






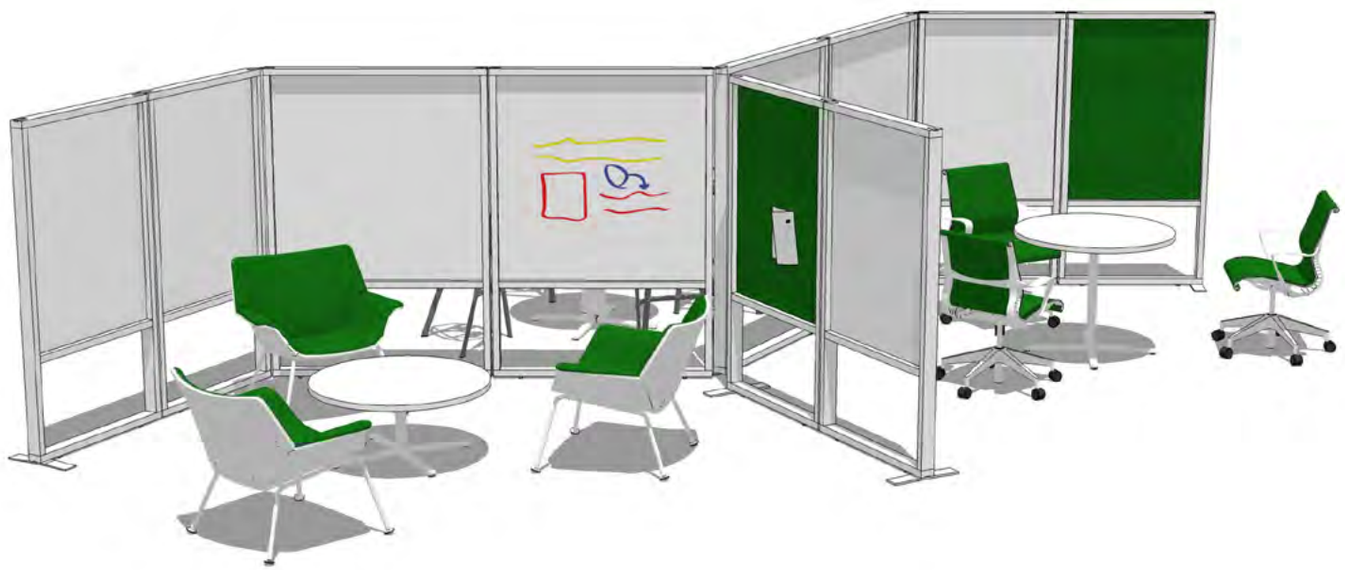
Group Application Ideas

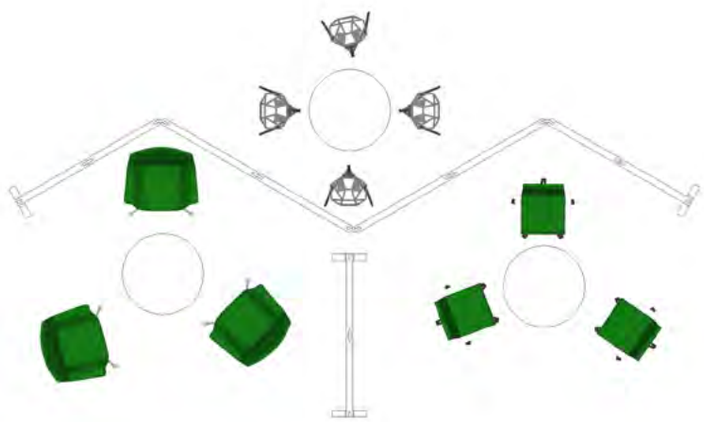
Group 12 | 12’ x 24’ Approximate Area



Group Application Ideas

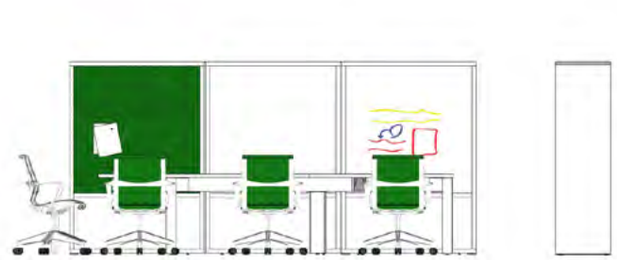
Group 13 | 15’ x 25’ Approximate Area

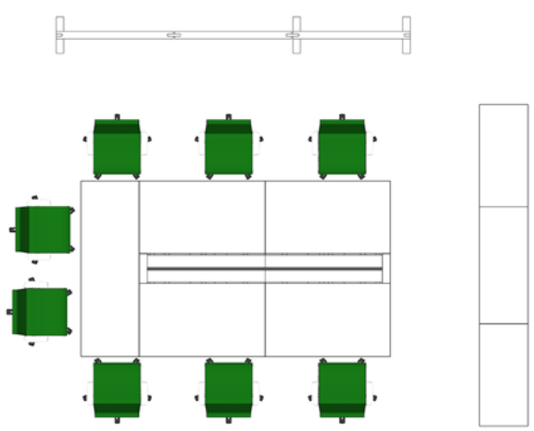




Group Application Ideas

Group 14 | 15’ x 20’ Approximate Area

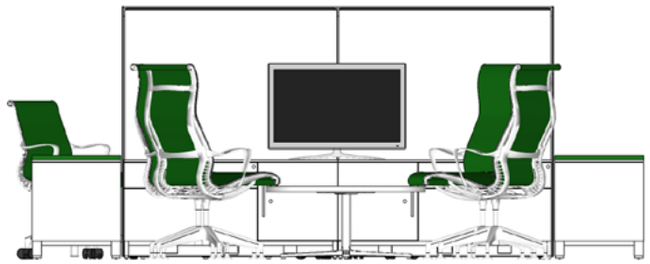


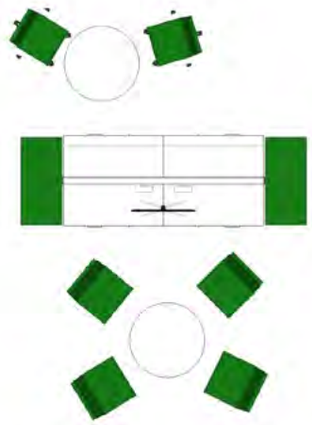


Group Application Ideas

Group 15 | 10’ x 12’ Approximate Area

57”-high frames

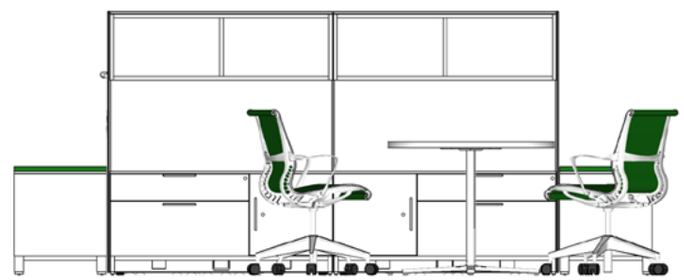


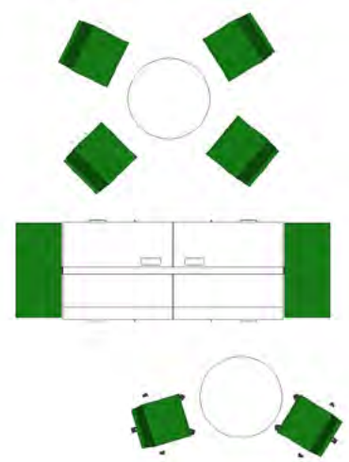


Group Application Ideas

Group 16 | 10’ x 12’ Approximate Area

57”-high frames

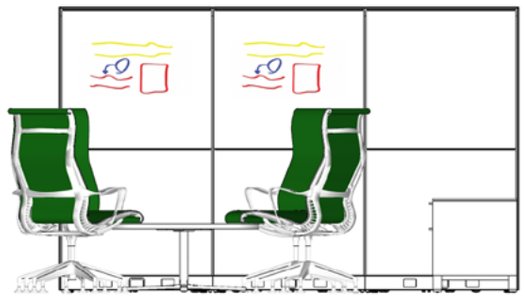


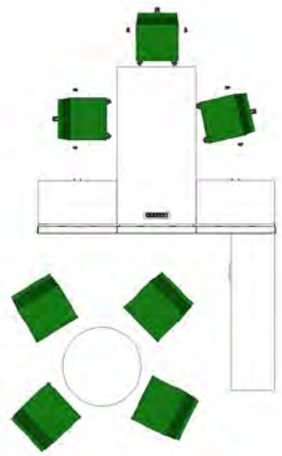


Group Application Ideas

Group 17 | 13’ x 10’ Approximate Area

68”-high frames

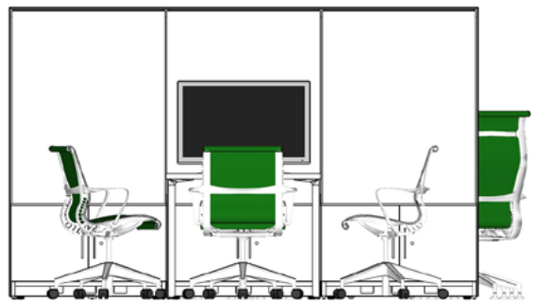


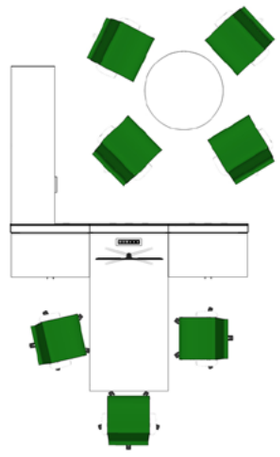


Group Application Ideas

Group 18 | 13’ x 20’ Approximate Area

68”-high frames

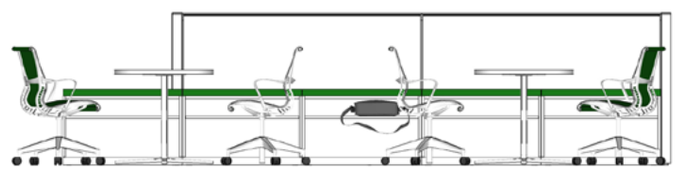


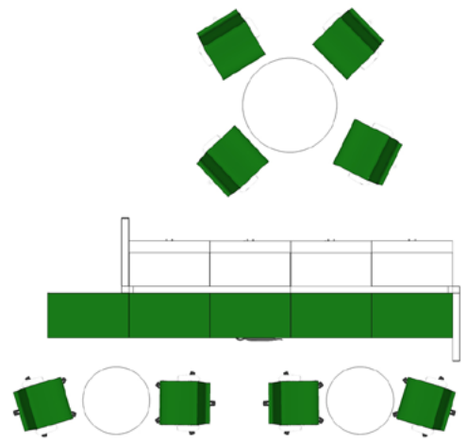


Group Application Ideas

Group 19 | 7’ x 18’ Approximate Area

46”-high frames

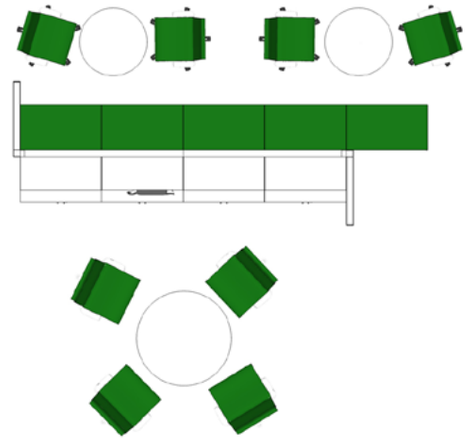




Group Application Ideas

Group 20 | 12.5’ x 12.5’ Approximate Area

46”-high frames



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