

FACILITIES CRITERIA (FC)

AIR FORCE INDOOR SMALL ARMS FIRING RANGE



FACILITIES CRITERIA (FC)

**UNITED STATES AIR FORCE
INDOOR SMALL ARMS FIRING RANGE**

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AIR FORCE CIVIL ENGINEER CENTER

Record of Changes (changes are indicated by \1\ ... /1/)

Change No.	Date	Location
<u>1</u>	<u>8 July 2021</u>	<u>All references to ETL11-18 updated to UFC 4-179-02, <i>Small Arms Ranges</i>. New range size calculator added to Appendix B.</u>

FOREWORD

Facilities Criteria (FC) provide functional requirements (i.e., defined by users and operational needs of a particular facility type) for specific DoD Component(s), and are intended for use with unified technical requirements published in DoD Unified Facilities Criteria (UFC). FC are applicable only to the DoD Component(s) indicated in the title, and do not represent unified DoD requirements. Differences in functional requirements between DoD Components may exist due to differences in policies and operational needs.

All construction outside of the United States is also governed by Status of Forces Agreements (SOFA), Host Nation Funded Construction Agreements (HNFA), and in some instances, Bilateral Infrastructure Agreements (BIA.) Therefore, the acquisition team must ensure compliance with the most stringent of the FC, the SOFA, the HNFA, and the BIA, as applicable.

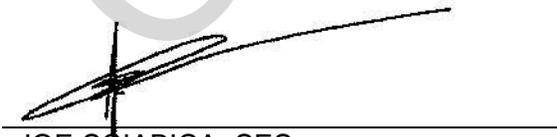
Because FC documents are coordinated with unified DoD technical requirements, they form an element of the DoD UFC system applicable to specific facility types. The UFC system is prescribed by MIL-STD 3007 and provides planning, design, construction, sustainment, restoration, and modernization criteria, and applicable to the Military Departments, Defense Agencies, and the DoD Field Activities. The UFC System also includes technical requirements and functional requirements for specific facility types, both published as UFC documents and FC documents.

FC are living documents and will be periodically reviewed, updated, and made available to users as part of the Services' responsibility for providing criteria for military construction. HQ U.S. Army Corps of Engineers (HQ USACE), Naval Facilities Engineering Command (NAVFAC), and the Air Force Civil Engineer Center (AFCEC) are responsible for administration of the UFC system. Defense agencies should contact the preparing service for document interpretation and improvements. Technical content is the responsibility of the cognizant DoD working group. Recommended changes with supporting rationale should be sent to the respective service proponent office by the following electronic form: [Criteria Change Request](#). The form is also accessible from the Internet site listed below.

FC are effective upon issuance and are distributed only in electronic media from the following source: Whole Building Design Guide web site <http://dod.wbdg.org/>

Refer to UFC 1-200-01, *General Building Requirements*, for implementation of new issuances on projects.

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FACILITIES CRITERIA (FC)

NEW SUMMARY SHEET

Document: FC 4-179-03F, *Air Force Indoor Small Arms Firing Range*.

Superseding: None.

Description: This FC provides guidelines for evaluating, planning, programming, and designing an indoor small arms firing range. The information in this FC applies to the design of all new construction projects, to include additions, alterations, and renovation projects in the continental United States (CONUS) and outside the continental United States (OCONUS). It also applies to the procurement of design-build services for the above-noted projects. Alteration and renovation projects should update existing facilities to meet the guidance and criteria within budgetary constraints.

Reasons for Document: This FC is the initial release to establish requirements for an indoor small arms firing range. It defines the criteria for determining appropriately sized, flexible, cost-optimized, durable, quality-designed facilities on a life cycle basis to support the mission. The plans presented in this FC are concepts only and are primarily intended to communicate functional user and adjacency requirements. A thorough compliance check of all other applicable criteria is required.

Impact: Use of this FC will facilitate and standardize the design of indoor small arms firing ranges throughout the Air Force. It will provide more complete and consistent project requirements and expedite the programming and design of facilities and reduce initial design cost.

Unification Issues: None.

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CHAPTER 1 INTRODUCTION

1-1 GENERAL INFORMATION.

1-1.1 Purpose.

This standard facility prototype design criteria was developed to assist Air Force programmers to prepare and validate DD Form 1391 requirements and to assist A-E design professionals with approved project-specific design requirements. It is a source of basic programming and functional information for a small arms firing range. \1\ This standard is consistent with the Air Force Corporate Facilities Standards (AFCFS) and Unified Facilities Criteria (UFC). This standard, in conjunction with the AFCFS and UFC criteria, defines Air Force expectations for project programming and A-E design decisions. /1/

1-1.2 Objective.

The standard facility prototype design program defines consistent facility requirements across the Air Force enterprise to expedite delivery of a facility. This standard was designed in compliance with AFMAN 32-1084. The objective is to deliver appropriately sized, flexible, cost-optimized, durable, quality-designed facilities on a life cycle basis to support the Air Force mission.

1-2 GENERAL BUILDING REQUIREMENTS.

Comply with UFC 1-200-01, which provides applicability of model building codes and government-unique criteria for typical design disciplines and building systems, as well as for accessibility, antiterrorism (AT), security, high-performance and sustainability requirements (comprehensive requirements are detailed in UFC 1-200-02), and safety. \1\ Use this FC in addition to UFC 4-179-02, UFC 1-200-01, and the UFCs and government criteria referenced therein. /1/

1-3 REFERENCES.

Appendix A contains a list of related documents and references to use in conjunction with this FC. In general, use the latest available issuance of the reference.

1-4 INSTRUCTIONS.

1-4.1 Method.

The standard facility prototype was developed by determining personnel counts, allowable room sizes, adjacency diagrams between functional spaces, and overall facility space requirements. The standard facility prototype establishes Air Force criteria for the facility type. \1\ Use the criteria in conjunction with other departmental publications and UFCs when programming and designing this facility type. /1/

Supplement this FC with a thorough review by individual program managers and operations staff.

1-4.2 Standard Facility Prototype Tools.

\1\ This standard facility prototype consists of four parts to be used by programmers and A-Es:

1. Facilities criteria for standard prototype (this FC)
2. Interactive programming spreadsheet
3. Facility Building Information Modeling (BIM) drawings
4. UFC 4-179-02 /1/

1-4.3 Facilities/Design Criteria.

The FC document consists of three primary components:

1. Notional site
2. Composite facility adjacency diagram(s)/composite floor plan(s)
3. Modules with associated room data sheets

1-4.3.1 Notional Site.

The notional site presents a notional site plan diagram that indicates key site development criteria; it is not a site-specific solution. The information represents the land requirements to construct this facility and includes associated AT standoff distances and parking. Utilization of existing or shared parking is allowable and may reduce the total acreage required for the facility. Adapt the requirements to the specific site and location and comply with the applicable Installation Development Plan (IDP) and Area Development Plan (ADP) for facility siting.

1-4.3.2 Composite Floor Plans.

The composite floor plans are conceptual solutions that illustrate functional user and adjacency requirements. Plan variations may be rotated, flipped, or reversed to fit the actual site. A thorough compliance check of all other applicable criteria is required even when using the conceptual solutions provided in this FC.

1-4.3.3 Modules.

Spaces and rooms that are integrally related with a specific functional connection or operational flow are grouped into a module. Modules and the associated room data sheets identify specific criteria and additional detail for each functional area of the

facility as outlined in the space program sheets in Appendix B. Information is provided in a standard presentation and data sheet format and the required space adjacencies and modules are illustrated in figures.

The resulting shape of the facility assembled from the facility prototype modules must provide construction efficiencies obtained from building proportions and overall configuration. The building footprint shall be organized and well composed. The building design must comply with the installation facility standards (architectural compatibility plan) and the AFCFS. Modules shall not be deconstructed or altered except as indicated in paragraph 1-4.3.4.

1-4.3.4 Module Flexibility/Adjustments.

Utilization of the modules provided is highly recommended to maintain functional relationships, adjacencies, and allowed program areas. Modules contain fixed attributes that are essential to functional requirements. Modules may be rotated, flipped, and reversed to accommodate an overall composition or site issue. When the modules cannot be arranged to produce a constructible floor plan due to site constraints, their proportions may be adjusted to create a constructible plan. Manipulating the module shape must not result in an overall increase in square feet and/or reduce the functionality of any module or the required adjacencies in the composite plan.

Some modules are linked to space requirements that increase or decrease in size based on the personnel count and equipment for a particular mission. In these cases, increase or decrease the size of the module to match the revised scope calculation. This may sometimes require minor adjustments in other adjacent modules so they properly fit together to create a constructible facility floor plan. Spaces must comply with any critical dimensions indicated on module plans. Manipulate as few modules as possible to create a constructible facility. The resulting composite plan must respect the established module's adjacencies and must not exceed the authorized project scope.

1-4.3.5 Room Data Sheets.

Specific requirements for each room, space, or area are provided on room data sheets that are located following their respective module. Information contained on the data sheets defines the functional and physical requirements for each of the spaces within the facility type.

1-4.4 Programming Spreadsheet(s).

This tool is provided in two formats. A PDF programming sheet is provided in Appendix B primarily as a reference and reflects the baseline standard facility program. The additional interactive programming sheet provides a tool for planners and programmers. It allows the input of authorized personnel positions and special purpose spaces. Updated inputs are automatically calculated and provide new required square footage for each space and the overall facility size. A link is provided in Appendix B for access to the interactive programming spreadsheet.

1-4.5 Facility Drawings – BIM.

This component of the standard facility prototype tools includes both a PDF version and a Revit version of the modules, and rooms and composite floor and site plans. The spaces, rooms and modules shown reflect the baseline standard facility program spreadsheet in Appendix B. The drawings in this FC are exact copies of the larger BIM drawings and comply with the program scope. The BIM drawings provide a starting point for the digitization of building data and a starting point in the design and construction of a facility. BIM drawings are found at the link provided in Appendix B.

1-4.6 Additions and Alterations.

For additions and alterations to existing facilities, use the adjacencies, sizing/scope, and detailed requirements contained in the site diagrams, module drawings, and room data sheets to the maximum extent possible. The functionality and adjacency of the modules are still valid but may require some manipulation to accommodate the existing structure. Move non-structural walls to the greatest extent possible to open up space in existing facilities to make them more receptive to the placement of the modules. The planner and designer shall determine the most efficient means to balance the placement of modules within existing spaces or as a facility addition.

1-4.7 A-E Design Professionals.

The requirements set forth by this standard are the approved space programming and functional layouts in accordance with AFCFS. The Air Force Security Forces Center (AFSFC) must approve variations to functional and operational issues and deviations from core requirements.

CHAPTER 2 SITE AND OVERALL ADJACENCY

2-1 GENERAL FACILITY OVERVIEW.

The indoor small arms range that houses space to fire and train on weapons use is typically a one-story structure that works best as a standalone facility. All Air Force recruits and active personnel must have weapons training, both initial and ongoing certification. This facility provides a safe space to fire live rounds, train on weapon assembly, and clean and maintain weapons. It consists of a large, enclosed space for firing live rounds, student classrooms, weapons cleaning, weapons storage, administration area, and support spaces. Consult the AFCFS to determine overall quality standards for the facility type. This standard facility prototype is considered as a Group II or III hierarchy based on its actual location on the installation.

2-2 FACILITY USERS/OCCUPANTS.

The facility users are as follows:

- Able-bodied active duty, National Guard, and Reserve military personnel
- Able-bodied DOD civilians, contractors, and others as authorized
- Non-range, common areas shall be ABA compliant

2-3 SIZE DETERMINANTS.

\1\ The indoor small arms firing range size is generally driven by the installation's training requirement and mission. The 21-lane facility has been designated as standard. See paragraph B-1 for the range size requirements calculator tool. /1/

2-3.1 Indoor Small Arms Firing Range Size.

Indoor small arms firing range sizes vary from 14-lane up to 56-lane facilities. For the purpose of this planning document, the minimum to maximum sizes were analyzed:

- Small, 14 lanes
- Standard, 21 lanes
- Large, 28 to 56 lanes (in increments of 7)

2-4 OPERATIONAL ASPECTS.

The hours of operation are driven by user and mission requirements.

2-5 NOTIONAL SITE.

The site diagram represents a notional layout to reflect site development requirements/criteria only. It is not an actual site design. Siting must comply with the IDP and ADP.

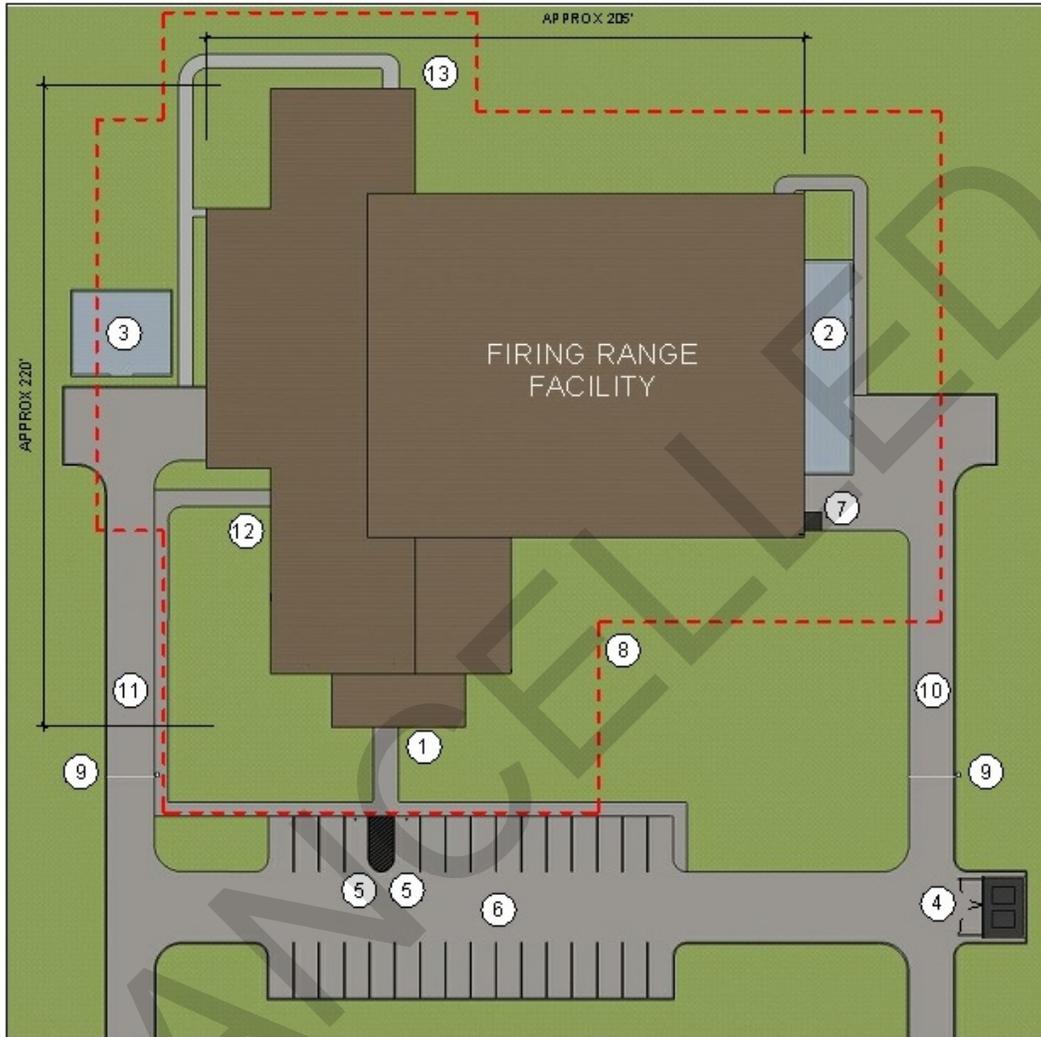
2-6 LOCATION DETERMINANTS (SITE SELECTION) OR SITE LOCATION AND ORIENTATION.

Several factors determine the most appropriate and cost-effective location for an indoor small arms firing range. The availability and capacity of required utilities and the mass/scale of the facility relative to adjacent structures and noise issues shall be analyzed.

2-6.1 Access.

The indoor small arms firing range's ideal location is in the vicinity of the main Security Forces Squadron facility. Locate the facility with main road access and away from any active pedestrian or populated areas. Provide parking and access drives as close to the facility as possible while complying with AT requirements in UFC 4-010-01. Separate service drives from privately owned vehicle (POV) parking.

Figure 2-1 Notional Site Diagram (21 Lane Facility)



SITE PLAN KEYNOTE LEGEND	
1	PRIMARY BUILDING ENTRANCE
2	SCREENED MECHANICAL YARD – RANGE EXHAUST
3	SCREENED MECHANICAL YARD – BUILDING SUPPLY
4	DUMPSTER ENCLOSURE
5	HANDICAPPED PARKING SPACE
6	STAFF/VISITOR PARKING SPACE – 31 TOTAL SPACES
7	SPENT AMMUNITION CONTAINMENT
8	UNOBSTRUCTED SPACE – CONCEPTUAL /1/
9	ACCESS CONTROL GATE
10	SERVICE DRIVE – MECHANICAL EQUIPMENT AND BULLET CONTAINMENT ACCESS
11	SERVICE DRIVE – HVAC AND DELIVERY ACCESS

12	SECONDARY/SERVICE ENTRANCE
13	SECONDARY MEANS OF EGRESS

2-7 COMPOSITE FACILITY ADJACENCY.

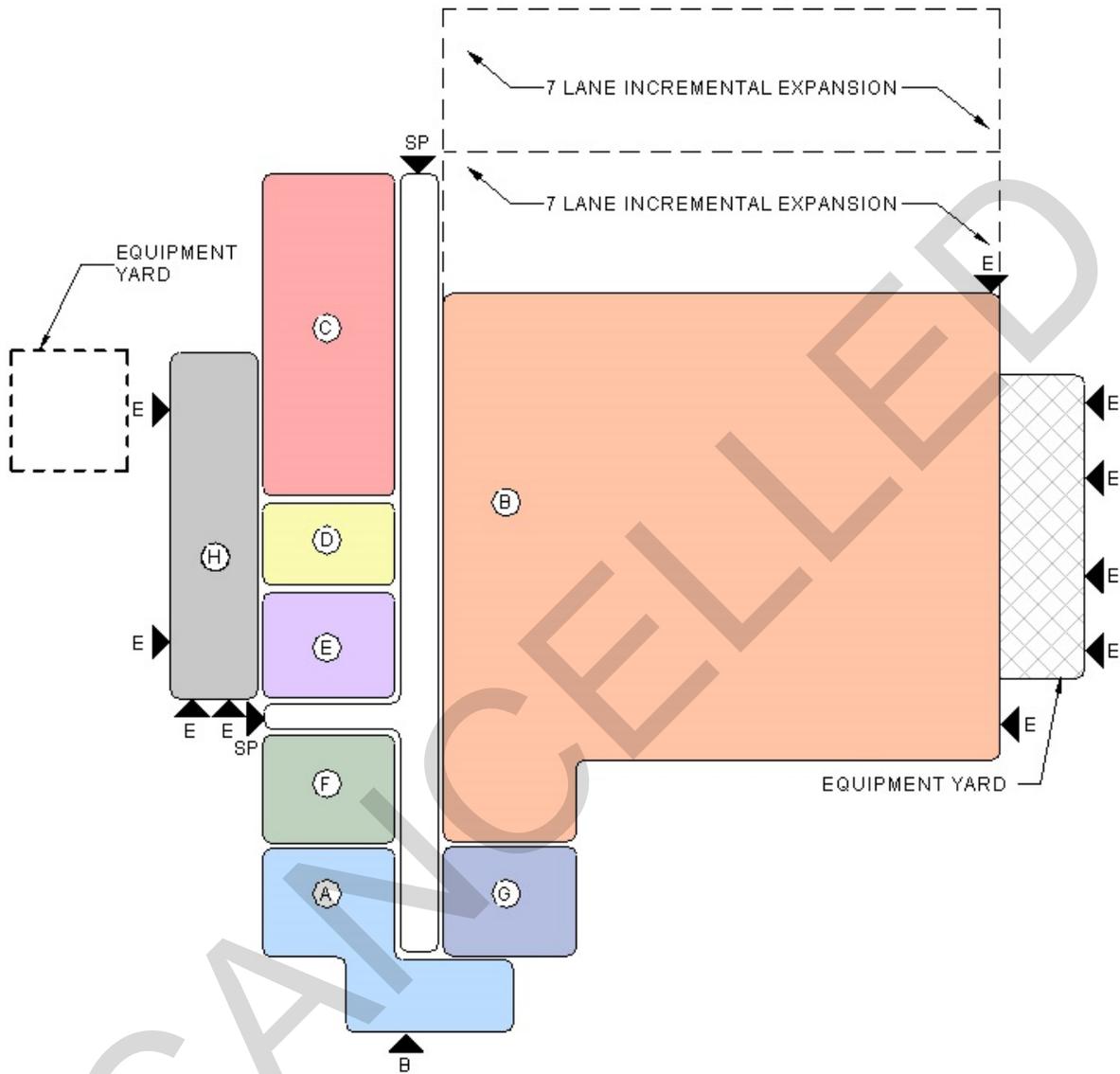
The space program for the indoor small arms firing range facilities is developed based upon the annual small arms qualification training requirements and authorized manning of the base, as well as historical data from the Air Force Security Forces Center (AFSFC).

The space program developed through the base planning team generally represents the maximum space allowed. The final space program for a new indoor small arms firing range will need to be carefully determined by installation representatives and the criteria in this FC. Additional information is found in Appendix B.

The required space adjacencies are illustrated in Figure 2-2. All program spaces are assigned a module designator. Spaces that must be located next to each other or share an important operational flow are grouped into one module with the intent that the module will remain intact during final design (although it may slightly change shape).

Composite plans represent conceptual solutions for indoor small arms range project requirements. These composite facility plans convey an AFSFC-approved solution. The building shape may be adjusted in response to site requirements or unusual or specific installation issues if approved in accordance with the procedures in Chapter I. See Appendix B for conceptual facility floor plans. Three concept plans and the related BIM drawings are included in Appendix B.

Figure 2-2 Functional Adjacency Diagram



MODULES

- A ADMINISTRATION
- B ARMS RANGE
- C TRAINING
- D MAINTENANCE
- E CLEANING
- F STORAGE
- G UTILITY
- H BUILDING SUPPORT

LEGEND ENTRY/EXIT

-  B BUILDING ENTRY
- E EQUIPMENT ENTRY
- SP SECONDARY/PERSONNEL ENTRY

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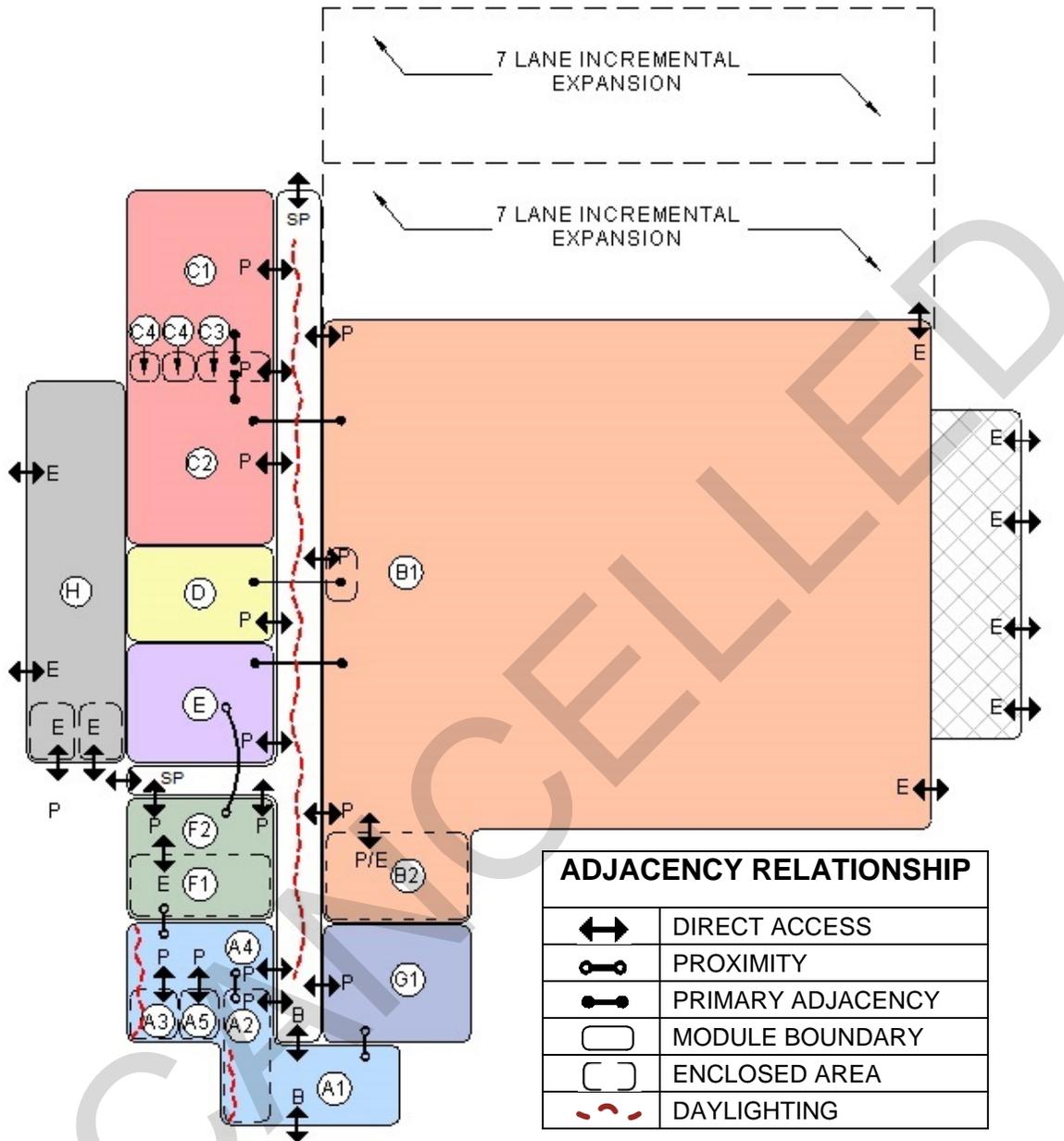
CHAPTER 3 FACILITY REQUIREMENTS AND CRITERIA MODULES

3-1 ADJACENCY DIAGRAM.

The majority of administration/instructors and trainees will enter the facility through the main building entrance. From that point, access to all other spaces within the facility is from a major circular corridor, etc.

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Figure 3-1 Overall Module Adjacency Diagram



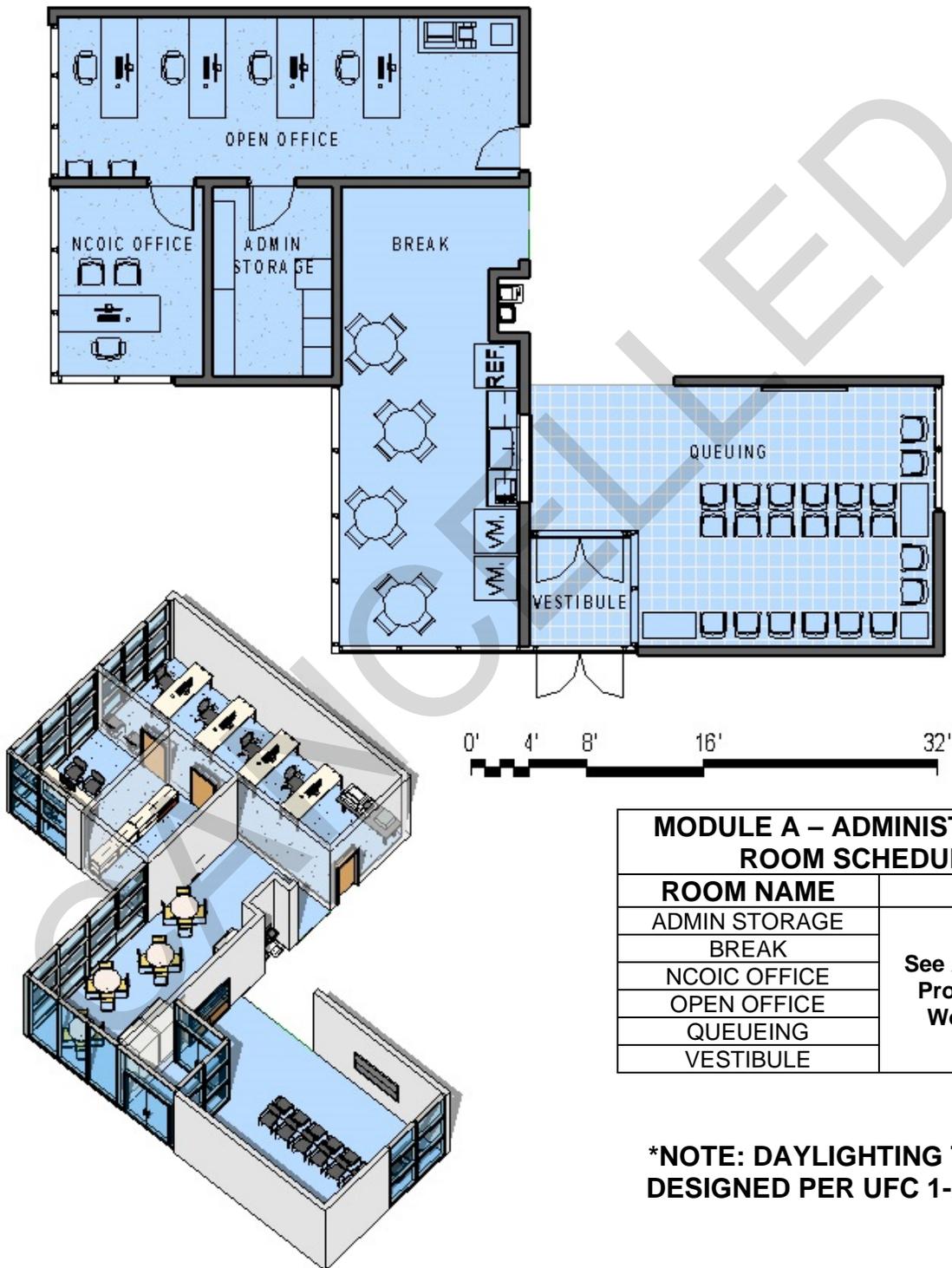
ADJACENCY RELATIONSHIP	
	DIRECT ACCESS
	PROXIMITY
	PRIMARY ADJACENCY
	MODULE BOUNDARY
	ENCLOSED AREA
	DAYLIGHTING

MODULES ROOM SCHEDULE			
A1	QUEUING	C2	WEAPONS SIMULATOR
A2	BREAK ROOM	C3	OBSERVATION ROOM
A3	NCOIC OFFICE	C4	STORAGE
A4	OPEN OFFICE	D	WEAPONS MAINTENANCE SHOP
A5	ADMIN/INSTRUCTOR STORAGE	E	CLEANING
B1	ARMS RANGE	F1	ARMS VAULT
B2	RANGE SUPPLIES	F2	ISSUE ROOM
C1	CLASSROOM	G1	RESTROOMS/LOCKER ROOM
		H	BUILDING SUPPORT

LEGEND ENTRY/EXIT	
B	BUILDING ENTRY
E	EQUIPMENT ENTRY
P	PERSONNEL ENTRY
SP	SECONDARY/PERSONNEL

3-2 MODULE A: ADMINISTRATION.

Figure 3-2 Floor Plan and Axonometric



MODULE A – ADMINISTRATION ROOM SCHEDULE	
ROOM NAME	AREA
ADMIN STORAGE	See Appendix-B Programming Worksheets
BREAK	
NCOIC OFFICE	
OPEN OFFICE	
QUEUEING	
VESTIBULE	

***NOTE: DAYLIGHTING TO BE
 DESIGNED PER UFC 1-200-02**

Figure 3-3 Administrative Instructor Storage Data Sheet

Description/Usage		Storage space for office supplies, file storage, and instructor's personal effects.
Ceiling Height		9'-0" minimum
Windows		N/A
Doors	Type	Hollow metal
	Security/ Hardwar	Keyed lock set
	View Panels/ Kick-Plates	Kick-plate
Finishes	Walls	Gypsum board
	Floor	Concrete
	Base	Vinyl
	Ceiling	Exposed to structure
Plumbing		N/A
HVAC		Air conditioned and heated
Fire Protection		Automatic sprinkler system (see UFC 3-600-01)
Power		One 120V convenience outlet
Lighting		Fluorescent or LED (5 fc) lighting
Communication	Tele.	N/A
	Data	N/A
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical		See UFC 4-179-02 for administrative sound levels
Furnishings, Equipment, and Casework		Storage shelving for office supplies; filing cabinets; 2'-0" x 2'-0" single-tier equipment storage lockers (one per instructor and NCOIC)
Special Requirements		Expandable, with open office based upon number of instructors

Figure 3-4 Break Room Data Sheet

Description/Usage		Room for students and instructors to get coffee or eat meals.
Ceiling Height		9'-0" minimum
Windows		Daylighting requirements per UFC 1-200-02
Doors	Type	N/A
	Security/ Hardware	N/A
	View Panels/ Kick-Plates	N/A
Finishes	Walls	Impact-resistant gypsum board, paint
	Floor	Sealed/stained concrete or tile
	Base	Rubber/vinyl or tile
	Ceiling	Acoustical ceiling tile
Plumbing		Connections for coffee maker, sink with disposer, refrigerator, and floor drain
HVAC		Air conditioned and heated
Fire Protection		Automatic sprinkler system (see UFC 3-600-01)
Power		120V dedicated circuits for coffee maker, microwave and refrigerator; 120V convenience outlets for vending machine(s)
Lighting		Fluorescent or LED lighting (20 fc) with ceiling-mounted occupancy sensors
Communication	Tele.	One public-use wall phone
	Data	Base-specific Wi-Fi
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical		Minimum STC rating of 42 between occupied spaces and break room
Furnishings, Equipment, and Casework		Coffee maker; microwave; refrigerator; upper and lower cabinets with sink; seating-tables or bar style w/seating
Special Requirements		Break area in close proximity to queuing room; break area based upon 16% of total building occupants multiplied by 18 square feet per occupant.

Figure 3-5 NCOIC Office Data Sheet

Description/Usage		Private office for non-commissioned officer in charge.
Ceiling Height		9'-0" minimum
Windows		Daylighting requirements per UFC 1-200-02
Doors	Type	Hollow metal
	Security/ Hardware	Keyed lock set
	View Panels/ Kick-Plates	N/A
Finishes	Walls	Gypsum board, paint
	Floor	Sealed/stained concrete or carpet tile
	Base	Vinyl/rubber or tile
	Ceiling	Acoustical ceiling tile
Plumbing		N/A
HVAC		Air conditioned and heated
Fire Protection		Automatic sprinkler system (see UFC 3-600-01)
Power		120V convenience outlets. One per wall, quad outlet at desk
Lighting		Fluorescent or LED (50 fc) lighting with ceiling-mounted occupancy sensor
Communication	Tele.	Outlet at desk
	Data	One data outlet at desk
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical		Minimum STC rating of 42. \1\ See UFC 4-179-02 for acoustic sound levels. /1/
Furnishings, Equipment, and Casework		Desk with chair; 2 guest chairs; computer
Special Requirements		140 square foot private office

Figure 3-6 Open Office Data Sheet

Description/Usage		Open office for range instructors to perform daily administrative duties.
Ceiling Height		9'-0" minimum
Windows		Daylighting requirements per UFC 1-200-02
Doors	Type	Hollow metal
	Security/ Hardware	Keyed lock set
	View Panels/ Kick-Plates	Kick-plates
Finishes	Walls	Gypsum board with chair rails, paint
	Floor	Sealed/stained concrete or carpet tile
	Base	Vinyl/rubber or tile
	Ceiling	Acoustical ceiling tile
Plumbing		N/A
HVAC		Air conditioned and heated
Fire Protection		Automatic sprinkler system (see UFC 3-600-01)
Power		120V convenience quad outlets at each work station; copier and other office equipment; charging station
Lighting		Fluorescent or LED (50 fc) lighting; ceiling-mounted occupancy sensor and daylighting sensor
Communication	Tele.	One outlet at each work station
	Data	One outlet at each work station
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical		Minimum STC rating of 42. \1\ See UFC 4-179-02 for acoustic sound levels. /1/
Furnishings, Equipment, and Casework		Desks with chairs (one per instructor); 2 guest chairs; computer (one per instructor); copier with table; radio charging station with table
Special Requirements		Open office to expand with range size; one instructor for each seven students; Open office area based upon 80 square feet per instructor with additional 20 square feet for admin support

Figure 3-7 Queuing Room Data Sheet

Description/Usage		Queuing area for range students awaiting instruction; includes seating (size based upon range capacity) and display area.
Ceiling Height		9'-0" minimum
Windows		Daylighting requirements per UFC 1-200-02
Doors	Type	Pair 3'-0" x 7'-0" anodized aluminum door and frames with sidelights; optional 3'-0" x 7'-0" aluminum door with removable sidelights
	Security/Hardware	Keyed lock set (minimum); possible access control
	View Panels/Kick-Plates	Sidelights
Finishes	Walls	Impact-resistant gypsum board, paint
	Floor	Sealed/stained concrete or tile
	Base	Rubber/vinyl or tile
	Ceiling	Open to structure or acoustical ceiling tile
Plumbing		Electric water cooler
HVAC		Air conditioned and heated
Fire Protection		Automatic sprinkler system (see UFC 3-600-01)
Power		120V convenience outlets/wall-mounted TV; display case
Lighting		Fluorescent or LED lighting (15 fc) with ceiling-mounted occupancy sensor
Communication	Tele.	One public-use wall phone
	Data	Base-specific Wi-Fi
	CCTV	N/A
	CATV	Base-specific
	Security	N/A
Acoustical		Minimum STC rating of 42
Furnishings, Equipment, and Casework		Display case; chairs (number based upon range capacity, minimum one chair per lane); wall-mounted TV; end tables
Special Requirements		Queuing area changes with range size, based upon total number of firing lanes at 20 square feet per student including area for circulation. Additional square feet for entry vestibule; provide walk-off mat.

3-3 MODULE B: ARMS RANGE – 21 LANES.

Figure 3-8 Floor Plan and Axonometric

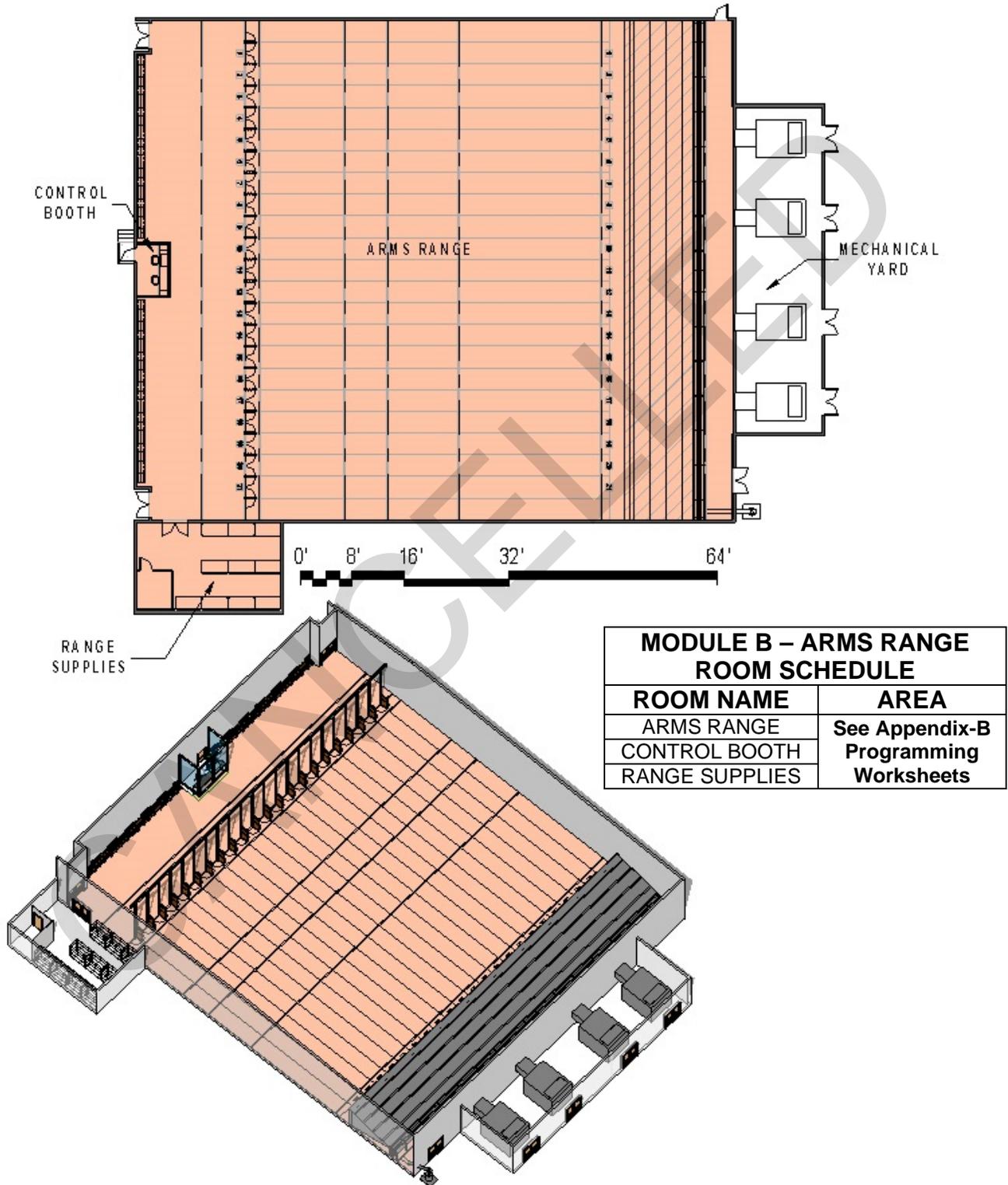


Figure 3-9 Arms Range Data Sheet

Description/Usage		Indoor arms range for weapons training with control room. Allows firing from standing, kneeling, prone, and barricade positions. \1\ Fourteen (14) 5-foot-wide lanes minimum, expandable to 56 lanes maximum; automatic target retrieving system adjustable; bullet trap with deceleration chamber and dust and solids collection. /1/
Ceiling Height		\1\ Ceiling height varies based on target distance. See UFC 4-179-02, Table 4-1. For ranges that require vehicle access, use a 12-foot ceiling height. /1/
Windows		N/A
Doors	Type	Acoustical hollow metal doors, two pair 3'-0" x 7'-0"
	Security/Hardware	Keyed lockset or cipher system
	View Panels/Kick-Plates	Kick-plates on all doors
Finishes	Walls	\1\ Armor plate or cast-in-place concrete (unpainted) with acoustical panels /1/
	Floor	\1\ Sealed concrete or armor plate /1/
	Base	N/A
	Ceiling	Steel baffles with acoustical panels
Plumbing		N/A
HVAC		Laminar airflow 75 fpm; see para. 4-5.2
Fire Protection		Visual strobes and mass notification. No sprinkler system.
Power		Specific for target retrieval and bullet collection systems
Lighting		Special lighting (controlled by control room); target controls
Communication	Tele.	One outlet in control room
	Data	One outlet in control room; one outlet near bullet collection
	CCTV	N/A
	CATV	N/A
	Security	None
Acoustical		\1\ Provide acoustical panels at perimeter walls and baffles in sufficient quantity to meet the noise reduction criteria of UFC 4-179-02 /1/
Furnishings, Equipment, and Casework		\1\ Preparation area with wall-mounted benches and tables; control room with range control system; barricades; bullet trap system; acoustical panels; automatic target retrieval system (non-RPIE). /1/ See BIM drawings for additional information.
Special Requirements		\1\ Refer to UFC 4-179-02 for small arms range requirements /1/

Figure 3-10 Control Booth Room Data Sheet

Description/Usage		Area for control of range operations.
Ceiling Height		\1\ N/A /1/
Windows		\1\ Full range visibility acoustic /1/
Doors	Type	\1\ Acoustic metal doors and frames /1/
	Security/ Hardware	Keyed lockset
	View Panels/ Kick-Plates	Kick-plates on all doors
Finishes	Walls	\1\ Acoustic walls and windows /1/
	Floor	\1\ Sealed concrete with 2-foot raised floor /1/
	Base	N/A
	Ceiling	Acoustic ceiling tile
Plumbing		N/A
HVAC		Air conditioned and heated w/separate unit; see para. 4-5.2 (maintain positive air pressure)
Fire Protection		\1\ Visual strobes and mass notification. No sprinkler system /1/
Power		120V power strip(s) for controls
Lighting		Fluorescent or LED (15 fc) light fixtures with wall-mounted dimming control
Communication	Tele.	One outlet
	Data	One outlet connected to base LAN
	Control	Control panel for lights, target retrieval, and bullet collector
	PA	Speakers throughout facility
Acoustical		\1\ See UFC 4-179-02 /1/
Furnishings, Equipment, and Casework		Countertop and two workstations
Special Requirements		Locate adjacent to arms range with direct access to corridor

Figure 3-11 Range Supplies Data Sheet

Description/Usage		Area for storage of targets and other range-required supplies; secure tool storage.
Ceiling Height		\1\ 8'-0" minimum /1/
Windows		N/A
Doors	Type	Hollow metal, pair 3'-0" x 7'-0"
	Security/ Hardware	Keyed lock set
	View Panels/ Kick-Plates	Kick-plates on door
Finishes	Walls	Concrete; CMU
	Floor	Sealed concrete
	Base	Vinyl
	Ceiling	Open to structure
Plumbing		N/A
HVAC		Exhaust only (provide ducted make-up air or outside air grill)
Fire Protection		\1\ See UFC 4-179-02 /1/
Power		120V convenience outlet; two per room
Lighting		Fluorescent or LED (15 fc) light fixtures with wall-mounted occupancy sensor
Communication	Tele.	N/A
	Data	N/A
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical		N/A
Furnishings, Equipment, and Casework		Shelving racks for supply storage; wire mesh partition for secure tools and materials storage
Special Requirements		Locate adjacent to arms range with direct access

3-4 **MODULE C: TRAINING.**

Figure 3-12 Floor Plan and Axonometric

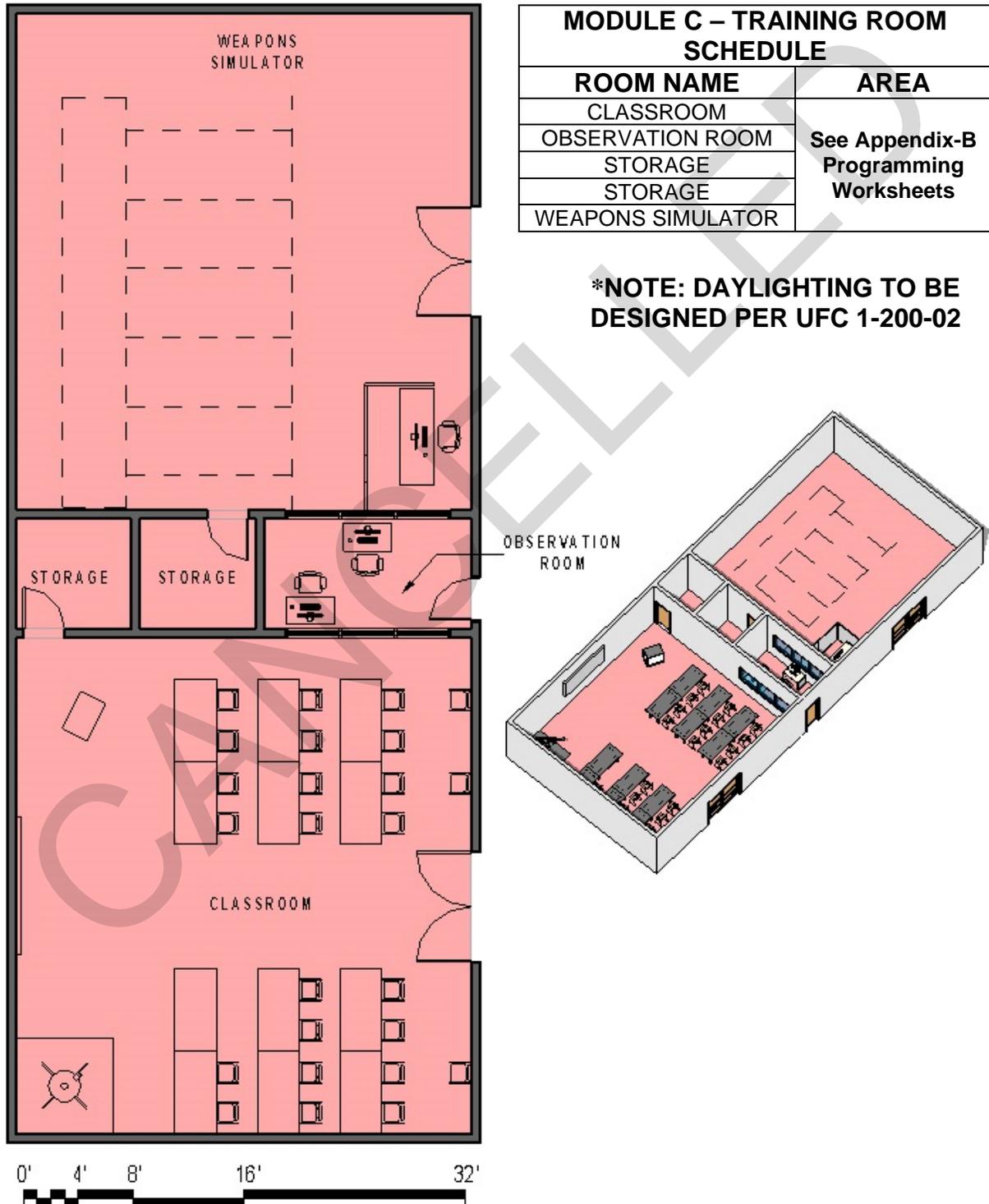


Figure 3-13 Classroom Data Sheet

Description/Usage		Instructor-based arms training in classroom setting, including vehicle weapons mount training.
Ceiling Height		9'-0" minimum
Windows		Daylighting requirements per UFC 1-200-02
Doors	Type	Pair 4'-0" x 7'-0" hollow metal doors
	Security/ Hardware	Keyed lock set
	View Panels/ Kick-Plates	Kick-plates
Finishes	Walls	Concrete/CMU, painted
	Floor	Sealed/stained concrete or tile
	Base	Vinyl/rubber or tile
	Ceiling	Open to structure or acoustical ceiling tile
Plumbing		N/A
HVAC		Air conditioned and heated
Fire Protection		Automatic sprinkler system (see UFC 3-600-01)
Power		120V convenience outlets; ten 1f on center around perimeter; projector outlet(s); dedicated circuit for podium
Lighting		Dimmable fluorescent or LED lighting fixtures (50 fc) with ceiling-mounted occupancy sensors and override switches; daylight sensors
Communication	Tele.	One wall outlet near podium
	Data	One wall outlet near podium
	CCTV	N/A
	CATV	One wall outlet near podium; base-specific
	Security	N/A
Acoustical		Minimum STC rating of 50. \1\ See UFC 4-179-02 for maximum noise levels in classrooms. /1/
Furnishings, Equipment, and Casework		7'-0" x 7'-0" vehicle mount mockup; projector set up or wall-mounted TV; 36" x 48" tables with 2 stackable chairs per table; 36" x 48" instructor table; instructor podium; stackable chairs for additional instructors (1 instructor per 7 students); motorized blackout screens for fenestration
Special Requirements		22-person classroom is standard for 21-lane range with one seat per firing lane and additional seating for instructors; expandable with range; verify egress requirements for larger facilities

Figure 3-14 Observation Room Data Sheet

Description/Usage		\1\ Current operations no longer require a separate observation room for classrooms or simulator rooms. Space may be reallocated to simulator equipment storage and simulator support systems. /1/
Ceiling Height		9'-0" minimum
Windows		One-way glass window units to classroom and simulator
Doors	Type	Hollow metal, 3'-0" x 7'-0"
	Security/ Hardware	Keyed lock set
	View Panels/ Kick-Plates	Kick-plates
Finishes	Walls	Concrete/CMU, painted
	Floor	Sealed/stained concrete or tile
	Base	Vinyl/rubber or tile
	Ceiling	Acoustical ceiling tile
Plumbing		N/A
HVAC		Air conditioned and heated
Fire Protection		Automatic sprinkler system (see UFC 3-600-01)
Power		120V convenience outlet for each work station
Lighting		Fluorescent or LED lighting fixtures (20 fc) with ceiling-mounted occupancy sensors and override switches; dimmable
Communication	Tele.	One outlet per workstation
	Data	One outlet per workstation
	CCTV	\1\ Optional observation tools (non-RPIE equipment support) /1/
	CATV	N/A
	Security	N/A
Acoustical		Minimum STC rating of 46
Furnishings, Equipment, and Casework		Desk with chair for each viewing area; computer
Special Requirements		Used in conjunction with classroom and simulator; Observation area based upon 64 square feet per occupant

Figure 3-15 Classroom/Simulator Room Storage Data Sheet

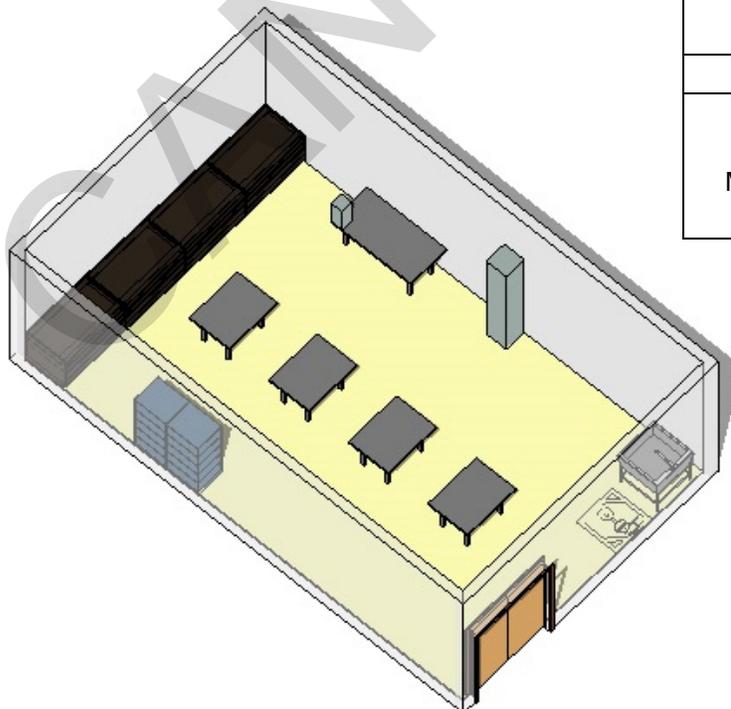
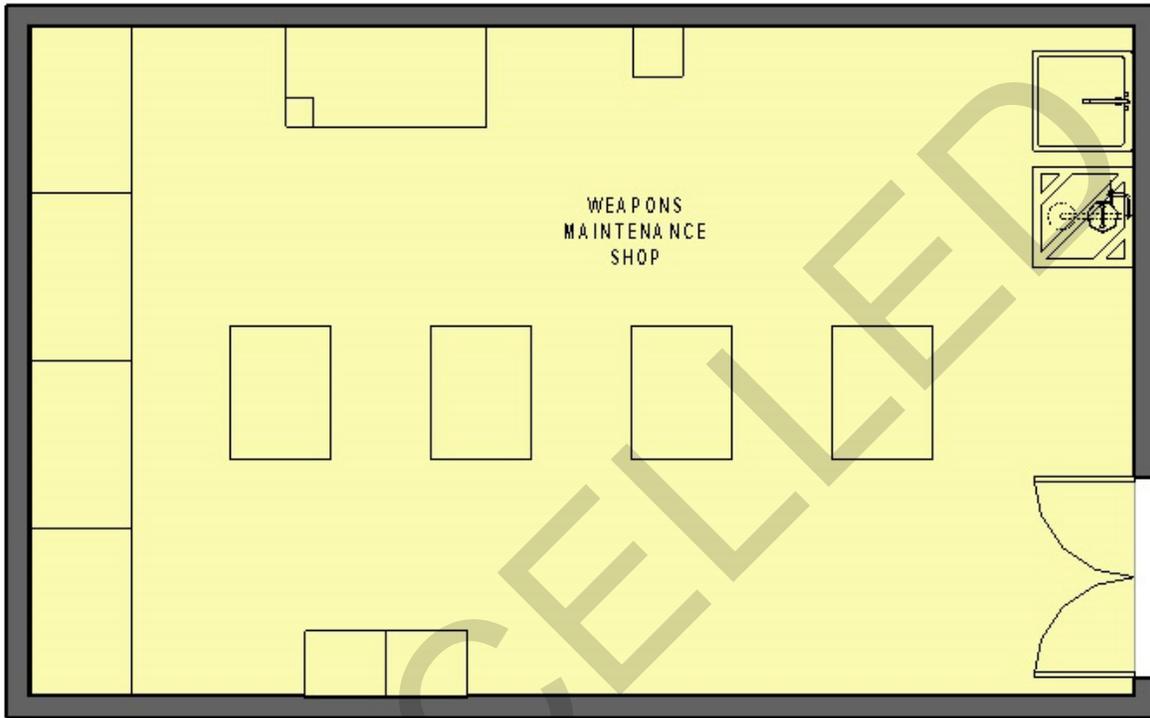
Description/Usage		Storage for classroom and simulator items.
Ceiling Height		9'-0" minimum
Windows		N/A
Doors	Type	Hollow metal, 3'-0" x 7'-0"
	Security/ Hardware	Keyed lock set
	View Panels/ Kick-Plates	Kick-plates
Finishes	Walls	Concrete/CMU, painted
	Floor	Sealed/stained concrete or tile
	Base	Vinyl/rubber or tile
	Ceiling	Acoustical ceiling tile
Plumbing		N/A
HVAC		Provide conditioned supply air
Fire Protection		Automatic sprinkler system (see UFC 3-600-01)
Power		None
Lighting		Fluorescent or LED lighting fixtures (5 fc) with wall-mounted occupancy sensor
Communication	Tele.	N/A
	Data	N/A
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical		N/A
Furnishings, Equipment, and Casework		N/A
Special Requirements		Provide storage room for each classroom and/or simulator module; expandable with range size.

Figure 3-16 Weapons Simulator Data Sheet

Description/Usage		Computer-based marksmanship training. \1\ Simulator size and controls configuration determined by manufacturer's requirements. Current simulator of choice is the Meggit's FATS 100MIL. Validate actual simulator requirements with the installation. /1/
Ceiling Height		\1\ 10'-0" minimum /1/
Windows		N/A
Doors	Type	Hollow metal, pair 3'-0" x 7'-0"
	Security/ Hardware	Keyed lock set
	View Panels/ Kick-Plates	Kick-plates
Finishes	Walls	Concrete/CMU, paint
	Floor	Sealed/stained concrete or tile. \1\ Two-foot raised firing platform /1/
	Base	Vinyl/rubber or tile
	Ceiling	Acoustical ceiling tile
Plumbing		N/A
HVAC		Air conditioned and heated
Fire Protection		Automatic sprinkler system (see UFC 3-600-01)
Power		120V convenience outlets; dedicated circuit for simulator system
Lighting		Dimmable fluorescent or LED lighting fixtures (50 fc) with ceiling-mounted occupancy sensors
Communication	Tele.	One outlet at front
	Data	One outlet at front
	CCTV	N/A
	CATV	One outlet at front; base-specific
	Security	N/A
Acoustical		\1\ See UFC 4-179-02 for maximum noise levels. /1/ Minimum STC rating of 50, walls and doors
Furnishings, Equipment, and Casework		Commercially purchased projection-based simulator system; desk with chair; computer; simulator instructor booth
Special Requirements		Simulator module is preferred module; module can be deleted based upon specific base installation requirements and budgeted facilities

3-5 **MODULE D: MAINTENANCE.**

Figure 3-17 Floor Plan and Axonometric



MODULE D – MAINTENANCE ROOM SCHEDULE	
ROOM NAME	AREA
WEAPONS MAINTENANCE SHOP	See Appendix-B Programming Worksheets

Figure 3-18 Weapons Maintenance Shop Data Sheet

Description/Usage		Space to restore/maintain weapons to serviceable condition. Primarily for instructor use.
Ceiling Height		9'-0" minimum
Windows		N/A
Doors	Type	Hollow metal, pair 3'-0" x 7'-0"
	Security/Hardware	Keyed lock set
	View Panels/Kick-Plates	Kick-plates
Finishes	Walls	CMU, paint
	Floor	Sealed concrete
	Base	Vinyl
	Ceiling	Open to structure
Plumbing		Connections for shop sink and emergency eyewash
HVAC		Air conditioned and heated w/exhaust ventilation for chemicals
Fire Protection		Automatic sprinkler system (see UFC 3-600-01)
Power		120V convenience outlets around room and at work spaces; provide power to workbenches and grinding wheel stand
Lighting		Fluorescent or LED lighting fixtures (50 fc) with wall-mounted occupancy sensor; task lighting at repair stations
Communication	Tele.	One outlet
	Data	One outlet
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical		Minimum STC rating of 50
Furnishings, Equipment, and Casework		Lockable parts storage cabinets; stainless steel workbenches; grinding wheel with stand; shop sink; table with vise; flammable storage cabinets; emergency eyewash
Special Requirements		Expandable with range; provide one workbench per instructor;

3-6 **MODULE E: CLEANING.**

Figure 3-19 Floor Plan and Axonometric

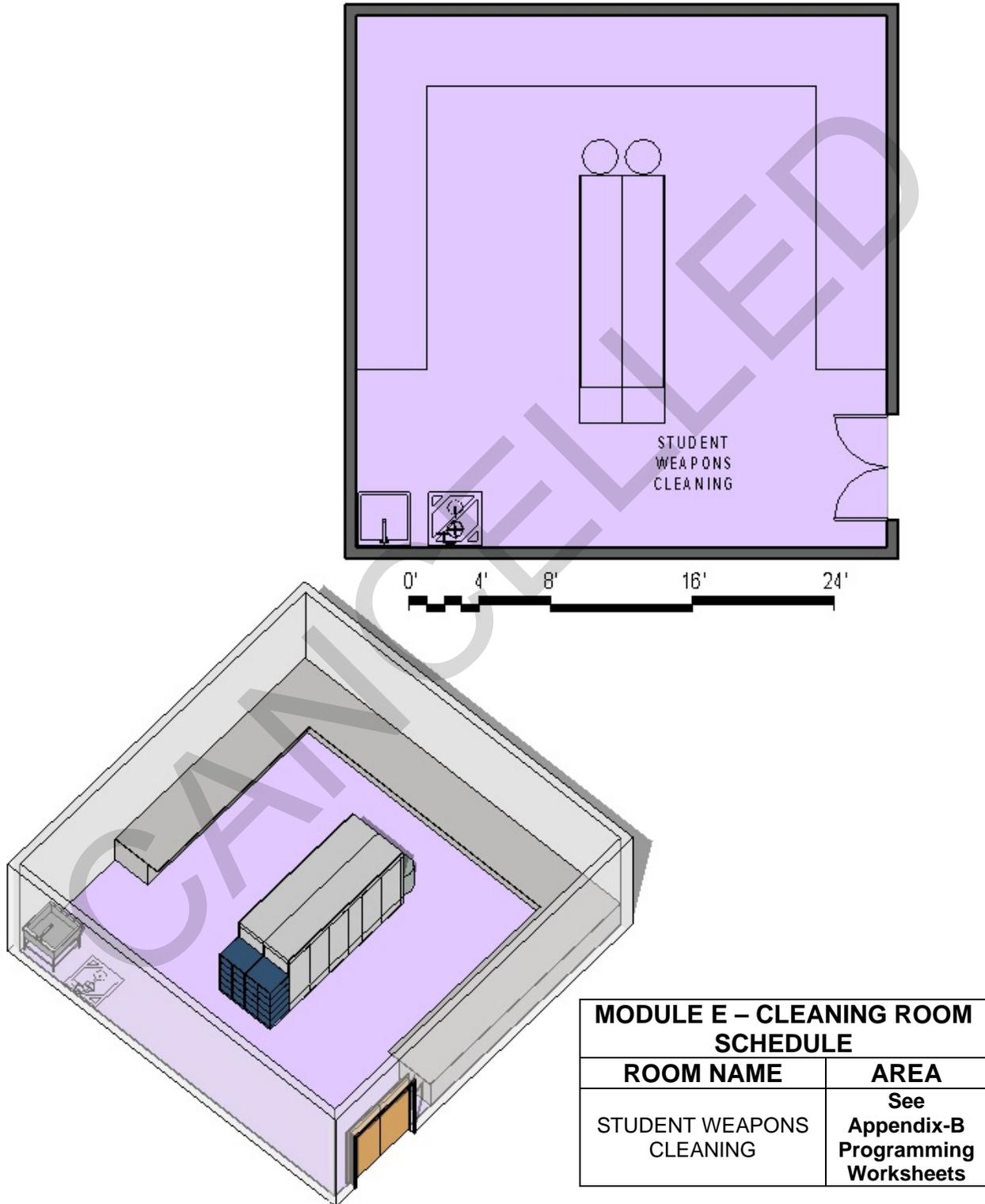
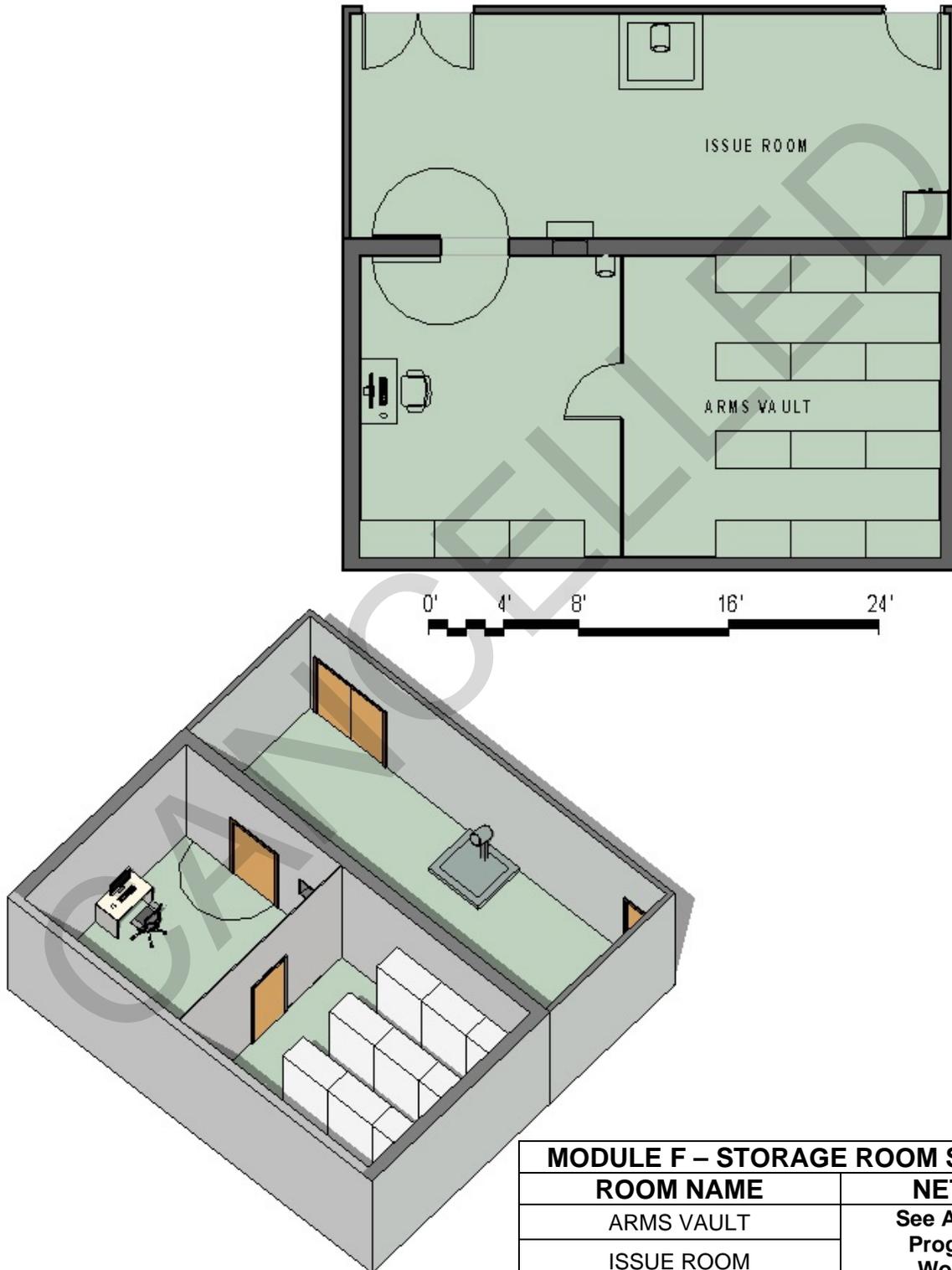


Figure 3-20 Student Weapons Cleaning Data Sheet

Description/Usage		Space for instructor-supervised weapons cleaning procedures performed by students.
Ceiling Height		9'-0" minimum
Windows		N/A
Doors	Type	Hollow metal, pair 3'-0" x 7'-0"
	Security/ Hardware	Keyed lock set
	View Panels/ Kick-Plates	Kick-plates
Finishes	Walls	CMU/impact-resistant gypsum board, paint
	Floor	Sealed concrete
	Base	Vinyl
	Ceiling	Acoustical ceiling tile
Plumbing		Connections for shop sink and emergency eyewash
HVAC		Air conditioned and heated w/exhaust ventilation
Fire Protection		Automatic sprinkler system (see UFC 3-600-01)
Power		120V convenience outlets at all tables
Lighting		Fluorescent or LED lighting fixtures (50 fc) with ceiling-mounted occupancy sensors; task lighting at cleaning stations
Communication	Tele.	One outlet
	Data	One outlet
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical		Minimum STC rating of 50
Furnishings, Equipment, and Casework		Continuous stainless steel U-shaped perimeter table (standing height); lockable storage cabinets; shop sink; emergency eyewash; flammable storage cabinets; hazardous waste receptacles
Special Requirements		Expandable with range; verify egress requirements for larger facilities

3-7 MODULE F: STORAGE.

Figure 3-21 Floor Plan and Axonometric



MODULE F – STORAGE ROOM SCHEDULE	
ROOM NAME	NET AREA
ARMS VAULT	See Appendix-B Programming Worksheets
ISSUE ROOM	

Figure 3-22 Arms Vault Data Sheet

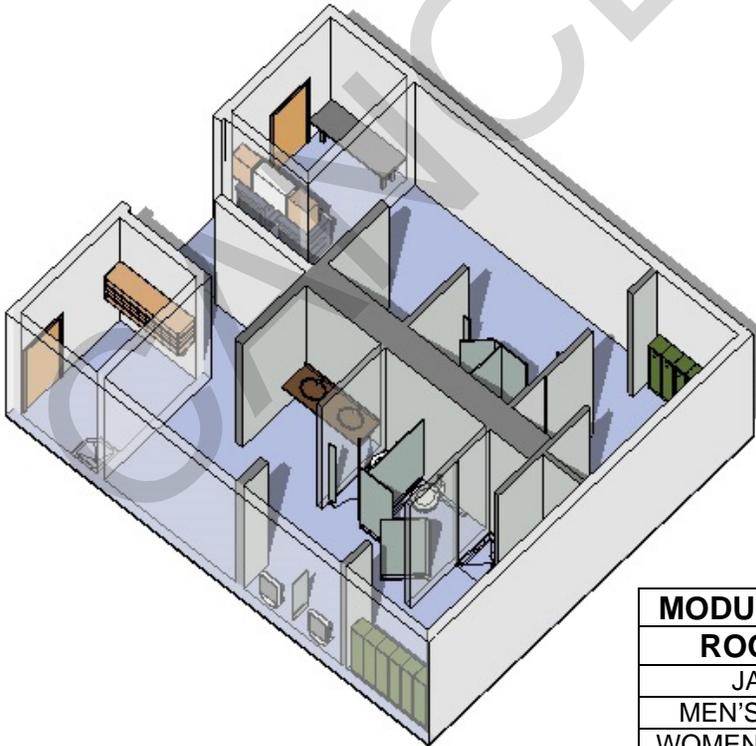
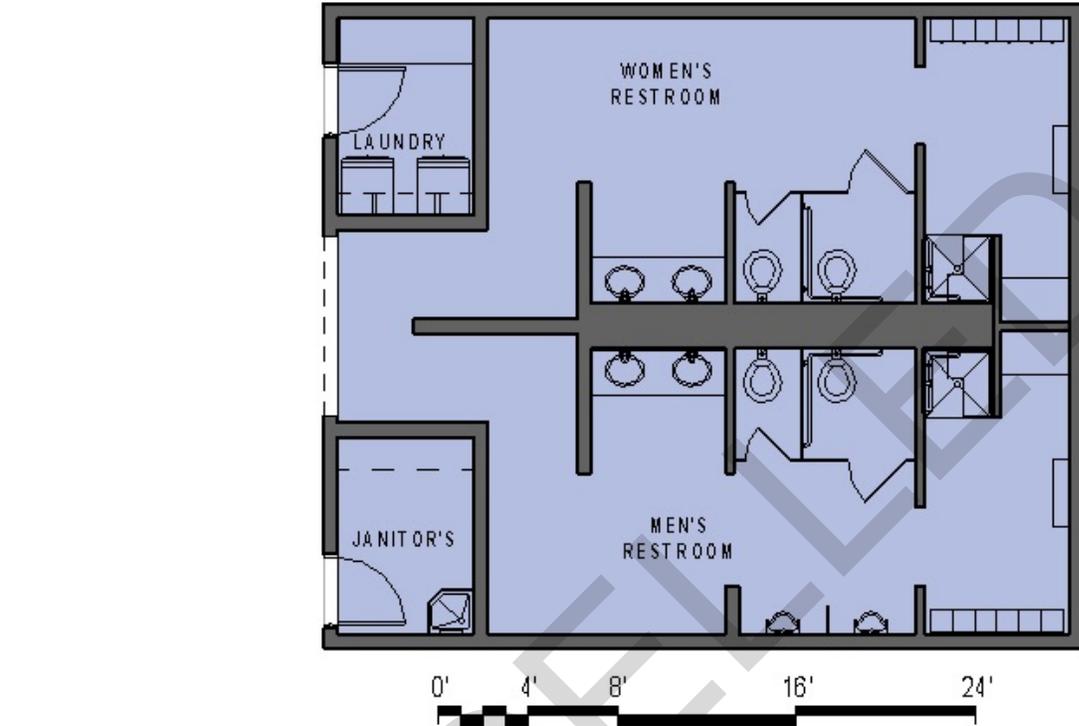
Description/Usage		Weapons and ammunition storage and distribution. Vault constructed area to provide secure storage of arms and ammunition; secure storage of ammunition separate from arms; issue window.
Ceiling Height		9'-0" minimum
Windows		N/A
Doors	Type	GSA-approved Class V vault door
	Security/ Hardware	N/A
	View Panels/ Kick-Plates	N/A
Finishes	Walls	Concrete/CMU, paint
	Floor	Sealed concrete
	Base	Vinyl
	Ceiling	Concrete
Plumbing		N/A
HVAC		Air conditioned and heated (maintain RH < 65%)
Fire Protection		Automatic sprinkler system (see UFC 3-600-01)
Power		120V outlets at all workstations
Lighting		Fluorescent or LED (30 fc)
Communication	Tele.	One outlet at workstation
	Data	One outlet at workstation
	CCTV	N/A
	CATV	N/A
	Security	Access control and door switch monitoring
Acoustical		N/A
Furnishings, Equipment, and Casework		Clearing barrel; issue window; GSA-approved Class V vault door; wire mesh partition for ammunition storage; desk and chair; computer; arms rack (number determined by location requirements)
Special Requirements		Day gate optional based upon specific base installation; expandable with range

Figure 3-23 Issue Room Data Sheet

Description/Usage		Area for students to obtain and safely clear arms.
Ceiling Height		9'-0" minimum
Windows		N/A
Doors	Type	Hollow metal
	Security/ Hardware	Keyed lock set
	View Panels/ Kick-Plates	Kick-plates
Finishes	Walls	\1\ Wall behind clearing barrel must be UL-rated for maximum weapon. /1/ CMU/impact-resistant gypsum board, paint.
	Floor	Sealed concrete
	Base	Vinyl
	Ceiling	Acoustical ceiling tile
Plumbing		N/A
HVAC		Year-round temperature control
Fire Protection		Automatic sprinkler system (see UFC 3-600-01)
Power		One outlet near window
Lighting		Fluorescent or LED lighting fixtures (20 fc) with ceiling-mounted occupancy sensor
Communication	Tele.	N/A
	Data	N/A
	CCTV	N/A
	CATV	N/A
	Security	Intrusion detection system (IDS)
Acoustical		N/A
Furnishings, Equipment, and Casework		GSA-approved two-drawer safe; clearing barrel (design per AFMAN 31-229)
Special Requirements		Maintain 12'-0" clear depth of room; expandable with arms vault

3-8 MODULE G: UTILITY.

Figure 3-24 Floor Plan and Axonometric



MODULE G – UTILITY ROOM SCHEDULE	
ROOM NAME	AREA
JANITOR'S	See Appendix-B Programming Worksheets
MEN'S RESTROOM	
WOMEN'S RESTROOM	
LAUNDRY ROOM	

Figure 3-25 Janitor's Closet Data Sheet

Description/Usage		Storage for cleaning supplies.
Ceiling Height		9'-0" minimum
Windows		N/A
Doors	Type	Hollow metal, 3'-0" x 7'-0"
	Security/ Hardware	Keyed lock set
	View Panels/ Kick-Plates	Kick-plate
Finishes	Walls	Moisture-resistant gypsum board; cement board at wet walls, paint
	Floor	Sealed concrete
	Base	Vinyl
	Ceiling	Moisture-resistant gypsum board
Plumbing		Connection for utility sink, floor drain
HVAC		Exhausted (provide fresh make-up air)
Fire Protection		Automatic sprinkler system (see UFC 3-600-01)
Power		None
Lighting		Fluorescent or LED lighting fixtures (5 fc) with ceiling-mounted occupancy sensors
Communication	Tele.	N/A
	Data	N/A
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical		N/A
Furnishings, Equipment, and Casework		Stainless-steel shelving with integrated mop holders; floor-mounted utility sink
Special Requirements		None

Figure 3-26 Restroom/Locker Room Data Sheet

Description/Usage		Restroom facilities for students and instructors; locker/shower room facilities for instructors to remove potential lead contamination.
Ceiling Height		9'-0" minimum
Windows		N/A
Doors	Type	Hollow metal, if utilized
	Security/Hardware	N/A
	View Panels/Kick-Plates	N/A
Finishes	Walls	Moisture-resistant gypsum board; cement board at wet walls; tile at wet areas near fixtures or tile wainscot
	Floor	Tile
	Base	Tile
	Ceiling	Moisture-resistant gypsum board
Plumbing		Connections for lavatories, water closets, urinals, showers; floor drain
HVAC		Year-round temperature control, humidity control, exhaust at showers
Fire Protection		Automatic sprinkler system (see UFC 3-600-01)
Power		Outlet for hand dryer and hair dryer in locker area
Lighting		Fluorescent or LED lighting fixtures (10 fc) with ceiling-mounted occupancy sensors; moisture-resistant
Communication	Tele.	N/A
	Data	N/A
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical		N/A
Furnishings, Equipment, and Casework		Vanities with lavatories; urinals; toilet partitions with water closets; urinal partitions; toilet and shower accessories; accessible and standard benches; accessible showers; lockers; mirrors at lavatories and shower areas
Special Requirements		70/30 male to female ratio typical (verify with location requirements) plumbing fixture count per UFC 3-420-01; Provide lockers per location requirements

Figure 3-27 Laundry Room Data Sheet

Description/Usage		Laundry facilities for instructors to remove lead contamination.
Ceiling Height		9'-0" minimum
Windows		N/A
Doors	Type	Hollow metal, 3'-0" x 7'-0"
	Security/ Hardware	Standard
	View Panels/ Kick-Plates	Kick-plate
Finishes	Walls	Moisture-resistant gypsum board, paint
	Floor	Sealed concrete
	Base	Vinyl
	Ceiling	Moisture-resistant gypsum board
Plumbing		Connection for washer
HVAC		Vent dryer and exhaust room air (provide fresh make-up air)
Fire Protection		Automatic sprinkler system (see UFC 3-600-01)
Power		Connection for washer and dryer
Lighting		Fluorescent or LED lighting fixtures (10 fc) with ceiling-mounted occupancy sensors
Communication	Tele.	N/A
	Data	N/A
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical		Minimum STC rating of 50
Furnishings, Equipment, and Casework		Washer; dryer; 2'-0" x 4'-0" stainless-steel layout table
Special Requirements		None

3-9 MODULE H: BUILDING SUPPORT.

Figure 3-28 Floor Plan and Axonometric

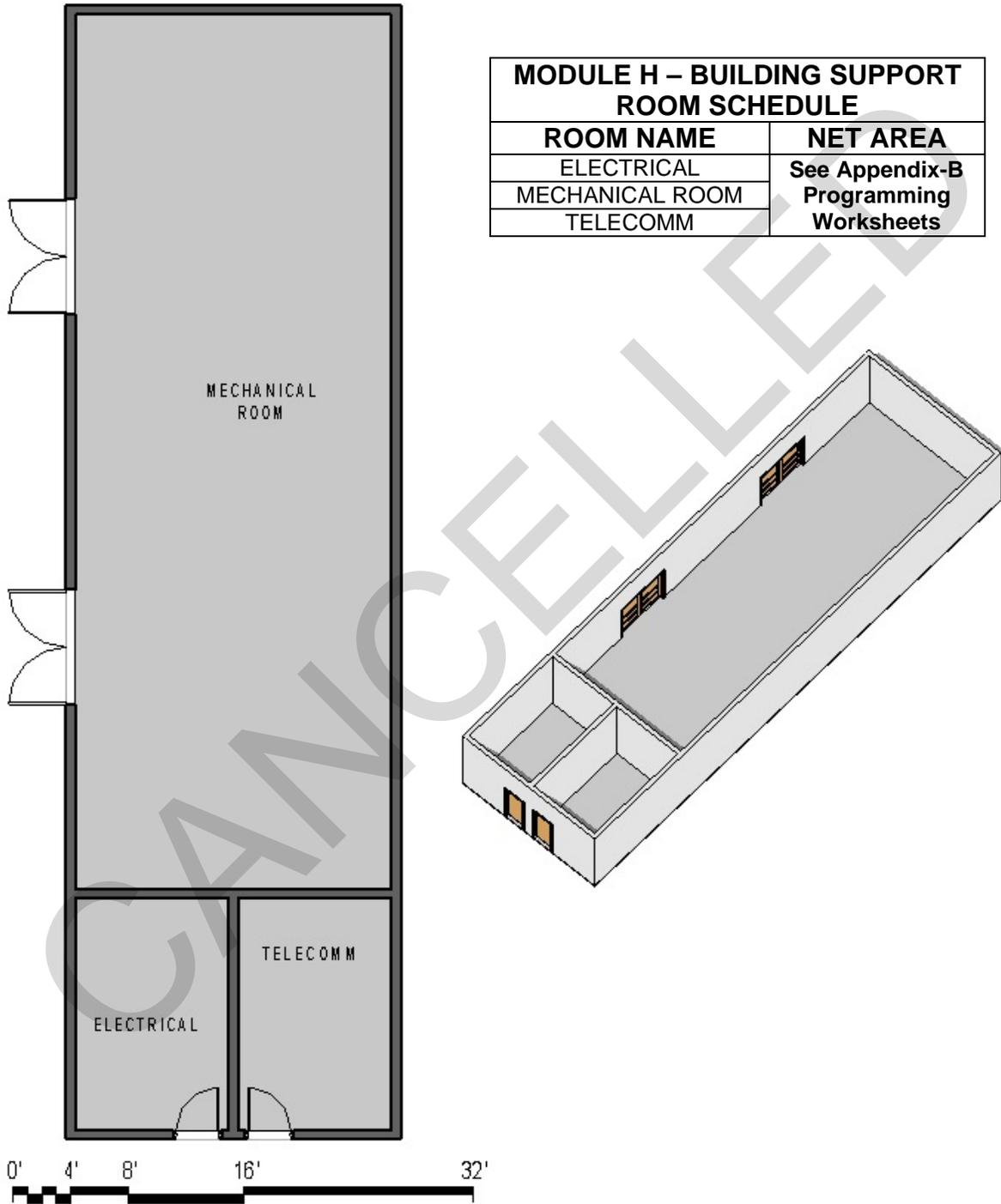


Figure 3-29 Building Support Data Sheet

Description/Usage		Space for mechanical, electrical, and telecommunications systems.
Ceiling Height		9'-0" minimum
Windows		N/A
Doors	Type	Hollow metal
	Security/ Hardware	Keyed lock set
	View Panels/ Kick-Plates	Kick-plate
Finishes	Walls	Gypsum board/CMU
	Floor	Sealed concrete
	Base	Vinyl
	Ceiling	Open to structure
Plumbing		Floor drains, water connections; compressed air
HVAC		Ventilated w/fresh air (provide conditioned air for telecom rm)
Fire Protection		Automatic sprinkler system (see UFC 3-600-01)
Power		120V outlet on each wall; circuit connections to specific equipment
Lighting		Fluorescent or LED fixtures (10 fc)
Communication	Tele.	One outlet; service entrance to main room rack
	Data	One outlet
	CCTV	N/A
	CATV	N/A
	Security	N/A
Acoustical		Minimum STC rating of 50 at mechanical room walls
Furnishings, Equipment, and Casework		Mechanical, electrical and telecommunication equipment
Special Requirements		Design each system per appropriate UFC document

CHAPTER 4 TECHNICAL CRITERIA

4-1 GENERAL.

\1\ Comply with UFC 1-200-01, which provides the applicability of model building codes and government-unique criteria for typical design disciplines and building systems, as well as for accessibility, AT, security, high-performance and sustainability requirements, and safety. /1/ Use this FC in addition to UFC 1-200-01 and the UFCs and government criteria referenced therein. \1\ Use UFC 4-179-02 for specific indoor small arms firing range requirements. /1/

4-2 STRUCTURE.

4-2.1 Foundation.

The foundation design and type is site specific and must be designed based on geotechnical recommendations provided by a licensed geotechnical engineer knowledgeable of the local conditions.

4-2.2 Superstructure.

\1\ The range may be constructed using modular or conventional construction methods. /1/ Provide clear spans for the firing range and target systems. Use pre-engineered components for superstructure framing, where feasible. The superstructure must support the bullet deflector plates/baffle system and other equipment (e.g., bullet trap). Camber the roof framing for the firing range to remain flat under super-imposed dead loads.

\1\ Provide hardened ceilings and walls for the arms/ammunition storage rooms. /1/

A perimeter steel structure to support the roof framing and CMU or concrete walls may be used for ease of construction and local parameters. \1\ CMU is no longer allowed for ballistic containment. /1/

The framing for the roof structure of the firing range may be one of the following two options:

- Roof joists spanning the full distance from the front to the back of the range with no intermediate supports. Do not span side to side because it limits expansion.
- Along the firing line (barricade) there may be steel columns (dividing the lanes) supporting steel girders spanning the width of the firing range. This line of girders could support open web bar joists spanning from the girder to the front wall (about 25 feet [7.6 meters]) on one side and to the back wall (about 115 feet [35 meters]) on the other side.

4-3 EXTERIOR DESIGN.

In general, the building's image, theme, and fixtures must be consistent with the programs offered and the architecture established on base. Reflect the local geographical and cultural environment in the design and comply with AFCFS and installation architectural standards. Provide a visually attractive, safe, and welcoming appearance. Consider grouping high bay spaces together. Do not allow the building massing to dominate or overwhelm surrounding structures.

4-3.1 Entrances/Exits.

Entries into the firing range must be limited and secured for safety. Entries to the range are not to be provided downrange of the firing line. Provide warning lights to signal that live rounds are being fired within the range.

4-3.2 Doors and Windows.

Limit windows to the queuing room, classroom, administrative areas, break room, and corridor. Use aluminum or hollow metal frames and doors. Mitigate glare and direct sunlight in activity spaces.

4-4 INTERIOR DESIGN.

4-4.1 Interior Construction.

Personnel will be handling weapons that bump against walls and trim. Provide durable, low-maintenance construction materials and do not use hollow-core wood doors. All interior glass must be tempered safety glass and mirrors must be made of break-resistant materials.

Provide counters, casework, and cabinets of high-quality and durable construction. Provide countertops of solid surface/solid composite plastics only or stainless steel.

4-4.2 Finishes.

Provide finishes that are compatible with the intended uses and are highly durable and low maintenance. They must meet the requirements listed in NFPA 101. \1\ Also coordinate the interior design with the Air Force Interior Design Standards, major command and installation design standards, and UFGS 09 68 00. /1/ Personnel with weapons and ammunition often bump and scrape walls, so provide heavy-duty, durable finishes.

Provide acoustical treatment to minimize sound reverberations and intensity within the indoor small arms firing range.

4-4.3 Window Treatments.

Include window treatments (shading systems) as an integral part of the construction contract in administrative areas. Dual fabric solar roller shade systems with manual roll chain operation are recommended. Analyze solar conditions when selecting a window treatment. Window treatments must provide full coverage to reduce light leakage. Any window treatment must be flame-resistant and commercial quality.

4-5 SERVICES.

4-5.1 Plumbing.

Design domestic hot and cold water, sanitary and storm drainage, compressed air, propane, fuel oil, or natural gas systems to meet the requirements of UFC 3-420-01 and local installation standards.

The weapons maintenance and student weapons cleaning rooms shall each require emergency eyewash. Compressed air shall be provided in the student weapons cleaning room.

4-5.2 Heating, Ventilating, and Air Conditioning (HVAC).

\1\ Design the HVAC system to meet the requirements of UFC 3-410-01 and UFC 4-179-02. /1/

The air supply system for the firing range must ensure a safe environment for participants by delivering air at the firing line and exhausting air at the target end. \1\ Air must travel in a laminar fashion at 71 to 79 fpm across the firing line to prevent powder residue from settling. Provide uniform, unidirectional laminar airflow across the firing line by installing a perforated air distribution radial plenum along the rear wall. See UFC 4-179-02 for heating and cooling criteria. Exhaust air must be provided at the end of the indoor small arms firing range at the bullet trap and must maintain 0.05 inch of water negative pressure on the range. /1/ Exhaust fan controls must be interlocked with the supply fan to ensure simultaneous operation. Re-circulation of range air is not permitted and exhaust air discharge from the range and bullet trap shall meet local, state, and federal requirements. The range control booth shall maintain positive pressure relative to the indoor small arms firing range.

The HVAC system for the weapons cleaning area, ammunition storage area, and weapons maintenance area must be designed for safe operations with chemicals and munitions. Provide exhaust ventilation for the weapons maintenance shop, range supplies, student weapons cleaning room, laundry, janitor closet, and restrooms. Exhaust makeup air may be transferred from adjacent spaces (not from firing range), provided adequate ventilation is supplied to prevent negative air pressure in relation to the outside. Provide occupancy sensors to control all exhaust fans. Weapons and ammunition storage areas must maintain relative humidity below 65 percent.

4-5.3 Fire Protection and Life Safety.

Refer to UFC 1-200-01 to determine the applicable design codes and standards for all building and life safety features for the facility. UFC 1-200-01 references UFC 3-600-01 and will be utilized to determine the passive fire protection features of the facility, such as building height and area, construction type, egress limitations, etc., as well as the active fire protection features of the facility, including fire detection, fire alarm, fire suppression, etc.

\1\ UFC 4-179-02 provides specific DoD design and construction criteria for small arms ranges and shall take precedence over all other design standards where conflicts exist for fire protection requirements. /1/

4-5.4 Electrical.

\1\ Provide electric service and distribution equipment, wiring receptacles and grounding, interior and exterior lighting and control, emergency lighting, telephone, communication systems, fire alarm, other health and safety alarms, and intrusion systems in accordance with NFPA 70, UFC 3-520-01, UFC 4-179-02, and installation design requirements. /1/

See the latest edition of *Electric Current Abroad* to determine voltages and cycles in overseas locations. Service grounding system and all wiring methods must meet current NFPA 70 requirements. All service equipment must be Underwriters Laboratories (UL) listed. Alternately, published proof from an approved independent testing laboratory may be provided.

4-5.4.1 Lighting.

\1\ Provide lighting and control systems throughout the facility in accordance with UFC 3-530-01 and UFC 4-179-02. /1/ Pay particular attention to issues such as glare, heat generation, and impact protection for the fixtures in the indoor small arms firing range. Provide a control system to highlight target lines at the 3, 7, 10, 15, and 25 meter lines and to simulate night or daylight.

Provide a flashing light system to simulate a police car light bar. Provide “range in use” warning lights.

4-5.4.2 Communications and Data.

Telephone and data outlets may be independent of each other or combined into a single junction box. Also consider wireless audio, video, and data installations to add flexibility. If the hard-wired connections can be combined into a single junction box then the cover plate to that junction box must allow for multiple connections. In some unique situations, the CATV/internal video connection can also be combined into a single junction box with the appropriate cover plate.

Identify the technical design requirements for the CCTV system with the base user and AFSFC.

4-5.4.3 Alarm Systems.

Provisions for alarm systems must be identified during the planning/programming process. Provide an alarm system to warn personnel that live fire is in progress and/or if any downrange doors are open. Provide an intrusion detection alarm system to protect vault arms and ammunition.

4-6 SITE DESIGN AND ORGANIZATION.

4-6.1 Parking and Access Drives.

Provide parking for both staff and patrons with the appropriate access drives. Consider bicycle racks near the facility entrance in a secure location. \1\ For landscaping and site pavements refer to UFC 4-010-01, paragraph 3-3, for the unobstructed space requirement around the facility. /1/

4-6.2 Service Drive.

The size of required service vehicles should be verified by the designer prior to planning the service access areas. Provide a back-up spur for dead-end and service drives that exceed 100 feet (30 meters) in length for receiving area, garbage dumpster/storage (indoor or outdoor), mechanical room, and service entry, if one is designated. Provide a service vehicle apron and consolidate service access when possible.

4-6.3 General Site Lighting.

\1\ Provide exterior "range in use" flashing red indicator lighting as required by UFC 4-179-02. /1/

4-7 BARRIER-FREE DESIGN REQUIREMENTS.

Refer to UFC 1-200-01 for barrier-free design requirements.

Indoor small arms firing range activities will be for able-bodied personnel only. Visitors with physical disabilities will be allowed as observers but not participants.

4-8 ANTITERRORISM.

Refer to UFC 4-020-01 for AT requirements. The firing range portion of the building may be classified as low occupancy due to the personnel density of more than 430 SF/PN, which would exempt the firing range from all UFC 4-010-01 provisions.

4-9 SUSTAINABLE DESIGN.

Comply with the requirements of UFC 1-200-02, *High Performance and Sustainable Building Requirements* and achieve green building certification in accordance with the current AF Sustainable Design and Development memo.

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APPENDIX A REFERENCES

Use the latest available issuance of the reference

AIR FORCE

AFI 31-101, *Integrated Defense*, <http://www.e-publishing.af.mil/>

AFMAN 31-229, *USAF Weapons Handling Manual*, <http://www.e-publishing.af.mil/index.asp>

AFMAN 32-1084, *Facility Requirements*, <http://www.e-publishing.af.mil/>

Air Force Corporate Facility Standards (AFCFS), <http://afcfs.wbdg.org/index.html>

US Air Force Interior Design Standards, <http://wbdg.org/ccb/AF/AFDG/interiordesign.pdf>

ARCHITECTURAL BARRIERS ACT

ABA Accessibility Standard for Department of Defense Facilities, <http://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-aba-standards/aba-standards>

DEPARTMENT OF COMMERCE

Electric Current Abroad, <http://trade.gov/publications/abstracts/electric-current-abroad-2002.asp>

DEPARTMENT OF DEFENSE

UFC 1-200-01, *General Building Requirements*,
http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4

UFC 1-200-02, *High Performance and Sustainability Building Requirements*,
http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4

UFC 3-410-01, *Heating, Ventilating, and Air Conditioning Systems*,
http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4

UFC 3-420-01, *Plumbing Systems*,
http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4

UFC 3-520-01, *Interior Electrical Systems*,
http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4

UFC 3-530-01, *Design: Interior and Exterior Lighting and Controls*,
http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4

UFC 3-600-01, *Fire Protection Engineering for Facilities*,
http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4

UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*,
http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4

UFC 4-020-01, *DoD Security Engineering Facilities Planning Manual*,
http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4

\1\ UFC 4-179-02, *Small Arms Ranges*,
http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4 /1/

\1\ UFGS 09 68 00, *Carpeting*, <https://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs> /1/

NATIONAL FIRE PROTECTION ASSOCIATION

NFPA 101, *Life Safety Code*, <http://www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=101>

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APPENDIX B BEST PRACTICES

11\

B-1 U.S. AIR FORCE RANGE SIZE REQUIREMENTS CALCULATOR.

The Range Size Requirements Calculator is used to determine the number of lanes required based on the historic training load and as adjusted for future growth or draw-down expectations. The spreadsheet can be found on the Whole Building Design Guide website: http://www.wbdg.org/references/pa_dod_sps.php

Figure B-1 Range Size Requirements Calculator

STEP 1--Annual Training Requirement						
Historical AF Training requirement	Rifle Qua	Pistol Qua	Shotgun Qual	Other Qual (i.e. MPS)	Yr Total	
Current FY -1	1233	455	28	14	1730	
Current FY -2	1337	335	32	32	1736	
Current FY -3	1298	438	14	28	1778	
3 Yr Average					1748	
Mission Changes: list, and add/subtract the number of personnel projected to require annual training (+ or -)						0
Total Design Training Requirement (DTR)						1748
STEP 2--Total Training Days Requirement						
Available Training Days	365	Days				
Weekends (104), Holidays (10)	-114	Days				
SF Core Trng	-27	Days				
CA Core Trng	-12	Days				
MAJCOM, Wing Down days	-4	Days				
Non-Main Range Weapons Trng (i.e. M203, M249, M240, MK19, etc.)	-9	Days				
Range Maintenance (1 day dedicated per month, does not include range rehab/project)	-12	Days				
Weapons Maintenance (1 day dedicated per month)	-12	Days				
Annual Weapons Inspections	-10	Days				
List additional requirement/ # of days (do not include pro-fire or sustainment) (AFSFC must validate)	0	Days				
Total Training Days Available (TDA)		165	Days			
STEP 3--Lane Requirement						
Range Lane Requirement DTR/TDA		10.59	Lanes			
Greatest multiple of 7 lanes to satisfy the range lane requirement		14	Lanes			
STEP 4--Manpower Consideration						
Manpower Authorization--as reflected on the UMD						
Officer-in-charge (if applicable)	0					
Non-commissioned Officer-in-Charge (SEI 312 or 3P051B)	1					
CA Instructors (3P051B or 3P031B)	3					
Total Manpower Authorized		4				
STEP 5--AFCEC and AFSFC Consideration (i.e. number of ranges, range type, and mission set)						

B-2 U.S. AIR FORCE INDOOR RANGE INTERACTIVE PROGRAMMING SPREADSHEET.

The Interactive Programming Spreadsheet assists programmers to determine the size of the direct and indirect support component of the range based on the training load requirement, as described in paragraph B-1. The Interactive Programming Worksheet can be found on the Whole Building Design Guide website:

http://www.wbdg.org/references/pa_dod_sps.php

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Figure B-2 Indoor Small Arms Range Facility (14 Lane – Standard)

Indoor Small Arms Range Facility (14 Lane - Standard)

MODULE NO.	AREA	NO. OCCUP	SF PER USER	NO. OF ROOMS REQD	INDIVIDUAL ROOM RQRMTS SF	NET USER REQUIREMENTS		COMMENTS
						SF	SM	
A Administration								
A.1	Queuing	14	20	1	340	340	31.59	1
A.2	Break	17	20	1	340	340	31.59	2
A.3	NCOIC Office	1	140	1	140	140	13.01	3
A.4	Open Office	3	80	1	260	260	24.15	4
A.5	Admin / Instructor Storage	0	0	1	100	100	9.29	
SUBTOTAL ADMINISTRATION AREA						1180	109.62	
B Arms Range								
B.1	Arms Range	17		1	10,930	10,930	1,015.40	
B.2	Range Supplies	0		1	700	700	65.03	
SUBTOTAL ARMS RANGE AREA						11630	1,080.43	
C Training								
C.1	Classroom	17		1	900	900	83.61	5
C.2	Weapons Simulator	17		1	900	900	83.61	5
C.3	Observation Room	2		1	130	130	12.08	6
C.4	Storage	0		2	50	100	9.29	
SUBTOTAL TRAINING AREA						2030	188.59	
D Maintenance								
D.1	Weapons Maintenance Shop	2		1	550	550	51.10	7
SUBTOTAL MAINTENANCE AREA						550	51.10	
E Cleaning								
E.1	Student Weapons Cleaning	17		1	700	700	65.03	8
SUBTOTAL CLEANING AREA						700	65.03	
F Storage								
F.1	Arms Vault	1		1	400	400	37.16	9
F.2	Issue Room	17		1	300	300	27.87	10
SUBTOTAL STORAGE AREA						700	65.03	
G Utility								
F.1	Restrooms / Locker Rooms	0		1	530	530	49.24	
F.2	Janitor's Closet	0		1	45	45	4.18	
F.3	Laundry Room	0		1	65	65	6.04	
SUBTOTAL UTILITY AREA						640	59.46	
H Building Support								
F.1	Mechanical	0		1	1800	1800	167.22	11
F.2	Electrical	0		1	150	150	13.94	11
F.3	Telecommunications	0		1	150	150	13.94	
SUBTOTAL BUILDING SUPPORT AREA						2100	195.09	
Exterior Elements								
	Mechanical Yard	0		0.5	1100	550	51.10	14
	Exterior Canopy	0		0.5	120	60	5.67	14
SUBTOTAL STORAGE AREA						610	56.67	
TOTAL FACILITY NET FLOOR AREA						20,140.00	1,871.01	
NET TO GROSS								14%
TOTAL FACILITY GROSS AREA						22,960	2,133	12,13

COMMENTS:

- 1 Queuing area based upon 20 sq ft per occupant with additional 60 sq ft for Vestibule; Refer AFI 32-1084 Table 6.3 - Waiting and Vestibule
- 2 Break area based upon 20 sq ft per occupant; Arms Range to conduct simultaneous training
- 3 NCOIC Office area based upon Private office with up to two visitors; Refer AFI 32-1084 Table 6.2
- 4 Open Office area based upon 80 sq ft per occupant with additional 20 sq ft for administrative support; Refer AFI 32-1084 6.1.2.1, 6.1.2.3, and Table 6
- 5 Classroom / Weapons Simulator areas based upon specific requirements per AFSF
- 6 Observation Room area based upon 64 sq ft per occupant, Refer AFI 32-1084 Table 6.2.1
- 7 Weapons Maintenance Shop area based upon specific requirements per AFSF
- 8 Student Weapons Cleaning area based upon specific requirements per AFSF
- 9 Arms Range area based upon requirements set forth in UFC 4-215-01
- 10 Issue Room area based upon 12'-0" minimum depth for proper distribution and clearing of arms
- 11 Building Support areas may differ per climatic and systematic requirements
- 12 This facility has a low net to gross factor due to the square footage of the indoor small arms range
- 13 Net to Gross Area includes circulation, walls, and corridors
- 14 Arms Range Mechanical Yard and Exterior Canopy are covered exterior spaces and are calculated at 1/2 square footage

Figure B-3 Indoor Small Arms Range Facility (21 Lane – Standard)

Indoor Small Arms Range Facility (21 Lane - Standard)

MODULE NO.	AREA	NO. OCCUP	SF PER USER	NO. OF ROOMS REQD	INDIVIDUAL ROOM RQRMNTS SF	NET USER REQUIREMENTS		COMMENTS
						SF	SM	
A Administration								
A.1	Queuing	24	20	1	540	540	50.17	1
A.2	Break	24	20	1	480	480	44.59	2
A.3	NCOIC Office	1	140	1	140	140	13.01	3
A.4	Open Office	4	80	1	340	340	31.59	4
A.5	Admin / Instructor Storage	0	0	1	100	100	9.29	
SUBTOTAL ADMINISTRATION AREA						1600	148.64	
B Arms Range								
B.1	Arms Range	25		1	15,800	15,800	1,467.82	
B.2	Range Supplies	0		1	700	700	65.03	
SUBTOTAL ARMS RANGE AREA						16500	1,532.85	
C Training								
C.1	Classroom	25		1	1200	1200	111.48	5
C.2	Weapons Simulator	25		1	1200	1200		5
C.3	Observation Room	2		1	130	130		6
C.4	Storage	0		2	50	100		
SUBTOTAL TRAINING AREA						2630	244.33	
D Maintenance								
D.1	Weapons Maintenance Shop	4		1	700	700	65.03	7
SUBTOTAL MAINTENANCE AREA						700	65.03	
E Cleaning								
E.1	Student Weapons Cleaning	24		1	900	900	83.61	8
SUBTOTAL CLEANING AREA						900	83.61	
F Storage								
F.1	Arms Vault	1		1	576	576	53.51	9
F.2	Issue Room	22		1	400	400	37.16	10
SUBTOTAL STORAGE AREA						976	90.67	
G Utility								
F.1	Restrooms / Locker Rooms	0		1	680	680	63.17	
F.2	Janitor's Closet	0		1	45	45	4.18	
F.3	Laundry Room	0		1	65	65	6.04	
SUBTOTAL UTILITY AREA						790	73.39	
H Building Support								
F.1	Mechanical	0		1	1800	1800	167.22	11
F.2	Electrical	0		1	150	150	13.94	11
F.3	Telecommunications	0		1	150	150	13.94	
SUBTOTAL BUILDING SUPPORT AREA						2100	195.09	
I Exterior Elements								
	Mechanical Yard	0		0.5	1575	787.5	73.16	14
	Exterior Canopy	0		0.5	120	60		14
SUBTOTAL STORAGE AREA						847.5	78.73	
TOTAL FACILITY NET FLOOR AREA						27,043.50	2,512.34	
NET TO GROSS								13%
TOTAL FACILITY GROSS AREA						30,559	2,839	

COMMENTS:

- 1 Queuing area based upon 20 sq ft per occupant with additional 60 sq ft for Vestibule; Refer AFI 32-1084 Table 6.3 - Waiting and Vestibule
- 2 Break area based upon 20 sq ft per occupant; Arms Range to conduct simultaneous training
- 3 NCOIC Office area based upon Private office with up to two visitors; Refer AFI 32-1084 Table 6.2
- 4 Open Office area based upon 80 sq ft per occupant with additional 20 sq ft for administrative support; Refer AFI 32-1084 6.1.2.1, 6.1.2.3, and Table 6
- 5 Classroom / Weapons Simulator areas based upon specific requirements per AFSF
- 6 Observation Room area based upon 64 sq ft per occupant, Refer AFI 32-1084 Table 6.2.1
- 7 Weapons Maintenance Shop area based upon specific requirements per AFSF
- 8 Student Weapons Cleaning area based upon specific requirements per AFSF
- 9 Arms Range area based upon requirements set forth in UFC 4-215-01
- 10 Issue Room area based upon 12'-0" minimum depth for proper distribution and clearing of arms
- 11 Building Support areas may differ per climatic and systematic requirements
- 12 This facility has a low net to gross factor due to the square footage of the indoor small arms range
- 13 Net to Gross Area includes circulation, walls, and corridors
- 14 Arms Range Mechanical Yard and Exterior Canopy are covered exterior spaces and are calculated at 1/2 square footage

Figure B-4 Indoor Small Arms Range Facility (56 Lane)

Indoor Small Arms Range Facility (56 Lane)

MODULE NO.	AREA	NO. OCCUP	SF PER USER	NO. OF ROOMS REQD	INDIVIDUAL ROOM RQRMNTS	NET USER REQUIREMENTS		COMMENTS
						SF	SM	
A Administration								
A.1	Queuing	56	20	1	1180	1180	109.62	1
A.2	Break	56	20	1	1120	1120	104.05	2
A.3	NCOIC Office	1	140	1	140	140	13.01	3
A.4	Open Office	16	80	1	1300	1300	120.77	4
A.5	Admin / Instructor Storage	0	0	1	400	400	37.16	
SUBTOTAL ADMINISTRATION AREA						4140	384.61	
B Arms Range								
B.1	Arms Range	64		1	39,700	39,700	3,688.13	
B.2	Range Supplies	0		1	1,600	1,600	148.64	
SUBTOTAL ARMS RANGE AREA						41300	3,836.77	
C Training								
C.1	Classroom	63		1	2700	2700	250.83	5
C.2	Weapons Simulator	63		1	2700	2700		5
C.3	Observation Room	2		2	200	400		6
C.4	Storage	0		4	200	800		
SUBTOTAL TRAINING AREA						6600	613.14	
D Maintenance								
D.1	Weapons Maintenance Shop	8		1	1200	1200	111.48	7
SUBTOTAL MAINTENANCE AREA						1200	111.48	
E Cleaning								
E.1	Student Weapons Cleaning	63		1	2500	2500	232.25	8
SUBTOTAL CLEANING AREA						2500	232.25	
F Storage								
F.1	Arms Vault	1		1	900	900	83.61	9
F.2	Issue Room	22		1	700	700	65.03	10
SUBTOTAL STORAGE AREA						1600	148.64	
G Utility								
F.1	Restrooms / Locker Rooms	0		1	680	680	63.17	
F.2	Janitor's Closet	0		1	45	45	4.18	
F.3	Laundry Room	0		1	65	65	6.04	
SUBTOTAL UTILITY AREA						790	73.39	
H Building Support								
F.1	Mechanical	0		1	4600	4600	427.34	11
F.2	Electrical	0		1	300	300	27.87	11
F.3	Telecommunications	0		1	300	300	27.87	
SUBTOTAL BUILDING SUPPORT AREA						5200	483.08	
I Exterior Elements								
	Mechanical Yard	0		0.5	4705	2352.5	218.55	14
	Exterior Canopy	0		0.5	210	105	9.75	14
SUBTOTAL STORAGE AREA						2457.5	228.30	
TOTAL FACILITY NET FLOOR AREA						65,787.50	6,111.66	
NET TO GROSS								13%
TOTAL FACILITY GROSS AREA						74,340	6,906	12,13

COMMENTS:

- Queuing area based upon 20 sq ft per occupant with additional 60 sq ft for Vestibule; Refer AFI 32-1084 Table 6.3 - Waiting and Vestibule
- Break area based upon 20 sq ft per occupant; Arms Range to conduct simultaneous training
- NCOIC Office area based upon Private office with up to two visitors; Refer AFI 32-1084 Table 6.2
- Open Office area based upon 80 sq ft per occupant with additional 20 sq ft for administrative support; Refer AFI 32-1084 6.1.2.1, 6.1.2.3, and Table 6.:
- Classroom / Weapons Simulator areas based upon specific requirements per AFSF HQ
- Observation Room area based upon 64 sq ft per occupant, Refer AFI 32-1084 Table 6.2.1
- Weapons Maintenance Shop area based upon specific requirements per AFSF HQ
- Student Weapons Cleaning area based upon specific requirements per AFSF HQ
- Arms Range area based upon requirements set forth in UFC 4-215-01
- Issue Room area based upon 12'-0" minimum depth for proper distribution and clearing of arms
- Building Support areas may differ per climatic and systematic requirements
- This facility has a low net to gross factor due to the square footage of the indoor small arms range
- Net to Gross Area includes circulation, walls, and corridors
- Arms Range Mechanical Yard and Exterior Canopy are covered exterior spaces and are calculated at 1/2 square footage

B-3 PDF FLOOR PLANS AND BIM DRAWING LINK.

The .pdf and BIM drawings can be found on the Whole Building Design Guide at <https://www.wbdg.org/ffc/af-afcec/prototypes-standard-designs/1/>

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APPENDIX C GLOSSARY

°F	degrees Fahrenheit
ABA	Architectural Barriers Act
ADP	Area Development Plan
A-E	architect-engineer
AFCFS	Air Force Corporate Facilities Standards
AFH	Air Force Handbook
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFSFC	Air Force Security Force Center
ASTM	American Society of Testing and Materials
AT	antiterrorism
BIM	Building Information Modeling
CATV	cable television
CCTV	closed-circuit television
CMU	concrete masonry unit
DOD	Department of Defense
fpm	feet per minute
GSA	General Services Administration
HVAC	heating, ventilating, air conditioning
IDP	Installation Development Plan
LED	light-emitting diode
NCOIC	non-commissioned officer in charge
NFPA	National Fire Protection Association
PDF	Portable Document Format

SF	square feet
STC	Sound Transmission Class
UFC	Unified Facilities Criteria
UFGS	Unified Facilities Guide Specification
V	volt

CANCELLED