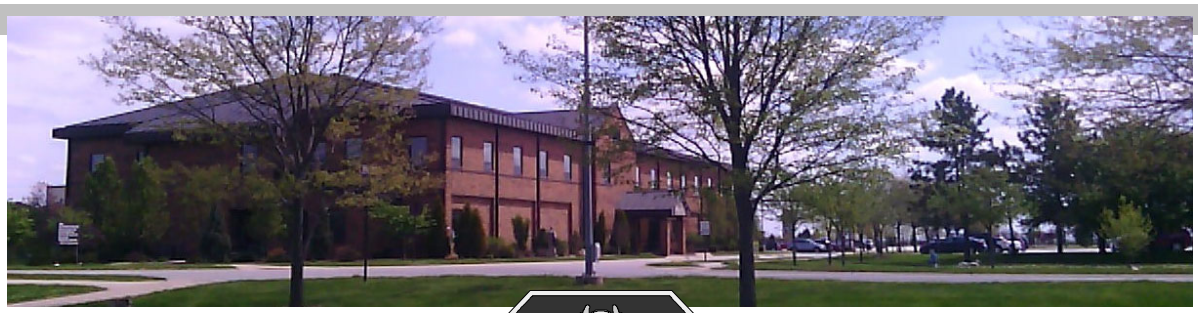
# Grissom Air Reserve Base

## Base Standards (AUG 2020)

434 Base Civil Engineering

# Chapter A: FACILITY STANDARDS



***The 434 Civil Engineering team at Grissom Air Reserve Base has achieved design excellence economically thru team work, following codes and subtle rational design. We challenge the Designers, Reviewers, Facility Users and Contractors to continue our efforts to allow, effective reviews, <u>quality</u> construction and <u>timely</u> occupancy***

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# SECTION A: FACILITY STANDARDS

## GENERAL

### A-1 GENERAL STANDARDS

### A-1.1 PURPOSE

The purpose of this guide is to define the vision, the design and the construction standards for the base, which serve to integrate the visual character throughout the base. This will ensure consistent quality design decisions by commanders, planners, architects, engineers, contractors, maintenance staff and residents. The guide will promote clear concise communication between Grissom ARB and design and construction professionals. The audience for this chapter is mainly base users, engineers, facility managers, BOS contractor

### A-1.2 STANDARD

The goal of this document is to provide information to program, design, and construct facilities for the air force mission. Designs shall comply with air force standards, base standards, federal regulations, state codes and current statement of work. Design solidly and for the long term. The base standards is comprised of 4 chapters:
Chapter A – FACILIITY STANDARDS (ARCH, CIVIL, MECH, ELEC)
Audience: General for All (base users, engineers, facility managers, BOS contractor)
Chapter B – STANDARD DRAWINGS AND DETAILS
Audience: Base users, engineers, facility managers, BOS contractor
Chapter C – CONSTRUCTION STANDARDS (ADMIN, SUBMITTAL, ETC.)
Audience: Construction Contractors, Inspectors, Contracting Officer, Project Managers
Chapter D – DESIGN STANDARDS
Audience: Engineers, Architect/Engineer Firms

The DOR is responsible for architectural and engineering aspects of the project using this document and user input to ensure reasonable facility cost appropriate for the functions to be performed through design.

### A-1.3 AUTHORITY

This is an Air Force Reserve base. As such some policies, funding and regulations are different than the Air Force and the Army. Before starting a project review all regulations. Space Authorizations are in AFRC 321001. Review the 1391 and 332. All design and spaces must be justified. Priority is AFRC regulations, Base policy, User Requirements and User Request. The user provides a request backed by a written justification. It is up to the Civil Engineering department on how that request is fulfilled based on solid regulations, design and engineering decisions. Impractical and excessively costly requests and designs are not acceptable. Projects will be review by AFRC HQ.

### A-1.4 CRITERIA

Design and construction shall comply with all pertinent Unified Facility Criteria (UFC) AND References *{See www.wbdg.org}* See reference section in this document . For successful projects the contractor shall be familiar with the primary guidance UFC-1-200-01 DOD Building Code (list of core UFC's)

## CIVIL

### A-2 CIVIL STANDARDS

### A-2.1 General:

Grissom ARB is divided into the flight line facilities, industrial facilities and office/ support facilities. The support facilities include lodging, offices, shops warehouses and hangars. Pedestrian travel from building to building should be efficient, handicap accessible and enjoyable having small areas of interest along the path. Facility main entrances should stand out as the facility's focal point.

### A-2.2 Landscaping:

Use landscaping to enhance facilities and site. Provide a welcoming comfortable environment. Develop pedestrian and vehicular routes with organizing landscaping features that unify and connect individual facilities. Use landscaping and lighting to bolster force protection, security and traffic control. Avoiding over lighting. Separate pedestrian paths from roads. Provide landscaping to reduce appearance of equipment and trash containers.

### A-2.3 Lawn:

Grade land to drain away from buildings use site drainage encouraging evaporation. Do not allow the site hold water over 48 hrs. Minimize field drains and allow curb overflow. Provide a storm water runoff and control plan. Use best management practice in UFC 3-210-10. Do not use artificial irrigation. Do not use loose straw near flightline and apron. Use hydroseeding for grass and grade. No sprinklers. Provide lawn areas away from building to increase water infiltration of the soil. Amend and replace soil in these areas for 18" depth to increase infiltration by min 3%. For best practices use Grissom Facility seeding blend for areas outside of flightline. Kentucky 31 for airfield.

Grissom Facility Seeding:

| Planting Season | Variety | Percent (by Weight) | |
|---|---|---|---|
| Season Yuma | | 100% | Temporary Seeding 100% |
| Kentucky Bluegrass | | 60% | Annual 80% |
| Chewing Red Fescue | | 30% | Perennial Ryegrass 10% |
| Perennial Ryegrass | | 10% | Redtop 10% |

### A-2.4 Trees:

Removal of existing trees will require express base permission. Provide small caliper trees (1" sprigs) in landscaping plans. Avoid selecting trees prone to heavy fruiting, storm breakage and disease. Removal of a tree will require replacement of 1" to 1" of tree size. One 4"d tree = twelve 1"d trees.

### A-2.5 Planting:

Provide planting beds and plants as accents. Select hardy low maintenance local perineal and evergreen plants. Plans shall be, drought tolerant and low-level plantings spaced to allow view around plant. Planting areas shall have 4" mulch, edging and landscape barriers. Existing soil is silty clay. Amend for better drainage. Provide time released fertilizer 10-20-10 for all trees, shrubs and planting beds. Include trees. Planter beds shall not be above side walk.

**A-2.6 Sidewalks:**

Provide standard 5'x5' broom finished concrete sidewalks with compacted subsurface. 5" thick with rebar at traffic crossings. Provide subdued pattern at patio, entrances and plaza areas. Reduce high contrast of concrete, grass and building. Main concrete porch entrances and stoops to facilities shall have at a minimum 2x2 pattern in the concrete. Patios and porches shall use a brick pattern. Stamped concrete will be considered. Use INDOT handicap ramp standards with slopes, landings, vertical lines, and grey truncated domed brick. Embed brick in sand per INDOT standard for easy replacement after wearing or damage. Provide 30" x 30" angled corners at all sidewalk intersections. Use curved path to the best extent possible. Do not use sidewalks as water paths. Separate from road curbs with minimum of 3' green space. Design to prevent upheavals due to freezing cycle.

**A-2.7 Entrances:**

Provide small planter beds with small to medium sized plants and mix of evergreens and perennials at main entrances, sized bed to accent and focus entrance. Provide 20% of space for government furnished and installed annuals. Layout and space the plants to prevent packages from being hidden in the foliage. Select plants rated for local area, drought resistant and no-to-low plant maintenance. Provide planter beds at secondary entrances if traffic is 30% of main entrance traffic. Do not plant trees close to building or physical structures. Provide and locate downspout, splash blocks and medium size rocks into bed area to allow watering and reduce erosion. Design bed depth and shape to allow ease of maintenance and lawnmower use. Design stoops at doors to resist frost upheaval

**A-2.8 Roads:**

Grissom asphalt roads and parking are INDOT standard asphalt mix design. PG 64-22, SuperPave job mix formula with modified Grissom roll curbs. Parking uses 4" white reflective stripe. Provide handicap accessible parking, signs, striping and cross walks. Minimize painting on pavement. Provide dark bronze and white building signs and directional signs. Do not use permeable pavement without permission. Provide round posts with round caps for traffic signs. For signs post within 7' of roads install break away couplings for signs.

**A-2.9 Bollards:**

Provide bollards to protect items that might be hit by a vehicle or lawnmower and to limit direct vehicular access to sidewalks. Cover bollards with plastic dark bronze cover with reflective top and stripes. Bollards may be also used for force protection to prevent vehicular access to a site and to discourage pedestrian traffic without being obtrusive.

**A-2.10 Utilities:**

Site Utilities are to be underground. Utilities should have metal- traceable marking tape 18" below grade. Utility base and commercial locates are required before construction. Contact CE services desk (688-3383) coordinate with CE construction manager for base utility locates and required dig permits. Contact Indiana underground (1-800-382-5544 and 811) for commercial utility locates. Provide metering and grounding protection. Provide storm retention plan and erosion control plan. Directional boring must be specifically approved during the design phase. Utility "pushing" under roadways is permitted. Coordinate to prevent cutting of existing utilities. Coordinate with CE to prevent conflicts with

future base facilities and developments. Provide shop drawing showing pathways and proposed depths.

## ARCHITECTURAL

### A-3 GENERAL ARCHITECTURE:

The Grissom Air Reserve Base is a series of office and industrial facilities connecting to an airport. The base's design theme is low profile campus/ office park environment balancing the human scale with the large airfield. Subtle aesthetics and massing are used to tone down the building volume and height facilities. The buildings indicate permanence, strength and security while being aesthetically pleasing. Building entrances shall have a sense of arrival and strength. The goal is to provide excellent quality design. Buildings shall be energy efficient, sustainable, environmentally friendly, easily maintained and economical. Designs shall reduce vertical appearance and volume.

### A-4 GRISSOM CURRRENT STYLES:

Grissom Air Reserve Base can be separated in to four different design concepts: Grissom Blend Office, Grissom Blend Industrial, Flightline facilities and Other Facilities.

### A-4.1 Grissom Blend Office Facilities:

This is the preferred standard: Dark bronze standing seam metal roof and full wall Grissom Blend Brick in a park /office theme. Low profile design. Portico entrances with columns appropriate for group arrivals and professionals. Use accent features as indicated in the standard. Metal siding for walls is not used unless structurally required. Type's spaces include Offices, Admin, lodging and services facilities. Use full Grissom blend brick on any building with eaves below 10'

### A-4.2 Grissom Blend Industrial Facilities:

Dark bronze standing seam metal roof, metal siding, and Grissom Blend Brick wainscot in a base warehousing theme. Maximize use of brick as much as practical. 4' for smaller buildings 8' is preferred. For larger. Deemphasize the height and industrial feel as much as possible Type of spaces include Maintenance and shop facilities with eaves above 10'. Almond metal siding is preferred.

### A-4.3 Flight line Facilities:

Construction shall follow flightline / airfield guidance. Safety and function are primary concerns. This includes colors, height, standoff distances and frangibility separation. Maximize use of brick as much as practical. Using the grissom blend brick up to 8' is preferred. Some customized signage and architype features may be utilized.

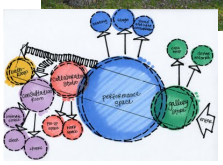
### A-4.4 Other Facilities:

The specific features varies from full metal to brick. Most are facilities that have not been renovated. The intent is for these to be upgraded using the Grissom blend brick themes to the maximum extent possible. Replace metal at wainscot level with brick. Existing material shall match the Grissom blend with standard base park office theme. Ancillary structure shall be compatible with Grissom blend themes and the surrounding facilities. These will be taken on a case by case basis.

**A-5 MISCELLANEOUS DESIGN PRINCIPLES:**

Design facility for function and efficient people movement. Separate groupings into public, semipublic, semi private, private areas and secure sectors. Secure areas have unconventional and costly construction features.

**A-5.1** Design rooms and spaces for flexibility to allow changes in function and mission. Design for stability, durability and long term functions in selection of material, equipment and processes. Reduce facility maintenance



**A-5.2** Design for force protection and protection of DoD assets. Design to facilitate functions in higher THREATCON conditions.

**A-5.3** Design for highest ASHRAE and energy standards for wall and attic insulation. Min R 45+ for attics and R 19+ for walls. Insulation has more value than other energy savings. Design to minimize air infiltration. Use foam to address voids. Use a foam and batt system if possible.

**A-5.4** Provide portico to protect entrance from weather and to reduce maintenance from tracking dirt water and salt into building. If secondary entrance uses more than 30% of main entrance traffic and is a main through fare install portico

**A-5.5** WALL SPACE: Wall space is a premium for system furniture, white boards, maps, lockers and displays. Thermostats, fire alarm, and sensor devices shall NOT be centered on the wall. Reduce amount of wall space used for switches and devices to a minimum foot print**.**

**A-6 GRISSOM ARCHITECTURAL STANDARD FACILITY COMPONENTS:**

Provide components as indicated by the following

**Exterior Systems**

**A-6.1 Roof:**

**A-6.1.1** The standard roof is dark bronze Standing Seam metal panels, ribbed made of Galvalume. Color is Kynar 5000. Use hipped roofs with 4:12 slopes, Rib flat sections of trim above 8" width. Design roof structure to minimize deflection. Roof vents and items penetrating the roof shall match the roof color. Minimize penetrations.

**A-6.1.2** Overhangs shall be proportional to the standard overhang style. Typically: 2'6 eave with a 2' deep fascia. Standing seam shall continue from roof to fascia. Soffits and fascia color shall match roof.

**A-6.1.3** Provide built-in gutters. Insure gutter and soffits design / details allows for overflow and leaks. (Use perforated soffits). To prevent leaks from movement and temperature changes provide add sealant, back flashing and flashing. Especially at valley and end walls. Keep gutter away from wall closer to fascia.

**A-6.1.4** Provide lightning protection assessment per UFC.

**A-6.1.5** Roof edge trim at gable ends shall be wider than 10". The edge trim should extend 10" from the building. Provide snow breaks above doors

**A-6.1.6** Provide minimum of 20 year manufacture warranty for roof and a 5 year contractor weather tight warranty. Design to allow minimum deflection and take into account the extensive freeze-thaw cycles in Indiana. Provide snow breaks over entrances, paths, work areas and on long roof areas.

**A-6.2 Exterior Walls:**

**A-6.2.1** The aesthetic intent is to blend in and reduce vertical lines with the addition of subtle accents of interest in the façade. Provide shadow lines. The design shall also reduce long term maintenance of the building.

**A-6.2.2** The **Standard Brick** is 'Grissom Blend' brick pattern with soldier accent bands. Grissom blend brick is multicolor brick with random brown, oranges, and flashings, See photos and building 641, 671, 669 and other buildings on base. The Accent band design standard is one or

two running course(s) and one soldier course of Tegular brown brick at 56" AFF. More bands may be required depending on height. Corners and ends are solid. Expansion joints are to match brick color

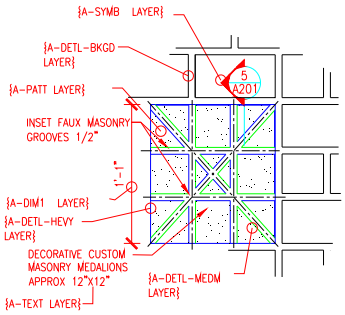
**A-6.2.3** The **Standard siding** is almond / beige or dark bronze panel with minimized ribbed panel profile and concealed fasteners. The manufacturer's standard colors will need to be approved. Submittal will be disapproved if colors do not match base standard colors. The metal panel should meet top of wainscot

**A-6.2.4 Brick wainscot** is preferred on industrial building to reduce damage to the metal panels due to lawn mowers, people and vehicles. Wainscot height depends on `building proportion. Provide slanted rowlock at top of wainscot.

**A-6.2.5** Flashing at openings, interior corners and at transitions shall be carefully applied to lead water away from building and not behind material. Do not create a growing place for mold. Provide screened weep holes. Apply self-stick flashing around openings.

**A-6.2.6** Insulate exterior walls for thermal efficiency and interior walls for sound attenuation. Provide air barrier in all exterior walls. Foam insulate at windows and doors. Provide air infiltration barriers. Seal roof/ wall and foundation/ wall joints with foam.

**A-6.2.7** COLORS SW exterior paint colors (Verify colors in field, Base Architect must approve. Esp in renovations. Field colors have changed.




**A-6.3 Portico:**

**A-6.3.1** Provide portico to protect entrance from weather and to reduce maintenance from tracking dirt water and salt into building. If secondary entrance uses more than 30% of main entrance traffic and is a main through fare install portico

**A-6.3.2** The main entrance shall be treated as one of the primary building design elements. The entrance must be a well-defined feature obvious to its location and function. It must provide user with a sense of having arrived at their destination. Entrances shall be oriented and covered to provide shelter from snow and rain. Size as appropriate for building size and function Min 8'

**A-6.4 Exterior building accessories:**

**A-6.4.1** Downspouts: Color shall be dark bronze to match roof. Connect downspout to underground storm system. Provide flexible, removable connection between downspout and in-ground connector. This will allow drain cleanout and water backup overflow.

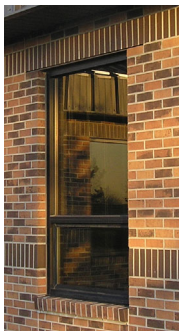
**A-6.4.2** Accessories attached to and penetrating walls and roofs shall match background, including panels, pipes and vents. Minimize exterior piping and wiring. See Force Protection Guidelines.

**A-6.4.3** Design shall include a minimum of 12 approx 2x2 stone Grissom medallions. Entrance shall have accent lighting. Provide brick offsets at the entrance. Allow for a minimum of 2% above basic costs for architectural features to be determined in the design phase.

**A-6.5 Doors**:

**A-6.5.1** Exterior doors are metal and dark bronze to match roof. Field finish secondary steel doors and overhead doors to match roof. Anodized storefront for main entrance. Design door for force protection to limit possible damage. Detail stoop and foundation to prevent water leakage and damage due to freeze upheavals.

**A-6.5.2** Interior shop doors are flush metal. Offices door are flush wood book matched, plain sawn, stained door, red oak. Finish edges to match exterior door color. Frame color is to match base board and interior design pattern.



**A-6.5.3** Design to allow welcoming entrance and natural light in hall reducing energy usage. Consider transom window above main doors and sidelights at entrance and reception areas.

**A-6.5.4** Interior doors and secondary doors should be solid with a 6" x 20"small glass panel at the door handle side. This will allow natural light and visibility.

**A-6.5.5** Interior door frames shall be metal. Field finished. Color to match door and baseboard. Tabs shall be welded to frame

**A-6.5.6** Door hardware: handle are to be levered style. Accessories and hardware are typically brushed stainless steel. Mechanisms shall be rated for heavy duty use.

**A-6.5.7** Locks: Best core 7 pin only. Deliver core and keys for keying on base. Use narrow line closures, door cushions and stops. Storefront main entrances shall have concealed latches. Use T type panic bars and narrow line closers

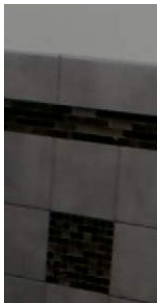
**A-6.6 Windows:**

**A-6.6.1** Provide 4'x6' aluminum double pane windows, insulated. Window has a fixed panel with a two-foot screened awning. Window framing shall be a maximum of 2" wide. Fill frame and brick gap with insulation to block air infiltration from brick airspace. Follow Force protection UFC guidance for glazing, lamination and frames. Conceal connection to structure. Provide calculations and setbacks.

**A-6.6.2** Provide alabaster or pearl miniblinds. Provide angled rowlock under windows. Solid brick at header, end soldier rows and end of rowlocks

**A-6.6.3** Windows. Insulate gaps all around window with foam head Jamb. Close gap between brick and wall for windows and doors. Verify air infiltration

**nterior Systems**



**A-6.7 Walls and finishes**

**A-6.7.1** Design finishes and furniture shall be professional but light and energetic. It shall reduce the industrial look and feel cubicles, system furniture and equipment. The interior shall be energetic and uplifting without being industrial. Metallic colors are not encouraged. Waiting rooms and conference rooms shall be calming. Administrative interior furnishings and finishes shall be upscale and professional. Cubicles shall be designed to reduce noise reflectance and pollution.

**A-6.7.2** The finish design styles shall vary per room but are compatible with the entire building. Plan for space flexibility. Furniture may be relocated in same or into other rooms. Design for variety of multiples rooms. Avoid dark colors. Use conservative colors, patterns and styles. Select for longevity and ease of maintenance (finishes that resist or disguises scratches, fingerprint and holes in walls). Do not use faddish, neon, pinks or purples colors, or paisleys or flowery patterns. Masses of cubicles of the same color and design is not acceptable.

**A-6.7.3** Provide finish / paint variety in rooms. Provide finishes differences for public, semiprivate, private and command spaces. Show hierarchy. Finishes (colors) should distinguish differences in corridors, mech rooms, general offices, executive offices, shops and conference room. Accent walls shall be subtle. Provide floor plan showing the finishes and concept on the plan. Provide elevations.

**A-6.7.4** Layouts and designs shall take into account users are military personnel in full gear. Avoid trip hazards, things that catch and items on floor.

**A-6.7.5** Avoid long corridors. Provide preformed expansion joints

**A-6.7.6** Provide metal corner guards (26 gauge, 1.5" wide max, 42"height) at exposed gypsum wall corners and columns.

**A-6.7.7** Insulate interior offices and conference room for noise and STC ratings.
**A-6.7.8** RESTROOMS: Provide paint and tile wainscot wall finishes on all walls. Use light paint, bull nose tile, light neutral tile with accent tiles on walls and floor. Use elongate glass mosaic tile for narrow accent band. Shower areas receive higher wainscot per UFC
**A-6.7.9** Provide interior plan(s) showing demountable walls and system furniture per the UFC. Coordinate and specify responsibility of installation wall power and comm to allow a full and complete system.
**A-6.7.10** Verify outlets on walls do not conflict with structure of cubicles and furniture placement. Provide elevation and cut sheets.
**A-6.7.11** Provide floor plan showing the finishes and concept on the plan.
**A-6.7.12** Provide an 8”x11” three ring binder color board with finish placement plan. Provide book marked email version of the binder representing the true color of the submitted items. Provide both hard copy and electronic copies
**A-6.7.13** SID (finishes) and CID (furniture) must follow and coordinate with the AFRC Comprehensive Interior Design Policy Manual, AFRC HQ and the UFC 03-120-10. The base has final approval.

**A-6.8 Flooring:**
**A-6.8.1** OFFICE AREAS. Provide multicolored/ random patterned carpet tile in floors. See AF Interior Design Standards. Provide anti-static and antibacterial. All flooring shall be rated for heavy duty, low maintenance and non-slip surfaces.
**A-6.8.2** Due to cost of replacement and maintenance minimize use of VCT. Use carpet or tile
**A-6.8.3** Provide stained and sealed concrete or quarry tile in warehouse / industrial shops stained and sealed concrete or quarry tile. Some shops may have carpet. Review shops special requirements. Evaluate potential for floor material damage.
**A-6.8.4** Provide vinyl floor base with carpet and concrete. Even in mech rooms. Provide tile base with tile floors.
**A-6.8.5** FOYERS AND ENTRANCES. Provide quarry tile or natural nonslip tile in Provide weather proof entry carpet in foyers. This will reduce snow, mud and salt damage to floors. Minimum 10’
**A-6.8.6** STAIRS. Provide concrete pan stairs with nonslip rubber treads
**A-6.8.7** RESTROOMS. No tile pattern on floors. Use sealed Dark grout. Use nonslip 6x6 or smaller tile in restrooms. Minimize patterns in flooring.

**A-6.9 Ceiling:**
**A-6.9.1** See UFC for interiors
**A-6.9.2** Provide 2’x2’ acoustical tile, tegular, dropped edges in office areas. and meeting rooms
**A-6.9.3** Provide high noise reflective value. Esp in open plan and cubicle areas. Design to reduce office noise.
**A-6.9.4** In restroom and wet areas provide a water proof tile I 2x2 grid. Tile material shall be firm, anti-fungi, nonsag, fire resistant, material. Durability and resistance to moisture is a must.
**A-6.9.5** Maximize room height in meeting rooms, entrances and larger rooms.
**A-6.9.6** Provide hold down clips for ceiling tile in foyers.

**A-6.10 Specialties and accessories**

**A-6.10.1** BREAKROOMS and kitchenettes: provide upper and lower cabinets. Standard stock kitchen styles with laminated finishes and Provide top drawers.

- Provide Corian counter.
- Provide LED lights under upper cabinets.
- Install goose neck pull out faucet with sprayer, and garbage disposer.
- Provide microwave shelf. 18" deep at upper cabinet level
- Provide space for large refrigerator. Min 36"
- Provide space for large coffee pot

**A-6.10.2** RESTROOMS: Provide metal toilet partitions and brushed stainless steel accessories including:

- Semi-recessed combination towel dispenser unit,
- Double toilet paper dispenser,
- Sanitary napkin disposal,
- Hooks in toilet rooms and showers
- Soap dispenser,
- Framed full length mirror, 12x60
- Framed mirror above sinks.
- Provide Handicap sinks with lever handle and goose neck faucets.
- Lavatory counter shall be open front.
- Urinal partition height shall match toilet partition.

**A-6.10.3**JANITOR ROOM:

- Provide mop sink with metal backsplash,
- Stainless steel metal wire shelf.
- Provide heavy duty wire shelves and mop holders. Above mop sink

**A-6.10.4**CONFERNCE ROOMS

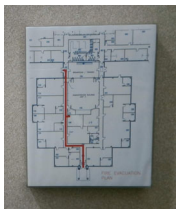
- Provide white boards and
- Recessed powered projector screen.
- Provide supports for projector and large TV
- Provide audiovisual connection
- In floor outlets at table..

**A-6.10.5**WATER FOUNTAIN.

- Provide backsplash behind unit,
- Provide bottle filler accessory.
- Filtering is not required.

**A-6.10.6** WINDOW sills

- Shall be Corian type light color
- Provide apron under sill fitted to each window.
- Seal corners with colored caulk to match walls and window.



**A-6.11 Interior Signs:**

**A-6.11.1** Provide a Room Identification Sign for each entrance to a room.

**A-6.11.2** Use base standard signage:

- Plastic sign with embossed room number and
- Large slide in slots for room designation
- Attached to wall with double sided tape.
- Follow ADA guides and UFC for signage heights.

**A-6.11.3** Provide directional signs for large buildings

**A-6.11.4** Provide a Building directory. The Building User must be able to change signage without special equipment.

**A-6.11.5** Provide enough 56”x56”building bulletin boards for:

- Union,
- Safety,
- Notices,
- Reserves,
- Civilian, and
- EEOC.

**A-6.11.6** Provide an 8.5”x11” clear plastic Evacuation Sign case for every occupied room. The case will located by the user with the building evacuation plan. Provide minimum of one white board in 30 % of offices and 1 in each meeting room

**A-6.12 Exterior Signs:**

**A-6.12.1** Provide wall mounted Building Identification Sign for main and secondary entrances. The Building Identification Sign has building number, building designation, address and call number. Standard Sign colors are dark bronze background with white letters. Match existing.

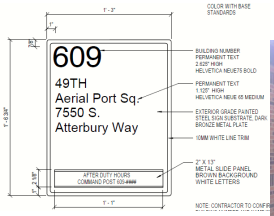
**A-6.12.2** Provide a minimum of two “FPCON” signs for facilities for main and secondary entrances.

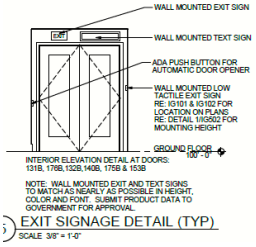
**A-6.12.3** Provide two post base standard building directional or site signage at the side of the main street.

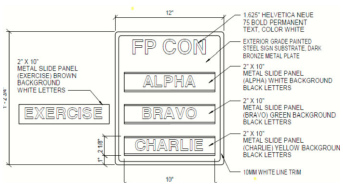
**A-6.12.4** Provide one two post sign in at street to identify building and address. For renovation work revise existing sign.

**A-6.12.5** Do not install separate “no smoking signs “. Smoking is only in designated exterior areas that are TBD by human relations department. Put in bulletin board.

**A-6.12.6** Exit sign and visual alert text sign shall be located next to each other centered on door, match text and size.







## A-6.13 Furniture

**A-6.13.1**. The use, purpose and design of this is covered by the Air Force interior design standards and UFC's the main issue is the furniture shall be durable, and conservative. Designer to provide a relaxing office environment avoid the industrial look. Due to the inherent function of the mission and military concept, the base policy is to design to be energetic but reduce the stress and pace where possible. No fads, bright colors, pinks, paisley or shiny colors.

**A-6.13.2**Furniture is not real property however the design must incorporate planning for furniture to avoid conflict. This is esp. true with use of system furniture cubicles and demountable walls.

**A-6.13.3**Design interiors for open floor plan using demountable walls per AFRC interior design guidance. There is specific guidance on full walls, permanent walls, and cubicles including minimum and maximum spaces. Demountable walls are listed as furniture. The intent is to provide more flexibility for the AFRC changeable environment. Due to mission change or command change.

**A-6.13.4** Provide cubical panel faces that are removable, reusable, and attached to the panel frame without the use of screws or other mechanical fasteners. Provide a top channel that holds panels in place and for floor-to-ceiling variations.

**A-6.13.5** Demountable Walls shall match permanent walls and doors. Minimize glass in demountable wall for privacy but design to allow daylighting. Use fabric or solid nonmetal and non-plastic surfaces to reduce sound reflectance. Provide tack able surfaces. No fad colors or complex patterns or shiny colors. Neutral and subtle colors. Accent by painting and accessories. No exposed fasteners.

**A-6.13.6** Maximize use of wall for switches, power and comm connections. Wiring is real property. No surface mounted units.

**A-6.13.7** Provide framed portal or open space to reach wall outlets without moving furniture. Electrical design may need to lower outlet height to 16" aff .

**A-6.13.8** Design to provide flexibility, maximize durability, minimize maintenance and minimize repair. Design spaces and interiors to reduce unusable resultant spaces due to systems furniture standard sizes.

**A-6.13.9** Plans, drawings and spec shall be laid out for demountable walls to be a option that can be separated out of the project

**A-6.14** More info for demountable walls and furniture at the **AF Systems and Modular Furniture website** {https://cs2.eis.af.mil/sites/10074/afcc/afica/AFFCC/SiteCollectionDocuments/Systems%20and%20Modular/SYSTEMS%20AND%20MODULAR%20FURNITURE.aspx}

**A-6.15** Furniture purchased under SRM and MILCON has different requirement then furniture purchased by base level organizations. Base level purchase are more restrictive.

## MECHANICAL

**A-7 MECHANICAL: HVAC MISCELLANEOUS DESIGN PRINCIPLES:**

**A-7.1** Designs shall include analysis of psychrometrics, human thermoregulation, indoor environmental health, fundamentals of control, energy resources, ventilation and infiltration, climatic design information with heating-cooling & ventilation load profiles and calculation procedures using CLTD and CLF methods and/or Carrier HAP program. Fenestration analysis supporting architectural design components.

**A-7.2** Life Cycle Costing Analysis to be perform on major mechanical equipment incorporating over 20 tons of refrigeration/cooling methods and 250 mbtu/hr heating energy requirements. Program analysis shall be the use of the FEMP LCCA version available from US Gov't website, femp.gov.

**A-7.3** Hydronic Systems design shall incorporate analysis of computational fluid dynamics, CFD, regarding pressurization of closed hydronic system, pressurization of open systems and pressure boosting, pumping requirements, flow in pipes-pressure drop and head loss. The use of terminal units for primary heat, reheat and secondary heating systems. Designs shall incorporate analysis of non-compressible fluid flow in pipes for: One pipe systems, two pipe systems-(direct return, reverse return and ring loop), constant volume flow systems, variable volume flow systems primary system sub-circuits with and without separate pumps. Primary, secondary and tertiary hydronic campus wide fluid systems.

**A-7.4** Incorporate specific mechanical hydronic specialties utilizing components from Bell and Gosset

**A-7.5** Pipe sizing and design analysis shall be performed to determine two characteristics: Size and material of pipe, secondly-flow pressure relationships.

**A-7.6** Air distribution systems designs shall incorporate analysis of: space availability, space air diffusion, noise levels, duct leakage, duct heat gains and losses, balancing, fire and smoke, system operating costs and code compliance.

**A-7.7** Design criteria: US Government design codes, regulation and practices established within the WBGD shall be followed and have precedent over any jurisdiction. Specific WBGD code shall be strictly followed: UFC 3-401-01. Secondary code for basis of design shall be referenced from the American Society of Heating, Ventilation and Air Conditioning Engineers, ASHRAE.

**A-7.8** Energy sources available on GARB include: electricity, natural gas, renewable sources-geothermal, wind and solar.

**A-7.9** A complete product incorporating equipment from design: Exterior vents shall have bird screens matching base architectural standards. Air handling equipment shall be located inside the building envelop. Emergency shutdown of system design shall incorporate a mass notification switch/button in each separate building, also connected to the base wide building automation system, BACnet. Variable motors will be the basis of design for all motors with horsepower greater than 5.0 HP. Condensing units for air conditioning shall use air (atmospheric) cooling with free cooling cross flow radiation fan units. Where applicable, geothermal shall be analyzed for application to condenser/heat recovery equipment.

**A-7.10** Industrial processes are identified as: Painting aircraft, parts, and mechanisms shall have designs per SMACNA and the Manual of Recommended Practice for Industrial Ventilation.

**A-7.11** Vents penetrating roof shall match color of roof or exterior finish of wall**.**

## A-8 MECHANICAL: CONTROLS, ALARM & MONITORING

**A-8.1** HVAC designs shall incorporate digital monitoring, alarm and control of such equipment to ensure efficient operation, monitoring of equipment upon inquiry of a central BACnet wide control system and alarm of such installed points to alert personnel of an impending event that could/would cause harm, damage to equipment or building elements. Existing components of the base wide building automation system consists of Schneider-Electric Struxureware with AS-P front end node controllers with associated plant control devices.

**A-8.2** Designs will strictly follow direction and recommendations contained in the following design criteria identified as: WBGD UFC 3-410-02. In addition to: UFGS 23 09 23.1. Secondary guidance for reference shall be: ASHRAE hvac applications and systems.

**A-8.3** Design of existing building (remodel/modification) or new construction shall incorporate new floor, occupancy areas graphical representation and display at the main server of the building automation system. Program algorithms for schedule of operation, optimization, set backs, special use of operations for UTA shall be incorporated within the node controller.

**A-8.4** Supervisory control strategies and optimization: Two-level control structure shall be incorporated in the design of the control system for any and all modified and new constructed buildings, areas, etc. Lower level local-loop control of a single set point is provided by an actuator. The upper control level, supervisory control, specifies set points and other time-dependent modes of operation.

**A-8.5** Design considerations and principles for building automated systems shall incorporate analysis for the entire building, or part thereof, the type, size, use, and operation of the structure. Subsystems such as fan and water supply (hydronics) shall be normally controlled by local automatic or a local loop lower level control methodology. This would include, for example: sensors, controllers and controlled devices used with a single hvac system-in addition, excludes any supervisory or remote functions such as reset and start/stop. Local control of these points shall extend to the base server central control point to diagnose malfunctions that might result in damage from delay.

**A-8.6** Restrictions for area of control utilizing a whole hvac system shall be observed within the design. No individual controlled area shall exceed 5,000 sq.ft. Each individually controlled area must have similar load characteristics throughout. Equitable distribution, provided through engineering practice and design, equipment sizing and proper system balancing shall be executed with algorithms matching the performance requirements. Areas, or rooms of occupied space having dissimilar load characteristics or different conditions to be maintained shall be controlled individually. Large open spaces, aircraft hangers, storage, warehouse, assembly areas shall be analyzed, designed and engineered as one zone of occupancy climate control space with temperature/humidity averaging.

**A-8.7** Distribution air system and control: Outside, return and exhaust are ventilation dampers shall be controlled by the discharge air temperature controller to provide free cooling as the first stage in the cooling sequence.

**A-8.8** Conference rooms and briefing room are not allocated to just users in the building. They shall be designed for full use while offices are occupied.

## A-9 MECHANICAL: PLUMBING

**A-9.1** Plumbing, piping and fluid piping (process) designs shall be executed to the standard of codes established by WBGD UFC 1-200-02 and DOD standards that apply. In addition to: ASHRAE, ASME, NFPA requirements depending on the schematic of design. Parallel to these references, process piping shall be executed to the standard of ASME B31.9 and B31.5 for refrigerant piping, low and high pressure systems.

**A-9.2** Steel Pipe: Designs incorporating steel pipe shall be design in accordance with ASTM A53 and A106. Any or all process piping incorporating steel as the material of selection will be in accordance with ASME standards without exception.

**A-9.3** Copper Pipe: Designs incorporating copper piping, tubing are identified as two principal classes of copper tube and shall be designed in accordance with ASTM standard B88, that includes: Types K, L, M and DWV for water and drain services. ASTM B280 specifies air-conditioning and refrigeration tube for refrigeration service.

**A-9.4** Ductile Iron and Cast Iron: Designs incorporating cast-iron soil pipe will be executed to the standard of AWWA C150/A21.50 without exception. This type of pipe will not be designed/installed under pressure because the pipe is not suitable and the joints are not restrained. Ductile iron can be used for replacement of cast-iron pipe due to strength, less brittle and similar to cast iron for pressure pipe.

**A-9.5** Analytical design requirements for steel pipe: Such designs shall be classified in the following services, boiler piping, refrigeration piping, plumbing systems, sprinkler systems and fuel gas systems. Design parameters for the selection of steel pipe shall involve: application, pipe material, weight, joint type, class of use to determine schedule, temperature of fluid and maximum pressure at temperature of fluid.

**A-9.6** Analytical design requirements for copper pipe/tube: Such designs shall be classified in the following services: Domestic hot/cold water systems, chilled/hot hydronic pipe distribution systems, sanitary fixture domestic water systems, kitchen appliances requiring domestic water service, compressed air pneumatic industrial service.

**A-9.7** Conditions for Design of water systems utilized for domestic/process services-material selection, copper: Flow in these systems involves two different regimes: Laminar (at low velocities), Turbulent (at high velocities). The parameter that dictates design requirements for copper pipe/tubing will be the velocity of fluid factor. Within domestic water services, the velocity parameter shall not exceed 5 to 7 feet per second (FPS). Within hydronic systems to include: chilled water, hot water, very high temperature hot water under nitrogen pressure systems, the velocity parameter cannot exceed 20 feet per second (FPS).

**A-9.8** Limitations of pipe distribution design: At a basic minimum, pipe head loss calculations shall be performed for each service of pipe being designed, engineered and installed without exception. Pipe friction charts shall be provided upon the completion of any piping designs to demonstrate adequate flow requirements, acceptable velocity parameter and required pumping or external energy input required. Stratification of such systems shall be designed to a minimum, so demonstrated by analytical calculations.

**A-9.9** Water and Sewage provider: Peru Utilities.765-473-7651 ext2001

## ELECTRICAL

**A-10 ELECTRICAL:**

**A-10.1** Design and construction by IBC, NEC and UFC (Building, Electrical and Force protection) standards. UFC 1-200-01, 3-501-01. Provide lightning protection, grounding and clearances. Electrical: UFC-3-520-01, Interior Electronic Systems

**A-10.2** Provide meters to allow connection to the internet reporting system.

**A-10.3** Coordinate with utility companies and base for permits and connections.

**A-10.4** Provide documentation on energy and environmental saving equipment and processes

**A-10.5** Due to force protection rules in the UFC the design and construction of the electrical system may be more extensive. Contractor is to bid accordingly

**A-10.6** Provide cut sheets for lighting

**A-10.7** Wiring and conduits are to be concealed in walls. Surface mounted conduits are allowed in shops. This includes communications, security and electrical conduits

**A-10.8** Designs shall include system description, layout and sizing with calculations; zonings; elect room layout and equipment positioning; Load calculations; equipment schedules; sequence of operations; panel schedules and diagrams.

**A-10.9** Use LED lights. Provide lifecycle cost and payback data.

**A-10.10** Coordinate power service design with the utility company. Transformers and some meters may be the property of the utility company.

**A-10.11** Electrical Provider: Miami Cass REMC/ PERU 765 473 6668

**A-11 LIGHTS:**

**A-11.1** Lighting Design shall focus on energy efficiency and economics. Confer with base on lighting levels. Lighting shall not produce cave effect (dark ceilings and illuminate flooring.). See AF guidelines for foot candle requirements.

**A-11.2** Provide interior down lighting and up lighting coverage if ceiling is above 9' h. Provide lay-in ceiling light if ceiling below 9'. Use LED lights for hall and office lights. Use 2x2 lights and can lights in halls. Use LED for can lights.

**A-11.3** Provide switched entry light above all exterior doors.

**A-11.4** Provide switched reduced lighting levels in facility and occupancy sensors.

**A-11.5** Provide daylighting and occupancy sensors. This will allow lower lighting levels and increase energy efficiency

**A-11.6** Provide lights above sinks in restroom.do not allow shadows on face in this area.

**A-11.7** Provide separate Emergency lights using fixtures with LED lights.

**A-11.8** See AF guidelines for lighting of exterior. Exterior light shall be on photo cell. Exterior lights shall limit uplighting and not extend past the base or site perimeter. Lights for paths must also be considered. Use LED lights.

**A-11.9** Foot-candle restrooms and locker 20 ftc.min; laundry 30 ftc area. Storage room 20 ftc min. Auditorium and corridor 20 ftc.min (minimize shadows due to down lights); lobby, waiting and briefing rooms 30 ftc min.

**A-11.10** It is important that outlets, switches and devices be places accurately on the drawing for coordination of furniture, TV, marker boards, mech devices, fire devices and other equipment. Consolidate switches were possible. Place as close to doors as possible.

**A-12 COMMUNICATION (COMM) SYSTEMS:**

**A-12.1** Provide telephone and network per base communication standards, comm UFC fire codes and building codes. All telephone, grounding and network cabling shall be installed in accordance with TIA/EIA-568-B and TIA/EIA-569-A

**A-12.2** Provide comm rooms per UFC. Design and install room and infrastructure per fire and building codes. Projects design and shop drawings must be reviewed stamped by BICISI Registered Communication Distribution Designer. (RCDD). RCDD will need to coordinate requirements with the base comm department.

**A-12.3** Work on the communication portion of the project will not be allowed before approved shop drawings, plans and data. This includes RCDD requirements

**A-12.4** Communication infrastructure in facilities at Grissom can be more extensive than standard private construction, bid and design accordingly. Audio visual cabling RG6 cabling from main wall of conference rooms and TV locations to comm room will be required. Home runs may require conduit

**A-12.5** Provide a minimum of one 4 jack (IMO) information management outlet per 8 feet in each room. Provide electrical outlets next to Comm outlets. Provide base standard coloring and labeling on outlets and wiring. Each shall have room #, jack number.

**A-12.6** Wiring and Cat 6 cabling shall go from outlet to patch panel in Computer equipment room (CER) room. Provide cable trays for support in room per UFC. Provide floor mounted racks, entry terminals and grounding. Contractor is to coordinate with government to connect to base LAN system.

**A-12.7** Provide dedicated 240 outlet for UPS in comm equipment room. L6 20R plug. Other dedicated outlets per UFC is required. Provide double outlet in cabinets.

**A-12.8** Lan/ Telephone provider: Grissom Comm. / AT&T

**A-12.9** Provide EMT conduits vs cable tray for layout. Coordinate paths with comm. Organize and label wiring per UFC and comm base standards.

**A-12.10** Allow enough slack for cabling in manholes to splice outside of the manhole.

**A-12.11** Verify wiring from manhole to building match building design capacity.

**A-12.12** For renovations contractor shall provide survey the comm in the existing facility and document /verify conditions and wiring.

**A-12.13** Provide EXCEL spreadsheet of designed and submitted parts.

## FIRE SYSTEMS

**A-13 FIRE SYSTEMS STANDARDS:**

**A-13.1** Provide professionally designed complete addressable fire alarm system connected by narrow bandwidth radio transceiver compatible with base Monaco central fire alarm/mass notification trans-receiving system. Coordinate radio signal with emergency communication center (ECC) for frequency testing and connection. Locate main panels in Communication Equipment Room (CER). Commission per NFPA and UFC 4-021-01 and other UFC codes.

**A-13.2** Provide wet pipe fire protection system in base buildings unless told otherwise. Provide attic coverage and freeze protection. Provide drain points for the system. Provide full coverage, including wet systems, dry systems and pumps as part of the contract. Provide 2 extra drainage locations above NFPA

**A-13.3** Sprinkler connection shale be Siamese 2 1/2 inch female NST coupling.

**A-13.4** Provide combined mass notification system (MNS) with fire alarm system per UFC 4-021-01. Signal must be sent by telephone (fiber) and radio to Monaco FA/MNS transceiver in the ECC. System is to be tested and commissioned per UFC. Provide eight base standard pre-recorded messages with two test and six real world messages and be able to receive live voice messages from ECC.

**A-13.5** Install flush main remote fire alarm panel and MNS Local Operating Console (LOC) near main entrance near emergency light. Vertically stack units. LOC's shall include HVAC shut off, shelter acknowledgement and evacuating switches as part of the enclosed but non-locked portion of the cabinet. LOC shall be able to send local live voice messaging. Fire alarm/MNS. Cabinet shall be flush mounted and labeled. Provide place to house instructions.

**A-13.6** Install exit lights, emergency lights, alarms and speakers in ceiling. Assume walls will move in the future. Exit signs are red LED lights

**A-13.7** Duct detectors are required. Provide fire extinguisher cabinets with extinguishers.

**A-13.8** MNS text signs indicating “EVACUATE” or “ANNOUNCEMENT” shall be place next to EXIT signs over exit doors. Signs shall match color and sizes. Show on an elevation.

**A-13.9** It is important that outlets, switches and devices be places accurately on the drawing for coordination of furniture, TV, marker boards, mech devices, and other equipment. Consolidate switches were possible. Place as close to doors as possible.

**A-13.10** Grissom Fire station building 474. FD/SFS Emergency Communication Center(ECC) and Command Post, - building 671

## ENVIRONMENTAL STANDARDS

**A-14 ENVIRONMENTAL:**

**A-14.1** Design to reduce waste of land, material and pollution of resources. Provide documentation: Material determination form, Air quality info, MSD sheets, Environmental plan, Storm water plan and calculations, Erosion control, Safety plan, Hazardous waste, disposal waste tickets and recycle content.

**A-14.2** Energy conservation: Natural light shall be used to best extent possible. Geothermal or alternate energy efficient sources shall be considered. Lighting shall be designed with an alternate low lighting switch. Reduce the amount of energy use and waste without jeopardizing security or function.

**A-14.3** Recycled materials and recovered content in design and construction shall be used to EPA current standards and best extent possible- {http://www.epa.gov/cpg/products.htm}. Use product listed in 40CFR247 for recycle or recovered material content. Document material and amount.

**A-14.4** Base Facility Hazards:

**A-14.5** Most buildings were built in 1959 and have been renovated several times. The base used to have steam systems for heat. The underground piping does have asbestos wrapping. Assume undercoatings of old paint may have lead. Assume original floor tile is asbestos and should be tested. Standard policy is remove asbestos found on pipes or in tile above ground. The Contractor is responsible to provide all test and documentation required for state approval as part of contract. Review Radon requirements.

**A-14.6** Waste Management Resources: Grissom may be able to recycle selected items. Coordinate with recycling department. The contractor still has owner ship of the item and is responsible for proper disposal. Provide weight tickets in O&M manual.

**A-14.7** Construction site: Provide truck entry area to control dirt and debris. Control loose materials. Control water run off. Clean site for dirt and debris daily

**A-14.8** EPA Documentation:. Provide the size, capacity and fuel type of boilers, furnaces, water heaters, generators, solvent tanks, fuel tanks, dust collectors and blasting machines to be installed or moved in a facility. Environmental will also need data on any item or process that produces air emissions or smoke. Contact Environmental department with any questions. Documents will be used to process and satisfy state regulations.

**A-14.9** Backflow: Cross connection backflow devices (RP, DC, SVB and PVB) will need to havetamper and waterproof inspection tags. Inspection tags should state the inspector's name, date of inspection, inspector's certification #, and device details (manufacturer's name, serial #, model, and size of device**)**

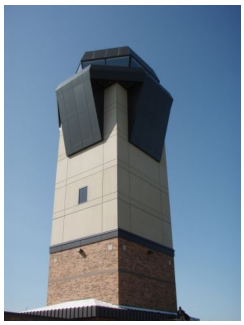
## SUSTAINABILITY

### A-15 HIGH PERFORMANCE SUSTAINABLE BUILDING

**A-15.1** By increasing the sustainability and energy efficiency thru renovations of the facility's on base we have reduced the base energy use to above the 15% reduction mandated. This was achieved thru increased, better material increased insulation, light replacement and efficient HVAC systems. The goal is to continue this trend.

**A-15.2** The renovation and new designs has allowed the base to resolve and eliminate past safety and environmental hazards. It is the designer responsibility to research, identify and resolve these hazards.

**A-15.3** HPSB: Design and construct to High Performance Sustainable Building (HPSB) UFC -1-200-02. Provide documentation and submission. Use Air Force MILCON Sustainability Requirements Scoresheet for HSPB this has replaced LEED (Leadership in Energy and Environmental Design).



**A-15.4** HPSB points: Points and design concepts shall not increase maintenance and operational costs for the base. New systems shall be time tested for longevity. System shall not limit the functional use of spaces during all times of the year. Provide 5% over min. requirements to allow for unachieved points.

**A-15.5** HSPB notebook: Provide separate section in the design analysis (pdf and hard copy) explaining the HPSP principles and concept specific to the building. .

**A-15.6** Signs shall be placed on designated bulletin boards. No free standing signs.

**A-15.7** Daylighting and visibility: No skylights. Security and force protection has priority over view lines and natural lighting. Maximize points in energy, water conservation and air quality. Daylighting is required.

**A-15.8** Maximize storm water quantity and quality point. At minimum encourage evaporation and reduce water going off base. Provide storm water plan

## MISCELLANEOUS DESIGN AND CONSTRUCTION ISSUEs

### A-16 DESIGN AND CONSTRUCTION ISSUES

**A-16.1 Base access**

**A-16.1.1** Contractor is responsible for coordinating base access of employees and deliveries

**A-16.1.2** Written approval for access (EAL form) will need to be complete before base entrance. May take 15 days. All vehicles are subject to search. Encrypt letter with PPI and send password separately. Document must be readable. Include in the email a list of all the people on the forms and project location.

**A-16.1.3** CAC Id or passes from the VISITOR CENTER is required before proceeding thru the gate house check in.

**A-16.1.4** Trucks will need to be inspected before access to base. Large trucks will need to proceed to the truck inspection facility.

**A-16.2 Weather**

**A-16.2.1** For exterior work a WINTER WEATHER EXCLUSION is usually 15 NOVEMBER to 15 APRIL on a case by case basis. Especially if masonry is involved. The contractor is expected to use winter weather time for planning, submittals to increase the efficiency of the good construction weather

**A-16.3 Site layout sheet:**

**A-16.3.1** Provide hauling route, contractor layout space, trailer location, contractor parking and clean off space on site plan. Include any base security zone

**A-16.3.2** Life safety/ force protection sheet. Must show square footages and occupancy for each room, exit path, life safety issues including force protection issues. Such as setback for walls and windows. Design information for window, (glazing, frame, attachments and wall resistance features).

**A-16.3.3** Environmental/SWPP sheet and details shall be separate sheets.

**A-16.3.4** An exit plan will be needed for each room.

**A-16.4 Site**

**A-16.4.1** Contractor is responsible for the maintenance of the construction site's appearance during until contract completion. This includes grass mowing. Grass shall be no higher than 3inches

**A-16.4.2** Contractor is responsible to erect and maintain erosion control.

**A-16.4.3** Contractor is responsible for any FOD, dirt or loose material they create. Do not allow any material to become airborne and leave the site. Do not cross nay red lines or enter any secured or controlled areas without permission.

**A-16.4.4** Photos: Contractor will be required to take pictures of the onsite building and construction. The contractor is required to get written approval for individuals taking photos. No photos of aircraft will be allowed. No photos in any controlled areas.

**A-16.5 Common inspections issues:**

**A-16.5.1** Existing and new floors (concrete and tile) with drains shall slope; concrete at overhead doors will slope. Confirm after with inspection at installation. Tests will include buckets of water to determine flow.

**A-16.5.2** Grout lines shall be straight, consistent and plumb.

**A-16.5.3** Ceiling tile shall lay in grid straight and level. No

**A-16.5.4** Inspect Quality of paint and drywall around outlets. Door closing and latching. Items shall not have with sharp edges. Panels or corner guards shall lay flat and flush against walls

**A-16.5.5** Caulking is to be complete, continuous and smooth.

**A-16.5.6** Lack of expansion joints in walls and floors

**A-16.5.7** Site not being maintained. Grass height, trash and loose FOD issues.

**A-16.5.8** Submittal not being provided. Submittals sheet not filled out correctly.

**A-16.5.9** Comm submittals and installation not following drawings and spec. Not providing RCDD stamp

**A-16.5.10** Existing and new floors (concrete and tile) with drains shall slope; concrete at overhead doors will slope. Confirm after with inspection at installation. Tests will include buckets of water to determine flow

## EXAMPLES AND REFERENCES

### A-17 EXAMPLES OF BUILDINGS WITH GRISSOM STANDARDS:

Building 641, - CE complex: Grissom Blend Office and Grissom Blend Industrial scheme
Building 473 - Services Complex: Grissom Blend Office scheme
Building 436, 435 - Aircraft Hangar: Grissom Blend Industrial scheme
Building 600 – Base ops: Grissom Blend scheme

### A-17.1 COLORS

Base standard colors are midnight bronze and almond. Since various manufacturers have different versions of these colors the intent is to match that color of the roof, and metal panels on that specific building. The colors indicated below are Sherwin Williams colors that may match the metal panels. Provide samples and verify colors in field. The Base Architect must approve. Esp in renovations. Field colors have changed.

**Almond. (**Intention is to match almond in MIBC panels)

| | |
|---|---|
| Semigloss 844 colorant | 02 32 64 128 |
| LB – lamp black | 00 04 00 001 |
| RO Red ox | 00 00 00 001 |
| YO-yellow Ox | 00 21 00 000 |

**Dark bronze.** (Intention is to match midnight bronze in MIBC roofing panels)

| | |
|---|---|
| Semigloss 844 colorant | 02 32 64 128 |
| TW-White | 02 01 01 000 |
| LB – lamp black | 04 45 01 001 |
| QR- Quin Red | 02 21 00 001 |
| YO-yellow Ox | 00 27 00 001 |

## A-17.2 REFERENCES and STANDARDS

**A-17.2.1** Follow Air Force RESERVE regulations and guidance's for the design, admin and construction of project unless otherwise noted. Grissom ARB organization may have exception to standard DOD, Army or Air force regulation. Order of precedence unless otherwise noted is Grissom Base standard, ETL, Air Force Reserve requirements, AFI, UFC, building codes and UFGS. State and national codes are referenced thru the UFC.

**A-17.2.2** Contractor shall inquire with the government and facility user if any other specific guideline should be followed in the design including any required shops' guidance or safety rules. T.O's will need to be addressed on a case by case basis.

**A-17.2.3** Use base version of UFGS section 011100 and administration sections.

**A-17.2.4** Army Corp of Engineer documents and procedures versions will need to be modified for Air force and base contracting

**A-17.2.5** References/ links

The following are References and guidance used in administration, design and construction projects. The contractor shall be familiar and design to the guidance's. The links to other reference can be found in the United States Air force Projects Mangers Guide for Design and Construction and the WDGB sites

- Whole Building Design Guide WBDG { www.wbdg.org/ccb/ccb.php}
- United States Air force Projects Mangers Guide for Design and Construction {*www.wbdg.org/ccb/AF/AFDG/pmguide.pdf*
- UFC: Unified Facility Criteria *{www.wbdg.org}*
  - General: UFC-1-200-01 DoD Building codes (this references the main UFC and national codes.)
  - UFC-1-200-02 High Performance and Sustainable building
  - UFC-1-300-07A –Design Build Technical Requirements and Construction-
  - Mech: UFC-3-410-01, Heating, Ventilation and Air Conditioning UFC-3-410-02A, HVAC control systems
  - Elec: UFC-3-501-01, Electrical, UFC-3-520-01, Interior Electronic Systems
  - Comm UFC-3-580-01, Communication Systems
  - Fire: UFC-3-600-01 fire UFC-4-021-01, mass notification
  - Security: UFC-4-010-01, Anti Terrorism Standards
  - Interior : UFC-3-120-10 Interior Design
    AFRID: Air Force Reserve Interior Design standard
- UFGS: Unified Facility Guide Specifications *{www.wbdg.org}*
- ETL: Engineering Technical Letters*{www.wbdg.org}*
- AFRC: Air Force Reserve regulations: *{www.wbdg.org}*
- AFI: Air Force Instructions *{www.wbdg.org}*
- TO's: Technical Orders. Required for the shops guidance's
- GARB Contractors Guide: {CONTRACTING OFFICE}
- IBC International Building Code. (exceptions in UFC 1-200-01)
- IBEC International Existing Building Code. (exceptions in UFC 1-200-01)
- ABA: Architectural Barriers Act - Accessible requirements for federal facilities - Handicap code

# Grissom Air Reserve Base

## Base Standards (AUG 2020)

434 Base Civil Engineering

# Chapter B: DESIGN DETAILS

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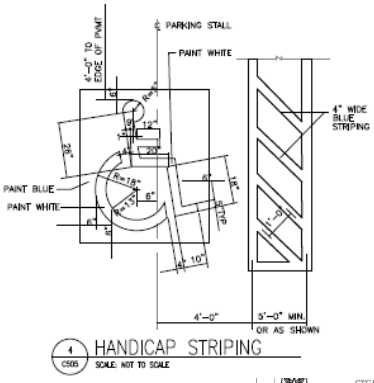


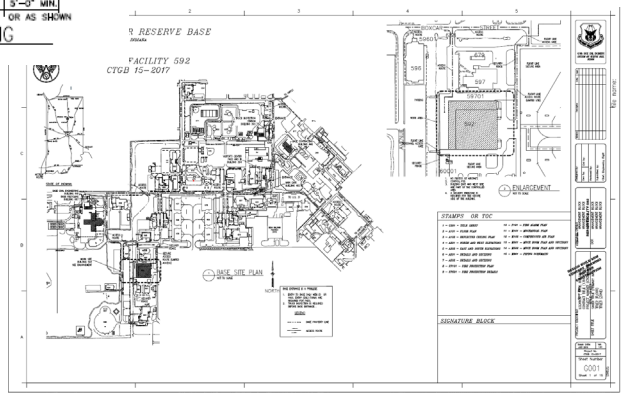

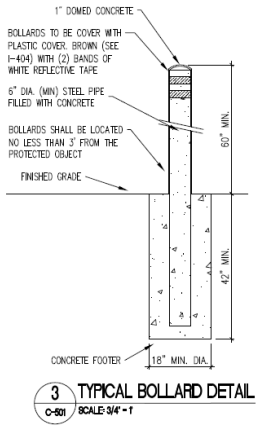

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Other GARB base standard chapters.
Chapter A: FACILITY STANDARDS *
Chapter C: CONSTRUCTION STANDARDS *
Chapter D: DESIGN STANDARDS. *

## SECTION B: DESIGN DETAILS

### GENERAL

**B-1 GENERAL STANDARDS**

**B-1.1 GENERAL**

The purpose of this guide is to define the details standard to the base which serve to integrate the visual character throughout the base. This will ensure consistent quality design decisions by commanders, planners, architects, engineers, contractors, maintenance staff and residents. The guide will promote clear concise communication between Grissom ARB and design and construction professionals. The audience for this chapter is mainly base users, engineers, facility managers, BOS contractor

**B-1.2 BASE STANDARDS (FULL COMPILATION) The base standards is comprised of 4 chapters:**

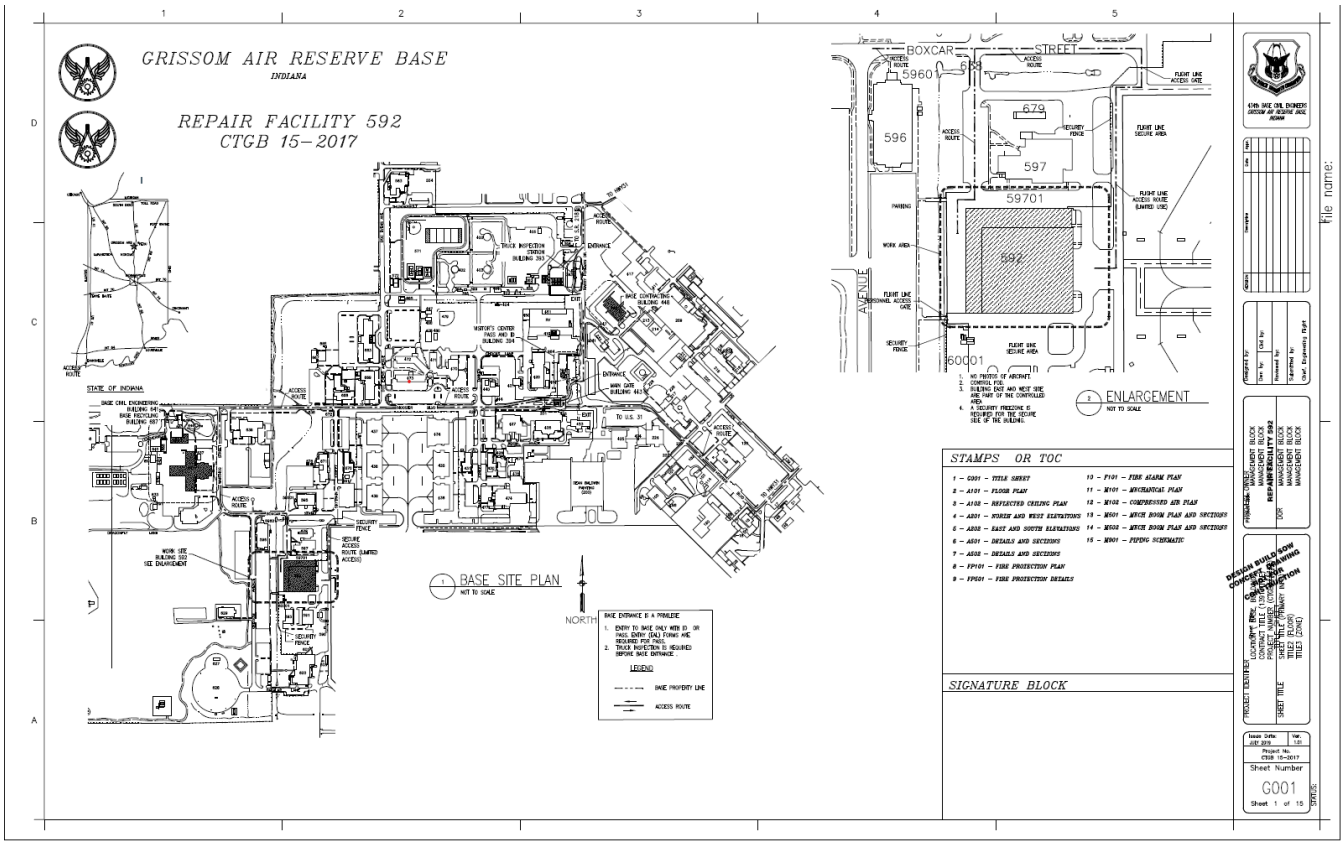
Chapter A – FACILIITY STANDARDS (ARCH, CIVIL, MECH, ELEC)
Audience : General for All (base users, engineers, facility managers, BOS contractor)
Chapter B – STANDARD DRAWINGS AND DETAILS
Audience : Base users, engineers, facility managers, BOS contractor
Chapter C – CONSTRUCTION STANDARDS (ADMIN, SUBMITTAL, ETC.)
Audience : Construction Contractors, Inspectors, Contracting Officer, Project Managers
Chapter D – DESIGN STANDARDS
Audience : Engineers, Architect/Engineer Firms

## DRAWINGS

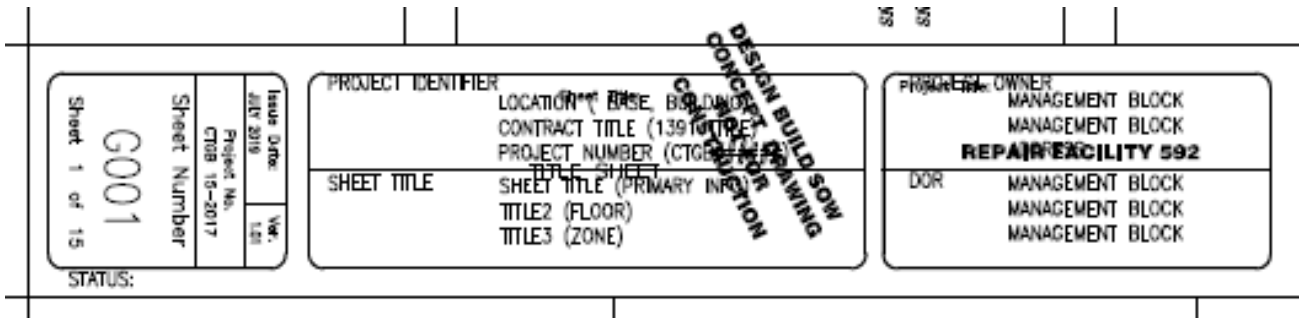
### B-2 Drawing details

### B-2.1 General:

Details for drawings, titles and sheet arrangement. Sheet arrangement shall be per this base standard and the UFC.




### B-2.2 TITLE SHEET

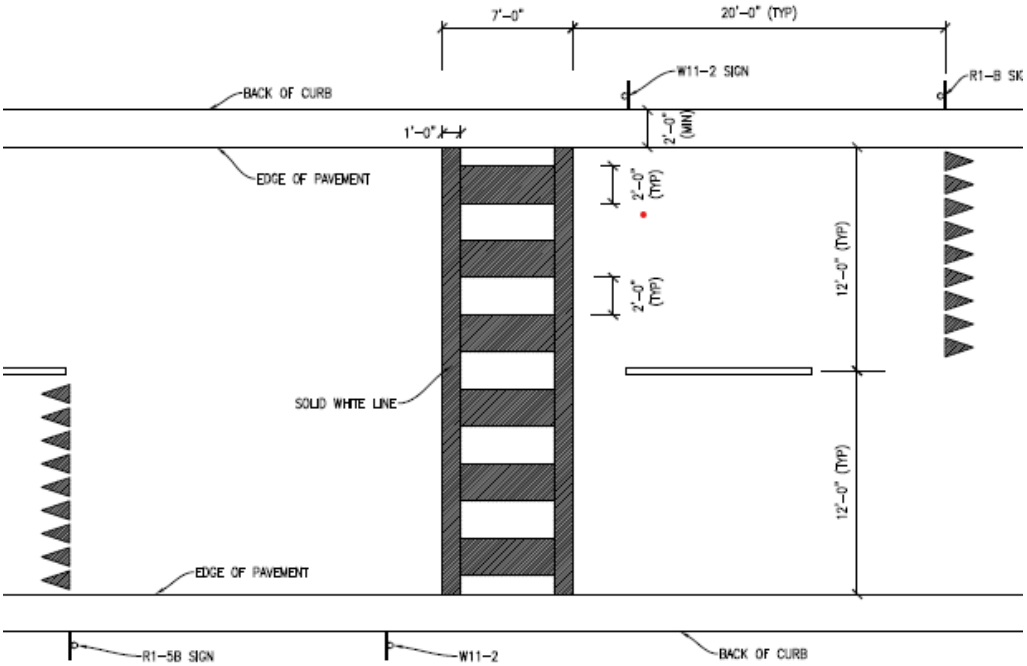


## CIVIL

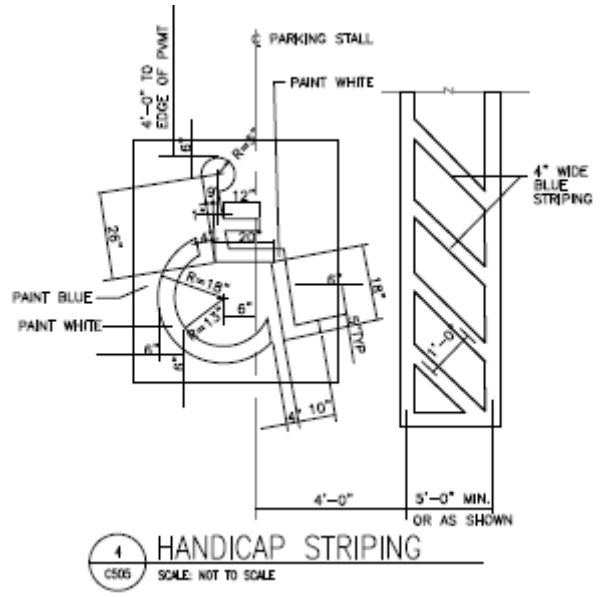
### B-3 CIVIL details

### B-3.1 General:

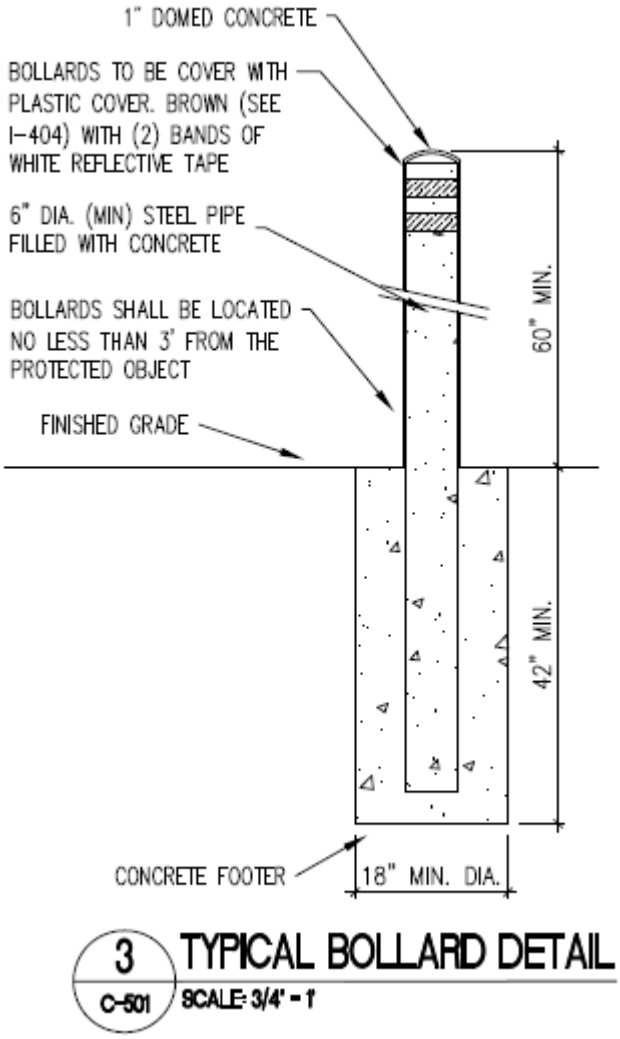
Details to facilitate civil detailing and construction.



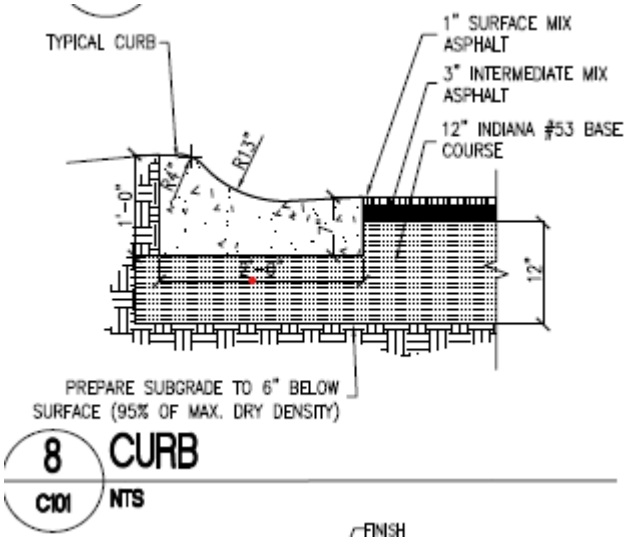

### B-3.2 CROSS WALK



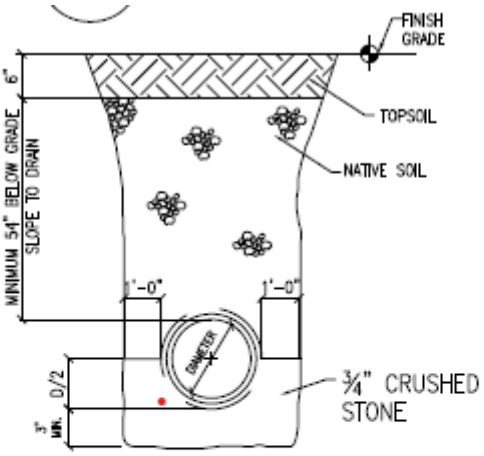

### B-3.3 HANDICAP STRIPPING




**B-3.4 BOLLARD**

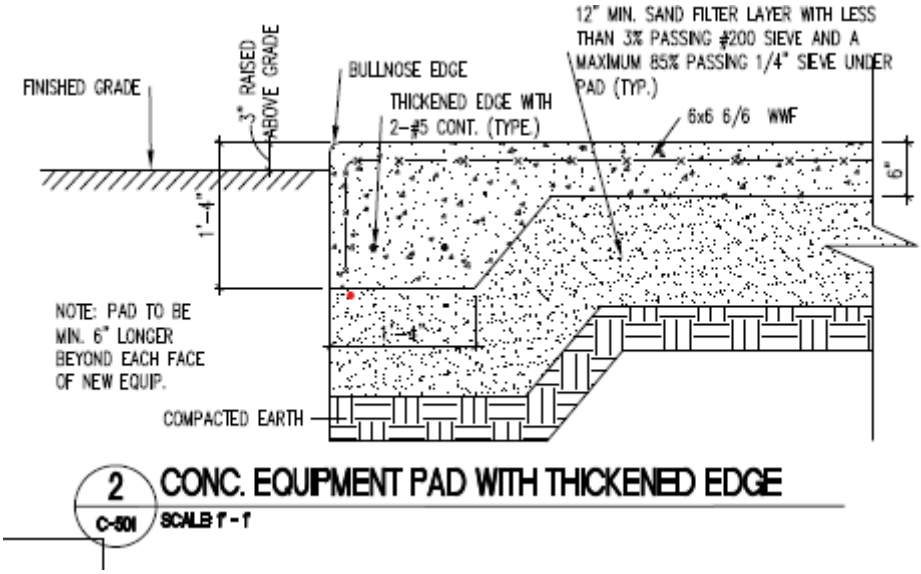



**B-3.5 ROLL CURB**



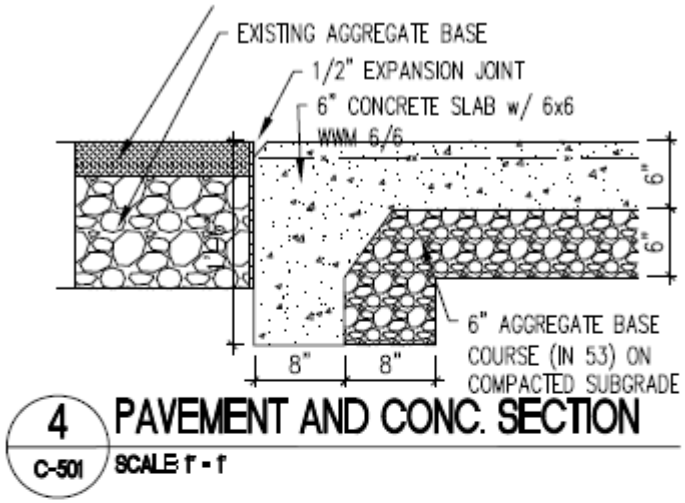
9 C101 PIPE TRNCHING NTS

**B-3.6 PIPES**

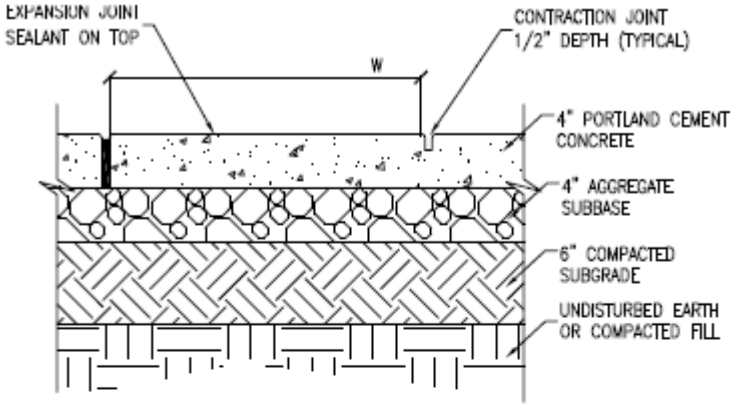



2 C-501 CONC. EQUIPMENT PAD WITH THICKENED EDGE SCALE 1" = 1'

**B-3.7 EQUIPMENT PAD TYP**



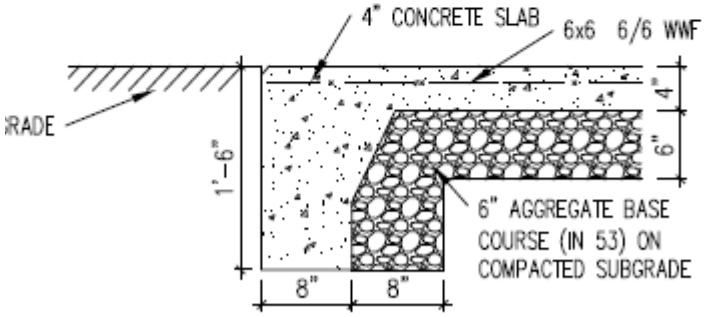

4 C-501 PAVEMENT AND CONC. SECTION
SCALE: 1" = 1'




NOTES:

1. W = WIDTH OF SIDEWALK
2. SPACE CONTRACTION JOINTS AT W. PLACE EXPANSION JOINTS AT 3xW.
3. EXPANSION JOINT MATERIAL SHALL BE PLACED THROUGH THE FULL DEPTH OF THE SIDEWALK.
4. SAWCUT JOINTS WITHIN 16 HOURS OF PLACEMENT.

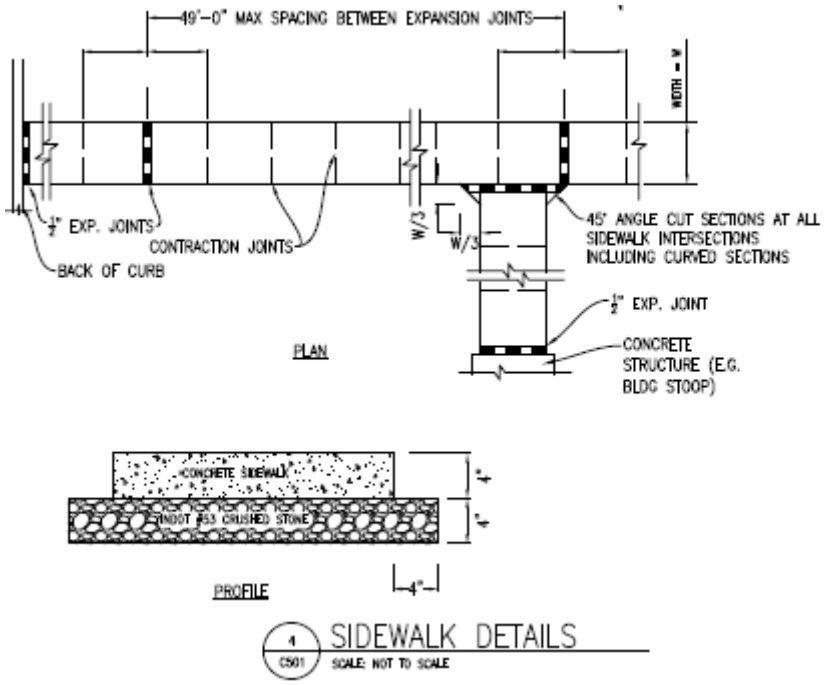
5 C101 CONCRETE WALK DETAIL
NOT TO SCALE



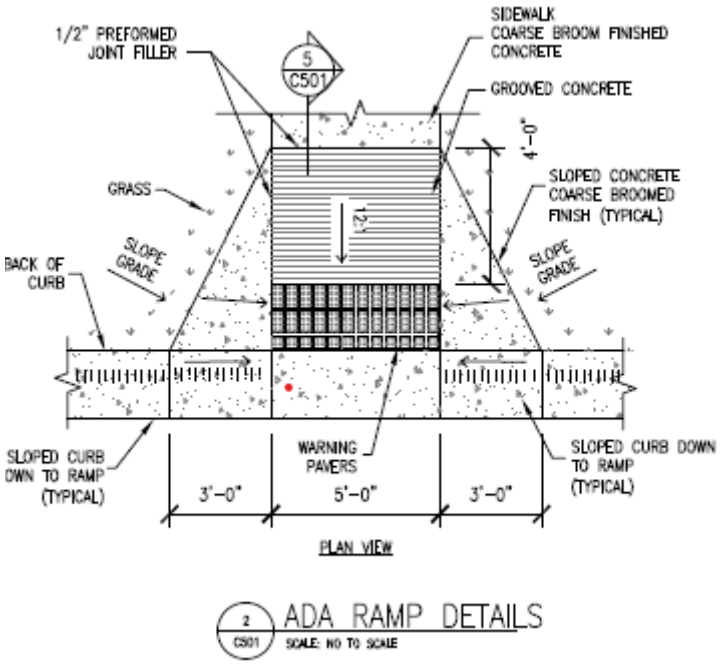

5 C-501 LAWN AND SIDEWALK SECTION
SCALE: 1" = 1'

6 C101 SIDEWALK
NTS

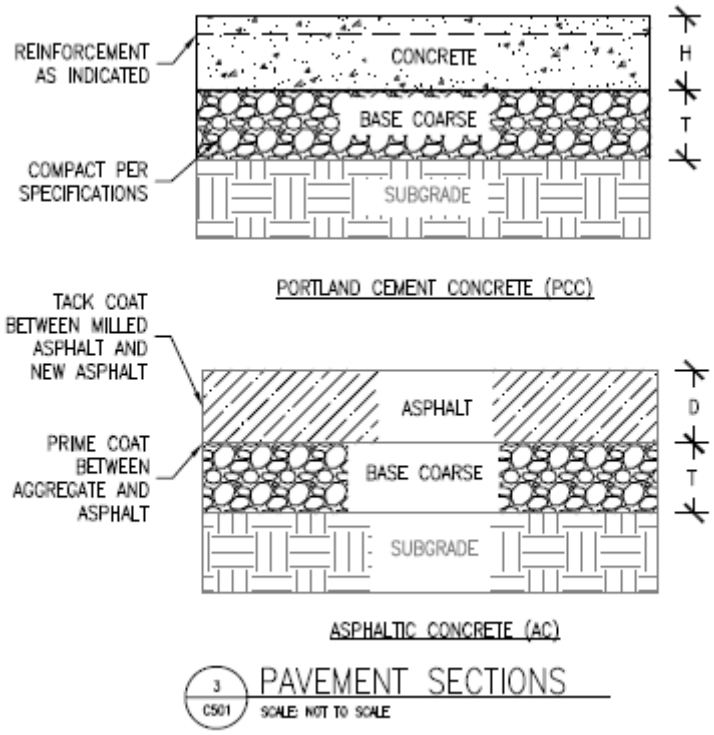
**B-3.8 CONCRETE DETAILS**




**B-3.9 SIDEWALK DETAILS: all sidewalks are 5' wide**




**B-3.10 SIDEWALK DETAILS**




**B-3.11 PAVEMENT DETAILS**

# Grissom Air Reserve Base

## Base Standards (AUG 2020)

434 Base Civil Engineering

# Chapter C: CONSTRUCTION STANDARDS

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SECTION C: CONSTRUCTION STANDARDS

## C-1 CONSTRUCTION PHASE

### C-1.1 PURPOSE

The purpose of this portion of standard is to define the stages, elements responsibilities and critical features of the construction portion of the project. It can be divided up into preconstruction construction and close out. The audience for this is designers, spec writers, contractors, inspectors and contracting officer and other organizations. .

### C-1.2 GOAL

This goal of this document is to provide is information for a smooth and effective construction. To reduce question and establish standards. In most case the construction is governed by the contract. Items in this standard should already been included. IF written by the ACOE some items may not have been covered.

### C-1.3 STAGE

This stage allows the contractor to start construction. A preconstruction meeting is held and the base construction operations briefing is held. Specifically review the sections: on preconstruction, submittals, RFIs, intermediate and closeout. .

### C-1.4 BASE STANDARD chapters

The base standards is comprised of 4 chapters:
Chapter A – FACILIITY STANDARDS (ARCH, CIVIL, MECH, ELEC)
Audience: General for All (base users, engineers, facility managers, BOS contractor)
Chapter B – STANDARD DRAWINGS AND DETAILS
Audience: Base users, engineers, facility managers, BOS contractor
Chapter C – CONSTRUCTION STANDARDS (ADMIN, SUBMITTAL, ETC.)
Audience: Construction Contractors, Inspectors, Contracting Officer, Project Managers
Chapter D – DESIGN STANDARDS
Audience: Engineers, Architect/Engineer Firms

## C-2 GENERAL:

**C-2.1** The contractor is responsible for **QUALITY ASSURANCE**, schedule control, and cost control. Minimize unnecessary modifications without adversely affecting the project. This is not an adversarial operation. The goal is to complete the project per the contact and on time.

**C-2.2** The phase of construction falls into preconstruction, main construction and close out.

**C-2.3** No-cost-modifications are quicker to process. Contractor shall provide documentation for experience, and certifications.

## C-3 ROLES AND RESPONSIBILITIES

**C-3.1** Only a duly appointed Air Force Contracting Officer has the authority to obligate the Government in contractual matters.

**C-3.2** **Contracting officer:** The Contracting Officer is the **only person with the authority to direct any changes** in the contract and his/her signature will be on all contractual documents

**Construction inspector:** Point of contact on the job-site will be the Civil Engineer Contract Inspector.

- Acting as single-point-of-contact between the Contractor and the AF
- Providing Quality Assurance of the work
- Reviewing and approving submittals
- Maintaining schedules
- Administering the contract; modifying the contract when necessary

**C-3.3** **Project manager- engineer:** Lead in technical subject matter of the plan. This individual is a technical representative for the Contracting Officer **DO NOT** have the authority to commit the Government to changes

**C-3.4** **Government subject matter experts**: User POC, Comm, fire. Safety, environmental, bio, security forces, engineers (elect, mech, civil, architectural). No role for the contractor only communicate with permission of the contracting Officer. This individual is a consultants

for the Contracting Officer **DO NOT** have the authority to commit the Government to changes. However the project may affect areas were they own the property. Any communication shall be documented in writing.

**C-3.5 Contractor:** Contractor in charge of construction and quality control. Responsible for site and fulfilling the contract. Company needs to define roles and authority of supervisor and PM.

**C-3.6 On-site supervisor.** Representative of the singed contract company. Must be on site as long as work is going on. Must have access to company decision makers so decision can be made in a timely fashion. Must be able to update on site documents. And provide inspectors with information as required.

**C-3.7 Subcontractor:** Works for the contracted contractor. No role with base engineers or inspectors without approval of contractor and contracting officer.

## C-4 QUALITY CONTROL AND QUALITY ASSURANCE

**C-4.1** Quality control is a Contractor's responsibility; however, quality issues may arise during the progress of construction that requires AF DM/CM involvement.

**C-4.1.1** The Contractor is responsible for inspecting, testing, and documenting those tests and inspections that are required by the contract to control material quality and workmanship. The Contractor is also required by the terms of the contract to employ a Quality Control (QC) representative. The contract specifications spell out in detail what inspections and tests are to be performed and the detail of reporting.

**C-4.1.2** The Agent, through the Quality Assurance (QA) program, oversees the Contractor Quality Control (CQC) program. Quality cannot be "inspected" into the project; rather, the individual instances of workmanship and overall job quality must be directly related to the Contractor's reputation and pride of accomplishment. Although over-inspection can reduce cooperation and result in changes, ensure the Agent is effective in assuring quality. It is difficult to make corrections for appearance related work as the construction nears completion, so bring these issues to the Agent's attention immediately.

**C-4.1.3** Encourage the Agent's QA effort aimed at enhancing the Contractor's pride in order to receive the desired project quality. This may include quizzing CQC personnel, frequent meetings with Contractor's superintendent or project executive on quality issues, and checking preparatory inspection work to include CQC. Understanding of CQC enables the AF DM/CM to become aware of potential issues in a timely manner and encourage the Agent, at the appropriate management level, to make the necessary corrections.

### C-4.2 Construction Inspection

**C-4.2.1** Continuous construction inspection is the responsibility of the Contractor. This responsibility, established by FAR 52.246-12, *Inspection of Construction,* requires the Contractor to maintain an adequate inspection system and perform such inspection to ensure that the work performed conforms to contract requirements. The Contractor must maintain inspection and test records and make these available to the Government. The AF reserves the right to inspect and test any phase of the work at all reasonable times without relieving the Contractor of any responsibility for contract compliance.

### C-4.3 Construction Surveillance

The Agent performs construction surveillance on the job site and at off-site locations (fabrication locations or stored materials) when necessary. Construction surveillance differs from inspection in that specific technical

inspection and tests are not performed on a continuing basis. Those items are the responsibility of the Contractor. The AF DM/CM's job is to review project function and overall appearance and to raise any cost and time issues that affect the Air Force. Additionally, the AF DM/CM represents the using agency and BCE's concerns with functional and technical issues to the Agent. **Do not discuss or provide any comments and suggestions directly to the Contractor.** Instead, document concerns using photos, videos, and notes and discuss discrepancies with the Agent. Notify the Agent in writing regarding any job site, schedule, cost, or quality problem areas needing prompt attention and resolution. An AF DM/CM should assure that the following checklists of construction surveillance items are being performed:

**C-4.3.1** Verify appropriate coordination has been effected between the Agent and the Base Civil Engineer to ensure smooth job progression in areas such as security, utility outages, etc.

**C-4.3.2** Confirm that the Agent's personnel are familiar with Base Civil Engineer and AF DM/CM representatives who will be performing surveillance inspections.

**C-4.3.3** Confirm the status of actions on AF furnished item

**C-4.3.4** Check adherence to plans and specifications and take necessary actions to correct deficiencies. Ensure shop drawings are submitted timely and color boards are sent to appropriate reviewing offices.

**C-4.3.5** Review the approved construction schedule to determine any changes in schedule or disparity with actual progress. Review the schedule for reasonableness. Differences of 5% or greater between scheduled/actual progress require detailed justification to include steps to correct. Also look at any phased construction scheduling. All indicated slippages in BOD or completion date must be reviewed with the Agent. Where critical need dates have been established for the total or a portion of the facility, possible ways of removing slippage should be reviewed with the resident engineer and higher echelons of the Agent as necessary. Actions will be coordinated with the using command and their concurrence obtained as required.

**C-4.3.6** Review status of change orders and their effect on construction progress and project funding. Indicate in surveillance reports the status of these change orders which have been in progress more than 30 days, together with reasons for delays. Review funds status to ensure proper fiscal management and adequate funding in the field.

**C-4.3.7** Check quality of construction and workmanship and initiate the required appropriate action.

**C-4.3.8** Review the AF Form 1477, *Construction Inspection Record,* prepared by the BCE, with individuals responsible. Discuss deficiencies, if any, and problems noted. Note visit and findings on BCE AF Form 1477 and sign. BCE construction inspection personnel should be reminded to alert your office of potential or actual problems immediately.

**C-4.3.9** Discuss any claims received or anticipated with the Agent. Review his experience with "Request for Information" (RFI) including timely response. Discuss any problems or anticipated difficulties to include any induced by the Air Force...

## C-4.4 Quality Indicators

The following items are primary indicators of the quality of the Contractor's operations. If these indicators are good, the project is probably in good overall condition. If these indicators are not good, additional AF DM/CM attention may be warranted. Poor cleanup, for example, often is a sign of careless supervision.

• Workmanship and craftsmanship
• Overall job cleanup and appearance
• Daily housekeeping
• Hard hat discipline and other safety issues
• Material storage procedures
•A good project will have an organized appearance during all stages of construction.

**C-4.5 Quality Assurance by Agent**

**C-4.5.1** The Agent is to maintain good communications with the Contractor's superintendent and Quality Control, improving project management effectiveness. Under the QA/QC system, the Contractor is required to control quality.

**C-4.5.2** The Agent in a QA oversight role, to ensure that the Contractor performs the QC that is required in the contract. Therefore, the level of quality desired and expected in the completed project must be accurately reflected in the contract documents. Insist that the Agent ensures that the level of quality specified is indeed received.

## C-5 SCHEDULE CONTROL

**C-5.1** Schedule Control is the contractor's responsibility; however, it is the AF DM/CM's responsibility to help assure the contract remains on schedule. The construction schedule is prepared by the Contractor, and details how the contract completion date(s) will be met. Network schedules are used by construction contracts to schedule work and track progress of the Contractor.

**C-5.2** While the Agent must approve reasonable Contractor schedules, the AF DM/CM should question any schedule that provides for a disproportionate amount of work in the last month or two of the contract. The schedule is a major construction management tool. Identify in the schedule and watch very closely those areas that may cause the critical points during the construction or the construction completion date to slip. Compare the schedule with actual construction progress because the Contractor should be paid only for the work accomplished. Especially review the status of pending modifications and their potential effect on the schedule. Finally, question the Agent on actions taken to meet the schedule when the Contractor falls behind in construction.

**C-5.3** Extended overhead can add considerable cost to a project when construction completion is delayed through no fault of the Contractor.

**C-5.4** The Agent is responsible for review and approval of the schedule. The Air Force can require changes to the schedule, and does so when mission changes dictate. A network schedule, properly administered by the Agent, provides an accurate means of measuring the time impact of potential changes. The AF DM/CM should continually encourage the Agent to obtain an approved schedule as required by the contract. Changes in the work and time extensions due the Contractor must be included in the network concurrent with the performance of the change or immediately after a delay. Otherwise, the critical path network and schedule will not reflect the current status of work performed or progress attained.

## C-6 LESSON LEARNED.

**C-6.1** Best practices: communication communication, communication…. Keep everyone informed of any issues and project status. If a problem occurs that the contractor can't resolve internally talk about it.

**C-6.2** If a suspense is missed say something. If something needs to be expedited. (Note every issue do not need to be expedited.)

**C-6.3** Anticipate problems and issue before it becomes critical. Especially delays and cost issues.

**C-6.4** Copy the Contracting Officer on all communications.

## C-7 PRECONSTRUCTION:

**C-7.1** No work until Notice to Proceed is provided by contracting. Also no work until all preconstruction submittals and plans are provided.

**C-7.2 Preconstruction meeting:**
Discussion on project scope contract and briefing on base concepts an d policy from, Safety, environmental, bio environmental, fire, construction management, security, force management, using agency, engineering, project manager, and contracting,

**C-7.3** Progress schedule preparation 3064

**C-7.4** Project schedule preparation Gantt / CPM chart

**C-7.5** Preconstruction submittals (safety, work plans , environmental plans, dig permits)

**C-7.6** Acceptance of property and maintenance of property

## C-8 CONSTRUCTION

**C-8.1** Contractor is required to review the site, verify dimensions, verify conditions and provide whatever is required to analysis and bid the job.

**C-8.2** Contract requests and contract modifications that require cost changes should be kept to a minimum. Higher headquarters approvals are required and processing can be time consuming. Provide electronically unless otherwise noted. **General contractor shall review emails, requests and submittals for validity. This is QUALITY CONTROL**

**C-8.3** Maintain/update the construction documents, GANTT/ CPM chart, submittals, modifications and RFI's on site. A paper copy should be available for the inspectors.

**C-8.4 Construction meeting:** contractor shall provide meeting as per the contract and as needed to complete the project. See below for minimum meetings.

**C-8.5 Communication** Contract requests and contract modifications that require cost changes should be kept to a minimum. Higher headquarters approvals are required and processing can be time consuming. Provide electronically unless otherwise noted. **General contractor shall review emails, requests and submittals for validity. This is QUALITY CONTROL.**

**C-8.5.1 VERBAL**: Verbal and telephone conversations happen but official decisions shall be documented. The post conversation RFI (preferred to allow tracking) or email is to be copied to the contracting office. Until this is done decisions are not official.

**C-8.5.2 EMAIL:** Contractor shall communicate thru RFI (request for information), email and submittals. The EMAIL subject line must be unique, have project number and the issue. Including the RFI number(s), submittal number(s). Ex (162008 RFI 25 toilet discrepancy or 162008 RFI 25, 26, 30) email security will not accept all email info. Limit links and company logos when emailing. Size cannot be above 7 mb.

**C-8.6 Site visit**

**C-8.6.1** Inspections: Inspector's visits to the site do not obligate the government for approval of an installation.

**C-8.6.2** Daily: inspector shall be provide with a list of people on site, affiliations and any other information contracting needs. Per the FARS clauses.

**C-8.6.3** Close up. Contractor shall not close up utilities until the inspector reviews the installation.

**C-9 Contract Progress schedule: Form 3064** : Contract Progress schedule:

**C-9.1** Use electronic version. Use format as provided by template. Coordinate payment line items and percentages with Construction management. Organize for ease of verification and inspection. At a minimum all specification sections shall be listed. Provide native excel document. Coordinate payment line items and percentages with Construction management. This will be used for the form **3065**. Excel template should link with 3064.

**C-9.2** 3065 this document is used for assess work done and payment allowed. The contractor provides percentages on the document with the approval and concurrence. Of the construction inspectors. If there is a disagreement that is taken up with the contraction officer. Work must be installed

**C-9.3** Work must be inspected

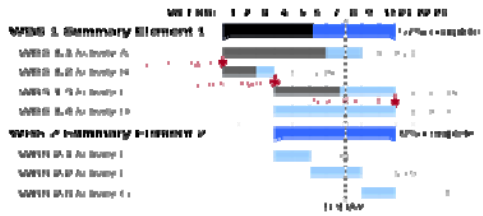
**C-9.4** Work covered up without inspection should not be paid.

**C-9.5** Work shall not be fully paid to cove overhead, warranty, asbuilts, inspections and other coordination issues. Min of 10% should be held. Work done out of sequence may need to be reduced due to potential damage and rework.

**C-9.6** Payment of Warranty goes with line item. O&M and close out documents are just production of the documents.

**C-9.7** Mobilization should not be fully paid unless there is a separate line item for demobilization and site maintenance.

**C-10 PROJECT schedule** Provide a CPM Gantt type **PROJECT schedule** showing critical paths and milestones allows monitoring and control of the project time schedule. Include



- Major headings/ divisions ( 3064)
- Long lead items,
- Critical systems,
- Roofing,
- Fire protection systems,
- Steel,
- Transformers…

**C-11 RFI:** Request for information RFI is used to allow tracking of issues and tasks to make sure of a timely response. Provide quantity and value of the as part of the RFI. Provide the contractual issues and sheet number. More provide suggested solutions. Including time and cost if it is and issue. RFI's must have a question if an answer is required.

**C-12 SUBMITTALS**: Shall be electronic. Submittals should be clear and concise on what is being provided. Submittals not requiring government approval will not be returned or responded unless there is a problem. Major changes to the contract or cost changes cannot be made thru submittals**.** Photos of colors shall be emailed using true color. Book mark the pdf files and make files small enough to email.

**C-12.1** Review all submittals for clarity, organization and validity.

- Use cover sheet Submittal sheets AF3000. Fill in each block correctly. List all items in the submittal list the spec section and paragraph.
- Reference and list all attached electronic files. File naming examples: 172001 sub01- AF3000; 172001 sub 01-schedule.pdf; 17001 sub 23-hardware2; 172001 RFI 01.pdf.
- Strikeout items/ selections not in the submittal or highlight any option/ items/ selections that are in the submittal
- Multiple s files for one submittal shall be listed on the submittal. Each file shall have a copy of that submittal sheet. Include sheet in each file.

- Electronically **Book mark** email file with more than 30 sheets/pages. List on submittal. Provide tabs and table of contents.
- If more than 15 items provide table of contents.
- Do not overload the submittal.

**C-12.2** Update the SUBMITTAL REGISTER regularly to show the submittal number.

**C-12.3** Contractor will group submittals to allow cross coordination reviews. Ex: Fire protection and alarm systems;

**C-12.4** Critical submittals:

- Bi weekly Meeting minutes/ status updates. Photos if possible Project schedule
- Contract documents, plans, specs, asbuilts, Modifications; Substitutions. Especially those that affect changes in the performance requirements.
- All color/ finish samples. Paint, stain, Exterior wall panels, roof panels, windows, doors, masonry, carpet, tile, flooring, signs, any substitutions cabinet colors and counter tops Submittals for section 090600
- Environmental plans; Waste reports.
- Demolition plans,
- Security plan. Esp. any affecting the flight line and any controlled areas.
- Utility plans; Fire systems; Comm plans,
- Data on ceiling or walls showing STC and NR rating
- Components of walls with special STC rating.
- Components that have force protection requirements.
- Locks, Access control locks
- Light fixtures.
- Furniture, roofing Doors and hardware. Provide early submittals for long lead items, critical systems and systems to allow for disapproved:

**C-13 RFP**: Request for proposal: Contractor's response shall be submitted with original request to validate requirements was addressed for the proposed modification or change order. At minimum response should address any line item given as a separate line item. Cost estimate shall also be on spreadsheet to allow line item comments. Documents shall be written to be able to be used for the modification to the contract.

**C-14 MODIFICATON:** Shall be electronic. Modifications should be complete, clear and concise on what is being provided. Include all drawing changes. Identify each sheet, document and drawing that is being changed. Modifications shall reference RFI address cost and project time. Shall address scope of project schedule changes. Cost changes will affect the 3064 and 3065. This should be resolved before next regular meeting along with any other ramifications of the mod. Add on changes or mods to resolve item in the original mod should be avoided.

**C-15 PERMITS and PERMISSIONS**

**C-15.1 WORK APPROVAL**: NO work, site investigation, borings, or site visits are allowed without notification of Base Civil Engineering and Security forces. The General Contractor and base project manager shall be aware of all visits by subcontractors. Provide locations, start and completion dates. Side trips are not allowed without permission.

**C-15.2 DIG PERMIT:** Obtain and coordinate DIG PERMIT before construction, demolition, digging or borings. To initiate: 1) call 811 for the state and local process, 2) contact the base operation and support maintenance (6883144) for process and time line. Provide map of areas showing extent of area. Mark area on site for investigation with white flags. Inform base construction management when this is accomplished. List this as a milestone in the project schedule

**C-15.3 BURN PERMIT**: Obtain and coordinate BURN (WELDING) PERMIT before use. Contact fire department 688-3353.

**C-15.4 ENVIRONMENTAL APPROVAL:** Obtain and coordinate any ENVIRONMENTAL before construction and digging. Base, state and federal. Provide any drawings, plans, procedures and documents needed. Provide storm water plans. Inform base project manager when this is accomplished.

**C-15.5 MANHOLES:** Areas below 3' and manholes are considered confined spaces. The contractor is to SELF-PERMIT CONFINED SPACES. Have official documents posted on hand as per OSHA and state regulations. The contractor is required to coordinate with fire department and safety. Inform base construction management when this is accomplished.

**C-15.6 SECURE AREAS:** Approved SECURITY FREEZONES authorizations are required for the contractor to work in secure areas. Provide maps and description of work equipment, (type, size and height). Show haul routes, fencing and entry control point. Work in airfield clearance zones may require a waiver. Pay attention to any red lines and secure area signs.

## C-16 CLOSE OUT

**C-16.1** Schedule prefinal, final inspections and turn over dates. Provide specific meeting to address issues, deficiencies and arrangements.

**C-16.2** Contractor is to provide completed punch list and commissioning documentation at Prefinal and final inspections. 100% design closeout will have Acad files and hard copies. Project will have asbuilts

**C-16.3** Provide Operation and Maintenance (O&M) manuals for all items in project at final and prefinal inspections. Provide in 5 ring binders, indexed and separated.

**C-16.4** Provide training, testing, commissioning and environmental documentation. Provide 8.5x11 bond Color boards (packages) both electronic copies of manual

**C-16.5** Contractor is to fill in Cost Break down (form AF 1354) to be submitted to and coordinated with the Real Property office for actual construction by the project

## C-17 PROJECT UPDATES /MEETINGS

**C-17.1 KICKOFF MEETING:** Provide a kickoff meeting (Both at start of design and start of construction work)

**C-17.2 BIWEEKLY UPDATES**: Provide BIWEEKLY status updates to address the project and issues. Track, highlight and date ACTION ITEMS/TASKING'S must be assigned OWNERSHIP and SUSPENSE'S. Item is not to be removed from updates until closed. Items more than 3 weeks overdue or affects the critical path shall be given a high priority.

**C-17.3 REDZONE MEETING:** ONE month out from the contract completion date the biweekly meeting will also be a REDZONE meeting. To also discuss and finalize schedule for prefinal inspection, final inspection, asbuilts, O&M and contractual obligations.

**C-17.4 CONSTRUCTION PHASE UPDATES and meetings**:

**C-17.4.1** Provide BIWEEKLY MEETINGS to address the status update issues

**C-17.4.2** Contractor will provide MINUTES to the base on all meetings noting all the above items within 4 days. Include photos that show project status and any problems. Record any field/verbal decisions. Record plan for and suspense date for overdue items. See spec for more specifics. If meeting are canceled a status report is still required.

**C-17.4.3** TOPIC: headings for agenda shall be:

- PREVIOUS MEETING: notes, tasking's, open items, action items, ownership of issues.
- PROJECT STATUS: completion date: projected percentage, actual percentage and difference.
- PROJECT SCHEDULE: GANNT/ CPM chart review. Comment on long lead items, and corrections.
- PROJECT SAFETY:
- WORK PROGRESS: Current work progress and 2 week look ahead. discrepancies
- RFI's: label RFI'S completed: open; overdue and critical. Show suspenses.
- SUBMITTALS: label Completed; open; overdue; critical Show suspenses.
- SUBMITTAL REGISTER REVIEW: How many are outstanding and what are the critical ones.
- RFP AND MODIFICATION STATUS: label Open; overdue and critical identify ownership.
- PAYMENT STATUS: Project schedule and payment review.
- OPEN Discussions and questions
- Next meeting:

**C-17.4.4** Contractor shall bring the contract drawings and documents to the meeting. Contractor shall bring a copy of RFI's, submittals to be discussed in the meeting and any pertinent documentation need in the meeting to make a decision. .

## C-18 ABOVE CEILING INSPECTION

All required testing should be completed and finalized before contractor request an Above Ceiling Inspection. An inspection will be performed by the Government once all work is accomplished above ceiling grid and ceiling tile is ready to be installed. The contractor shall ensure the prime contractor had inspection of the area before the government inspection and report any deficiency or deviations. Inspection will ensure all items are installed according to prints, specifications, and manufacture installation instruction. The contractor is responsible for the installation and inspection.

- Ceiling tile around perimeter of rooms, hallways, sprinkler heads, and all devices can be installed prior to Above Ceiling Inspection.
- Items that will be inspected, but not limited, will include the following: wall penetration sealed, fire pillows installed, fire alarm conduit and junction boxes identified with markings/painting.
- Sprinkler main and branch piping prepared and painted red. Ensure sprinkler main and branch lines have positive drainage to sprinkler main drain. Ensure above ceiling sprinkler heads have proper clearance and no paint/debris on them. Sprinkler main hanger spacing and security.
- All low voltage wiring installed in systematic manner following routing of conduit and all connections shall be in junction boxes. All electric conduit clamp spacing, junction boxes secured, and all related fittings tight and conduit installed in systematic manner and plumb/level.
- Only CAT 6 cables installed in COMM trays. Ensure all COMM trays are grounded on sides with copper jumpers (not on bottom) and if conduit is used to penetrate through walls ensure ground wire is installed through separate conduit.
- Ensure all HVAC ducting penetrations and duct work is sealed, VAV's, fan coil units installed, level/plumb with all thread jamb nuts are secured and ducts insulated.
- Ceiling lighting require safety chains/wires.
- Ceiling grid shall be level, flat, and even and secured according to manufacture installation instruction.
- All electrical/COMM junction/pull through boxes will have easy user access.
- Remove all abandoned/excess sharp edges, brackets, clamps, hangers, conduit, junction boxes, wiring, braces not required for completion of project.
- Clean/remove all construction debris/spoils from anything above ceiling tiles.

**C-19 OTHER TOPICS.**

**Inspections:** General break down of work inspection areas per engineering divisions

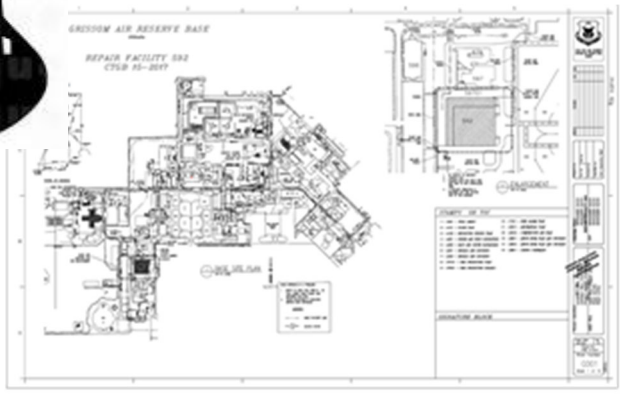
- **1.1. SITE**
  - 1.1.1. **MAINTENANCE**
  - 1.1.2. **EXCAVATION GRADING**
  - 1.1.3. **UTILITIES**
  - 1.1.4. **LANDSCAPE**
- **1.2. ARCH**
  - 1.2.1. **STRUCTURE**
  - 1.2.2. **ROUGH IN**
  - 1.2.3. **FINISHES**
  - 1.2.4. **BUILT INS**
- **1.3. MECH**
  - 1.3.1. **HVAC**
  - 1.3.2. **DUCTING/ WIRING**
  - 1.3.3. **EQUIPMENT INSTALLATION**
  - 1.3.4. **OPERATION**
  - 1.3.5. **CONTROLS**
- **1.4. PLUMBING**
  - 1.4.1. **PIPING**
  - 1.4.2. **EQUIP**
  - 1.4.3. **OPERATION**
- **1.5. ELECT**
  - 1.5.1. **CONDUITS,**
  - 1.5.2. **WIRING ,**
  - 1.5.3. **PANELS**
- **1.6. TELECOMMUNICATION**
  - 1.6.1. **CONDUITS,**
  - 1.6.2. **WIRING ,**
  - 1.6.3. **PANELS**
- **1.7. FIRE PROTECTION**
  - 1.7.1. **LAYOUT**
  - 1.7.2. **CONNECTION/ACTIVATION**
- **1.8. ALARM SYSTEMS**
  - 1.8.1. **CONDUITS,**
  - 1.8.2. **WIRING ,**
  - 1.8.3. **PANELS**
- **1.9. FURNITURE**
  - 1.9.1. **DELIVERY**
  - 1.9.2. **INSTALLATION**
  - 1.9.3. **CONNECTION**

# Grissom Air Reserve Base

## Base Standards (AUG 2020)

434 Base Civil Engineering

# Chapter D: DESIGN STANDARDS



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# D-1 INTRODUCTION AND POLICY

## D-1.1 Purpose and Scope

This guide provides policy and standards for the design, and development of project documents, including drawings, and specifications or facilities under Grissom Air Reserve Base, Indiana. It has been developed to ensure consistency and clarity of project documents that form the basis of contracts for the design and construction of facilities.

## D-1.2 Base standards

The base standards is comprised of 4 chapters:
Chapter A – FACILIITY STANDARDS (ARCH, CIVIL, MECH, ELEC)
Audience: General for All (base users, engineers, facility managers, BOS contractor)
Chapter B – STANDARD DRAWINGS AND DETAILS
Audience: Base users, engineers, facility managers, BOS contractor
Chapter C – CONSTRUCTION STANDARDS (ADMIN, SUBMITTAL, ETC.)
Audience: Construction Contractors, Inspectors, Contracting Officer, Project Managers
Chapter D – DESIGN STANDARDS
Audience: Engineers, Architect/Engineer Firms

## D-1.3 Criteria

Air Force Design Criteria is available from the Whole Building Design Guide website (https://www.wbdg.org/ffc/dod). Design guidance is typically in the form of Unified Facilities Criteria (UFC). The contract must reference the specific guidance applicable to a particular project. Deviations from criteria must be approved by HQ AFRC/A4.

## D-1.4 System of Units

Grissom policy is to use imperial units of measure in planning and design criteria.

## D-1.5 Accessibility

Designs shall incorporate Americans with Disability Act (ADA) Standards in accordance with guidelines provided by the U.S. Access Board (https://www.wbdg.org/ffc/usab/guidelines-standards).

## D-1.6 Sustainable Design

Grissom policy is to reduce the total ownership costs, including life-cycle costs of base facilities, by incorporating sustainable development principles and strategies in the planning, programming, design, construction, operation and maintenance, sustainment, restoration and modernization of all facilities and infrastructure projects to the fullest extent possible, consistent with mission, budget and user requirements.

## D-1.7 Physical Security and Antiterrorism

Design inhabited buildings to meet the requirements of UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*; UFC 4-010-02, *DoD Minimum Antiterrorism Standoff Distances for Buildings.* It is important to remember that the project documents provide only the minimum amount of information necessary for the installation of all elements required for force protection and must not contain information on force protection methods, philosophy, or information on design threats, as this information is considered sensitive and for official use only.

### D-1.7.1 DoD Minimum Antiterrorism Standards for Buildings

UFC 4-010-01 and UFC 4-010-02 (For Official Use Only – FOUO) establish standards that provide minimum levels of protection against terrorist attacks for the occupants of all DoD inhabited buildings.

These UFC are intended to be used by security and antiterrorism personnel and design teams to identify the minimum requirements that must be incorporated into the design of all new construction and major renovations of inhabited DoD buildings. They also include recommendations that should be, but are not required to be incorporated into all such buildings.

### D-1.8 Ownership of Project Documents

The clauses set forth in DFAR 252.227-7023, *Drawings and Other Data to Become Property of Government*, DFAR 227.71, *Rights in Technical Data*, and DFAR 227.72 *Rights in Computer Software and Computer Software Documentation*, apply to all project design documents.

### D-1.9 Registration

Develop project documents under the direction of a Registered Architect or a Professional Engineer currently licensed in accordance with FAR 52.236-25, *Requirements for Registration of Designers*.

Each drawing shall only be signed, sealed, and dated by the Registered Architect or the Professional Engineer who is registered to practice in the particular field involved for work depicted on that drawing, serves as the Designer of Record for that work.

Where special certifications are required for the design, certify in accordance with the contract and local requirements.

### D-1.10 Temporary Facilities and Occupancy Phasing

If temporary facilities are required, they must be shown as a separate contract line item (CLIN) on all construction documents to include the bid schedule. Drawings and Specifications must have a clear distinction for bidders for each line item. A construction phasing schedule must also be developed that encompasses the user's needs for continued operation by phasing contract work within the construction cost limitations. The Commander of the Using Organization must review and sign off on any temporary facility and/or phasing plan.

## D-2 DRAWINGS

### D-2.1 Requirements

Prepare drawings in accordance with Section 4, "Electronic Design Deliverables" and as required herein.

### D-2.2 Presentation

Drawings shall be consistent in presentation and format. If one discipline shows material selections directly on the details, other disciplines should conform to that format, and not use numbers to refer to a numerical legend elsewhere on the drawings.

### D-2.3 Proper Use of Notes on Drawings

a) Be consistent with grammar used in notes on drawings. Use imperative statements to describe work to be accomplished by Contractor. For example, instead of using "Contractor shall provide," use "provide." It is understood that the notes are written for the Contractor's action.

b) Do not use "to be" for describing work that will be accomplished by the Contractor. "To be" implies that someone will accomplish the work other than the Contractor, such as the Government or another Contractor. If work is to be accomplished by Government, for example, say "Government will remove storage building prior to start of construction."

c) Do not use “install” for work that is to be accomplished by the Contractor. “Install” means Government or others will furnish equipment or materials and Contractor will install. “Furnish” means Contractor shall only furnish; Government or others will install. Use “provide” when the Contractor is to furnish and install equipment and materials.

d) Do not use “proposed” for new construction. “Proposed” means future work by others or work not in this contract.

e) Do not use “new” for work in the contract. All work shown on the drawings is considered new, unless indicated otherwise. Inconsistent use of “new” throughout the drawings could mean that only some of the work is required.

f) Do not use ambiguous statements that cannot be enforced by the inspector during construction. For example: “grade to drain;” “hand excavate carefully;” “provide materials in good condition.”

g) Be careful with statements like “remove and replace,” which means to remove old item or material and replace that item or material when work is completed. This statement would be appropriate for work in a pump station where pumps were removed prior to the work and those same pumps replaced after the work is completed. On the contrary, if a portion of a concrete walk is cracked and requires replacement, say “remove and provide concrete walk.”

h) When referring a requirement for coordination between Contractor and Government agency, use “coordinate utility connection with Contracting Officer;” do not use words such as “base”, “Air Force” or “Engineering”.

i) Do not indicate, “see specifications” on the drawings. The drawings and the specifications form a complete construction package. Specific elements shall be separated in the spec reference (e.g. Sidewalk Concrete and Airfield Concrete are listed under different specs, identify that scope to the contractor in specification scope of work).

j) Do not use “all” or “any.”

k) Do not use words that have multiple meanings, requiring opinions, or judgmental decisions, such as “timely,” “nearly,” “good-condition,” “suitable,” “well-balanced,” “suitable for intended use,” “reasonable,” “approximately,” “reliable,” “proper,” “usable,” “appropriate,” “adequate,” or “qualified.”

l) Do not use terms that are not biddable by the Contractor nor enforceable by the Government, such as “recondition,” “as directed,” “equal to,” “as required,” “similar to,” “as necessary,” “as close as possible,” “repair,” “match existing,” or “refurbish.”

m) Some terms are only enforceable if quantities are shown on the drawings or included in the specifications, such as “as indicated,” “as shown,” “specified herein,” and “as noted.”

**n)** Be careful when using the word, “typical,” especially if there are exceptions to the detail.

## D-3 SPECIFICATIONS

### D-3.1 Requirements

Provide specifications that are as brief as possible, definitive, and free of ambiguities and omissions that may result in controversy and contractor claims for additional compensation.

#### D-3.1.1 Unified Facilities Guide Specifications (UFGS)

Use of the guide specifications of the Unified Facilities Guide Specifications (UFGS) system is mandatory in preparing specifications. UFGS are available at the Whole Building Design Guide website (https://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs). Tailor the UFGS as necessary to suit the work required by the specific project. In addition, modify and edit to reflect the latest proven technology, materials, and methods, if warranted. Use the project specification sections from the website that are current at the beginning of the 95% design.

### D-3.2 Preparation Policies

Edit specifications to conform to project requirements so that they may be incorporated into the contract documents of a specific project. Project specification sections describe details such as: products, systems, performance requirements, quality of products, methods to incorporate a system and other functions as necessary.

#### D-3.2.1 Proprietary Specifications

Do not use proprietary or restrictive requirements unless it is conclusively established that no substitute will serve the purpose. When a situation arises in which only a single product will perform the required function, forward a request from the DOR to the Project Manager, fully justifying the use of a sole source product. In addition to the detailed justification, provide an estimate of the proprietary item in relation to the total project contract cost. Use of proprietary items is prohibited unless formal written approval is obtained from the Contracting Officer.

If authorization is granted, specify the proprietary item by manufacturer's name and catalog number, followed by the phrase: "notwithstanding any other provision of the contract, no other product will be acceptable." This statement is necessary to override the contract clause that permits substitution of any supposedly equal product unless such language is used.

Any specification section that contains proprietary items must include a notice to that effect on the first page of the section. Place the following above the section number and title at the top of the first page of the section:

**********
This Specification Contains Proprietary Products.
**********

The use of proprietary items has been the subject of many contract claims. Project designers and specifiers must be aware of the restriction on the specification of proprietary items and take special precautions to avoid their use unless formal written approval is obtained.

### D-3.2.2 "Or Equal" Specifications

Specifying products by naming acceptable commercial products followed by the words "or equal" is permitted under the following conditions:

1) There are no Government or commercial standards or specifications for the item,
2) The item is a minor part of the construction project, and
3) The item cannot be adequately described because of technically involved construction or composition.

In each instance, include in the description a minimum of two manufacturers followed by the words "or equal". The essential features (salient characteristics) of the item must also be set forth in sufficient detail to establish the basis upon which the equality of non-listed products will be determined.

### D-3.2.3 Experience Clauses

On occasion, because of special difficulties in the work, strict construction schedules, or past unsuccessful experience with contractors, an experience clause may be used to ensure competence in the contractor. Experience clauses relate to the responsibility of a firm, and more specifically, to its capacity to perform the work. The inclusion of experience clauses in project specifications requires the approval of the Contracting Officer. Experience clauses that occur in the UFGS have already been reviewed by a Contracting Officer and may be used without further approval. When adding an experience clause to the UFGS, obtain approval of the Contracting Officer.

### D-3.2.4 Warranty Clauses

A warranty clause is any provision that modifies terms of the normal 1-year warranty required by the contract clause. These are not typically used unless already approved in the UFGS by a contracting officer. If the designer or customer requests to add terms to warranty it must have written approval form the Contracting Officer.

## D-3.3 Coordination of Specifications and Drawings

FAR 52-236-21, *Specifications and Drawings for Construction* states: "Where 'as shown', 'as indicated', 'as detailed', or words of similar import are used, the reference is made to the drawings accompanying this contract unless stated otherwise."

### D-3.3.1 Precedence

Refer FAR 52-236-21. In general, treat anything mentioned in the specifications but not shown on the drawings or shown on the drawings but not included in the specifications as if shown or mentioned in both. In the case of discrepancies between the drawings and specifications, the specifications take precedence.

### D-3.3.2 Coordination

Coordinate the drawings and the specifications to ensure that all items depicted in the drawings are covered by an appropriate specification section and that all specification sections relate to items in the drawings.

### D-3.4 SPECS-IN-TACT

Grissom uses a specification processing system called "Specs-In-tact," an acronym for "Specifications-Kept-Intact." Specs-In-tact is the word processing software used to edit the UFGS database.

This system provides several time-saving features including creation of an outline specification; paragraph renumbering; printing without notes; reference verification; bracket removal check; and printing of the reference standards list, a submittal register, and a report which lists test requirements and actions of interest to the Contracting Officer. The system also offers a redline editing tool that will save the project specification with edits. Specs-In-tact is available for download, free of charge, at the Specs-In-tact web site (http://specsintact.ksc.nasa.gov).

### D-3.5 General Requirements (Division 00 and 01) Specification Sections

Provide typical General Requirements, UFGS sections as applicable, and the following:

| | |
|---|---|
| 01 11 00 | Summary of Work |
| 01 14 00 | Work Restrictions |
| 01 33 00 | Submittal Procedures |
| 01 45 00 | Construction Quality Control |
| 01 78 00 | Closeout Procedures |
| 01 78 23 | Operation and Maintenance Data |

## D-4 ELECTRONIC DELIVERABLES

### D-4.1 Summary

Grissom policy for records management and paper reduction requires electronic deliverables that include contract documents, requests for information (RFI's), submittals, etc. Therefore, all projects shall follow these requirements.

### D-4.2 Design Deliverables

The following electronic deliverables are required for all projects:

1) Native AutoCAD (*.dwg) files, version 2018.
2) PDF of Drawings and Specifications
3) Submittal Register
4) Calculations
5) Cost Estimates in Excel or PDF format
6) All Reports, Surveys and Studies
7) Basis of Design – PDF format.
8) Photos, Background support files, etc.
9) Comprehensive Interior Design – PDF format.

### D-4.3 Format Requirements

Format requirements for the following deliverables are listed below:

#### D-4.3.1 Specifications

Provide PDF versions of the specifications that are bookmarked to give shortcuts to specification sections, this can be found in the subfolder Printdata. Source files for specifications (*.sec) must be submitted containing all the specifications found in the subfolder Pulldata.

#### D-4.3.2 Drawings

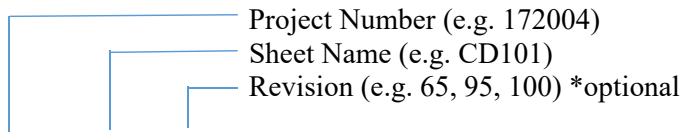
Comply with the DoD A/E/C CADD Standard latest version except as noted below. The A/E/C CADD standard is available at https://www.wbdg.org/ffc/army-coe/cad-bim-technology-center.

All drawings shall use the Grissom standard CADD title block border sheet. Provide drawings in ANSI D (22" x 34") size format for projects using imperial units.

Larger sheet sizes for projects involving airfield lighting or pavements must be approved by base project manager.

##### D-4.3.2.1 File Naming Conventions for CADD Files

Name CADD files in accordance with the following guidance.




XXXXXX_ABCXXX_XXX.dwg

* The intent for the revision sheet is to show it at the current submittal level. This may not be applicable to all projects as design phases are altered to specific projects. Example submittal 172004_C101_35.dwg would be the 35% drawing for project 17-2004 and the sheet for the civil site plan.

### D-4.3.3 Drawing Support Files

Support files necessary for initializing, editing and plotting drawing files shall be a standard component of Autodesk® or Microsoft Windows or they shall be an integral and standard component within the drawing file that require no third party custom utility or program to use. Support files include, but are not limited to, line types, hatch patterns, font styles, layer filters, display configurations and object styles. Drawing files containing objects, styles, or definitions that require any external files (e.g. SHX, LIN or LAY) to initialize, operate and display properly will be rejected.

### D-4.3.4 Cost Estimates

Provide the cost estimate electronically in excel format and a pdf. If specific cost estimating software is used such as PACES, an editable electronic file, a pdf and a excel version is acceptable. All estimates shall be in accordance with UFC 3-740-05 *Handbook: Construction Cost Estimating*. Do not include in same disk as the other support files.

### D-4.3.5 Intermediate Design Submittals

Provide all drawings in pdf form. Stamp across the title blocks "Preliminary Not for Construction" until the final design submittal.

### D-4.3.6 Final Design Documents

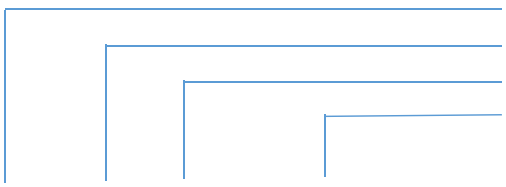
#### D-4.3.6.1 General

Convert documents to the Adobe Acrobat Portable Document File (PDF) format directly from their authoring software.

#### D-4.3.6.2 Format

Combine all drawings into a single PDF file to facilitate ease of use unless file size requires a multi-file submission. PDF files shall be bookmarked and visual "thumbnails" created. Create a bookmark for the beginning of each drawing discipline. Create a sub-bookmark for individual drawing sheets. Bookmark wording shall be as descriptive as practical (i.e., S-101 Foundation Plan). When complete, the files shall open to the "bookmarks" view as the default view with the drawing sheets visible in "fit to page" magnification.

#### D-4.3.6.3 File Naming Conventions



Header (e.g. building number or project number)
File Description (e.g. short description)
Date (universal convention)
Revision Status *(letter is draft, 0 is final)

XYZ_Subject_YYYYMMDD_RevA.doc – Draft File

XYZ_Subject_YYYYMMDD_Rev0.pdf -- Final File

*Grissom naming convention is a standard header (project number); subject (short description; date created in universal convention (year, month, day), Revision status (letters indicate draft status and stay in native file form); Final revision product is converted to pdf and letter is replaced with number. Below is the standard layout with underscore to combine the items. Revision status is not required, purpose of this convention is to convey to the reader important contents of a file without having to open the file.

A few example project files would be as follows:

- 172004_RFI10Chiller_20200226.pdf
- 172024_RFI10Chiller_20200226_Resp.pdf
- 122009_QARpt_20180313_Rev0.pdf
- 202001_MtgMin_20190410_RevA.doc
- 202001_MtgMin_20190410_Rev0.pdf
- 122001_Drawings-35_20121210_Rev0.pdf
- 162025_A101_Rev0.pdf
- 181010_C501-35_CadTechEdit.dwg
- 181010_E301_95.dwg
- 596_DesignAnalysis_Rev0.pdf

#### D-4.3.6.4 Password Protection of PDF Files

Password protection to prevent changes to the PDF files is not allowed

### D-4.3.7 Electronic Media and Organization

#### D-4.3.7.1 General

Provide Official submittals on Digital Versatile Disc Recordable (DVD-R) or as directed. Submit all CADD files in AutoDesk Drawing (*.DWG) format 2018. Drawing files shall be uncompressed and unzipped. Purge files of all unused items (e.g. blocks, layers, line types, and nested items). Do not submit single drawing files with multiple layouts. Bind final drawings.

#### D-4.3.7.2 Minimum Final Requirements

- Drawing PDF file(s) stamped by the Professional(s) in Responsible Charge.
- Specification PDF file stamped by the Professional in responsible charge.
- All Native CADD Files for all disciplines; include X-refs, image, or other external reference files.
- All Specification source files (i.e. PullData folder *.sec files).
- Design analysis: Basis of Design, calculations, photos and support info (provide separate disk)
- Cost Estimate as described in this standard.(provide separate disk )

### D-4.3.8 Design Reviews

Local design reviews are required. Local approval may also be required. Consult the Project Manager to determine participant list for design reviews.

#### D-4.3.8.1 Coordination

All design reviews shall be coordinated with representatives of the Public Works, Utilities, Energy, and Base design personnel. This coordination list will be provided by the Base Project Manager. A typical list of offices that require coordination is below:

- HQ AFRC/A4CM
- HQ AFRC/A4CD
- 434 MSG/CEF
- 434 MSG/SGPB
- 434 MSG/CECC
- 434 MSG/CEV
- 434 OSS/ATC
- (Traffic)
- 434 MXS/MXM
- 434 AMXS/MXA
- 434 CS/SCXP
- 434 SFS
- 434 MSG/CE
- 434 ARW/SEG
- Peru Utilities (Water, Sewer)
- REMC (Electric)
- NIPSCO (Gas)
- MCEDA (County Development)
- County Engineer

#### D-4.3.8.2 Final Government Approval

Authority and responsibility for formal approval of drawing and specifications by or for the Commander, is vested in the Base Civil Engineer, Chief Engineer and their delegated signatory representative.

# D-5 DESIGN SUBMITTAL REQUIREMENTS

## D-5.1 General

The contract identifies which submittal stages, from Concept to Final, are required and any additional stages. Designs may be incremented in stages, i.e. DOR or Contractor may only be authorized to proceed to one stage at a time.

The information presented below defines the minimum level of information required at each submittal stage.

### D-5.1.1 Number of Copies

Provide number of electronic and hard copies required for each submittal, and comply with any additional requirements specified in the contract. CE Design requires at least two hardcopies (11"x17") delivered to the base Project Manager for review at each submittal stage.

### D-5.1.2 Responding to Review Comments

The DOR or Contractor is responsible for the resolution and incorporation of government comments into the project design. At each submittal, return and address previous review comments. If the comment was incorporated into the design, a response shall so indicate. If the comment was not incorporated, an explanation shall be provided for not doing so. Contact the Government reviewer to discuss any comment that will not be incorporated, for whatever reason.

### D-5.1.3 Design Analysis

#### D-5.1.3.1 Basis of Design

The Basis of Design is a narrative presentation of facts sufficiently complete to demonstrate that the project concept is fully understood and that subsequent design details and their ultimate presentation in the final drawings and specifications will be based on sound architectural and engineering decisions. Provide a discussion and description of the design in each of the disciplines.

#### D-5.1.3.2 Discipline-Specific Guidance

Follow guidance related to each discipline per the Unified Facilities Criteria (UFC). These can be found at the Whole Building Design Guide website (https://www.wbdg.org/ffc/dod/unified-facilities-criteria-ufc.) A general list of UFC's are listed below, additional can be found at the website.

- UFC 1-200-01, *DoD Building Code*
- UFC 3-101-01, *Architecture*
- UFC 3-201-01, *Civil Engineering*
- UFC 3-301-01 *Structural Engineering*
- UFC 3-401-01, *Mechanical Engineering*
- UFC 3-501-01, *Electrical Engineering*
- UFC 3-580-01, *Telecommunications Interior Infrastructure Planning and Design*
- UFC 3-600-01, *Fire Protection Engineering for Facilities*

#### D-5.1.3.3 Calculations

Design calculations shall be submitted at design stages indicated in the contract. They shall be formatted as pdf with a cover sheet and table of contents identifying the specific discipline.

### D-5.1.4 Drawings

General guidance for preparation of drawings is provided section 2 and 4 of this guide.

### D-5.1.5 Specifications
General guidance for preparation of specifications is provided in section 3 of this guide.

### D-5.1.6 Comprehensive Interior Design (CID)
Preparation of the CID and its subparts the Structural Interior Design (SID) and Furniture, Fixtures & Equipment (FF&E) shall be prepared in accordance with the AFRC Interior Design Guide. The CID package must be developed as a bid option for all base contracts. Options can include Contractor Furnished/Contractor Installed FF&E (CFCI), Government Furnished/Government Installed FF&E (CFGI), and Government Furnished/Contractor Installed FF&E (CGCI).

### D-5.1.7 Design Charrettes
Charrettes shall be provided when required by contract to develop concept plans and use value-engineering techniques. The objective is to reach consensus on the schematic design. The approved solution becomes the basis for preparing the construction documents. Submittals associated with charrettes should include the following:

- Meeting Minutes
- Conceptual Design
- Contact List
- As-Built Confirmation
- Budget Assumptions
- Special Design Considerations

## D-5.2 Interim Design Submittal (35%)
The Interim Design Submittal is intended to convey the extent of the work beyond the preliminary conceptual manner. Drawings are approximately 35% complete at this stage.

For Interim Design, include the following as a minimum:

### D-5.2.1 Design Analysis
#### D-5.2.1.1 Basis of Design
Submit a preliminary version of the Basis of Design addressing items defined in the contract, this document, the more detailed Discipline-Specific UFCs and as applicable to the project:

#### D-5.2.1.2 Calculations
Calculations must be complete and in sufficient detail to support the items outlined in the Basis of Design and indicated on the drawings. Provide calculations required by this document and the Discipline-Specific UFCs and as follows.

##### D-5.2.1.2.1 Electrical
Preliminary Design Analysis including Preliminary load calculations for utility connections.

### D-5.2.2 Drawings
Provide drawings required by the contract, this document and discipline-specific UFCs. Include the following drawings defined by the Discipline-Specific UFCs and as applicable to the project:

#### D-5.2.2.1 Architectural:
- Floor Plans – Provide all floor plans, new and demolition, indicating room names and basic dimensions. Provide furniture layout plan indicating the operation and function of the facility has been incorporated.

- Building Elevations – Provide all building elevations indicating all exterior materials.
- Building Section – Indicate heights of critical building elements.

#### D-5.2.2.2 Civil:

- Conceptual Site Plan - Indicate above and below grade utility lines, vehicular and pedestrian circulation paths, buildings, parking, paved areas, preliminary landscape architectural concept, and existing site features to remain.
- ATFP Standoff Distances.

#### D-5.2.2.3 Electrical:

Need not provide extensive details but must be complete enough to thoroughly express the Designer's intentions and include the following:

- Existing Site and Demolition Plan.
- Site Plan.
- Single Line Diagram.
- Preliminary floor plans with dedicated space clearly identified for electrical and telecommunications rooms.

#### D-5.2.2.4 Fire Protection:

- Code Compliance Summary Sheets.
- Life Safety Floor Plan.

### D-5.3 Design Submittals (65%)

The Design Submittal is intended to convey the complete scope of the work in a preliminary manner. The drawings are typically about 65% complete at this stage. This submittal must include requirements of the previous submittal plus additional detail to bring them to the required completion percentage. Include the following as a minimum:

#### D-5.3.1 Design Analysis;

#### D-5.3.1.1 Basis of Design

Submit a complete Basis of Design addressing items defined in this document and the Discipline-Specific UFCs.

#### D-5.3.1.2 Calculations

Provide the following calculations, as a minimum, and as defined in detail by the Discipline-Specific UFCs.

##### D-5.3.1.2.1 Pavements:

Provide Pavements calculations in sufficient detail to support the items outlined in the Basis of Design and indicated on the drawings.

##### D-5.3.1.2.2 Energy Analysis:

Provide the computerized energy analysis that includes input and output data in their entirety.

##### D-5.3.1.2.3 Life Cycle Cost Analysis:

Submit the computerized LCC analysis utilizing the latest edition of the NIST Building Life-Cycle Cost Program.

#### D-5.3.1.2.4 Building Heating and Cooling Load:

Provide the computerized load calculations with input and output data in their entirety.

#### D-5.3.1.2.5 ASHRAE 90.1 Compliance Calculations:

Submit calculations and compliance forms indicated in the Basis of Design.

#### D-5.3.1.2.6 Electrical:

Updated Design Analysis to substantiate design level shown. Provide calculations including:

- Lighting: Interior and Exterior Foot-candles.
- Load Analysis.
- Service size.
- Feeder size.
- Larger special circuit sizes.
- Lightning Risk Assessment.

#### D-5.3.1.2.7 Fire Protection:

Submit all calculations supporting all fire suppression and fire alarm/detection systems for the project. Calculations for systems, features, or elements other than fire suppression or detection will be required as applicable. Fire suppression system calculations must be prepared using commercially available computer software.

### D-5.3.1.3 Estimate

Provide estimate in detail for the specific Discipline- and features..

## D-5.3.2 Drawings

Provide drawings required by this document, the Design-Specific UFCs and the contract. Include the following drawings as defined in the Discipline-Specific UFCs and as applicable to the project:

### D-5.3.2.1 Architectural:

- Floor Plans – Provide all floor plans, new and demolition, indicating room names and dimensions.
- Building Elevations – Provide all building elevations indicating all exterior materials.
- Roof Plan – Provide a plan of all roof areas, indicating direction of slope and method of drainage.
- Building Section – Indicate heights.
- Typical Wall Sections – Provide sufficient wall section(s) to indicate all materials and different conditions.
- Finish Schedule – Indicate all proposed finishes.
- Furniture Plan.

### D-5.3.2.2 Landscape Architecture:

- Planting Plan – show locations of all facilities (buildings, parking areas, roads, existing vegetation noted for preservation, etc.) and new plantings (trees, shrubs, ground cover, etc.).

- Plant Schedule and Details – provide a schedule for plant material showing as a minimum: common name, botanical name, quantity of plants, root condition (balled and burlapped, containerized, boxed, etc.), and a keyed reference to a planting detail. Provide separate details for plant types (trees, shrubs, ground covers, etc.).
- Miscellaneous Plans and Details – provide plan drawings and details for specialized construction including such items as plazas, courtyards, child play equipment, monuments, memorials, site furniture, fences, walls, signage, etc.

**D-5.3.2.3 Civil:**

- Legend and Notes.
- Existing Conditions.
- Utility Plan.
- Layout Plan for Roads and Parking.
- Pavement sections, including joint layout plan and details.

**D-5.3.2.4 Structural:**

- Foundation Plans - Include for all structures, showing dimensions, arrangements, elevations, locations referred to a column line grid system, type of foundation and foundation obstructions. Include the layout of all slabs, footings, piers, grade beams, piles, etc., showing all foundation features of the design.
- Framing Plans – Include a framing plan for each structural level of the facility, showing dimensions, elevations, and column locations and numbering referenced to a column line grid system, and overall sizes of major members and components. Show the layout of beams, joists, stringers, etc.
- Structural Details – Show typical details of construction, indicating the connection and relationship between major components of the structural system.
- Structural Elevations – Show general sizes, location and arrangement of all significant features of the vertical framing system, including columns, walls, beams, etc.

**D-5.3.2.5 Mechanical:**

- Plumbing Floor Plan. Show plumbing fixtures, floor drains and equipment locations.
- Site Plan. Show connection to base steam distribution, location of propane and oil tanks, and layout of ground coupled heat pump well fields, etc.
- HVAC Floor Plan. Show equipment locations, one or two-line duct layout and preliminary piping runs.
- Mechanical Room Plan. Show major equipment and maintenance access space. Provide section view(s) to clarify layout and supports.

**D-5.3.2.6 Electrical:**

- Legend and Abbreviations.
- Existing Site and Demolition Plan.
- Site Plan.
- Lighting Plan(s).
- Power Plan(s).
- Lightning Protection Plan.
- Cathodic Protection Plan.
- Special Systems Plans.
- Single Line Diagram.
- Additional Plans/Risers.

#### D-5.3.2.7 Fire Protection:

- Code Compliance Summary Sheets (Updated from 35% Design).
- Life Safety plan (Updated from 35% Design).
- Fire Suppression plans.
- Fire Alarm and Mass Notification System Plans.
- Detail Sheets.

### D-5.3.3 Specifications

Provide outline specifications, in the form of a list of specification sections the DOR intends to use in the job.

## D-5.4 Pre-Final Design Submittal (95%)

### D-5.4.1 Design Analysis:

#### D-5.4.1.1 Basis of Design

Submit revised Basis of Design including updated information and incorporating responses to previous government review comments.

#### D-5.4.1.2 Calculations

Revise calculations as required to reflect resolution of all previous government review comments. Provide design analysis that is 100% complete. Provide calculations for each discipline

##### D-5.4.1.2.1 Mechanical

Submit calculations to support the plumbing and mechanical systems and the major equipment comprising those systems. Submittals shall include, but not be limited to cooling loads, heating loads, air balance, and outside air calculations. Update the energy analysis, provided at the 65% Design Submittal, with the equipment efficiencies scheduled on the drawings.

##### D-5.4.1.2.2 Electrical

Provide updated Calculations from previous submittal to substantiate design level shown, including the following, as applicable.

- Short Circuit
- Voltage Drop
- Lighting
- Load Analysis
- Cathodic Protection

### D-5.4.2 Drawings

Drawings must be 100% complete, minus final signatures, and modified to reflect the responses to previous review comments. The drawings must be complete to the extent that they may be released for bid or constructed as submitted. Provide complete set of construction drawings organized by discipline as described in this document and the discipline specific UFCs.

In addition to requirements specified in the Discipline-Specific UFCs and RFP, provide the following:

#### D-5.4.2.1 General:

- Phasing Plan
- Temporary Construction Facilities (if applicable)
- Temporary Utility Facilities (if applicable)

#### D-5.4.2.2 Electrical:

- Legend and Abbreviations.
- Existing Site and Demolition Plan.
- Lighting Plans and Details.
- Power Plans and Details.
- Power - Single Line Diagram.
- Other Riser Diagrams for Television, Security, and similar systems.
- Panel Schedules.
- Switchboards and Motor Control Center Schedules.
- Lighting Fixture Details.

#### D-5.4.3 Specifications

Provide edited, red-lined specification sections, showing deletions from and additions to the master guide specification sections. Deletions should be shown in bold print and lined out. Additions should be shown in bold print, italicized, and underlined. Provide a submittal register.

### D-5.5 Final Design Submittal

The Final Submittal provides a complete and final set of contract documents ready for bid solicitation by the Government. All previous government review comments must have been addressed.

Unless specified otherwise by the Contract, provide final submittals in electronic format.
Provide the following, as a minimum, for the Final Submittal:

#### D-5.5.1 Design Analysis

##### D-5.5.1.1 Basis of Design

Submit final, revised and updated, Basis of Design as required herein and by the Discipline-Specific UFCs.

##### D-5.5.1.2 Calculations

Revise design analysis and calculations as required to reflect resolution of all previous government review comments and as required by this document and the discipline-specific UFCs.

##### D-5.5.1.3 Estimate

Provide and update cost estimate with construction performance period.

#### D-5.5.2 Drawings

Provide complete construction drawings (detailed in the PreFinal Design Phase) organized by discipline in accordance with this UFC and Discipline-Specific UFCs.

##### D-5.5.2.1 Drawing General Notes

The following statement must be provided on the general notes for the project

"If a conflict exists in the drawings, specifications, referenced building codes, etc. the more stringent requirement shall be required, unless otherwise instructed by the Contracting Officer. The Contractor shall report conflicts with a Request for Information (RFI) to the contracting officer for clarification before starting that work element."

#### D-5.5.3 Specifications

Provide complete specifications (detailed in PreFinal Design Phase) formatted and organized per EDD section of this standard.