
OREGON MILITARY DEPARTMENT | Oregon Army National Guard

PERFORMANCE SPECIFICATIONS

Project Manual

For Projects Solicited After XXXX

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DIVISION 00

PROCUREMENT AND CONTRACTING REQUIREMENTS

SECTION 00 73 00

SUPPLEMENTARY CONDITIONS — REFERENCED STANDARDS

PART 1 — GENERAL

1.01 GOVERNING CODES

All portions of the Project shall comply with the most current editions of the following at time of award:

- A. IBC — International Building Code
- B. State of Oregon Building Codes
- C. Applicable Federal Statutes and Regulations

1.02 ARMY NATIONAL GUARD CRITERIA

In addition to specific regulatory requirements, the following Non-Regulatory Criteria Documents/ORS are also incorporated into the definition of the Code for the purposes of this Project, most current at time of award:

- A. Army National Guard G-9 Guidance — Electrification Implementation Policy for Military Construction (MILCO) and Renovation and Modernization (R&M) Projects.
(https://www.wbdg.org/FFC/ARMYCOE/POLICY/Army_Electrification_Policy_Combined.pdf)
- B. NG Pam 415-12 — Army National Guard Facilities Allowances
(<https://www.ngbpmc.ng.mil/Publications/National-Guard-Pamphlets/>).
- C. Design Guide 415-10 — Facilities Design Guide (Request from OMD).
- D. Design Guide 415-1 — Readiness Centers Design Guide (now incorporated in 415-10 — Facilities Design Guide).
- E. Design Guide 415-5 — General Facilities Information Design Guide (now incorporated in 415-10 — Facilities Design Guide).
- F. Guiding Principles for Sustainable Federal Buildings and Associated Instructions (December 2020) — Council on Environmental Quality
(https://www.sustainability.gov/pdfs/guiding_principles_for_sustainable_federal_buildings.pdf).

1.03 UNIFIED FACILITIES CRITERIA (UFC)

All portions of the Project shall comply with the most current editions of the following at time of award:

- A. UFC 1-200-02 — High Performance and Sustainable Building Requirements
(<https://www.wbdg.org/dod/ufc/ufc-1-200-02>).

- B. UFC 3-230-01 — Water Storage and Distribution
(<https://www.wbdg.org/dod/ufc/ufc-3-230-01>).
- C. UFC 3-230-03 — Water Treatment
(<https://www.wbdg.org/dod/ufc/ufc-3-230-03>).
- D. UFC 3-240-01 — Wastewater Collection and Treatment
(<https://www.wbdg.org/dod/ufc/ufc-3-240-01>).
- E. UFC 3-240-02 — Water Reuse
(<https://www.wbdg.org/dod/ufc/ufc3-240-02>).
- F. UFC 3-301-01 — Structural Engineering
(<https://www.wbdg.org/dod/ufc/ufc-3-301-01>).
- G. UFC 3-410-01 — Heating, Ventilating, and Air Conditioning Systems
(<https://www.wbdg.org/dod/ufc/ufc-3-410-01>).
- H. UFC 3-530-01 — Interior and Exterior Lighting Systems and Controls
(<https://www.wbdg.org/dod/ufc/ufc-3-530-01>).
- I. UFC 3-600-01 — Fire Protection Engineering for Facilities
(<https://www.wbdg.org/dod/ufc/ufc-3-600-01>).
- J. UFC 4-010-01 — DoD Minimum Antiterrorism Standards for Buildings
(<https://www.wbdg.org/dod/ufc/ufc-4-010-01>).
- K. UFC 4-010-05 — Sensitive Compartmented Information Facilities
(<https://www.wbdg.org/dod/ufc/ufc-4-010-05>).
- L. UFC 4-010-06 — Cybersecurity of Facility-Related Control Systems
(<https://www.wbdg.org/dod/ufc/ufc-4-010-06>).
- M. UFC 4-020-01 — Security Engineering Facilities Planning Manual
(<https://www.wbdg.org/dod/ufc/ufc-4-020-01>).
- N. UFC 4-021-01 — Design and O&M: Mass Notification Systems
(<https://www.wbdg.org/dod/ufc/ufc-4-021-01>).
- O. UFC 4-022-01 — Entry Control Facilities / Access Control Points
(<https://www.wbdg.org/dod/ufc/ufc-4-022-01>).
- P. UFC 4-022-02 — Selection and Application of Vehicle Barriers
(<https://www.wbdg.org/dod/ufc/ufc-4-022-02>).
- Q. UFC 4-022-03 — Security Fences and Gates
(<https://www.wbdg.org/dod/ufc/ufc-4-022-03>).
- R. UFC 4-023-07 — Design to Resist Direct Fire Weapons Effects
(<https://www.wbdg.org/dod/ufc/ufc-4-023-07>).
- S. USACE ECB 2008-15 — Design of Surface Drainage Facilities
(<https://www.wbdg.org/dod/ecb/usace-ecb-2008-15>).

1.04 OREGON-SPECIFIC REQUIREMENTS

- A. The Oregon Department of Energy (“ODOE”) 1.5% Green Energy Technology in Public Building Construction Contracts requirements pursuant to ORS 279C.527, 279C.528, and OAR 330-135-0010 to 330-135-0055, at (<https://www.oregon.gov/energy/energy-oregon/pages/get.aspx>).
- B. The completed Project must meet The State of Oregon energy efficiency design (“SEED”) requirements set forth at Oregon Revised Statutes (“ORS”) 276.900 through 276.915 and Oregon Administrative Rules (“OAR”) 330-130-0010 through 330-130-0100 (which can be

reviewed at (<https://www.oregon.gov/energy/energy-oregon/Pages/SEED-Program-Guidelines.aspx>).

- C. OMD Control System Specifications — Instrumentation and Control for HVAC (Request from OMD).
- D. OMD MDF/IDF Communications Room Voice-Data-Video Cabling Standard 2014 (Request from OMD).
- E. Office of the Governor Executive Order No. 25-22 — Constructing Seismically Resilient State Buildings (<https://www.oregon.gov/gov/eo/eo-25-22.pdf>).

1.05 OCCUPATIONAL SAFETY AND HEALTH

- A. 29 CFR 1910 — Occupational Safety and Health Standards (https://www.osha.gov/laws-regs/regulations/standardnumber/1910?p_doc_type=STANDARDS&p_toc_level=1&p_keyvalue=1910).
- B. 29 CFR 1926 — Safety and Health Regulations for Construction (<https://www.osha.gov/laws-regs/regulations/standardnumber/1926>).
- C. 29 CFR 1960 — Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters (<https://www.osha.gov/laws-regs/regulations/standardnumber/1960>).
- D. National Fire Protection Association (“NFPA”) 2024 Standards (comprehensive, applicable per scope of work).
- E. Applicable ANSI Standards — Construction, Ladder, Fall Protection, Clothing and Equipment, Workplace Surfaces, etc.
- F. OAR Chapter 437 Division 3 — Oregon Safe Employment Act (Construction) (<https://osha.oregon.gov/OSHARules/div3/div3.pdf>).

1.06 SECURITY AND FORCE PROTECTION

- A. AR 190-11 — Physical Security of Arms, Ammunition, and Explosives
- B. AR 190-13 — The Army Physical Security Program
- C. AR 190-51 — Security of Unclassified Army Property (Sensitive and Nonsensitive)
- D. AR 380-05 — Army Information Security Program
- E. DA PAM 190-51 — Risk Analysis for Army Property, Department of the Army Pamphlet
- F. DA PAM 386-64 — Ammunition and Explosives Safety Standards
- G. ATP 3-39.32 (formerly FM 3-19.30) — Physical Security
- H. ICD 705 — Sensitive Compartmented Information Facilities
- I. ICS 705-01/02 — Physical & Technical Security Standards for Sensitive Compartmented Information Facilities
- J. Intelligence Community Technical Specifications for Sensitive Compartmented Information Facilities
- K. I&E-HPG.2018 — Installations and Environmental Handbook and Program Guidance
- L. ARNG ESS Program Standards, Criteria, and Typical Design
- M. AA-D-600D with Amendment 4 — Door, Vault, Security (https://exwc.navfac.navy.mil/Portals/88/Documents/EXWC/DoD_Locks/PDFs/AA-D-600D.pdf)

- N. QPL-AA-D-600-12 Qualified Product List – Door, Vault, Security
(https://exwc.navfac.navy.mil/Portals/88/Documents/EXWC/DoD_Locks/PDFs/QPL-AA-D-600-12.pdf).
- O. FF-L-2937 with Amendment 2 — Lock, Combination, Mechanical
(https://exwc.navfac.navy.mil/Portals/88/Documents/EXWC/DoD_Locks/PDFs/FF-L-2937_A2.pdf).
- P. QPL- FF-L-2937 Qualified Product List - Lock, Combination, Mechanical
(https://exwc.navfac.navy.mil/Portals/88/Documents/EXWC/DoD_Locks/PDFs/QPL-FF-L-2937.pdf).
- Q. UFGS 08 34 59 — Vault Door and Day Gates
(<https://www.wbdg.org/dod/ufgs/ufgs-08-34-59>).
- R. UFGS 25 05 11 — Cybersecurity for Facility-Related Control Systems
(<https://www.wbdg.org/dod/ufgs/ufgs-25-05-11>).
- S. UFGS 28 31 76 — Interior Fire Alarm and Mass Notification System (Addressable)
(<https://www.wbdg.org/dod/ufgs/ufgs-28-31-76>).

PART 2 — PRODUCTS

2.01 NOT USED

PART 3 — EXECUTION

3.01 NOT USED

END OF SECTION — 00 73 00 — Supplementary Conditions — Referenced Standards

**END OF DIVISION — DIVISION 00 — Procurement and Contracting
Requirements**

DIVISION 01

GENERAL REQUIREMENTS

SECTION 01 10 00

SUMMARY

PART 1 — GENERAL

1.01 BASIC FUNCTION

Provide built elements and Site modifications in conformance with the following performance specifications, as required to fulfill needs described in the Project program.

1.02 PROJECT SCOPE

The complete Project comprises the following elements:

- A. Substructure — Elements below grade and in contact with the ground.
- B. Shell — The superstructure, exterior enclosure, and the roofing.
- C. Interiors — Interior construction, stairs, finishes, and fixtures, except fixtures associated with services and specialized equipment.
- D. Services — Mechanized, artificial, automatic, and unattended means of supply, distribution, transport, removal, disposal, protection, control, and communication.
- E. Equipment and Furnishings — Fixed and movable elements operated or used by occupants in the functioning of the Project.
- F. Site Work — Site modifications, site improvements, and utilities.

1.03 REFERENCED STANDARDS

- A. LEED Rating System – U.S. Green Building Council
- B. Oregon State Energy Efficient Design (SEED) Program
- C. DG 415-5 — General Facilities Information Design Guide
- D. NG Pam 415-12 — Army National Guard Facilities Allowances
- E. ARNG G-9 Construction Program Guidance for Fiscal Year 2026 through 2030
- F. Guiding Principles for Sustainable Federal Buildings and Associated Instructions (December 2020) — Council on Environmental Quality
- G. ANSI/BOMA Z65.1 – Standard Method for Measuring Floor Area in Office Buildings

1.04 ENVIRONMENTALLY RESPONSIBLE DESIGN

In addition to other requirements, provide design and construction that minimizes adverse effects on the exterior environment, enhances the quality of the indoor environment, and minimizes consumption of energy, water, construction materials, and other resources. Design shall comply with the Guiding Principles for Sustainable Federal Buildings (Council on Environmental Quality,

December 2020) (“GP”), which establish the overarching federal framework for sustainable design across six principles: integrated design, energy performance, water conservation, indoor environment quality, materials, and building resilience. The requirements below implement the GP framework through applicable state, federal, and program-specific pathways.

A. State Energy Efficient Design (“SEED”)

1. Achieve 20% or better of the State of Oregon energy code and according to the SEED program requirements to minimize the long-term operation and maintenance costs. SEED rules are described in the Department of Energy's publication of the SEED Program Guidelines, available at <https://www.oregon.gov/energy/energy-oregon/pages/seed.aspx>.
2. Substantiation:
 - a. Proposal Stage: SEED Checklist annotated to show specific credits, systems, and efficiencies with a brief description of how they will achieve the intended requirements.
 - b. At Completion: SEED Certification and report from the State Energy Efficient Design program that validates that the facility is compliant with all SEED requirements.

B. Leadership in Energy and Environmental Design (“LEED”)

1. LEED Silver shall serve as a design reference standard consistent with ARNG G-9 Military Construction program requirements and the Guiding Principles for Sustainable Federal Buildings framework. The design shall reflect LEED Silver principles to the extent life cycle cost-effective. Formal LEED Silver certification is not required and no additional expense shall be incurred solely to pursue certification. Where LEED Silver principles conflict with or are superseded by SEED requirements, SEED governs as the primary Oregon energy compliance pathway.
2. Substantiation:
 - a. Proposal Stage (30% Concept Design): Submit a LEED Statement and LEED Silver Checklist annotated to identify targeted credits, systems, and efficiencies, with a brief description of how the design approach addresses each. This submittal satisfies the ARNG G-9 checklist requirement for LEED documentation at the 30% design phase.
 - b. Design Development (60% Preliminary Design): Submit an updated LEED Checklist reflecting design decisions made through the Preliminary Design phase. This submittal satisfies the ARNG G-9 checklist requirement at the 60% phase.
 - c. Final Design (90%): Submit a completed LEED Checklist documenting credits achievable through the completed design consistent with LEED Silver principles. Formal certification submission is not required. This satisfies the ARNG G-9 checklist requirement at the 90% phase.

C. ARNG Sustainable Building Design Requirements

1. Comply with all applicable National Guard Bureau requirements for sustainable building design and construction as established by ARNG G-9 for Military Construction projects.
2. Comply with the Army Sustainable Design and Development Policy (Army Sustainability Implementation Guide, 4 March 2024), as referenced in the ARNG Construction Program Guidance. This policy implements the Guiding Principles for Sustainable Federal Buildings (CEQ, December 2020), which establishes the overarching federal framework for sustainable design across all six principles: integrated design, energy performance, water conservation, indoor environment quality, materials, and building resilience. Where the Army policy conflicts with or provides requirements beyond other referenced standards in this section, the Army Sustainable Design and Development Policy shall govern. Any exceptions to criteria require ARNG G-9 approval prior to routing to DASA for final approval.

1.05 FOOD PREPARATION, STORAGE, AND SERVING FACILITIES

Where provided, such facilities shall be located, designed, and constructed to allow efficient operations, minimize contamination and spoilage of foods, allow easy maintenance and cleaning, and provide effective protection against the entrance and harborage of pests.

- A. Provide a facility that is flexible enough to allow changes and adjustments due to modification of production procedures from time to time.
- B. Provide a design in accordance with the latest published criteria from the U.S. Army Quartermaster Center and School ("USAQMC&S").
- C. Substantiation:
 - 1. Proposal Stage: Identification of design consultants.
 - 2. Preliminary Design: Space allocations and detailed program, if not already established; analysis of traffic flows of users and supplies.
 - 3. Design Development: Layouts and workflow diagrams, including methods of protecting against contamination of foodstuffs.
 - 4. Construction Documents: Material and equipment specifications.

1.06 KITCHEN, RESTROOMS, SHOWER ROOMS

Where provided, such facilities shall have solid lid ceilings and epoxy or ceramic tile flooring.

1.07 ATHLETIC SPACES

Refer to DG 415-5, Chapter 5 and NG PAM 415-12, Chapter 2 for design guidance for the physical fitness area.

1.08 ACCESS TO SPACES

Provide keyed access to all areas, utilizing the Medeco Key system that is compatible with the system that OMD has at all of its facilities.

- 1. Provide three keys per door, plus one Master for the entire building.

1.09 SERVICE LIFE

Expected functional service life of the built portions of this Project is 50 years. Service life spans of individual elements that differ from the overall Project life span are defined in other Sections.

- A. Since actual service life cannot be proven, substantiation of actual service life is not required; however, the following are reasonable indicators of anticipated service life:
 - 1. Preliminary Design or Design Development: Service life expectancy analysis, for each element for which life span is specified; including:
 - a. Length of effective service life and aesthetic service life if specified, with action required at end, e.g. complete replacement, partial replacement, and refurbishment.
 - b. Conditions under which estimate will be valid, e.g. expected uses, inspection frequency, maintenance frequency, etc.

2. Design Development: Replacement cost, in today's dollars, for each major element that has a service life expectancy less than that of the Project; include both material and labor cost, but not overhead or profit; base costs on installing in existing building, not as a new installation.
3. Design Development: Life cycle cost of Project, over the specified Project service life, excluding operating staff costs; include costs of:
 - a. Replacement of each element not expected to last the life of the Project; identify the frequency of replacement.
 - b. Deduct salvage value of replaced elements.
 - c. Calculate costs in today's dollars, disregarding the time value of money, inflation, taxes, and insurance.

1.10 STRUCTURAL PERFORMANCE

Provide interior construction and fixtures to support without damage all loads required by the Code.

- A. Special Loads: In addition to loads defined by the Code, provide for adequate support of wall-mounted or ceiling-mounted furnishings and equipment in spaces where such equipment is required by program or is likely to be installed after construction because of intended function.
 1. Adequate support is defined as the ability to sustain 150 percent (%) of design loads without damage to building or equipment.

1.11 ACCIDENTAL WATER LEAKAGE

Locate components that would be damaged by water leakage from pipes or through foundations or roof out of likely paths of water and at least 100 mm (4 inches) above floor level.

1.12 OPERATION & MAINTENANCE – SERVICES

- A. Capacity:
 1. Conveying Systems: As required for the number of occupants.
 2. Water and Drainage: As required by the Code.
 3. Heating, Cooling, and Ventilating: Maintain interior environment within ranges specified in General Requirements and HVAC – General Performance.
 4. Fire Suppression: As required by the Code.
 5. Electrical: As required by the Code.
 - a. Power: Non-interruptible power supply.
 6. Telecommunications: As specified in Project program.
 7. Substantiation:
 - a. Proposal: Description of systems required, sources, input-side capacities, and means of distribution.
 - b. Design Development: Engineering calculations showing input- and output-side capacities and loads and sizes of distribution elements.
 - c. Construction and Closeout: Functional performance testing, as specified in Design and Coordination Procedures.

B. Ease of Use:

1. Provide facility, equipment, and systems that are easily operated by personnel with a reasonable level of training for similar activities.
2. Access: All mechanical and electrical equipment located to allow easy access. Provide access doors for equipment accessed through walls, partitions, or fixed ceilings.
3. Valves and Other Control Devices: Accessible handles, switches, control buttons; valve handles on top/upper side; chain or other remote operators where located out of normal reach above floor level in SU1 and SU2 spaces (utility spaces for Building Services and Utility Equipment, respectively).
 - a. SU1 – Building Services: Spaces for maintenance supplies, trash collection, trash removal, maintenance shop, and loading dock.
 - b. SU2 – Utility Equipment: Spaces for mechanical, heating, electrical, elevator equipment, and communications.
4. Space Around Components: Working clearances and access routes as required by the Code and as recommended by component manufacturer.
5. Testing: After completion of installation, prepare services for starting-up by testing appropriately for proper operation.
6. Preparation for Operation: Minimize the need for specialized training in operation of specific equipment or systems; identify all equipment and systems for which the manufacturer recommends or provides training programs. Provide assistance for the Owner's preparations for operation, as specified in Design and Coordination Procedures and as follows:
 - a. Demonstration of all services to Owner personnel.
 - b. Training Owner personnel in the operation of all service systems.
 - c. Substantiation:
 - i. Proposal: Type of operating personnel and amount of training required; identification of each equipment item or system for which more than one day of training is required; identify source of data.
 - ii. Construction Documents: Schedule of demonstrations.
 - iii. Construction Documents: Training plan and schedule.
7. Minimize the amount of maintenance required.
 - a. Substantiation:
 - i. Proposal: Estimated maintenance cost for first year of operation, based on use of outside maintenance contracts; estimate of the impact that aging materials will have on maintenance costs; description of maintenance activities included in estimated cost.
 - ii. Make sure all items that require routine maintenance are accessible and access points are marked and visible from occupied space.
8. Elements that do not meet the specified requirements for ease of repair may be used, provided they meet the specified requirements for ease of replacement of elements not required to have service life span equal to that specified for the Project as a whole; the service life expectancy analysis and life cycle cost substantiation specified for service life are provided; and Owner' acceptance is granted.
9. Ease of Replacement:
 - a. Elements not required to have the Expected Service Life Span Equal to that Specified for the Project as a Whole: Make provisions for replacement without undue disruption of building operation.

PART 2 — PRODUCTS

2.01 BIOLOGICAL FACTORS

- A. Animals: Do not use materials that are attractive to or edible by animals or birds.
- B. Insects: Do not use materials that are edible by insects, unless access by insects is prevented.

PART 3 — EXECUTION

3.01 GOOD WORKMANSHIP

All work shall be performed with good workmanship: work done with skill, precision, and attention to detail, meeting industry standards and demonstrating a competent level of expertise in the applicable trade or field; essentially, a job done well by someone with the necessary knowledge and ability to produce a functional and reliable result. Key aspects of good workmanship include:

- A. Proper technique: using the correct methods and tools for the task.
- B. Attention to detail: carefully considering and executing even small elements of the work.
- C. Quality materials: employing materials that meet required specifications and standards.
- D. Adherence to specifications: following project plans and guidelines precisely.
- E. Consistency: maintaining a high level of quality throughout the entire project.

3.02 REGULATED BUILDING MATERIALS

Owner will provide a regulated building material survey of accessible areas of the building; this will not cover materials where destructive testing is required. During construction, if questionable materials are uncovered, inform the Owner's representative for action.

- A. Avoid installing any new products that contain Regulated Building Materials.
- B. Avoid using any powder-actuated fasteners.

3.03 SPACE EFFICIENCY

Minimize floor area required while providing specified spaces and space relationships, plus circulation and services areas required for functions.

- A. Substantiation: Areas and ratios measured and calculated in accordance with ANSI/BOMA Z65.1.
 - 1. Proposal: Calculation of Gross Building Area, Building Common Area, Floor Common Areas, Floor Rentable Areas, and Building Rentable Area, R/U Ratio, and net area of each space.
 - 2. Design Development: Calculation of Gross Building Area, Building Common Area, Floor Common Areas, Floor Rentable Areas, and Building Rentable Area, R/U Ratio, and net area of each space.

3.04 ACCESS / INGRESS / EGRESS

Provide access to all primary interior spaces from Circulation spaces (SC Spaces) (no access to any primary interior space exclusively through another primary interior space).

- A. View: Provide views to the building exterior or interior atria from most locations within primary interior spaces. View spaces include the following types:
1. Customer Contact (SP1 Spaces).
 2. Occupant Work (SP2 Spaces).
 3. Equipment Utilization (SP3 Spaces).
 4. Assembly (SP4 Spaces).
 5. Meeting and Instruction (SP4 Spaces).
 6. Physical Fitness Area (SP3 Spaces).
- B. Egress: Provide egress from all interior spaces in accordance with the Code.

Space Type	Space Code	Space Name	Description of the Space
Interior Space	Personnel	SP1	Visitor Contact
		SP2	Occupant Work
		SP3	Equipment Utilization
		SP4	Assembly
	Occupancy Services	OS	Occupancy Services
	Storage	SS	Storage
	Circulation	SC	Circulation
	Utility	SU1	Building Services
		SU2	Utility Equipment
Exterior Space	Personnel	SP5	Outdoor Assembly
	Utility	SU1	Outdoor Building Services
	Vehicle	SV2	Automotive
	Military Vehicle	SV3	Organizational Parking

END OF SECTION — 01 10 00 — Summary

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 — GENERAL

1.01 SUBSTANTIATION — DEFINITION

Substantiation is any form of evidence that is used to predict whether the design will comply with the requirements or to verify that the construction based on the design actually does comply. During Preliminary Design, Design Development, and Construction Documents, requirements to submit substantiation are primarily intended to forestall use of designs or constructions that will not comply. At any time before completion of construction, substantiation is presumed to be only a prediction and may subsequently be invalidated by actual results.

- A. Regardless of whether substantiation is specified or not, actual construction must comply with the specified requirements and may, at the Owner's discretion, be examined, inspected, or tested to determine compliance.
- B. Substantiation submittals will not be approved or accepted, except to the extent that they are part of documents required to be approved or accepted in order to proceed to the next stage of design or construction. However, approval or acceptance of substantiation will not constitute approval or acceptance of deviations from the specified requirements unless those deviations are specifically identified as such on the submittal.
- C. The Owner accepts the responsibility to review substantiation submittals in a timely manner and to respond if they are unacceptable.
- D. If a substantiation requirement is specified without a submission time, submit before the end of Construction Documents.
- E. In addition to the requirements stated in other Sections, provide the following substantiation of compliance at each stage of the Project:
 - 1. If a substantiation requirement is specified without an indication of when it is to be submitted, submit or execute it before the end of Construction Documents.

1.02 PROVEN-IN-USE ELEMENTS

Where elements proven-in-use are used to comply with performance requirements:

- A. In the Proposal, identify which elements will be accomplished using proven-in-use elements.
- B. During Design Development, identify proven-in-use elements proposed for use, including building name, location, date of construction, owner contact, and description of design and materials in sufficient detail to enable reproduction in this Project.

1.03 MOCK-UP TESTING

Where elements proven-by-mock-up are used to comply with performance requirements:

- A. In the Proposal, identify which elements will be accomplished using proven-by-mock-up elements.
- B. During Design Development identify proven-by-mock-up elements proposed for use, with test report including date and location of test, name of testing agency, and description of test and mockup.

- C. Mock-up testing need not have been performed specifically for this Project, provided the mock-up is substantially similar in design and construction to the element proposed.

1.04 DESIGN ANALYSES AND ENGINEERING CALCULATIONS

- A. Where a design analysis or calculation is specified without identifying a particular method, perform analysis in accordance with accepted engineering or scientific principles to show compliance with specified requirements, and submit report that includes analysis methods used and the name and qualifications of the designer.
- B. Where engineering design is allowed to be completed after commencement of construction, substantiation may be in the form of shop drawings or other data.
- C. Submit design analyses at the end of Design Development unless otherwise indicated.
- D. Where design analysis is specified to be performed by licensed design professional, use a design professional licensed in Oregon.
- E. Special Inspections will be contracted separately by the Owner; DBC shall coordinate directly with the special inspection firm.

1.05 SPECIAL INSPECTIONS

Special Inspections will be contracted separately by the Owner. DBC shall coordinate tests, inspections, and approvals directly with the special inspection firm.

PART 2 — PRODUCTS

2.01 NOT USED

PART 3 — EXECUTION

3.01 NOT USED

END OF SECTION — 01 33 00 — Submittal Procedures

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 — GENERAL

1.01 GENERAL RULES

In addition to requirements specified in other Sections, provide products and elements that comply with the following:

- A. Where actual brand name products are not identified by either the Owner or the Design-Builder, identify the products to be used.
- B. Where 'no substitutions' is indicated, use only the product (or one of the products) specified.
- C. Elements Made Up of More Than One Product:
 - 1. Where an element is specified by performance criteria, use construction that is either proven-in-use or proven-by-mock-up, unless otherwise indicated.
 - a. Proven-In-Use: Proven to comply by having been built to the same or very similar design with the same materials as proposed and functioning as specified.
 - b. Proven-by-Mock-Up: Compliance reasonably predictable by having been tested in full-scale mock-up using the same materials and design as proposed and functioning as specified. Testing need not have been accomplished specifically for this Project; when published listings of independent agencies include details of testing and results, citation of test by listing number is sufficient (submittal of all test details is not required).
 - c. The DBC may choose whether to use elements proven-in-use or proven-by-mock-up, unless either option is indicated as specifically required.
 - d. Where test methods accompany performance requirements, use those test methods to test the mock-up.
 - 2. Where a type of product is specified, without performance criteria specifically applicable to the element, use the type of product specified.
 - 3. Where more than one type of product is specified, without performance criteria specifically applicable to the element, use one of the types of products specified.
 - 4. Where a type of product is specified with applicable performance criteria, use either the specified type or another type that meets the performance criteria as proven-in-use or proven-by-mock-up.
 - 5. Where more than one type of product is specified, with applicable performance criteria, use either one of the types of products specified or another type of product that meets the performance criteria as proven-in-use or proven-by-mock-up.
 - 6. Where neither types of products nor performance criteria are specified, use products that will perform well within the specified life span of the building.
- D. Where a product is specified only by a manufacturer name and model number/brand name, use only that model/brand product.
- E. Where the properties of a product are specified by description and/or with performance criteria, use products that comply with the description and/or performance criteria.
- F. Where manufacturers are listed for a particular product, use a product made by one of those manufacturers that also complies with other requirements.

PART 2 — PRODUCTS

2.01 PRODUCT IDENTIFICATION — SUBMITTAL SCHEDULE

Submittals shall be provided at the following stages:

- A. In the Proposal:
 - 1. Identify one or more product types for each system, assembly, or element.
 - 2. For each product type, provide brief descriptive or performance specifications.
 - 3. For major manufactured products that are commonly purchased by brand name, and any other products so indicated, identify at least one manufacturer that will be used.
- B. During Preliminary Design / Design Development:
 - 1. Where more than one product type is identified for a particular system, assembly, or element, identify exactly which type will be used.
 - 2. For each product type, provide descriptive or performance specifications; early submittals may be brief specifications, but complete specifications are required prior to completion of construction documents.
 - 3. For each product type, identify at least one manufacturer that will be used.
 - 4. For major manufactured products that are commonly purchased by brand name, and any other products so indicated, provide manufacturer's product literature on at least one actual brand name product that meets the specifications, including performance data and sample warranty.
- C. During Construction:
 - 1. Identify actual brand name products used for every product, except commodity products specified by performance or description.
 - 2. Where a product is specified by performance requirements with test methods, and if so specified, provide test reports showing compliance.
 - 3. Provide manufacturer's product literature for each brand name product.
 - 4. Provide the manufacturer's certification that the product used on the Project complies with the Contract Documents.
- D. Before End of Closeout:
 - 1. Provide copies of all manufacturer warranties that extend for more than one year after completion.

PART 3 — EXECUTION

3.01 ATTIC STOCK — SURPLUS MATERIALS

Provide a minimum of one unopened box or gallon of each of the following at Project closeout:

- A. Paint — interior and exterior, all colors
- B. Carpet — all patterns
- C. Floor tile — ceramic and VCT
- D. Ceiling tile
- E. Cove base
- F. HVAC filters — one complete set of each size

END OF SECTION — 01 60 00 — Product Requirements

END OF DIVISION — DIVISION 01 — General Requirements

DIVISION 02

EXISTING CONDITIONS

SECTION 02 41 00

DEMOLITION

PART 1 — GENERAL

1.01 SUMMARY

Provide all Site and structure demolition required for proper functioning of the Project and as indicated in the Project program. In addition to the requirements of this section, comply with all applicable requirements of General Requirements.

1.02 REGULATORY REQUIREMENTS

- A. Verify recycle requirements and reporting requirements with AGI-ENV and CFMO prior to demolition.
- B. Comply with applicable federal, state, and local demolition and disposal regulations.

PART 2 — PRODUCTS

2.01 NOT USED

PART 3 — EXECUTION

3.01 SITE DEMOLITION

Provide all Site demolition required for proper Project functioning, including:

- A. Vegetation and Plantings — All demolition and debris removal to the existing vegetation and plantings required for construction of new work and for proper functioning of the Project.
- B. Existing Fencing — All demolition and debris removal to the existing security fencing required for construction of new work and for proper functioning of the Project.
- C. Site Improvements — All demolition and debris removal to the existing Site improvements required for construction of new work and for proper functioning of the Project.
- D. Site Utilities — All demolition, abandonment, and debris removal to the existing subsurface and above ground utilities required for construction of new work and for proper functioning of the Project.
- E. Other Site Demolition — Miscellaneous Site elements not listed but require demolition for construction of new work and for proper functioning of the Project.

3.02 BUILDING DEMOLITION

- A. Existing Structures — All demolition and debris removal to the existing buildings required for construction of new work and for proper functioning of the Project.

END OF SECTION — 02 41 00 — Demolition

END OF DIVISION — DIVISION 02 — Existing Conditions

DIVISION 03 CONCRETE

SECTION 03 30 00

CAST-IN-PLACE CONCRETE — SUBSTRUCTURE AND FOUNDATIONS

PART 1 — GENERAL

1.01 SUMMARY

Provide substructure and foundations as required to support the completed and occupied building safely and without uncontrolled subsidence or other movement. Where substructure or foundation elements are integral with elements defined within another element groups, meet requirements of both element groups. Comply with all applicable requirements of General Requirements.

1.02 SCOPE OF SUBSTRUCTURE

Substructure comprises all elements below grade and in contact with the ground, including:

- A. Standard Foundations — Includes spread footings below columns, linear spread footings below load-bearing walls, foundation walls not part of basements, caisson (pier) caps, and pile caps.
- B. Other Foundations — All types of special foundation systems including permanent shoring and underpinning, raft foundations, piles, drilled piers (caissons), cofferdams, and permanent dewatering systems.
- C. Floors on Grade — All elements necessary for slab foundations including trenches, pits, and sumps, equipment bases, integral thermal insulation, slab moisture protection, and sub-drainage systems.

1.03 REFERENCED STANDARDS

- A. ACI 201.2R — Guide to Durable Concrete
- B. ACI 302.1R — Guide for Concrete Floor and Slab Construction
- C. ASTM E 1155 — Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness
- D. NG Pam 415-5, Appendix G — Soil Bearing Pressure Requirements
- E. UFC 3-310-04 — Seismic Design of Buildings
- F. Oregon Structural Specialty Code (OSSC) — Radon Mitigation

1.04 SUBMITTALS / SUBSTANTIATION

- A. Proposal: Identification of major structural materials and systems.

- B. Preliminary Design: Detailed listing of design criteria and preliminary analysis, prepared by a licensed structural engineer.
- C. Construction Documents: Detailed design analysis by a licensed structural engineer.
- D. Thermal Performance: Provide thermal resistance as necessary to maintain interior comfort levels specified and in accordance with the Code and the following:
 - 1. Preliminary Design: Identification of major thermal resistant materials and systems.
 - 2. Design Development: Detailed listing of design criteria and design analysis, prepared by a licensed mechanical engineer.
 - 3. Construction Documents: Product data on thermal materials and details of continuous thermal barrier.
 - 4. Water Penetration: Prevent ground water penetration into the interior of the building, under any circumstances.
 - a. Preliminary Design: Identification of major water-resistant assemblies and drainage features.
- E. Design Development: Detailed listing of design criteria and design analysis, prepared by a licensed mechanical engineer.

PART 2 — PRODUCTS

2.01 CONCRETE MIX DESIGN

- A. Water-Cement Ratio: For concrete slabs on grade that are partly or completely exposed to freezing conditions, limit water-Cementitious materials ratio as recommended by ACI 302.1R.
- B. Air Content: For concrete slabs on grade that are partly or completely exposed to freezing conditions, provide air content in accordance with recommendations of ACI 201.2R
- C. For concrete floors on grade, comply with composition and finishing recommendations of ACI 302.1R for floor classifications based on type of anticipated traffic and intended use.

2.02 VAPOR RETARDER

- A. Limit vapor transmission through floor construction to a maximum of $6 \text{ ng/Pa} \cdot \text{s} \cdot \text{m}^2$ (0.1 perms) at locations where impermeable applied interior finishes such as resilient flooring, wood flooring, or acrylic terrazzo are used.
 - 1. Use supplementary vapor retarder if necessary to meet requirements.
 - 2. Use a method of sealing joints between vapor retarder elements that will be effective given available construction practices.

2.03 THERMAL PERFORMANCE — FOUNDATIONS

- A. Thermal Resistance: (per code or, whichever is greater) R-value of 1.23 SI (7.0 IP) minimum for portions of foundation above grade or within 450 mm (18 in) below grade enclosing conditioned space.
- B. Minimum thermal performance values for individual foundation elements are also specified in other sections including Concrete Finishing – Floors on Grade.

PART 3 — EXECUTION

3.01 STRUCTURAL REQUIREMENTS

- A. Provide load bearing substructure members as required by the Code and designed to distribute dead loads, live loads, and environmental loads so that bearing capacity of soil is not exceeded.
 - 1. Extend bearing portions of substructure to levels below frost line at Project location; not less than 1 foot below grade.
- B. Dead Loads: Accommodate loads from weights of building materials, construction itself, and all fixed service equipment.
- C. Live Loads: Accommodate loads from use and occupancy of the building, either uniformly distributed loads as prescribed by the Code or concentrated loads, whichever are more demanding structurally.
- D. Soil Bearing Pressure: per NG Pam 415-5, Appendix G.
- E. Earthquake Loads: per IBC and UFC 3-310-04.
- F. Environmental Loads: Accommodate loads from all environmental forces in accordance with the Code.

3.02 WATER PENETRATION

- A. Prevent groundwater penetration into the building interior under any circumstances.

3.03 RADON MITIGATION

- A. Provide radon mitigation per the Oregon Structural Specialty Code (OSSC).

3.04 FIRE RESISTANCE

- A. Design and select materials to provide fire resistance in accordance with the Code.

END OF SECTION — 03 30 00 — Cast-In-Place Concrete — Substructure and Foundations

SECTION 03 35 00

CONCRETE FINISHING — FLOORS ON GRADE

PART 1 — GENERAL

1.01 SUMMARY

Provide floors on grade as required to enclose habitable spaces and support interior functions without subsidence, structural cracking, or other uncontrolled movement. Where floors on grade are integral with elements defined within another element group, meet requirements of both element groups.

Provide concrete floor finishing for floors on grade achieving the flatness, levelness, and durability requirements specified herein. In addition to the requirements of this section, comply with all applicable requirements of General Requirements and Cast-in-Place Concrete.

1.02 SCOPE OF FLOORS ON GRADE

Floors on grade comprise structural slabs, individual pavers, and framed flooring systems that are installed over fill or at excavated and compacted grade, including all depressions in the floor, such as trenches, pits, and sumps. Floors on grade also include equipment bases, under floor and perimeter drainage, thermal insulation at floor edge, and moisture barriers installed integrally with floor system.

1.03 REFERENCED STANDARDS

- A. ASTM E 1155 — Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness
- B. ACI 302.1R — Guide for Concrete Floor and Slab Construction
- C. ACI 201.2R — Guide to Durable Concrete

PART 2 — PRODUCTS

2.01 CONCRETE MIX DESIGN

- A. Water-Cement Ratio: For concrete slabs on grade that are partly or completely exposed to freezing conditions, limit water-Cementitious materials ratio as recommended by ACI 302.1R.
- B. Air Content: For concrete slabs on grade that are partly or completely exposed to freezing conditions, provide air content in accordance with recommendations of ACI 201.2R
- C. For concrete floors on grade, comply with composition and finishing recommendations of ACI 302.1R for floor classifications based on type of anticipated traffic and intended use.

2.02 THERMAL PERFORMANCE — FLOORS ON GRADE

- A. Provide thermal properties at edges of floors on grade as necessary to maintain interior comfort levels specified and in accordance with the Code.

PART 3 — EXECUTION

3.01 FLOOR FLATNESS AND LEVELNESS

Provide floors on grade engineered and constructed to achieve the following, measured in accordance with ASTM E 1155:

- A. Floor Flatness (FF): Specified Overall Value (SOV) at 35; Minimum Localized Value (MLV) at 24.
- B. Floor Levelness (FL): SOV at 25; MLV at 17.

3.02 DURABILITY

- A. Comply with ACI 302.1R floor classification recommendations based on anticipated traffic and use.
- B. Radon Mitigation: per Oregon Structural Specialty Code (OSSC).

3.03 APPEARANCE

Concrete should appear uniform and free from all defects.

- A. Special care shall be taken to minimize spalling.
 - 1. Relief cuts shall not be performed until concrete is appropriately cured to a state that will resist the dislodging of aggregate during saw cutting.

END OF SECTION — 03 35 00 — Concrete Finishing — Floors on Grade

END OF DIVISION — DIVISION 03 — Concrete

DIVISION 05

METALS

NOTE: This Division covers metal structural framing components of the shell and superstructure. Where the superstructure incorporates wood framing, refer also to Division 06 – Wood, Plastics, and Composites. Requirements for fire, durability, and loads apply to both Divisions and are repeated as applicable.

SECTION 05 12 00

STRUCTURAL STEEL FRAMING

PART 1 — GENERAL

1.01 SUMMARY

Provide metal structural elements, above grade and within basements, capable of supporting all anticipated loads without failure or damage. Do not use electrically operated or fuel-powered construction for support of floor or roof members. Comply with all applicable requirements of Referenced Standards and Shell – General Performance.

1.02 SCOPE OF SUPERSTRUCTURE

The superstructure comprises:

- A. Elevated Floors — Floor construction above grade and within basements, including balconies, mezzanines, and ramp floors, floors elevated for access, stair construction if part of the structure, and roof decks intended for occupant live load; and all elements required for their support, insulation, fireproofing, and fire-stopping.
- B. Roofs — Roof construction, including canopies, and all elements required for their support, insulation, fireproofing, and fire-stopping.
 - 1. Where superstructure elements also must function as elements defined within another element group, meet requirements of both element groups.

1.03 REFERENCED STANDARDS

- A. ASCE 7 — Minimum Design Loads for Buildings and Other Structures
- B. IBC — Structural provisions as applicable
- C. UFC 3-310-04 — Seismic Design of Buildings
- D. Applicable AISC and AWS standards for structural steel

1.04 SUBMITTALS / SUBSTANTIATION

Design and select materials to support all loads without damage due to loads, in accordance with the Code.

- A. Proposal:
 - 1. Identification of major structural materials and systems.
 - 2. Identification of weather-exposed elements and proposed materials.
- B. Preliminary Design: Detailed listing of design criteria and preliminary analysis, prepared by a licensed structural engineer.
- C. Construction Documents: Detailed design analysis by a licensed structural engineer.

PART 2 — PRODUCTS

2.01 STRUCTURAL STEEL

- A. Materials shall conform to applicable ASTM standards for structural steel shapes, plates, and fasteners specified.
- B. Moisture Resistance of Load-Bearing Members:
 - 1. Use materials that are not damaged by contact with water or moisture vapor.
 - 2. Design to prevent deterioration of materials due to condensation of moisture vapor inside assemblies.
- C. Impact Resistance of Load-Bearing Members:
 - 1. Use materials that are not easily damaged by common hand tools.
 - 2. Design and select materials to resist damage due to impact in accordance with the Code.
- D. Weather Resistance: Design and select materials to minimize deterioration due to precipitation, sunlight, ozone, normal temperature changes, salt air, atmospheric pollutants.
 - 1. Deterioration includes corrosion, shrinking, cracking, spalling, delamination, abnormal oxidation, decay and rot.
 - 2. Surfaces Exposed to View: Deterioration adversely affecting aesthetic life span includes color fading, crazing, and delamination of applied coatings.
 - 3. Corrosion Resistance: In locations exposed to the outdoor air or in potential contact with moisture inside shell assemblies, use only corrosion-resistant metals as defined in this section.
 - 4. Ozone Resistance: Do not use materials that are adversely affected by ozone.

2.02 FIRE AND SAFETY

- A. Design and select materials to provide fire resistance in accordance with the Code.
 - 1. Proposal: Identification of major fire resistive materials and systems.
 - 2. Design Development: List of laboratories tested fire resistive assemblies to be used.
- B. Provide members with combustibility, flame spread, and smoke generation characteristics not greater than allowed by the Code.
- C. Explosion: Design for and provide resistance to forces generated by explosion hazards specified in General Requirements and Special Construction. Design and construct shell to provide relief from explosion hazards so as to minimize effect on occupants and structural members.
 - 1. Proposal: Identification of explosion hazards and proposed methods of relief.
 - 2. Construction Documents: Engineering design calculations and drawings prepared by a licensed engineer.

- D. Grounding: When grounding of electrical systems is accomplished using structural members, design to prevent shock to occupants.

PART 3 — EXECUTION

3.01 STRUCTURAL DESIGN REQUIREMENTS

- A. Capacity: Design and provide load-bearing structural members of capacities required by the Code.
- B. Dead Loads: Design to resist loads from weights of materials, construction, and fixed service equipment.
- C. Live Loads:
 - 1. Floors: Resist uniformly distributed, concentrated, and impact loads without live load reductions.
 - 2. Roofs: Resist uniformly distributed, concentrated, and impact loads.
- D. Special Loads: In addition to loads defined by the Code, design for loads from moving machinery, elevators, cranes, vehicles, and military tracked vehicles.
- E. Construction Loads and Erection Stresses: Accommodate temporary construction loads and erection stresses during construction.
- F. Water Penetration: Where roof coverings as specified are not used over roofs, provide supplementary waterproof construction providing equivalent protection.
- G. Vibration: Isolate structure from sources of vibration.
- H. Comply with requirements and recommended design procedures of ASCE 7 for structural design and serviceability.

3.02 SERVICE LIFE

Same as building service life, except as follows:

- A. Load-Bearing Structural Members: minimum 100-year service life.
 - 1. No anticipated deterioration when protected as specified.
 - 2. Protective Elements: minimum 25-year service life.
- B. Portions of superstructure exposed on the exterior shall comply with Shell requirements for water penetration, weather resistance, impact resistance, and wear resistance (Division 07).

END OF SECTION — 05 12 00 — Structural Steel Framing

END OF DIVISION — DIVISION 05 — Metals

DIVISION 06

WOOD, PLASTICS, AND COMPOSITES

NOTE: This Division covers wood and engineered wood framing components of the superstructure. Where the superstructure incorporates structural steel or other metals, refer also to Division 05. Requirements for fire, durability, and loads apply to both Divisions and are repeated as applicable.

SECTION 06 10 00

ROUGH CARPENTRY — STRUCTURAL WOOD FRAMING

PART 1 — GENERAL

1.01 SUMMARY

Provide wood structural elements above grade and within basements capable of supporting all anticipated loads without failure or damage. Do not use electrically operated or fuel-powered construction for support of floor or roof members. Comply with all applicable requirements of Referenced Standards and Shell – General Performance.

1.02 SCOPE

The superstructure wood framing comprises:

- A. Elevated Floors — Floor framing above grade and within basements, including balconies, mezzanines, and ramp floors, floors elevated for access, stair construction if part of the structure, and roof decks intended for occupant live load; and the elements required for their support, insulation, fireproofing, and fire stopping.
- B. Roofs — Roof construction, including canopies, and elements required for their support, insulation, fireproofing, and fire stopping.
 - 1. Where superstructure elements also must function as elements defined within another element group, meet requirements of both element groups.

1.03 REFERENCED STANDARDS

- A. ASCE 7 — Minimum Design Loads for Buildings and Other Structures
- B. IBC — Structural provisions as applicable
- C. AWPA U1 — Use Category System: User Specification for Treated Wood
- D. AWC NDS — National Design Specification for Wood Construction

1.04 SUBMITTALS / SUBSTANTIATION

- A. Structural Performance:
 - 1. Proposal:
 - a. Identification of major structural materials and systems.

2. Preliminary Design: Detailed listing of design criteria and preliminary analysis, prepared by a licensed structural engineer.
 3. Design Development: List of laboratory-tested fire-resistive assemblies to be used.
 4. Construction Documents: Detailed design analysis by a licensed structural engineer.
- B. Weather Resistance:
1. Proposal: Identification of weather-exposed elements and proposed materials.

PART 2 — PRODUCTS

2.01 LUMBER AND ENGINEERED WOOD

- A. Structural lumber and engineered wood products shall conform to applicable grading standards and species requirements.
- B. Moisture Resistance of Load-Bearing Members:
1. Use materials that are not damaged by contact with water or moisture vapor.
 2. Design to prevent deterioration of materials due to condensation of moisture vapor inside assemblies.
- C. Impact Resistance of Load-Bearing Members:
1. Use materials that are not easily damaged by common hand tools.
 2. Design and select materials to resist damage due to impact in accordance with the Code.
- D. Weather Resistance: Design and select materials to minimize deterioration due to precipitation, sunlight, ozone, normal temperature changes, salt air, atmospheric pollutants.
1. Deterioration includes corrosion, shrinking, cracking, spalling, delamination, abnormal oxidation, decay and rot.
 2. Surfaces Exposed to View: Deterioration adversely affecting aesthetic life span includes color fading, crazing, and delamination of applied coatings.
 3. Corrosion Resistance: In locations exposed to the outdoor air or in potential contact with moisture inside shell assemblies, use only corrosion-resistant metals as defined in this section.
 4. Ozone Resistance: Do not use materials that are adversely affected by ozone.
- E. Wear Resistance: Design and select materials to provide resistance to normal wear-and-tear in accordance with the Code and the following:
1. Elements Within Reach of Pedestrians: Minimize degradation from rubbing and scratching caused by pedestrians.
- F. Physical Security: Design and construct to provide protection as required by the Anti-Terrorism Force Protection Guidelines (“ATFP”).

2.02 FIRE AND SAFETY

- A. Design and select materials to provide fire resistance in accordance with the Code.
1. Proposal: Identification of major fire resistive materials and systems.
 2. Design Development: List of laboratories tested fire resistive assemblies to be used.
- B. Provide members with combustibility, flame spread, and smoke generation characteristics not greater than allowed by the Code.

- C. Explosion: Design for and provide resistance to forces generated by explosion hazards specified in General Requirements and Special Construction. Design and construct shell to provide relief from explosion hazards so as to minimize effect on occupants and structural members.
 - 1. Proposal: Identification of explosion hazards and proposed methods of relief.
 - 2. Construction Documents: Engineering design calculations and drawings prepared by a licensed engineer.
- D. Accidental Injury: Design and select materials to protect pedestrians and building occupants in accordance with the Code and the following:
 - 1. Prevent ice and snow from falling off building elements onto pedestrians, building occupants, and vehicles.
 - 2. Protect pedestrians, building occupants, and vehicles from objects accidentally dropped from elevated observation decks, balconies, or plazas.

2.03 WOOD TREATMENT

- A. When wood is used in conditions susceptible to biological degradation, provide at least the level of protection recommended by AWP, as contained in AWP U1.
- B. Do not use materials that are attractive to or edible by animals, birds, or insects, unless access by such organisms is prevented.

2.04 FIRE PROTECTION MATERIALS

- A. Fireproofing and fire-stopping materials shall meet Code-required fire ratings and shall not exceed combustibility, flame spread, and smoke generation limits required by Code.

PART 3 — EXECUTION

3.01 STRUCTURAL DESIGN REQUIREMENTS

- A. Comply with ASCE 7 in addition to IBC requirements.
- B. Design for all dead loads, live loads (without reductions), concentrated loads, and impact loads as required by Code.
- C. Special Loads: include loads from moving machinery, elevators, cranes, vehicles, and military tracked vehicles.
- D. Accommodate temporary construction loads and erection stresses.
- E. Comply with ASCE 7 recommended design procedures for structural serviceability.

3.02 SERVICE LIFE

Same as building service life, except as follows:

- A. Load-Bearing Structural Members: minimum 100-year service life.
 - 1. No anticipated deterioration when protected as specified.
 - 2. Protective Elements: minimum 25-year service life.
- B. Portions of superstructure exposed on the exterior shall comply with Shell requirements for water penetration, weather resistance, impact resistance, and wear resistance (Division 07).

END OF SECTION — 06 10 00 — Rough Carpentry — Structural Wood Framing

END OF DIVISION — DIVISION 06 — Wood, Plastics, and Composites

DIVISION 07

THERMAL AND MOISTURE PROTECTION

SECTION 07 00 00

SHELL — GENERAL PERFORMANCE

PART 1 — GENERAL

1.01 SUMMARY

Provide permanently enclosed spaces for all functional areas shown in the Project program, unless otherwise indicated. Provide a physical enclosure that keeps out weather, unwelcome people, animals, and insects without requiring specific action by occupants, while providing convenient movement of occupants between inside and outside, desirable natural light, and views from inside to outside. Provide level floor areas, comfortable ceiling heights, and essentially vertical walls. The elements forming usable enclosed space and separating that space from the external environment comprise the shell and consist of:

1. Superstructure (Divisions 05 & 06): All elements forming floors and roofs above grade and within basements, and the elements required for their support, insulation, fireproofing, and fire-stopping.
2. Exterior Enclosure (Division 08): All essentially vertical elements forming the separation between exterior and interior conditioned space, including exterior skin, components supporting weather barriers, and jointing and interfacing components; not including the interior skin unless an integral part of the enclosure.
3. Roofing (This Division): All elements forming weather and thermal barriers at horizontal and sloped roofs and decks, and roof fixtures.

Where shell elements also function as elements defined within another element group, meet requirements of both groups. Comply with all applicable requirements of Referenced Standards.

1.02 SUBMITTALS / SUBSTANTIATION

A. Thermal Performance:

1. Preliminary Design: Identification of major thermal-resistant materials and systems.
2. Design Development: Detailed criteria and analysis by licensed mechanical engineer.
3. Construction Documents: Product data and details of continuous thermal barrier.

B. Exterior Appearance:

1. Proposal: Concept drawings of proposed solution indicating overall building configuration, massing, scale, and relationship to surrounding buildings.
2. Preliminary Design: Drawings showing facade treatment for principal elevations identifying visible materials.
3. Construction Documents: Details of building shell, annotated to show compliance with performance requirements.

C. Thermal Performance:

1. Preliminary Design: Identification of major thermal resistant materials and systems.
 2. 2) Design Development: Detailed listing of design criteria and design analysis, prepared by a licensed mechanical engineer.
 3. Construction Documents: Product data on thermal materials and details of continuous thermal barrier.
- D. Water Penetration:
1. Preliminary Design: Identification of major water-resistant assemblies.

PART 2 — PRODUCTS

2.01 THERMAL AND MOISTURE CONTROL PRODUCTS

- A. Provide construction that will have thermal resistance as necessary to maintain interior comfort levels specified and in accordance with the Code and the following:
1. Energy Efficiency: As specified in Division 00.
 2. Condensation: None on interior surfaces under normal interior temperature and relative humidity conditions, during 98 percent of the days in the coldest 3 months of the year.
 3. Components that Have Surfaces Facing Both Interior and Exterior Environment: Condensation Resistance Factor (CRF) as required to meet requirement above, when tested in accordance with AAMA 1503.
 4. Minimum thermal performance values for individual shell elements are also specified in other Sections
 5. Glazing Tint / Glazing color -Graylite II + Solarban 60 : VLT=7; SHGC = .11. or better.

2.02 JOINT SEALERS

- A. Capable of resisting expected thermal expansion and contraction.
- B. Use overlapping joints that shed water wherever possible.

2.03 WEATHERPROOFING MATERIALS

- A. Use only corrosion-resistant metals in locations exposed to outdoor air or potential moisture contact inside assemblies.
- B. Do not use materials adversely affected by ozone.

2.04 SERVICE LIFE SPANS

- A. Load-Bearing Structural Members: Minimum of 100 years.
1. No anticipated deterioration when protected as specified.
 2. Protective Elements: Minimum 25 years.
- B. Wall Primary Weather-Barrier Elements: Minimum 50 years functional and aesthetic service life, excluding joint sealers.
- C. Joint Sealers: Minimum 20 years before replacement.
- D. Surfaces Exposed to View: Minimum 20 years aesthetic service life; in addition, deterioration includes color fading, crazing, and delamination of applied coatings.
- E. Roof Covering Weather-Barriers: Minimum 20 years, fully functional.

PART 3 — EXECUTION

3.01 WATER PENETRATION

- A. Design and select materials to prevent water penetration into the interior of the building, under conditions of rain driven by 80 km/h (50 mph) wind.
 - 1. Exception: Controlled water penetration is allowed if materials will not be damaged by presence of water or freezing/thawing, if continuous drainage paths to the exterior are provided, and water passage to the building interior is prevented.
 - 2. Substantiation: In addition to requirements specified for proven-in-use and proven-by-mockup construction, drawings showing paths of water movement, with particular attention to changes in direction or orientation and joints between different assemblies.

3.02 EXTERIOR APPEARANCE

Exterior Surfaces Exposed to View: Surfaces visible from street or ground level, plus surfaces visible from windows of same building and adjacent existing buildings.

- A. Design exterior to be compatible with adjacent campus buildings.
- B. Conceal mechanical, plumbing, and electrical equipment, including piping, conduit, and ducts from street-view.
- C. Conceal rooftop equipment from street-view, windows within the Project that overlook the roof, and adjacent building windows that overlook the roof. This includes all mechanical, plumbing, and electrical equipment, including piping, conduit, and ducts.
- D. Design and select materials to:
 - 1. Prevent attraction and adherence of dust and air-borne dirt and soot and minimize appearance of settled dust and dirt.
 - 2. Be washed reasonably clean by normal precipitation.
 - 3. Prevent precipitation from washing settled dust and dirt over surfaces exposed to view.

3.03 WEATHER AND DURABILITY

- A. Prevent corrosion, shrinking, cracking, spalling, delamination, abnormal oxidation, decay, and rot.
- B. Provide freeze-thaw resistance adequate for the climate of the Project site.

3.04 NATURAL LIGHT

Provide fenestration in shell as required to meet the requirements for natural light as specified by the Code, General Requirements, and Interiors.

3.05 NATURAL VENTILATION

Design and construct shell to provide natural ventilation in accordance with the Code.

- A. Design ventilation to provide cross ventilation where possible.

END OF SECTION — 07 00 00 — Shell — General Performance

SECTION 07 50 00

ROOF SYSTEM

PART 1 — GENERAL

1.01 SUMMARY

Provide a weather-proof enclosure over the entire top side of building that also excludes unwelcome people, animals, and insects without requiring specific action by occupants, while shedding water and preventing uncontrolled water infiltration, withstanding anticipated loading conditions, providing required access, and permitting the entry of desirable natural light. Comply with all applicable requirements of General Requirements and Shell – General Performance.

A specific roofing type is not mandated. Roofing systems shall be selected based on environmental conditions, expected service life, compatibility with building systems, and life-cycle cost. OMD prefers standing seam metal roofing where appropriate but recognizes that membrane and other roofing types may be best suited to certain conditions, such as mechanical equipment platforms or low-slope areas. Designers shall evaluate and document the basis of the roofing type selected.

1.02 SCOPE OF ROOFING

Roofing comprises the following elements:

- A. Roof Coverings — Weather barriers, vapor retarders, insulation, wearing surfaces, water collectors and conductors, trim and accessories; including coverings over plaza decks, balconies, and other exposed floors.
- B. Roof Openings — Skylights, ventilation openings, access openings, and other roof opening elements.
- C. Roof Fixtures — All elements attached to the roof, unless classified as equipment or services.

1.03 WARRANTY REQUIREMENTS

All warranties shall include coverage for water infiltration and leakage, whether resulting from defective materials or faulty workmanship, and any such condition shall be remedied at no cost to the Owner for the full duration of the applicable warranty period.

- A. Manufacturer Warranty: 25 years minimum.
- B. Installation and Workmanship Warranty: 2 years minimum.

1.04 SUBSTANTIATION

- A. Post-Construction: Roof inspection conducted in the first spring after completion of roofing, after chance of snow has passed.
- B. Construction: Reports of first 3 significant rainfalls after completion of each roofing element.

PART 2 — PRODUCTS

2.01 ROOF COVERING SYSTEM

The roof covering system shall be selected based on site-specific environmental conditions, building use, slope, interface with mechanical and other building systems, and long-term performance requirements. The designer of record shall document the rationale for the roof system type selected. Acceptable systems include, but are not limited to: standing seam metal roofing, single-ply membrane (TPO, EPDM, PVC), built-up roofing, and modified bitumen, provided all performance criteria of this section are met.

- A. Noise of Precipitation: Design and select materials that dampen the sound of precipitation on the roof to maintain interior ambient sound levels as specified in Shell.
- B. Fire Resistance: In addition to fire resistance specified in Shell, provide materials that will prevent:
 - 1. Roof surface catching fire due to external fire sources.
 - 2. Roof coverings catching fire due to internal fire sources.
 - 3. Substantiation
 - a. Design Development: Identification of assemblies or methods used.
- C. Weather Resistance: Provide weather-exposed roof coverings and other components that comply with weather resistance specified in Shell and the following:
 - 1. Minimization of Deterioration Due to Weather: For weather-barrier materials, minimization means no deterioration that adversely affects water penetration resistance at any time during the specified service life span.
- D. Water Penetration: None, under conditions of rain driven at 80 km/h (50 mph), unless water paths are completely accessible.
 - 1. Substantiation:
 - a. Construction: Reports of first 3 significant rainfalls after completion of each roofing element, including rainfall amount and intensity, wind speed and direction, and results of inspection of roof and underside.
- E. Ice: Design to avoid damage due to ice formation and buildup on roofing and in water conductors.
- F. Roof Covering Substrate: sufficiently rigid or dense to support the water barrier and prevent puncture due to traffic on roof.
- G. Where roof covering manufacturer recommends or requires certain design features for satisfactory performance or warranty, comply with manufacturer's requirements.

2.02 WATER CONDUCTORS

- A. Water Conductor Capacity: per Code or SMACNA Architectural Sheet Metal Manual (ASMM), whichever is greater, based on 10-year 5-minute intensity.
 - 1. Substantiation:
 - a. Design Development: Calculations of capacity.

2.03 SERVICE LIFE SPANS

Aesthetic Life Span: Significant degradation of appearance during the functional life span is not acceptable.

- A. Substantiation:
 - 1. Proposal: Material type, expected functional life span, expected changes in appearance over life span, and manufacturer warranty available, installation quality control plan.
 - 2. Design Development: Material type and specification, expected functional life span, and manufacturer warranty available.

3. Construction: Actual manufacturer warranty.

PART 3 — EXECUTION

3.01 INSTALLATION

- A. Provide all fixtures needed on the roof due to the design or indicated in the Project program.
- B. Coordinate all roof penetrations with original roof manufacturer/installer to maintain roofing warranty.
- C. No water penetration under conditions of rain driven at 80 km/h (50 mph), unless water paths are completely accessible.
- D. Design to avoid damage due to ice formation and buildup on roofing and in water conductors.
- E. Eliminate interior roof drains to the greatest extent practicable.

3.02 OPERATIONS AND MAINTENANCE / SAFETY

- A. Roof Worker Safety: Design to provide safe design and safety measures as required by the Code and the following:
 1. Provide permanently installed supports for equipment used for cleaning windows and other glazed areas of the shell and working on roof equipment.
- B. All components of roofing (not just roof covering) easily accessible by maintenance persons on foot without the use of portable ladders or other portable devices.
- C. Rooftop fixtures serviceable by simple replacement of parts, minimizing time required on roof, and eliminating need for repair work in the weather.
- D. Maintain equipment setbacks from leading edge such that fall protection is not required for typical or routine maintenance, coordinate with all other sections.
- E. Install tie-offs near equipment.

END OF SECTION — 07 50 00 — Roofing System

SECTION 07 90 00

JOINT PROTECTION

PART 1 — GENERAL

1.01 SUMMARY

Provide joint sealers at all locations required for weathertightness, air sealing, and acoustic control. Comply with requirements of Shell – General Performance.

PART 2 — PRODUCTS

2.01 SEALANTS

- A. Joint Sealers: 20-year service life minimum before replacement.
- B. Capable of resisting expected thermal expansion and contraction.

PART 3 — EXECUTION

3.01 INSTALLATION

- A. Use overlapping joints that shed water wherever possible.
- B. Seal all penetrations through the building envelope to meet performance requirements specified in Section 07 00 00.

END OF SECTION — 07 90 00 — Joint Protection

END OF DIVISION — DIVISION 07 — Thermal and Moisture Protection

DIVISION 08

OPENINGS

SECTION 08 00 00

EXTERIOR ENCLOSURE — GENERAL PERFORMANCE

PART 1 — GENERAL

1.01 SUMMARY

Provide an essentially vertical separation between exterior and interior conditioned space, which keeps out weather, uninvited people, and animals and insects, without unusual action by occupants, while providing convenient movement of occupants between inside and outside, desirable natural light, and views from inside to outside. Comply with all applicable requirements of Referenced Standards, General Requirements, and Shell – General Performance. Where exterior enclosure elements also must function as elements defined within another element group, meet requirements of both element groups.

1.02 SCOPE

The Exterior Enclosure comprises:

- A. Exterior Walls
- B. Exterior Windows and Other Openings
- C. Exterior Doors

1.03 REFERENCED STANDARDS

- A. 16 CFR 1201 — Safety Standard for Architectural Glazing Materials
- B. AAMA 1503 — Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows
- C. UFC 4-010-01 — DoD Minimum Antiterrorism Standards for Buildings (ATFP/Blast)

PART 2 — PRODUCTS

2.01 GLAZING

- A. Glazing Tint / Glazing color -Graylite II + Solarban 60 : VLT=7; SHGC = .11. or better. Refer to Section 07 00 00 for full glazing performance criteria.
- B. Safety Glazing: per 16 CFR 1201 at all Code-required locations, glazed areas subject to human impact, glazed areas at grade, and doors.
 - 1. Substantiation:
 - a. Preliminary Design: Identification of building elements that require special accident prevention measures.

- b. Design Development: Identification of safety measures taken, detailed description of design criteria, and structural analysis of load-resisting elements prepared by licensed structural engineer.
 - c. Construction Documents: For load-resisting elements, structural design calculations and drawings sealed by licensed structural engineer.
- C. Do not use fully tempered glass more than 7.6 m (25 feet) above grade.

2.02 BLAST-RESISTANT GLAZING

- A. ATFP / Blast Glass: per UFC 4-010-01 requirements. Refer also to Division 13 for antiterrorism standards.

PART 3 — EXECUTION

3.01 THERMAL AND WATER PENETRATION

- A. Provide thermal performance values as specified in Section 07 00 00 and applicable individual element sections.
- B. Prevent water penetration under conditions of rain driven by 80 km/h (50 mph) wind.

3.02 DURABILITY

- A. Allow for daily expansion and contraction within and between elements caused by temperature range from most extreme low temperature to 39 degrees C (70 degrees F) greater than the most extreme high temperature, in any year, without causing detrimental effect to components and anchorage.
- B. Impact Resistance
 - 1. Elements Adjacent to Traffic Lanes: Resist damage from accidental passenger vehicular impact at 8 km/hr (5 mph) maximum velocity.
 - 2. ATFP / Blast Glass

3.03 PRIVACY

- A. Direct views of occupants in the building from the outside should be limited.
- B. Views in exterior doors should limit the ability to see into the building.
- C. Carpeted Areas: Manual roller shade window coverings required.

END OF SECTION — 08 00 00 — Exterior Enclosure — General Performance

END OF DIVISION — DIVISION 08 — Openings

DIVISION 09

FINISHES

SECTION 09 00 00

INTERIORS — GENERAL PERFORMANCE

PART 1 — GENERAL

1.01 SUMMARY

Provide appropriately finished interiors for all program spaces with physical separation achieving required fire ratings, appropriate security, and visual, acoustic, olfactory, and atmospheric isolation. Provide interiors that are pleasing in appearance and do not detract from the primary functions performed in each space. Comply with all applicable requirements of General Requirements.

1.02 SCOPE OF INTERIOR CONSTRUCTION

Interior Construction comprises:

- A. Partitions — all types including demountable and operable.
- B. Interior Doors — including hardware and frames (excluding elevator doors).
- C. Interior Windows — all fixed and operable interior windows.
- D. Other Interior Openings — hatches, access panels, louvers, and vents.
- E. Stairs and Ramps — interior and exterior elements not part of superstructure or exterior enclosure.
- F. Interior Finishes — all functional and decorative applied interior finishes.

1.03 REFERENCED STANDARDS

- A. ASTM E 336 — Standard Test Method for Measurement of Airborne Sound Attenuation
- B. ASTM E 413 — Classification for Rating Sound Insulation
- C. ASTM E 1130 – Standard Test Method for Objective Measurement of Speech Privacy in Open Plan Spaces Using Articulation Index
- D. ASTM E 1477 — Standard Test Method for Luminous Reflectance Factor of Acoustical Materials
- E. ASTM C 1028 / ASTM D 2047 — Static Coefficient of Friction of Floor Surfaces
- F. ANSI/ASHRAE 62.1 — Ventilation for Acceptable Indoor Air Quality
- G. ASHRAE Handbook – HVAC Applications
- H. IESNA RP-5 — Recommended Practice of Daylighting
- I. ADAAG — Americans with Disabilities Act Accessibility Guidelines

1.04 SERVICE LIFE SPANS

- A. Interior Doors and Operable Elements: 15-year minimum functional and aesthetic service life.
- B. Interior Ceiling Finishes (including suspended): 15-year minimum functional and aesthetic service life.
- C. Interior Wall and Floor Finishes: 10-year minimum functional and aesthetic service life.
- D. Other Interior Construction: 15-year minimum functional and aesthetic service life.
- E. Ducts, Piping, and Wiring in All Services: Same as the service life of the building.

1.05 BACKGROUND NOISE CRITERIA (NC) RANGES

Provide interiors that maintain ambient sound levels in primary spaces within the following Noise Criteria (NC) ranges, as defined in ASHRAE HVAC Applications Handbook, when adjacent spaces are occupied and are being used normally:

- A. Theater, Music Room: 20 – 25.
- B. Executive Office: 20 – 30.
- C. Classroom, Lecture Hall: 25 – 30.
- D. Conference Room: 25 – 30.
- E. Assembly Hall, Auditorium: 25 – 35.
- F. Semiprivate Office: 30 – 35.
- G. Library: 30 – 35.
- H. Large Open Office: 35 – 45.
- I. Open Office: 40 – 45.
- J. Physical Fitness Area: 45 – 50.
- K. Maintenance Work-Bays: 50 – 60.
- L. Substantiation:
 - 1. Preliminary Design: Engineering calculations for representative spaces, predicting acoustic conditions.
 - 2. Construction: Field test of acoustic conditions, verifying compliance with performance requirements.

1.06 ACOUSTICAL PERFORMANCE — NOISE ISOLATION CLASS (NIC) REQUIREMENTS

Design and construct interior construction to achieve the following minimum Noise Isolation Class (“NIC”) values between adjacent spaces, when tested in accordance with ASTM E 336 and classified in accordance with ASTM E 413:

- A. Spaces of Like Function and Similar NC Value: NIC 36.
- B. Quiet Space (NC 20–30) and Moderately Noisy Space (NC 30–40): NIC 39.
- C. Quiet Space (NC 20–30) and Noisy Space (NC 40–50): NIC 42.
- D. Quiet Space (NC 20–30) and Very Noisy Space (NC 50–60): NIC 48.
- E. Moderately Noisy Space (NC 30–40) and Noisy Space (NC 40–50): NIC 36.
- F. Moderately Noisy Space (NC 30–40) and Very Noisy Space (NC 50–60): NIC 42.
- G. Noisy Space (NC 40–50) and Very Noisy Space (NC 50–60): NIC 36.
- H. Exceptions:
 - 1. Adjacent Music Practice Rooms: NIC 55.
 - 2. Adjacent Theaters: NIC 45.

3. Adjacent Offices Requiring High Speech Confidentiality: NIC 50.
- I. Substantiation:
 1. Proposal: Proposed STC values for major building elements.
 2. Preliminary Design: Measurements of ambient site noise levels over full range of audible frequencies, identification of acoustic properties of major interior and exterior sound and vibration generators, and preliminary analysis prepared by an acoustic engineer.
 3. Design Development: Drawings indicating proven-in-use STC values for construction separating primary spaces and separating primary spaces from noise sources such as mechanical equipment.
 4. Construction Documents: Acoustical analysis prepared by an acoustical engineer.
 5. Construction Documents: Drawings showing details required for acoustic performance.
 6. Construction: Field tests of representative spaces to verify compliance with performance requirements.

1.07 ACOUSTICAL PERFORMANCE — AIRBORNE SOUND

- A. Maintain the sound transmission characteristics of assemblies through which services must pass; comply with requirements of Section where penetrated assembly is specified.
- B. Prohibited Plumbing Noises: All sounds of flushing and of liquid running through pipes ("bathroom sounds") are prohibited outside of the rooms housing toilets, bathtubs, and showers, with the exception of when doors to those rooms are open.
- C. Equipment Noises: Noise level below that which will be objectionable, based on occupancy of spaces.

1.08 ACOUSTICAL PERFORMANCE — STRUCTURE BORNE SOUND & VIBRATION

Prevent transmission of perceptible sound and vibration from services equipment that rotates, vibrates, or generates sound, by isolating such equipment from superstructure or by isolating equipment support foundations from building foundations.

- A. Substantiation:
 1. Preliminary Design: Identification of sound- and vibration-generating equipment and method of isolation.
 2. Construction Documents: Details of isolation methods.

1.09 NATURAL LIGHT / DAYLIGHTING — MINIMUM LIGHT LEVELS

Provide ambient natural light in primary spaces that is

- A. Free of excessive direct or reflected glare, as defined in IESNA RP-5, Recommended Practice of Day-lighting, and
- B. Of intensity adequate for essential tasks when measured on a typical overcast winter day in mid-afternoon.

Spaces for day-lighting include the following types:

- A. Customer Contact (SP1 Spaces): Spaces where the occupants meet the public or their customers, including reception desks, lobby, common areas, and family support areas.

- B. Occupant Work (SP2 Spaces): Spaces intended primarily for one worker, including offices and open-office cubicles.
- C. Equipment Utilization (SP3 Spaces): Spaces where more than one person may use common equipment, including copier rooms, work rooms, computer rooms, mail rooms, production kitchen, exercise room, audio/video recording, print shop.
- D. Assembly (SP4 Spaces): Spaces without fixed seating, including assembly halls, dining and drinking, library, and multipurpose rooms.
- E. Meeting and Instruction (SP4 Spaces): Spaces designed for group gatherings, presentations, or teaching, including conference rooms, classrooms, training rooms, seminar rooms, lecture halls, and briefing rooms.
- F. Physical Fitness Area (SP3 Spaces): Spaces intended for exercise and physical activity where multiple occupants may share common equipment, including weight rooms, aerobic studios, gymnasium floors, locker support areas, and indoor courts.
- G. Occupant Services (SR Spaces): Spaces for toilets, showers, changing and dressing, eating, cooking, resting (lounges), and sleeping.

Minimum maintained daylighting levels (measured on a typical overcast winter day, mid-afternoon):

- A. Public Spaces: 30 lux (3 foot candles).
- B. Working Spaces including Basic Administrative, General Administrative, Offices, Inspection, Library, Tool Rooms, and Supply Rooms with Simple Visual Tasks: 50 lux (5 fc).
- C. Working Spaces with Visual Tasks of High Contrast and Large Size including heated storage, work bays, vault, and toilet/shower: 300 lux (30 fc).

Substantiation:

1. Proposal: Information on overall building configuration that will permit day-lighting to levels specified.
 - a. Daylighting is encouraged through the use of high-elevation windows or skylights where tinting requirements are less stringent.
2. Design Development: Engineering calculations for representative spaces, predicting anticipated day-lighting levels under specified conditions.
3. Construction Documents: Details of lighting control mechanisms.

Provide local devices to enable occupants to control brightness and glare from direct day-lighting.

1.10 IMPACT INSULATION

- A. Provide floor-ceiling construction, including floor structure, floor finish, and ceiling finish, to insulate primary spaces from undesirable impact noise when adjacent spaces are occupied and are being used normally.
- B. Provide acoustic absorption within interior spaces to achieve reverberation times within the limits specified in Interiors.

1.11 ARTICULATION INDEX

Provide articulation index (AI) of not less than 0.05 when measured in accordance with ASTM E 1130.

- A. Application: Open office areas where multiple workstations occur without intervening full height partitions.

1.12 HEALTH & SAFETY

- A. Maintain fire resistance of walls, floors, ceilings, and other fire-rated assemblies that services must pass through, in accordance with requirements of the Section in which the fire-rated assembly is specified.
- B. Provide fire-rated separations between equipment rooms and other spaces where required, and as specified by the Code.
- C. Provide products which are fire rated for the specific locations where they are installed.
- D. Avoid safety hazards wherever possible; where services must involve flammable materials or hazardous operations, comply with the Code.

PART 2 — PRODUCTS

2.01 REFLECTIVITY REQUIREMENTS

Provide interior finishes that will not result in discomfort glare due to excessive contrast with light sources.

- A. Ceiling Surfaces: not less than 80% reflectivity, per ASTM E 1477.
- B. Wall Surfaces: not less than 50% reflectivity.
- C. Floor Surfaces: not less than 30% reflectivity.
- D. Exceptions: SR Resident/Occupant Services, SS Storage, SV Vehicular, SC Circulation, and SU Utility spaces.

2.02 SLIP-RESISTANT FLOORING

- A. At spaces subject to floor wetting (entry lobbies, kitchens, toilets, maintenance rooms): provide floor finishes with inherent slip resistance under wet conditions.
- B. Minimum static coefficient of friction: 0.60 when wet, per ASTM C 1028 or ASTM D 2047.
- C. At building entries: provide means for reducing moisture and debris on shoe soles.

2.03 TEXTURE REQUIREMENTS

Provide interior elements and surfaces that are textured appropriately for primary functions to be accommodated within each space.

- A. For surfaces that are within normal reach of occupants, provide textures that are safe for occupants and require minimum maintenance.
- B. For surfaces that are not within normal reach of occupants, provide textures that are comparable to those within normal reach.

2.04 DURABILITY

- A. Wear Resistance: Provide interior construction and fixtures that are suitable in durability for the degree and type of traffic to be anticipated in each space.
- B. Vandal Resistance: In spaces accessible to the public and not subject to continuous surveillance, provide interior construction and fixtures that are inherently vandal resistant or designed to be difficult to access or damage.

- C. Cleaning: Provide interior construction and fixtures that will not be damaged by ordinary cleaning and maintenance operations.
- D. All components exposed to outdoor environment must comply with the requirements of Shell and Exterior Enclosure; equipment enclosures are considered the equivalent of the exterior enclosure.
- E. Where components are mounted to surfaces that are required to be moisture-resistant, seal mounting surface of components to finish surface so that moisture cannot penetrate under or behind component, using material that is not affected by presence of water, that is mildew-growth resistant, and that has a minimum service life of 10 years.
- F. Finishes on Exposed Components Subject to Touching by Occupants: Durable enough to withstand regular scrubbing using ordinary methods.

2.05 STRUCTURE

- A. Supports for Piping, Conduit, Ducts, and Components: Attached to, and supported by, the superstructure, not to or by non-structural construction or sheet metal elements, so that they do not move or sag, using the following:
 - 1. Supports that allow movement of the rigid linear elements (pipe, etc.) without undue stress on the piping, tubes, fittings, components, or the superstructure.
 - 2. Intermediate supports mounted between structural members to limit distance between supports.
 - 3. Supports capable of handling seismic forces in accordance with the Code.
 - 4. Mounting frames, bases, or pads, designed for ease of anchorage or mounting.
 - 5. Rigid sway bracing at changes in direction of more than one-half of a right-angle, for all pipes.
 - 6. Substantiation:
 - a. Design Development: Details of supports, including engineering analysis.
- B. Structural Design of Components and Their Supports: In accordance with the Code.

PART 3 — EXECUTION

3.01 ODOR CONTROL

Prevent unpleasant odors generated within a space from affecting occupants of adjacent spaces, by providing physical isolation of the spaces, separate ventilation, or a combination of isolation and ventilation. Control odors from the spaces of the following types:

- A. Commercial kitchen.
- B. Break room.
- C. Toilet rooms.
- D. Locker or changing rooms.
- E. Trash collection, removal, and incineration areas.
- F. Maintenance work-bays.

3.02 CLEANING

At toilet rooms, shower rooms, bathrooms, trash collection rooms, and janitorial closets, provide interior construction that will allow harsh chemical cleaning (owner's green chemical standards) without damage.

3.03 APPEARANCE

- A. Cover annular spaces around pipes, ducts, and conduits, where they pass through walls, ceilings, and floors with escutcheons or cover plates.
- B. Mountings: On finished surfaces, use concealed attachments with cover plates, frames, or trim overlapping finishes.

END OF SECTION — 09 00 00 — Interiors — General Performance

SECTION 09 30 00

TILING

PART 1 — GENERAL

1.01 SUMMARY

Provide tile finishes at kitchens, restrooms, and shower rooms as specified below. Comply with all applicable requirements of Interiors – General Performance.

PART 2 — PRODUCTS

2.01 WALL TILE SYSTEMS

- A. Wall tile with epoxy grout at showers — floor to ceiling.
- B. Wall tile with epoxy grout at water closet areas — minimum 5'-0" above finished floor.
- C. FRP or wall tile with epoxy grout on kitchen walls.

PART 3 — EXECUTION

3.01 INSTALLATION

- A. Install all tile with epoxy grout in wet areas.

END OF SECTION — 09 30 00 — Tiling

SECTION 09 60 00

FLOORING

PART 1 — GENERAL

1.01 SUMMARY

Provide flooring finishes appropriate for each space's anticipated usage and traffic. Flooring shall be based on a 10-year replacement cycle, with appropriate warranties and finishes for high-traffic areas. Comply with all applicable requirements of Interiors – General Performance.

1.02 SEALER SELECTION

Sealer selection and application requirements for polished concrete at each level shall be confirmed during Design Development.

PART 2 — PRODUCTS

2.01 FLOOR SYSTEMS

- A. Non-slip epoxy flooring with integral cove base at kitchen and bathroom floors.
- B. Provide transition strips at all locations where different types of flooring meet.

2.02 POLISHED CONCRETE — THREE LEVELS OF FINISH

Polished concrete with polyurethane sealer shall be provided in three finish levels as follows:

- A. Level 3 — 800 grit: entry ways, corridors, Drill Hall.
- B. Level 2 — 600 grit: gear storage rooms, audio/visual room, training aid storage, open bay living quarters.
- C. Level 1 — 200 grit: IT rooms, supply, maintenance, mechanical, vaults, tool rooms, and similar utility spaces.

2.03 CARPET TILE

Carpet tile shall be provided in the following spaces:

- A. Offices, classrooms, library, family readiness center, RAPIDS office, recruiting office, basic administrative spaces, hotel-style living quarters, and general administrative spaces.
- B. Rubber cove base shall be provided at all carpet tile areas.

2.04 SLIP RESISTANCE

For spaces subject to floor wetting, including entry lobbies, provide floor finishes with inherent slip resistance under wet conditions.

- A. At building entries, provide means for reducing or minimizing moisture and debris on shoe soles.

- B. At spaces such as kitchens, treatment rooms, laboratories, toilets, and maintenance rooms, provide floor surfaces with minimum static coefficient of friction of 0.60 when wet, measured in accordance with ASTM C 1028 or ASTM D 2047.

2.05 ACCESSORIES

- A. Corner guards: stainless steel in corridors and high-traffic areas.

2.06 CLEANLINESS

- A. For kitchens, provide wall, ceiling, and floor surfaces that are USDA approved.
- B. For spaces such as treatment rooms, laboratories, toilet rooms, bathrooms, and maintenance rooms, provide wall, ceiling, and floor surfaces that are inherently resistant to moisture and that can be cleaned by caustic agents without damage.

PART 3 — EXECUTION

3.01 INSTALLATION

- A. Protect building occupants from tripping hazards due to uneven floor surfaces or abrupt changes in floor elevation of more than 3.2 mm (1/8 inch).
- B. Protect building occupants from falling from elevated interior observation decks.
- C. Provide kick plates and corner guards at all applicable high-traffic locations.

END OF SECTION — 09 60 00 — Flooring

SECTION 09 90 00

PAINTS AND COATINGS

PART 1 — GENERAL

1.01 SUMMARY

Provide paint and coating systems for all interior and exterior surfaces as required by the Project program and as specified herein. Comply with all applicable requirements of Interiors – General Performance.

PART 2 — PRODUCTS

2.01 PAINT SPECIFICATIONS

- A. Sheen: Semi-gloss.
- B. Texture: Orange peel (smooth finish acceptable).

2.02 EPOXY WALL PAINT

- A. Bottom 4 feet of hallways and corridors.
- B. Lower 4 feet of Drill Hall floor perimeter and Open Bay sleeping areas.
- C. At restrooms.

PART 3 — EXECUTION

3.01 APPLICATION

- A. Paint all sheetrock walls, unless otherwise approved.
- B. Patch and Paint: When repairs are made to existing painted walls, paint from floor to ceiling, corner to corner. On large walls, painting may extend to the nearest expansion joint.
 - 1. Texture shall match existing surfaces on repair work.

END OF SECTION — 09 90 00 — Paints and Coatings

END OF DIVISION — DIVISION 09 — Finishes

DIVISION 10 SPECIALTIES

NOTE: This Division covers Interior Fixtures — functional items permanently attached to interior walls, ceilings, and floors. For Equipment (mechanized, plumbed, or permanently installed items), refer to Division 11. For Furnishings (movable/loose furniture and fittings), refer to Division 12.

SECTION 10 00 00

INTERIOR FIXTURES — GENERAL PERFORMANCE

PART 1 — GENERAL

1.01 SUMMARY

Provide elements fixed to interior construction necessary for the complete and proper functioning of program spaces. Comply with all applicable requirements of General Requirements and Interiors – General Performance.

1.02 SCOPE OF INTERIOR FIXTURES

Interior fixtures are functional items that are permanently attached to interior walls, ceilings, and floors, except for equipment items and items that are integral components of service systems, and comprise the following elements:

- A. Identifying Devices — Informational accessories, including room numbers, signage (including slide-in placard holders), and directories
- B. Storage Fixtures — Non-furniture items intended primarily for storing or securing objects, materials, and supplies, including cabinets, casework, closet fixtures, lockers, and fixed shelving.
- C. Window Treatment — Non-furnishing accessories for control of light, solar heat gain, privacy, and view at interior and exterior windows, including blinds, shades, shutters, and curtain tracks.
- D. Accessory Fixtures — Specialty items intended to provide service or amenity to building interiors, including toilet and bath accessories, and postal fixtures.

1.03 ACCESSIBILITY

- A. Comply with ADAAG; fixtures shall be usable by persons with disabilities without outside assistance.
- B. Provide interior fixtures with fittings and controls that are manageable without special instruction or the need for excessive force.

1.04 EASE OF REPAIR AND REPLACEMENT

- A. Provide interior fixtures at all locations that are designed to permit repair or replacement of individual components without removal of the entire fixture.

- B. Provide interior fixtures at all locations that are modular in form and detachable from substrate without damage to fixtures or excessive damage to substrate.
- C. Provide interior fixtures at all locations that are attached to substrates with concealed, tamper-resistant, or tamperproof fasteners to minimize theft and vandalism.

PART 2 — PRODUCTS

2.01 COUNTERTOPS

- A. Countertops (other than commercial kitchen): solid surface; rated to hold 800 lbs; no free-standing fixtures.

2.02 RESTROOM ACCESSORIES

- A. Paper product dispensers: generic paper towel roller dispensers are standard.
- B. Non-recessed hand or trash receptacles.
- C. Women's hygiene cabinets are not supported.
- D. Soap dispensing method: to be determined during Design Development.

2.03 WATER CLOSETS

- A. Floor-mounted where possible; wall-mounted when necessary.
- B. Tankless preferred; provide lockable tank lid when tank is required.

2.04 WINDOW SHADES

- A. Mechanical, non-electric type.
- B. Rolling shades or faux wood slatted shades are acceptable.

2.05 TOILET PARTITIONS

- A. Floor-to-ceiling supported composite panels with metal splines.
- B. Graffiti-proof.
- C. Large panels shall include support to prevent warping.

2.06 DRINKING FOUNTAINS AND BOTTLE-FILL STATIONS

- A. Provide as required by program.

2.07 DOORS

- A. Provide stainless steel kick plates on high traffic doors on push side, including restroom and kitchen entries.

2.08 WALL PROTECTION

- A. In corridors, mail rooms, freight receiving rooms, and table or chair storage rooms, provide impact resistant wall bumpers, and corner guards or wall surfaces that are inherently resistant to impact damage due to rolling carts, gurneys, and hand trucks.
- B. At partition openings intended to accommodate pedestrian or vehicular traffic, provide protection of opening edges in the form of door frames (cased openings), or corner guards.
- C. In classrooms and meeting rooms that support more than six (6) occupants, provide chair rails.

PART 3 — EXECUTION

3.01 INSTALLATION

- A. Provide interior fixtures that are coordinated in design with other elements of interior construction, using compatible materials, colors, textures, and design features; conceal attachments where possible.
- B. Provide durable, low maintenance exposed surfaces for interior fixtures that are within reach of occupants engaged in activities normal for the particular space in which they are installed.
 - 1. Flat Metal Surfaces: Coatings not permitted.
 - 2. Hardware and Other Rounded Metal Surfaces: Coatings not permitted.
- C. Coordinate window shade installation with glazing and daylight control requirements.
- D. Coordinate toilet partition dimensions with accessible stall requirements per ADAAG.

END OF SECTION — 10 00 00 — Interior Fixtures — General Performance

END OF DIVISION — DIVISION 10 — Specialties

DIVISION 11

EQUIPMENT

NOTE: This Division covers Equipment — mechanized, plumbed, and electrical devices not part of a building service system (HVAC, electrical, etc.), and permanently installed fixtures not covered elsewhere. For Furnishings (movable/loose furniture and fittings), refer to Division 12.

SECTION 11 00 00

EQUIPMENT — GENERAL PERFORMANCE

PART 1 — GENERAL

1.01 SUMMARY

Design the facility to accommodate equipment required by the Owner per the Project program. Equipment includes mechanized, plumbed, and electrical devices not part of a building service system (HVAC, electrical, etc.), and permanently installed fixtures not covered elsewhere. All specified equipment is to be provided by the Design-Builder unless otherwise indicated in the Project Program. Provide design support to Owner as a basic service for procurement of Owner-furnished equipment. Comply with all applicable requirements of General Requirements.

1.02 REFERENCED STANDARDS

- A. 29 CFR 1910 – Occupational Safety and Health Standards
- B. 29 CFR 1926 – Safety and Health Regulations for Construction
- C. UL Listing

1.03 HEALTH AND SAFETY

- A. Comply with 29 CFR 1910 (General Industry) and 29 CFR 1926 (Construction).
- B. Prevent accidental pinching, crushing, and cutting of operator limbs, fingers, and toes in or by moving parts of equipment by using intelligent design or guards or other protection, without reliance on self-protective operation by operator.
 - 1. Exception: Equipment specifically designed for cutting (such as food preparation equipment) may have exposed cutting edges.
- C. Provide equipment which protects personnel from electrical shock.
- D. Ensure adequate lighting for locating and operating equipment; emergency lighting for critical components.

1.04 OPERATION AND MAINTENANCE

- A. Ease of Maintenance: no routine measures required to maintain operation or finishes beyond washing with soap-and-water.
- B. Ease of Cleaning: Where not otherwise specified, design equipment mountings to allow easy cleaning around, and under, equipment, if applicable, without crevices, cracks, and

concealed spaces where dirt and grease can accumulate and with raised, closed bases for equipment mounted on the floor.

- C. Repair and Cleaning Access: serviceable parts and access panels easily removable with common tools.
- D. Rooftop Equipment: serviceable by quick parts replacement; minimize time required on roof and eliminate need for repair work in weather.
- E. Parts with shorter service life than the element as a whole shall be easily replaceable without de-installation or de-mounting of the entire element, component, or equipment item.
- F. Valves: easily replaceable internal parts, eliminating necessity of removal of entire valve for repair.

PART 2 — PRODUCTS

2.01 DURABILITY REQUIREMENTS

- A. Outdoor items: comply with Shell requirements for weather resistance (Division 07).
 - 1. Temperature and Humidity Endurance: Design equipment to endure temperature and humidity that will be encountered and to resist damage due to thermal expansion and contraction.
- B. Vandal Resistance: parts not easily removable without the use of tools.
- C. Electrically Operated Equipment and Appliances: UL listed for application or purpose to which they are put; suitable for wet locations listing for exterior use.

2.02 SERVICES CONNECTIONS

- A. Services connections to equipment shall be concealed behind or under items or their housings.
- B. Conceal services elements from view to greatest extent possible, with exposed portions of simple, neutral design and color.
 - 1. Exception: Standard designs of manufacturers, without consideration for appearance, may be used for fire suppression sprinkler heads.

PART 3 — EXECUTION

3.01 INSTALLATION

- A. Install all equipment in accordance with manufacturer's recommendations and applicable codes.
- B. Coordinate equipment installation with structural supports, utility connections, and access requirements.
- C. Do not locate any equipment requiring maintenance in attics, in crawl spaces, where access must be through attics or crawl spaces, or where access is not possible using removable panels or doors.
 - 1. Construction Documents: Identification of parts normally replaced during routine maintenance and parts replaced only when damaged or unexpectedly worn out; location of stocking distributors.
- D. Provide all required access panels and service clearances per manufacturer recommendations and Code.

- E. Equipment Producing By-Product Heat: Ventilate housings and cabinets as required by equipment manufacturer and rooms and spaces as required to maintain specified environmental conditions.
- F. Moisture: Prevent condensation from forming on service elements.
- G. Odors: Eliminate, isolate, or exhaust odors produced by occupant functions and building services.
- H. Prevent accumulation of debris and dirt at floor mounted equipment, such as air handlers, chillers, pumps, switchgear, and panelboards by one or more of the following methods.
 - 1. Provide 100 mm (4 inch) thick, concrete housekeeping pads.

END OF SECTION — 11 00 00 — Equipment — General Performance

END OF DIVISION — DIVISION 11 — Equipment

DIVISION 12

FURNISHINGS

NOTE: This Division covers Furnishings — movable (loose) furniture and fittings without electrical or plumbing connections. For Equipment (mechanized, plumbed, or permanently installed items), refer to Division 11.

SECTION 12 00 00

FURNISHINGS — GENERAL PERFORMANCE

PART 1 — GENERAL

1.01 SUMMARY

Design the facility to accommodate furnishings required by the Owner per the Project program. Furnishings are movable (loose) furniture and fittings without electrical or plumbing connections. All specified furnishings are to be provided by the Design-Builder unless otherwise indicated in the Project Program. Provide design support to Owner as a basic service for procurement of FF&E. Comply with all applicable requirements of General Requirements.

1.02 REFERENCED STANDARDS

- A. 29 CFR 1910 – Occupational Safety and Health Standards
- B. 29 CFR 1926 – Safety and Health Regulations for Construction

1.03 HEALTH AND SAFETY

- A. Comply with 29 CFR 1910 (General Industry) and 29 CFR 1926 (Construction).

1.04 OPERATION AND MAINTENANCE

- A. Ease of Maintenance: no routine measures required to maintain operation or finishes beyond washing with soap-and-water.
- B. Parts with shorter service life than the furnishing as a whole shall be easily replaceable.

PART 2 — PRODUCTS

2.01 DURABILITY REQUIREMENTS

- A. Outdoor items: comply with Shell requirements for weather resistance (Division 07).
 - 2. Temperature and Humidity Endurance: Design equipment to endure temperature and humidity that will be encountered and to resist damage due to thermal expansion and contraction.
- B. Vandal Resistance: parts not easily removable without the use of tools.

PART 3 — EXECUTION

3.01 INSTALLATION

- A. Coordinate furnishings installation with interior finishes, lighting, and electrical systems.
- B. Provide Owner with FF&E procurement support as a basic service.
- C. Materials shall be durable, vandal-resistant, and appropriate for the intended occupancy.

END OF SECTION — 12 00 00 — Furnishings — General Performance

END OF DIVISION — DIVISION 12 — Furnishings

DIVISION 13

SPECIAL CONSTRUCTION

SECTION 13 27 00

ARMS VAULT CONSTRUCTION

PART 1 — GENERAL

1.01 SUMMARY

The functional space details attached to the DD Form 1390/91 include a single arms vault. Provide arms vault construction in compliance with AR 190-11. Refer to Division 28 for electronic security system infrastructure requirements associated with the arms vault.

1.02 REFERENCED STANDARDS

- A. AR 190-11 Appendix G, Section G-1 — New facility criteria for the storage of Category II through Category IV arms
- B. AA-D-600D with Amendment 4 — Door, Vault, Security
- C. FF-L-2937 with Amendment 2 — Lock, Combination, Mechanical
- D. UFGS 08 34 59 — Vault Door and Day Gates
- E. ARNG ESS Program CIDS MILCON Infrastructure Typical Designs

PART 2 — PRODUCTS

2.01 VAULT DOOR

- A. Arms Vault Door: GSA-approved Class 5A Armory Vault Door compliant with Federal Specification AA-D-600D(4) and listed on the qualified product list (“QPL”) for this federal specification.

2.02 COMBINATION LOCKS

- A. Mechanical Combination Locks: compliant with Federal Specification FF-L-2937(2) and listed on the qualified product list (“QPL”) for this federal specification.

PART 3 — EXECUTION

3.01 STRUCTURAL

- A. Structural design drawing details shall illustrate the design criteria for arms vault construction as defined by AR 190-11 Appendix G, Section G-1.

END OF SECTION — 13 27 00 — Arms Vault Construction

SECTION 13 46 00

BLAST-RESISTANT CONSTRUCTION AND ANTITERRORISM FORCE PROTECTION

PART 1 — GENERAL

1.01 SUMMARY

Provide blast-resistant construction and antiterrorism measures in compliance with all applicable DoD minimum antiterrorism standards as listed in Division 00. All standards listed apply to new construction. Refer also to Division 08 for blast-resistant glazing requirements.

1.02 REFERENCED STANDARDS

- A. UFC 4-010-01 — DoD Minimum Antiterrorism Standards for Buildings
- B. UFC 4-020-01 — Security Engineering Facilities Planning Manual
- C. UFC 4-023-03 — Design of Buildings to Resist Progressive Collapse
- D. UFGS 28 31 76 — Fire Alarm and Mass Notification System
- E. DG 415-5 — Army National Guard General Facilities Information Design Guide
- F. USACE ECB 2018-17 — US Army Corps of Engineers New Requirements for Visual Notification for Mass Notification Systems

1.03 ANTITERRORISM ASSESSMENT

This Project includes an inhabited, off-installation facility. As required by UFC 4-010-01 – DoD Minimum Antiterrorism Standards for Buildings, use UFC 4-020-01 Security Engineering Facility Planning Manual to conduct an antiterrorism assessment and identify the design basis threat and level of protection. Use the USACE-provided workbook or UFC 4-020-01 Appendix E forms to complete the assessment. Once a level of protection is identified, use the appropriate table in Appendix E in conjunction with the exterior design elements to define the conventional construction standoff distances for walls, roof, and glazing.

- A. Designers are advised to utilize the 220-lbs blast weight as the controlling charge weight for facilities without a controlled perimeter.
- B. Where a controlled perimeter is provided, utilize the 220-lbs blast weight as the controlling charge weight from the controlled perimeter to the structure, and the 55-lbs blast weight as the controlling charge weight from the POV parking to the structure.

1.04 PHYSICAL SECURITY / FORCE PROTECTION

In addition to any provisions that may be required by law or Code, design and construct both exterior and interior spaces to incorporate accepted principles of crime prevention through environmental design (“CPTED”), using natural (as opposed to technological) methods of providing surveillance, access control, and territorial reinforcement wherever possible.

- A. Definition of Elements at Ground Level: For purposes of physical security, any element within 6 m (20 feet) of the ground, grade, or adjacent paving.
- B. Security Zones:

1. Public Access Zone: That area to which the public has free access, including public corridors, grounds, and parking lots.
2. Reception Zone: The area to which the general public has access but beyond which access is restricted at all times.
3. Operations Zone: The area to which only employees and visitors with a legitimate reason to be there have access.
4. Secure Zone: The area to which access is always controlled and which is monitored continuously.
5. High-Security Zone: Areas indicated in Project program and areas named "vault" and "secure file room".

Design and construct to provide protection as required by the Anti-Terrorism Force Protection Guidelines ("ATFP"):

- A. Proposal: Identification of proposed methods of meeting security requirements.
- B. Design Development: Identification of materials to be used, the physical properties that accomplish the security requirements, and details of anchorage to the structure.

PART 2 — PRODUCTS

2.01 BALLISTIC-RESISTANT DOORS

- A. If this project includes stand-alone facility requirements, where future design specifications and drawings are provided, include a design specification capturing the UL 752 Level 5 ballistic-rated doors and sufficient design drawings that identify the infrastructure pathways to support the stand-alone facility electronic security system components.

PART 3 — EXECUTION

3.01 STANDARD 1 — STANDOFF DISTANCES

Controlling charge weights for standoff distance design:

- A. Without controlled perimeter: 220 lbs blast weight.
- B. With controlled perimeter — perimeter to structure: 220 lbs; POV parking to structure: 55 lbs.

3.02 STANDARD 9 — EXTERIOR MASONRY WALLS

- A. Where exterior reinforced masonry is used, include requirements of this standard in structural design drawing general notes and demonstrate compliance in structural design drawing details.

3.03 STANDARD 10 — WINDOWS AND SKYLIGHTS

- A. Future submissions that include design specifications for glazing must capture the requirements of this standard. Refer to Division 08.

3.04 STANDARD 11 — BUILDING ENTRANCE LAYOUT

- A. All public vantage points to the main entrance must be mitigated.
- B. If this project does not include a controlled perimeter, the POV parking area must be treated as a public vantage point.

3.05 STANDARD 15 — OVERHEAD MOUNTED ARCHITECTURAL FEATURES

- A. Future submissions that include design specifications must capture the requirements of this standard within the applicable design specification for the design element.

3.06 STANDARD 18 — EMERGENCY AIR DISTRIBUTION SHUTOFF

- A. Future submissions that include design drawings and specifications must include clear symbology for the HVAC emergency air distribution shutoff switches, their locations within the mechanical drawings, and their operation in the direct digital control system riser diagrams.

3.07 STANDARD 19 — EQUIPMENT BRACING

- A. Future submissions that include design specifications must capture the requirements of this standard within the applicable design specification for the design element.

3.08 STANDARD 21 — MASS NOTIFICATION

- A. Future submissions that include design specifications must use the current UFGS 28 31 76 Fire Alarm and Mass Notification System as required by DG415-5.
- B. Note: USACE engineering construction bulletin (ECB) 2018-17 modifies Army requirements for mass notification systems including changes to the visual appliance notification network.
- C. Fire alarm and mass notification systems are considered platform IT systems and must be evaluated and hardened for cybersecurity compliance — see Division 25.

END OF SECTION — 13 46 00 — Blast-Resistant Construction and Antiterrorism Force Protection

END OF DIVISION — DIVISION 13 — Special Construction

DIVISION 21

FIRE SUPPRESSION

NOTE: It is the Design-Builder's responsibility to propose a structure compliant with all fire life and safety codes. If the Proposer determines to propose a facility that utilizes an automatic fire sprinkler system then the proposal shall be based on the relevant fire suppression specifications in this section. Please note that this will be an exception to NGB criteria and will require Code compliance certification as well as economic justification.

SECTION 21 00 00

FIRE SUPPRESSION — GENERAL PERFORMANCE

PART 1 — GENERAL

1.01 SUMMARY

Provide services systems to protect life and property from fire, including automatic fire detection, suppression, and warning; automatic smoke control; and manual fire-fighting equipment. Comply with all applicable requirements of General Requirements and other MEP services. Where fire protection elements also must function as elements defined within another element group, meet the requirements of both element groups.

1.02 SCOPE OF FIRE PROTECTION

Fire protection comprises the following elements:

- A. Fire Sprinkler and Extinguishing Systems — Elements which automatically extinguish fires.
- B. Fire Detection and Alarm — Elements required to detect fires and communicate fire location to building occupants, building management, and public firefighting agencies.
- C. Fire Protection Specialties — Elements required for manual firefighting by occupants.
- D. Mass Notification — Provide a mass notification capable of providing voice communication as well as an ADA compliant visual alerting system.

1.03 REFERENCED STANDARDS

- A. UFC 3-600-01 — Fire Protection Engineering for Facilities
- B. NFPA 70 — National Electrical Code (hazardous locations)
- C. NFPA 2024 Standards (applicable per scope)
- D. UFGS 28 31 76 — Fire Alarm and Mass Notification System (Addressable)
- E. UFC 4-021-01 — Mass Notification Systems

1.04 SUBSTANTIATION

- A. Preliminary Design: Fire protection areas identified. System layout indicating operator interface locations.
- B. Design Development: Fire protection zones indicated on drawings with riser locations identified. System equipment locations indicated on the drawings and manufacturer's product data indicating products to be used.
- C. Construction: Functional performance testing per Code.

PART 2 — PRODUCTS

2.01 FIRE SUPPRESSION SYSTEM

- A. Provide automatic fire suppression for the entire building.
- B. Provide a permanent water supply for standpipes as required by Code.
- C. Provide water supply to sprinkler systems sufficient to extinguish fires inside the structure.
- D. Provide systems which safeguard path of egress.
- E. Provide system materials which do not contribute to the spread of the fire.
- F. Provide systems to limit spread of fire from storage area to office area.
- G. Seismic Design: provide support systems which sustain static (dead) loads twice the wet weight of the system.
- H. Corrosion Resistance: use corrosion-resistant materials; ferrous metal is not considered corrosion resistant unless hot-dipped galvanized, chrome-plated, or coated with rust-inhibitive paint.

2.02 FIRE ALARM CONTROL PANEL (FACP)

- A. Provide a FACP with fire location map and first-responder building call handset.
- B. Locate FACP in the main lobby, maintenance office, and Mechanical/Electrical room.

2.03 MASS NOTIFICATION SYSTEM

- A. Provide a mass notification system capable of providing voice communication as well as an ADA-compliant visual alerting system.
- B. Use current UFGS 28 31 76 as required by DG 415-5. Refer to Division 13 for anti-terrorism mass notification requirements.
- C. Provide audible alarm system to signal building occupants of fire hazard.
- D. Provide an automatic system to signal building occupants of fire.

2.04 SERVICE LIFE

- A. Sprinkler Heads, Valves, and Other Inlet and Outlet Components: Same as building service life.
- B. Pumps and Other Operating Components: Minimum 20 years.
- C. Fire Hoses: Minimum 20 years.

PART 3 — EXECUTION

3.01 INSTALLATION

- A. Provide systems that are leak-free and tamper-resistant.
- B. Provide systems which minimize risk of injury and damage to property.
- C. Maintain fire resistance of walls, floors, ceilings, and other fire-rated assemblies that services must pass through.
- D. Provide fire-rated separations between equipment rooms and other spaces where required by Code.

3.02 ACCESS AND CLEARANCES

- A. Provide easy access to and working clearances around all system components.
- B. Provide systems that minimize activation and use by unauthorized persons.

END OF SECTION — 21 00 00 — Fire Suppression — General Performance

END OF DIVISION — DIVISION 21 — Fire Suppression

DIVISION 22

PLUMBING

SECTION 22 00 00

WATER AND DRAINAGE — GENERAL PERFORMANCE

PART 1 — GENERAL

1.01 SUMMARY

Provide delivery of hot and cold domestic water to points of utilization and the removal of water, rainwater, and liquid waste. Comply with all applicable requirements of General Requirements and other MEP services. Where plumbing elements also must function as elements defined within another element group, meet the requirements of both element groups.

1.02 SCOPE

Water and drainage elements comprise of the following:

- A. Water Supply — Water sources and storage.
- B. Plumbing Fixtures — All fixtures necessary for sanitation, occupancy, and use, which are connected to water supply or drainage; not including water heating or conditioning equipment or kitchen appliances.
- C. Domestic Water — All elements required to distribute water to fixtures, including piping and equipment for water cooling, heating, conditioning, and storage.
- D. Sanitary Waste — All elements required for unattended removal of sanitary waste, including piping, venting, discharge and disposal, and equipment.
- E. Rainwater Drainage — All elements required for unattended drainage of rainwater from building areas in which it may accumulate and drainage of clear wastes from building services; not including gutters and downspouts or sub drainage.

1.03 UTILITY CONNECTIONS

- A. Water Source: Existing public utility.
- B. Sewage Disposal: Connect building sewer to existing public sewage system.
- C. Rainwater Drainage Outlet: Existing public utility storm drainage — independent of sanitary sewer.
- D. Prevent damage to public utility drainage systems by removing or neutralizing hazardous materials before discharging.

1.04 REFERENCED STANDARDS

- A. ANSI/ASME 13.1-2015 — Scheme for the Identification of Piping Systems
- B. UFC 3-230-01 — Water Storage and Distribution

C. UFC 3-240-01 — Wastewater Collection

1.05 LIFE SPAN

Same as the service life of the building, except as follows:

- A. Shut-Off Valves and Similar Components: Same as service life of building.
- B. Electrically- and Fuel-Operated Equipment: Minimum 20 years.
- C. Other Moving Components: Minimum 20 years.
- D. Plumbing Fixtures: Same as building service life.

PART 2 — PRODUCTS

2.01 PIPING AND VALVES

- A. Provide watertight joints throughout.
- B. Underground piping: watertight and root-proof.
- C. Buried piping below slabs: 75 mm (3 inch) diameter minimum.
- D. Buried Water Piping: Minimum of 15 mm (6 inches) below lowest recorded level at which the ground freezes. Beyond Code requirements.
- E. Do not route piping through electrical rooms, switchgear rooms, transformer vaults, or elevator equipment rooms unless absolutely necessary. Where piping must be routed near electrical equipment, shield equipment with drip pans which drain to the nearest floor drain.

2.02 PLUMBING FIXTURES

- A. Provide pressure-balanced shower valves that limit water temperature to 49°C (120°F).
- B. Fixture Heights and Configurations: as specified in the Code.
- C. Water Connections: hot water on left side of fixtures, cold water on right side.
- D. Faucets: manual push-button metered type.
- E. Water closets/urinals: manual flush or hard-wired auto flush.
- F. Sinks: surface-mounted to solid surface countertop.
- G. Provide insulated drain pans and piping to remove condensation from cooling coils.

PART 3 — EXECUTION

3.01 INSTALLATION

- A. Odors:
 - 1. Locate odor producing elements in areas separate from human occupancy in dedicated equipment rooms.
 - 2. Do not locate sanitary waste vent openings where odors are noticeable by occupants or by occupants of adjacent properties or where odor-bearing air may enter building spaces.
 - 3. Connect fixtures to prevent entry of sewer gases into occupied spaces.
- B. Waste Drainage:

1. Provide food handling equipment, food storage equipment, commercial dishwashing, cooler and freezer floor drains, drinking fountains, and water coolers with indirect waste pipe for drainage.

3.02 HEALTH AND SAFETY

- A. Provide potable water throughout.
 1. Protect potable water supply as required by Code.
- B. Connect each fixture to sanitary drainage system for proper disposal of waste and harmful materials.
- C. Control pressures to protect the building, fixtures, equipment, and occupants from harm.
 1. Maximum Water Distribution Working Pressure: 550 kPa (80 psi).
 2. Air Removal: Remove air trapped in water distribution system.
- D. Burn Hazards:
 1. Maximum Fixture Discharge Temperature: 49°C (120°F).
 2. Maximum Exposed Surface Temperature: 40°C (105°F).
- E. Provide waste system vents to avoid trap siphonage or compression, as required by Code.
- F. Prevent entry of sewer gases from the sanitary sewer into the building's sewer system.
- G. Hazard Labeling: per ANSI/ASME 13.1-2015; Clearly label domestic hot water, domestic cold water, rainwater drainage, and sanitary waste and vent systems indicating the nature of contents and direction of flow.

3.03 SYSTEM SIZING

Provide adequate water flow and pressure to supply peak demand requirements. Comply with requirements specified in the Code. If the water source has insufficient flow or pressure, provide means of increasing to required level.

- A. Maximum water velocity: 2.4 m/s (8 fps) at design flow rate.
- B. Waste Pipe Sizing: As required per Code.
 1. Buried Piping Below Slabs: 75 mm (3 inch) diameter, minimum.
- C. Rainwater Drainage Capacity: as specified in the Code.

3.04 ISOLATION AND MAINTENANCE

- A. Provide a means of isolating the following:
 1. Each building from main water service. Provide a shut-off valve located inside a valve box whose removable access cover is at grade level.
 2. Water meter from building piping.
 3. Individual fixtures and equipment. Provide an isolation device within 900 mm (3 feet) of pipe connection to item.
- B. Provide devices at each branch take-off which allow insertion of measurement devices to monitor flow and pressure levels in the water distribution system.
- C. Provide a cleanout as required by the Code and as follows:
 1. At the upstream end of each horizontal sanitary drainage pipe, for cleaning in direction of flow.
 2. Pipe 75 mm (3 inches) and Smaller: At intervals of 15 m (50 foot), maximum.

3.05 TESTING AND SUBSTANTIATION

- A. Preliminary Design:
 - 1. Analysis and documentation of water supply source and flow conditions.
 - 2. Analysis and documentation of sewer discharge method and locations.
- B. Design Development:
 - 1. Identification of pressure and flow requirements (design conditions) for the building.
 - 2. Verification of source availability at design conditions.
 - 3. Piping design calculations and entrance locations.
 - 4. Drainage design calculations and documentation of piping outlets.
- C. Construction: Test of system flow and pressure; submit report verifying performance.
 - 1. Prior to installation of plumbing fixtures and prior to concealment of piping, air and water tests of piping systems at 110 percent of operating pressure, maintaining pressure for 2 hours to demonstrate system is watertight.

END OF SECTION — 22 00 00 — Water and Drainage — General Performance

END OF DIVISION — DIVISION 22 — Plumbing

DIVISION 23

HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

SECTION 23 00 00

HVAC — GENERAL PERFORMANCE

PART 1 — GENERAL

1.01 SUMMARY

Provide artificial means of controlling temperature, relative humidity, air velocity and direction in the interior spaces enclosed by the shell, and reduction of airborne odors, particulates, and contaminant gases. Comply with all applicable requirements of General Requirements and other MEP services. Where HVAC elements also must function as elements defined within another element group, meet the requirements of both element groups.

1.02 SCOPE OF HVAC SYSTEMS

The HVAC system comprises the following elements:

- A. Energy Supply — Elements which provide energy used to maintain building comfort.
- B. Heat Generation — Elements required to heat building to maintain space comfort.
- C. Cooling Generation — Elements necessary to generate the cooling required to maintain building comfort.
- D. Air Distribution — Elements required to distribute air to maintain building comfort.
- E. HVAC Controls — Elements required to control equipment which maintains building comfort. For Direct Digital Control (“DDC”)-based control elements; coordinate with OMD Operations and Maintenance and controls contractor during design; refer also to Section 23 09 00.

1.03 REFERENCED STANDARDS

- A. ANSI/ASHRAE 62.1 — Ventilation for Acceptable Indoor Air Quality
- B. ASHRAE Fundamentals Handbook
- C. ASHRAE 15 — Safety Standard for Refrigeration Systems
- D. ASHRAE 90.1 — Energy Standard for Buildings
- E. UFC 3-410-01 — Heating, Ventilating, and Air Conditioning Systems
- F. OMD Control System Specifications — Instrumentation and Control for HVAC (supplied with RFP)
- G. U.S. Army Corps of Engineers (“USACE”) Meter Data Management System (“MDMS”) Specifications

PART 2 — PRODUCTS

2.01 REFRIGERANTS

- A. Comply with ASHRAE 15.
- B. Prevent release of refrigerant to atmosphere.
- C. Prevent exposure of occupants to hazardous refrigerants.
 - 1. Substantiation: Measurement of refrigerant concentration in mechanical equipment rooms where refrigerants are located.

2.02 ENERGY EFFICIENCY

Minimize energy consumption while providing function, amenity, and comfort specified.

- A. Provide energy efficient design using procedures and values specified in ASHRAE 90.1.
- B. Substantiation:
 - 1. Proposal: Identification of method of calculation of energy efficiency to be employed.
 - 2. Design Development: Detailed listing of design criteria and design analysis showing compliance, prepared by a licensed mechanical engineer.
 - 3. Design Development: Energy cost of all energy-consuming equipment and systems over the first year of operation; include analysis of probable change in annual cost over time due to aging but disregarding inflation and rate changes.

2.03 EXPECTED LIFE SPAN

Same as the service life of the building, except as follows:

- A. Shut-Off Valves: Minimum 10 years.
- B. Dampers, Louvers, Registers, Grilles: Same as service life of building.
- C. Main Heat Generation and Cooling Equipment: Minimum 20 years.
- D. Secondary Equipment: Minimum 10 years.
- E. Control Components, Except Wiring: Minimum 10 years.

PART 3 — EXECUTION

3.01 HEALTH, SAFETY, AND INDOOR AIR QUALITY

- A. Emergency Power: Provide emergency power to 100% of facility HVAC systems.
- B. Smoke Control: Coordinate ventilation fans, supply/return/exhaust fans, and dampers with smoke control system.
- C. Indoor Air Quality: Provide sufficient ventilation to obtain acceptable indoor quality, determined using the Ventilation Rate Procedure of ANSI/ASHRAE 62.1.
 - 1. Substantiation:
 - a. Design Development: Engineering analysis. Identification of methods to be used to comply with requirements; ventilation design calculations. Identification of unusual indoor contaminants or sources and methods to mitigate their effects on occupants.
 - b. Construction Documents: Specifications showing that construction materials are not contaminant sources and do not adversely affect air quality.

- c. Occupancy: Field testing to show compliance after full occupancy, and survey of occupants.
 - d. Vehicle Maintenance Bay Exhaust System.
- D. Vehicle Maintenance Bay: Provide a dedicated exhaust system.
- E. Refrigerant Measurement at Closeout: Measure refrigerant concentration in mechanical equipment rooms.

3.02 OPERATION AND MAINTENANCE

- A. Provide a means of disconnecting power at each piece of equipment.
- B. Smoke dampers shall be placed in locations to allow easy access and inspections by ladder.

3.03 AMENITY AND COMFORT

Design and construct to provide comfortable interior environment in accordance with the Code and the following:

INTERIOR DESIGN CONDITIONS — SUMMER

- A. Daytime Setpoint: 22°C (72°F) ± 1°C (2°F)
- B. Computer Room: 22°C (72°F) ± 0.5°C (0.3°F)
- C. Night Setback: 25°C (78°F)
- D. Interior Relative Humidity: 50% maximum

INTERIOR DESIGN CONDITIONS — WINTER

- A. Daytime Setpoint: 22°C (72°F) ± 1°C (2°F)
- B. Computer Room: 22°C (72°F) ± 0.5°C (0.3°F)
- C. Night Setback: 25°C (78°F)
- D. Interior Relative Humidity: 50% maximum

OUTSIDE AIR DESIGN CONDITIONS

- A. Summer: 0.4% cooling design condition — ASHRAE Fundamentals Handbook
- B. Winter: 99.6% heating design condition — ASHRAE Fundamentals Handbook
- C. Energy Design Wind Speed: 40 km/h (25 mph)

3.04 NATURAL VENTILATION

Design and construct interiors to permit air movement between exterior openings positioned to enhance warm weather thermal comfort of occupants in all major spaces.

- A. SR1 (Sanitary Facilities), SS (Storage), SV (Vehicular), SC (Circulation), and SU (Utility, Building Services) spaces are exempt from natural ventilation requirements.
- B. Substantiation:
 - 1. Proposal: Information on overall building configuration that will permit natural ventilation of all major spaces.
 - 2. Design Development: Engineering calculations for representative spaces, predicting anticipated air movement under weather conditions typical for Project Site.
- C. Cross Ventilation: Provide interior construction to facilitate natural cross ventilation required in other Sections and as required per Code.

3.05 STARTUP / COMMISSIONING / TESTING / BALANCING

- A. Functional performance testing required.
 - 1. If equipment is damaged or malfunctions within one year after completion, reporting of the cause of equipment damage or malfunctions.
 - 2. Corrective Action: Provide corrective measures necessary to eliminate equipment damage and malfunctions.
- B. Closeout Substantiation: Measure temperature and humidity in spaces with unacceptable fluctuations.

END OF SECTION — 23 00 00 — HVAC — General Performance

END OF DIVISION — DIVISION 23 — Heating, Ventilating, and Air Conditioning (HVAC)

DIVISION 25

INTEGRATED AUTOMATION

SECTION 25 50 00

BUILDING AUTOMATION SYSTEM (BAS)

PART 1 — GENERAL

1.01 SUMMARY

Provide the elements necessary to engineer, design, install, control, monitor, and report the building's indoor environment and utility consumption. This entails a fully integrated web-based Building Automation System (BAS) incorporating Direct Digital Control (DDC) per the following performance standards and the manual *Instrumentation and Control for HVAC - Oregon Military Department Control System Specification* (supplied with RFP). Comply with all applicable requirements of General Requirements and HVAC – General Performance.

1.02 SCOPE OF BAS

BAS shall address:

- A. Energy management
- B. Equipment monitoring
- C. Temperature control
- D. The following subsystems:
 - 1. Indoor environment
 - 2. Energy consumption management
 - 3. Preventative maintenance scheduling
 - 4. Fire alarm integration (as required)
 - 5. Fuel consumption monitoring
 - 6. Water usage monitoring
- E. Energy Monitoring: Install utility meter monitoring systems for water, gas, and electricity as prescribed by U.S. Army Corps of Engineers ("USACE") Meter Data Management System ("MDMS") Specifications.

1.03 COMPLIANCE AND WARRANTY

- A. BAS shall comply with UL 864 UUKL, UL 916 PAZX, UL 864 UDTZ, and other applicable subsystem listings.
- B. FCC Regulation Part 15, Section 15 (Radio Frequency EMI) compliance and labeling required.
- C. Warranty: one year from date of Owner acceptance; factory-authorized warranty service available on site within 60 minutes.
- D. Expected Service Life Span:
 - 1. Integrated Facility Controls: Minimum 15 years.

2. Security and Surveillance Controls: Minimum 15 years.

1.04 TRAINING

- A. Provide training in operation, maintenance, and programming of the DDC system for the Owner's Designated Personnel. Training shall conform to, and include the following:
 1. Provide 16 hours of training for Owner's designated operating personnel.
 2. Students shall be provided with binder containing product and system specific training modules for system installed. Minimum of one copy per student plus one extra copy.

PART 2 — PRODUCTS

2.01 DDC CONTROLLERS — ENERGY MANAGEMENT ROUTINES

DDC Controllers shall have the ability to perform each of the following energy management routines:

- A. Time-of-day scheduling
- B. Calendar-based scheduling
- C. Temporary schedule overrides
- D. Automatic Daylight Savings Time switchover
- E. Peak demand limiting
- F. Temperature-compensated duty cycling
- G. Energy Conservation Routines, including:
 1. Water temperature reset
 2. Air temperature reset
 3. Economizer cycle
 4. Unoccupied-hour temperature setback
 5. Night flush

2.02 MANUFACTURER

- A. DDC system components and architecture: Automated Logic or approved equal.

NOTE: Provide contact for budget, scope, and requirements.

2.03 SOFTWARE PROGRAMS

Software programs shall be provided as an integral part of DDC Controllers and shall not be dependent upon any higher-level computer for execution. DDC Controllers shall be able to execute custom, job-specific processes defined by user, to automatically perform calculations and special control routines. A variety of historical data collection utilities shall be provided to manually or automatically sample, store and display system data for points specified in I/O summary.

- A. Software and Firmware Integral to Operation of Services Equipment: Minimum 20 year's functional life without reprogramming required.

2.04 RELIABILITY

- A. BAS system shall be designed, installed, commissioned and serviced by factory trained employees of the BAS system manufacturer.
- B. Materials and equipment shall be catalogued products of manufacturers regularly engaged in production and installation of automatic temperature control systems. Materials and equipment used shall be standard components, regularly manufactured for this and/or other systems and not custom designed especially for this Project. Systems and components shall have been thoroughly tested, proven in actual use for at least two years, and shall be manufacturer's latest standard design that complies with specification requirements.
- C. BAS shall comply with UL 864 UUKL, UL 916 PAZX and 864 UDTZ, and other subsystem listings as applicable.
- D. Electronic equipment shall conform to requirements of FCC Regulation, Part 15, Section 15, Governing Radio Frequency Electromagnetic Interference and be so labeled.
- E. BAS devices and installation shall be warranted to be free from defects in workmanship and material for a period of one year from date of job acceptance by Owner. Any equipment, software, or installation found to be defective during this period shall be repaired or replaced without additional expense to Owner. Factory authorized warranty service shall be available on site within 60 minutes of a call for service.

PART 3 — EXECUTION

3.01 NETWORK ARCHITECTURE

- A. Design BAS to network operator workstations and stand-alone DDC Controllers. Network architecture shall consist of three levels, building wide Ethernet network based on TCP/IP protocol, high performance peer-to-peer network, and DDC Controller floor level local area networks. Access across networks should be transparent to user when accessing data or developing control programs.
- B. Design of BAS shall allow co-existence of new DDC Controllers with existing DDC Controllers in same network without use of gateways or protocol converters.
- C. The BAS shall allow for dial up modem access for terminal mode (text) automatic control system monitoring and adjustment. Remote device shall be allowed to function without having BAS software installed at remote site.
- D. BAS should include color graphic floor plan displays and system schematics for each piece of mechanical equipment including, but not limited to, air handling systems, chilled water systems, heating water systems, general exhaust systems, boiler systems and domestic water heating systems. Package shall include pop-up menu prompting, archiving, point, and program editing. Graphics shall include overall building architecture with keys to individual floors, system schematics for systems and equipment serving the areas, flow diagrams and control system panel layout diagram.

3.02 ALARM MANAGEMENT

- A. Provide alarm management to monitor and direct alarm information to operator devices. Each DDC Controller shall perform distributed, independent alarm analysis and filtering to minimize operator interruptions due to non-critical alarms, minimize network traffic and prevent alarms from being lost.

- B. At no time shall the DDC Controllers ability to report alarms be affected by either operator or activity at PC workstation, local I/O device or communications with other panels on network.

END OF SECTION — 25 50 00 — Building Automation System (BAS)

END OF DIVISION — DIVISION 25 — Integrated Automation

DIVISION 26

ELECTRICAL

SECTION 26 00 00

ELECTRICAL POWER — GENERAL PERFORMANCE

PART 1 — GENERAL

1.01 SUMMARY

Provide electrical power with appropriate characteristics to operate all electrically operated devices, including those in other services. Comply with all applicable requirements of General Requirements and other MEP services. Where electrical power elements also must function as elements defined within another element group, meet the requirements of both element groups.

1.02 SCOPE OF ELECTRICAL SYSTEM

The electrical system comprises:

- A. Electrical Energy Generation — Utility power sources, engine-generator systems, battery power systems, uninterruptible power supply systems and unit power conditioners.
- B. Service and Distribution — Service entrance equipment, distribution equipment, transformers, motor control equipment, service and feeder wiring (conductors and raceways), monitoring, safety and control equipment, and other elements required for a complete functional system.
- C. Branch Circuits — Branch circuit wiring and receptacles and other branch circuit wiring systems.

1.03 REFERENCED STANDARDS

- A. NFPA 70 — National Electrical Code
- B. NFPA 780 — Standard for the Installation of Lightning Protection Systems
- C. NFPA Standards — all applicable per occupancy and application
- D. NEMA 250 — Enclosures for Electrical Equipment
- E. IEEE Standard 1100 — Powering and Grounding Sensitive Electronic Equipment
- F. ASHRAE 90.1 — Energy Standard for Buildings

1.04 SUBMITTALS / SUBSTANTIATION

- A. Construction: Continuity test of wiring systems prior to functional performance test.
Functional performance test of wiring systems.

1.05 LIFE SPAN

Same as the service life of the building, except as follows:

- A. Power Distribution Equipment: Same as building service life.
- B. Power Generation Equipment: Minimum 20 years.
- C. All Components of Life Safety-Related Systems: Minimum 20 years.

PART 2 — PRODUCTS

2.01 VOLTAGE STANDARDS

- A. General Receptacle System: 120V / 3-phase / 60 Hz.
- B. Provide 240V / 3-phase / 60 Hz Receptacles at the following locations:
 - 1. Copier room.
 - 2. Maintenance area.
 - 3. Kitchen area — As needed to support equipment.
- C. Equipment: 480V / 3-phase / 60 Hz.

2.02 DURABILITY

- A. Moisture Resistance:
 - 1. Water-resistant equipment includes transformers, raceways, enclosures, panel boards, and switchgear.
- B. Enclosures: As required to protect equipment from environment in which it is installed, complying with NEMA 250 and:
 - 1. Areas to be Hosed-Down, or Equivalent, Exterior or Interior: Type 4.
 - 2. Exterior, Exposed to Weather and Wind: Type 3S.
 - 3. Exterior, Other Locations: Type 3R.
 - 4. Interior, Subject to Settling Dust, Falling Dirt, or Dripping Liquids: Type 5.
 - 5. Interior, Subject to Circulating Dust: NEMA Type 12.
 - 6. Interior, Other Locations: Type 1.
- C. Underground Conduit: watertight and root-proof.

PART 3 — EXECUTION

3.01 DISTRIBUTION

- A. All electrical power distribution shall be underground. Remove and relocate underground all existing above-grade power lines within the Project Site.
- B. Utility Revenue Meters: Meter incoming electrical service on the low-voltage side of the service transformer (secondary metering).
- C. Provide means of reading power meters and demand meters from inside the building.
- D. Provide an interface between the electrical monitoring and the building automation system including the following:
 - 1. Switchboard Monitoring:

- a. Power Analysis Values:
 - i. Output voltage of each phase; line-to-line and line-to-neutral.
 - ii. Output current; each phase and ground
 - iii. Real power; per phase.
- 2. Real-time Readings of:
 - a. Fundamental voltages; per phase.
 - b. Fundamental real power; per phase
 - c. Unbalance; current and voltage.
- 3. Demand Readings:
 - a. Demand current; per phase and peak.
 - b. Average power factor; 3-phase total.
 - c. Demand real power; 3-phase total.

3.02 HEALTH AND SAFETY

- A. Electrical Hazards: Design in accordance with all NFPA standards that apply to the occupancy, application, and design.
 - 1. Control access to spaces housing electrical components and allow access only by qualified personnel.
 - 2. Provide electrical distribution equipment with locking cabinets, doors, and panels when it is located in public areas.
- B. Emergency Power: Provide as programmed in project description.
- C. Hazardous Locations: Comply with NFPA 70.
 - 1. Maintenance Bays are classified hazardous locations.
- D. Control access to electrical component spaces; provide locking cabinets in public areas.

3.03 CAPACITY AND SPARE

- A. Capacity: Calculated in accordance with NFPA 70.
- B. Power Consumption and Efficiency: Comply with requirements of ASHRAE 90.1.
- C. Allowance for Change and Expansion:
 - 1. Spare Load Capacity — System Wide: 20% minimum.
 - 2. Future Circuit Capacity — System Wide: 20% minimum additional circuits.
- D. Availability: Provide an electrical system which is available to deliver power at least 99 percent of the time.
- E. Provide a dedicated panelboard for lighting which is separate from panelboards serving equipment and sensitive electronic equipment.
- F. Provide one panelboard for each tenant unit, located inside unit.

3.04 PROTECTION AGAINST DISTURBANCES

- A. Provide circuits which serve sensitive electronic equipment with electrical characteristics within the ranges defined in IEEE Standard 1100.
 - 1. Preliminary Design: Identification of design strategies to minimize electrical disturbances.

2. Design Documents: Identification of circuits which require power conditioning
3. equipment.
4. Construction: Functional performance testing.
5. Occupancy:
 - a. If equipment is damaged or malfunctions within one year after completion, reporting of the cause of equipment damage or malfunctions.
 - b. Corrective Action: Provide corrective measures necessary to eliminate electrical disturbances which cause equipment damage and malfunctions.
 - c. Retest Report: Identification of electrical characteristics after corrective equipment has been installed and all equipment is operating properly and without damage.
- B. Noise Protection: Limit frequency excursions between 90 to 110 percent of design frequency.
- C. Surge Protection: Voltage excursion limit of 2 times design voltage

3.05 FACILITY LIGHTNING PROTECTION

Design to prevent damage to occupants, structure, services, and contents due to lightning strikes.

- A. Provide protection equivalent to that specified in NFPA 780; supplementary strike termination devices, ground conductors, and grounding electrodes are required only where the integral portions of the structure cannot perform those functions.
- B. Ground Resistance Measurement Methods: As described in NFPA 780, Appendix I.
- C. Substantiation:
 1. Design Development: If methods prescribed by NFPA 780 are not used, description of engineering basis of design, including grounding terminal design.
 2. Design Development: Diagrams showing locations of strike (air) terminals and zones of protection; identification of internal components that require bonding to equalize potential.
 3. Construction Documents: Drawings showing locations and sizes of conductors, bonding of metal bodies, and components; detailed installation specifications.

END OF SECTION — 26 00 00 — Electrical Power — General Performance

SECTION 26 31 00

SOLAR PHOTOVOLTAIC (PV) SYSTEM

PART 1 — GENERAL

1.01 SUMMARY

Provide a complete Code-compliant solar photovoltaic (“PV”) system with all interconnection gear and web-based monitoring. Include net metering switchgear consisting of a utility power consumption meter and a solar power production meter with separate disconnecting means for each meter. Include all utility company applications and procedures, solar PV nameplate rating and net metering switchgear configuration in accordance with the utility company requirements. Comply with all applicable requirements of General Requirements and Electrical Power – General Performance.

1.02 PV SYSTEM GOALS

- A. Maximize Lifetime Energy Production (“LEP”) within available budget.
- B. Maximize all available solar incentives and grants.
- C. Minimize Operations and Maintenance (“O&M”) costs.
- D. Minimize Levelized Cost of Electricity (“LCOE”).
- E. Provide future expansion capability to achieve Net Zero Energy (NZE) goal with total annual electrical production equal to annual electrical usage.

1.03 REFERENCED STANDARDS

- A. NEC Article 690 — Solar Photovoltaic Systems
- B. California Energy Commission (CEC) — Equipment Certification Lists

PART 2 — PRODUCTS

2.01 PV MODULES

- A. STC nameplate rating of 250W; Voc = 37.8V; Isc = 8.28A; NOCT 47°C; measuring tolerance $\pm 3\%$; 60-cell monocrystalline with tempered glass module; 25-year linear performance guarantee.
- B. Module Efficiency: 16% minimum.
- C. Performance Guarantee: 25-year minimum.
- D. Product Warranty: 20-year minimum.
- E. Certified by California Energy Commission (CEC).
 - 1. http://www.gosolarcalifornia.ca.gov/equipment/pv_modules.php
- F. Include structural racking and mounting hardware.

2.02 LINE CONDITION FILTER (“LCF”)

Enclosure with lugs for terminating panel-board feeder conductors and for conductors from the LCF to the net metering switchgear. The communications gateway for monitoring the micro inverters is also enclosed in the LCF.

2.03 INVERTERS

- A. CEC certified:
 - 1. <http://www.gosolarcalifornia.ca.gov/equipment/inverters.php>
- B. CEC Efficiency: 96% minimum.
- C. Product Warranty: 20-year minimum, with option to extend for additional 10 years.

2.04 MONITORING SYSTEM

- A. Web-based system with the following capabilities (Solar Edge):
 - 1. System performance dashboard.
 - 2. Daily energy production.
 - 3. Lifetime energy production.
 - 4. Inverter status and operational data.
 - 5. Sub-array DC current.
 - 6. Email alerts for alarm conditions.
 - 7. Data export capability.
- B. Provide an interface between the digital meters in the net metering switchgear and the building automation system ("BAS").
- C. Monitoring at the net metering switchgear for both meters:
 - 1. Voltage of each phase; line-to-line and line-to-neutral.
 - 2. Current of each phase.
 - 3. Total real power.
- D. Includes a communications gateway and ethernet data cabling and/or fiber optic cabling for distances exceeding 300 feet between the LCF and the data patch panel in the building.

2.05 CIRCUIT BREAKER PANEL-BOARD

Panel-board with door-in-door trim for terminating the 3-phase source circuits from the inverters. Includes feeder conductors from the panel-board to the LCF and from the LCF to the net metering switchgear.

2.06 NET METERING SWITCHGEAR

Switchgear with two utility meters: one to measure utility power consumption and the other to measure solar power production. Each meter with its own disconnecting means. Also include a customer owned digital meter with LCD display at each utility meter for the customers use in observing real-time electrical data on each utility meter. The digital meters shall also be connected to the building automation system. Coordinate switchgear configuration and nameplate ratings with the utility company.

2.07 DRY-TYPE TRANSFORMERS

Include transformers where needed to change voltage of the output of the solar PV system to match the voltage of the electrical utility and net metering switchgear.

2.08 ENCLOSURES

As required to protect equipment from environment in which it is installed, complying with most current NEMA 250 and:

- A. Areas to be Hosed-Down, or Equivalent, Exterior or Interior: Type 4.
- B. Exterior: Type 12.
- C. Interior, Subject to Circulating Dust: NEMA Type 12.
- D. Interior, Other Locations: Type 1.

PART 3 — EXECUTION

3.01 SYSTEM DESIGN

- E. Production Modeling: It is desirable to use a software simulation tool to optimize system performance and calculate annual energy production.
 - 1. Accepted software: PV*SOL, PVsyst, PVWatts, System Advisor Model (“SAM”).
 - 2. Provide product information if using software not listed above.
- F. Aesthetics: Minor trade-offs in system performance due to sub-optimal tilt and orientation that enhance aesthetics of the installation are acceptable.
- G. Array-to-Inverter Power Ratio: Target 1.20 to 1.35.
 - 1. Maximize the system Specific Yield in kWh/kW.
 - 2. Maximize the annual energy production by balancing additional generation from a higher DC-to-AC ratio against potential clipping losses due to inverter power limiting.
- H. System Losses: Calculate losses for categories listed below - Target less than or equal to 15.0% total:
 - 1. Soiling.
 - 2. Shading.
 - 3. Light Induced Degradation (“LID”).
 - 4. Thermal Losses.
 - 5. Module Mismatch.
 - 6. Nameplate Rating Variance: Select modules with a positive power tolerance that deliver or exceed the nominal rated power under Standard Test Conditions (“STC”).
 - 7. Wiring & Connection Losses: Minimize resistive losses in DC and AC wiring and connections.
 - 8. System Availability: Minimize outages and downtime for scheduled and unscheduled maintenance.
- I. Maximum AC and DC voltage drop: Not to exceed 3%.
- J. Spare Capacity: Plan the layout of the solar PV modules and size the panel-boards, feeder conductors, net metering switchgear, transformers, etc. to allow the addition of 20 percent more solar PV modules.
- K. Net Meter: Comply with all utility interconnection requirements.

3.02 SAFETY AND GROUNDING

- A. Design per NEC Article 690.
 - 1. Control access to spaces housing electrical components and allow access only by qualified personnel.
 - 2. Signage: Provide required system labels, and warning signs for Control of Hazardous Energy.
 - 3. Provide electrical distribution equipment with locking cabinets, doors, and panels when it is located in public areas.
- B. Provide system grounding per NEC.
- C. Provide an unspliced stranded copper bonding conductor for all solar PV modules and metallic mounting hardware.
- D. Provide active grounding as required by local utility or Code (i.e. grounding transformer).

3.03 ROOF PENETRATIONS

- A. Coordinate all roof penetrations with original roof manufacturer/installer to maintain roofing warranty.

END OF SECTION — 26 31 00 — Solar Photovoltaic (PV) System

SECTION 26 50 00

LIGHTING

PART 1 — GENERAL

1.01 SUMMARY

Provide artificial means of lighting interior and exterior spaces, independent of reliance on natural light. Where artificial lighting elements also must function as elements defined within another element group, meet the requirements of both element groups. In addition to the requirements of this section, comply with all applicable requirements of General Requirements and other MEP services.

1.02 SCOPE OF LIGHTING

- A. Interior Lighting – General room lighting, emergency lighting, and accent lighting.
- B. Exterior Lighting – General lighting of exterior spaces including roadways, driveways, walkways, parking areas, and recreation areas.

1.03 REFERENCED STANDARDS

- A. NFPA 70 — National Electrical Code
- B. NFPA Standards — all applicable per occupancy and application
- C. ASHRAE 90.1 — Energy Standard for Buildings
- D. IESNA Lighting Handbook

1.04 LIFE SPAN

- A. Lighting Fixtures: 10 years, minimum.

PART 2 — PRODUCTS

Portable lamps (not permanently attached to the building or other building furnishings) may not be used to accomplish required artificial lighting.

PART 3 — EXECUTION

3.01 AMENITY & COMFORT

Provide illumination for all interior spaces that is adequate in level and quality for comfortable performance of tasks typical for each space, regardless of the availability of natural light.

- A. Light Levels: Provide maintained ambient luminance values for various activities that are within the ranges specified in the IESNA Lighting Handbook.
- B. Accent Lighting: In addition to general and task illumination, provide lighting on architectural features, displays, and artwork in focal areas to produce luminance's that are within the range of 5:1 with respect to ambient background.

C. Substantiation:

1. Design Development: Overall lighting scheme, including types of luminaires and lamps for primary spaces.

3.02 HEALTH & SAFETY

- A. Electrical Hazards: Design in accordance with all NFPA standards that apply to the occupancy, application, and design.
 1. Comply with NFPA 70 requirements for hazardous locations applications.
- B. Emergency Systems: Provide backup lighting for periods of normal power interruption, for the following:
 1. Systems and areas as required by Code.

3.03 OPERATION & MAINTENANCE

- A. Capacity: Design lighting to deliver required illumination while operating within intended ratings.
- B. Power Consumption and Efficiency:
 1. Comply with requirements for energy efficiency of lighting in ASHRAE 90.1
- C. Allowance for Change and Expansion:
 1. Spare Capacity: 10% minimum.

END OF SECTION — 26 50 00 — Lighting

END OF DIVISION — DIVISION 26 — Electrical

DIVISION 27 COMMUNICATIONS

SECTION 27 00 00

TELECOMMUNICATIONS — GENERAL PERFORMANCE

PART 1 — GENERAL

1.01 SUMMARY

Provide telecommunications services in conjunction with the referenced manual MDF- IDF Communications Room Voice – Data - Video Cabling Standard (supplied as part of the RFP). Comply with all applicable requirements of General Requirement and other MEP services. Where telecommunications elements also must function as elements defined within another element group, meet the requirements of both element groups.

1.02 SCOPE OF TELECOMMUNICATIONS

Telecommunications services comprise:

- A. Voice and Data — Infrastructure for voice, data transmission and telephone equipment. Each data outlet shall contain a port for telecom, printer, and network.
- B. Sound Reinforcement — Public address and music systems.
- C. Television — Distribution, reception, and equipment.

1.03 REFERENCED STANDARDS

- A. OMD MDF/IDF Communications Room Voice-Data-Video Cabling Standard
- B. NFPA 70 — National Electrical Code
- C. NEMA 250 — Enclosures for Electrical Equipment
- D. ASHRAE 90.1 — Energy efficiency requirements for electrical equipment

1.04 LIFE SPAN

- A. Telecommunication Systems: 10 years, minimum.

PART 2 — PRODUCTS

2.01 SYSTEM ENCLOSURES

- A. Enclosures: As required to protect equipment from environment in which it is installed, complying with NEMA 250.

PART 3 — EXECUTION

3.01 HEALTH AND SAFETY

- A. Design per all applicable NFPA standards; NFPA 70 for hazardous location compliance.
- B. Control access to spaces housing electrical/telecom components; allow access only by qualified personnel.
- C. Emergency Power: Provide for entire building.

3.02 CAPACITY AND EXPANSION

- A. Arrange wiring and protective devices so that outages caused by local faults do not affect unrelated areas or systems.
- B. Main Telecommunications Panel: one per building.
- C. Branch Panels: one per tenant unit, located inside unit.
- D. Spare Distribution Capacity: 10% minimum.
- E. Future Distribution Capacity: 20% minimum.
- F. Comply with ASHRAE 90.1 energy efficiency requirements for electrical equipment.

3.03 TESTING

- A. Construction: continuity testing of wiring systems prior to functional performance testing; functional performance testing.

END OF SECTION — 27 00 00 — Telecommunications — General Performance

END OF DIVISION — DIVISION 27 — Communications

DIVISION 28

ELECTRONIC SAFETY AND SECURITY

SECTION 28 00 00

CYBERSECURITY OF FACILITY-RELATED CONTROL SYSTEMS

PART 1 — GENERAL

1.01 SUMMARY

Where platform IT systems are provided — including fire alarm, mass notification, building automation, and others — design specifications must comply with UFGS 250511 for each facility-related control system. The State is advised to coordinate with the State G6 to determine the applicable Confidentiality-Integrity-Assurance (C-I-A) rating for each system. Refer also to Division 13 for mass notification antiterrorism requirements and Division 28 for electronic security systems.

1.02 REFERENCED STANDARDS

- A. UFC 4-010-06 — Cybersecurity of Facility-Related Control Systems
- B. UFGS 25 05 11 — Cybersecurity of Facility-Related Control Systems

PART 2 — PRODUCTS

2.01 NOT USED

PART 3 — EXECUTION

3.01 IMPLEMENTATION

- A. Provide a design specification based on UFGS 250511 for each facility-related control system.
- B. Evaluate and harden all platform IT systems for cybersecurity compliance.

END OF SECTION — 28 00 00 — Cybersecurity of Facility-Related Control Systems

SECTION 28 13 00

ACCESS CONTROL

PART 1 — GENERAL

1.01 SUMMARY

Provide a security control system capable of monitoring, detecting, and controlling access to the Site, facility, and high-secure zones. Comply with all applicable requirements of General Requirements and Special Construction. Refer to Division 13 for arms vault electronic security infrastructure requirements.

1.02 NON-INSTALLED EQUIPMENT NOTE

NOTE: Electronic security systems (except infrastructure) are classified as non-installed building equipment (proponent costs) and cannot be funded with construction funds. Coordinate all non-AA&E ESS requirements with the ARNG ESS Program Manager. Infrastructure supporting electronic security systems may be funded with construction funds.

1.03 TRAINING

- A. Provide training in operation, maintenance, and programming of the security control system for the Owner's Designated Personnel. Training shall conform to, and include, the following:
 - 1. Provide 16 hours of training for Owner's designated operating personnel.
 - 2. Students shall be provided with binder containing product and system specific training modules for system installed. Minimum of one copy per student plus one extra copy.

PART 2 — PRODUCTS

2.01 ACCESS CONTROL SYSTEM

- A. Provide a keyless entry system compatible with proximity HID cards and Government-Issued Common Access Cards (CAC) to control entry at the main entrance and all exterior entry doors. The system shall be expandable to cover interior doors. The access control system shall be a fully distributed processing system so that information including time, date, access credentials, access levels, and other similar data is managed and authenticated through the Genetec Security Center platform in accordance with DoD network and Public Key Infrastructure (PKI) requirements. The system shall be Genetec Security Center, which is certified compatible with DoD networks and infrastructure.
- B. Provide a badging station including a badging printer and supply of cards. A standalone computer is not required; the Genetec platform shall integrate directly with the DoD network, utilizing network-connected workstations already provided under the project or by the Government.
- C. The fully distributed processing system shall manage and authenticate access credentials, access levels, and time/date parameters via the Genetec Security Center platform over the DoD network. All hardware and software shall be configured and licensed for DoD network compatibility.

2.02 INTRUSION DETECTION SYSTEM

- A. Provide intrusion detection for all areas deemed high-secure zones per Section 0600 Project Program.
- B. Intrusion Detection System shall be compatible with the security system currently in use by OMD Electronic Security System (ESS).

2.03 MANUFACTURER / SYSTEM

- A. System must be fully operable during emergency conditions including but not limited to power outages.
- B. Security control system shall be designed, installed, commissioned and serviced by factory trained employees of the security control system manufacturer.
- C. Materials and equipment shall be catalogued products of manufacturers regularly engaged in production and installation of automatic temperature control systems. Materials and equipment used shall be standard components, regularly manufactured for this and/or other systems and not custom designed especially for this Project. Systems and components shall have been thoroughly tested, proven in actual use for at least two years, and shall be manufacturer's latest standard design that complies with specification requirements.
- D. Security control devices and installation shall be warranted to be free from defects in workmanship and material for a period of one year from date of job acceptance by Owner. Any equipment, software, or installation found to be defective during this period shall be repaired or replaced without additional expense to Owner. Factory authorized warranty service shall be available on site within 60 minutes of a call for service.
- E. MANUFACTURER - Security control system components and architecture shall be manufactured by **Genetec**. (See Attachment for more information on system DB is to provide.)
- F. Badging Computer System Requirements, (latest edition of the items):
 - 1. One Amazon Basics 60-inch Tripod
 - 2. One Sony HDR – CX240 / B Full HD 9.2 MP CamCorder 27x2 7 LCD
 - 3. Tennesco – 7224 – Standard Storage Cabinet.
 - 4. One Startech USB 2.0 Video Capture Cable SVID2USB232
 - 5. One Transcend Memory 2GB Micro SD card TS2GUSD
 - 6. One Startech USBFAB 6ft White
 - 7. One Belkin 3' USB A/A M/F Ext Cable
 - 8. HID Fargo DTC4500e dual Side Card Printer
 - 9. HP – LaserJet M401 – Laser Jet Printer
 - 10. HP – M283FDW – Laser Jet Printer
 - 11. One Genetec Badging License, pack sized to cover the doors plus expansion.
 - 12. HID Cleaning Kit 086177
 - 13. HID ECO YMCKO print ribbon 045200
 - 14. Printable Badge Cards quantity 500.
 - a. Manufacture: HID
 - b. Part Number: 1386—ISOPROX II Card
 - c. Starting badge number: -----
 - d. Format Number:
 - e. Facility Code:

NOTE: No suitable substitutions. All equipment must come with a warranty that equals or exceeds the State of Oregon Purchasing contracts for equipment above. Submit your proposed list for approval, prior to ordering. This equipment will need delivered to the AGI-IT office to be inventoried, configured, and deployed to operate with our Lenel OnGuard system.

PART 3 — EXECUTION

3.01 INSTALLATION

- A. Provide remote access control system for receptionist to remotely unlock entry doors to allow public access to the facility.
- B. Provide point-to-point voice communication at building entries and service entries.
- C. Provide a PC central station with software designated as the main controlling PC of the security access system.
- D. Design drawings must include sufficient details for infrastructure requirements per ARNG ESS Program CIDS MILCON Infrastructure Typical Designs.
 - 1. Requests for equipment in addition to the standard ARNG ESS Program equipment selections must be reviewed and approved by the ARNG ESS Program Manager.

END OF SECTION — 28 13 00 — Access Control

SECTION 28 20 00

VIDEO SURVEILLANCE (CCTV)

PART 1 — GENERAL

1.01 SUMMARY

Provide a digital closed-circuit television (CCTV) surveillance system consisting of cameras, data transmission wiring, and a control station with its associated equipment to monitor the Site, Site perimeter, Site improvements, facility entry points, and secure areas. Comply with all applicable requirements of General Requirements.

1.02 TRAINING

- A. Provide training in operation, maintenance, and programming of the CCTV system for the Owner's Designated Personnel. Training shall conform to, and include the following:
 - 1. Provide 16 hours of training for Owner's designated operating personnel.
 - 2. Students shall be provided with binder containing product and system specific training modules for system installed. Minimum of one copy per student plus one extra copy.

1.03 RELIABILITY

- A. Statewide System - The CCTV system needs to be compatible with the current statewide CCTV system, including remote operation.
- B. The CCTV system must be fully capable during emergency conditions including but not limited to power outages.
- C. CCTV system shall be designed, installed, commissioned and serviced by factory trained employees of the CCTV system manufacturer.
- D. Materials and equipment shall be catalogued products of manufacturers regularly engaged in production and installation of automatic temperature control systems. Materials and equipment used shall be standard components, regularly manufactured for this or other systems and not custom designed especially for this Project. Systems and components shall have been thoroughly tested, proven in actual use for at least two years, and shall be manufacturer's latest standard design that complies with specification requirements.
- E. CCTV devices and installation shall be warranted to be free from defects in workmanship and material for a period of one year from date of job acceptance by Owner. Any equipment, software, or installation found to be defective during this period shall be repaired or replaced without additional expense to Owner. Factory authorized warranty service shall be available on site within 60 minutes of a call for service.

PART 2 — PRODUCTS

2.01 CCTV CAMERAS

- A. Site CCTV Cameras:
 - 1. The Site CCTV system should include pan tilt zoom ("PTZ") cameras.

2. The Site CCTV system should be capable of monitoring POV and military vehicle parking lots, all out buildings including but not limited to unheated storage, flammable materials, controlled waste, maintenance work bays, emergency generator pad, etc.
- B. Indoor CCTV Cameras:
 1. The facility CCTV system should include fixed cameras.
 2. The facility CCTV system should be capable of monitoring facility entry points, and high secure zones including but not limited to weapons vaults, and secure communications rooms.
- C. The installed CCTV system should consist of closed-circuit video cameras and a digital video recorder, connected by a high-speed electronic data transmission network to the owners' existing security management system.
- D. The installed cameras should have zoom and picture quality capabilities for providing face recognition of persons in a vehicle at all locations monitored by the CCTV system.
- E. The installed CCTV system should be capable of meeting performance requirements in both day and nighttime conditions.
- F. The installed CCTV system should be capable of meeting performance requirements in all seasons and extreme weather conditions consistent with this geographical location.

2.03 CONTROL AND MONITORING STATION

- A. Primary Station - Provide a primary monitoring station located in the new facility with four 13-inch color monitors. The monitoring station should include the ability to view all cameras as well as operate/control the PTZ cameras.

PART 3 — EXECUTION

3.01 INSTALLATION

- A. The Site CCTV system should be installed in a manner to eliminate obstructed view of the base entry, and surrounding area of new facility.
- B. The indoor facility CCTV system should be installed in a manner to eliminate obstructed view of all persons entering the new facility or high security zones.

END OF SECTION — 28 20 00 — Video Surveillance (CCTV)

SECTION 28 31 00

FIRE DETECTION AND ALARM / MASS NOTIFICATION

PART 1 — GENERAL

1.01 SUMMARY

Provide Fire Alarm and Mass Notification System per UFGS 28 31 76 (Addressable), UFC 4-021-01, and DG 415-5. Refer to Division 13 for antiterrorism mass notification standards, and Division 21 for fire suppression requirements. System is a platform IT system subject to cybersecurity requirements per Division 25.

1.02 REFERENCED STANDARDS

- A. UFGS 28 31 76 — Fire Alarm and Mass Notification System (Addressable)
- B. UFC 4-021-01 — Mass Notification Systems
- C. USACE ECB 2018-17 — Modifications to Army mass notification requirements
- D. DG 415-5 — General Facilities Information Design Guide

PART 2 — PRODUCTS

2.01 EQUIPMENT

Products shall be specified per UFGS 28 31 76. Refer to Division 21 for FACP requirements.

PART 3 — EXECUTION

3.01 IMPLEMENTATION

- A. Note USACE ECB 2018-17 modifications for visual appliance notification networks.
- B. Evaluate and harden the system for cybersecurity compliance per Division 25.

END OF SECTION — 28 31 00 — Fire Detection and Alarm / Mass Notification

END OF DIVISION — DIVISION 28 — Electronic Safety and Security

DIVISION 31 EARTHWORK

SECTION 31 00 00

SITE WORK — GENERAL PERFORMANCE

PART 1 — GENERAL

1.01 SUMMARY

Provide all modifications to the Site and Site improvements and utilities required for proper Project functioning as indicated in the Project program. Comply with all applicable requirements of General Requirements. Where Site elements also must function as elements defined within another element group, meet the requirements of both element groups.

1.02 SCOPE OF SITE WORK

Site work comprises:

- A. Site Preparation — All modifications to the Site and grades required for construction of new work and for proper functioning of the Project.
- B. Site Improvements — All elements required to provide finished and durable Site surfaces, indoor plantings, and outdoor improvements described in the Project program.
- C. Site Services — All outdoor and underground elements required to complete the design of services defined in Services.
- D. Other Site Construction — Miscellaneous site elements.

1.03 REFERENCED STANDARDS

- A. ASCE 7 — Minimum Design Loads for Buildings and Other Structures
- B. NFPA 1144 — Standard for Reducing Structure Ignition Hazards from Wildland Fire (most current edition)

1.04 SUBSTANTIATION

- A. Preliminary Design: Identification of types and thicknesses of paving and surfacing for various functions.
- B. Design Development:
 - 1. Site plans showing methods of achieving appearance requirements; renderings or sketches showing principal views described in requirements.
 - 2. Engineering design of any structural fills, if required.
 - 3. Engineering design of Site drainage, including drainage volume calculations.
 - 4. Documentation of the historical extremes and duration of extremes in temperature, rainfall, and drought periods; proven-in-use documentation on major plant groups to be

- used, under similar Site conditions in the same climatic region; length of time required for full establishment.
- C. Construction Documents: Engineering calculations, based on anticipated weights and intensity of traffic.

PART 2 — PRODUCTS

2.01 SITE SURFACING

- A. Preferred surface treatment: landscaping over paving; perennial shrubbery/ground covers over lawns; water-pervious paving over monolithic pavement.
- B. Provide paving or surfacing where vegetated surfaces will not withstand anticipated traffic.

2.02 LANDSCAPING AND PLANTING

- A. Use plants that will withstand extremes of weather likely to occur in any 5 years without supplementary irrigation and without seasonal protection other than mulch.
1. Owner agrees that maintenance to the level specified by the Design-Builder will be necessary to ensure survival of the plants.
 2. Exception: Supplementary irrigation is expected during new plant establishment period.
- B. Do not use materials attractive to or edible by animals, birds, or insects, unless access is prevented.

2.03 SITE FURNISHINGS

- A. Provide outdoor seating as described in the Project program and as follows:
1. Two (2) bench seats at each exterior door.
 2. Six (6) fixed tables with fixed seating at outdoor courtyard areas.
- B. Site Fixtures, Equipment, and Services:
1. Provide foundations or other mountings as required to support the completed and operational element permanently and safely and without uncontrolled subsidence or other movement.

PART 3 — EXECUTION

3.01 GRADING AND DRAINAGE

- A. Under substructure, paving, and Site structural elements, maintain natural bearing capacity or achieve compaction as required to prevent uncontrolled subsidence or other movement.
- B. Structural design per ASCE 7 where not otherwise required by Code.
- C. Control storm water runoff as required to prevent damage to Project elements, including vegetation, and to prevent damage to neighboring properties, including vegetation.
- D. Prevent storm water runoff into public utilities in excess of actual capacity or amount allowed by public agencies, whichever is less, under conditions of the most extreme rainfall that might occur in 100 years.
- E. Minimize increase in storm water runoff into rivers, streams, lakes, and other waterways and drainage ways as required by authorities having jurisdiction.

3.02 HEALTH, SAFETY, AND SLOPES

- A. Inhibit intentional driving of vehicles from roadways onto pedestrian and planted areas.
- B. Prevent access by unauthorized persons to areas containing electrical equipment with exposed powered components.
- C. Smooth pavement slopes: 1:10 maximum (unless restricted to vehicular-use only).
- D. Grass-covered slopes: 1:5 maximum (unless under 1m/3ft in height).
- E. Pedestrian-inhibiting vegetation slopes: 1:1 maximum (unless under 1.5m/5ft in height).
- F. Inaccessible from-the-top slopes: Limited only by structural stability and resistance to erosion.
- G. Fire Sources: Design to minimize the danger of wildfires spreading to the Site, by complying with most current NFPA 1144.
- H. Prevent and eliminate standing water that could become stagnant.
- I. Comply with Code for vehicular safety; provide visual barriers at extreme elevation changes near roadways; provide tactile warnings where pedestrian walkways cross or run adjacent to roadways.
- J. Design to minimize the probability of vehicular impact on Site fixtures and accidental driving on lawns and landscaped areas.
- K. Abuse resistance of buried components: Minimum of 300 mm (12 inches) below surface of ground.

3.03 AMENITY AND COMFORT

- A. Provide shelter from weather for minimum 20 people standing at entrances.
- B. Design to shield entrances from wind in all seasons.
- C. Fit new activities on Site to the topography, soils, and existing vegetation as much as possible.
- D. Make finished surfaces smooth and uniform in appearance, without depressions that collect water.
- E. Do not leave soil surfaces exposed in finished work; minimize exposure time of soil surfaces.
- F. Conceal unsightly Site elements from view from the street.
- G. Conceal from view from the remainder of the Site: trash collection/storage areas, utility yards, and vehicle maintenance areas.

3.04 EROSION AND TRAFFIC RESISTANCE

- A. Soil Erosion: comply with Code.
 - 1. Maintain the existing Site features that contribute to erosion resistance to the greatest extent possible.
 - 2. The present natural resistance to erosion is insufficient; take measures to improve the resistance to erosion.
 - 3. Design to minimize soil erosion.
 - 4. If erosion occurs during construction and within one year after completion, relocation or replacement of eroded soil and repair of eroded areas shall be performed by the Design-Builder at no cost to the Owner.

5. If erosion occurs within one year after completion, provide improved erosion control measures within one week after notification by Owner.
- B. Traffic Resistance: Provide finished Site surfaces that are permanently resistant to the type of traffic to be expected, under all weather conditions.
 1. Where vegetated surfaces will not withstand the anticipated traffic, provide pavement or other surfacing.
 2. If vegetated surfaces are damaged due to traffic within one year after completion, replacement of vegetation with more durable materials shall be performed by the Design-Builder at no cost to the Owner.
 3. Vegetation and fencing may be used to discourage pedestrian traffic, if other functional requirements can be met.

3.05 SNOW REMOVAL

- A. Design to facilitate removal of snow from vehicular and pedestrian traffic ways using mechanized equipment or automatic means wherever possible; where not possible, design to minimize the effort required to use manual snow removal methods.

END OF SECTION — 31 00 00 — Site Work — General Performance

END OF DIVISION — DIVISION 31 — Earthwork

END OF PERFORMANCE SPECIFICATIONS — SECTION 0700

All sections apply to the Design-Build Contractor (DBC). Requirements within each division cross-reference and supplement one another. In cases of conflict, the more stringent requirement governs.
