

UNIVERSITY OF MAINE SYSTEM DESIGN CRITERIA

1.0 Introduction. The word Designer, as hereinafter used, shall mean Architect or Engineer.

The Designer shall adhere to the following design criteria as appropriate:

1.1 The Designer shall adhere to all federal, state and local laws, codes and statutes relative to building design and construction. The University does not intend to list all pertinent laws, codes and statutes, but will outline below some relevant to design of University facilities along with other University design and construction requirements.

1.2 Accessibility. The entire design shall comply with Federal Section 504 Requirements of The Rehabilitation Act of 1973, the Americans with Disabilities Act (ADA), and the Maine Human Rights Act. The design of the project shall comply with the currently adopted ANSI Standard A117.1 and ADA Accessibility Guidelines for Buildings and Facilities. Under current State Law, the Designer must submit a certification of compliance with the State Accessibility Law prior to the project being advertised.

Specific issues Designer should consider:

- .1 One main entrance door on the exterior door set shall have power-assisted door opener activated by a push-plate wall switch.
- .2 Power door opener shall be of a type which is activated only on demand; it must not be the type that assists users without having to push the wall plate.
- .3 For the inner exterior door set, either all closers shall be set at or below the ADA push force maximum or one interior vestibule door will be equipped with a power-assisted opener in the same manner as a main entrance door. In this case, separate push plate circuits and switches shall be used for the exterior door and the inner vestibule door or the doors shall be equipped with a time delay sequencing the exterior and interior door actuators.
- .4 Decision to have a power door on the inner vestibule door set will be provided to the Designer by the Project Manager.
- .5 Provide all specified door and related hardware to conform to current requirements of the Americans with Disabilities Act (ADA). This includes being certain that no twist locking mechanisms are specified, such as on the insides of any room doors. An example of an acceptable locking mechanism for doors is Schlage XL11-800, or its most recent successor.
- .6 All room locks or latch sets shall have lever operators or be a panic hardware type. The level operator on doors to hazardous areas such as mechanical rooms, electrical switch rooms, loading platforms, or other similar type locations shall have tactile warning on lever operator even though door may be permanently locked.
- .7 Each multi-stall toilet room shall have one stall which complies with Figure 30(a) in ANSI A117.1 for size, fixture layout and grab bar location. No toilet partition latch shall require a twist motion to operate.
- .8 All doors using closers must provide side clearance on the push side of at least 12”.
- .9 All multi-story buildings shall contain an elevator meeting accessibility standards. The elevator cab shall contain a hands-free telephone. Telephone must connect to a location which is monitored on a 24-hour basis. The elevator car shall also contain an emergency light and an emergency alarm, each of which must be powered by not only normal building power but also an emergency power source which is automatically available upon failure of normal power to the elevator cab.
- .10 All stairs must have accessible handrails on both sides that run out at top and bottom, as well as all required “guards.”

- .11 Where platform lifts are to be installed, ensure conformance with Maine rules regarding two-way communication devices.

Plans must be reviewed to assure coordination between architectural, mechanical and electrical plans to assure requirements of different portions of the total project design do not compromise the accessibility design. Where conflicts are identified, the design must be adjusted to assure full compliance with ANSI A117.1 or the ADA Accessibility Guidelines, whichever is most stringent.

1.3 Carbon Monoxide in Residential Facilities. Designer must comply with requirements outlined in Maine Law H.P. 1286 – L.D.1744 regarding installation of CO monitors in new construction of residential facilities.

2.0 Entrance & Exit Design. Design must consider the following and be discussed with the Project Manager:

- .1 Effect of wind on doors.
- .2 Need for hold-open stops.
- .3 Type of floor required. (e.g. water control, dirt control, surface traction, etc.)
- .4 Handicapped access requirement.
- .5 Draft control inside building.
- .6 Full-depth frost footing below entry slabs, in part to prevent heaving that could interfere with door operation.
- .7 Knox Box to be located near main entrance as coordinated through the Project Manager.
- .8 Contract Documents must clearly delineate responsibility for wiring of exterior door openers and operating switches.

3.0 Blasting. Specify that General Contractor shall establish a process to identify and plan for blasting, including controls to prevent ancillary damage. Blasting plan must be submitted to Project Manager and no blasting shall occur prior to written approval from the Project Manager.

All blasting shall be specified using the following MasterFormat numbers as appropriate:

- | | |
|----------|----------------------|
| 31 39 00 | Rock Blasting |
| 31 39 13 | Trench Rock Blasting |
| 31 39 16 | Open Rock Blasting |

4.0 Waste Management. The Owner is committed to a resource management strategy which reduces to a minimum the production of waste material while reusing, recycling or composting as much as possible of the remaining materials. Design should strive to identify opportunities to reduce, reuse or recycle waste from renovations or new construction. In an effort to promote environmental sustainability, the Owner requests the inclusion of specifications that encourage the recycling and reuse of materials associated with construction and demolition.

5.0 Sustainability & Energy Conservation. Board of Trustees policy requires that the University design and construct facilities in a manner that encourages environmental responsibility and promotes sustainable development on campus properties and in local communities (<http://www.maine.edu/about-the-system/board-of-trustees/policy-manual/section1002/>).

- .1 By Board of Trustee policy and Governor’s Executive Order, the selected design firm will be required to design to green standards compliant with Executive Order 27 FY11/12 when applicable and cost-effective. The Architect will use LEED standards whenever possible and will keep an accurate accounting of each area of energy conservation concern, with annotation indicating how LEED standards are used or why they were not included.

For more information, go to <http://www.usgbc.org>.

- .2 New construction or substantial renovation must conform to ASHRAE Standard 62-2001 and ASHRAE Standard 90.1-2001 or current accepted version under any of the compliance methods specified in the standards. For the purpose of this section, “substantial renovation” means any renovation for which the cost exceeds 50% of the building’s current value prior to renovation; see Title 10 MRSA 1415-D

Mandatory Standards for Commercial Construction, as amended. In addition, design should have an energy-use target that exceeds ASHRAE 90 by at least 20%; see Title 5 MRSA 1764 Life-Cycle Costs, as amended.

- .3 The Architect shall prepare a Life Cycle Analysis as required by Title 5 MRSA 1762 No Facility Constructed Without Life-Cycle Costs, as amended, which states (in part):

“No public improvement constructed or substantially renovated in whole or in part with public funds or using public loan guarantees, with an area in excess of 5,000 square feet, may be constructed without having secured from the designer a proper evaluation of life-cycle costs, as computed by a qualified architect or engineer. The requirements of this section with respect to substantial renovation shall pertain only to that portion of the building being renovated. Construction shall proceed only upon disclosing, for the design chosen, the life-cycle costs...and the capitalization of the initial construction costs of the facility or building. The life-cycle costs shall be a primary consideration in the selection of the design...”

Any life-cycle costs must include:

- The reasonably expected energy costs over the life of the building, as determined by the Architect, that are required to maintain illumination, power, temperature, humidity and ventilation, and all other energy-consuming equipment in a facility;
 - The reasonable energy-related costs of probable maintenance, including labor and materials, and operation of the building, replacement costs over the expected life of the facility, and any other ownership cost issues identified by the University; and,
 - A comparison of energy-related and economic-related design alternatives. The University may direct the Architect to select, include and develop life-cycle costs for any viable alternatives that should be considered.
 - The Life Cycle Analysis must be coordinated with appropriate LEED criteria. The Final report shall include an executive summary highlighting the analysis. The Architect shall submit during preliminary design phase a preliminary life cycle cost analysis to be reviewed with the University.
- .4 Maine law (Title 5 MRSA 1762-A Water Conservation in State Facilities, as amended,) requires all University facilities to be constructed with water conserving fixtures. All designs shall incorporate fixtures meeting Maine law, unless a lower flow rate is required by the University and communicated in writing.
- .5 Maine law (Title 5 MRSA 1769) requires all University owned exterior lighting fixtures having an output greater than 1,800 lumens to be full cut-off type which allow no direct light emission above a horizontal plane through the luminaries’ lowest light-emitting point.

6.0 Utility Lines. In general, the Owner owns and maintains all above and below ground utility lines on University campuses. Any connections made by a Contractor to utility lines must receive prior approval. All connections shall be inspected to meet all applicable standards, and approved by the Owner upon completion and prior to backfilling. Design documents must identify responsibility for all required connections to site utilities.

6.1 Water Meters. Water meters are required in all buildings. Water meters shall be the same size as the distribution main on all sizes up to and including 2”. Larger mains shall be served by multiple 2” meters or larger single units as determined by the Owner.

6.2 Electricity. Electric meters are required in all University buildings. Meters should have a multiplier of 1, 10 or 100. Where secondary metering is provided by local utility, metering requirements will be in accord with utility requirement.

Where primary service exists on campus, the Owner normally will provide the primary service to the transformer vault or transformer pad mount including the installation of necessary transformers and primary switching. The Designer shall specify in the transformer vault, or at the transformer pad mount, ground rods and necessary ground cable for the grounding of the primary power. Secondary power for buildings will normally be 120/208 or 277/480 volt 3 phase, 4 wire.

Designer shall ensure design documents state at what date and time the Owner will provide electrical service during the construction project.

Any electrical outlet that is placed within 6 feet of a water source shall be a GFI-protected outlet. Design requirements are as required under OSHA's Electrical Standard 29 CFR 1910.303(b)(1) as enforced by the Maine Bureau of Labor Standards and the National Electric Code, NFPA 70.

6.3 Heating. Coordinate with the Project Manager to provide heating and fuel storage systems to meet the campus needs. All above ground oil storage system designs must be engineered to ensure secondary containment of the stored materials is available in the event of failure of primary containment system.

- .1 At UMaine's Orono campus and USM's Portland campus, most buildings are heated from a central steam heating plant with distribution pressures as follows: UMaine: 50psi Steam. USM-Portland: 15psi Steam.
- .2 At USM's Gorham campus, most buildings are heated from a central hot water plant with water circulated at 300 degrees at 300psi.
- .3 Other campuses have individual, low pressure building heating systems using either hot water or steam.
- .4 Designer shall ensure design documents state at what date and time the Owner will provide heating service during the construction project on campuses with central heating plants.
- .5 Where a campus is served by a central energy management system, the design of the heating, ventilation and air-conditioning system shall make provisions for interconnection with this system.

6.4 Gas. Increasingly, University campuses are being connected to gas pipelines, connection to which should be included in the work of the Contractor. However, when gas service will be from a bulk LP tank, the Owner shall determine if there is an existing bulk tank of sufficient size in the vicinity of the proposed building so that another tank is not required or if a new tank is required to serve the new facility and any adjacent buildings. If a new tank is required, it shall be installed and connected as part of the construction contract. Connections to existing tanks may be part of the contract if it is in the best interest of the Owner.

6.5 Temporary Utility Service. Arrangements for any temporary utility service must be coordinated with the Owner. The cost of the installation of the temporary service will be charged to the Contractor, who will be charged for the quantity of the utility used at cost. Temporary service shall meet all applicable standards.

Steam or hot water for temporary heat may be provided to the Contractor at no charge when the permanent construction is completed and if it is in the best interest of the Owner to provide the heat.

7.0 Room Numbering. The assignment of room numbers on construction documents for individual rooms shall be coordinated with the Owner so that Room Numbering is in accord with the University Standard System, as described below. The Designer shall assign room numbers prior to completion of preliminary design and verify the room numbering with the Project Manager prior to numbering of the rooms on the drawings.

UMS FACILITIES ROOM NUMBERING SYSTEM

The following system is established for numbering rooms. This system is a general guide and will not preclude variations for special reasons. The following definitions will aid in the use of the system:

Basement – A floor below grade with no entrance at grade.

Ground Floor – A floor which is below grade on at least one side but has an entrance at grade on at least one side.

First Floor – Normally the main floor of a building. This floor will have entrances at or above grade.

Mezzanine – A partial floor level between two normal floor levels.

All numbers must use a three-digit format and are reserved for each level according to the following schedule:

Basement or Ground Floor	000 – 049
Basement Mezzanine	050 – 099
First Floor	100 – 149
First Floor Mezzanine	150 – 199
Second Floor	200 – 249
Second Floor Mezzanine	250 – 299
Third Floor	300 – 349
Third Floor Mezzanine	350 – 399

The numbering starts on the North or West end of a building with the odd numbers on the west or south side and the even numbers on the east or north side. Where there are interior rooms with corridors on each side of the building, the odd numbers shall follow the west or south corridor and the even numbers the east or north corridor.

Rooms which open onto two levels, such as sloped floor lecture rooms, shall be numbered according to the floor from which the most common entrance would be made.

Rooms which open off another room with no entrance from the corridor will carry the room number from which the entrance is made plus a letter designation.

Numbers may be omitted so that rooms across the corridor from each other can carry numbers nearly in sequence.

Unique unassigned spaces are to be identified in the following manner:

Telecommunications rooms: number plus letter “T,” 104T.

Electrical vaults: number plus letter “X,” 175X.

Coordinate room numbering so that all plans, panel directories and valve tags show final, appropriate room numbers.

8.0 Historic Preservation. If this agreement involves a structure listed in the National Register of Historic Places or a structure within a designated historic zone, its design and implementation shall be done in compliance with the U.S. Secretary of the Interior’s Standards for Rehabilitation as applicable. Plans for such projects shall be made available by the Architect to the Maine Historic Preservation Commission for the Commission’s review and comment. Projects to which this section applies may be exempted from the provision only if done so explicitly in writing by the Owner.

9.0 Keying Systems. All locks will be keyed using one of the University GGMK systems. Keying requirements, including electronic entrance controls, will be coordinated by the Project Manager. All permanent building keys should be shipped directly to the University by the hardware supplier.

Construction master keying system should be used during construction. At the time of building acceptance, the Owner will arrange for appropriate action to remove individual lock cylinders from the “construction keying system.”

10.0 Facilities for Custodial Services.

- .1 Provide a central area for receiving and storing cleaning supplies, ladders and equipment in each facility.
- .2 Provide a lockable storage area keyed under building master, in which can be stored spare parts for the building. This area may be one corner of a larger storage room (but not part of a mechanical, electrical or boiler room or a means of egress such as under stairs) with wire security partition around it. Spare parts should include: ceiling tile, resilient floor tile, ceramic tile items, glass, wall fabric, carpet, plus some mechanical and electrical parts such as steam trap elements, fan belts and filters, fuses, etc.
- .3 The design shall include enclosed area(s) for collection and storage of recyclable materials and waste as deemed necessary by the Project Manager. The design will address the following:
 - a. Space that is both easily accessible and adequate to accommodate storage of materials between pickups by personnel. The space should be dedicated.

- b. Convenient internal access for depositing of materials by custodians or building occupants.
 - c. Convenient external access for pickup of materials by Waste Management/Recycling personnel.
 - d. Protection of materials from weather.
 - e. Specific needs prompted by campus Waste Management/Recycling Shop procedures.
- .4 Provide for an area for normal accumulation of non-recyclable trash to be hauled away.
- .5 Provide a custodial closet on each floor with either a mop receptor or a deep sink.

11.0 IT/Telecommunications. Coordinate with Project Manager to provide telecommunication and IT spaces and service meeting campus needs and standards. Prior to initiating the HVAC design, the Designer must obtain from the Project Manager written instructions for specific HVAC requirements in these spaces. Utilize Communications specification section 27 00 00 as provided in Appendix B.

12.0 Roof Design. Roof surfaces shall slope a minimum of 1/4 inch per foot to drain. Interior drains shall be recessed below adjacent roofing. Interior drain piping shall be insulated to reduce sweating. Unless otherwise directed by the Owner, low slope roofing shall be EPDM and steep roofing shall be heavyweight asphalt shingles or metal.

13.0 Laboratories. Any installations of or modifications to laboratory spaces require special attention to standards that address the potential indoor air quality and hazardous materials normally associated with laboratories. At a minimum, the Owner requires designs to adhere to *ANSI/AIHA Z9.5-2003, Laboratory Ventilation* and *NFPA-45-2002, Standard on Fire Protection for Laboratories Using Chemicals*. Where laboratory fume hood installation, modification or modification of the ventilation systems for a laboratory occurs, Designer shall include acceptance testing in the contract using *ANSI/ASHRAE 110-1995 Method of Testing Performance of Laboratory Fume Hoods* or most current version.

14.0 Subsurface Investigation. The Owner will provide the Designer with necessary boring data, test results and soils reports as soon as possible after receiving a request from the Designer as to type and extent of information required. The Designer should request from the Owner additional soils information if the Designer believes the soils information is insufficient to properly design the facility.

15.0 Lot Lines and Grades. The Owner will establish a base line where necessary to properly locate the building. The Owner will also establish a Bench Mark convenient to the site for use by the Contractor.

16.0 File Sub-Bids/Bid Depository. In most cases, for projects with an estimated cost in excess of \$1,000,000, Maine Bid Depository services are to be used. The Owner, through the Project Manager and the Designer, shall decide which sections shall be "File Bid." The Designer shall contact Associated Constructors of Maine to reserve a date for use of the Bid Depository. The date should be no less than five (5) days prior to the scheduled date for submission of base bids.

17.0 Tests. All design tests or controls deemed necessary by the Designer should be discussed with the Project Manager to determine arrangement and payment responsibility within the project. The Designer should provide a checklist of all testing requirements along with a list of parties responsible at the preconstruction meeting.

18.0 Training. All project manuals shall have a requirement that the Contractor provide a training session for University maintenance employees on operation and maintenance of building systems. These training sessions shall provide special emphasis on mechanical, electrical, control, life safety, communications, and owner operated systems.

These training sessions shall also be attended by the design professional responsible for the system design. The length of the training session should be determined by the complexity and extent of the building system with a minimum training session allocation being two hours. The most critical parts of the training session should be videotaped for future use by the University.

19.0 Specific Drawing Requirements.

- .1 Structural drawings or floor plans shall show design live load for each floor and roof.

- .2 Lighting plans shall show design lighting levels for each room.
- .3 Coordinate room numbering with Owner so plans show final, appropriate room numbers.
- .4 The Designer shall provide to the Owner at the completion of the work documents as outlined in AIA B201 2017 Article 2.7 Closeout Services.

APPENDIX B
SECTION 27 00 00
COMMUNICATIONS

PART 1 GENERAL

1.01 DESCRIPTION

- A. All cabling for voice and data will be CAT6. The general building contractor shall provide Inside Plant (ISP) pathways, which may include accessible utility corridors, finished and exposed metal cable tray or ladder, enclosed conduit, duct, or raceway including pull ropes to allow the installation of cable. Junction boxes shall be provided to allow installation of termination jacks at each station. The general contractor shall provide dedicated building closets, equipment backboards, wire management supports, termination racks, a grounding system, and an Outside Plant (OSP) conduit with pull ropes from the Building Distribution Frame (BDF) to nearest manhole.
- B. US:IT will refer to the cable, which carries Telecommunications System signals, either integrated voice/data or voice only signals, as “voice” cable, i.e. voice riser, voice station cable.
- C. ISP/OSP bid submittals shall include all costs for construction material, labor and any other items required for ISP/OSP installation.
- D. The Contractor will be responsible for implementing all ISP/OSP per the design layout and specifications in its proposal. The design of all pathways and hardware shall allow for a 50% growth in capacity. This responsibility includes installation and termination of all ISP/OSP cabling to their proper equipment.
- E. Particular consideration is to be given to the restoration of penetrated fire and smoke stop partitions and floor slabs to their original condition or to current fire code standards, whichever is greater.
- F. The Contractor shall furnish blueprints, schedules and other technical data in order to illustrate to US:IT the intended method of installation. These shall define material type, path and concealment methods, distribution cable quantities, and room or wall space requirements. This information will be submitted prior to starting any portion of work and is subject to the approval of US:IT department.

1.02 DEFINITIONS

- A. Inside Plant (ISP) is defined as intra-building distribution of cable media such as riser cable both fiber and copper coax, station cable, station jack hardware, Intra building Distribution Frame (IDF) terminals, sleeves, conduit, raceways, distribution frame hardware, etc. All other physical plant such as grounding, power, conduit, and raceway not considered OSP are part of the ISP.
- B. Outside Plant (OSP) are all facilities used to support inter-building connections, including (but not limited to) copper, fiber and coaxial cable, splices, terminators, pairs protection, grounding systems, ducts, conduits, manholes, and all related outside infrastructure. Also included are Main Distribution Frames (MDF) and Building Distribution Frames (BDF).
- C. Voice Cable – Cabling, which carries Telecommunications System signals, either integrated voice/data or voice only signals, i.e. voice riser, voice station cable.
- D. Data Cable – Cabling, which carries data communications signals, i.e. data riser, data station cable, data fiber.
- E. Video Cable – Cabling, which carries video or TV communications signals, i.e. video riser, video station cable, video coax.

- F. Approved contractor – The bidder shall be Cat 6 certified. Also, must have a minimum of 5 years telecommunications/data installation experience. Cabling technicians must be certified installers. No more than one helper per certified installer. Certification of technicians must be shown if requested.

1.03 REFERENCES

- A. All work shall meet all applicable codes and standards.
 - 1. National Fire Protective Assoc. (NFPA) 70.
 - 2. Building Industry Consulting Service International (BICSI) Standards.
 - 3. National Electrical Manufacturers Assoc. (NEMA) Standards.
 - 4. Electronics Industry Assoc./Telecom. Industry Assoc. (EIA/TIA).
 - 5. US:IT requirements.

PART 2 PRODUCTS

2.01 OSP – DUCT SYSTEM

- A. The Contractor shall be prudent in the design and installation and use of all available industry techniques to fully utilize individual ducts or raceways and avoid using existing spare ducts or raceways where feasible.
- B. Each duct bank shall consist of three 4” conduits to each building. The duct bank sizing reflects the installation of video coax, data fiber, and voice cable. Contractors shall install Type C (Carlson 68515WH) and industry approved fittings. One 1¼” three cell maxicell shall be installed in one 4” conduit.
- C. Where sharp bends or turns are required, prefabricated fittings will be used unless such bends or turns prohibit the pulling of large cables. In such cases, manholes or hand holes shall be installed.
- D. Rigid conduit will be used where ducts run under roadways. Where conduits are installed in concrete slabs or where the minimum required depth is not feasible. All 4” Rigid conduits will extend a minimum of 10’ past the outside wall and attach to ducts feeding the building.
- E. The duct systems shall be sloped to permit penetrating water to drain towards the manhole(s). The highest point of the duct array will be at the building entry point. All duct systems will be marked with the appropriate marking tape on top. There must be a minimum of 4 inches of sand above the conduits before backfilling.
- F. All unused ducts shall be provided with removable conduit plugs or equivalent for waterproofing and protection. All ducts shall be cleaned of earth and debris, and equipped with minimum 200-pound strength pull rope.
- G. All cables entering ducts shall be sealed according to industry standards and provide a watertight seal.

2.02 MANHOLES AND HAND HOLES

- A. New manholes shall be reinforced concrete construction, cast-in-place or pre-cast, and must meet industry standards for telephone manholes.
- B. The manholes/hand holes sizes shall be a minimum of 4’ x 4’ x 4’, up to a maximum of 6’ x 12’ x 7’ (see manhole/conduit drawings for manholes sizes and locations).
- C. A PVC water barrier shall be installed at each construction joint.
- D. Maximum distances between manholes and from manhole to buildings shall not be great than 600 feet for a run containing an aggregate of a 45-degree bend and 400 feet for runs having an aggregate of a 90-degree bend.

- E. On straight sections maximum distance between manholes shall be no greater than 600 feet.
- F. Manhole lids will be permanently marked with the word “Telecom” or “Communications.”
- G. Each manhole must have an integral 7/8” inch steel ring 6” diameter as part of the manhole structure. A 12-inch circular sump hole must also be included at the lowest point in a manhole.
- H. All manhole covers must meet industry standards for vehicular traffic loads.

2.03 TRENCHING, BACK-FILLING AND RESTORATION OF GROUNDS

- A. Trenching shall be done using trenching machines or backhoes and supplemented by hand excavation where required in order to avoid utility disruption.
- B. Ducts shall be placed on top of four inches (4”) of sand bedding at the bottom of each duct run. An additional four inches (4”) of sand shall be placed around and between ducts. A final four inches (4”) of sand shall be placed on top such that an aggregate of twelve inches (12”) exists from the floor of the duct trench and the top of the last four inches (4”) of sand.
- C. Below finished grade, just on top of the final layer of sand, and offset from the center of the duct bank, the Contractor shall place one (1) continuous plastic marking strip labeled “Communications.”
- D. Gravel backfill shall be used in paved areas and earth shall be used in lawn area. Backfill shall be free of large stones of 3” in diameter or greater.
- E. All backfill materials shall be compacted 95%.
- F. The Contractor shall repair all the University grounds and property to their pre-construction condition using materials of same or better quality. This includes, but is not limited to, re-paving, re-seeding, walls, fences, landscaping, utilities, signs, painting, curbing, etc.
- G. Bituminous materials should be used where necessary for repairing roads, parking areas, and footpaths. The materials shall be provided in two (2) courses: two 2” binders and a 1” surface course. All existing paths and roadways of greater depth shall be repaired to match existing materials and depths.
- H. US:IT reserves the right to inspect all materials to be used in the process required in this section on trenching, backfilling, restoration of grounds, and to demand changes in type and quality in order to meet US:IT standards. Such changes will be at the Contractor’s expense unless US:IT requires materials of a higher quality than originally required by this document. In all cases concerning determination of “original condition”, US:IT will be the judge and have final approval.
- I. Trench depth, from the bottom of the trench to the top of finished grade will be three feet, eight inches (3’ 8”) under pavement, and two feet, two inches (2’ 2”) under finish grade.

2.04 CABLE IDENTIFICATION AND LABELING

- A. After final acceptance, Contractor will prepare and submit cable OSP drawings. These site drawings will be supplied on reproducible materials, and the Contractor will add its distribution system and show at a minimum:
 1. Exact route of total outside plant including trenching routes.
 2. Depth of cable trench.
 3. Locator coordinates measurements from cable location to nearest building.
 4. Cable number, cable pair count, wire gauge, cable lengths, and cable types of every OSP copper, coax and fiber cable included in the system.

2.05 OSP CABLE SIZING

- A. Contractor will design an OSP that is complete.
 - 1. **All** OSP pairs must be terminated in Northern 191 or CIRCA #2200B-100 fuse protectors.
 - 2. **All** fiber cable shall be Hitachi 12 multi-mode 62.5/125 and 12 single-mode fibers or as specified.
 - 3. **All** cable shall be rated for outside usage in duct systems.

2.06 CABLE TYPE, SPLICES AND PROTECTION

- A. All Copper cable used in OSP shall be waterproof with moisture and heat resistant properties up to 125 degrees, Gel-Filled Core Duct/Direct Burial type, with a Metal Clad composition. All wire shall be Twisted Pair type PE89 jelly filled 24 AWG solid copper cables.
- B. All splice connections in manholes shall be placed in re-enterable waterproof closures and sealed according to manufacturer's specifications. All splices shall be made with 3M modular connectors (4000-D) and enclosed in "Preform" enclosures.
- C. All OSP will be properly grounded according to NEC Codes and BICSI Standards, and Local Codes and industry standards. All ground connections are subject to the inspection and approval of the US:IT, as well as State and Federal Inspectors.
- D. All OSP will be enclosed in conduit or raceway where appropriate, such as required by Fire Codes, exposed to steam pressure relief valves, or in public areas.

2.07 ADMINISTRATIVE AND ACADEMIC BUILDING OSP DATA FIBER SIZING

- A. Fiber cables shall be pulled to the BDF.
- B. All fiber cables shall be properly terminated at the BDF.
- C. In the fiber installation there will be no splices in the fiber cable, other than those at termination points.
- D. All fiber cable shall be Hitachi 12 multi-mode 62.5/125 and 12 single-mode fibers or as specified.

2.08 OSP – VIDEO CABLE SPECIFICATIONS

- A. All video cables for OSP will be Hitachi single-mode fiber.
- B. Video fibers shall terminate on SC/APC fiber optic connectors.

2.09 CONFIGURATION AND SPECIFICATIONS FOR ISP

- A. Where existing sleeves, riser conduit, etc., are insufficient for new riser cable, construction of new sleeves, cores, and conduit or raceway shall be proposed and included in the contractor's purchase price. A minimum of twelve inches is required between all phone/data services and any electrical circuits. This is a US:IT requirement.
- B. There must be a 50% growth factor built in on all conduit runs used for Voice, Data and Video jacks. Minimum conduit for station runs will be 1" trade size conduit with proper fittings. A 1" NMT non-metallic tubing properly installed meeting all NMT requirements of NEC/BISCI and the University of Maine is also acceptable. There will be NO DAISY CHAINING of jacks for any reason. A pull string needs to be installed in all conduits used for ISP/OSP cabling.
- C. Open Ceiling – All conduits will be installed above the tray or back to the proper IDF/BDF.

- D. Suspended Ceiling – All conduits will be stubbed above the ceiling or back to proper IDF/BDF. Install B-Line cable tray in all corridors providing a continuous pathway back to the proper BDF/IDF.
- E. All old cables are to be removed as required by the NEC.

2.10 CABLE ROUTING

- A. It is mandatory that the contractor makes use of and provides cable pathway materials between all building MDFs, BDFs or IDFs. A 50% growth factor must be provided when a job is completed. A minimum of 12 inches shall be kept between all data and electrical pathways when being designed (US:IT requirements).
- B. Such pathway materials may include:
 - 1. Finished and exposed metal cable tray, ladder, or raceway.
 - 2. Enclosed conduit or wireway through walls or ceiling plenums.
 - 3. Sleeves and conduit.
 - 4. Other materials as the contractor may require.
- C. Provide B-Line – Part # FT2X12X10. Must be mounted no more than 12” above suspended ceiling, or 8’ 6” in open corridors. A usable pull string is to be left in each cable tray on completion of cable installation.
- D. It should be noted that US:IT will not supply pathway materials.
- E. All raceways used for Telecom/Data shall be **Panduit**. They shall be sized properly for use. ONLY proper fittings for raceway shall be used.

2.11 CAT 6 REQUIREMENTS AND PARTS

- A. All data cables shall be CAT6 Hitachi part # 30212-8.
- B. All data cables installed shall be Hitachi part # 30212-8BL CAT6 with a PVC jacket being **blue**.
- C. All dorm jacks shall be installed at 33” to bottom.
- D. All E&G building jacks shall be installed 16” to the bottom.
- E. All CAT6 cable shall be installed according to the NEC code, BICSI standards and EIA/TIA standards.
- F. All CAT6 cable shall be installed on **blue** Hitachi part # 30212BL and terminated on Panduit jacks, part # CJ688PBB.
- G. All CAT6 cable shall be 23 AWG and 8 conductors terminated as 568-A standards allow.
- H. All raceway installed to be used for CAT6 installation must meet all BICSI standards as well as ANSI/TIA/EIA standards.
- I. Cables shall terminate in proper Siemon part # HD6-24B-SIE patch panels rated for CAT6 specs, RJ45 faceplates with 110 terminations on back.
- J. Patch cables rated for CAT6 100mb are to be supplied and installed.
- K. CAT6 certification must be received prior to final payment.
- L. Velcro required to tie and support cables.

M. All raceways for IT shall be properly sized for **Panduit** or 1" conduit.

2.12 DISTRIBUTION FRAME REQUIREMENTS

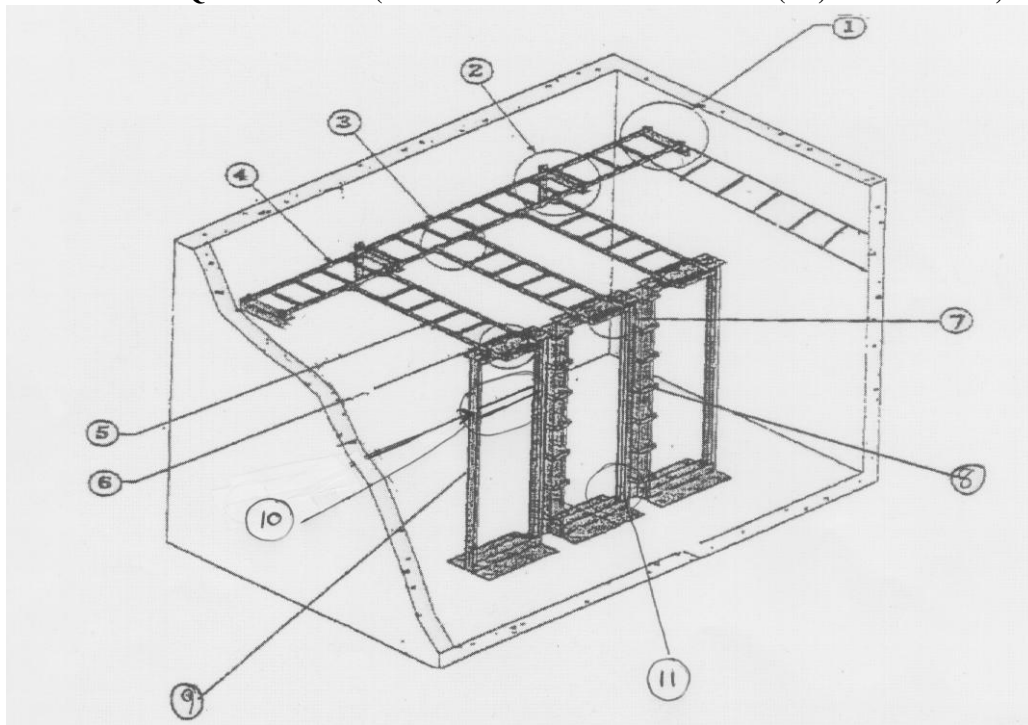
- A. New IDF and BDF room construction shall be included in Building Design blueprints.
- B. There shall be included, in the building, an equipment room as designated by US:IT strictly for data telecommunications. All BDF and IDF rooms shall be a minimum of 8' x 10' x 8', with signage indicating that the room is a data telecommunications facility.
- C. An IDF room will be required per floor in order to keep distance requirements for CAT6 wiring within specifications. This room(s) shall be keyed to the telecommunications master key. A 50 pair feeder cable for voice shall be run to the BDF room from each IDF room. These cables should run in pipe chases of 4" conduits. A 12/12 fiber riser cable will be run from BDF to each IDF for data feed. BICSI and NEC standards and US:IT requirements must be met. RJ11 coax shall be installed to each IDF from the BDF. Air temperature and air movement should meet office requirements for the building.
- D. BDF/IDF rooms should have a switched light with 50 ft. candles available and at least two isolated duplex outlets rated for 20 amps. A covered # 6 copper ground wire and bus bar must be installed at each IDF from main grounding frame in BDF and from racks installed at each IDF/BDF.
- E. A # 4 copper ground wire, properly installed and terminated, will be required in all BDF rooms, part # SB477K.
- F. Two 4" conduits from BDFs to IDFs with pull strings installed.
- G. Three 4" conduits feeding BDF from OSP manholes.
- H. All conduit, raceway, coring, and equipment backboards must be supplied and installed by the Contractor.
- I. Contractor will be required, prior to start of project, to submit a floor-by-floor list of where new BDFs and IDFs will be required.
- J. No sprinkler heads should be installed within the BDF/IDF rooms. Heat/smoke detectors should be installed where necessary for fire code compliance.
- K. All cable will be marked clearly and legibly at both ends.
- L. All cables and fiber shall be terminated on a 7' x 30' x 19' rack. All installed equipment shall meet all BICSI requirements as well as US:IT requirements. All racks shall be properly bonded to ground bar in IDF/BDF rooms.
- M. One wall having a 4' x 8' x 3/4" sheet of plywood attached painted with fire retardant paint is required in the BDFs and IDFs. Plywood should be vertically mounted behind the racks installed 2' off the finished floor.
- N. Wire management hardware located on three (3) walls above the racks is required in preparation of installation of termination equipment by the contractor (see diagram included in this document BDF/IDF requirements closet).
- O. Single-mode fiber will be fusion spliced to factory ceramic SC and SC/APC pigtails.
- P. Multi-mode fiber will be terminated using ST Unicams factory polished ceramic.
- Q. All fiber patch panels are to be Seicore, sized to accept fibers from the OSP plant as well as riser for the IDFs.

1. Data telecommunication rooms (including but not limited to BDF and IDF closets): The BDF closets shall be on the lowest floor level of the building being served. An IDF closet is **required** for each floor above the lowest floor.
2. All BDF/IDF closets shall be designed as shown in the diagram below. Materials for this requirement are shown in the diagram.
3. All data telecommunication rooms must have a 3' door swinging out into the hallway.
4. All data telecommunication rooms are for **INFORMATION TECHNOLOGIES USE ONLY**; any other equipment needing IT service should be located in a separate mechanical room.

2.13 CABLE SUPPORT AND RACK PRODUCTS

- A. All material to be installed to product specifications.
- B. All material to match cable trays installed in the building.
- C. All racking and cable tray to be grounded with # 6 green PVC ground wire.

BDF/IDF REQUIREMENTS (EXAMPLE USING B-LINE AND (SB) HARDWARE)



Item Number	Description of Item	Item Part Number
1	End Bracket Relay Wall Bracket	SB87019S2FB
2	Runway Wall Bracket	FTB12CS
3	90 deg. Splice Bar	90DEGREE KIT
4	Fast Splice Bar	FTSTLC
5	Cable Runway B-Line	FT2X12X10
6	Splice Washer Kit	WASHERSPL KIT
7	Runway Termination Kit	SB-2105-12-TG
8	Copper B-Line Vertical Management	SB57166D084AL
9	Copper B-Line Aluminum Rack	SB556084XUAL
10	Horizontal Management	CMPHH2
11	20 AMP Dedicated Electrical Outlet	

NOTE: Wire management required around each frame: top, bottom and side. This will be sized to fit each building requiring size changes to match density and count of building. All products and fittings are B-Line Cable Tray and fittings.

2.14 CABLE NETWORKS IDENTIFICATION AND LABELING

- A. Each contractor shall permanently mark all cables with permanent labels.
- B. Labels shall be waterproof materials with indelible text information and mechanical attachment or waterproof adhesive.
- C. Each required label location shall contain all fields of required information below.
- D. Required identification information shall include the following items, combined to produce a unique and non-duplicating identification for each cable. No two jacks within the cable plant shall have the same number.
- E. Jacks shall show termination location; floor location and BDF/IDF location (i.e. basement – BDF A001; 1st floor to IDF B101; 2nd floor to IDF C201).
- F. Where multiple cables have the same termination location and floor identification number, the contractor shall add an alpha/numeric suffix to provide non-duplicating identifiers (i.e. A201, A201B).
- G. All jack locations should run straight back to the equipment rooms or cable trays in their own raceway.
- H. Equipment rooms should have a switched light and at least two duplex outlets rated for 20 amps.
- I. Pull strings are to be installed at the time of construction in all conduits.
- J. If utilized, pull strings must be replaced prior to completion of project.
- K. Cables need to be toned and correctly labeled at the time of installation.
- L. Riser fiber cable shall be 12 strand multi-mode and 12 strand single-mode fiber.
- M. Cables for voice and data shall not exceed 290' end to end.

2.15 UNIFORM WIRING PLAN (UWP)

- A. Below are the jacks and symbols to be used by the contractor when cables and terminations are installed. Panduit jacks and equipment will be used. All jacks will be wired as 568A and meet CAT6 certification.



- B. UWP#1s – Consists of three separate cables (23 AWG), 2 blue data and 1 RG6 coax. (See symbol 1 above).
- C. UWP#2s – Consists of two separate cables (23 AWG), 2 blue data, these are the standard for all offices. (See symbol 2 above).
- D. UWP#3s – 1 blue voice cable only (23 AWG). This jack is used for alarm circuits mostly. (See symbol 3 above).
- E. UWP#4s – 1 blue data cable (23 AWG). Used where no phone will ever be needed but data transmission is required. An example would be an in-house billing system, i.e. Harco. (See symbol 4 above).

2.16 VOICE AND DATA CABLE SPECIFICATIONS FOR HORIZONTAL CABLING

- A. Cables will be 23 AWG 8 conductors Unshielded Twisted Pair (UTP).
- B. All cables will be blue category 6 four pair and comply with EIA/TIA 568A standards.

2.17 VIDEO WIRING PLAN (UMP)

- A. The contractor must install F59SSV quad shielded RG 6 type drop cables for subscriber loop locations. RG6 type subscriber drop cables are used to interconnect the TV outlet with multi-tap devices that will be installed at the BDFs or IDFs.
- B. At the outlet, the contractor shall terminate the cable in the outlet connector using an F10F10S11-X straight jack. The TV outlet shall then be terminated using a 75-ohm F terminator.

2.18 VIDEO RISER CABLES

- A. Where video riser cables are required between floor types F11SSEF and single-mode fiber will be installed.
- B. Routing of video riser cables follows voice cable installation from floor to floor.

2.19 WIRELESS NETWORKING REQUIREMENTS

- A. One (1) 1" conduit run to each location for networking cables.
- B. Conduits will terminate either at BDF, IDF or above the cable trays with CAT6 data cable being installed.
- C. All ANSI/TIA and NEC codes or requirements must be met.

2.20 CAMERA INSTALLATION

- A. A 1" conduit from the camera location back to the cable tray or above suspended ceilings.
- B. Conduits will terminate either at BDF, IDF or above the cable trays with blue CAT6 data cable being installed.
- C. A blue CAT6 data cable shall be installed and terminated in an RJ45 Panduit jack.
- D. Jack shall be labeled to show proper BDF or IDF location, i.e. Jack A1001 for BDF or B2001 for IDF.
- E. Cameras to be used are axis 216FD for fixed dome inside installation.
- F. Outside cameras are to be axis and will be listed by their needs. Recommended part # AXIS 223M, Outside Housing recommended part # AXIS #24889, including heater and blowers.
- G. NUV for each building to be installed in BDF rooms equipment rack, part # 1PNUR1UST4TB8R must be able to record for 28 days.

2.21 OUTSIDE EMERGENCY PHONES

- A. Two 1¼" conduits run to pedestal location, 1 for Telecom/fiber cables, and 1 for electrical circuit to be installed with ground fault interruption 20 Amp minimum 120v rated. Each to be terminated in the proper equipment rooms, i.e. electric to electric panel, IT to proper BDF room.

B. 1¼” conduits need to be rated for outdoor use, PVC schedule 40 recommended.

C. Symbol for location(s) is:



2.22 US:IT VOICE AND DATA CABLE SPECIFICATIONS FOR JACKS

- A. All cables are 23 AWG 8 conductors unshielded twisted pair cable.
- B. Category/Level 6 – cable must be 8 conductor and comply with EIA/TIA 568-A standards.
- C. Color-coded with a blue PVC jacket.
- D. DC Resistance 9.38 @ 100 meters.
- E. DSC Resistance Unbalanced 5% maximum.
- F. Impedance @ 250 MHZ $100 \pm 15\%$.
- G. Category/Level 6 – When requested for installation, specs will be given and approval from Telecommunications on the cable to be installed will be given.
 - 1. Characteristics:
 - a. Propagation Delay @ 10 MHZ 5.7 per/meter.
 - b. Delay Shew @ 25NS/100 meters.
 - c. Attenuation crosstalk 11.4 db @ 250 MHZ.
 - 2. Specifications:
 - a. Blue PVC jacket.
 - b. 8 Conductors 23 gauge.
 - c. DC Resistance 9.38/100 meters.
 - d. DSC Resistance unbalanced 5% maximum.
 - e. Pair to ground capacitance unbalanced maximum @ 1 KHZ 100m.
 - 3. Transmission Properties:
 - a. Freq 427.0.
 - b. Maximum attenuation @ 20 deg. Celsius 50.5.
 - c. Near end crosstalk worst pair combination 64-15log (F/00.772).
 - d. Power Sum N/A.
 - e. Worst Pair SRL 10 db.
 - f. Resistance OHMS 100 115%.

2.23 INSTALL LEVEL 6 STANDARDS

- A. ANSI/TIA.E1A 568A Category 6 E (400 MHZ):
 - 1. 155 mbps ATM and 100 mpbs Ethernet.
 - 2. 4 pair 23 gauge copper.
 - 3. ISO/IEC 11801.
 - 4. Min Bend Radius .820.
 - 5. PVC Blue Jacketed.
 - 6. Cable markings starting at 0 to 1000' per box.
 - 7. Non Plenum 75N4.
- B. ETL Verified Electrical Performance:
 - 1. CAT6 STANDARDS:
 - a. Input Impedance 100 ohm ± 15 ohm 1-100 MHZ.
 - b. Capacitance 4.6 NF/100 m nominal.
 - c. DE Resistance/Unbalanced 6.66 ohms/100 m max.
 - d. Propagation Delay 5.7 N/SEC/m mac at 10 MHZ.

2.24 TEST RECORDS FOR ISP/OSP

- A. Contractor will test each OSP pair in each cable on an end-to-end basis after terminating. Maximum allowable defective pairs will be limited to 1% of the total number of pairs and a maximum of one (1) pair per 25-pair binder group. Defective pairs over 1% will require cable repair or replacement at the Contractor's expense.
- B. ISP testing for each station cable is required with zero defective pairs acceptable.
- C. The Contractor, at no cost to the University, will replace cables rejected by the US:IT department with new cable from end to end.
- D. Records of testing will be delivered to US:IT in MSEXcel format, or software that is compatible with MSEXcel.
- E. Building will not be accepted for service prior to records being received, thus no service will be provided.

PART 3 EXECUTION

3.01 OSP – FIBER INSTALLATION

- A. No splices will be allowed in OSP fiber. Any faulty cables must be replaced at Contractor's expense.
- B. All fiber cable must be installed in accordance with manufacturer recommended tensile specifications.
- C. Lubricant must be used when installing fiber cable. This lubricant must be manufacturer guaranteed to be non-destructive to the cable sheath or any portion of the inner duct.
- D. All fiber cables shall be terminated in an approved Lynn patch panel using approved ST, SC or SCAPC connectors. All connections shall be fusion splicing onto correct connectors. Labels shall show the destination of each fiber optic strand.
- E. All fiber cable will be tested for loss and bandwidth according to the manufacturer's specifications. Tests shall be performed after all the cable has been installed, spliced and terminated.
- F. All fiber cable shall be 62.5/125 multi-mode or hybrid Hitachi/Corning Fiber containing twelve multi-mode fibers and 12 single-mode fiber rated for outside usage in duct system.

3.02 OSP – DATA FIBER INSTALLATIONS

- A. Specifications for Altos/Lst Cables:
 - 1. Maximum attenuation: 3.5/1.0.
 - 2. Minimum bandwidth: 120/500 850 MHZ to 1300 MHZ.
 - 3. Gigabit Ethernet Distance Guarantee 500/1000.
 - 4. Multi-mode/Single-mode.
 - 5. Graded Index: 50 Gigabit Plus CL.
 - 6. 62.5/125 micron core diameter (+/-3).
 - 7. Maximum Tensile Loading: 600 lbf.
- B. The Contractor is responsible for installation and testing of fiber. A loss of more than 2dB is not acceptable.
- C. All fiber cable must be installed in accordance with manufacturer recommended tensile specifications.

- D. All fiber cables shall be terminated in an approved patch panel using SC ceramic ferrule connectors. Single-mode fiber must also be properly terminated and marked using SC/APC or SC pigtails, both need to be fusion spliced. Labels shall show the destination of each data fiber optic strand.
- E. All fiber must be tested prior to installation with an Optical Time Domain Reflectometer (OTDR) to insure cable integrity and to identify any damage due to shipping. An OTDR graph must be delivered to the University prior to the installation of the fiber cable and after the cable has been installed.

3.03 DATA FIBER TESTING

- A. All fiber cable must be tested to guarantee the performance integrity of cables, bends, tensile loads and terminations or cross connects.
- B. Each fiber cable must be tested for loss and bandwidth. Tests shall be performed upon completion of installation and termination.
- C. Any cable that is found to be defective shall be repaired or replaced at the contractor's expense.
- D. An OTDR graph must be provided for each fiber strand tested.
- E. Testing must be accomplished with an OTDR.

3.04 INSIDE PLANT (ISP) INSTALLATION

- A. The cable will be less than 280 feet from station jack to distribution frame termination.
- B. All cable paths that will be used for Category 6 cable installation must meet all applicable codes, BICSI and ANSI/TIA/EIA standards.
- C. When a cable must be created in an existing building, the following concealment methods are acceptable:
 - 1. Dry wall: fishing of hollow wall cavities.
 - 2. Plaster or Tile Wall: Color coordinated wire mold.
 - 3. Drop ceiling: Velcro every 10' and avoid lighting fixtures and all electrical conduit and raceway.
 - 4. Utility Corridors: Concealment not required; Velcro every 10' to (chases and trays) to self-supporting hangers, avoid receptacles and all electrical conduit/raceways. Clear and free conduit or riser sleeves are available for use wherever they are found and should be used first.
 - 5. Raceway shall be installed where indicated and when required to run on the surface of a wall. Raceway shall be Panduit and must be properly sized and meet the installation requirements of the manufacturer of the cable to be installed.

END OF SECTION 27 00 00

Project:
Date Prepared:

Structural Statement of Special Inspections

Project:

Location:

Owner:

This *Statement of Special Inspections* encompass the following discipline: **Structural**

This *Statement of Special Inspections* is submitted as a condition for permit issuance in accordance with the Special Inspection and Structural Testing requirements of the Building Code. It includes a schedule of Special Inspection services applicable to this project as well as the name of the Structural Special Inspection Coordinator (SSIC) and the identity of other approved agencies to be retained for conducting these inspections and tests.

The Structural Special Inspection Coordinator shall keep records of all Structural inspections and shall furnish inspection reports to the Building Code Official (BCO) and the Structural Registered Design Professional in Responsible Charge (SRDP). Discovered discrepancies shall be brought to the immediate attention of the Contractor for correction. If such discrepancies are not corrected, the discrepancies shall be brought to the attention of the Building Official and the Structural Registered Design Professional in Responsible Charge. The Special Inspection program does not relieve the Contractor of his or her responsibilities.

Interim reports shall be submitted to the Building Official and the Structural Registered Design Professional in Responsible Charge at an interval determined by the SSIC and the BCO.

A *Final Report of Special Inspections* documenting completion of all required Special Inspections, testing and correction of any discrepancies noted in the inspections shall be submitted to the BCO prior to issuance of a Certificate of Use and Occupancy.

Job site safety and means and methods of construction are solely the responsibility of the Contractor.

Interim Report Frequency: Upon request of Building Official _____ or per attached schedule.

Prepared by:

John Q. Public, P.E.

(type or print name of the Structural Registered Design Professional in Responsible Charge)

Signature

Date

Design Professional Seal

Owner's Authorization:

Building Code Official's Acceptance:

Signature

Date

Signature

Date

Project:
Date Prepared:

Structural Statement of Special Inspections (Continued)

List of Agents

Project:

Location:

Owner:

This Statement of Special Inspections encompass the following discipline: **Structural**

(Note: Statement of Special Inspections for other disciplines may be included under a separate cover)

This Statement of Special Inspections / Quality Assurance Plan includes the following building systems:

- Soils and Foundations
- Cast-in-Place Concrete
- Precast Concrete System
- Masonry Systems
- Structural Steel
- Wood Construction
- Special Cases

Special Inspection Agencies	Firm	Address, Telephone, e-mail
1. STRUCTURAL Special Inspections Coordinator (SSIC)		
2. Special Inspector (SI 1)		
3. Special Inspector (SI 2)		
4. Testing Agency (TA 1)		
5. Testing Agency (TA 2)		
6. Other (O1)		

Note: The inspectors and testing agencies shall be engaged by the Owner or the Owner's Agent, and not by the Contractor or Subcontractor whose work is to be inspected or tested. Any conflict of interest must be disclosed to the Building Official, prior to commencing work.

Project:
Date Prepared:

Structural Statement of Special Inspections (Continued)

Final Report of Special Inspections (SSIC/SI 1)

[To be completed by the Structural Special Inspections Coordinator (SSIC/SI 1). Note that all Agent's Final Reports must be received prior to issuance.]

Project:
Location:
Owner:
Owner's Address:

Architect of Record: _____
(name) (firm)

Structural Registered Design
Professional in Responsible Charge: John Q. Public
(name) (firm)

To the best of my information, knowledge and belief, the Special Inspections required for this project, and itemized in the *Statement of Special Inspections* submitted for permit, have been performed and all discovered discrepancies have been reported and resolved.

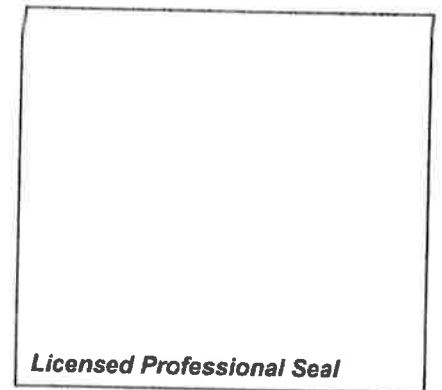
Interim reports submitted prior to this final report form a basis for and are to be considered an integral part of this final report.

Respectfully submitted,
Structural Special Inspection Coordinator

(Type or print name)

(Firm Name)

Signature Date



Project:
Date Prepared:

Structural Statement of Special Inspections (Continued)
Special Inspector's/Agent's Final Report

Project:
Special Inspector or
Agent:

Designation: _____
(name) *(firm)*

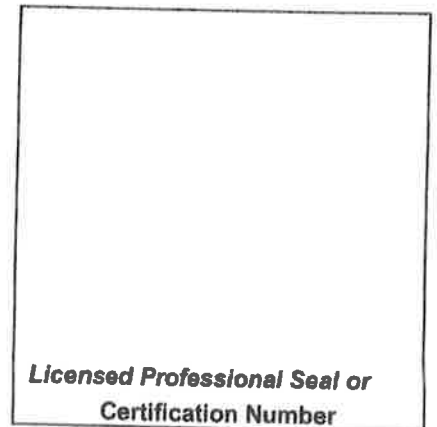
To the best of my information, knowledge and belief, the Special Inspections or testing required for this project, and designated for this Inspector/Agent in the *Statement of Special Inspections* submitted for permit, have been performed and all discovered discrepancies have been reported and resolved.

Interim reports submitted prior to this final report form a basis for and are to be considered an integral part of this final report.

Respectfully submitted,
Special Inspector or Agent:

(Type or print name)

Signature Date



Project:
Date Prepared:

Structural Schedule of Special Inspections

Qualifications of Inspectors and Testing Technicians

The qualifications of all personnel performing Special Inspection and testing activities are subject to the approval of the Building Official. The credentials of all Inspectors and testing technicians shall be provided to the Special Inspector for their records. *NOTE VERIFICATION THAT QUALIFIED INDIVIDUALS ARE AVAILABLE TO PERFORM STIPULATED TESTING AND/OR INSPECTION SHOULD BE PROVIDED PRIOR TO SUBMITTING STATEMENT. AGENT QUALIFICATIONS IN SCHEDULE ARE SUGGESTIONS ONLY; FINAL QUALIFICATIONS ARE SUBJECT TO THE DISCRETION OF THE REGISTERED DESIGN PROFESSIONAL PREPARING THE SCHEDULE.*

Key for Minimum Qualifications of Inspection Agents:

When the Registered Design Professional in Responsible Charge or Special Inspector of Record deems it appropriate that the individual performing a stipulated test or inspection have a specific certification, license or experience as indicated below, such requirement shall be listed below and shall be clearly identified within the schedule under the Agent Qualification Designation.

PE/SE	Structural Engineer – a licensed SE or PE specializing in the design of building structures
PE/GE	Geotechnical Engineer – a licensed PE specializing in soil mechanics and foundations
EIT	Engineer-In-Training – a graduate engineer who has passed the Fundamentals of Engineering examination

Experienced Testing Technician

ETT	Experienced Testing Technician – An Experienced Testing Technician with a minimum 5 years experience with the stipulated test or inspection
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American Concrete Institute (ACI) Certification

ACI-CFTT	Concrete Field Testing Technician – Grade 1
ACI-CCI	Concrete Construction Inspector
ACI-LTT	Laboratory Testing Technician – Grade 1&2
ACI-STT	Strength Testing Technician

American Welding Society (AWS) Certification

AWS-CWI	Certified Welding Inspector
AWS/AISC-SSI	Certified Structural Steel Inspector

American Society of Non-Destructive Testing (ASNT) Certification

ASNT	Non-Destructive Testing Technician – Level II or III.
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International Code Council (ICC) Certification

ICC-SMSI	Structural Masonry Special Inspector
ICC-SWSI	Structural Steel and Welding Special Inspector
ICC-SFSI	Spray-Applied Fireproofing Special Inspector
ICC-PCSI	Prestressed Concrete Special Inspector
ICC-RCSI	Reinforced Concrete Special Inspector

National Institute for Certification in Engineering Technologies (NICET)

NICET-CT	Concrete Technician – Levels I, II, III & IV
NICET-ST	Soils Technician - Levels I, II, III & IV
NICET-GET	Geotechnical Engineering Technician - Levels I, II, III & IV

Other

at Structural engineer's discretion.

Project:

Date Prepared:

Structural Schedule of Special Inspections

SOILS & FOUNDATION CONSTRUCTION

VERIFICATION AND INSPECTION	Y/N	EXTENT: CONTINUOUS, PERIODIC, SUBMITTAL, OR NONE	COMMENTS	AGENT	AGENT QUALIFICATION	TASK COMPLETED
IBC Section 1704.7, 1704.8, 1704.9						
1. Verify existing soil conditions, fill placement and load bearing requirements						
a. Prior to placement of prepared fill, determine that the site has been prepared in accordance with the approved soils report.		P	IBC 1704.7.1		PE/GE, EIT or ETT	
b. During placement and compaction of fill material, verify material being used and maximum lift thickness comply with the approved soils report.		P	IBC 1704.7.2		PE/GE, EIT or ETT	
c. Test in-place dry density of compacted fill complies with the approved soils report.		P	IBC 1704.7.2		PE/GE, EIT or ETT	
2. Pile foundations:						
a. Observe and record procedures for static load testing of piles.		C	IBC 1704.8		PE/GE, EIT or ETT	
b. Observe and record procedures for dynamic load testing of piles.		C			PE/GE, EIT or ETT	
c. Record installation of each pile and results of load test. Include cutoff and tip elevations of each pile relative to permanent reference.		C			PE/GE, EIT or ETT	
d. Test welded splices of steel piles		C	AWS D1.1		AWS-CWI	
3. Pier foundations: Verify installation of pier foundations for buildings assigned to Seismic Design Category C, D, E or F.		C	IBC 1704.9		PE/GE, EIT or ETT	
a. Verify pier diameter and length		C			PE/GE, EIT or ETT	
b. Verify pier embedment (socket) into bedrock		P			PE/GE, EIT or ETT	
c. Verify suitability of end bearing strata		P			PE/GE, EIT or ETT	

Project:
Date Prepared:

Structural Schedule of Special Inspections
CONCRETE CONSTRUCTION

VERIFICATION AND INSPECTION	Y/N	EXTENT: CONTINUOUS, PERIODIC, SUBMITTAL, OR NONE	COMMENTS	AGEN T	AGENT QUALIFICATION	TASK COMPLETED
IBC Section 1704.4						
1. Inspection of reinforcing steel, including prestressing tendons, and placement		P	ACI 318: 3.5, 7.1-7.7		PE/SE or EIT	
2. Inspection of reinforcing steel welding in accordance with Table 1704.3, Item 5B			Welding of Reinf Not Allowed		AWS-CWI	
3. Inspect bolts to be installed in concrete prior to and during placement of concrete where allowable loads have been increased		C	IBC 1912.5		PE/SE or EIT	
4. Verifying use of required design mix		P	ACI 318: Ch 4, 5.2-5.4		PE/SE or EIT	
5. At time fresh concrete is sampled to fabricate specimens for strength test, perform slump and air content test and temperature		C	ASTM C 172 ASTM C 31 ACI 318: 5.6, 5.8		ACI-CFTT or ACI-STT	
6. Inspection of concrete and shotcrete placement for proper application techniques		C	ACI 318: 5.9, 5.10		PE/SE or EIT	
7. Inspection for maintenance of specified curing temperature and techniques		P	ACI 318: 5.11-5.13		PE/SE or EIT	
8. Inspection of Prestressed Concrete						
a. Application of prestressing force.		C	ACI 318: 18.20		PE/SE or EIT	
b. Grouting of bonded prestressing tendons in seismic force resisting system		C	ACI 318: 18.18.4		PE/SE or EIT	
9. Erection of precast concrete members		P	ACI 318: Ch 16		PE/SE or EIT	
10. Verification of in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms beams and structural slabs		P	ACI 318: 6.2		ACI-STT	

Project:
Date Prepared:

Structural Schedule of Special Inspections
MASONRY CONSTRUCTION – LEVEL 1 (NON-ESSENTIAL FACILITY)

VERIFICATION AND INSPECTION IBC Section 1704.5	Y/N	EXTENT: CONTINUOUS, PERIODIC, SUBMITTAL, OR NONE	COMMENTS	AGENT	AGENT QUALIFICATION	TASK COMPLETED
1. As masonry construction begins, the following shall be verified to ensure compliance:						
a. Proportions of site-prepared mortar.		P	ACI530.1, 2.6A		PE/SE or EIT	
b. Construction of mortar joints.		P	ACI530.1, 3.3B		PE/SE or EIT	
c. Location of reinforcement and connectors.		P	ACI530.1, 3.4, 3.6A		PE/SE or EIT	
d. Prestressing technique.		P	ACI530.1, 3.6B		PE/SE or EIT	
e. Grade and size of prestressing tendons and anchorages.		P	ACI530.1, 2.4B, 2.4H		PE/SE or EIT	
2. The inspection program shall verify:						
a. Size and location of structural elements.		P	ACI530.1, 3.3G		PE/SE or EIT	
b. Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames or other construction.		P	ACI530, 1.2.2(e), 2.1.4, 3.1.6		PE/SE or EIT	
c. Specified size, grade and type of reinforcement.		P	ACI530, 1.12, ACI530.1, 2.4, 3.4		PE/SE or EIT	
d. Welding of reinforcing bars.		C	AC530, 2.1.10.6.2, 3.2.4 (b)		AWS-CWI	
e. Protection of masonry during cold weather (temperature below 40°F) or hot weather (temperature above 90°F).		P	IBC 2104.3, 2104.4; ACI530.1, 1.8C, 1.8D		PE/SE or EIT	
f. Application and measurement of prestressing force.		P	ACI530.1, 3.6B		PE/SE or EIT	
3. Prior to grouting, the following shall be verified to ensure compliance:						
a. Grout space is clean.		P	ACI530.1, 3.2D		PE/SE or EIT	
b. Placement of reinforcement and connectors and prestressing tendons and anchorages.		P	ACI530, 1.12, ACI530.1, 3.4		PE/SE or EIT	
c. Proportions of site-prepared grout and prestressing grout for bonded tendons.		P	ACI530.1, 2.6B		PE/SE or EIT	
d. Construction of mortar joints.		P	ACI530.1, 3.3B		PE/SE or EIT	
4. Grout placement shall be verified to ensure compliance with code and construction document provisions:		C	ACI530.1, 3.5		PE/SE or EIT	
a. Grouting of prestressing bonded tendons.		C	ACI530.1, 3.6C		PE/SE or EIT	
5. Preparation of any required grout specimens, mortar specimens and/or prisms shall be observed.		C	IBC 2105.2.2, 2105.3; ACI530.1, 1.4		PE/SE or EIT	
6. Compliance with required inspection provisions of the construction documents and the approved submittals shall be verified.		P	ACI530.1, 1.5		PE/SE or EIT	

Project:
Date Prepared:

Structural Schedule of Special Inspections
MASONRY CONSTRUCTION – LEVEL 2 (ESSENTIAL FACILITY)

VERIFICATION AND INSPECTION IBC Section 1704.5	Y/N	EXTENT: CONTINUOUS, PERIODIC, SUBMITTAL, OR NONE	COMMENTS	AGENT	AGENT QUALIFICATION	TASK COMPLETED
1. From the beginning of masonry construction, the following shall be verified to ensure compliance:						
a. Proportions of site-mixed mortar, grout and prestressing grout for bonded tendons.		P	ACI530.1, 2.6A		PE/SE or EIT	
b. Placement of masonry units and construction of mortar joints.		P	ACI530.1, 3.3B		PE/SE or EIT	
c. Placement of reinforcement, connectors and prestressing tendons and anchorages.		P	ACI530, 1.12; ACI530.1, 3.4, 3.6 A		PE/SE or EIT	
d. Grout space prior to grouting.		C	ACI530.1, 3.2D		PE/SE or EIT	
e. Placement of grout.		C	ACI530.1, 3.5		PE/SE or EIT	
f. Placement of prestressing grout.		C	ACI530.1, 3.6C		PE/SE or EIT	
2. The inspection program shall verify:						
a. Size and location of structural elements.		P	ACI530.1, 3.3G		PE/SE or EIT	
b. Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames or other construction.		C	ACI530, 1.2.2(e), 2.1.4, 3.1.6		PE/SE or EIT	
c. Specified size, grade and type of reinforcement.		P	ACI530, 1.12; ACI530.1, 2.4, 3.4		PE/SE or EIT	
d. Welding of reinforcement.		C	ACI530, 2.1.10.6.2, 3.2.3.4(b);		PE/SE or EIT	
e. Protection of masonry during cold weather and (temperature below 40°F) or hot weather (temperature above 90°F).		P	IBC 2104.3, 2104.4; ACI530.1, 1.8C, 1.8D		PE/SE or EIT	
f. Application and measurement of prestressing force.		C	ACI530.1, 3.6B		PE/SE or EIT	
3. Preparation of any required grout specimens, mortar specimens and/or prisms shall be observed.		C	IBC 2105.2.2, 2105.3; ACI 530.1, 1.4		PE/SE or EIT	
4. Compliance with required inspection provisions of the construction documents and the approved submittals shall be verified.		P	ACI530.1, 1.5		PE/SE or EIT	

Project:

Date Prepared:

Structural Schedule of Special Inspections - STEEL CONSTRUCTION

VERIFICATION AND INSPECTION	Y/N	EXTENT: CONTINUOUS, PERIODIC, SUBMITTAL, OR NONE	COMMENTS	AGENT	AGENT QUALIFICATION	TASK COMPLETED
IBC Section 1704.3						
1. Material verification of high-strength bolts, nuts and washers:						
a. Identification markings to conform to ASTM standards specified in the approved construction documents.		S	Applicable ASTM material specifications; AISC 335, Section A3.4; AISC LRFD, Section A3.3		PE/SE or EIT	
b. Manufacturer's certificate of compliance required.		S			PE/SE or EIT	
2. Inspection of high-strength bolting						
a. Bearing-type connections.		P	AISC LRFD Section M2.5		AWS/AISC-SSI	
b. Slip-critical connections.		C or P (method dependent)	IBC Sect 1704.3.3		AWS/AISC-SSI	
3. Material verification of structural steel (IBC Sect 1708.4):						
a. Identification markings to conform to ASTM standards specified in the approved construction documents.		S	ASTM A 6 or ASTM A 568 IBC Sect 1708.4		PE/SE or EIT	
b. Manufacturers' certified mill test reports.		S	ASTM A 6 or ASTM A 568 IBC Sect 1708.4		PE/SE or EIT	
4. Material verification of weld filler materials:						
a. Identification markings to conform to AWS specification in the approved construction documents.		S	AISC, ASD, Section A3.6; AISC LRFD, Section A3.5		PE/SE or EIT	
b. Manufacturer's certificate of compliance required.		S			PE/SE or EIT	
5. Submit current AWS D1.1 welder certificate for all field welders who will be welding on this project.		S	AWS D1.1		PE/SE or EIT	
6. Inspection of welding (IBC 1704.3.1):						
a. Structural steel:						
1) Complete and partial penetration groove welds.		C	AWS D1.1		AWS-CWI	
2) Multipass fillet welds.		C			AWS-CWI	
3) Single-pass fillet welds > 5/16"		C			AWS-CWI	
4) Single-pass fillet welds < 5/16"		P			AWS-CWI	
5) Floor and deck welds.		P	AWS D1.3		AWS-CWI	
b. Reinforcing steel (IBC Sect 1903.5.2):						
1) Verification of weldability of reinforcing steel other than ASTM A706.		C	AWS D1.4 ACI 318: 3.5.2			
2) Reinforcing steel-resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special reinforced concrete shear walls and shear reinforcement.		C			AWS-CWI	
3) Shear reinforcement.		C			AWS-CWI	
4) Other reinforcing steel.		P			AWS-CWI	
7. Inspection of steel frame joint details for compliance (IBC Sect 1704.3.2) with approved construction documents:						
a. Details such as bracing and stiffening.		P			PE/SE or EIT	
b. Member locations.		P			PE/SE or EIT	
c. Application of joint details at each connection.		P			PE/SE or EIT	

Project:
Date Prepared:

Structural Schedule of Special Inspection Services
FABRICATION AND IMPLEMENTATION PROCEDURES – STRUCTURAL STEEL

VERIFICATION AND INSPECTION IBC Section 1704.2	Y/N	EXTENT: CONTINUOUS, PERIODIC, SUBMITTAL, OR NONE	COMMENTS	AGENT	AGENT QUALIFICATION	TASK COMPLETED
1. Fabrications Procedures: Review of fabricator's written procedural and quality control manuals and periodic auditing of fabrication practices by an approved special inspection agency. At the completion of fabrication, the approved fabricator shall submit a certificate of compliance to the building code official stating that the work was performed in accordance with the approved construction documents. -OR- 2. AISC Certification		S	Fabricator shall submit one of the two qualifications		PE/SE or EIT	
3. At completion of fabrication, the approved fabricator shall submit a certificate of compliance to the building code official stating that the work was performed in accordance with the approved construction documents.		S	IBC 1704.2.2		PE/SE or EIT	

Project:
Date Prepared:

Structural Schedule of Special Inspection Services
FABRICATION AND IMPLEMENTATION PROCEDURES – WOOD TRUSSES

VERIFICATION AND INSPECTION IBC Section 1704.2	Y/N	EXTENT: CONTINUOUS, PERIODIC, SUBMITTAL, OR NONE	COMMENTS	AGENT	AGENT QUALIFICATION	TASK COMPLETED
<p>1. Fabrications Procedures: Review of fabricator's written procedural and quality control manuals and periodic auditing of fabrication practices by an approved special inspection agency. At the completion of fabrication, the approved fabricator shall submit a certificate of compliance to the building code official stating that the work was performed in accordance with the approved construction documents. -OR-</p> <p>2. TPI Inspection Program: Fabricator shall participate in the TPI Quality Assurance Inspection Program, and maintain a copy of the Quality Assurance Procedures Manual, QAP-90. Submit copy of certificate. All trusses shall bear the TPI Registered Mark.</p>		S	Fabricator shall submit one of the two qualifications		PE/SE or EIT	
<p>3. At completion of fabrication, the approved fabricator shall submit a certificate of compliance to the building code official stating that the work was performed in accordance with the approved construction documents</p>		S	IBC 1704.2.2		PE/SE or EIT	

Project:
Date Prepared:

Structural Schedule of Special Inspections
WOOD CONSTRUCTION

VERIFICATION AND INSPECTION IBC Section 1704.6	Y/N	EXTENT: CONTINUOUS, PERIODIC, SUBMITTAL, OR NONE	COMMENTS	AGENT	AGENT QUALIFICATION	TASK COMPLETED
1. Fabrication of high-load diaphragms						
a. Verify wood structural panel sheathing for grade and thickness		P	IBC 1704.6		PE/SE or EIT	
b. Verify the nominal size of framing members at adjoining panel edges		P	IBC 1704.6		PE/SE or EIT	
b. Verify the nail or staple diameter and length		P	IBC 1704.6		PE/SE or EIT	
b. Verify the number of fastener lines		P	IBC 1704.6		PE/SE or EIT	
b. Verify the spacing between fasteners in each line and at edge margins		P	IBC 1704.6		PE/SE or EIT	
2. Load Tests for Joist Hangers: Provide evidence of manufacturer's load test in accordance with ASTM D1761 including the vertical load bearing capacity, torsional moment capacity, and deflection characteristics when there is no calculated procedure recognized by the code.		S	IBC 1715 [submit ICBO reports]		PE/SE or EIT	

Project:
Date Prepared:

Structural Schedule of Special Inspections
SEISMIC RESISTANCE - STRUCTURAL

VERIFICATION AND INSPECTION	Y/N	EXTENT: CONTINUOUS, PERIODIC, SUBMITTAL, OR NONE	COMMENTS	AGENT	AGENT QUALIFICATION	TASK COMPLETE D
IBC Section 1707						
1. Special inspections for seismic resistance. Special inspection as specified in this section is required for the following:			Seismic Design Category: B			
a. The seismic-force-resisting systems in structures assigned to Seismic Design Category C, D, E or F		P	IBC 1707.1		PE/SE or EIT	
2. Structural steel: Continuous special inspection for structural welding in accordance with AISC 341.		P	IBC 1702.2		AWS-CWI	
3. Structural wood:						
a. Continuous special inspection during field gluing operations of elements of the seismic-force-resisting system.		C	IBC 1702.3		PE/SE or EIT	
b. Periodic special inspections for nailing, bolting, anchoring and other fastening of components within the seismic-force-resisting system, including drag struts, braces and hold-downs		P	IBC 1702.3		PE/SE or EIT	
4. Cold-formed steel framing: Periodic special inspections during welding operations of elements of the seismic-force-resisting system. Periodic special inspections for screw attachment, bolting, anchoring and other fastening of components within the seismic-force-resisting system, including struts, braces, and hold-downs		N				
4. Seismic isolation system. Provide periodic special inspection during the fabrication and installation of isolator units and energy dissipation devices if used as part of the seismic isolation system		N	IBC 1707.8			

Project:
Date Prepared:

Quality Assurance Plan – Seismic and Wind

QUALITY ASSURANCE FOR SEISMIC RESISTANCE CHECK LIST [IBC 1705]

Seismic Design Category

FOR SEISMIC DESIGN CATEGORY C OR HIGHER:

Structural:

The seismic-force-resisting systems

- Steel Braced Frames and associated connections/anchorage
- Steel Moment Frames and associated connections
- Shear walls: CMU Wood Concrete
- Other:

Diaphragms: Floor Roof

QUALITY ASSURANCE FOR WIND RESISTANCE CHECK LIST [IBC 1706]

Wind Exposure Category

REQUIRED	NOT REQUIRED	NOT APPLICABLE	QUALITY ASSURANCE PLAN REQUIREMENTS (A Quality Assurance Plan is required where indicated below)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	In wind exposure Categories A and B, where the 3-second-gust basic wind speed is 120 miles per hour (mph) (52.8 m/sec) or greater.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	In wind exposure Categories C and D, where the 3-second-gust basic wind speed is 110 mph (49 m/sec) or greater.

Prepared by:

Building Code Official's Acceptance:

Signature Date

Signature Date

Project:
Date Prepared:

Contractor's Statement of Responsibility

Each contractor responsible for the construction or fabrication of a system or component designated in the Quality Assurance Plan must submit a Statement of Responsibility. The Statement of Responsibility is required for Seismic Design Category C or higher. Make additional copies of this form as required.

Project:

Contractor's Name:

Address:

License No.:

Description of designated building systems and components included in the Statement of Responsibility:

Contractor's Acknowledgment of Special Requirements

I hereby acknowledge that I have received, read, and understand the Quality Assurance Plan and Special Inspection program.

I hereby acknowledge that control will be exercised to obtain conformance with the construction documents approved by the Building Official.

Signature

Date

Contractor's Provisions for Quality Control

Procedures for exercising control within the contractor's organization, the method and frequency of reporting and the distribution of reports is attached to this Statement.

Identification and qualifications of the person(s) exercising such control and their position(s) in the organization are attached to this Statement.

SECTION 15710 (Or Applicable Section Number)

HEAT EXCHANGERS – FACE & BYPASS HEATING COIL PACKAGED SYSTEM

PART 1 GENERAL

1.1 WORK INCLUDED

A. Provide Steam (or Hot Water as applicable) Heavy Duty Face & By-Pass Air Pre-Heating Packaged Systems in a common unit, including, but not limited to:

1. Pneumatic or Electric Actuators (unless specifications indicate "supplied by others")
2. Dampers and Associated Linkage
3. Finned Tube Heating Surface
4. Casing/Framing, for Duct Mounted or Air Handler Mounted Locations as Detailed in the Drawings, Specifications and Schedules.

1.02 RELATED WORK: Applicable Piping Specialties and Temperature Controls Sections.

1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.
- B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.
- C. Installation & Operation Data: Submit manufacturer's installation and operation manual.

1.2 QUALITY ASSURANCE

- A. Comply with governing codes and local regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 FACE & BYPASS HEATING COIL PACKAGED SYSTEMS:

- A. Manufacturer: Armstrong-Hunt, Inc. (Armstrong Heat Transfer Group, Div. of Armstrong Intl., Inc.)
- B. Refer to web page: <http://www.armintl.com/products/coils/duramix.php3>
- C. Integral Face & Bypass Heat Exchanger: Armstrong DURAMIX™ Vertical or Horizontal Tube Orientation, with size and capacity as shown on schedules, specifications or drawings.
- D. Heat Exchanger, Face & Bypass Coil System shall consist of an all welded construction of Heavy Duty, extended surface (finned tube) heating elements and bypass damper sections designed to modulate from fully open to fully close.

- E. Face & Bypass Coils to be constructed of highest quality materials to include:
1. All Welded (ASME welding procedures apply) Mono-Metallic Construction for all wetted parts.
 2. TUBES: Heavy Duty Construction. Materials Options based on Fluid Temperature, Pressure, and External Environmental (Airside) Conditions. To Include:
 - A. 12 Ga. Steel (Type Q)
 - B. 14 Ga. 304L Stainless Steel (Type W)
 - C. 14 Ga. 316L Stainless Steel (Type Y)
 - D. Schedule 10, 304L or 316L St.Stl. Pipe
 3. FINS: Heavy Duty Construction. Materials Options based on Performance Requirements and External Environmental (Airside) Conditions. To Include:
 - A. 0.020" Thick Aluminum (Type A) (Embedded, Keyfin, or Tension Wound)
 - B. 0.030" Thick Aluminum (Type B) (Embedded, Keyfin or Tension Wound)
 - C. 0.024" Thick Steel (Type G) ("L" Footed Fin or Tension Wound)
 - D. 0.020" Thick 304 or 316 St.Steel ("L" Footed Fin or Tension Wound)
 4. HEADERS: Heavy Wall Carbon or St.Steel (matching Tube Materials)
 5. TUBE/HEADER JOINTS: All Welded (ASME Welding Procedures Apply) Mono-Metallic Construction for Wetted Parts, Including Connections.
 6. DAMPER LINKAGE ASSEMBLY: Heavy Gauge Stainless Steel for Corrosion Prevention, with Free Movement at axis/swivel points.
 7. CASING/ENCLOSURE: 12 Ga. Galvanized Steel (optional 12 Ga. 304L or 316L St.Steel), Drilled or Undrilled for Mounting Holes as required.
 8. Heating Core to be designed to allow for expansion and piping system to be designed to accommodate pipe system expansion related to temperature of heating medium.
 9. Pressure & Temperature Rating to Comply with System Steam or Fluid Heating Medium Requirements and Applicable Codes and Standards.
 10. Hydrotest to Code Minimum 1.3 Times Maximum Working Pressure
 11. Design Construction of Pressure Parts to 150 PSIG Steam / 400dgF Minimum. (Other Pressure/Temp. Limits based on Materials Selection and Connection Designs.)
- F. PERFORMANCE:
1. To Meet or Exceed Leaving Air Temperature Requirements in Plans and Specifications.
 2. To Maintain Uniform Outlet Air Temperatures under Constant Steam or Heating Medium Conditions, while Modulating Airflow Over and Around Heat Transfer Surfaces (Finned Tube Sections).
 3. Damper Contact to be sufficient to minimize bypass when dampers are fully closed.
 4. Total Air Side Pressure Drop over Face and Bypass Section shall not vary significantly regardless of bypass damper positioning.
 5. Fin/Tube Construction shall be such as to accommodate periodic High Pressure Washing of Fin/Tube Surfaces.

PART 3 EXECUTION

- A. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials in proper relation with adjacent construction and with uniform appearance for exposed work. Coordinate with work of other sections. Comply with applicable regulations and code requirements. Provide proper clearances for servicing. Clearly label and tag all components as required by specifications.
- B. Pneumatic Controls and Electric Controls by Electrical or Controls Contractor.
- C. Piping Installer to insure inlet and outlet connection allow for flexibility and expansion during normal operation, start-up and shutdown.
- D. System shall be drained to an open/vented return system or gravity drain to insure full drainage during shutdown.
- E. Test and balance all systems for proper operation. Restore damaged finishes.
- F. Clean and protect work from damage.
- G. Instruct Owner's personnel in proper operation of systems.

END OF SECTION

APPENDIX C

UNIVERSITY OF MAINE CAMPUS DESIGN CRITERIA

The following is a list of items that the University of Maine has developed as an indication of the expected level of quality for equipment, materials, and procedures. These items are applicable to the extent they are relevant and appropriate to the project being undertaken.

The University of Maine requires that the design comply fully with all applicable codes, accessibility requirements, regulatory permitting, and municipal code office reviews. The design shall not, however, require additional project resources to exceed these standards.

At each stage of the design process, the University shall be provided with a digital set of drawings in AutoCAD .dwg and PDF format.

All paper Specifications shall be accompanied by a digital copy in MS Word format.

All Drawings and Specifications associated with the Project become the property of the University of Maine and shall not be copyrighted.

01 00 00 GENERAL REQUIREMENTS

- A. Avoid impacts to campus from construction activity. Coordinate project schedule with the academic calendar for the semester(s). There shall be no construction generated noise in buildings where final examinations are being conducted (two weeks per year).
- B. Specify no asbestos-containing materials shall be used.
- C. Specify submittal review time no greater than 10 calendar days.
- D. For renovation projects, specify fire watches are required per NFPA101 standards.
- E. Specify hot work permit requirements.
- F. Any code exceptions included in bid documents shall be documented by written approval by the AHJ prior to bid.
- G. On renovation projects any existing Electrical or Mechanical equipment or services that are rendered unserviceable must be disconnected and removed.
- H. Consider operational issues from snow and ice, including plowing, staging, and removal.

01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

- A. Specify the Owner shall receive a record of materials generated from the Project for recycling, reuse or disposal either on-site or off-site. At a minimum, the record shall detail all of the following:
 - 1. Item(s)/material(s) recycled, reused or disposed of;
 - 2. How much (pounds or tons) was recycled, reused or disposed of;
 - 3. The breakdown of material recycled, reused or disposed of;
 - 4. The location where the material was recycled, reused or disposed of;
 - 5. Dates of disposal; and,
 - 6. The name, owner name and contact information of the receiving facility.
- B. Specify the Owner shall be provided, each week, copies of the truck slips (count) to document the quantity of material removed from the site. The slips shall define the off-site location used for recycling, reuse or disposal.

02 00 00 EXISTING CONDITIONS

- A. Existing roofs shall be protected from damage during construction.
- B. Existing floors shall be protected from damage during construction.
- C. Use Section 02 83 33.13, Lead-Based Paint Removal and Disposal where applicable. (document attached)

03 00 00 CONCRETE

- A. Specify tool concrete stair nosing where rubber treads are to be installed.
- B. Specify replaceable metal nosing on steps if they are required.
- C. Specify the construction of entrance slabs on frost walls.
- D. Specify sloped floors to drains.
- E. Specify concrete floors in Machine and Mechanical Rooms.

04 00 00 MASONRY

- A. Specify weep holes shall be kept open to allow water to flow from wall cavity.

05 50 00 METAL FABRICATIONS

- 1.0 Identify special inspection requirements early in Design Development phase and coordinate with Owner to develop special inspection planning. (sample requirements attached)
 - A. Specify steel stairpans, risers, and sub-platform, for use between the ground level and next floor shall be hot dipped galvanized after fabrication.
 - B. Specify exterior railings shall be hot dipped galvanized after fabrication.
 - C. Aluminum hand railings shall be for interior use only.

07 00 00 THERMAL AND MOISTURE PROTECTION

- A. Roofing materials: specify architectural grade asphalt shingles only or 0.060" PVC membrane roofing. Do not use EPDM or TPO roofing.
- B. Specify roof top units shall be installed on water tight support curbs 12" above roof elevation minimum.
- C. Where practical, specify roof top equipment shall be installed a minimum of 16'-0" from the roof edge. Units that must be installed less than 16'-0" from roof edge, shall require OSHA compliant safety railings.
- D. Specify fall protection shall be provided as needed in the form of anchors, lifelines, railings/parapet walls, or any combination thereof. Fall protection shall be OSHA compliant. Necessity, type of protection, and location(s) to be determined by FM Safety Office.
- E. Where skylights or similar are installed, specify skylights and similar shall be protected by guardrails or skylight safety screens.
- F. Specify roof hatches shall be protected by guardrails installed around the hatch with self-closing and self-latching entry/exit gate.
- G. Specify roof hatches shall be installed with ladder-up devices from the interior access ladder that extend the access ladder in the building up through the hatch to protect against falls.

07 84 13 PENETRATION FIRESTOPPING

- A. Specify firestopping existing penetrations in rated construction.

08 00 00 OPENINGS

- A. Specify nominal 3'-0" x 7'-0" wood, steel, fiberglass, aluminum. For labs and other areas where equipment will be moved in and/or out of rooms, all interior/exterior doors shall be 4'-0" x 7'-0" (single) and 6'-0" x 7'-0" (double)
- B. Specify reinforcing plates for door closers shall be tack welded in place at door header frame.
- C. Specify hinge plates shall be welded all around, not tack welded.
- D. Specify doors and hardware shall be salvaged and turned over to Owner.
- E. Specify steel doors shall be seamless with caps for bottom and top of doors, 5/8" maximum undercut at bottom of doors.
- F. Specify thresholds shall be latch track aluminum at non-handicap entrances.
- G. Specify exterior doors and astragals shall be weather-stripped.
- H. Specify wood back-up framing at all doors and windows when using metal studs.
- I. Specify hold opens at all exterior delivery doors.
- J. Specify frames shall be set outside of openings for doors installed in deep wall construction.
- K. Specify door openings shall be installed to enter all mechanical spaces and similar to prevent the creation of a confined space.
- L. Specify vision glass in stairwell doors (4" x 25").
- M. Specify keyed removable mullions for keyed double doors.

08 50 00 WINDOWS

- A. Specify windows shall have removable glass for repair.
- B. Specify single hung and sliding window units only.
- C. Specify screens shall be made of quality, high gauge, aluminum extrusion. Specify 12 replacement screens of each size.
- D. Specify window screens mounted on outside of window. Specify attic stock for screens and replacement hardware (i.e. locks, pivots, balances)

08 70 00 HARDWARE

- A. Keying for New Construction will be coordinated by the FM Project Manager. Specify the hardware supplier shall ship all permanent building keys and cylinders directly to the FM Locksmith Shop.
- B. Specify door frame hardware locations in accordance with ANSI specifications.
 - 1. ANSI strike plates.
 - 2. Exterior door hinges: Stanley FBB 199, jeweled with non-removable pins.
 - 3. Interior door hinges: Stanley FBB 179, jeweled.
 - 4. Doors over 3'-0" wide, require three (3) double strength hinges. Doors over 7'-0" wide, require four (4) hinges.

- C. Specify door closer with back-check, non-handed, parallel arm, steel body. Acceptable: LCN 4040 XP Series.
- D. Specify panic hardware with handicap trim, rim devices. Acceptable: Von Duprin Series 33 standard, Von Duprin Series 99 fire-rated.
- E. Specify stainless steel door knobs and kickplates.
- F. Specify Schlage ND Series locksets Grade 1 cylindrical (Rhodes Design, 626 Color), no exceptions. Or Schlage L Series locksets Grade 1 mortise (Rhodes Design, 626 Color) , no exceptions. All locks shall be provided with an Everest Primus restricted keyway system, to be determined by Owner prior to bidding. Specify interchangeable cores preferred.
- G. Specify handicap operator on door opener/closer.
 - 1. Pneumatic unit. Acceptable: LCN Pneumatics
 - 2. Electric unit. Acceptable: Besam, Horton, LCN, Stanley
- H. Specify surface mounted vertical rods only.
- I. Specify match existing building hardware for renovations and additions to buildings, unless otherwise stated by Owner.
- J. Specify a rapid-entry key box (Knox Box) to be located in the vicinity of one main exterior door. Location determined by Orono Fire Department. Knox Box provided by Owner.
- K. Specify "Exit Only" doors shall be cylinder by no trim.
- L. Specify card entry system at all entrances and all critical spaces (i.e.: laboratories). Critical spaces determined by Owner. Acceptable: Blackboard.
- M. Specify mechanical key override in door for all card entry system entrances.

09 51 00 ACOUSTICAL CEILINGS

- A. Specify main runners 2 feet on center with 14 gauge wire at 4 foot intervals staggered for ceiling runner support system.
- B. Specify random punched ceiling tile 2' x 2'. Shop drawings should include materials, pattern number, tile number and manufacturer. Acceptable: Armstrong, Celotex, US Gypsum.
- C. Specify hung ceilings to leave a minimum 8" deep cavity above ceiling.
- D. Specify heavy duty, fire guard, 15/16" exposed track by Armstrong.
- E. Specify wall angle (L). Do not use U-channel.
- F. Specify attic stock for ceiling tiles.

09 60 00 FLOORING

- A. Floor tile. Acceptable: Armstrong, Johnsonite, Mannington.
- B. Specify sufficient expansion joints for quarry tile.
- C. Specify sealing of concrete floors before installing floor tiles.
- D. Specify epoxy compound when installing rubber treads.

09 68 00 CARPETING

- A. Specify Collins and Aikman 6' Powerbond RS vinyl cushion backing with chemically welded seams and Mark 1 "peel and stick" adhesive.

09 69 00 ACCESS FLOORING

- A. Specify entrance grids. Acceptable: Pedigrid or equal drained.

09 70 00 WALL FINISHES

- A. Specify baseboards shall be 6" to 8" high.
- B. Specify waterproof baseboards in restrooms to provide a minimum 4 ft high moisture barrier. Consider ceramic tile walls.
- C. Specify graffiti-resistant wall surfaces in restrooms.

09 90 00 PAINTING AND COATING

- A. Specify no lead-containing paints and coatings shall be used on drywall walls and ceilings, metal doors and casings, wood trim and doors, wood clear finishes, structural steel, and concrete.
- B. Specify paints and coatings shall adhere to the Green Seal GS-11 and Green Seal GS-03 standard for volatile organic compound (VOC) content.
- C. Specify Sherwin Williams primer coat, intermediate coat, and finish coat for interior jobs.
 - 1. Drywall walls.
 - a. Primer coat: Sherwin Williams Pro Green 200 Interior Latex Flat Wall Primer.
 - b. Intermediate coat: Superpaint Interior Latex Semi-Gloss Enamel.
 - c. Finish coat: Superpaint Interior Latex Semi-Gloss Enamel.
 - 2. Drywall ceilings.
 - a. Primer coat: Sherwin Williams Pro Green 200 Interior Latex Flat Wall Primer.
 - b. Intermediate coat: Pro Green 200 Interior Flat Latex.
 - c. Finish coat: Pro Green 200 Interior Flat Latex.
 - 3. Metal doors and casings.
 - a. Primer coat: Sherwin Williams Kem Bond High Solids.
 - b. Intermediate coat: Promar Alkyd Metal Enamel Semi-Gloss.
 - c. Finish coat: Promar Alkyd Metal Enamel Semi-Gloss.
 - 4. Wood trim and doors.
 - a. Primer coat: Sherwin Williams Pro Block Alkyd High Solids Primer.
 - b. Intermediate coat: Promar Alkyd Metal Enamel Semi-Gloss.
 - c. Finish coat: Promar Alkyd Metal Enamel Semi-Gloss.
 - 5. Wood clear finish.
 - a. Primer coat: Wood Classics Waterborne Varnish Satin.
 - b. Intermediate coat: Wood Classics Waterborne Varnish Satin.
 - c. Finish coat: Wood Classics Waterborne Varnish Satin.
 - 6. Structural steel.
 - a. Primer coat: Pro-Cryl Universal Primer.
 - b. Intermediate coat: Sher-Cyrl HPA Gloss.
 - c. Finish coat: Sher-Cyrl HPA Gloss.
 - 7. Existing Plaster ceilings and walls: Use Sherwin Williams fast-dry oil-based primer.
- D. Specify Sherwin Williams primer coat, intermediate coat, and finish coat for exterior jobs.
 - 1. Wood and trim.
 - a. Primer coat: A-100 Exterior Alkyd Wood Primer.
 - b. Intermediate coat: Super Paint Exterior Latex Gloss.
 - c. Finish coat: Super Paint Exterior Latex Gloss.
 - 2. Structural steel.

- a. Primer coat: Pro-Cryl Universal Primer.
 - b. Intermediate coat: Sher-Cryl HPA Gloss.
 - c. Finish coat: Sher-Cryl HPA Gloss.
- E. Specify primer coat and finish coat for interior concrete jobs.
- 1. Cured concrete.
 - a. Primer coat: DTM Primer.
 - b. Finish coat: Pro Industrial.
 - 2. Concrete floors.
 - a. Primer coat: Tred Plex.
 - b. Finish coat: Tred Plex.
- F. Specify primer coat and finish coat for exterior concrete jobs.
- 1. Cured concrete.
 - a. Primer coat: Lexon Primer.
 - b. Finish coat: Lexon Finish.
 - 2. Concrete floors.
 - a. H&C Concrete Stain.
- G. For other types of applications, Contractors should check Benjamin Moore, Sherwin Williams, and Wilbur & Williams products and application manuals to serve as guides.

10 00 00 SPECIALTIES

- A. Specify loading docks 4'-0" or higher require safety railings.
- B. Specify proper blocking for Owner-provided soap dispensers, paper towel dispensers, sanitary napkins dispensers, and toilet tissue dispensers.
- C. Specify blocking for all window treatments.
- D. Do NOT specify built in trash receptacles for restrooms.
- E. Specify fire extinguisher cabinets for 10-pound extinguishers. Ten (10) pound ABC extinguishers will be provided by Owner.
- F. Where ladder use is required to access a raised platform, opening or service point, specify OSHA-compliant fixed ladders shall be installed and positioned to allow users to step off ladder onto the platform, into the opening or at the service point.

11 52 13 PROJECTION SCREENS

- A. Specify electric-operated projection screens.

12 00 00 FURNISHINGS

- A. Specify post-form counter construction for all writing tables, writing tablets and counters without edge banding.
- B. When specifying movable furniture such as chairs, tables, partitions, and similar, consider the ergonomics of staff using, maintaining, cleaning and handling the furniture or systems.

12 93 23 TRASH AND LITTER RECEPTORS

- A. Specify exterior rubbish and recycling containers.
- B. Specify concrete pads for dumpsters and compactors. Consider a minimal route from building to pads.

13 20 00 SPECIAL PURPOSE ROOMS

- A. Specify the provision of a lockable, separate storage space for replacement building materials.
- B. Specify all equipment containing oil in mechanical spaces shall be installed on a drip collection pan suitable in volume to collect 110 percent of the oil volume contained in the equipment.
- C. Specify a separate 8' x 12' room for custodial supplies and equipment with at least one receptacle and one floor sink.
- D. If needed, specify a shed/storage facility shall be provided for storage of a snow-blower attached to the building or stand alone that is not accessible from the building.

14 20 00 ELEVATORS

- A. Specify:
 - 1. Hydraulic hole type slow speed. Acceptable: Otis, Stanley, Thyssen.
 - 2. Hydraulic non-telescopic twin piston, slow speed. Acceptable: Otis, Stanley, Thyssen.
- B. Specify oil detection control panels and equipment in elevator pits with local alarm. Acceptable: CSI Oil Minder Elevator Panel PNL 115V or similar as approved by Owner.
- C. Specify elevator shafts shall meet NFPA two-hour fire rating and not require sprinkler heads.
- D. Do not specify elevator shaft smoke/heat detectors that require testing from the top of the elevator car.
- E. Specify equipment pad or concrete pier for elevator equipment located in pit to protect equipment from floor moisture.
- F. For hydraulic elevators, specify capacity of hydraulic fluid.

21 13 00 FIRE-SUPPRESSION SPRINKLER SYSTEMS

- A. Specify, prior to fabrication, two sets of sprinkler contractor's shop drawings and one set of hydraulic calculations shall be submitted to the University of Maine System, Director of Risk Management, 65 Texas Avenue, Bangor ME 04401 for state of Maine property insurer review and acceptance.
- B. Specify Schedule 40 black iron or galvanized piping on dry sprinkler systems.
- C. Specify dry pipe, pre-action or other fire sprinkler system shall be a "stand alone" system provided with a connection to the Fire Department connection, the fire alarm panel and the water-motor gong. All systems within a building shall connect to the water main at the point where the water main enters the building in the Mechanical Room.
- D. Specify a 3" floor drain to handle water flow from the sprinkler system for all spaces where dry pipe valves and/or alarm valves are located.
- E. Specify a water-motor gong for all fire sprinkler systems to provide backup mechanical alarm protection to the fire alarm panel.
- F. For all wet sprinkler systems specify:
 - 1. Retard chambers equipped with pressure switches tied to fire alarm panel; and,
 - 2. Excess pressure pumps mounted on or near supply riser complete with pressure switches and piping connections for automatic operation.
- G. Specify direct piping to an appropriate location outside the building for all fire sprinkler main drains to facilitate operating the main drain in a "full-flow" condition.
- H. For all fire sprinkler systems specify an inspector's test valve location at the highest, furthest distance away

from the dry pipe valve or alarm valve.

- I. Specify bronze or brass bodies for back flow preventers installed on fire sprinkler systems. Acceptable: Wilkins Model 350.
- J. Specify air compressors with oil for sprinkler systems.
- K. Specify an electrically-operated automatic bleeder to eliminate condensation from the tank on dry pipe systems equipped with a tank-mounted air compressor that utilizes the tank. This will require the installation of a 120 volt circuit at the compressor location.
- L. On systems utilizing a tank-mounted air compressor, specify the installation of a pressure-regulating valve, sized for the appropriate pressure, range to maintain a pressure differential of 20 psi.
- M. Specify back flow preventers installed on fire sprinkler systems shall be tested and certified by a licensed tester upon installation. Test results shall be submitted to the University of Maine, Office of Facilities Management, 5765 Service Building, Orono ME 04469.
- N. Specify 1" or larger ball valve equipped with a garden hose adapter and a brass cap on all sprinkler low-points.
- O. Specify all pre-action systems shall have an air compressor and electrical controls to maintain a supervisory air pressure within the system.
- P. Specify Owner's Manual shall contain specific model information for automatic sprinkler systems, including heads.

22 00 00 PLUMBING

- A. Fixtures, color white. Acceptable: American Standard, Eljer, Kohler.
- B. Fixture supports. Acceptable: Smith, Wade, Zurn. Specify black iron piping only, not galvanized piping.
- C. Water closets. Specify seat, no cover, color black. Acceptable: American Standard, Eljer (elongated), Kohler.
- D. Flushometers. Specify manual or hard-wired motion-sensor type. Acceptable: Royal, Sloan.
- E. Waste fittings. Specify chrome-plated, 17 ga. brass.
- F. Valves.
 - 1. Under 1" 400 WOG with drain full port – ball valves, stainless steel ball, seat, stem. Acceptable: Apollo, Nibco, Wolverine Brass.
 - 2. Over 1" 600 WOG without drain full port – ball valves. Acceptable: Apollo, Nibco, Wolverine Brass.
- G. Specify 10-year manufacturing warranties for all water heaters.
- H. Electric water coolers. Specify all stainless steel, capable of delivering a minimum of 8.0 GPH of 50°F water, at an ambient air temperature of 70°F. Do NOT specify bubblers. Acceptable: Halsey Taylor WM8AQ, Elkay, G.E.
- I. Emergency showers.
 - 1. Acceptable: Guardian G-1643, Hawes, Speakman.
 - 2. Tempering valve: Specify Leonard TA-800, Powers, Symmons.
 - 3. Do not provide floor drain.
- J. Emergency eye wash stations.
 - 1. Acceptable: Guardian, Hawes, Speakman.
 - 2. Tempering valve: Specify Leonard TA-300, Powers, Symmons.

3. Do not provide floor drain.
- K. Emergency combination shower and eye wash units.
 1. Acceptable: Guardian G-1902P, Hawes, Speakman.
 2. Tempering valve: Specify Leonard TM-800, or equal.
 3. Do not provide floor drain.
 - L. Service faucet. Specify hot and cold water draw off in each restroom.
 - M. Shower valves. Specify pressure balanced, anti-scald. Preferred: Symmons Safety Mix. Acceptable: Leonard, Powers.
 - N. Shower drains. Specify 3" for gang showers; 2" for single showers. Specify showers shall have shower pans. Do not use painted pans.
 - O. Water meters. Specify water meters shall have remote-reader heads made by Badger Meter, Inc., Model #RET™, 4 to 20 mA analog signal head, to read in cubic feet. Acceptable: Badger Model 170.
 - P. Specify brass strainer and ball valve at service entrance ahead of backflow preventer. Specify brass ball valve after backflow preventer. All back flow preventers on the water service shall be brass or bronze bodied, and shall be tested and certified by a licensed tester upon installation. Test results shall be submitted to the University of Maine, 5765 Service Building, Orono ME 04469. See UM piping detail dated 12/19/07 "Domestic Water Entrance Detail."
 - Q. Floor drains. Specify piping to sanitary sewer. Acceptable: Josam, Smith, Zurn. Specify screens to minimize insect intrusion.
 - R. Roof drains. Specify piping to storm sewer. Acceptable: Josam, Smith, Zurn.
 - S. Specify floor type slop sinks. Specify first floor slop sinks shall have sand trap solids interceptors.
 - T. Faucets. Specify hard-wired motion-sensor type. Acceptable: American Standard, Chicago, Kohler.
 - U. Specify ball valve and end cap for building drain down on water system.
 - V. Specify low-flow plumbing fixtures shall comply with Maine State Plumbing Code:
 - W. Specify pressure reducing valve on building water service shall be set to deliver 60 to 65 psi at most remote fixture.
 - X. Specify two frost proof sill cocks with vacuum breakers for each building on opposite faces. Acceptable: Zurn Model Z1321C – compression type. Do not specify Model Z1321 with ceramic disc cartridge.
 - Y. Specify all gas piping shall be Schedule 40 black iron pipe or stainless steel. Approved ball valves shall be used at every branch line, at the point where it leaves the main. Valves shall also be used at every fixture termination.
 - Z. Specify sump pumps in elevator pits, tied to sanitary sewer. Refer to 14 20 00, Item B.
 - AA. Specify a floor drain and pan in drying areas.
 - AB. Specify a minimum of one (1) custodial closet per floor with a floor-mounted utility sink.
 - AC. Specify floor drains in restrooms and mechanical rooms.
 - AD. Specify all acid-resistant drainage and vent piping shall be joined with heat-fusion joints. Mechanical joints shall only be used for fixture connections and shall be exposed and fully accessible. Acceptable: Zurn corrosive waste drainage systems.

- AE. Specify all fume hood stack discharges shall extend a minimum of 10 feet off the roof deck.
- AF. Fume hoods with hot and/or cold water faucets shall be provided with approved pressure-type vacuum breaker outside of fume hood. These shall be accessible, and tested and certified by a licensed tester upon installation. Test results shall be submitted to the University of Maine, Office of Facilities Management, 5765 Service Building, Orono ME 04469. Acceptable: Conbraco, Watts, Wilkens.
- AG. Specify all PVC solvent-welded joints shall be made with a PVC primer-containing purple primer dye.
- AH. Do NOT specify CPVC water lines.
- AI. Specify conformance with UM piping detail dated 12/19/07 “Domestic Water Entrance Detail.”
- AJ. Specify solder used on copper domestic water piping shall be SilverBrite 100. Do not specify 95/5 solder.
- AK. Specify exterior LP gas and natural gas devices shall be protected from damage.
- AL. Specify accessibility to fixtures (i.e. valves, shutoffs) through chases and access panels.

23 00 00 HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

- 1.0. Mechanical Engineer of Record shall be present for all AHU start up and during Owner systems training.
- 2.0. For projects requiring modifications to existing HVAC systems, the Mechanical Engineer of Record shall identify the impacted systems such that the Owner may perform testing to determine the baseline of the existing conditions.
- 3.0. Identify Commissioning requirements early in Design Development phase and coordinate with Owner to develop Commissioning planning.
 - A. Boilers.
 - 1. Specify all cast iron steam boilers shall be designed to be assembled with cast iron or steel push nipples or be constructed with external supply and return headers. For systems requiring process steam or steam for humidification, specify boilers with cast iron or steel push nipples.
 - 2. Specify all buildings requiring boilers shall be designed with a ground level boiler room with an outside entrance. Air handling systems shall not occupy the same space as the boiler. The ceiling height of boiler rooms shall be no less than 10 feet. All penetrations for heating, plumbing and electrical pipes from the boiler room into the building shall be sufficiently sealed to prevent contamination of the occupied areas of the building by any fume leakage from the boiler. All penetrations shall be sealed to meet fire code requirements.
 - 3. Humidification.
 - a. Buildings connected to the central distribution system that require humidification shall use steam generated at the Central Heating Plant. (UMaine specific)
 - b. Buildings with their own boiler shall use steam generated for humidification through an exchanger type humidifier.
 - 4. Steam boilers. Acceptable: Burnham, Peerless, Smith Mills 350 or 450.
 - 5. Specify hot water boilers serving heating systems that incorporate air handling systems, shall have a cold shock prevention system integrated into the boilers’ return system.
 - 6. Hot water boilers. Acceptable: Burnham, Peerless, H.B. Smith, Utica, Weil McClain.
 - B. Air handling systems.
 - 1. Air handling systems shall serve only areas of like use. Classrooms, computer labs, scientific labs, lecture halls and offices all have different usage and temperature requirements, all air supply systems shall be designed accordingly.
 - 2. Air handling systems shall be designed with consideration given to present and pending indoor air quality standards.
 - 3. Air handling equipment shall be designed with adequate access doors and panels in all segments of the HVAC equipment to allow proper cleaning, maintenance and repair of all system components. Filters shall be accessible with a door on each side of the air handlers.

4. Air handling equipment shall be located in the building for easy access to all components for service and maintenance.
 5. Air handlers shall have a mixed air box with mixing vanes designed to eliminate the stratification of outside air and return air.
 6. Design an air filtration system of pre-filter and final filter. A minimum efficiency for air filtration of 35 percent is expected with all filters being pleated, bag, box, or cell construction. Do not specify fiberglass filters or filters blended with fiberglass.
 7. Air handling systems shall be designed with sufficient air diffusers to assure quiet and even distribution of air within each ventilated space. Balance dampers shall be installed in the trunk before each diffuser. Dampers that are built into the diffuser shall NOT be used for balancing purposes.
 8. Specify electric or pneumatically driven HVAC control actuation devices including valves, VAV controllers and dampers.
 9. Specify variable air volume systems shall use variable speed drivers instead of vortec dampers. Acceptable: Honeywell, Reliance, Toshiba.
 10. Air handlers.
 - a. Acceptable air handlers: McQuay, Trane, York.
 1. Specify the on-site control system check out shall include the proper operation of all EMS control system devices. All thermostats, dampers, freezestat, etc., and the operation of all modes of each AHU shall be proven correct to the satisfaction of the Designer and Owner. The control system shall not be accepted as complete until this has been done. This is the Contractor's responsibility and shall be part of the base bid price.
 - b. Acceptable air filters: Airguard, American Air Filter, Farr.
 11. Laboratory fume hood design shall be in accordance with NFPA45. Fume hood exhaust shall discharge at least 10 feet above roof level.
 12. All HVAC equipment shall be housed within the building envelope.
 13. Specify Armstrong Duramix for air handlers requiring integral face and bypass coil. (see sample specification document attached)
 14. As part of submittal process, the contractor shall attain the MAC address for the unit and confirm DHCP compatibility with the University IT department.
 15. Specify access doors at each side of dampers of such size to allow ready access to the fusible link.
 16. If code allows, specify fusible link at ductwork fire dampers shall be capable of 210 degrees.
 17. As part of the contract and warranty, the AHU manufacturer shall provide a representative for a service call monthly to confirm proper operation of the unit(s). The service calls shall be for the one-year warranty period and commence one month after substantial completion.
- C. Testing and balancing.
1. Specify a balance report shall be supplied prior to the completion of the project. During the process of training and/or punching out the mechanical system, the balance contractor shall be present with the mechanical designer to check as many grilles as necessary against the balance report to ensure to the Designer and the Owner that the report is correct. This shall be clearly stated in the specifications that this is part of the balance contractor's bid and any changes brought about by this shall be borne by the Contractor.
- D. Air conditioning units – factory start-up.
1. Specify AC units shall require start-up by a factory field service technician to ensure the units are properly installed and set-up and operating to design and factory specifications. If the factory field service technician finds any problems with the installation, the mechanical contractor shall take any required corrective measures immediately and be responsible for any subsequent start-up expenses. Any available factory extended warranties shall be purchased with each AC unit. Acceptable AC Units: Carrier, Trane, York.
 2. Specify a minimum of eight hours of training by the factory field service technician during the start-up procedure for the University's HVAC technicians with Designer present.
 3. As part of the contract and warranty, the AC unit manufacturer shall provide a representative for a service call monthly to confirm proper operation of the unit(s). The service calls shall be for the one-year warranty period and commence one month after substantial completion.

- E. Hot water heating and chilled water cooling.
 1. Specify hot water heating and chilled water cooling systems shall be protected from freezing with a 50 percent by volume solution of propylene glycol.
 2. Specify isolation ball valves and drain stations on the supply and return sides of each heating unit (unit heaters, baseboard radiation, VAV reheat coils, main branch lines, etc.) and a drain valve for each unit. A balance valve shall not be considered as an isolation valve.
 3. Specify rising stem gate isolation valves on the suction and discharge side of each circulation pump.
 4. Specify check valves on the suction or discharge side of each circulation pump.
 5. Ball valves, with stainless ball, stem and seat. Acceptable: Apollo, Nibco, Stockham, Watts.
 6. Specify welded or threaded pipe on chilled water and hot water heating lines.
 7. Gate valves, with rising stem. Acceptable: Crane, Jenkins, Nibco, Stockham, Walworth.
 8. Pumps. Acceptable: Bell & Gossett, Taco, Weinman.
 9. Anti-freeze. Acceptable: Dow Frost, No-Burst.
 10. All pumps shall be floor-mounted with 2' clearance on all sides.

- F. Steam traps.
 1. Thermostatic traps. Acceptable: Armstrong TS2, Barnes & Jones models 122 & 134, Sarco.
 2. Float & thermostatic traps. Acceptable: Barnes & Jones, Sarco, Armstrong.
 3. Bucket traps. Acceptable: Armstrong, Barnes & Jones, Sarco.

- G. Gate and globe valves. Specify 150#, os&y for flanged valves and rising stem for threaded valves. Acceptable: Crane, Nibco, Stockham, Walworth.

- H. Ball valves. Do not specify ball valves for steam service. 150# steam-rated with stainless steel ball, stem and seat, RTFE seat and packing, and latch lock handles for hot water heating service. Acceptable: Apollo, Nibco, Stockham, Watts.

- I. Steam pressure reducing valves. Specify 50# entering steam – pilot operated. Acceptable: Leslie, Masoneilan, Spence.

- J. Fittings cast iron and malleable. Acceptable: Flagg, Stockham, Ward.

- K. Flange gaskets. Acceptable: 150# API 601 Flexitallic, Leader, Parker.

- L. In-line strainers and check valves. Acceptable: Crane, Stockham, Walworth.

- M. Pressure and temperature gauges. Specify pressure gauges on all chilled and hot water pumps shall be liquid filled. Acceptable: Ashcroft, Marshalton, Terrice.

- N. Air eliminators. Acceptable: Spiro-vent, Armstrong, Sarco, Taco.

- O. Steam-heated semi-instantaneous water heater. Acceptable: Ace, Armstrong, Patterson-Kelly.

- P. Expansion joints. Acceptable: ADSCO, Advanced Thermal, Yarway.

- Q. Condensate pumps. Acceptable: Dunham Bush, Skidmore, Weil.
 1. Specify condensate pumps shall be duplex with alternating operation.
 2. Specify condensate pumps shall be equipped with failure alarm contacts. The alarm contacts shall be wired to the Energy Management Control System for reporting all pump failures to the head-end computers located in the HVAC Shop.
 3. Specify condensate tanks shall have a temperature sensor installed by Johnson Controls, Inc. or Honeywell International, Inc. This sensor shall be wired to the Energy Management Control System for continuous monitoring at the head-end computers located in the HVAC Shop. A high limit alarm point shall be programmed into the system.

- R. Boiler feed pumps and tanks.
 1. Specify boiler feed tanks shall be equipped with duplex alternating pumps with alarm contacts. A temperature sensor shall be installed in the tank. The alarm contacts and temperature sensor shall be

- wired and programmed as described in the specifications.
2. Specify boiler feed tanks shall be sized appropriately with consideration given to boiler, pipe, heat exchanger, heating coil, and radiation capacity. Acceptable: Dunham Bush, Skidmore, Weil.
- S. Unit and cabinet heaters.
1. Specify unit and cabinet heaters used in conjunction with steam heating systems shall have heating coils specifically designed for use with steam, T/B connections. Acceptable: Beacon-Morris, Dunham Bush, Modine, Trane.
- T. Building fin tube radiation. Acceptable: Beacon-Morris, Ted Read, Trane.
- U. HVAC control systems.
1. The University has two fiber optic trunks available for Energy Management Control Systems. One fiber optic trunk is dedicated to Johnson Controls, Inc. system network, the other to Honeywell International, Inc. system network. The networks are terminated at the head-end computers located in the HVAC Shop. All controls work shall be coordinated with the University IT department prior to installation.
 2. Specify HVAC systems shall be operated and controlled by either the Johnson Controls, Inc. system or the Honeywell International, Inc. system through the appropriate existing fiber optic network located in the HVAC Shop. The systems shall be DHCP capable.
 3. Specify new control systems shall have an on-site, hand-held device that allows access to the fiber optic network for building-to-building communications and operations.
 4. Specify programming shall be consistent and compatible with the existing systems. All status and control points shall be programmed to be accessible from the head-end computers in the HVAC Shop.
 5. Specify HVAC control points shall be accessible from the head-end computers located in the HVAC Shop, through both access groups and dynamic system graphics. The graphics shall accurately depict the HVAC system with dynamic status and interactive control and adjust points. Access to scheduling shall also be available through system graphics.
 6. Specify HVAC Control Systems shall be designed by applications engineers employed by Johnson Controls, Inc. or Honeywell International, Inc. and installed and programmed by either Johnson Controls, Inc. or Honeywell International, Inc. technicians. Installation may be sub-contracted if all work is directly supervised by Johnson Controls, Inc. or Honeywell International, Inc. and responsibility for the installation and programming is held by Johnson Controls, Inc. or Honeywell International, Inc.
 7. Specify HVAC control actuation devices (valves, dampers, VAVs, etc.) shall be electric or pneumatic.
 8. Specify minimum outside air shall be re-set from a carbon dioxide sensor to be located in the return air duct.
 9. Specify air compressors for pneumatic controls shall be equipped with an electric auto-drain.
 10. During construction if pneumatics are needed, the control company must supply a temporary compressor. The temporary compressor shall remain in use for the duration of the construction period, at which time the building will be connected to its permanent compressor.
 11. Specify hot water heating and domestic hot water derived from steam converters shall have pneumatic receiver/controllers with remote set-point adjustment by the Johnson Controls, Inc. system or the Honeywell International, Inc. system located in the HVAC Shop.
 12. Specify boilers shall NOT be controlled by the Energy Management Control System, but shall be monitored for temperature, pressure and alarms at the head-end computers located in the HVAC Shop.
 13. Specify the use of the specifications for control systems check out and start up supplied by Project Engineer.
 14. Specify 24 hours of on-site technical and operational training for the University's HVAC staff at project completion. Acceptable: Honeywell International, Inc., Johnson Controls, Inc.
 15. Specify the contract-provided HVAC control compressor shall be installed on the date of substantial completion.
 16. As part of the contract and warranty, the controls manufacturer shall provide a representative for a service call monthly to confirm proper operation of the unit(s). The service calls shall be for the one-year warranty period and commence one month after substantial completion.
- V. Exhaust ventilation.
1. Specify all mechanical spaces shall be ventilated.
 2. Specify all custodian closets shall be ventilated.

- W. Where previous equipment is abandoned in place, specify that such equipment will be disconnected and locked out.

26 00 00 ELECTRICAL

- A. Specify LED fixtures (either 3500 or 4100; coordinate with FM per project). If unable to use LED fixtures, shall be supplied with T5 or T8-41K lamps and electronic energy saver ballasts.
- B. Light switches. Specify specification grade, ivory color. Consider occupancy sensors connected to light switches.
- C. Receptacles.
 - 1. Specify specification grade, ivory color.
 - 2. Emergency power receptacles shall be specification grade and be red color with cover as determined by coordination with FM.
- D. Wall plates. Specify specification grade, stainless steel or nylon ivory.
- E. Specify 120 volt, single-phase, 15 and 20 ampere receptacles installed within 6 feet of sinks shall be GFCI receptacles. Do not specify receptacles of higher voltages and/or amperages within 6 feet of sinks.
- F. Electrical panels. Specify panelboards with bolt-in breakers only. Acceptable: Cutler Hammer, GE, Siemens, Square D.
- G. Specify electrical panelboard covers shall be door-in-door or hinge-to-front type.
- H. Specify electrical panels installed outside mechanical rooms and electrical rooms shall have locking doors.
- I. Specify electrical panels shall be marked and breakers labeled per NEC. Permanently post a copy of the power one-line riser diagram in the Main Switch Room as close to the main switchboard as possible.
- J. Fire Alarm System. Specify wiring shall be as required by Gamewell standards. Acceptable: Gamewell only.
 - 1. The Owner shall review and approve the documentation of the fire alarm program.
 - 2. Location descriptions for fire alarm addresses shall be approved by the Owner prior to programming.
 - 3. Specify fire alarm smoke detectors in egress corridors.
 - 4. Specify red jacketed multi-conductor cables shall only be used for fire alarm installations.
- K. Specify 120 volt convenience receptacles shall be installed:
 - 1. In corridors at maximum 40 foot spacing; and,
 - 2. In stair towers, at lowest level and at every level of the stair tower.
- L. Conductor color coding.
 - 1. Specify conductors for 208/120 volt systems shall be color coded as follows:
 - a. Ungrounded conductors shall be black, red and blue.
 - b. Grounded conductors shall be white.
 - c. Equipment grounding conductors shall be bare, green, or green with one or more yellow stripes.
 - 2. Specify conductors for 480/277 volt systems shall be color coded as follows:
 - a. Ungrounded conductors shall be brown, orange, and yellow.
 - b. Grounded conductors shall be gray.
 - c. Equipment grounding conductors shall be bare, green, or green with one or more yellow stripes.
- M. Do not specify key operated switches. Where necessary, key switches for specific devices or equipment are acceptable. Key switches are to be avoided for lighting controls. Stairwell lighting is to be controlled by occupancy sensors.
- N. Specify electrical conductors shall be copper only.

- O. Specify secondary service conductors running from the service transformer to the building service disconnect shall be installed in rigid galvanized steel conduit or covered by concrete PVC conduit.
- P. Specify exterior transformers shall be protected from damage based on hazard assessment for the location (i.e. bollards).
- Q. Specify termination of copper secondary conductors to the secondary lugs of the service transformer shall be by means of 2 hole un-insulated long barrel copper compression terminals, such as Burndy Type YA() - 2N, or equivalent. These terminals shall be bolted to the transformer secondary lugs using an approved method and hardware.
- R. The University of Maine Electrical Shop will furnish and install the service transformer and pad as well as the primary conduit and conductors.
- S. Specify emergency generators shall be protected from damage based on hazard assessment for the location (i.e. bollards and overhead protection).
- T. Specify revenue grade Shark multi-function power and energy meter manufactured by Electro Industries shall be provided in the main switchboard. Owner to determine appropriate model.
- U. Specify ample raceways and wire ways to allow wiring from lectern to equipment.
- V. Provide scale plan drawing showing all conduit runs and paths.
- W. Where previous equipment is abandoned in place, specify that such equipment will be disconnected and locked out.

26 50 00 INTERIOR LIGHTING

- A. Specify interior lighting installed above 8 feet shall be installed in locations where clear and unobstructed access, to include around non-movable chairs, seats, desks, lab counters, etc., is available via ladder or lift.
- B. Specify interior lighting installed below 8 feet shall be protected against breakage.
- C. Specify lights in stairwells shall be wall-mounted at ± 8 feet above floors/platforms.
- D. Specify lighting control devices that are readily available. Package lighting control systems are not desired.

26 56 00 EXTERIOR LIGHTING

- A. Specify exterior site lighting and exterior lighting on buildings shall be photocell-controlled with lighting contactors. Photocells shall not be installed under eaves. Photo cells shall be readily available item and not specifically connected to any lighting control system. The location of the photo cell shall be coordinated with Owner.
- B. Specify exterior lighting shall not be connected to or controlled by any Johnson Controls, Inc., Honeywell International, Inc. or other energy management control system.
- C. Specify exterior luminaries shall be 100 percent cut-off type.
- D. Specify exterior lighting shall be installed in locations where clear and unobstructed access is available via ladder or lift, to include around entrances, landscaping, transformers, etc.
- E. Specify where wall pack mounted lighting is used it shall be accessible via portable ladders and/or aerial lifts.
- F. Specify illuminated path shall be provided to all large rooftop equipment from the roof access point. Controls shall be located at roof access point and shall have indicator lamp integral to the control indicating when site lighting is on or off.

27 00 00 COMMUNICATIONS

- A. Use Section 27 00 00, Communications where applicable. (document attached)
- G. Walkway lights to be Kim model Warp 9 LED lights and accessories.

28 13 00 ACCESS CONTROL

- A. Specify card entry system at all entrances. Acceptable: Blackboard.
- B. Specify recommended wire, type, use, series, run location, and maximum length.

Recommended Wire	Wire Type	Usage	Series	Run Location	Maximum Length
	1 pair 14 or 12 AWG	latch	SA2k/3k	SA2k to Door Crashbar	300'/500'
Belden 8723	2 pair 22AWG each pair shielded	point	SA2k/3k	SA2k to Door Frame	n/a
Belden 8723	2 pair 22AWG each pair shielded	request to exit	SA2k/3k	SA2k to Door Crashbar	n/a
Belden 8723	2 pair 22AWG each pair shielded	handicapped exit	SA2k/3k	SA2k to Handicap Paddle	n/a
Belden 8723	2 pair 22AWG each pair shielded	swipe	SA3k	SA3k to swipe	n/a`
Belden 9540	10 condr 24 AWG shielded	prox	SA3k	SA3k to Prox. Sensor	100'
Belden 9541	15 condr 24 AWG shielded	prox	SA2k	Weigand Board to Prox. Sensor	100'
Belden 9541	15 condr 24 AWG shielded	prox	SA2k	Weigand Board to Prox. Sensor	4000'

- C. Specify control and power to door. Acceptable: Model K-DL38A Armored Door Loop.

32 10 00 BASES, BALLASTS, AND PAVING

- A. Specify bituminous pavement roadways. Coordinate width with Grounds Shop for associated plowing equipment. .
- B. Specify a safety zone shall be maintained between parking, walkways and buildings.
- C. Specify woven geotechnical fabric under all paved surfaces.
- D. Specify 9' x 18' parking spaces with 24' drive aisle typical. Do not use angled parking.

32 16 00 CURBS, GUTTERS, SIDEWALKS, AND DRIVEWAYS

- A. Specify bituminous pavement sidewalks. Coordinate width with Grounds Shop for associated plowing equipment. Do not use concrete sidewalks.
- B. Specify a safety zone shall be maintained between parking, walkways and buildings.
- C. Locate sidewalks along roadway curbing. Do not provide lawn esplanades.
- D. Specify vertical granite curb. Do not use sloping curb.

- E. Locate sidewalks along roadway curbing. Do not provide lawn esplanades.

32 30 00 SITE IMPROVEMENTS

- A. Specify new buildings shall consider a truck accessible loading dock consistent with the building's use.
- B. Specify raised loading docks shall have stairs with handrails.
- C. Specify loading dock drives shall not be used as parking areas.
- D. Specify loading dock overdoor doors shall be protected from the elements via a portico or similar structure.
- E. Specify overhead or double door access to loading dock from building interior. Where possible, create a service entrance to the building for maintenance considering proximity to service vehicle parking, mechanical rooms, and elevators.
- F. Consider operational issues from snow and ice, including plowing, staging, and removal.
- G. Specify 9' x 18' parking spaces with 24' drive aisle typical. Do not use angled parking.
- H. Specify all exterior signage by Owner.
- I. Specify any outside equipment must be placed in such a way as to avoid damage from falling roof ice and snow.

32 90 00 PLANTING

- A. Specify lawn restoration by Owner.

33 10 00 WATER UTILITIES

- A. Water utility distribution piping.
 - 1. Specify pipe and fittings shall be Ductile Iron Class 52 conforming to ANSI 21.51.
 - 2. Specify trench shall be laying condition "B" (flat bottom trench without blocks and with compacted backfill). Pipe bedding material shall be 3/4" crushed stone, 6" below pipe to 6" above pipe.
 - 3. Specify thrust blocks shall be cast-in-place wherever possible.
 - 4. Specify fittings shall be rodded where necessary to prevent movement and leakage.
 - 5. Specify a corporation and blow-off line shall be installed at or near the point of connection with the main. The blow-off shall be completely removed and the corporation either plugged or capped after testing and chlorination is successfully completed.
 - 6. Specify a bacteriological water test shall be made by an acceptable laboratory, with test results submitted to the University of Maine, Office of Facilities Management, 5765 Service Building, Orono ME 04469.
 - 7. Specify a hydrostatic pressure test to 200 psi or 1-1/2 x working pressure, whichever is greater, shall be performed.
 - 8. Specify valves shall be installed on all three sides of a "T" connection.
- B. Fire hydrants.
 - 1. Operating direction open clockwise. Acceptable: Mueller Super Centurion 250.
 - 2. Operating direction open counter-clockwise for all system building valves.
- C. Domestic Water Entrance Detail.
 - 1. See attached detail.

33 30 00 SANITARY SEWERAGE UTILITIES

- A. Specify outside clean-outs exterior to building if no manhole in close proximity.

33 40 00 STORM DRAINAGE UTILITIES

- A. Specify outside clean-outs exterior to building if no catch basin in close proximity.

33 56 00 FUEL-STORAGE TANKS

- A. Specify above ground oil tanks in buildings shall be of double-walled construction with 110 percent secondary containment capacity.

**UNIVERSITY OF MAINE
CAMPUS DESIGN CRITERIA
ATTACHMENTS**

The following items are referenced attachment to the Campus Design Criteria.

- Structural Statement of Special Inspections
- Section 15710 Heat Exchangers – Face & Bypass Heating Coil Packaged System
- Domestic Water Entrance Detail
- SA3000 Wiring Block Diagram

SA3000 Wiring Block Diagram

