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# 00 62 76 Application for Payment Form for AE Services

All Applications for Payment shall include the information in the following UNF AE Services Invoice Template – EXHIBIT 1.

## Firm’s Letter Head

<table>
<thead>
<tr>
<th>University of North Florida</th>
<th>Invoice Number _______________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 UNF Drive</td>
<td>Date ________________________________________</td>
</tr>
<tr>
<td>Jacksonville, FL. 32224</td>
<td></td>
</tr>
<tr>
<td>Attn: Campus Design, Planning &amp; Construction Office</td>
<td></td>
</tr>
<tr>
<td>Building 832</td>
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</tr>
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Project: xxxxx xxxxx xxxxx
Purchase Order: P1000000

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<tr>
<th>SERVICES DESCRIPTION</th>
<th>CONTRACT AMOUNT</th>
<th>PERCENT COMPLETED</th>
<th>PRIOR BILLED</th>
<th>TOTAL BILLED</th>
<th>CURRENT BILLED</th>
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</thead>
<tbody>
<tr>
<td>Programming</td>
<td>xxx,xxx</td>
<td></td>
<td></td>
<td></td>
<td>xx,xxx</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>xxx,xxx</td>
<td></td>
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<tr>
<td>Landscape Arch.</td>
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<tr>
<td>Leeds Related Services</td>
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<td>xx,xxx</td>
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<tr>
<td>Interior Design / FF&amp;E</td>
<td>xxx,xxx</td>
<td></td>
<td></td>
<td></td>
<td>xx,xxx</td>
</tr>
<tr>
<td>Surveying Services</td>
<td>xxx,xxx</td>
<td></td>
<td></td>
<td></td>
<td>xx,xxx</td>
</tr>
<tr>
<td>Geotechnical Services</td>
<td>xxx,xxx</td>
<td></td>
<td></td>
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<td>xx,xxx</td>
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<tr>
<td>Environmental Services</td>
<td>xxx,xxx</td>
<td></td>
<td></td>
<td></td>
<td>xx,xxx</td>
</tr>
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</table>

| CO # 1                      | xxx             |                   |              | xxxx         |

| TOTAL                       | xxx,xxx         |                   |              | xxxx,xxx     |

## Reimbursable Expenses

| Printing                    | xxx             |
| Copying                     | xx              |
| Travel                      | xx              |
| Meals                       | xx              |

% of mark-up if applicable: 1.1 times

| TOTAL                       | xxx,xxx         |

Reimbursables Billing Limits

<table>
<thead>
<tr>
<th>Expenses</th>
<th>Current</th>
<th>Prior</th>
<th>To Date</th>
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<tr>
<td></td>
<td>x,xxx</td>
<td>xxx</td>
<td>x,xxx</td>
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<tr>
<td>Limit</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Remaining Balance</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Invoice Total               | xxx,xxx   |

---

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Revised: 12/16/2010
00 73 16 Summary Construction Insurance Requirements – EXHIBIT 1

This summary is intended to assist you in preparing the Surety Bonds and Certificates of Insurance contractually required by the University’s Construction contract documents.

It is important to note “Certificate of Insurance acceptable to the Owner (University of North Florida) shall be filed with the Owner prior to execution of the formal contractual agreement.

The University of North Florida Board of Trustees and the Florida Board of Governors must be named as the Certificate Holder and as Additional Named Insureds as to the operations of the contractor under the Agreement and shall provide the Severability of Insureds Provision and a Waiver of Subrogation in favor of the Owner on all liability policies.

Waiver of Subrogation is also required on all Property Insurance as well as naming the University of North Florida Board of Trustees and the Florida Board of Governors as Additional Named Insureds.

The A M Best Insurance Company rating requirements for projects in excess of $500,000 are:

<table>
<thead>
<tr>
<th>Contract Amount</th>
<th>Best Rating</th>
<th>Required Financial Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>$10,000,000+</td>
<td>A</td>
<td>IX ($250 million to $500 million)</td>
</tr>
<tr>
<td>$1,500,000 to 9,999,999</td>
<td>A</td>
<td>VIII ($100 million to $250 million)</td>
</tr>
<tr>
<td>$1,000,000 to $1,499,999</td>
<td>A</td>
<td>VII ($50 million to $100 million)</td>
</tr>
<tr>
<td>$750,000 to 999,999</td>
<td>A</td>
<td>VI ($25 million to $50 million)</td>
</tr>
<tr>
<td>$500,000 to 749,999</td>
<td>A</td>
<td>V ($10 million to $25 million)</td>
</tr>
</tbody>
</table>
If any liability insurance is written on a Claims Made Form, the Retroactive date of Coverage must also be included on the Certificate of Insurance.

Certificates of Insurance must include the specific Project Name.

The Owner (University of North Florida) shall be exempt from and in no way liable for any sums of money which may represent a deductible in any insurance policy.

Each Certificate of Insurance must be countersigned (with name of agent signing the certificate also printed on the certificate) by a lawfully licensed agent in the State of Florida and the agent must be appointed to represent the companies shown on the certificate.

Excerpts from the Sections of the project manual specific to the insurance requirements are attached for your convenience.

§ 7.2.3 The Owner’s accountants will review and report in writing on the Construction Manager’s final accounting within 30 days after delivery of the final accounting to the Architect by the Construction Manager. Based upon such Cost of the Work as the Owner’s accountants report to be substantiated by the Construction Manager’s final accounting, and provided the other conditions of Section 7.2.1 have been met, the architect will, within seven days after receipt of the written report of the Owner’s accountants, either issue to the Owner a final Certificate for Payment with a copy to the Construction Manager or notify the Construction Manager and Owner in writing of the Architect’s reasons for withholding a certificate as provided in Section 9.5.1 of A201™-1997. The time periods stated in this Section 7.2 supersede those stated in Section 9.4.1 of A201™-1997.

§ 7.2.4 If the Owner’s accountants report the Cost of the Work as substantiated by the Construction Manager’s final accounting to be less than claimed by the Construction Manager, the Construction Manager shall be entitled to proceed in accordance with Article 9 without a further decision of the Architect. Unless agreed to otherwise, a demand for mediation of the disputed amount shall be made by the Construction Manager within 60 days after the Construction Manager’s receipt of a copy of the Architect’s final Certificate for Payment. Failure to make such demand within this 60-day period shall result in the substantiated amount reported by the Owner’s accountants becoming binding on the Construction Manager. Pending a final resolution of the disputed amount, the Owner shall pay the Construction Manager the amount certified in the Architect’s final Certificate for Payment.

§ 7.2.5 If, subsequent to final payment and at the Owner’s request, the Construction Manager incurs costs described in Section 6.1 and not excluded by Section 6.2 (1) to correct nonconforming Work or (2) arising from the resolution of disputes, the Owner
shall reimburse the Construction Manager such costs and the Construction Manager’s Fee, if any, related thereto on the same basis as if such costs had been incurred prior to final payment, but not in excess of the Guaranteed Maximum Price. If the Construction Manager has participated in savings, the amount of such savings shall be recalculated and appropriate credit given to the Owner in determining the net amount to be paid by the Owner to the Construction Manager.

ARTICLE 8   INSURANCE AND BONDS

§ 8.1 INSURANCE REQUIRED OF THE CONSTRUCTION MANAGER

During both phases of the Project, the Construction Manager shall purchase and maintain insurance as set forth in Section 11.1 of A201™-1997.

*(If Umbrella Excess Liability coverage is required over the primary insurance or retention, insert the coverage limits. Commercial General Liability and Automobile Liability limits may be attained by individual policies or by a combination of primary policies and Umbrella and/or Excess Liability policies. If Project Management Protective Liability Insurance is to be provided, state the limits here.)*

*(Paragraphs deleted)*

§ 8.2 INSURANCE REQUIRED OF THE OWNER

Intentionally deleted.

*(Paragraphs deleted)*

§ 8.3 PERFORMANCE BOND AND PAYMENT BOND

§ 8.3.1 The Construction Manager shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder. Bonds shall be in the form prescribed by Owner, and the cost of bonds shall be included in the Cost of the Work. The amount of each bond shall be equal to 100% (one hundred percent) of the Contract Sum.

§ 8.3.2 The Construction Manager shall deliver the required bonds to the Owner at least three days before the commencement of any Work at the Project site.

§ 10.5 If, without negligence on the part of the Contractor, the Contractor is held liable for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.
§ 10.6 EMERGENCIES

§ 10.6.1 In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor’s discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Section 4.3 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR’S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor’s operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

.1 claims under workers’ compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;

.2 claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor’s employees;

.3 claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor’s employees;

.4 claims for damages insured by usual personal injury liability coverage;

.5 claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;

.6 claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;

.7 claims for bodily injury or property damage arising out of completed operations; and

.8 claims involving contractual liability insurance applicable to the Contractor’s obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever
coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days’ prior written notice has been given to the Owner. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment as required by Section 9.10.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor’s information and belief.

§ 11.2 OWNER’S LIABILITY INSURANCE

§ 11.2.1 The Owner shall be responsible for purchasing and maintaining the Owner’s usual liability insurance.

§ 11.3 PROJECT MANAGEMENT PROTECTIVE LIABILITY INSURANCE

§ 11.3.1 Optionally, the Owner may require the Contractor to purchase and maintain Project Management Protective Liability insurance from the Contractor’s usual sources as primary coverage for the Owner’s, Contractor’s and Architect’s vicarious liability for construction operations under the Contract. Unless otherwise required by the Contract Documents, the Owner shall reimburse the Contractor by increasing the Contract Sum to pay the cost of purchasing and maintaining such optional insurance coverage, and the Contractor shall not be responsible for purchasing any other liability insurance on behalf of the Owner. The minimum limits of liability purchased with such coverage shall be equal to the aggregate of the limits required for Contractor’s Liability Insurance under Sections 11.1.1.2 through 11.1.1.5.

§ 11.3.2 To the extent damages are covered by Project Management Protective Liability insurance, the Owner, Contractor and Architect waive all rights against each other for damages, except such rights as they may have to the proceeds of such insurance. The policy shall provide for such waivers of subrogation by endorsement or otherwise.
§ 11.3.3 The Owner shall not require the Contractor to include the Owner, Architect or other persons or entities as additional insureds on the Contractor’s Liability Insurance coverage under Section 11.1

§ 11.4 PROPERTY INSURANCE

§ 11.4.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder’s risk “all-risk” or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.4 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.4.1.1 Property insurance shall be an “all-risk” or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect’s and Contractor’s services and expenses required as a result of such insured loss.

§ 11.4.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance which will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.4.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.
§ 11.4.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.4.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.4.2 Boiler and Machinery Insurance. The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.4.3 Loss of Use Insurance. The Owner, at the Owner’s option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner’s property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner’s property, including consequential losses due to fire or other hazards however caused.

§ 11.4.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.4.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.4.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.4.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.4. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a
provision that the policy will not be canceled or allowed to expire, and that its limits
will not be reduced, until at least 30 days’ prior written notice has been given to the
Contractor.

§ 11.4.7 Waivers of Subrogation. The Owner and Contractor waive all rights against
(1) each other and any of their subcontractors, sub-subcontractors, agents and
employees, each of the other, and (2) the Architect, Architect’s consultants, separate
contractors described in Article 6, if any, and any of their subcontractors, sub-
contractors, agents and employees, for damages caused by fire or other causes of
loss to the extent covered by property insurance obtained pursuant to this Section
11.4 or other property insurance applicable to the Work, except such rights as they
have to proceeds of such insurance held by the Owner as fiduciary. The Owner or
Contractor, as appropriate, shall require of the Architect, Architect’s consultants,
separate contractors described in Article 6, if any, and the subcontractors, sub-
subcontractors, agents and employees of any of them, by appropriate agreements,
written where legally required for validity, similar waivers each in favor of other parties
enumerated herein. The policies shall provide such waivers of subrogation by
endorsement or otherwise. A waiver of subrogation shall be effective as to a person
or entity even though that person or entity would otherwise have a duty of
indemnification, contractual or otherwise, did not pay the insurance premium directly
or indirectly, and whether or not the person or entity had an insurable interest in the
property damaged.

§ 11.4.8 A loss insured under Owner’s property insurance shall be adjusted by the
Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as
their interests may appear, subject to requirements of any applicable mortgagee
clause and of Section 11.4.10. The Contractor shall pay Subcontractors their just
shares of insurance proceeds received by the Contractor, and by appropriate
agreements, written where legally required for validity, shall require Subcontractors to
make payments to their Sub-subcontractors in similar manner.

§ 11.4.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon
occurrence of an insured loss, give bond for proper performance of the Owner’s
duties. The cost of required bonds shall be charged against proceeds received as
fiduciary. The Owner shall deposit in a separate account proceeds so received, which
the Owner shall distribute in accordance with such agreement as the parties in
interest may reach, or in accordance with an arbitration award in which case the
procedure shall be as provided in Section 4.6. If after such loss no other special
agreement is made and unless the Owner terminates the Contract for convenience,
replacement of damaged property shall be performed by the Contractor after
notification of a Change in the Work in accordance with Article 7.
§ 11.4.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner’s exercise of this power; if such objection is made, the dispute shall be resolved as provided in Sections 4.5 and 4.6. The Owner as fiduciary shall, in the case of arbitration, make settlement with insurers in accordance with directions of the arbitrators. If distribution of insurance proceeds by arbitration is required, the arbitrators will direct such distribution.

§ 11.5 PERFORMANCE BOND AND PAYMENT BOND

§ 11.5.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the contract.

§ 11.5.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall permit a copy to be made.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Architect’s request or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Architect, be uncovered for the Architect’s examination and be replaced at the Contractor’s expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered which the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner’s expense. If such Work is not in accordance with the Contract Documents, correction shall be at the Contractor’s expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION
§ 12.2.1.1 The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections and compensation for the Architect’s services and expenses made necessary thereby, shall be at the Contractor’s expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor’s obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial completion by the period of time between Substantial Completion and the actual performance of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor’s correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have
under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within the obligation to comply with the Contract

[document continuation?]}

endorsed or prohibited, and utilizing all personal protection devices included, within OSHA and MIOSHA Construction Safety Regulations. The Contractor shall take all necessary precautions for the safety of the persons on or near the site of the Work, and shall comply with all applicable laws, rules, regulations and orders to prevent accidents or injuries to persons on or in the proximity of the project site. The Contractor shall put into place a meaningful and effective safety program comprised of regular safety training of its employees on site, focusing upon various topics which, from time to time, its employees are likely to encounter in performing the Work. The Owner will cooperate with all safety audits and recommendations with regard to improving worker’s safety, but the Contractor hereby acknowledges and agrees that the Owner is not responsible, in whole or in part, for the Work, execution of the Work or initiating, maintaining and supervising any safety precautions and programs in connection with the Work or the Project.

ARTICLE 11

Section 11.1.1 is deleted and replaced with the following:

§ 11.1.1 Commercial General Liability Insurance. The Contractor shall provide and maintain throughout its performance of the Work a commercial general liability insurance policy which has liability limits of at least $2,000,000 per occurrence for bodily injury, death and property damage, with a deductible no greater than $50,000. Such insurance shall be provided by a bona fide insurer licensed to provide insurance coverage within the State of Florida maintaining an “A” rating. The University of North Florida Board of Trustees, State of Florida, their employees, directors, officers, and agents shall be named insureds on such policy, and the policy shall provide cross liability coverage. Such insurance policy shall protect the Contractor from Claims which may arise out of or result from the Contractor’s operations under the Contract Documents and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. In addition, the policy shall contain the following endorsements: (i) “XCU” (explosion, collapse, underground damage) for those classifications excluded under the policy and (ii) contractual liability. If the Contractor is performing asbestos-related work, the policy shall also contain a pollution liability endorsement.
Automobile Liability Insurance. The Contractor shall carry automobile liability insurance which has liability limits of at least $500,000.00. Worker’s Compensation Insurance. The Contractor shall maintain worker’s compensation insurance which complies with the requirements of Chapter 440, Florida Statutes.

The first sentence of Section 11.1.2 is deleted.

The first two sentences of Section 11.1.3 are deleted and replaced with the following:

“Certificates of Insurance and/or evidence of insurance for all insurance required to be carried under this Article, together with certified copies of the insurance policies (including required endorsements), shall be filed with, and approved by, the Owner prior to commencement of the Work. The Certificates of insurance shall be dated and show the name of the Insurer, the number of the policy, its effective date, and its termination date. Owner will not issue a notice to proceed for the Work until Contractor has complied with this Article. Contractor shall not be entitled to an extension of time or to compensation which may result from delays in the issuance of a notice to proceed caused by its failure to provide the foregoing certificates and policies in a timely manner. Certificates of insurance evidencing the renewal of all Insurance required to be carried under this Article shall be provided to Owner at least thirty (30) days prior to the date each applicable insurance policy is scheduled to expire. Owner’s review, inspection, or approval of Contractor’s insurance shall not relieve Contractor of its responsibility for providing the insurance required hereby nor constitute a waiver of any such requirements.”

Delete Section 11.1.4.

Add the following Section:

§ 11.1.5 The Owner is exempt from and in no way liable for any sums of money which may represent a deductible in any insurance policy. The payment of any deductible shall be the sole responsibility of the Contractor or Subcontractor providing the insurance.

Delete Section 11.2.

Delete Section 11.3 and replace it with the following:
§ 11.3.1 Builder’s Risk Insurance. The Contractor shall maintain builder’s risk insurance, at replacement cost covering the full value of the construction being performed, including where applicable, the existing structure. This insurance shall insure the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work. Property covered by the insurance shall include temporary building(s) or structure(s) at the Project site, other than any of Contractor’s office trailer(s). In addition, such insurance shall cover portions of the Work stored off the site, after written approval of the Owner, at the value established in the approval, and portions of the Work in transit. This insurance shall be maintained until Final Payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.4 to be covered, whichever is later, provided that such coverage shall not be required as to any portion of the Project which Owner has actually occupied prior to final completion. This insurance shall be provided by a bona fide insurer licensed to provide insurance coverage within the State of Florida maintaining an “A” rating. The University of North Florida Board of Trustees and the State of Florida, their employees, directors, officers and agents shall be named insureds on such policy. The policy shall include a waiver of subrogation endorsement and a severability of interests endorsement.

Delete Section 11.3.1.1 and replace it with the following:

§ 11.3.1.1 Such policy shall be written on a causes of loss special form policy, and shall include coverage for reasonable compensation for the Architect’s services and expenses required as a result of such insured loss.

Delete Section 11.3.1.2.

Add the following sentence to the end of Section 11.3.1.3:

“The deductible under the policy shall not exceed $5,000.00. Owner shall not be liable for amounts that may represent a deductible in any insurance policy. The payment of such deductible shall be the sole responsibility of the Contractor.”

Delete Section 11.3.2 and replace it with the following:

§ 11.3.2 When the Work includes the repair, removal, installation and/or testing of live steam boilers, valves, pipes or lines, then such insurance shall include boiler and machine coverage, written on an ISO form or its equivalent.

Delete Sections 11.3.3, 11.3.4, 11.3.5 and 11.3.6.
Delete Section 11.3.7 and replace it with the following:

§ 11.3.7 Waiver of Subrogation. The Contractor hereby releases and discharges the Owner, State of Florida and Florida Board of Governors from all liability to the Contractor, and to anyone claiming by, through or under the Contractor, by subrogation or otherwise, on account of any loss or damage to tools, machinery, equipment or other property, however caused. The Contractor shall cause its Contractor’s risk property insurance company to issue a waiver of subrogation consistent with this provision.

Delete Section 11.3.8 and replace it with the following:

§ 11.3.8 A loss or losses insured under this insurance policy shall be adjusted by the Contractor and its insurance company. The Contractor shall repair or replace the damaged property with the proceeds from the Contractor’s risk policy. The Contractor shall be responsible for all damages and necessary repairs whether or not the loss is covered by the Contractor’s risk policy.

Delete Sections 11.3.9 and 11.3.10.

Add the following Section:

§ 11.3.11 Compliance with insurance requirements shall not relieve the Contractor of any responsibility to indemnify the Owner for any liability to the Owner as specified in any other provision of the Contract for Construction, and the Owner shall be entitled to pursue any remedy in law or equity if the Contractor fails to comply with the provisions of this Contract for Construction. Indemnity obligations specified elsewhere in this Contract for Construction shall not be negated or reduced by virtue of any insurance carrier’s (i) denial of insurance coverage for the occurrence of event which is the subject matter of the claim; or (ii) refusal to defend any named insured.

Delete Section 11.4.1 and replace it with the following:

“The Contractor shall furnish bonds in the form prescribed by Owner covering faithful performance of the Contract and payment of obligations arising thereunder in the full sum of the Contract and otherwise in compliance with the requirements of Florida Statutes Section 255.05.”

Add the following Section:
§ 11.4.3 The Contractor shall deliver the required bonds to the Owner prior to commencement of the Work.

ARTICLE 12

[This appears incomplete.]
01 41 00 Regulatory Requirements

01 41 00 UNF Acid Dilution Tank Exemption – EXHIBIT 1

21 West Church Street
Jacksonville, Florida 32202-3139

June 12, 2001

Mr. Dan Endicott
University of North Florida
Office of Environmental Health & Safety
Insurance & Risk Management
4567 St. Johns Bluff Road, South
Jacksonville, FL 32224-2645

Dear Mr. Endicott:

I received a fax letter from you on June 4, 2001 indicating the University’s preference to forego installation of an acid dilution tank at this building to neutralize corrosive liquids before they enter the sanitary sewer system. In your letter, you indicated that UNF has a number of control measures for the proper disposal of chemical wastes, including the following:

1. UNF prohibits the improper disposal of chemical waste via the sanitary sewer system;
2. UNF uses a centralized chemical acquisition system;
3. UNF conducts annual lab safety surveys to include chemical storage and disposal procedures;
4. UNF provides annual RCRA training for lab faculty and staff;
5. UNF has a centralized chemical waste accumulation and disposal program.

We understand your concern that acid dilution tanks may become subject to waste characterization and the tank could become a permit-required treatment facility. Based on the comprehensive institutional controls you have in place, the Industrial Pretreatment Department agrees that there is little need for the dilution tank, and we will not require you to have it in place.

We commend you on your thorough pollution prevention and appropriate waste handling activities, and thank you for bringing this to our attention. JEA offers our best wishes to UNF in your endeavor to provide high quality Science and Engineering facilities to your students.

Sincerely,

[Signature]

Paul Steinbrecher, P.E.
JEA Manager, Industrial Pretreatment
October 10, 2003
MEMORANDUM

To: Richard Crosby
Karen Stone
Julie Sheppard
Janet Owen
Charles Bear
Shari Shuman
Dan Endicott
Fred Bervig
Dave Kramer

From: Joseph R. Noll
Construction Manager

Re: Florida Building Code – Wind Zone Ordinance

When the Florida Building Code (FBC) became effective in 2001, it established new parameters for wind speed design criteria. It also provided provisions for the local authority having jurisdiction to establish specific locations on local maps for these wind speed lines to be located. The City of Jacksonville (COJ), by Ordinances, originally adopted a wind speed map that placed the entire University in the 120mph wind zone. The effect of this action by COJ would have required all of our future construction to be designed to accommodate this more restrictive requirement. A consequence of this would have increased our construction cost by approximately 10% on each building project. The referencing document in the FBC (ASCE 7-98) actually places the line between our core campus and our eastern ridge.

Facilities Planning has worked successfully with the COJ General Counsel over the last year to have the wind speed ordinance amended to move the wind speed line to the position shown in the FBC. As a result, the only future construction on the campus that will need to be designed to the higher standard is located on our eastern ridge and in the vicinity of the University Center.

Attached to this memo for your information and records is a copy of the revised ordinance and a map that indicates graphically the language in the ordinance. This will allow our Building Code Official to apply the proper design guidelines to future projects.

If you have any questions or require clarification on this please contact us.

Cc: PMI Turner
Elizabeth Jones
Gary Aussi
Col Welton
Introduced by Council Members Holland and Jenkins:

ORDINANCE 2009-1007-E

AN ORDINANCE AMENDING - SECTION 320.103,
ORDINANCE CODE; ESTABLISHING WIND ZONES; PROVIDING
AN EFFECTIVE DATE.

BE IT ORDAINED by the Council of the City of Jacksonville:

Section 1. Section 320.103, Ordinance Code, is hereby amended
to read as follows:

Sec. 320.103. Wind Zones.

For purposes of structural design, the location of the 120 mph
wind line for the City of Jacksonville shall be as follows:
Starting at the intersection of Phillips Highway and the Duval
County line at the south, proceed north along Phillips Highway to
the intersection of State Road 9A. Proceed north along State Road
9A to the intersection of J. Turner Butler Boulevard. Proceed east
along J. Turner Butler Boulevard to a point 4115 feet east of the
midpoint of the intersection of State Road 9A and J. Turner Butler
Boulevard. Proceed northerly to the southern terminus of Regent
Boulevard. Proceed north along Regent Boulevard to the intersection
of Central Parkway. Proceed north along Central Parkway to the
intersection of Beach Boulevard/U.S. 90. Proceed west along Beach
Boulevard/U.S. 90 to the intersection of State Road 9A. Proceed
north along 9A to Yellow Bluff Road. Proceed north along Yellow
Bluff Road to Highway 17. Proceed north along Highway 17 to the
Duval County line. All structures located east of this line shall
be considered in the Wind- zones Debris Region as defined by the
Florida Building Code. All structures west of this line shall be
Section 2. Effective Date. This Ordinance shall become effective upon signature by the Mayor or upon becoming effective without the Mayor's signature.

Form Approved:

[Signature]

Office of General Counsel

Legislation Prepared By: Tracey I. Arpon, Jr.

8/11/2010 a:lawpropsia UNIVERSITY2010101729402234700176
ORDINANCE 2003-1007-E

CERTIFICATE OF AUTHENTICATION

ENACTED BY THE COUNCIL

SEPTEMBER 9, 2003

[Signature]
LAD DANIELS
COUNCIL PRESIDENT

ATTEST:

[Signature]
CHERYL L. BROWN
COUNCIL SECRETARY

APPROVED:

[Signature]
JOHN PEYTON, MAYOR

SEP 17 2003
01 41 00 UNF Acid Dilution Tank Exemption – EXHIBIT 1

01 41 00 UNF Landscape MOU With County – EXHIBIT 3

Adam W. Herbert
President

12 September 1991

Chancellor Charles B. Reed
State University System of Florida
1514 Florida Education Center
325 West Gaines Street
Tallahassee, Florida 32399-1950

Dear Charlie:

I am pleased to advise you that we have reached complete agreement with the City of Jacksonville relative to the tree ordinance. The City’s Chief Administrator Officer has signed the attached Letter of Agreement. We also have received a signed memorandum from the Building & Zoning Inspection Division indicating our compliance with the spirit and intent of the Landscape and Tree Protection regulations.

I greatly appreciate your advice and Greg Gleason’s intervention with the City Attorney.

Sincerely,

[Signature]

cc: Greg Gleason

4567 St. Johns Bluff Road, South, Jacksonville, Florida 32216-6599
An Equal Opportunity Institution

Page 25 of 330 Revised: 12/16/2010
12 September 1991

Mr. Lex A. Hester
Chief Administrative Officer
Office of the Mayor
City of Jacksonville
1400 City Hall
Jacksonville, Florida 32202

RE: Resolution of Zoning Dispute

Dear Mr. Hester:

This letter will confirm our understanding of how the current difference of opinion between the University of North Florida ("UNF") and the City concerning the applicability of certain portions of the City’s Ordinance Code to UNF may be resolved to the mutual benefit of both parties. We understand the City’s policy of enforcing the Landscape and Tree Protection Regulations, which comprise a part of the City’s Zoning Code, against all governmental agencies, including state agencies, arises out of its desire to act in the best interest of all of the citizens of Jacksonville, and that it is to the benefit of the City as a whole to protect trees from destruction during development to the greatest possible extent and to establish minimum landscaping standards for all development.

Accordingly, UNF will agree to comply with the spirit and intent of the Landscape and Tree Protection Regulations and will provide its landscape and site plans for review by the City’s Building & Zoning Inspection Division to ensure that the requirements of the law are met. However, the City will continue to treat UNF as it has in the past, and as it continues to treat all other state agencies, and will not require UNF to obtain any permits which would otherwise be required under the zoning regulations.

AN AFFIRMATIVE ACTION — EQUAL OPPORTUNITY EMPLOYER
Mr. Lex A. Hester
12 September 1991
Page Two

Your acknowledgement on behalf of the City, in the space
provided below, will constitute an immediate resolution of all
issues which are currently in dispute between UNF and the City
and will authorize UNF to continue site clearing immediately at
the gymnasium site, provided the above-specified gymnasium plans
are furnished to the City within a reasonable period of time from
the date hereof.

Sincerely,

[Signature]
Adam W. Herbert
President

ACCEPTED and AGREED TO
BY THE CITY OF JACKSONVILLE

By: [Signature]
Lex A. Hester
Chief Administrator Officer

AHH/bgh
October 21, 1974

074-321

Honorable Robert B. Mautz
Chancellor
State University System of Florida
107 West Gaines Street
Tallahassee, Florida 32304

Re: STATE UNIVERSITIES—applicability of a county tree ordinance to university campus.

Dear Chancellor Mautz:

This is in response to your request for an opinion upon the following question:

ARE LANDS OWNED BY THE STATE OF FLORIDA IN ITS GOVERNMENTAL CAPACITY, SPECIFICALLY THE UNIVERSITY OF FLORIDA CAMPUS, SUBJECT TO THE ATTACHED TREE ORDINANCE OF ALACHUA COUNTY (A POLITICAL SUBDIVISION OF THE STATE), WITHIN WHOSE BOUNDARIES SAID LAND IS LOCATED?

Previous opinions of this office relating to the applicability of city and county regulatory ordinances to state-owned property indicate that your question should be answered, generally, in the negative.

In AGO 071-263A, in ruling on the question of whether the City of Gainesville or Alachua County could exercise its police power over the campus of the University of Florida, I said:

... the police power of a municipality or county respecting matters such as zoning,
building codes, the sale or use of alcoholic beverages, licensing or other regulatory ordinances, and the like, cannot be enforced against the state—its agencies and its property—in the absence of an act of the state legislature manifesting a legislative intent to waive the state's immunity from such local regulation.

According to AGO 074-237, applying the same rule to the question of whether a municipality's zoning regulations could validly be applied to regulate the Division of Youth Services, a state agency, in carrying out its official duties with respect to the placement of children in foster group homes.

I am not aware of any changes in the constitutional or statutory law of this state since the 1971 opinion was rendered—nor, certainly, since the 1974 opinion, dated August 4, 1974; was adopted—that would require a different ruling. It follows, therefore, that the University is not required to obtain a county permit before removing or destroying a tree on the campus in order to carry out a governmental function. The caveat of AGO 074-237 should not, however, be overlooked. It was there noted that state agencies must always seek to act reasonably in any situation; and attention was directed to the article Governmental Immunity From Local Zoning Ordinances, 84 Harv. L. Rev. 869 (1970-71), stating that the author . . . proposes the application of a "balancing of interests" test when the accomplishment of one governmental entity's statutorily-assigned duty conflicts with another governmental entity's local regulations.

Your question is answered accordingly.

SUMMARY

Ordinarily, lands owned by the State of Florida are not subject to the regulatory ordinances of the county within whose boundaries such lands are located, and a
university is not required to obtain a county permit, as required by the county's tree ordinance, before removing or destroying a tree on the campus in order to carry out a governmental function.

Sincerely,

ROBERT T. SHEVIN
ATTORNEY GENERAL

Prepared By:

Rebecca Bowles Hawkins
Assistant Attorney General

RDS/RBH/6W
## 01 41 00 UNF Building Code Enforcement Program Checklist – EXHIBIT 4

### UNF Building Code Enforcement Program

**Design and Construction Checklist Guideline**

Listed below are typical design and construction issues found by the building code enforcement program (BCEP) for designer and contractor consideration for construction projects at UNF.

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>COMMENT/ISSUE</th>
<th>REFERENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>All work shall be inspected prior to cover-up unless otherwise directed by BCO</td>
<td></td>
</tr>
<tr>
<td>Reviews</td>
<td>Architect/Engineer shall respond to BCEP Construction Document Review comments in writing</td>
<td></td>
</tr>
<tr>
<td>Product Approval</td>
<td>Florida Product Approval information for exterior components needs to be submitted prior to issuance of the permit.</td>
<td>FAC 9B-72</td>
</tr>
<tr>
<td>TERMITE PROTECTION</td>
<td>Existing – All floor penetrations or cutouts need to be retreated for termites unless otherwise directed by the BCO.</td>
<td>FBC 1818; 105.10 and 105.11</td>
</tr>
<tr>
<td></td>
<td>New – After completion, the treatment company needs to provide a warranty and label for placement within the building</td>
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<tr>
<td></td>
<td>New &amp; Existing – Prior to exterior concrete pour or after disturbance, the area within 12 inches of a building needs to be retreated</td>
<td></td>
</tr>
<tr>
<td>Stairwells &amp; Hallways</td>
<td>Obstructions in and adjacent to accessible routes, including light fixtures, fire extinguisher cabinets, sprinkler heads &amp; piping, etc. need to comply with the requirements of the FBC</td>
<td>FBC 11-4.4; Figure 8 (a-d); FBC 1003.3.1 and 1003.3.3</td>
</tr>
<tr>
<td>Aisle Stairs</td>
<td>In Assembly Area – Center aisle stairs typically require handrails on each side of aisle or in the center. Rammed aisles may also need handrails.</td>
<td>FBC 1025.13; 11-4.8.5</td>
</tr>
<tr>
<td>Stairs &amp; Ramps</td>
<td>Construction variances on treads and risers of stairs.</td>
<td>FBC 1009.3.2; NFPA 101.7.2.2.3.6</td>
</tr>
<tr>
<td></td>
<td>Handrail heights (top of railing to be 34” to 38” AFF of landing, ramp or step nosing).</td>
<td>FBC 1012.2</td>
</tr>
<tr>
<td></td>
<td>Handrail Diameter – 1.5” outside diameter or width (gripping diameter) maximum: 1.25” ID. Schedule 80 pipe acceptable.</td>
<td>FBC 11-4.26.2</td>
</tr>
<tr>
<td></td>
<td>Openings in guardrails.</td>
<td>FBC 1013.3</td>
</tr>
<tr>
<td></td>
<td>Termination of handrails.</td>
<td>FBC 11-4.9.4(6)</td>
</tr>
<tr>
<td></td>
<td>Guardrail heights (top of rail to be minimum 42” AFF).</td>
<td>FBC 1013.2</td>
</tr>
<tr>
<td></td>
<td>Handrail Continuity – Minimum 1.5” from rail to wall and minimum 1.5” from bottom of rail to top of wall/post mounting bracket.</td>
<td>FBC 1012.4, Exc. 3.1; NFPA 101-7.2.4.5(4a)</td>
</tr>
<tr>
<td>Ramps</td>
<td>Landing size (top, bottom and intermediate).</td>
<td>11-4.8.4 and FBC 11-4.13.6</td>
</tr>
<tr>
<td></td>
<td>Cross-slope (slope &lt; 2%).</td>
<td>FBC 11-4.8.6</td>
</tr>
<tr>
<td>Sidewalks</td>
<td>Cross-slope of sidewalks on accessible routes (slope &lt; 2%).</td>
<td></td>
</tr>
<tr>
<td>Slabs</td>
<td>Wire mesh needs to be supported by suitable chairs in slabs.</td>
<td>FBC 1910.2.2</td>
</tr>
<tr>
<td>LOCATION</td>
<td>COMMENT/ISSUE</td>
<td>REFERENCES</td>
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<tr>
<td>---------------------</td>
<td>-------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Masonry</td>
<td>Vertical rebar in fill cells need to be fixed in position.</td>
<td>FBC 1805.5.2</td>
</tr>
<tr>
<td></td>
<td>Cleanouts needed on fill cell lifts over 5' in height; fill cell shall be a</td>
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<td></td>
<td>minimum width of 3' and a minimum area of 10 square inches.</td>
<td>ACI 530</td>
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<tr>
<td></td>
<td>Provide required length on rebar splices (horizontal and vertical),</td>
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<tr>
<td></td>
<td>including corner bars.</td>
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<td></td>
<td>Keep fill cells clean of debris and excess mortar; Leave the grout at</td>
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<td></td>
<td>least 2' – 4' below the surface of the top CMU for the next pour.</td>
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<tr>
<td>Reinforcing</td>
<td>Provide minimum spacing between reinforcing bars.</td>
<td>FBC 1907.6</td>
</tr>
<tr>
<td></td>
<td>Provide minimum cover over rebar to earth and formwork.</td>
<td>FBC Table 1907.7.1</td>
</tr>
<tr>
<td></td>
<td>► BUILDING – ACCESSIBILITY ◄</td>
<td></td>
</tr>
<tr>
<td>Observation &amp;</td>
<td>Typically, observation and service windows are set too high and not</td>
<td>FBC 11-4.3.7</td>
</tr>
<tr>
<td>Service Windows</td>
<td>functional for wheelchair users. Review locations and heights with the UNF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ADA Compliance Officer prior to design and construction.</td>
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</tr>
<tr>
<td>Sidewalks</td>
<td>Cross-slope of sidewalks on accessible routes (slope &lt; 2%).</td>
<td></td>
</tr>
<tr>
<td>Stairwells</td>
<td>Overhead Hazards – Typically, the first floor intermediate landing and</td>
<td></td>
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<tr>
<td></td>
<td>flight create an overhead hazard for the sight impaired that needs to be</td>
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</tr>
<tr>
<td></td>
<td>addressed.</td>
<td></td>
</tr>
<tr>
<td>Equipment &amp;</td>
<td>Check with UNF ADA Compliance Officer and BCO on required equipment safety</td>
<td></td>
</tr>
<tr>
<td>Millwork</td>
<td>accessibility prior to ordering. Typically, all cabinet and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>countertops need a section at a maximum height of 34″ AFF.</td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>Breakfast, lounges and hallway sinks, and counters (or portion),</td>
<td></td>
</tr>
<tr>
<td>Accessibility</td>
<td>workstation sinks (unless use requirements prevent), workstation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>counters (or portion); service desks (or portion) shall be accessible</td>
<td></td>
</tr>
<tr>
<td></td>
<td>for workers and customers; UNF ADA Compliance Officer may have additional</td>
<td></td>
</tr>
<tr>
<td>Detectable Warning</td>
<td>Detectable warning pads required where accessible routes adjoin</td>
<td>FBC 11-29.5</td>
</tr>
<tr>
<td></td>
<td>vehicular ways, including parking lots.</td>
<td></td>
</tr>
<tr>
<td>Lavatories &amp;</td>
<td>At least one accessible lav (and mirror) shall be installed, in addition</td>
<td>FBC 11-4.22.6; 11-</td>
</tr>
<tr>
<td>Mirrors</td>
<td>to the one required for the accessible toilet stall/room.</td>
<td>4.19.6; ADAGA 213.3.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lavatories &amp;</td>
<td>The bottom of the front apron shall have a minimum clearance of 29″ AFF.</td>
<td>FBC 11-4.19.2;</td>
</tr>
<tr>
<td>Vanities</td>
<td></td>
<td>Figure 31</td>
</tr>
<tr>
<td>Toilet Stalls</td>
<td>There shall be a 60” clear floor space provided between the edge of the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the lavatory and wall adjacent to the water closet. The 60”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>dimension is also recommended for individual toilet rooms (unisex).</td>
<td></td>
</tr>
<tr>
<td>Door Opening Force</td>
<td>Interior Doors: 5 lbf (with latch and closer); Exterior Doors: 8.5 lbf.</td>
<td></td>
</tr>
<tr>
<td>Refrigerators</td>
<td>Refrigerators and other appliances typically need to be accessible</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and should not be placed in the corner of a room; 48” clear floor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>space dimension should be centered on appliance, with turning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>radius provided. Review locations with the UNF ADA Compliance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Officer prior to design and installation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>► ELECTRICAL ◄</td>
<td></td>
</tr>
<tr>
<td>MC Cable</td>
<td>Properly support cable and keep off ceiling grid to allow access.</td>
<td>NEC 300.4(D); NEC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>330.30; NEC300.11</td>
</tr>
<tr>
<td></td>
<td>Typically, if the edge of a metal stud cutout is closer than 1.25’ from the</td>
<td>NEC 330.17</td>
</tr>
<tr>
<td></td>
<td>stud face the cable shall be secured every 6’ or as required to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>protect the cable (providing a minimum 1.25” clearance).</td>
<td></td>
</tr>
<tr>
<td>LOCATION</td>
<td>COMMENT/ISSUE</td>
<td>REFERENCES</td>
</tr>
<tr>
<td>----------</td>
<td>---------------</td>
<td>------------</td>
</tr>
<tr>
<td>MC Cable</td>
<td>Should not be attached to ceiling grid or grid support wires; separate wires are required and shall be attached at the bottom.</td>
<td>NEC 300.11(A)</td>
</tr>
<tr>
<td></td>
<td>Drop wires used to support conduit and cables shall be attached at the bottom (same for EMT, IMC, etc.).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>#8 drop wires (used in place of rods) will not be acceptable unless rigidly fixed at structure above; free moving connection similar to that used for ceiling grid support wires are not acceptable.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Installations through, parallel and attached to studs, shall have a 1.25&quot; clearance to the face of the stud, or shall be protected.</td>
<td>NEC 330.17</td>
</tr>
<tr>
<td>Conductor Sizing</td>
<td>Circuits with overcurrent protection up to and including 30A shall have grounded conductors the same size as ungrounded conductors (proportionality rule).</td>
<td>NEC 250.122(B)</td>
</tr>
<tr>
<td>Conductor ID</td>
<td>Sizes 6 AWG and less grounded conductors shall be identified continuously in accordance with NEC; Phase tape, or similar, not acceptable.</td>
<td>NEC 200.8(A)</td>
</tr>
<tr>
<td>Panels</td>
<td>Keep equipment out of the overhead dedicated equipment space; and protect from foreign systems as required.</td>
<td>NFPA 110.7(R)(F)(1)</td>
</tr>
<tr>
<td>Initiation and Notification Devices</td>
<td>The entire strobe lens must be a minimum of 80&quot; AFF - coordinate height of J-box rough-in with device supplier; Recommend 62&quot; AFF.</td>
<td>NFPA 72.7.5.4</td>
</tr>
<tr>
<td></td>
<td>Properly mark circuit components, including J-boxes, circuit breakers, etc.</td>
<td>NEC 760.30; NFPA 72.4.4.1.4.2.2</td>
</tr>
<tr>
<td></td>
<td>Conductors need to be secured against pull-out within the J-boxes.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Install circuit breaker lock if subpanel not secured against unauthorized access.</td>
<td>NFPA 72.4.4.1.4.2 Commentary</td>
</tr>
<tr>
<td>Lights</td>
<td>Fixtures to be properly supported or attached to structure or ceiling grid (main runners).</td>
<td></td>
</tr>
<tr>
<td>J-boxes</td>
<td>When conductors are spliced within metal J-box the box needs to be bonded, in all cases.</td>
<td>NEC 250.14B</td>
</tr>
<tr>
<td>Device Boxes</td>
<td>Box shall be a maximum of 0.25&quot; from face of finished wall surface (noncombustible); Box shall have a maximum of 1/8&quot; gap around box to wall surface in GWB and plaster.</td>
<td>NEC 314.20; NEC 314.21</td>
</tr>
</tbody>
</table>

**MECHANICAL**

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>COMMENT/ISSUE</th>
<th>REFERENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire &amp; Smoke Dampers</td>
<td>All dampers need to be tested in place and the specified log sheet completed and signed; Labeled access doors required.</td>
<td>NFPA 80A, Chapter 7, FBC Mechanical 607.4</td>
</tr>
<tr>
<td>Duct Pressure Tests</td>
<td>To be witnessed by BCO if required by code or SMACNA.</td>
<td></td>
</tr>
<tr>
<td>Exterior Equipment</td>
<td>Design anchoring for equipment to meet wind loading requirements, including roof curbings, compressors, AHUs, etc.</td>
<td>FBC Mechanical 301.12</td>
</tr>
<tr>
<td>Exhaust Ducts</td>
<td>Exhaust ducts shall be metal, from fan to termination.</td>
<td>FBC Mechanical 501.4</td>
</tr>
</tbody>
</table>

**PLUMBING**

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>COMMENT/ISSUE</th>
<th>REFERENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure Tests</td>
<td>Use proper size gauges for tests (# increments from 10# to 100# test; 2# increments over 100# test), Provide gauge that reads higher than test pressure.</td>
<td>FBC Plumbing 312.1.1</td>
</tr>
<tr>
<td>Pipe Supports</td>
<td>PVC Pipe Supports: Horizontal – 4’ on center (maximum); Vertical – 10’ (midstory guide for 2’ and smaller).</td>
<td>FBC Plumbing Table 308.5</td>
</tr>
<tr>
<td>Pipe Protection</td>
<td>Protect PVC pipe from cut edges of metal studs and within 1.5” of stud edge; Protect copper piping from dissimilar metal studs and unistrut hangers.</td>
<td>FBC Plumbing Section 305</td>
</tr>
<tr>
<td>Floor &amp; Wall Penetrations</td>
<td>PVC piping more difficult to firestop; over 2” diameter; Provide listing for firestopping systems prior to inspection.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>COMMENT/ISSUE</th>
<th>REFERENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urinals</td>
<td>At least one accessible urinal in restroom if urinals provided;</td>
<td>FBC 11.4.10.2</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Sprinkler Calcs</th>
<th>Need to be provided for review prior to installation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated-Walls</td>
<td>Check for proper screw patterns based on UL listing used and orientation of sheetrock; Warning labels required.</td>
</tr>
<tr>
<td></td>
<td>2-hour rated walls – 1st layer needs to be inspected prior to installation of top layer.</td>
</tr>
<tr>
<td>Firestop Systems</td>
<td>Provide copies of firestop assemblies and systems to be used, prior to first inspection.</td>
</tr>
<tr>
<td>Initiation and Notification Devices</td>
<td>Sound Levels - The dBA levels in rooms and areas, new and existing, may be checked during inspections; Check for incorrect device addresses prior to final inspection.</td>
</tr>
<tr>
<td>Initiation and Notification devices</td>
<td>Plans, including Life Safety Plan, need to show location of devices and candela rating of strobes (existing and new).</td>
</tr>
<tr>
<td>Manual Pull Station</td>
<td>Manual Pull Station shall be located not more than 5’ from door.</td>
</tr>
<tr>
<td>Sprinkler Heads</td>
<td>Typically, uplift clips required for pendent heads mounted in ceilings with fire pump systems (&gt;100 psi).</td>
</tr>
<tr>
<td>Rated-Walls</td>
<td>Provide UL Listing number, or equivalent, for partitions.</td>
</tr>
<tr>
<td>Tactile EXIT Signs</td>
<td>Tactile signage shall be located at each EXIT door requiring and EXIT sign</td>
</tr>
<tr>
<td>Storage</td>
<td>General office storage rooms large enough to walk into shall be protected (typically, more than 36” deep).</td>
</tr>
<tr>
<td>State Fire Marshal</td>
<td>Typically, the SFM review requires submittal of sprinkler and alarm system shop drawings prior to inspections.</td>
</tr>
<tr>
<td>State Fire Marshal</td>
<td>Inspection Requests: The SFM has a form that needs to be submitted to the Tallahassee Office at least 5 working days before the inspection. The form is submitted to the SFM by Dan Endicott, Director, UNF EH&amp;S. Typically, the UNF construction project manager should submit the form to EH&amp;S after the contractor has informed them of the time and date of the required inspection.</td>
</tr>
</tbody>
</table>

Code References: 2007 FBC (Building, Mechanical and Plumbing); 2008 NEC (NFPA 70); 2002 National Fire Alarm Code (NFPA 72); 2006 Life Safety Code (NFPA 101); 2002 Installation of AC and Ventilating Systems (NFPA 90A)
01 77 00 Closeout Procedures

1. General

A. Related Documents: Drawings and general provisions of the contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

B. Summary:

- This section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - Inspection procedures.
  - Project Record Documents.
  - Operation and maintenance manuals.
  - Warranties.
  - Instruction of Owner’s personnel.
  - Final cleaning.

- Related sections include the following:
  - Divisions 2 through 16 sections for specific closeout and special cleaning requirements for products of those sections.

C. Substantial Completion:

- Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
  - Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the work is not complete.
  - Advise Owner of pending insurance changeover requirements.
  - Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  - Obtain and submit releases permitting Owner unrestricted use of the work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
01 77 00 Closeout Procedures

○ Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs and photographic negatives, damage or settlement surveys, property surveys, and similar final record information.

○ Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer’s name and model number where applicable.

○ Make final changeover of permanent locks and deliver keys to Owner. Advise Owner’s personnel of changeover in security provisions.

○ Complete startup testing of systems.

○ Submit test/adjust/balance records.

○ Terminate and remove temporary facilities from project site, along with mockups, construction tools, and similar elements.

○ Advise Owner of changeover in heat and other utilities.

○ Submit changeover information related to Owner’s occupancy, use, operation, and maintenance.

○ Complete final cleaning requirements, including touchup painting.

○ Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

● Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify contractor of items, either on contractor’s list or additional items identified by architect, that must be completed or corrected before certificate will be issued.

○ Reinspection: Request reinspection when the work identified in previous inspections as incomplete is completed or corrected.

○ Results of completed inspection will form the basis of requirements for Final Completion.

D. Final Completion:

● Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
○ Submit a final Application for Payment according to Division 1 section “Payment Procedures.”

○ Submit certified copy of Architect’s Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

○ Submit evidence of final, continuing insurance coverage complying with insurance requirements.

○ Instruct Owner’s personnel in operation, adjustment, and maintenance of products, equipment and systems.

● Inspection: Submit a written request for final inspection for acceptance. On receipt of request, architect will either proceed with inspection or notify contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify contractor of construction that must be completed or corrected before certificate will be issued.

○ Reinspection: Request reinspection when the work identified in previous inspections as incomplete is completed or corrected.

E. List of Incomplete Items (Punch List)

● Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by contractor that are outside the limits of construction.

○ Organize list of spaces in sequential order, starting with exterior areas first.

○ Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

○ Include the following information at the top of each page:
  ➔ Project Name.
  ➔ Date.
  ➔ Name of Architect.
  ➔ Name of Contractor.
  ➔ Page number.
F. Project Record Documents:
   • Refer to individual project contract requirements.

G. Operation and Maintenance Manuals:
   • Refer to Specification Section 01 78 23 Operations and Maintenance Data.

H. Warranties:
   • Refer to individual project specifications for warranty requirements.

2. Products

A. Materials:
   • Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

3. Execution

A. Demonstration and Training:
   • Instruction: Instruct Owner’s personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
     ○ Provide instructors experience in operation and maintenance procedures.
     ○ Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
     ○ Schedule training with Owner with at least seven days’ advance notice.
     ○ Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.
     ○ Provide Owner training for all mechanical, electrical, plumbing, communication systems, operable panel partitions and custodial. Provide this training recorded on a DVD. Video taping shall be done outside of the training class so that it can be scripted and completed without interruption. This video tape training shall answer the following questions about each component and system: What is it? What does it do? How does it do it? Where is the power feed from / Where are the emergency shut-offs and any other pertinent information related to each component and system.
B. Final Cleaning:

- General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

- Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer’s written instructions.

  - Complete the following cleaning operations before requesting inspection of certification of Substantial Completion for entire project or for a portion of project:

    - Clean project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances. Staging area shall be returned to pre-mobilization condition with sod; seeding is not acceptable.

    - Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

    - Rake grounds that are neither planted nor paved to a smooth, even-textured surface.

    - Remove tools, construction equipment, machinery, and surplus material from project site.

    - Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

    - Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

    - Sweep concrete floors broom clean in unoccupied spaces.

    - Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soils or stains remain.

    - Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other...
damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

- Remove labels that are not permanent.

- Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
  
  Do not paint over “UL” and similar labels, including mechanical and electrical nameplates.

- Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

- Replace parts subject to unusual operating conditions.

- Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

- Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

- Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

- Leave project clean and ready for occupancy.

- Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid project of rodents, insects, and other pests. Prepare a report.

- Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner’s property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from project site and dispose of lawfully.
01 78 23 Operation and Maintenance Data

1. General

   A. Related Documents: Drawings and general provisions of the contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

   B. Summary:

      ● This section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

      ○ Operation and maintenance documentation directory.

      ○ Emergency manuals.

      ○ Operation manuals for systems, subsystems, and equipment.

      ○ Maintenance manuals for the care and maintenance of products, materials, and finishes systems and equipment.

      ● Related sections include the following:

      ○ Division 1 Section “Project Record Documents” for preparing record drawings for operation and maintenance manuals.

      ○ Divisions 2 through 16 Sections for specific operation and maintenance manual requirements for products in those sections.

   C. Definitions:

      ● System: An organized collection of parts, equipment, or subsystems united by regular interaction.

      ● Subsystem: A portion of a system with characteristics similar to a system.

   D. Submittals:

      ● Initial Submittal: Submit 1 draft copy of each manual at least 15 days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Architect will return this copy of draft and mark whether general scope and content of manual are acceptable.

      ● Final Submittal: Submit 1 copy of each manual in final form at least 15 days before final inspection. Architect will return copy with comments within 15 days after final inspection.
○ Correct or modify each manual to comply with architect’s comments. Submit 1 copy of each corrected manual within 15 days of receipt of architect’s comments to the Owner.

E. Coordination: Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

2. Products

A. Operation and Maintenance Documentation Directory:

● Organization: Include a section in the directory for each of the following:
  ○ List of documents.
  ○ List of systems.
  ○ List of equipment.
  ○ Table of contents.
● List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
● List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
● Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
● Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with the same designation used in the contract documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, “Preparation of Operating and Maintenance Documentation for Building Systems.”

B. Manuals, General:

● Submit separate manuals for warranties and closeout documents. This is applicable for all divisions.
Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

- Title page.
- Table of contents.
- Manual contents.

Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
- Subject matter included in manual.
- Name and address of project.
- Name and address of Owner.
- Date of submittal.
- Name, address, and telephone number of contractor.
- Name and address of Architect.
- Cross-reference to related systems in other operation and maintenance manuals.

Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to specification section number in project manual.

- If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

- Binders: Heavy-duty, 3-ring, “D” shaped wire, vinyl-covered, loose-leaf binders, in thickness necessary, but no larger than 3 inches thick, to accommodate contents, sized to hold 8½-by-11-inch (115-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system. Label binders as Volume #1, Volume #2, etc., if more than one binder is required to fit the content.

Identify each binder on front and spine, with printed title “OPERATION AND MAINTENANCE MANUAL,” project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

No glue on labels will be permitted.

- Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to specification section number and title of project manual.

- Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.

- Supplementary Text: Prepared on 8½-by-11-inch (115-by-280-mm), 20-lb./sq. ft. (75-g/sq. m) white bond paper.

- Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
  - If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
  - If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

C. Emergency Manuals:

- Content: Organize manual into a separate section for each of the following:
  - Type of emergency.
  - Emergency instructions.
  - Emergency procedures.
• Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
  ○ Water leak.
  ○ Power failure.
  ○ Water outage.
  ○ System, subsystem, or equipment failure.

• Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner’s operating personnel for notification of installer, supplier, and manufacturer to maintain warranties.

• Emergency Procedures: Include the following, as applicable:
  ○ Instructions on stopping.
  ○ Shutdown instructions for each type of emergency.
  ○ Operating instructions for conditions outside normal operating limits.
  ○ Required sequences for electric or electronic systems.
  ○ Special operation instructions and procedures.

D. Operation Manuals:

• Content: In addition to requirements in this section, include operation data required in individual specification sections and the following information:
  ○ System, subsystem, and equipment descriptions.
  ○ Performance and design criteria if contractor is delegated design responsibility.
  ○ Operating standards.
  ○ Operating procedures.
  ○ Operating logs.
  ○ Wiring diagrams.
  ○ Control diagrams.
  ○ Piped system diagrams.
○ Precautions against improper use.
○ License requirements including inspection and renewal dates.

● Descriptions: Include the following:
  ○ Product name and model number.
  ○ Manufacturer’s name.
  ○ Equipment identification with serial number of each component.
  ○ Equipment function.
  ○ Operating characteristics.
  ○ Limiting conditions.
  ○ Performance curves.
  ○ Engineering data and tests.
  ○ Complete nomenclature and number of replacement parts.

● Operating Procedures: Include the following, as applicable:
  ○ Startup procedures.
  ○ Equipment or system break-in procedures.
  ○ Routine and normal operating instructions.
  ○ Regulation and control procedures.
  ○ Instructions on stopping.
  ○ Norman shutdown instructions.
  ○ Seasonal and weekend operating instructions.
  ○ Required sequences for electric or electronic systems.
  ○ Special operating instructions and procedures.

● Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

● Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

E. Product Maintenance Manual:
Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

Source Information: List each product included in manual, identified by product name and arranged to match manual’s table of contents. For each product, list name, address, and telephone number of installer or supplier and maintenance service agent, and cross-reference specification section number and title in project manual.

Product Information: Include the following, as applicable:
- Product name and model number.
- Manufacturer’s name.
- Color, pattern, and texture.
- Material and chemical composition.
- Reordering information for specially manufactured products.

Maintenance Procedures: Include manufacturer’s written recommendations and the following:
- Inspection procedures.
- Types of cleaning agents to be used and methods of cleaning.
- List of cleaning agents and methods of cleaning detrimental to product.
- Schedule for routine cleaning and maintenance.
- Repair instructions.

Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds:
- Include procedures to follow and required notifications for warranty claims.

F. Systems and Equipment Maintenance Manual:

Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers’ maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts
list and source information, maintenance service contracts, and warranty and bond information, as described below.

- **Source Information:** List each system, subsystem, and piece of equipment included in the manual, identified by product name and arranged to match manual’s table of contents. For each product, list name, address, and telephone number of installer or supplier and maintenance service agent, and cross-reference specification section number and title in project manual.

- **Manufacturer’s Maintenance Documentation:** Manufacturers’ maintenance documentation including the following information for each component part or piece of equipment:
  - Standard printed maintenance instructions and bulletins.
  - Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  - Identification and nomenclature of parts and components.
  - List of items recommended to be stocked as spare parts.

- **Maintenance Procedures:** Include the following information and items that detail essential maintenance procedures:
  - Test and inspection instructions.
  - Troubleshooting guide.
  - Precautions against improper maintenance.
  - Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - Aligning, adjusting, and checking instructions.
  - Demonstration and training videotape, if available.

- **Maintenance and Service Schedules:** Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
  - Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  - Maintenance and Service Record: Include manufacturers’ forms for recording maintenance.
• Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers’ maintenance documentation and local sources of maintenance materials and related services.

• Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

• Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  ○ Include procedures to follow and required notifications for warranty claims.

3. Execution

A. Manual Preparation:

• Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the work.

• Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
  ○ Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  ○ Prepare a separate manual for each system and subsystem, in the form of an instruction manual for use by Owner’s operating personnel.

• Manufacturers’ Data: Where manuals contain manufacturers’ standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the work. If data include more than one item in a tabular format, identify each item using appropriate references from the contract documents. Identify data applicable to the work and delete references to information not applicable.
  ○ Prepare supplementary text if manufacturers’ standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

• Drawings: Prepare drawings supplementing manufacturers’ printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings
with information contained in record drawings to ensure correct illustration of completed installation.

○ Comply with requirements of newly prepared record drawings in Division 1 Section “Project Record Documents.”

● Comply with Division 1 Section “Closeout Procedures” for the schedule for submitting operation and maintenance documentation.
01 81 13 Sustainable Design Requirements

1. General

A. LEED: All new UNF facilities are to be LEED accredited.
01 83 00 Facility Shell Performance Requirements

1. General

A. Exterior Stairways: Exterior stairs shall be fully enclosed but need not be air conditioned.

B. Roofs:

- Roof Access:
  - If permissible by project’s budget, it is preferable to have elevator access to facility roof deck(s).
  - All buildings must have parapets at roof edges.
  - Gravel stops and flashing are not to be used.
  - Parapets that act as a railing for occupied rooftop areas are to be 42 inches high minimum. Other parapets are to be 24 inches minimum.

- Roof top anchorage points are to be provided in addition to building parapets.
01 84 00 Interiors Performance Requirements

01 84 00 UNF Custodial Work Rooms Diagram – EXHIBIT 1

Not to Scale

Minimum Requirements for Janitor Work Closet Each Floor
1. Room for one 2’ x 8’ Metal Shelf for Daily Supply Stock.
2. Room for one Floor Cart (2’ x 4’)
3. Floor Vacuum for Carpet.
4. Room for one round trash can (2’ Dia.)
5. Mop, Mop Bucket, Dust Mop, Broom, etc.
6. One Mop Sink.
7. At least one 120 v 20 a duplex outlet.
8. Lights switch
01 88 00 Other Facility Construction Performance Requirements

1. General

01 89 16 Site Improvements Performance Requirements

1. General

   A. Site Access:  New building designs should include site access for service vehicles, electric carts and bicycles.
05 00 00 Metals
05 73 00 Decorative Metal Railings – EXHIBIT 1

A. All handrails and railings shall be powder-coated aluminum to match Color XXXX.

3" Ø ALUMINUM PIPE TOP RAIL

1/2" X 1" ALUMINUM BORDER TRIM ALL AROUND INFILL PANEL

2" Ø ALUMINUM PIPE VERTICAL POST BEYOND

2" X 2" ALUMINUM GRID INFILL PANEL - GAUGE TO MATCH UNF STANDARDS AND EXISTING INSTALLATIONS ON CAMPUS.

2" Ø ALUMINUM PIPE BOTTOM RAIL

CONCRETE CURB

FINISHED FLOOR

NOTE: POWDER COAT ALL ALUMINUM RAILING COMPONENTS SILVER

GUARDRAIL SECTION
GUARDRAIL SECTION

3" Ø ALUMINUM PIPE TOP RAIL

1/2" X 1" ALUMINUM BORDER TRIM ALL AROUND INFILL PANEL

2" Ø ALUMINUM PIPE VERTICAL POST

2" X 2" ALUMINUM GRID INFILL PANEL

2" Ø ALUMINUM PIPE BOTTOM RAIL

CONCRETE CURB

FINISHED FLOOR
07 00 00 Thermal & Moisture Protection
07 52 16 Styrene-Butadiene-Styrene Modified Bituminous Roofing

1. Products

A. Manufacturer:

- Basis-of-Design Product: The specified roofing system is based on the Siplast, Inc. Subject to compliance with the requirements, provide either the named product or an equivalent product. Approved equivalent product requests must be submitted in writing five days prior to bid.

B. Base Sheet for Existing Lightweight Concrete and NVS Lightweight Insulating Concrete System Substrates:

- Base Sheet: A fiberglass reinforced, asphalt coated sheet with a polyolefin film backing, having a minimum weight of 20 lb./sq. The sheet shall conform to ASTM D4601, Type II requirements. Acceptable types are as follows:
  - Siplast Parabase.

C. Roofing Membrane Assembly: A roof membrane assembly consisting of two piles of a prefabricated, reinforced, homogeneous Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane applied over a prepared substrate. Both reinforcement mats shall be impregnated/saturated and coated each side with an SBS modified bitumen blend. The cross sectional area of the sheet material shall contain no oxide or non-SBS modified bitumen. The roof system shall pass 500 cycles of ASTM D 5849 Resistance to Cyclic Joint Displacement (fatigue) at 14°F (-10°C). Passing results show no signs of membrane cracking or interply delamination after 500 cycles. The roof system shall pass 200 cycles of ASTM D 5849 after heat conditioning performed in accordance with ASTM D 5147. The assembly shall possess waterproofing capability, such that a phased roof application, with only the modified bitumen base ply in place, can be achieved for prolonged periods of time without detriment to the watertight integrity of the entire roof system:

- Basis of Design: Siplast Paradiene 20/30 CR FR roof system:
  - Modified Bitumen Base and Stripping Ply – Basis of Design: Siplast Paradiene 20:
    - Thickness (avg.): 91 mils (2.3 mm) (ASTM D 5147).
    - Thickness (min.): 87 mils (2.2 mm) (ASTM D 5147).
07 52 16 Styrene-Butadiene-Styrene Modified Bituminous Roofing

- Weight (min. per 100 ft² of coverage): 62 lb. (3.0 kg/m²).
- Maximum filler content in elastomeric blend: -35 percent by weight.
- Low temperature flexibility @ -13ºF (-25ºC) – PASS (ASTM D 5147).
- Peak Load (avg.) @ 73ºF (23ºC): 30 lbf/inch (5.3 kN/m) (ASTM D 5147).
- Peak Load (avg.) @ 0ºF (-18ºC): 70 lbf/inch (12.3 kN/m) (ASTM D 5147).
- Ultimate Elongation (avg.) @ 73ºF (23ºC): 50 percent (ASTM D 5147).
- Dimensional Stability (max.): 0.1 percent (ASTM D 5147).
- Compound Stability (min.): 250ºF (121ºC) (ASTM D 5147).
- Approvals: UL Class listed (products shall bear seals of approval).
- Reinforcement: Fiberglass mat or other meeting the performance and dimensional stability criteria.

- Modified Bitumen Finish Ply – Basis of Design: Siplast Paradiene 30 CR FR:
  - Thickness (avg.): 110 mils (2.8 mm) (ASTM 5147).
  - Thickness at Selvage (coating thickness) (avg.): 98 mils (2.5 mm) (ASTM D 5147).
  - Thickness at Selvage (coating thickness) (min.): 94 mils (2.4 mm) (ASTM D 5147).
  - Weight (min. per 100 ft² of coverage): 75 lb. (3.6 kg/m²).
  - Maximum Filler Content in Elastomeric Blend: 35 percent by weight.
  - Low Temperature Flexibility @ -13ºF (-25ºC): PASS (ASTM D 5147).
  - Peak Load (avg.) @ 73ºF (23ºC): 30 lbf/inch (5.3 kN/m) (ASTM D 5147).
  - Peak Load (avg.) @ 0ºF (-18ºC): 75 lbf/inch (13.2 kN/m) (ASTM D 5147).
  - Ultimate Elongation (avg.) @ 73ºF (23ºC): 55 percent (ASTM D 5147).
  - Dimensional Stability (max): 0.1 percent (ASTM D 5147).
  - Compound Stability (min): 250ºF (121ºC) (ASTM D 5147).
  - Solar Reflectance: > 0.70 percent (ASTM D 1549).
  - Thermal Emittance > 0.80 percent (ASTM D 1371).
D. Roofing Membrane Flashing Assembly: A roofing membrane flashing assembly consisting of a prefabricated, reinforced, Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane with a continuous, channel-embossed metal-foil surfacing. The finish ply shall conform to ASTM D 6298 requirements. The base ply and finish ply shall also conform to the following physical and mechanical property requirements.

● Basis of Design: Siplast Veral Aluminum roof system:
  ○ Bituminous Base and Stripping Ply – Basis of Design: Siplast Paradiene 20:
    ▶ Thickness (avg.): 91 mils (2.3 mm) (ASTM D 5147).
    ▶ Thickness (min.): 87 mils (2.2 mm) (ASTM D 5147).
    ▶ Weight (min. per 100 ft² of coverage): 62 lb. (3.0 kg/m²).
    ▶ Peak filler content in elastomeric blend: 35 percent by weight.
    ▶ Low temperature flexibility @ -13°F (-25°C): PASS (ASTM D 5147).
    ▶ Peak Load (avg.) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147).
    ▶ Peak Load (avg.) @ 0°F (-18°C): 70 lbf/inch (12.3 kN/m) (ASTM D 5147).
    ▶ Ultimate Elongation (avg.) @ 73°F (23°C): 50 percent (ASTM D 5147).
    ▶ Compound Stability (max.): 0.1 percent (ASTM D 5147).
    ▶ High Temperature Stability (min.): 250°F (121°C) (ASTM D 5147).
    ▶ Approvals: UL Approved (products shall bear seals of approval).
    ▶ Reinforcement: Fiberglass mat or other meeting the performance and dimensional stability criteria.

● Metal-Clad Modified Bitumen Finish Ply – Basis of Design: Siplast Veral Aluminum:
  ○ Thickness (avg.): 150 mils (3.8 mm) (ASTM D 5147).
  ○ Thickness (min.): 146 mils (3.7 mm) (ASTM D 5147).
○ Weight (min. per 100 ft² of coverage): 96 lb (4.5 kg/m²).
○ Coating Thickness – back surface (min.): 40 mils (1 mm) (ASTM D 5147).
○ Maximum Filler Content in Elastomeric Blend: 35 percent by weight.
○ Low Temperature Flexibility @ -0°F (-18°C): PASS (ASTM D 5147).
○ Peak Load (avg.) @ 73ºF (23°C): 85 lbf/inch (15 kN/m) (ASTM D 5147).
○ Peak Load (avg.) @ 0ºF (-18°C): 180 lbf/inch (31.7 kN/m) (ASTM D 5147).
○ Ultimate Elongation @ 73ºF (23°C): 45 percent (ASTM D 5147).
○ Tear-Strength (avg): 120 lbf (0.54 kN) (ASTM D 5147).
○ Dimensional Stability (max): 0.2 percent (ASTM D 5147).
○ Compound Stability (min): 225ºF (107°C) (ASTM D 5147).
○ Cyclic Thermal Shock Stability (maximum): 0.2 percent (ASTM D 6298).
○ Approvals: UL Approved (products shall bear seals of approval).
○ Reinforcement: Fiberglass mat or other meeting the performance and dimensional stability criteria.
○ Surfacing: Aluminum metal foil.

E. Flashing Membrane Assembly: A flashing membrane assembly consisting of a prefabricated, reinforced, Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane with a continuous, channel-embossed metal-foil surfacing. The finish ply shall conform to ASTM D 6298 requirements. The finish ply shall also conform to ASTM D 6298 and the following physical and mechanical property requirements.

- Basis of Design: Siplast Veral flashing system, aluminum finish:
  ○ Flashing Reinforcing Ply – Basis of Design: Siplast Paradiene 20 SA:
    ⊳ Thickness (avg.): 102 mils (2.6 mm) (ASTM D 5147).
    ⊳ Thickness (min): 98 mils (2.5 mm) (ASTM D 5147).
    ⊳ Weight (min per 100 ft² of coverage): 72 lb. (3.0 kg/m²).
    ⊳ Maximum filler content in elastomeric blend: 35 percent by weight.
    ⊳ Low temperature flexibility @ -13°F (-25°C): PASS (ASTM D 5147).
    ⊳ Peak Load (avg.) @ 73ºF (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147).
07 52 16 Styrene-Butadiene-Styrene Modified Bituminous Roofing

- Peak Load (avg.) @ 0°F (-18°C): 70 lbf/inch (12.3 kN/m) (ASTM D 5147).
- Ultimate Elongation @ 73°F (23°C): 50 percent (ASTM D 5147).
- Dimensional Stability (max): 0.1 percent (ASTM D 5147).
- Compound Stability (min-sheet): 250°F (121°C) (ASTM D 5147).
- Compound Stability (min-adhesive coating): 212°F (100°C) (ASTM D 5147).
- Approvals: UL Approved (products shall bear seals of approval).
- Reinforcement: fiberglass mat or other meeting the performance and dimensional stability criteria.
- Backing Surfacing: Polyolefin film.

○ Metal-Clad Modified Bitumen Flashing Sheet – Basis of Design: Siplast Veral Aluminum:
  - Thickness (avg.): 142 mils (3.6 mm) (ASTM D 5147).
  - Thickness (min.): 138 mils (3.5 mm) (ASTM D 5147).
  - Weight (min. per 100 ft² of coverage): 92 lb. (4.5 kg/m²).
  - Coating Thickness – back surface (min.): 40 mils (1 mm) (ASTM D 5147).
  - Maximum filler content in elastomeric blend: 35 percent by weight.
  - Low temperature flexibility @ 0°F (-18°C): PASS (ASTM D 5147).
  - Peak Load (avg.) @ 73°F (23°C): 85 lbf/inch (15 kN/m) (ASTM D 5147).
  - Peak Load (avg.) @ 0°F (-18°C): 180 lbf/inch (31.7 kN/m) (ASTM D 5147).
  - Ultimate Elongation (avg.) @ 73°F (23°C): 45 percent (ASTM D 5147).
  - Tear-Strength (avg.): 120 lbf (0.54 kN) (ASTM D 5147).
  - Dimensional Stability (max.): 0.2 percent (ASTM D 5147).
  - Compound Stability (min.): 225°F (107°C) (ASTM D 5147).
  - Cyclic Thermal Shock Stability (maximum): 0.2 percent (ASTM D 6298).
  - Approvals: UL Approved (products shall bear seals of approval).
Reinforcement: Fiberglass scrim mat or other meeting the performance and dimensional stability criteria.

Surfacing: Aluminum metal foil.

Catalyzed Acrylic Resin Flashing System – Basis of Design: Parapro 123 Flashing System by Siplast; Irving, TX:

A specialty flashing system consisting of a liquid applied, fully reinforced, multi-component acrylic membrane installed over a prepared or primed substrate. The flashing system consists of a catalyzed acrylic resin primer, basecoat and topcoat, combined with a non-woven polyester fleece. The resin and catalyst are pre-mixed immediately prior to installation. The use of the specialty flashing system shall be specifically approved in advance by the membrane manufacturer for each application.
08 00 00 Openings
08 00 00 General

1. Door Design Information:

   A. Minimum Door Width: No doors (interior or exterior) to be less than 3 feet in width.

   B. Fiberglass Door Usage: Fiberglass doors are to be considered for some exterior door entry applications (mechanical & electrical rooms, etc.).

   C. Applicability: Proper application of these types of doors are to be discussed with UNF.
## 08 00 00 Product Procurement and Installation Matrix – EXHIBIT 1

<table>
<thead>
<tr>
<th>CSI SECTION</th>
<th>DESCRIPTION</th>
<th>SUPPLIER</th>
<th>INSTALLER</th>
<th>INTERFACES WITH</th>
<th>COMMENTS</th>
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<tbody>
<tr>
<td>81113</td>
<td>STANDARD STEEL DOORS AND FRAMES</td>
<td>DFH</td>
<td>DFH</td>
<td>DFH / ADO / BAS</td>
<td>FRAMES INSTALLED BY MASON OR DRYWALL TRADES</td>
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<tr>
<td>81400</td>
<td>FLUSH WOOD DOORS</td>
<td>DFH</td>
<td>DFH</td>
<td>DFH / ADO / BAS</td>
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<tr>
<td>84113</td>
<td>ALUMINUM FRAMED ENTRANCES AND STOREFRONTS</td>
<td>ALDF</td>
<td>ALDF</td>
<td>DFH / BAS / ADO</td>
<td>REQUIRES ELECTRICAL CONDUIT FOR LOW VOLTAGE</td>
</tr>
<tr>
<td>87100</td>
<td>DOOR HARDWARE</td>
<td>DFH</td>
<td>DFH / ALDF</td>
<td>DFH / BAS / ADO</td>
<td>SUPPLIES ALUM DOOR HARDWARE TO ALUM DOOR SUPPLIER</td>
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<tr>
<td>87100</td>
<td>INTELLIKEY</td>
<td>DFH</td>
<td>DFH</td>
<td>DFH / ALDF</td>
<td>INSTALLED BY AUTHORIZED INTELLIKEY INSTALLER</td>
</tr>
<tr>
<td>87113</td>
<td>AUTOMATIC DOOR OPERATORS</td>
<td>ADO</td>
<td>ADO / EC</td>
<td>DFH / ADO / BAS / ALDF</td>
<td>REQUIRES ELECTRICAL HIGH VOLTAGE CONNECTION</td>
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<tr>
<td>26220</td>
<td>LOW VOLTAGE TRANSFORMERS</td>
<td>DFH</td>
<td>EC</td>
<td>DFH / BAS / ADO</td>
<td>HIGH VOLTAGE CONNECTION AND INSTALLATION BY EC</td>
</tr>
<tr>
<td>25500</td>
<td>INTEGRATED AUTOMATION FACILITY CONTROLS</td>
<td>BAS</td>
<td>BAS</td>
<td>DFH / ALDF / ADO</td>
<td>INTEGRATES ALL ELECTRO MECHANICAL HARDWARE INTO ANDOVER BUILDING AUTOMATION SYSTEM</td>
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<tr>
<td>28130</td>
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**LEGEND**

- **DFH**: DOOR, FRAME HARDWARE SUPPLIER / INSTALLER
- **ALDF**: ALUMINUM STOREFRONT SUPPLIER / INSTALLER
- **ADO**: AUTOMATIC DOOR OPERATOR SUPPLIER / INSTALLER
- **BAS**: INTEGRATED FACILITY CONTROLS SUPPLIER / INSTALLER
- **EC**: ELECTRICAL CONTRACTOR
08 11 00 Metal Doors and Frames

1. Quality Assurance

A. Pre-installation Conference: Prior to installation of hardware, the contractor shall contact the manufacturers’ representatives to arrange and hold a jobsite meeting to instruct the installing contractors’ personnel on the proper installation of their respective products. Seminar shall be attended by installers of hardware (including electrical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedule, templates and physical product samples.

B. Frame Tolerances: Contractor shall utilize frame tolerance check list report for each opening to verify proper installation. See 08 11 00 EXHIBIT 2.

2. Products

A. Interior Doors Basis of Design:
   • Design: Flush panel, honeycomb core.
   • Gauge: 18.
   • Steel: Cold-Rolled steel sheet.
   • Edges: Seamless, tack weld, grind smooth, fill.
   • Factory baked primer ready for paint.

B. Exterior Doors Basis of Design:
   • Design: Flush panel, polystyrene or polyurethane insulated core.
   • Gauge: 16.
   • Steel: A-60 Galvanized Steel Sheet.
   • Edges: Seamless, continuous weld, grind smooth, fill and touch-up paint.
   • Factory baked primer ready for paint.

C. Hardware Reinforcement: Fabricate with internal reinforcing plates as follows: 7 gauge hinge reinforcements, 12 gauge continuous sleeve closer reinforcements.
D. Rated Door Label Requirement: Fire rated doors require metal applied label indicating rating designation.

E. Electrified Openings: Doors shall be factory pre-wired with sufficient number of concealed wires to accommodate electric function of specified hardware. Provide Molex type standardized plug in connectors to accommodate up to twelve wires.
## 08 11 00 Frame Tolerances – EXHIBIT 1

The following report must be completed for each door frame on the project, new or existing. Reports are to be initiated after installation of frame and prior to installation of adjacent walls or construction. Reports must be re-verified during and after completion of the adjacent construction.

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<th>Description</th>
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<th>Door Number</th>
<th>Frame Type</th>
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</table>

![Diagram of frame tolerances]
08 14 00 Wood Doors

1. General

A. Interior solid-core doors shall have wood-veneer faces.

B. Doors shall be factory finished flush wood doors.

C. Fit flush wood doors to frames and factory machine doors for hardware.

2. Products

A. WDMA I.S. 1-A Performance Grade: Extra Heavy Duty.
   - Construction: Five plies minimum, hot pressed.
   - Particleboard-Core Doors at non rated and 20-minute rated openings.
   - Mineral-Core Doors at 45, 60, and 90-minute rated openings.
   - Stiles: 1-3/8 inches prior to factory trimming, glued to core. Stiles shall be hardwoods of same species as face veneers.
   - Matching: Pairs within same opening.
   - Fire rated doors require metal applied label indicating rating designation.
   - Electrified Openings: Doors shall be pre-wired with sufficient number of concealed wires to accommodate electric function of specified hardware. Provide Molex type standardized plug in connectors to accommodate up to twelve wires.
   - Warranty: Lifetime of installation.
   - Glass lites are to be wired glass in areas where there are security concerns. For wall assemblies requiring a fire rating, wired glass or laminated glass can be utilized dependent on aesthetic concerns.

B. Fabrication:
   - Factory machine doors for hardware that is not surface applied. Internally reinforce for attachment without the use of thru bolts.
   - Factory finish doors with manufacturer’s standard stain color and sheen as selected by the architect.
C. Factory Finishing:

- Factory finish door faces and stiles to match color and sheen selected by the architect.

- Finish:
  - UV Cured system with performance properties equivalent to TR-6 or OP-6 catalyzed polyurethane.
  - Individually protect doors with factory poly-wrap.
  - Factory finish door faces and stiles to match color and sheen selected by the architect.
08 41 00 Entrances and Storefronts

1. General

A. Summary: Section includes:
   - Exterior storefront framing.
   - Exterior manual-swing entrance doors.

2. Products

A. Manufacturers:
   - Manufacturers: Provide products by one of the following:
     ○ Kawneer.
     ○ EFCO Corporation.
     ○ Vistawall Architectural Products; The Vistawall Group; a Bluescope Steel company.
     ○ YKK AP America Inc.
   - Note: Must meet Florida Building Code Windstorm Compliance unless otherwise specified.

B. Framing Systems:
   - Framing Members: Extruded-aluminum ASTM B 209.
   - Glazing: Double glazed. Design for replacement of glazing without disassembly of system.
   - Glazing within 120 MPH wind zone of campus (east of UNF Drive loop) shall meet large and small missile impact.

C. Entrance Door Systems:
   - 500 series (Kawneer).
   - Construction 1-3/4 inches overall thickness extruded-aluminum.
   - Design: Wide stile, 5 inches width.
   - Top, bottom and intermediate rails to be 6 inches.
   - Door maximum 7 feet 0 inch height.
D. Entrance Door Hardware:

- Cylinders: Specified in Section 08 71 00 “Door Hardware.”
- Hinges: BHMA A156.1, Grade 1.
  - Heavy duty / heavy weight continuous or heavy weight butt hinge-specified electrical requirements where applicable.
- Mortise Locks: BHMA A156.5, Grade 1.
- Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- Closers: BHMA A156.4, Grade 1, heavy duty with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to meet field conditions and requirements for opening force.
- Concealed Overhead Holders: BHMA A156.8, Grade 1. Heavy duty.
- Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper. Provide automatic door stops where floor stops are not feasible.
- Weather Stripping: Compression weather-stripping at against fixed stops; at other edges, provide sliding weather-stripping retained in adjustable strip mortised into door edge.
- Thresholds: BHMA A156.21, extruded aluminum raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.

E. Fabrication:

- Form or extrude aluminum shapes before finishing.
- Welding: Comply with AWS recommendations. Weld in concealed locations to greatest extent possible; grind exposed welds smooth and restore finish. Provide lifetime warranty.
- Reinforcing: Install reinforcement as required for hardware and necessary for performance requirements, sag resistance and rigidity.
• Dissimilar Metals: Separate dissimilar metals with zinc chromate primer, bituminous paint, or other separator that will prevent corrosion.

**F. Aluminum Finishes (Check with UNF):**

• Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm.

• Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm.
08 71 00 Door Hardware

1. General

A. Key Type Applications:

● All Information Technology (MDF / IDF) data closets to have Intellikey lock cylinders installed.

● All custodial closets to have Intellikey lock cylinders (storeroom function lockset).

● All electrical / mechanical closets to be hardkey.

● All bathrooms to have hardkey.

● All chemical storage rooms and laboratories to have Intellikey.

● All rooms equipped with AV or similar technology to have Intellikey.

B. Automatic Door Openers: For each project, the respective designer is to arrange for a meeting with UNF’s ADA Compliance Director upon entering the project’s Design Development phase to ascertain where UNF desires these devices to be located. Typically, automatic door openers are located on the following door types:

● Public restroom facilities.

● Main exterior facility entry doors.

C. UNF Remote Lock Down System - Exterior Door Electro-Mechanical Hardware:

● UNF’s campus remote lock-down system operates with an electronically controlled, retractable latch and/or drop rods that are remotely controlled by UNF’s Building Automation System (BAS).

● When these electronic hardware devices are programmed to “lock-down” a facility, the latch and/or drop rod hardware components are un-energized (power is dropped to these devices), which releases the latch and/or drop rod – securing the door in place. At these times, only individuals with key access rights can gain entry into the locked-down area.

● When the facility is “opened-up,” these devices are re-energized (power is restored), whereas the latch and/or drop rod are retracted back allowing the door to open with use of a key.
D. UNF Remote Lock Down System - Programming Options: UNF’s campus remote lock-down system’s electronic hardware is remotely controlled by UNF’s Building Automation System (BAS) software – Andover Controls. This software is programmed by UNF’s Physical Facilities Department and is monitored by UNF’s Police Department. Time schedule information is input into this system’s software by Physical Facility staff allowing a facility’s exterior door openings, equipped with this automatic hardware arrangement, to be remotely locked-down or opened-up at various desired times. Changes to a facility’s door security schedule can be made by submission of a Physical Facility work order request for such.

• OPTION 1A: “Permanent Unlocked” with Non-Classroom Function Hardware (Intellikey Operated):
  ○ This programming provides for free access into a space. When a door’s electro-mechanical hardware is programmed to be in this mode, the following occurs:
    ▶ Door’s hardware latch bolts and/or interior rods are electrically retracted.
    ▶ UNF Police Department do not get alarm notices when doors are opened.
  ○ This is the programming for the UNF’s Follett’s Bookstore Operation. In order for the Bookstore to have control over the opening of their exterior storefront door at the (empty)ing of the business day and closing (securing) at the close of business hours, an “override switch” has been installed. This “override” switch allows the Bookstore employees to manually control when the electro-mechanical hardware is energized.
  ○ Having Follett’s programmed in the Permanent Unlocked mode, at the end of the business day, the override switch is manually thrown which energizes the electro-mechanical hardware and the door is secured in a lock position. When the employee arrives the next day to “open-up” these doors to the public, he places his Intellikey into the door’s key cylinder, turns the Intellikey and then turns the exterior hardware’s thumb latch to retract the door’s interior rods for opening of the door. Upon entry into the bookstore, the door closes and is still in a locked mode. The employee then throws the override switch to “dog-down” the entry doors for free public access.
  ○ Please note: UNF PD can override the “override switch” whenever necessary due to how this switch has been installed (in series). In the event of an emergency, if these doors are currently “dogged-down” by the bookstore’s override switch, UNF PD can remotely release the electro-mechanical hardware’s internal component devices to latch shut.
Option 1A Override Switch - EXHIBIT 1

PB
Push Buttons

PB Series

<table>
<thead>
<tr>
<th>Part #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PB</td>
<td>1-1/2&quot; Round Momentary, DPST, Illuminated</td>
</tr>
<tr>
<td>PBA</td>
<td>1-1/2&quot; Round Alternate, DPST, Illuminated</td>
</tr>
</tbody>
</table>

- Includes switchable green and red buttons
- Red LED on plate
- 7 Amp rated contacts
- Stainless Steel single gang plate: 4.5 x 2.75

Note: Provide clear cover.

OPTION 1B: “Permanent Unlocked” with Classroom Function Hardware (Hard Key Operation) – Door Open Programming:

- This programming provides for free access into a space, yet the hardware allows the user of the space to manually dog-down the exit device for free public access as desired without the use of an override switch system. When a door’s electro-mechanical hardware is programmed to be in this mode, the following occurs:
Door’s hardware latch bolts and/or interior rods are electrically retracted.

UNF Police Department do not get alarm notices when doors are opened.

○ This is the programming for the UNF’s CFCU Bank Operation. In order for the Bank to have control over the opening of their exterior storefront door at the beginning of the business day and closing (securing) at the close of business hours, classroom type function hardware has been installed on their exterior storefront door. This hardware allows the user to manually control when the electro-mechanical hardware is placed in either a closed or open position.

○ Having CFCU Bank Operation programmed in the Permanent Unlocked mode, at the end of the business day, the exterior door’s hardware is manually released into a locked position via a key cylinder located on the exit device (crash bar). When the employee arrives the next day to “open-up” these doors to the public, he places his hard key into the door’s exterior key cylinder, turns the cylinder and then places the same hard key into the interior crash bar hardware’s cylinder to dog-down the door for free public access.

○ Due to the nature of banking operations, only CFCU personnel have a hard key to this space. UNF staff (including Police) do not have access rights to this space. The hard key cylinder is the property of CFCU. Should UNF place another University operation in this space in the future, this door’s hardware set would need to replaced with Option 1A’s hardware set.

• OPTION 2: “Permanent Lock” – Door Locked Program:

○ This programming provides for no access into an area unless an individual has been granted rights via his UNF issued Intellikey. When individuals access these doors with their Intellikey, they are able to disengage the electro-mechanical hardware by use of the hardware set’s thumb turn. Upon entry into the space, the door(s) shut behind the individual in a locked down mode. These doors cannot be “dogged-down” with any device other than remote programming.

• OPTION 3: “Time Schedule Programming” – Automatic Door Opening and Closing Programming:

○ Recommendations for establishing electro-mechanical trade responsibilities in regards to a general contractor’s procurement and installation of UNF’s remote lock down system, please refer to EXHIBIT 1 in Division 08 – Door Hardware Resource Matrix.
○ Project specific architect to employ an independent A.H.C. to specify door hardware and coordinate electro-mechanical hardware with electrical engineer.

2. Quality Assurance

A. Architectural Hardware Consultant: Employ an independent Architectural Hardware Consultant (AHC) to specify doors, frames, hardware and electro-mechanical hardware. AHC shall produce security drawings indicating all electro-mechanical hardware on floor plans and door security riser diagrams including automatic door operators and low voltage power supplies. Delete first paragraph and subparagraph below if not applicable.

B. Supplier Qualifications: Hardware supplier must be engaged regularly in contracting work and be staffed to expedite work; the firm shall have been furnishing hardware on similar projects in the geographic area for not less than five years. The supplier must have in his employ a certified Architectural Hardware Consultant (AHC) to direct detailing, setting, and applying of all hardware items. The supplier shall be an authorized factory direct dealer of major hardware items listed in this specification. The supplier shall be a factory trained and authorized Intellikey distributor.

C. Installer Qualifications: Hardware for the project shall be installed by factory authorized personnel who have successfully completed factory training courses and shall be certified for the installation of locksets, door closers and exit devices. Prior to installation the installer shall inspect all door frames for proper plumb and square condition. General contractor shall be notified of frames found out of square, plumb or unsuitable for door installation at the installation meeting. The installer shall be a factory trained and authorized Intellikey installer.

D. Electronic/Electric Hardware: It shall be the responsibility of supplier to coordinate with the approved manufacturer and the electrical / security / fire systems contractor all electronic / electrical finish hardware items covered within this section via factory wiring diagram showing point to point connections, riser diagram, operational narrative and system schematic. Wiring diagram shall be furnished with Door Hardware Submittals (See 1.06). Submittals without Factory Wiring Diagrams will be rejected without review.

E. Pre-installation Conference for Mechanical Hardware: Conduct conference at project site to comply with requirements in Division 01 Section “Project
Meeting.” Review methods and procedures related to mechanical door hardware, including but not limited to the following:

- Review and finalize construction schedule and verify availability of materials, installer’s personnel, equipment and facilities needed to make progress and avoid delays.

- Present general contractor with a written report of the condition of door frames in terms of squareness and any other condition that may impede the installation and operation of the doors and hardware.

- Review installer’s responsibilities for testing, inspecting and adjusting doors and hardware in accordance with 08710 Part 3 EXECUTION.

F. Pre-installation Conference for Electrified Hardware: Conduct conference prior to electrical Rough-in for electro-mechanical hardware components. Required attendance: UNF Project Manager, UNF Lock Department, Architect, Door Hardware (AHC) / Security Consultant, BAS System Integrator, Electrical Contractor, Door Hardware Supplier, Aluminum Door Supplier and Automatic Door Operator Supplier. Review methods and procedures related to electrified door hardware including, but not limited to the following:

- Discuss electrical rough-in requirements and other preparatory work to be performed by other trades.

- Review sequence of operation for each type of electrical door hardware.


- Review and finalize construction schedule and verify availability of materials, installer’s personnel, equipment and facilities needed to make progress and avoid delays.

G. Florida Wind and Impact Requirements: All hardware shall meet or exceed requirements for Wind Pressure and Impact ratings. Furnish copies of Notice of Acceptance as required by the architect.

H. Electrical Products: To assure proper integration, all electrical products to be produced by the same manufacturer.

3. Products

A. Butt Hinges:
- **Manufacturer**: McKinney Products Company Series TA2714, TA2314, T4A3786, and T4A3386 or the following acceptable alternates:
  - Bommer Industries, Inc. Series BB5000, BB5001, BB5004 and BB5005.
  - Hager Companies Series BB1279, BB1191, BB1168, and BB1199.
  - Stanley Commercial Hardware Series FBB179, FBB191, FBB168, and FBB199.
  - Ball bearing heavy duty hinges to be used at all high traffic areas (classrooms, bathrooms, conference centers, stairwell doors, restrooms, etc.).

- **Butts and Hinges**: BHMA A156.1 for interior wood doors, interior hollow metal doors, and exterior hollow metal doors.

- **Out-swinging lockable doors** shall have NRP (non-removable pin) hinges.

- **Exterior lockable doors** shall have NRP and SSF (Security Stud) hinges.

- **Width of hinges** shall be sufficient to clear trim and wall conditions shown on drawings.

- **Size**: 4-1/2 inches by 4-1/2 inches for doors up to 3 feet 0 inch width, and 5 inches by 4-1/2 inches for doors over 3 feet 0 inches in width. Provide heavy weight hinges (.180) at high traffic doors (i.e., corridors, exterior, classrooms, restroom, etc.).

- **Electric Hinges**: Provide sufficient number of concealed wires to accommodate electric function of specified hardware. Locate electric hinge at center location. Provide McKinney MG-16 mortar guard for each electric hinge specified. Provide Molex type standardized plug in connectors to accommodate up to twelve wires.

- **All exterior doors, restroom doors and doors in wet areas** shall be stainless steel (630).

**B. Continuous Hinges:**

- **Manufacturer**: McKinney Products Company Series MCK-12HD and MCK-25HD or the following acceptable alternates:
  - Pemko Manufacturing Co. Series CFM 83SLFHD and CFM 83D.
  - Select Products Limited Series SL-11HDCL and SL-24HDCL.
  - Roton Series 780-112HD and 780-224HD.
○ Stanley Commercial Hardware Series 661HD and 662HD.


● Provide continuous hinges at exterior aluminum and FRP doors.

● Provide heavy weight continuous hinges when retrofitting new doors in existing frames where frame hinge preparations are compromised.

C. Power Transfers:

● Manufacturer: Electrified hinges with quick connects, electrolynx connectors. See “Electric Hinges.” McKinney T4A3386 QC or MCK25 HD QC as required.

● Provide power transfers at heavy use electrical openings to transfer power from frame to door.

D. Flush Bolts:

● Manufacturer: McKinney Products Company Series FB M and FB W with DPS Dust Proof Strike or the following acceptable alternates:
  ○ Rockwood Series 555/557 and 1842/1942 with 570 Dust Proof Strike.
  ○ Trimco Series 3913/3917 and 3810/3815 with 3910 Dust Proof Strike.

● Provide manual or automatic flush bolts as necessary for code compliance. Install with dust proof strike.

● Provide extended top rod for oversized doors when using manual flush bolts.

● Manual Flush Bolts: BHMA A156.16; designed for mortising into door edge.

E. Lock Cylinders:

● Manufacturer: Provide Sargent Manufacturing Company Oldstyle Interchangeable Series for exterior doors and Sargent Standard Series for interior doors or provide Corbin/Russwin interchangeable core. Architect to consult with Physical Facilities.

● Standard Lock Cylinders: BHMA A156.5.

● High-Security Lock Cylinders: BHMA A156.30.

● Provide High Security cylinders with patented key control or Intellikey system for all exterior doors as required by Physical Facilities.

● Provide standard Sargent interchangeable core (I/C) cylinders for interior doors. Architect and Physical Facilities approval required.
● Cylinders shall be an integral part of the locks as manufactured by specified lock supplier. Substitution of foreign made cylinders or components will not be allowed and also will be cause for rejection of supplier.

● All locks and exit devices to be furnished capable of functioning with Intellikey System.

● Furnish cylinders with construction master keying for use during the construction period. Permanent cores shall be installed upon completion of project.

● Furnish Cylinders, keys and cores with CKC & VKC marking system as required by Physical Facilities.

F. Keying:

● Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Field keying will not be permitted and will be considered as just cause for rejection of supplier.

● Patented high security keys shall be able to operate both the appropriate conventional and high security cylinders within the same master key system while the keys for the conventional cylinders will not open the high security cylinders.

● Cylinders shall be keyed to an existing great grand master key system. All keying will be supplied directly to Physical Facilities.

● Key bitting list to be supplied to Physical Facilities.

● Keys: Nickel silver.

● Quantity (Confirm with Physical Facilities):
  ○ Cylinder Change Keys: Four (4) each per cylinder.
  ○ Master Keys: Ten (10) each section.
  ○ Grand Master Keys: Twenty (20) each.
  ○ Emergency Keys (hotel locks): Two (2) each.
  ○ Permanent Control Keys: Two (2) each.
  ○ Construction Master Keys: Ten (10) each.
  ○ Construction Control Keys: Two (2) each.
  ○ Key Blanks: Four (4) each, per set.
• Provide blank keying schedule to be completed by Physical Facilities.

G. Locks and Latches:

• Manufacturer:  Sargent Series 8200 x LNJ trim design or Corbin Russwin Series ML2000 x WSA trim design.

• Mortise Locks:  BHMA A156.13.

• Provide Mortise locks on all new construction.

• On all renovation projects, lock types to be verified by UNF.

• Install custom strikes to match existing frame preparations when new lock is scheduled to be installed in existing frame. Existing frames to be modified to accept new custom strikes as necessary.

• Provide lockset lever handles, and escutcheons with Standard 26D finish.

• Locking Function Descriptions:
  ○ Sargent (Corbin or equal) Storeroom Function:  51-8204 LNJ.
  ○ Dormitory or Exit:  51-8225 LNJ.
  ○ Others to be determined by Physical Facilities.

H. Electric Strikes:

• Manufacturer:  HES, Inc. 9600 Series or Folger Adam 300 and 700 Series.

• Standard:  BHMA A156.31.

• General:  Use fail-secure electric strikes with fire-rated devices.

I. Exit Devices:

• Manufacturer:  Sargent 80 Series x FW-ETL Trim Design or Corbin Russwin ED5000 Series x 900 Trim Design.

• Exit Devices:  BHMA A156.3.

• Single doors:  Use rim exit device.

• Pairs of doors:  Use rim devices with keyed removable mullion. Surface vertical rods only to be used if approved by Physical Facilities Lock Shop.

• Cross corridor interior doors:  Use vertical rod exit devices, less bottom rod as preferred securing device. Concealed rods on hollow metal doors, surface rods on wood doors.
- Exit device dogging: Cylinder in rail shall hold latch retracted to allow door to function as push pull. Omit on fire rated doors and when width of door is too narrow.

- Doors entering public occupied rooms off corridors - use double cylinder exit devices on mortise and rim types. Outside trim can be locked from inside room. Exit device on inside allows free egress, but outside trim remains locked.

- Exterior Doors: Pull trims preferred, free wheeling lever trim when lever is used.

- All exit devices to use thru bolts for mounting.

- Provide exit device push bars, lever handles and escutcheons with standard 26D finish. UL test in paragraph below includes operational test of 100,000 cycles. BHMA A156.3 requires 250,000 cycles for Grade 1 and 100,000 cycles for Grade 2.

- Fire Exit Devices: Devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.

- Power Supplies:
  - Manufacturer: Sargent 3540.
  - 24VDC, size power supply with a minimum of 50 percent more amperage than required by total load.

**J. Removable Mullions and Exit Devices:**

- Manufacturer: Sargent HCL980 Series or Corbin Russwin KM Series.

- Removable Mullions: BHMA A156.3.

<table>
<thead>
<tr>
<th>MECHANICAL</th>
<th>Single Door</th>
<th>Pair of Doors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non Rated</td>
<td>Fire Rated</td>
</tr>
<tr>
<td>Interior</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wood</td>
<td>Rim</td>
<td>Rim</td>
</tr>
<tr>
<td>Aluminum</td>
<td>Rim</td>
<td>N/A</td>
</tr>
<tr>
<td>Exterior</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hollow Metal</td>
<td>Rim</td>
<td>Rim</td>
</tr>
</tbody>
</table>
- Types: Lockable, steel, key removable. Part of keying system. Key is not required to reinstall the mullion.

- Provide multi-wire connectors when electric or monitor strikes are used. This allows mullion removal without damaging electrical connections.

- Preferred method of securing exterior pairs of doors when using rim exit devices.

<table>
<thead>
<tr>
<th>Material</th>
<th>Mullion</th>
<th>Removable Mullion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>Rim</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td></td>
<td></td>
<td>N/A</td>
</tr>
</tbody>
</table>
K. Operating Trim:

- Manufacturer: McKinney Products Company P053 Series Push Plates, OP9014 Series Door Pulls and PB812 Series Push/Pull Bars or the following acceptable alternates:

- Standard: BHMA A156.6.

- Materials: Fabricate from stainless steel.

- Mounting methods to be concealed type wherever possible.

- Provide decorative thru bolts at free ends of push/pull bars and pulls when used with exit devices.

- Push Plate Size: 8 inches by 16 inches minimum, except when limited by door stile.

L. Closers:

- Manufacturer: Sargent 1341 Series or Corbin Russwin DC6000 Series. Provide Heavy Duty Arms.

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<table>
<thead>
<tr>
<th>ELECTRO MECHANICAL</th>
<th>Single Door</th>
<th>Pair of Doors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non Rated</td>
<td>Fire Rated</td>
</tr>
<tr>
<td>Interior</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wood</td>
<td>Rim</td>
<td>Rim</td>
</tr>
<tr>
<td>Aluminum</td>
<td>Rim</td>
<td>N/A</td>
</tr>
<tr>
<td>Exterior</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hollow Metal</td>
<td>Rim</td>
<td>Rim</td>
</tr>
<tr>
<td>Aluminum</td>
<td>Rim</td>
<td>N/A</td>
</tr>
</tbody>
</table>
● Closers: BHMA A156.4.

● Closers shall have non-ferrous covers, heavy duty forged steel arms, and separate valves for adjusting backcheck, delayed action, closing and latching cycles and adjustable spring to provide sizes 1 through 6.

● Provide non-sized closers, adjustable to meet maximum opening force requirements of ADA.

● Provide drop plates, brackets, or adapters for arms as required to suit details.

● Mount closers on room side of corridor doors and inside of exterior doors. Where possible, install closers on door for optimum aesthetics. Use thru bolts to mount all closers.

● Provide closure stops where door stops are not feasible (high traffic areas).

● Provide spacers as necessary / utilize all fasteners & hardware provided by manufacturer.

M. Coordinators:

● Manufacturer: McKinney Products Company CSM Series Coordinator or the following acceptable alternates:
  ○ Rockwood 1600 Series Coordinator.
  ○ Trimco 3094 Series Coordinator.

● Coordinators: BHMA A156.3.

● Provide filler bars for total opening width, closer mounting brackets, carry bars and special preparation for top latches where applicable.

N. Low Energy Operators:

● Manufacturer: Besam SW 100 Series.

● Provide wall-mounted actuator switches by the same manufacturer as the operator. Provide weather-resistant types at exterior applications. Install per code.

O. Protective Trim Units:

○ Manufacturer: McKinney Products Company KP50 (B4E) Series Protection Plates and EG01 Series Edge Guards or the following acceptable alternates:

○ Rockwood K1050 (B4E) Series Protection Plates and 300 Series Edge Guards.
○ Trimco K0050 (B4E) Series Protection Plates and KE31-1 Series Edge Guards.

● Size: Kick plates 12 inches high, Mop plates 12 inches high, Armor plates 36 inches high.

● Width: 2 inches less door width (LDW) at single doors when mounted on push side. 1 inch LDW at pairs and when mounted on pull side.

● Material: Stainless steel 0.050 inch thick with countersunk holes, beveled four edges (B4E).

P. Overhead Stops and Holders:

● Manufacturer: Sargent 590 Series, 690 Series, and 1540 Series or the following acceptable alternates:
  ○ Rixson 9 Series, 1 Series and 3 Series.
  ○ Glynn Johnson 900 Series, 100 Series and 450 Series.

● Stops and Bumpers: BHMA A156.16.
  ○ Provide floor mounted dome stops for doors wall type stops. Used in brick or masonry only. Do not mount floor stops where they will impede traffic. Where floor or wall stops are not appropriate, provide overhead holders.
  ○ Use special template closers to allow offset arms for surface applied stops.

Q. Wall and Floor Stops:

● Manufacturer: McKinney Products Company WS03 Series Wall Stop and FS01 Series Floor Stop or the following acceptable alternates:
  ○ Rockwood 400 Series Wall Stop and 441 Series Floor Stop.
  ○ Trimco 1270 Series Wall Stop and 1200 Series Floor Stop.

● All stops shall be cast. Wrought stops are not acceptable.

● Use wall stops only on masonry walls.

R. Magnetic Holders:

● Manufacturer: Sargent 1561 Series or the following acceptable alternates:
  ○ Rixson FM-990 Series.
  ○ LCN SEM7800 Series.
○ Rockwood 441-CU.

● Wire to release upon activation of fire alarm. Verify required voltage.

S. Door Gasketing:

● Standard: BHMA A156.22.

● All gaskets screwed in place.

T. Thresholds:

● Manufacturer: McKinney MCK2005 Series Stop Threshold or the following acceptable alternates:
  ○ Pemko 2005 T Series Stop Threshold.
  ○ Reese S482APR Series Stop Threshold.

● Standard: BHMA A156.21.

● Accessibility Requirements: Where thresholds are indicated to comply with accessibility requirements, comply with “Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG).”
  ○ Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.

U. Key Cabinet:

● Key Control Cabinet: BHMA A156.5 metal cabinet with baked-enamel finish; containing key-holding hooks, labels, 2 sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150 percent of the number of locks.

● Wall-Mounted Cabinet: Cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.

● Key Cabinet shall be set up and indexed ready for Owner’s use.

● Provide key cabinet manufactured by Telkee or Lund Equipment Co. Inc.

V. Fabrication:

● Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer’s standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or
greater than that of specified door hardware units and BHMA A156.18 for finishes.

**W. Finishes (Architect Shall Verify Requirements for Individual Projects):**

- **Standard:** BHMA A156.18.
- **BHMA Designations:** Comply with base material and finish requirements indicated by the following:
  - **BMHA 626 (US26D):** Satin chromium plated over nickel, over brass or bronze base metal.

**X. Finish Schedule:**

<table>
<thead>
<tr>
<th>Hardware Item</th>
<th>Finish and Base Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exterior Butt Hinges:</td>
<td>BMHA 630 (US32D)</td>
</tr>
<tr>
<td>Interior Butt Hinges:</td>
<td>BMHA 652 (US26D)</td>
</tr>
<tr>
<td>Continuous Gear Hinges:</td>
<td>BMHA 628 (US28)</td>
</tr>
<tr>
<td>Pivot Sets:</td>
<td>BMHA 626 (US26D)</td>
</tr>
<tr>
<td>Flush Bolts:</td>
<td>BMHA 626 (US26D)</td>
</tr>
<tr>
<td>Locks and Latches:</td>
<td>BMHA 626 (US26D)</td>
</tr>
<tr>
<td>Cylinders:</td>
<td>BMHA 626 (US26D)</td>
</tr>
<tr>
<td>Exit Devices:</td>
<td>BMHA 630 (US32D)</td>
</tr>
<tr>
<td>Removable Mullions:</td>
<td>BMHA 600 (USP)</td>
</tr>
<tr>
<td>Operating Trim:</td>
<td>BMHA 630 (US32D)</td>
</tr>
<tr>
<td>Coordinators:</td>
<td>BMHA 600 (USP)</td>
</tr>
</tbody>
</table>
### Hardware Item | Finish and Base Material
--- | ---
Closers: | BMHA 689 (ALUM)
Automatic Operators: | BMHA 689 (ALUM)
Protective Trim: | BMHA 630 (US32D)
Overhead Stops/ Holders: | BMHA 626 (US26D)
Wall and Floor Stops: | BMHA 626 (US26D)
Magnetic Holders: | BMHA 628 (US28)
Thresholds and Gasketing: | MHA 628 (US28)
Key Cabinet: | BMHA 600 (USP)
Electric Strikes: | BMHA 630 (US32D)
Magnetic Locks: | BMHA 630 (US32D)

**Y. Products for a Battery Powered Exit alarm:** UNF’s master hard key to be able to operate this alarm.

### 4. Execution

**A. Inspection:** After installation has been completed, the hardware supplier shall have a qualified Architectural Hardware Consultant (AHC) check the job to determine the proper application of hardware according to the approved hardware schedule and keying schedule. The AHC shall submit a written report of compliance of the specifications and acceptance of the installation of products to Industry Standards to the general contractor for submission to the University of North Florida Project Manager.

**B. Installation:**
• Refer to the DHI manual publication for Recommended Locations for Builders Hardware, and ADA REQUIREMENTS for instruction. Install all hardware in compliance with manufacturer’s instruction and recommendations. Drill and countersink all items which are not factory prepared for fasteners. Cut and fit all thresholds and weather-stripping to profile of door frames. Set thresholds in accordance with the application condition.

• Use only fasteners supplied with hardware and approved by the manufacturer. Drill and tap doors and frames as required prior to installation of hardware. Self-drilling screws are not acceptable. Confirm controller locations with UNF Lock Shop prior to installation of Intellikey controllers.


• Install Intellikey controllers so that controller covers can be removed without the removal of any other hardware on the door.

• Coordinate automatic door operator installation and functions with electro-mechanical door hardware as required.

C. Adjusting & Cleaning:

• At final completion all hardware shall be left clean and free from disfigurement. The contractor shall make a final adjustment to all door closers and other hardware items. Where hardware is found defective, repair or replace or otherwise correct as directed.

• At the completion of the project and/or during the closeout phase of the project, the supplier will review with the designated Owner’s representative the proper service and adjustment of all hardware items.

• At the completion of the project and/or during the closeout phase of the project, the supplier will perform a final adjustment to all door closers furnished in this section to insure that all fire rated doors close and latch and that all door closer opening and closing pressures are in compliance with ADA.

D. Operations, Maintenance and Training:

• At completion of the project, provide the Owner with a manual containing the following information:
  ○ Final (as built) copy of hardware schedule.
  ○ Final copy of keying schedule.
○ Final copy of all system schematics and wiring diagrams.
○ Copy of product data sheets as submitted including all Warranty data.
○ Parts list for Locksets, Door Closers and Exit Devices.
○ Copy of installation instructions for each type of hardware used.
○ Name, address and phone number of each manufacturer and local representative.
○ Complete set of any specialized tools.

● At the completion of the project the supplier shall engage a factory authorized service representative to train the Owner’s maintenance personnel to adjust, operate and maintain door hardware and electronic cylinder systems.

E. Protection:

● The general contractor is responsible for the proper protection of all items of hardware until the Owner accepts the job as complete.
08 80 00 Glazing

1. General

A. Applicability: The project designer is to consult with UNF on a project-by-project basis concerning modifying this guideline.

2. Products

A. Manufacturer:

- AGC Flat Glass North America, Inc.; Kingsport, TN:
  - Configuration:
    - Exterior Lite 1/4 inch (6 mm) Clear Comfort Ti-AC40#2.
    - Airspace 1/2 inch (12.5 mm).
    - Interior Lite 1/4 inch (6 mm) Clear.
  - Visible Light:
    - Transmittance (LT) 68 percent.
    - Reflectance – Outdoors (LR) 9 percent.
    - Reflectance – Indoors 11 percent.
  - Solar Energy:
    - Transmittance 34 percent.
    - Reflectance – Outdoors (ER) 30 percent.
  - U.V. Light:
    - Transmittance 39 percent.
    - Damage Weighted Index – ISO 59 percent.
  - U-Values:
    - Winter – Air / Argon 0.29/0.24.
    - Summer – Air / Argon 0.28/0.22.
  - Other Values:
    - Solar Heat Gain Coefficient (SHGC) 0.39.
⇒ Shading Coefficient 0.45.
⇒ Relative Heat Gain – BTU/Hr/sq. ft. 94.
⇒ Light to Solar Heat Gain Ratio 1.74.
08 91 00 Louvers

1. General

   A. Summary: Section includes:
   • Miami-Dade County, Florida approved extruded aluminum stationary louvers.

2. Products

   A. Materials:
   • Aluminum Extrusions: ASTM B 221, alloy 6063-T5.

   B. Fixed, Extruded-Aluminum Louvers:
   • Vertical Storm-Resistant Louver.
   • Manufacturer: Ruskin, EME6625D.
   • Louver Depth: 6 inches.
   • Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.081 inch for blades and 0.125 inch for frames.
   • Performance Requirements: 99.8 percent effective at preventing water penetration through louver when tested at 50 miles per hour wind with 8 inches per hour rainfall and 2,175 feet per minute airflow through the free area in the AMCA 500-L Wind Driven Rain Test.
   • Screens:
     ○ Material: Aluminum, 1/2 inch mesh by 0.063 inch, intercrimp.
     ○ Frame: Removable, re-wireable.
   • Finish: Kynar 500 Fluoropolymer Coating. Color to be approved by the University.
   • AMCA Seal: Mark units with AMCA Certified Ratings Seal.
09 00 00 Finishes
09 00 00 General Finish Information

1. General

   A. Carpet:
      • UNF prefers carpet tiles.

   B. Vinyl Composition Tile:
      • No Vinyl Composition Tile is to be utilized. Utilize Linoleum Tile instead – see Section 09 65 16 for more information.

   C. Wall Surfaces:
      • Wall Tiles: Full height of wall.

   D. Vinyl Wall Coverings:
      • No Vinyl Wall Coverings are to be utilized.

   E. Tile:
      • Porcelain Floor Tile: Iris US; Deluxe - 12 inch by 12 inch.
      • Porcelain Wall Tile: DalTile; Keystone - 2 inch by 2 inch.
      • Ceramic Wall Tile: American Olean; Profiles - 8 inch by 10 inch.
      • Ceramic / Porcelain Floor Tiles: Floor tiles are to be no less than 12 inches by 12 inches in size, except in showers and wet areas where the tiles shall be 2 inches by 2 inches.
      • Grout to be dark in color.
      • No epoxy grout is to be utilized.
09 65 16 Resilient Flooring and Accessories

1. General

A. Summary: Section includes:
   - Linoleum tile.
   - Resilient wall base and accessories.

2. Products

A. Linoleum Tile:
   - Products: Basis-of-Design:
     ○ Forbo Flooring, Inc.; Marmoleum Dual Marbleized Linoleum Tile Resilient Floor Covering.
   - Linoleum Tile Physical Characteristics:
     ○ Tile size: Approximately 13 inches by 13 inches.
     ○ Gauge: 1/10 inch.
     ○ Backing: Polyester.

B. Resilient Wall Base:
   - Wall Base: ASTM F 1861.
   - Type (Material Requirement): Rubber.
   - Style: Cove (with top-set toe).
   - Minimum Thickness: 0.125 inch (3.2 mm).
   - Height: 4 inches (102 mm).
   - Lengths: Coils in manufacturer's standard length.
   - Outside Corners: Premolded or field formed.
   - Inside Corners: Premolded or field formed.
   - Surface: Smooth.

C. Resilient Molding Accessory:
● Description: Carpet edge for glue-down applications, nosing for carpet, nosing for resilient floor covering, reducer strip for resilient floor covering, joiner for tile and carpet.

● Material: Rubber.

● Profile and Dimensions: As indicated.
09 68 13 Tile Carpeting

1. General

   A. Summary: This section includes modular, pattern loop, solution dyed carpet tile.

2. Products

   A. Carpet Tile:

      • Basis-of-Design Products: Subject to compliance with requirements, provide one of the following:

         ○ Shaw Contract Group; “Luminosity” style number 59362:

             ▶ Color: As selected by architect from manufacturer's full range.

             ▶ Pattern: As directed by architect.

             ▶ Source: Shaw Contract Group, Phone (877)502-7429.

      • Fiber Type: 100 percent eco solution q premium branded nylon.

      • Pile Characteristic: Pattern loop pile.

      • Density: 7660 oz./cu. yd. (g/cu. cm.)

      • Pile Thickness: 0.141 inches (mm) for finished carpet tile.

      • Stitches: 09.33 stitches per inch (mm).

      • Gage: 1/12 gage in ends per inch (mm).

      • Face Weight: 30 oz./sq. yd. (g/sq. m) for finished carpet tile.

      • Primary Backing/Backcoating: Shaw Contract Group “SYNTHETIC.”

      • Secondary Backing: Shaw Contract Group “ecoworx.”

      • Size: 24 by 24 inches (610 by 610 mm).

      • Applied Soil-Resistance Treatment: Manufacturer's standard material.

      • Antimicrobial Treatment: Manufacturer's standard material.

      • Performance Characteristics: As follows:

         ○ Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm.
○ Dimensional Tolerance: Within 1/32 inch (0.8 mm) of specified size dimensions, as determined by physical measurement.

○ Dimensional Stability: 0.2 percent or less per ISO 2551 (Aachen Test).

○ Resistance to Insects: Comply with AATCC 24.

○ Colorfastness to Crocking: Not less than 4, wet and dry, per AATCC 165.

○ Colorfastness to Light: Not less than 4 after 40 AFU (AATCC fading units) per AATCC 16, Option E.

○ Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, no fungal growth; per AATCC 174.

○ Electrostatic Propensity: Less than 3.5 kV per AATCC 134.

○ Environmental Requirements: Provide carpet tile that complies with testing and product requirements of Carpet and Rug Institute's “Green Label Plus” program.
10 00 00 Specialties
10 00 00 General Specialties Information

1. General

A. Safety related:

- Evacuation chairs – to be specified and procured by Owner. Project designer to work with UNF’s EH&S group for location determination at completion of design development phase.

B. Signage / UNF Room Numbering Protocol:

- EH&S group requirement for evacuation maps.
- UNF room numbering protocol.
- In new buildings, all 10 space category rooms will be assigned a four (4) digit number. Generally, 1st floor will reflect 1000’s, 2nd floor 2000’s, etc. When numbering assignable space, a suite would be numbered 1000, rooms off of suite 1001, 1002, 1003, etc. When entering another suite, start with a different block of numbers – 1100, 1101, 1102, etc.
- In renovation projects it is important to coordinate numbering through the project manager as the numbers must not be duplicated; each space is individually entered in the space file and all rooms require a unique number.
- Mechanical, Custodial, Restrooms, Telephone Equipment, Recycling, etc. Unassignable space will have a dash 9 after the room number. Example: Custodial Room on the first floor 1000-9, Mechanical 1001-9 – number the rooms according to location – if in the 1000 area, 1000-9, etc. Stairwells will also require a dash 9 and reflect the floor accordingly. Since stairwells and restrooms are stacked, use same numbers except base on floor. Example: Stairwell on 1st floor 1000-9, 2nd floor 2000-9, 3rd floor 3000-9, etc. The same would hold true in the case of restrooms, mechanical rooms, etc.
- Circulation areas will also require the dash 9.
- In some instances, it may be necessary to assign an “A”; however, if possible, it is preferred to assign an individual room number.
- Any exterior “covered” areas will need to be identified as well as covered walkways with the dash 9.

C. Toilet Accessories:
• UNF to supply the following products for contractor installation: Toilet paper roll dispensers, paper towel roll dispensers, liquid soap dispensers, toilet seat protective cover dispensers and feminine napkin disposal receptacles.

• Toilet room cut-outs for the placement of a waste receptacle below the counter.
10 14 23 Panel Signage

10 14 23 Panel Signage – EXHIBIT 1

LETTER STYLE: FUTURA MEDIUM
GRAPHICS COLOR: PER UNF STANDARD LOGO
BACKGROUND COLOR: TBD
WINDOW SIGN COLOR: SATIN ALUMINUM
NOTE BAR COLOR: SATIN ALUMINUM
CHASSIS COLOR: BLACK
CHASSIS DEPTH: 0.063"
INSERT DEPTH: 1/8"
CHASSIS MOUNTING: MECHANICAL

OFFICE SIGNAGE
10 14 23 Panel Signage – EXHIBIT 2

LETTER STYLE: FUTURA MEDIUM
BACKGROUND COLOR: TBD
CHASSIS COLOR: BLACK
CHASSIS DEPTH: 0.063"
CHASSIS MOUNTING: MECHANICAL

RESTROOM SIGNAGE
10 14 23 Panel Signage – EXHIBIT 3

LETTER STYLE: FUTURA MEDIUM
GRAPHICS COLOR: PER UNF STANDARD LOGO
BACKGROUND COLOR: TBD
WINDOW SIGN COLOR: SATIN ALUMINUM
NOTE BAR COLOR: SATIN ALUMINUM
CHASSIS COLOR: BLACK
CHASSIS DEPTH: 0.063"
INSERT DEPTH: 1/8"
CHASSIS MOUNTING: MECHANICAL

TYPICAL ROOM SIGNAGE
Panel Signage – EXHIBIT 4

LETTER STYLE: FUTURA MEDIUM
BACKGROUND COLOR: TBD
CHASSIS COLOR: BLACK
CHASSIS DEPTH: 0.063"
CHASSIS MOUNTING: MECHANICAL

EXIT SIGNAGE
SCALE:
LETTER STYLE: FUTURA MEDIUM
BACKGROUND COLOR: TBD
CHASSIS COLOR: BLACK
CHASSIS DEPTH: 0.063"
CHASSIS MOUNTING: MECHANICAL

DIGITAL PRINT INSERT ON CLEAR LEXAN, GRAPHIC TBD

FIRE EVACUATION SIGNAGE
1. Products

A. Manufacturers:

- Basis-of-Design Product: The design for each sign is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

B. Panel Signs:

- General: Provide panel signs that comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction:
  - Produce smooth panel sign surfaces constructed to remain flat under installed conditions within tolerance of plus or minus 1/16 inch (1.5 mm) measured diagonally.

- Basis-of-Design Product: Mohawk Signage Systems Series 200A-Sand Carved using format “D” or a comparable product of one of the following.

- Available Manufacturers:
  - Allenite Signs; Allen Marking Products, Inc.
  - American Graphics Inc.
  - APCO Graphics, Inc.
  - ASI Sign Systems, Inc.
  - Best Manufacturing Co.
  - Mills Manufacturing, Inc.
  - Mohawk Sign Systems.

- Melamine Plastic Laminate: Melamine plastic laminate, approximately 1/8” thick with contrasting core color. The melamine shall be non-static, fire-retardant and self-extinguishing.

- Letterform: Gil Sans or other sans serif or simple serif letterforms.

- Unframed Panel Signs: Fabricate signs with edges mechanically and smoothly finished to comply with the following requirements:
  - Edge Condition: Square cut, edge color same as face.
○ Corner Condition: Square.
○ Copy position: Centered.
○ Colors: To be selected from manufacturer’s full range of colors.

● Graphic Content and Style: Provide sign copy that complies with requirements indicated in the sign schedule for size, style, spacing, content, mounting height and location, material, finishes, and colors of signage.

● Tactile and Braille Copy: Manufacturer's standard process for producing copy complying with ADA Accessibility Guidelines and ICC/ANSI A117.1. Text shall be accompanied by Grade 2 Braille. Produce precisely formed characters with square cut edges free from burrs and cut marks.

C. Panel Sign Types:

● Restroom signs shall be ADA-4, size 8” x 8”, with a 4” accessibility symbol, gender symbol and the written description placed directly below by Grade 2 Braille.

D. Accessories:

● Vinyl Film: Provide opaque non-reflective vinyl film, 0.0035-inch (0.089-mm) minimum thickness, with pressure-sensitive adhesive backing suitable for both exterior and interior applications.

● Mounting Methods: Use double-sided vinyl tape fabricated from materials that are not corrosive to sign material and mounting surface.

E. Finishes, General:

● Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

● Protect mechanical finishes on exposed surfaces from damage by applying strippable, temporary protective covering before shipping.

● Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of range of approved samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within range of approved samples and are assembled or installed to minimize contrast.
10 14 53 Traffic Signage

1. General

   **A. Road and Parking Signage Mounting:** UNF requires a 4 inch diameter aluminum sign pole for the mounting of all road and parking area traffic signage.
10 21 13 Toilet Compartments

1. General

   A. **Toilet Compartments and Urinal Screen Materials:** Toilet compartments and urinal screens shall be composed of solid-polymer panels.

   B. **Toilet Compartment Mounting:** Toilet compartments shall be floor mounted and braced overhead.

   C. **Toilet Compartment Doors:** Toilet compartment doors shall swing inward and shall be placed 36 inches from the leading edge of the water closet.
10 44 16 Fire Extinguishers

1. General

   A. Provide dry powder extinguishers.

   B. Provide CO2 extinguishers in all computer rooms or other areas with electrical equipment.
10 73 43 Transportation Stop Shelters

1. General

A. **Wheelchair Clear Floor Space**: Provide a minimum 60 inch wide clear floor space for two wheelchairs adjacent to one side of bus shelter benches.

B. **Finish**: The finish of the bus shelters to match University standards for this structure.

C. **Materials**: Bench seating surface and backrest material to be recycled wood composite or plastic with faux wood texture.

D. **Reference Drawings**: See EXHIBIT 1 for Transportation Stop Shelters elevation drawings.
10 73 43 Transportation Stop Shelters – EXHIBIT 1

SIDE ELEVATION

FRONT ELEVATION

PLAN

BENCH WITH BACKREST

60" X 60" CLEAR SPACE FOR TWO WHEELCHAIRS
12 00 00 Furnishings
12 00 00 General Furnishings Information

1. General
   
   A. Furniture:
      
      • All academic facility lobby furnishings are to be secured to the floor.
   
   B. Waste Cans:
      
      • Interior and exterior facility waste cans to be provided by UNF inclusive of recycling cans.
      
      • No recessed toilet waste receptacles, all to be free standing beneath counters.
   
   C. Clocks:
      
      • Furnished by UNF.
      
      • Battery operated, no electrical outlet required.

2. Products

   A. Waste Cans:
      
      • Manufacturer: Recycled Recycler, Excel Series 35.
1. Products

A. General Requirements: UNF’s preference is for solid surface toilet room countertops with Silestone as the performance standard.
12 46 33 Waste Receptacles

1. General

   A. **Source of Receptacles:** Waste receptacles will be provided by UNF.

   B. **Recessed Wall Receptacles:** Recessed wall waste receptacles are prohibited.

2. Products

   A. **Manufacturer:**

      • Equivalent to Keysan Recycling Containers.
12 48 00 Rugs and Mats

1. General

   A. Summary:
      ● This section includes the following types of entrance flooring systems:
         ○ Floor grids and frame assemblies.

2. Quality Assurance

   A. Flammability: In accordance with ASTM E648, Class 1, Critical Radiant Flux, minimum 0.45 watts/m².

   B. Slip Resistance: In accordance with ASTM D-2047-96, Coefficient of Friction, minimum 0.60 for accessible routes.

   C. Standard Rolling Load Performance: 400 lb./wheel with larger loading requirements as specified (load applied to a solid 5” x 2” side polyurethane wheel, 1000 passes without damage).

   D. Single Source Responsibility: Obtain floor grids and frames from one source of a single manufacturer.


3. Products

   A. Manufacturers:
      ● Drawings and specifications are based on manufacturer’s literature from Construction Specialties, Inc. unless otherwise indicated. Other manufacturers must comply with the minimum levels of material and detailing indicated on the drawings and specified herein.

   B. Materials:
      ● Aluminum: ASTM B 221, alloy 6105-T5 for rail extrusions and 6061-T6 for key lock bars.

      ● Tread Insert Options: Refer to Section 2.05.

   C. Floor Grids:
Model and Description: G8 Pedigrid SA shall be an extruded one piece 6105-T5 aluminum alloy. Serrated tread rails to be joined mechanically by 6106-T6 aluminum alloy, key lock bars. (Welding or bolting shall not be permitted.) Rail finish to be mill (standard) or one of 7 optional colors as offered by manufacturer. (Call factory for custom colors.) Choose from anodized or heavy-duty powder coat finish.

D. Grid Frames:

- LB: Level Base Frame: Shall be 6063-T5 aluminum alloy with 1/2" (12.7 mm) exposed surface and a depth of 1-13/16" (46.0 mm). These assemblies receive 1/4" (6.4 mm) thick heavy gauge support cushions 1" (25.4 mm) long mounted to each continuous foot at 20" (0.51 m) on center. Frame color shall be supplied in mill (standard) or one of 7 optional colors as offered by manufacturer. (Call factory for custom colors.) Choose from anodized or heavy-duty powder coat finish. Note: Mill finish frames in contact with concrete to be primer coated.

- NP: Drain Pan Series NP Frame shall be 4-3/16" (106.4 mm) deep with 1/2" (12.7 mm) exposed surfaces in 6063-T5 aluminum alloy. These assemblies shall rest upon a continuous vinyl cushion with additional support members 32" (0.81 m) on center maximum. At every 24" (0.61 m) along the support member, staggered side to side, is a 6063-T5 aluminum alloy adjustable support leg. The base of the framed enclosure shall be formed through the blocking out of the concrete at the time the frames are set. The drains, traps and drain connections shall be furnished under the plumbing contract. Frame color shall be supplied in mill (standard) or one of 7 optional colors as offered by manufacturer. (Call factory for custom colors.) Choose from anodized or heavy-duty powder coat finish. Note: Mill finish frames in contact with concrete to be primer coated.

- DP: Drain Pan Series DP Frame shall be 4-3/16" (106.4 mm) deep with 1/2" (12.7 mm) exposed surfaces in 6063-T5 aluminum alloy. These assemblies shall rest upon a continuous vinyl cushion with additional support members 32" (0.81 m) on center maximum. At every 24" (0.61 m) along the support member, staggered side to side, is a 6063-T5 aluminum alloy adjustable support leg. A 16 gauge aluminum pan complete with a 2" (50.8 mm) I.P.S. drain and stainless steel strainer to be provided by manufacturer. A 2" (50.8 mm) pipe and drain trap shall be furnished under the plumbing contract. Frame color shall be supplied in mill (standard) or one of 7 optional colors as offered by manufacturer. (Call factory for custom colors.) Choose from anodized or heavy-duty powder coat finish. Note: Mill finish frames in contact with concrete to be primer coated.
- LBDP: Level Base Frame with Optional Drain Pan shall be 6063-T5 aluminum alloy with 1/2" (12.7 mm) exposed surface and a depth of 1-13/16" (46.0 mm). These assemblies receive 1/4" (6.4 mm) thick heavy gauge support cushions 1" (25.4 mm) long mounted to each continuous foot at 24" (0.61 m) on center. These assemblies shall also include a 2" (50.8 mm) I.P.S. PVC drain, stainless steel strainer and a 16-gauge aluminum pan provided by manufacturer. Frame color shall be supplied in mill (standard) or one of the 7 optional colors as offered by manufacturer. (Call factory for custom colors.) Choose from anodized or heavy-duty powder coat finish. Note: Mill finish frames in contact with concrete to be primer coated.

12 48 00 Rugs and Mats – EXHIBIT 1
12 51 00 Office Furniture – Typical Office Layout – EXHIBIT 1

PLAN VIEW
SCALE: 1/4"=1'-0"

36" [2] DRAWER LATERAL FILE WITH BOOKCASE ON TOP
GUEST CHAIR
SUPPORT COLUMN
30"x66" D-TOP DESK WITH MODESTY PANEL
DESK CHAIR
24"x24" RETURN WITH BOX/BOX/FILE PEDESTAL AND ACCESSORY TRAY

3D VIEW
SCALE: NONE

STANDARD "A1" - PLASTIC LAMINATE RIGHT RETURN
STANDARD "A2" - PLASTIC LAMINATE LEFT RETURN

FRONT VIEW BOOKCASES
SCALE: NONE
12 51 00 Office Furniture – Typical Office Layout – EXHIBIT 2

STANDARD "A3A" - WOOD RIGHT BRIDGE
STANDARD "A3" - PLASTIC LAMINATE RIGHT BRIDGE
STANDARD "A4" - PLASTIC LAMINATE LEFT BRIDGE
12 51 00 Office Furniture – Typical Office Layout – EXHIBIT 3

12 51 00 Office Furniture – Typical Office Layout – EXHIBIT 3

**PLAN VIEW**
**SCALE: 1/4"=1'-0'**

**3D VIEW**
**SCALE: NONE**

**STANDARD "A5A" - WOOD RIGHT BRIDGE**
**STANDARD "A5" - PLASTIC LAMINATE RIGHT BRIDGE**
**STANDARD "A6" - PLASTIC LAMINATE LEFT BRIDGE**

**FRONT VIEW BOOKCASES**
**SCALE: NONE**
12 56 33 Classroom Furniture

1. General

   A. Tablet Arm Chairs: Provide KI 1000 series tablet arm chairs (1060 OTRN / CH / LWG / color) or equivalent.
12 93 00 Site Furnishings

1. General

A. Items Furnished by UNF: Waste receptacles shall be provided by UNF.

2. Products

A. Waste Receptacles:
   - See Section 12 00 00 General Furnishings Information for exterior waste can types.

B. Bicycle Racks:
   - DuMor Site manufactured Model 125 – 40 type or similar.

C. Site Seating:
   - Victor Stanley, Inc. manufactured Model Steelsites RB-28 bench.
14 00 00 Conveying Equipment
14 00 00 General Elevator Requirements

1. General
   A. Provide hydraulic elevators whenever possible.
   B. Elevators shall meet the performance standard of ThyssenKrup Elevators.
   C. Elevators shall have dedicated emergency power.
   D. Elevators shall have non-proprietary controls.
21 00 00 Fire Suppression
21 13 13 Wet-Pipe Sprinkler Systems

1. General

A. Summary: This section contains the requirements relating to fire protection systems.

B. General Requirements:

- Fire-Hydrant Flow Test: Shall be performed prior to the start of any design work. Test shall be coordinated with Physical Facilities, performed by an independent contractor.

C. System Performance Requirements:

- Fire-Suppression Standpipe System Design:
  - Minimum Residual Pressure at Each Hose-Connection Outlet:
    - NPS 1-1/2 Hose Connections: 65 psig.
  - Maximum Residual Pressure at Required Flow At Each Hose-Connection Outlet:
    - NPS 1-1/2 Hose Connections: 100 psig.

D. Components:

- Sprinkler Specialty Fittings: UL listed or FMG approved.
- Listed Fire-Protection Valves: UL listed or FMG approved.
- Sprinklers: UL listed or FMG approved.
- Wall-Type Fire Hydrants:
  - Type: Exposed, projecting.
  - Finish: Polished chrome plated.
- Fire Department Connections:
  - Exposed, Projecting Wall Type: Two inlets.
  - Finish: Polished chrome plated.
○ Sign: Provide red sign with white letters stating “Fire Department Connection.”

- Remote Fire Department Connections:
  ○ Sign: Provide red sign with white letters strapped to riser indicating building served.

E. Installation:

- Piping between Fire Department Connections and Check Valves: Galvanized, schedule 40 steel pipe with grooved joints.

- Standard-Pressure, Wet or Dry Type Standpipe Application: Schedule 40 black or galvanized steel pipe with threaded or grooved joints.

- Standard-Pressure, Wet or Dry Pipe Sprinkler System Application: Schedule 40 black or galvanized steel pipe with threaded or grooved joints.

- Sprinkler Applications:
  ○ Rooms without Ceilings: Upright sprinklers. Provide safety cage around heads less than 9 feet above finished floor.
  ○ Rooms with Suspended Ceilings: Recessed sprinklers.
  ○ Wall Mounting: Sidewall sprinklers.

- Color: Paint all exposed sprinkler piping except galvanized, fire engine red.
22 00 00 Plumbing
22 00 00 Plumbing Project Requirements

1. General

A. Summary: This section contains the Owner’s project requirements for the design of plumbing systems.

B. Codes and Standards:

- The latest ASPE standards shall be utilized in the design and construction of the plumbing systems.

C. Submittals:

- A copy of the plumbing submittals shall be provided to Physical Facilities concurrent with the engineer’s review, not for contract compliance-related approval, but to allow Physical Facilities to become familiar with the products to be maintained.

D. General Requirements:

- All systems shall be designed in a manner to facilitate ease of maintenance. Adequate access to accomplish all normally required maintenance without removal of other than access panels is mandatory.

- Piping and Component Diagram: The plumbing system shall be designed to facilitate the installation of components in a serviceable manner. Complete piping and component diagrams shall be included in the construction documents to verify that the design intent is constructible and maintainable.

- Coordination Drawings: The contractor shall submit coordination drawings assuring that the various components the contractor intends to install in mechanical rooms will result in a serviceable installation. These drawings shall be provided to Physical Facilities to review.

- Serviceability: Clearances suggested by manufacturers for equipment maintenance, removal, and replacement shall be indicated on the coordination drawings and accommodated by the layout. Larger and heavier components that may require future removal or replacement shall be identified on the coordination drawing and a clear path identified to the building exterior. Door sizes, lifting supports, and other pertinent information shall be identified on coordination drawings. All components (cleanouts, shut-off valves, floor drains, pumps, etc.) shall have at least 24 inches to 36 inches of radial room.
around them to allow for maintenance access. All equipment access shall be provided within the equipment room.

E. Domestic Water Service:

- Domestic water for the University is provided by the local utility (JEA). Three services, master-metered, provide water to the University-maintained distribution system. Physical Facilities shall be consulted at the start of the project to determine the appropriate connection point and impact of the project on the existing distribution system. Any increases in the distribution system must be addressed as part of the project design.

- Water Pressure: Available pressure is normally sufficient to supply buildings up to two stories in height. Buildings three stories and higher shall be equipped with a domestic water booster pump. Flow tests shall be conducted at the start of the project to verify the available water supply and pressure at the proposed point of connection.

- Water piping shall not be located beneath the building slab. The main lines shall enter the building via a mechanical or valve room located adjacent to the building exterior.

- Water Meters: All new buildings and major renovations to existing buildings shall be furnished with water meters to measure domestic water consumption. A full line size bypass with appropriate isolation valves shall be provided to allow for servicing of the meter without disruption to the building water service. Consult with Physical Facilities during design to determine any sub-metering requirements.

- Isolation Valves:
  - Provide sufficient flexibility to limit the area impacted by a water outage.
  - Provide isolation valves for each riser. Location of riser isolation valves will be directly after the riser enters the building from the exterior and shall be readily accessible for operation.
  - Provide isolation valves at the beginning of each branch piping takeoff from vertical risers and from horizontal mains.
  - Provide isolation valves for each bathroom group; preferred location is in the hallway outside the bathroom.
  - Provide isolation valves to allow isolation of equipment.

- Hose Bibs:
○ Provide a hose bib in each mechanical room.
○ Provide key-operated hose bibs on each side of the building, and not more than 200 feet apart for maintenance use.

- Domestic Hot Water: Hot water shall not be supplied to restroom lavatories unless required to support food service operations or otherwise required by EH&S.
  ○ Where hot water is required, provide instantaneous type water heater located below counter.

F. Sanitary Sewer:
- Sanitary sewer service for the University is provided by the local utility (JEA). Buildings are tied into a central gravity system that feeds into a central lift station located west of the Child Development and Research Center. Physical Facilities shall be consulted at the start of the project to determine the appropriate connection point for the building.
- Lift stations shall not be utilized unless a gravity connection to the existing sewer is unfeasible.
- Building sanitary lines shall be connected to manholes. Provide new manholes as required to intercept existing sewer lines. Connection to existing sewer lines using a wye fitting is prohibited.
- Cleanouts:
  ○ Provide cleanouts for each toilet group. Cleanout shall be located in an accessible location and above the bowl height of the adjacent water closet.
  ○ Provide cleanouts in the slab for each branch line and at 50 foot intervals on main lines.
  ○ Provide bi-directional cleanout at building exterior where main line enters the building.
- Floor Drains: All floor drains shall be equipped with trap primers.

G. Storm System:
- The roof drainage system shall be designed such that roof drains are located away from the roof edge.
- A complete secondary roof drainage system shall be provided. Scuppers are not acceptable.
Roof drains shall be located a minimum of 10 feet from the roof edge.

H. Plumbing Fixtures and Equipment:

- Trap primers shall be provided for each floor drain.
- Domestic water pumps shall be connected to and monitored by the energy management system (EMS).
22 05 13 Common Motor Requirements for Plumbing Equipment

1. General

A. Summary: Section includes general requirements for single-phase and poly-phase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on AC power systems up to 600 volts and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

2. Products

A. General Motor Requirements:

- Comply with requirements in this section except when stricter requirements are specified in plumbing equipment schedules or sections.
- Comply with NEMA MG 1 unless otherwise indicated.

B. Motor Characteristics:

- Duty: Continuous duty at ambient temperature of 40 Deg C and at altitude of 3300 feet above sea level.
- Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.
- All conduit boxes must face access side of motor.
- Poly-Phase Motors:
  - Motors shall be open drip-proof for indoor applications or totally enclosed fan cooled for outdoor applications.
  - Motors shall have cast iron frames with cast mounting feet.
  - Motors shall be three phase, 60 hertz, 1800 rpm, rated at 200 volts for 208-volt systems, 230 volts for 240-volt systems, and 460 volts for 480-volt systems. 230/208-volt motors shall not be permitted on 208-volt systems.
Motors shall be NEMA Design B and shall have 1.15 service factor at 60 hertz.

Insulation Systems:

- In fixed speed applications, motors shall have Class B insulation with 80 Deg C rise over 40 Deg C ambient.
- For variable frequency drive (VFD) applications, motors shall have Class B insulation with 80 Deg C rise over 40 Deg C ambient. Motor manufacturer shall be notified if a motor is being purchased for VFD application and motor nameplate shall be marked “Suitable for Variable Frequency Drive.”

Motor Efficiencies:


Motors 25 hp and larger which are to be installed outdoors or in other high humidity areas shall be equipped with silicone rubber space heaters. Space heaters shall be energized when motor is de-energized.

- Fractional Horsepower Motors One-Half HP and Above:
  - Motors shall be open drip-proof or totally enclosed fan cooled.
  - Motors shall be three phase, 60 hertz, 1800 rpm, rated at 200, 230 or 460 volts.
  - Motors shall be NEMA Design B with class B insulation.

- Fractional Horsepower Motors Less than One-Half HP:
  - Motors shall be single phase, 60 hertz, rated at 120 volts with integral thermal protection.

C. Overload Protection: Overload protection shall be provided for each motor. This protection may be an integral part of the motor or may be part of the motor controller and shall interrupt each ungrounded conductor. Three-phase motor protection shall insure that all three phases are interrupted with the loss of any one phase. Solid-state overloads shall be provided for poly-phase motors. Constructor to set overloads at start-up.
22 05 19 Meters and Gages for Plumbing Piping

1. General

A. Summary: Section includes gages.

2. Products

A. Pressure Gages:

- Direct-Mounting, Dial-Type Pressure Gages:
  - Case: Liquid-filled type, metal, 4-1/2 inch diameter.
  - Pressure-Element Assembly: Bourdon tube, unless otherwise indicated.
  - Pressure Connection: Brass, NPS 1/4, bottom-outlet type unless back-outlet type is indicated.
  - Movement: Mechanical, with link to pressure element and connection to pointer.
  - Dial: Satin-faced, non-reflective aluminum with permanently etched scale markings.
  - Pointer: Red or other dark-color metal.
  - Window: Glass.
  - Ring: Metal.
  - Accuracy: Grade A, plus or minus 1 percent of middle half scale.
  - Vacuum-Pressure Range: 30 inch Hg of vacuum to 15 psig of pressure.
  - Range for Fluids under Pressure: Two times operating pressure.

B. Pressure-Gage Fittings:

- Valves: NPS 1/4 brass or stainless-steel needle type.
- Snubbers: ASME B40.5, NPS 1/4 brass bushing with corrosion-resistant, porous-metal disc of material suitable for system fluid and working pressure.
22 05 23 General-Duty Valves for Plumbing Equipment

1. General

A. Summary: This section includes the following general-duty valves:
   - Copper-alloy ball valves.
   - Ferrous-alloy butterfly valves.

2. Products

A. Valves, General:
   - Bronze Valves: NPS 2-1/2 and smaller with threaded ends, unless otherwise indicated.
   - Ferrous Valves: NPS 3 and larger with flanged ends, unless otherwise indicated.
   - Valve Sizes: Same as upstream pipe.
   - Valve Actuators:
     ○ Chainwheel: For all exposed valves located greater than 6 feet A.F.F.
     ○ Gear Drive: For quarter-turn valves NPS 8 and larger.
     ○ Handwheel: For valves other than quarter-turn types.
     ○ Lever Handle: For quarter-turn valves NPS 6 and smaller.
   - Extended Valve Stems: On insulated valves.

B. Copper-Alloy Ball Valves:
   - Two-Piece, Copper-Alloy Ball Valves: Brass or bronze body, full-port, stainless steel ball and stem, PTFE or TFE seats, and 600 psig minimum CWP rating.

C. Ferrous-Alloy Butterfly Valves:
   - 150 CWP, ductile iron, lug type, single-flange butterfly valves with EPDM seat, 316 stainless steel disc, 416 stainless steel stem.
22 05 53 Identification for Plumbing Piping and Equipment

1. General

A. Summary: Section includes:

- Equipment labels.
- Warning signs and labels.
- Pipe labels.
- Valves tags.

2. Products

A. Equipment Labels:

- Plastic Labels for Equipment:
  - Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
  - Background Color: Blue.
  - Maximum Temperature: Able to withstand temperatures up to 160 Deg F.
  - Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
  - Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
  - Fasteners: Stainless-steel rivets or self-tapping screws.
  - Adhesive: Contact-type permanent adhesive, compatible with label and substrate.

- Label Content: Include equipment's drawing designation or unique equipment number.

- Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2 by 11 inch bond paper. Tabulate equipment identification number and
identify drawing numbers where equipment is indicated (plans, details, and schedules), plus the specification section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

B. Warning Signs and Labels:

- Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
- Background Color: Red.
- Maximum Temperature: Able to withstand temperatures up to 160 Deg F.
- Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- Fasteners: Stainless-steel rivets or self-tapping screws.
- Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- Label Content: Include caution and warning information, plus emergency notification instructions.

C. Pipe Labels:

- General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- Pre-tensioned Pipe Labels: Pre-coiled, semi-rigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on drawings, pipe size, and an arrow indicating flow direction.
○ Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.

○ Lettering Size: At least 1-1/2 inches high.

D. Valve Tags:

● Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.

○ Tag Material: Stainless steel, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.

○ Fasteners: Stainless steel beaded chain hook.

● Valve Schedules: For each piping system, on 8-1/2 by 11 inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shut-off and similar special uses. Valve tag schedule shall be posted in each mechanical room. Valve tag schedule shall be included in operation and maintenance data.

3. Execution

A. Equipment Label Installation:

● Install or permanently fasten labels on each major item of mechanical equipment.

● Locate equipment labels where accessible and visible.

B. Pipe Label Installation:

● Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

○ Near each valve and control device.

○ Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.

○ Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
○ At access doors, manholes, and similar access points that permit view of concealed piping.

○ Near major equipment items and other points of origination and termination.

○ Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.

○ On piping above removable acoustical ceilings.
22 11 16 Domestic Water Piping

1. General

A. Summary: Section includes:
   - Under-building slab and above-ground domestic water pipes, tubes, fittings, and specialties inside the building.

B. Project Conditions:
   - Interruption of Existing Water Service: Provide minimum 72 hours’ notification to Physical Facilities for any interruption to water service.
   - All piping shall be cleaned and tested to comply with Health Department regulations. Water samples shall be tested. Test results shall be forwarded to the University before service is turned on.

2. Products

A. Domestic Water Piping:
   - Above Slab, Inside Building: Copper tube, type “K” soldered to wrought copper or cast bronze fittings. Lead free solder joints and non-toxic water-based solder paste suitable for domestic water systems. Acid flux is prohibited.
   - Below Ground:
     - Schedule 80 PVC pipe and fittings with solvent-welded joints.
     - Ductile iron pipe.
     - Copper piping is not acceptable for underground use.
   - Reverse Osmosis / Deionized Water: Schedule 40 PVC with solvent-welded joints.
22 11 19 Domestic Water Piping Specialties

1. General

A. Summary: This section includes the following domestic water piping specialties:
   - Wall hydrants.

B. Performance Requirements: Minimum working pressure for domestic water piping specialties: 125 psig, unless otherwise indicated.

2. Products

A. Wall Hydrants: Vacuum Breaker Wall Hydrants:
   - Standard: ASSE 1019, Type A or Type B.
   - Type: Freeze resistant, automatic draining with integral air-inlet valve.
   - Classification: Type A, for automatic draining with hose removed or Type B, for automatic draining with hose removed or with hose attached and nozzle closed.
   - Pressure Rating: 125 psig.
   - Operation: Loose key.
   - Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
   - Inlet: NPS 1/2 or NPS 3/4.
   - Outlet: Exposed with garden-hose thread complying with ASME B1.20.7.
22 11 23 Domestic Water Pumps

1. General

   A. **Summary:** This section includes the following all-bronze and bronze-fitted centrifugal pumps for domestic cold- and hot-water circulation:

   ● Close-coupled, in-line, seal-less centrifugal pumps.

2. Products

   A. **Close Coupled, In-Line, Seal-Less Centrifugal Pumps:**

   ● **Manufacturers:**
      ○ Armstrong Pumps Inc.
      ○ Bell & Gossett Domestic Pump; ITT Industries.
      ○ Grundfos Pumps Corp.
      ○ Taco, Inc.

   ● **Description:** Factory-assembled and -tested, single-stage, close-coupled, in-line, seal-less centrifugal pumps:

      ○ **Pump and Motor Assembly:** Hermetically sealed, replaceable-cartridge-type unit with motor and impeller on common shaft and designed for installation with pump and motor shaft mounted horizontally.

      ○ **Casing:** Bronze, with threaded companion-flange connections.

      ○ **Impeller:** Corrosion-resistant material.

      ○ **Motor:** Single speed, unless otherwise indicated. Comply with requirements in Division 22 Section “Common Motor Requirements for Plumbing Equipment.”
22 13 16 Sanitary Waste and Vent Piping

1. General

A. Summary: Section includes:
   - Under-building slab and above-ground sanitary waste and vent piping, fittings, and specialties inside the building.

B. Project Conditions:
   - Interruption of Existing Sewer Service: Provide minimum 72’ hours notification to Physical Facilities for any interruption to sewer service.

2. Products

A. Sanitary:
   - Above Slab: Either of the following:
     - Cast-iron with no hub couplings.
     - Schedule 40 PVC with solvent-welded joints. PVC pipe located in return air plenums shall be wrapped.
     - Waterless Urinals Special Condition:
       - All waterless urinal lateral waste arms shall be entirely PVC to the vertical main and have a slope of ¼ inch per foot.
   - Below Slab: Schedule 40 PVC with solvent-welded joints.
   - Waste arms shall be schedule 40 PVC, minimum 1-1/2 inch in size.
22 14 13 Facility Storm Drainage Piping

1. General

   A. Summary: Section includes:

      ● Under-building slab and above-ground storm drainage piping, fittings, and specialties inside the building.

2. Products

   A. Storm Drainage Piping:

      ● Above Slab: Either of the following:

          ○ Cast iron with no hub couplings.
          ○ Schedule 40 PVC with solvent-welded joints. PVC pipe located in return air plenums shall be wrapped.

      ● Below Slab: Schedule 40 PVC with solvent-welded joints.

   B. Roof Drains:

      ● Metal Roof Drains:

          ○ Standard: ASME A112.21.2M.
          ○ Pattern: Roof drain.
          ○ Body Material: Cast iron.
          ○ Dimensions of Body: As noted.
          ○ Combination Flashing Ring and Gravel Stop: Required.
          ○ Flow-Control Weirs: Not required.
          ○ Outlet: Bottom.
          ○ Dome Material: Cast iron.
          ○ Extension Collars: Required.
          ○ Under-deck Clamp: Required.
          ○ Sump Receiver: Required.
22 40 00 Plumbing Fixtures

1. General

   A. Summary: Section includes:
      ● Water closets, urinals, lavatories, faucets, domestic water coolers.

2. Products

   A. Water Closets:
      ● Wall mounted:
         ○ White china with battery-operated flush valve. China and flush valve shall be a tested assembly rated at 1.28 GPF.
         ○ Acceptable Manufacturer: Sloan.

   B. Urinals:
      ● Waterless:
         ○ Cartridge-less type. White china.
         ○ Acceptable Manufacturer: Kohler.

   C. Lavatories:
      ● Construction: White vitreous china only.

   D. Sinks:
      ● Construction: 18 gauge stainless steel with sound dampening.

   E. Faucets:
      ● Battery-Operated Sensor Type:
         ○ Low-flow 0.5 GPM.

   F. Domestic Water Coolers:
      ● Surface-Mount:
G. Water Heaters:

- Special Warranty Requirement: 5 years from the date of Substantial Completion on tanks.

H. Expansion Tanks:

- Special Warranty Requirement: 5 years from the date of Substantial Completion on tanks.
23 00 00 Heating, Ventilating, and Air-Conditioning (Hvac)
23 00 00 Hvac Project Requirements

1. General

A. Codes and Standards: The latest ASHRAE Standards (55, 62.1, 90.1, etc.) shall be utilized in the design and construction of the Hvac systems.

B. Definitions:

- Provide/Install: The word "provide" shall mean furnish, install, connect, test, complete, and leave ready for operation. The word "install" where used in conjunction with equipment furnished by the University of North Florida or under another contract shall mean mount, connect, complete, and leave ready for operation.

- Concealed: The surface of insulated or non-insulated piping, ductwork or equipment is concealed from view when standing inside a finished room, such as inside a chase or above a ceiling.

- Exposed: The surface of insulated or non-insulated piping, ductwork or equipment is seen from inside a finished room, such as inside an equipment or Air Handling Unit room.

- Protected: The surface of insulated or non-insulated piping, ductwork or equipment on the exterior of the building but protected from direct exposure to rain by an overhang, eave, in an unconditioned parking garage or building crawl space.

- Unprotected: The surface of insulated or non-insulated piping, ductwork or equipment on the exterior of the building and exposed to rain.

- Abbreviations: Abbreviations, where not defined in the contract documents, shall be interpreted to mean the normal construction industry terminology, as determined by the architect. Plural words shall be interpreted as singular and singular words shall be interpreted as plural where applicable for context of the contract documents.

C. Design Conditions:

- Outdoor: ASHRAE published design conditions for Jacksonville, FL (Craig Field).

- Summer Indoor: 75 Deg F, 50 percent RH.

- Winter Indoor: 70 Deg F.
• Mechanical and Electrical Spaces: 85 Deg F, 50 percent RH Summer, 60 Deg F Winter.

D. Submittals: A copy of the Hvac submittals shall be provided to Physical Facilities concurrent with the engineer’s review, not for contract compliance-related approval, but to allow Physical Facilities to become familiar with the products to be maintained.

E. General Requirements:

• Provide building humidity control and positive pressurization to prevent growth of mold and to maintain indoor air quality in compliance with ASHRAE Standard 62.1.

• All systems shall be designed in a manner to facilitate ease of maintenance. Adequate access to accomplish all normally required maintenance without removal of other than access panels is mandatory.

• Noise Criteria:
  ○ Classrooms & Offices: NC-30.
  ○ Halls, Corridors, Lobbies: NC-40.
  ○ Specialty Spaces: To be determined on project-by-project basis.

F. Ventilation Requirements:

• Ventilation shall be in accordance with ASHRAE Standard 62.1. The outdoor air shall be well mixed with the return air.

• Rooms or spaces utilized for lunch-break rooms, lounges, reprographics areas and kitchen areas shall be provided with exhaust air of adequate quantity as per the latest ASHRAE Standards.

• All spaces which are provided with exhaust ventilation shall be maintained at a lower overall pressure than the surrounding areas (i.e., 0.01 inch w.g.).

• Any area that is designed to be exhausted shall be isolated from the return air system.

• Local exhaust ventilation systems shall be designed utilizing the most recent version of the American Conference of Governmental Industrial Hygienists’ “Industrial Ventilation, a Manual of Recommended Practice.”
● Exhaust stack discharge height shall be in accordance with Chapter 5 of the American Conference of Governmental Industrial Hygienists’ “Industrial Ventilation, a Manual of Recommended Practice.”

● Consideration shall be given to the location of fresh air intakes to prevent introduction of pollutants to the building’s air supply. Intakes shall be located at least 10 feet above the ground. Intakes shall be located at least 50 feet (vertically and horizontally) from loading docks, parking garages and garbage areas.

**G. Chilled and Heating Hot Water Distribution:**

● The campus is served by a central cooling and heating plant. All facilities within the campus core shall be tied into the existing distribution system. Physical Facilities shall be consulted at the start of the project to determine the impact of the project on the existing plant. Any increases in plant capacity or delivery system must be addressed as part of the project design. When buildings are remote from the campus distribution system, the designer shall investigate options to provide a single plant to serve the facility. Direct expansion (DX) type systems should be avoided.

● Design Temperatures:
  ○ Chilled Water Supply Temperature: 45 Deg F. Design coils for a 16 Deg F rise.
  ○ Heating Hot Water Supply Temperature: 120 Deg F. Design coils for a 20 Deg F drop.

● Buildings served by the central plant should not have an expansion tank or an automatic water make-up system. Tertiary pumps shall not be utilized without prior approval by Physical Facilities. Make provisions for flushing and initial filling of the chilled water system using domestic water.

● Chilled and Heating Hot Water piping shall not be located beneath the building slab. The main lines shall enter the building via a mechanical or valve room located adjacent to the building exterior.

● Isolation Valves:
  ○ Provide isolation valves at the beginning of each branch piping takeoff in vertical risers.
  ○ Provide isolation valves for each riser. Location of riser isolation valves will be directly after the riser enters the building from the exterior and shall be readily accessible for operation.
Provide manual air vents on the plant side of the building isolation valves.

Provide the means to drain and vent the building piping, as well as automatic air vents at the high points of supply and return risers.

• Metering:
  ○ All new buildings and major renovations to existing buildings shall be furnished with BTU meters to measure chilled and heating hot water consumption.
  ○ The BTU meters shall consist of flow stations with matched temperature sensors in the riser lines at the building service entry. Refer to Section 23 09 00 for additional information.

• HVAC Piping Components:
  ○ At a minimum, provide the following at each coil:
    ▶ Shut-off valves on supply and return.
    ▶ Strainer with blow down valve and hose connection.
    ▶ Two-way control valve (PICCV type if less than 2 inches or 100 GPM).
    ▶ Autoflow balancing valve (not applicable if PICCV valve is used).
    ▶ Pete’s plug on both sides of control valve and strainer.
    ▶ Pressure gage on supply and return (AHU only).
    ▶ Thermometers on supply and return (AHU only).

H. Mechanical Rooms:

• Standardization of Floor Plan: All mechanical rooms in new or renovated buildings shall have the same basic floor plan (equipment layout), as practical. Vertical alignment of mechanical rooms within new buildings is preferred, where practical.

• Piping and Component Diagram: All mechanical rooms shall be designed to facilitate the installation of components in a serviceable manner. Complete piping and component diagrams, including sections/elevations of major equipment, shall be included in the construction documents to verify that the design intent is constructible and maintainable.

• Coordination Drawings: The contractor shall submit coordination drawings assuring that the various components the contractor intends to install in
mechanical rooms will result in a serviceable installation. These drawings shall be provided to Physical Facilities to review.

- **Serviceability:** Clearances suggested by manufacturers for equipment maintenance, removal, and replacement shall be indicated on the coordination drawings and accommodated by the layout. Larger and heavier components that may require future removal or replacement shall be identified on the coordination drawing and a clear path identified to the building exterior. Door sizes, lifting supports, and other pertinent information shall be identified on coordination drawings. All components (cleanouts, shut-off valves, floor drains, pumps, etc.) shall have at least 24 inches to 36 inches of radial room around them to allow for maintenance access. All equipment access shall be provided within the equipment room.

- **Freight Elevator:** Mechanical rooms above the first floor shall have access to a freight elevator. Penthouses shall have access to a freight elevator.

- **Floor Drains:** Provide drains and drain piping that is adequately sized to accommodate water volume when testing as well as normal service loads in all mechanical rooms.

- **Hose Bib:** Furnish at least one hose bib in each mechanical room.

- **Finishes:**
  - **Floor:** Two-part, high gloss, self-leveling epoxy floor coating.
    - **Color:** Gray.
    - **Thickness:** 20 mils.
  - **Walls:** Paint:
    - **Color:** White.
  - **Equipment Pads:**
    - **Color:** Safety Yellow (edge only).
  - **Base:** Vinyl.

1. **Air Handling Systems:**
   - Roof-mounted equipment is not acceptable. The only exception to this is exhaust fans which are required to be roof mounted. Equipment shall be located a minimum of 10 feet from the roof edge.
● Air Handling Units shall be located in mechanical rooms within the building or located within a penthouse. The units shall be appropriately sized to allow for flexibility for future modifications.

● Service Clearance: Adequate clearance shall be provided for all service, repairs, and component replacement. For new buildings, the unit shall be placed such that the service personnel can freely walk to at least three sides of the unit. For renovations, the unit arrangement shall be reviewed with Physical Facilities.

● Equipment Pad: Mount AHU’s on concrete pads at least 6 inches above finished floor.

● Fan coil units shall not be installed above ceilings.

J. Air Distribution:

● No more than three offices shall be combined on a single thermostat (zone). Four offices may be permitted where not evenly divisible by three. Offices with different exposures or loads shall not be combined on the same thermostat.

● Classrooms, conference rooms, laboratories, and places of assembly shall each have a dedicated thermostat.

● Terminal Units:
  ○ Terminal units shall be located outside of offices where feasible. In no case shall terminal units be located above furniture.
  ○ Provide 120 volts / 1PH power to each terminal unit, unless fan-powered. Each terminal unit shall have a primary voltage to 24 volts secondary transformer in the control cabinet.

K. Energy Management System:

● Provide new direct digital control system compliant with Section 23 09 00. The system shall be fully integrated with the existing campus EMS system. Existing graphics shall be updated to include the new building plans and control points.

● The control system sequence of operations shall be tailored to capitalize on energy saving opportunities including:
  ○ Variable Air Volume.
  ○ Duct Static Pressure Reset.
○ Demand Ventilation Control.
○ Terminal Unit Minimum Reset.

● Sensor Locations:
  ○ Provide CO₂ sensors in all classrooms, conference rooms, and in the main return duct at the Air Handling Unit.

○ Terminal Units:
  ➔ Discharge air temperature.
  ➔ Room temperature (sensor, not thermostat, located away from drafts or other sources which create false readings).

○ Air Handling Units:
  ➔ Outdoor air airflow.
  ➔ Return air temperature.
  ➔ Mixed air temperature.
  ➔ Heating coil leaving temperature (averaging type).
  ➔ Freezestat (upstream of cooling coil).
  ➔ Cooling coil leaving temperature (averaging type).
  ➔ Discharge air temperature.
  ➔ Fan status (on/off, commanded speed, feedback speed).
  ➔ Duct static pressure.
  ➔ Filter differential pressure switch (pre and final).

○ Outside air flow stations shall be installed in sufficient straight run of duct to provide accurate measurement.

L. Manufacturer’s Checkout:

● Start-up and Checkout: At completion of installation and prior to performance verification, a factory-trained representative of the manufacturer shall provide start-up and checkout service. After the performance verification the manufacturer’s representative shall examine performance information and check the equipment in operation, and sign “Check-Out Memo” for the record. Submit a copy of Memo on each item of equipment where indicated in individual sections of these specifications for inclusion in each Technical Information
Brochure. The "Check-Out Memo" shall be included with the performance verification data. Do not request “Instruction in Operation Conference” or request final inspection until Memos have been submitted and found acceptable.

M. Instructions to University of North Florida:

- **General:** Instructions to the University of North Florida shall be by competent representatives of the manufacturers involved, with time allowed for complete coverage of all operating procedures. Provide classroom instruction and field training in the design, operation and maintenance of the equipment and troubleshooting procedures. Explain the identification system, operational diagrams, emergency and alarm provisions, sequencing requirements, seasonal provisions, security, safety, efficiency and similar provisions of the systems. On the date of Substantial Completion, turn over the prime responsibility for operation of the mechanical equipment and systems to the University of North Florida’s operating personnel.

- **Training Period:** Unless otherwise indicated, training periods shall encompass the following number of hours of classroom and hands-on instructions with a maximum period of 4 hours per day for either. Mixing classroom instructions and hands-on training in the same day is unacceptable.
  - ○ **Training periods:** As appropriate for the project.

- **Training shall be scheduled prior to Substantial Completion.**
23 05 00 Common Work Results For Hvac

1. General

   A. Summary:

      • General: All piping systems shall be cleaned, tested by the contractor and accepted by the University prior to being placed into service.

      • Ferrous Pipe and Fittings: Iron pipe installed in a corrosive area shall be wrapped in a plastic approved for underground applications.

      • Grooved Fittings, Valves, and Couplings: Grooved pipe and related devices shall be used at equipment connections only.

      • Acceptable manufacturers are Victaulic, Tyco/Grinnell.

   B. Piping Specialties: Dielectric nipples shall be used at all junctions of dissimilar metal piping, but as close as possible to the unit it serves. Provide isolation valves upstream, within 12 inches of dielectric nipples, and on all branch piping from mains.

   C. Definitions:

      • Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspace, and tunnels.

      • Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

      • Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

      • Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.

      • Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
2. Quality Assurance

A. **Steel Support Welding:** Qualify processes and operators according to AWS D1.1, “Structural Welding Code – Steel.”

B. **Steel Pipe Welding:** Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, “Welding and Brazing Qualifications.”

- Comply with provisions in ASME B31 Series, “Code for Pressure Piping.”
- Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
23 05 13 Common Motor Requirements for Hvac Equipment

1. General

A. Summary: Section includes general requirements for single-phase and poly-phase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on AC power systems up to 600 volts and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

2. Products

A. General Motor Requirements:

- Comply with requirements in this section except when stricter requirements are specified in Hvac equipment schedules or sections.
- Comply with NEMA MG 1 unless otherwise indicated.

B. Motor Characteristics:

- Duty: Continuous duty at ambient temperature of 40 Deg C and at altitude of 3300 feet above sea level.
- Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.
- All conduit boxes must face access side of motor.
- Poly-Phase Motors:
  - Motors shall be open drip-proof for indoor applications or totally enclosed fan cooled for outdoor applications.
  - Motors shall have cast iron frames with cast mounting feet.
  - Motors shall be three phase, 60 hertz, 1800 rpm, rated at 200 volts for 208-volt systems, 230 volts for 240-volt systems, and 460 volts for 480-volt systems. 230/208-volt motors shall not be permitted on 208-volt systems.
Motors shall be NEMA Design B and shall have 1.15 service factor at 60 hertz.

Insulation Systems:

- In fixed speed applications, motors shall have Class B insulation with 80 Deg C rise over 40 Deg C ambient.
- For variable frequency drive (VFD) applications, motors shall have Class B insulation with 80 Deg C rise over 40 Deg C ambient. Motor manufacturer shall be notified if a motor is being purchased for VFD application and motor nameplate shall be marked “Suitable for Variable Frequency Drive.”

Motor Efficiencies:


Motors 25 hp and larger which are to be installed outdoors or in other high humidity areas shall be equipped with silicone rubber space heaters. Space heaters shall be energized when motor is de-energized.

- Fractional Horsepower Motors One-Half Hp and Above:
  - Motors shall be open drip-proof or totally enclosed fan cooled.
  - Motors shall be three phase, 60 hertz, 1800 rpm, rated at 200, 230 or 460 volts.
  - Motors shall be NEMA Design B with class B insulation.

- Fractional Horsepower Motors Less Than One-Half Hp: Motors shall be single phase, 60 hertz, rated at 120 volts with integral thermal protection.

C. Overload Protection: Overload protection shall be provided for each motor. This protection may be an integral part of the motor or may be part of the motor controller and shall interrupt each ungrounded conductor. Three-phase motor protection shall insure that all three phases are interrupted with the loss of any one phase. Solid-state overloads shall be provided for poly-phase motors. Constructor to set overloads at start-up.


23 05 19 Meters and Gages for Hvac Piping

1. General

   A. Summary: Section includes:
      ● Thermometers.
      ● Gages.

2. Products

   A. Metal-Case, Liquid-in-Glass Thermometers:
      ● Manufacturers:
         ○ Trerice; H. O. Co.
         ○ Weiss Instruments, Inc.
         ○ Weksler Instruments Operating Unit; Dresser Industries, Instrument Div.
      ● Case: Die-cast aluminum, 9 inches long.
      ● Tube: Red or blue reading, organic-liquid filled, with magnifying lens.
      ● Tube Background: Satin-faced, non-reflective aluminum with permanently etched scale markings.
      ● Window: Glass or plastic.
      ● Connector: Adjustable type, 180 degrees in vertical plane, 360 degrees in horizontal plane, with locking device.
      ● Stem: Copper-plated steel, aluminum, or brass for thermowell installation and of length to suit installation.
      ● Accuracy: Plus or minus 1 percent of range or plus or minus 1 scale division to maximum of 1.5 percent of range.

   B. Thermowells:
      ● Manufacturers: Same as manufacturer of thermometer being used.
      ● Description: Pressure-tight, socket-type metal fitting made for insertion into piping and of type, diameter, and length required to hold thermometer.

   C. Pressure Gages:
• Manufacturers:
  ○ Trerice; H. O. Co.
  ○ Weiss Instruments, Inc.
  ○ Weksler Instruments Operating Unit; Dresser Industries, Instrument Div.

• Direct-Mounting, Dial-Type Pressure Gages: Indicating-dial type complying with ASME B40.100:
  ○ Case: Liquid-filled type, cast aluminum, 4-1/2 inch diameter.
  ○ Pressure-Element Assembly: Bourdon tube, unless otherwise indicated.
  ○ Pressure Connection: Brass, NPS 1/4, bottom-outlet type unless back-outlet type is indicated.
  ○ Movement: Mechanical, with link to pressure element and connection to pointer.
  ○ Dial: Satin-faced, non-reflective aluminum with permanently etched scale markings.
  ○ Pointer: Dark-color metal.
  ○ Window: Glass or plastic.
  ○ Ring: Brass.
  ○ Accuracy: Grade A, plus or minus 1 percent of whole scale.
  ○ Vacuum-Pressure Range: 30-in. Hg of vacuum to 15 psig of pressure.
  ○ Range for Fluids under Pressure: Two times operating pressure.

• Pressure-Gage Fittings:
  ○ Valves: NPS 1/4 brass or stainless-steel needle type.
  ○ Syphons: NPS 1/4 coil of brass tubing with threaded ends.
  ○ Snubbers: ASME B40.5, NPS 1/4 brass bushing with corrosion-resistant, porous-metal disc of material suitable for system fluid and working pressure.
23 05 23 General-Duty Valves for Hvac Piping

1. General

A. Summary: Section includes:

- Bronze ball valves.
- Iron, single-flange butterfly valves.
- Check valves.
- Balancing valves.
- Chainwheels.

2. Products

A. General Requirements for Valves:

- Valve Sizes: Same as upstream piping unless otherwise indicated.
- Valve Actuator Types:
  
  - Gear Actuator: For quarter-turn valves NPS 8 and larger.
  
  - Handwheel: For valves other than quarter-turn types.
  
  - Handlever: For quarter-turn valves NPS 6 and smaller.
  
  - Chainwheel: In exposed locations where valve is installed greater than 8 feet above finished floor. Extend chains to 50 inches above finished floor.

- Valves in Insulated Piping: Provide stem extensions matching insulation thickness and the following features:
  
  - Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
  
  - Butterfly Valves: With extended neck.

- Triple Duty Valves: Triple duty (check, balancing, shut-off) valves shall not be used.

B. Bronze Ball Valves: Two-piece, full-port, bronze ball valves with stainless-steel trim:
Description:
- SWP Rating: 150 psig minimum.
- CWP Rating: 600 psig minimum.
- Body Design: Two piece.
- Body Material: Bronze.
- Ends: Threaded.
- Seats: PTFE or TFE.
- Stem: Stainless steel.
- Ball: Stainless steel, vented.
- Port: Full.

C. Iron, Single-Flange Butterfly Valves: 150 CWP, iron, single-flange butterfly valves with EPDM seat and stainless-steel disc:

- Description:
  - CWP Rating: 150 psig minimum.
  - Body Design: Lug type, suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
  - Body Material: ASTM A 126, cast iron or ASTM A 536, ductile iron.
  - Seat: EPDM.
  - Stem: One- or two-piece 416 stainless steel.
  - Disc: 316 stainless steel.

D. Check Valves:
- Up to 2 inches: Bronze, swing type.
- 2-1/2 inches and above: Iron, spring-loaded (non-slam), swing type.

E. Balancing Valves:
- Up to 2 inches (100 GPM or less): A separate balancing valve is not required. Provide Pressure-Independent Characteristic Control Valve (PICCV) with integral balancing valve:
  - Manufacturer: Belimo.
● 2-1/2 inches and above: Auto-flow type for use in variable pressure / flow systems.

● Circuit setters shall only be used on multiple header coils where needed to balance the flow between multiple coil sections. The appropriate PICCV or auto-flow control device shall be used to control the flow for the entire coil assembly.

F. Chainwheels:

● Description: Valve actuation assembly with sprocket rim, brackets, and chain.
  ○ Brackets: Type, number, size, and fasteners required to mount actuator on valve.
  ○ Attachment: For connection to butterfly valve stems.
  ○ Sprocket Rim with Chain Guides: Ductile iron, of type and size required for valve. Include zinc coating.
  ○ Chain: Hot-dip, galvanized steel, of size required to fit sprocket rim.

3. Execution

A. Valve Installation:

● Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

● Locate valves for easy access and provide separate support where necessary.

● Install valves in horizontal piping with stem at or above center of pipe.

● Install valves in position to allow full stem movement.

B. General Requirements For Valve Applications: Select valves with the following end connections:

● For Copper Tubing, NPS 2-1/2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.

● For Copper Tubing, NPS 3 and Larger: Flanged ends.

● For Steel Piping, NPS 2-1/2 and Smaller: Threaded ends.

● For Steel Piping, NPS 3 and Larger: Flanged ends.
C. Valve Schedule:

- Pipe NPS 2-1/2 and Smaller: Ball valves.
- Pipe NPS 3 and Larger: Iron single-flange butterfly valves.
23 05 53 Identification for Hvac Piping and Equipment

1. General

A. Summary: Section includes:

- Equipment labels.
- Warning signs and labels.
- Pipe labels.
- Valve tags.

2. Products

A. Equipment Labels:

- Plastic Labels for Equipment:
  - Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
  - Background Color: Blue.
  - Maximum Temperature: Able to withstand temperatures up to 160 Deg F.
  - Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 inches by 3/4 inch.
  - Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
  - Fasteners: Stainless-steel rivets or self-tapping screws.
  - Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

- Label Content: Include equipment's drawing designation or unique equipment number.

- Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2 by 11 inch bond paper. Tabulate equipment identification number and
identify drawing numbers where equipment is indicated (plans, details, and schedules), plus the specification section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

**B. Warning Signs And Labels:**

- **Material and Thickness:** Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
- **Letter Color:** White.
- **Background Color:** Red.
- **Maximum Temperature:** Able to withstand temperatures up to 160 Deg F.
- **Minimum Label Size:** Length and width vary for required label content, but not less than 2-1/2 inches by 3/4 inch.
- **Minimum Letter Size:** 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- **Fasteners:** Stainless-steel rivets or self-tapping screws.
- **Adhesive:** Contact-type permanent adhesive, compatible with label and with substrate.
- **Label Content:** Include caution and warning information, plus emergency notification instructions.

**C. Pipe Labels:**

- **General Requirements for Manufactured Pipe Labels:** Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- **Pretensioned Pipe Labels:** Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- **Self-Adhesive Pipe Labels:** Printed plastic with contact-type, permanent-adhesive backing.
- **Pipe Label Contents:** Include identification of piping service using same designations or abbreviations as used on drawings, pipe size, and an arrow indicating flow direction.
○ Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.

○ Lettering Size: At least 1-1/2 inches high.

D. Valve Tags:

● Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.

○ Tag Material: Stainless steel, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.

○ Fasteners: Stainless steel beaded chain hook.

● Valve Schedules: For each piping system, on 8-1/2 by 11 inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shut-off and similar special uses. Valve-tag schedule shall be posted in each mechanical room. Valve-tag schedule shall be included in operation and maintenance data.

3. Execution:

A. Equipment Label Installation:

● Install or permanently fasten labels on each major item of mechanical equipment.

● Locate equipment labels where accessible and visible.

B. Pipe Label Installation:

● Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

○ Near each valve and control device.

○ Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.

○ Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
○ At access doors, manholes, and similar access points that permit view of concealed piping.

○ Near major equipment items and other points of origination and termination.

○ Spaced at maximum intervals of 500 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.

○ On piping above removable acoustical ceilings.

● Pipe Label Color Schedule:
  ○ Chilled-Water Piping:
    ▷ Background Color: Blue.
  ○ Condenser-Water Piping:
    ▷ Background Color: Black.
  ○ Heating Water Piping:
    ▷ Background Color: Red.
  ○ Refrigerant Piping:
    ▷ Background Color: Yellow.
    ▷ Letter Color: Blue.
23 05 93 Testing, Adjusting, and Balancing

1. General

   A. **Summary:** This section contains the technical procedures for testing, adjusting, and balancing of mechanical equipment and systems.

2. Quality Assurance

   A. **TAB Firm Qualifications:** Engage a TAB firm certified by AABC or NEBB:

      - A firm certified by the National Environmental Balancing Bureau (NEBB) in the testing, adjusting and balancing disciplines required for the project, who is not the installer of the systems to be tested and is otherwise independent of the project. Complying with NEBB “Procedural Standards for Testing Adjusting and Balancing of Environmental Systems.”

      - A firm certified by Associated Air Balance Council (AABC) in the testing, adjusting and balancing disciplines is required for the project. Complying with “AABC National Standards.”

   B. **Equipment Calibration:** Calibration of instruments shall be in accordance with the current NEBB or AABC requirements.

3. Execution

   A. **Requirements:**

      - A complete Test, Adjust and Balance (TAB) report is required for the entire building and/or project. The TAB shall include, but is not limited to, air distribution systems, hydronic distribution systems, and all associated equipment and apparatus of mechanical work. Including, but not limited to, setting of speed and volume (flow), adjusting all apparatus provided for systems, recording data, conducting tests, preparing and submitting reports.

      - A preliminary TAB report shall be submitted a minimum of 2 weeks prior to Substantial Completion for review by the University (FP&C, PF, EH&S and the Engineer or Record). All deficiencies noted by the TAB firm shall be listed in the preliminary report. The deficiencies deemed “minor” in nature by the University shall not prevent the project from being deemed “Substantially Complete.”

      - A final, corrected, TAB report shall be submitted to the University prior to Final Completion.
23 07 00 Hvac Insulation

1. General

A. Duct Insulation Schedule, General:

- Plenums and Ducts Requiring Insulation:
  - Indoor, concealed supply and outdoor air.
  - Indoor, exposed supply and outdoor air.
  - Indoor, concealed return located in nonconditioned space.
  - Indoor, exposed return located in nonconditioned space.
  - Indoor, concealed, Type I, commercial, kitchen hood exhaust.
  - Indoor, exposed, Type I, commercial, kitchen hood exhaust.
  - Indoor, concealed oven and warewash exhaust.
  - Indoor, exposed oven and warewash exhaust.
  - Indoor, concealed exhaust between isolation damper and penetration of building exterior.
  - Indoor, exposed exhaust between isolation damper and penetration of building exterior.
  - Outdoor, concealed supply and return.
  - Outdoor, exposed supply and return.
  - Backside of all supply diffusers and grilles.

- Items Not Insulated:
  - Factory-insulated flexible ducts.
  - Factory-insulated plenums and casings.
  - Flexible connectors.
  - Vibration-control devices.
  - Factory-insulated access panels and doors.

B. Insulation General Requirements:
● Insulation joints shall be sealed with glass fabric and mastic. Duct tape is not acceptable.

● If condensation occurs at any time during the warranty period, the contractor shall be required to re-work the insulation until satisfactory, at no additional cost to the University.

C. Indoor Duct And Plenum Insulation Schedule:

● Concealed Duct Insulation: Fiberglass blanket.

● Concealed, Type I, Commercial, Kitchen Hood Exhaust Duct and Plenum Insulation: Fire-rated blanket; thickness as required to achieve 2-hour fire rating.

● Exposed Duct Insulation: Fiberglass board.

● Supply ductwork shall not be internally insulated. Return ductwork shall only be internally insulated where required for acoustical purposes.

D. Indoor Piping Insulation Schedule:

● Condensate and Equipment Drain Water: Flexible elastomeric.

● Chilled Water: Cellular glass.

● Condenser-Water Supply and Return: None.

● Heating-Hot-Water Supply and Return: Cellular glass or fiberglass, pre-formed pipe, Type I.

● Refrigerant Suction and Hot-Gas Piping: Flexible elastomeric.

E. Outdoor, Above-Ground Piping Insulation Schedule:

● Condensate and Equipment Drain Water: None.

● Chilled Water: Cellular glass.

● Condenser-Water Supply and Return: None.


● Refrigerant Suction and Hot-Gas Piping: Flexible elastomeric.

F. Outdoor, Underground Piping Insulation Schedule:

● Underground piping shall be a pre-insulated system. Where loose fill insulation is required, provide the following.
- Chilled Water: Cellular glass.

G. Indoor, Field-Applied Jacket Schedule:
- Piping, Exposed: PVC.

H. Outdoor, Field-Applied Jacket Schedule:
- Piping, Exposed: Aluminum.

I. Underground, Field-Installed Insulation Jacket:
- For underground direct-buried piping applications, install underground direct-buried jacket over insulation material.
23 21 13 Hydronic Piping

1. General

A. Summary:

● This section includes pipe and fitting materials, joining methods, special-duty valves, and specialties for the following:
  ○ Hot-water heating piping.
  ○ Chilled-water piping.
  ○ Condensate-drain piping.

● All piping systems shall be cleaned, tested, and accepted by Physical Facilities prior to being placed in service.

2. Products

A. Copper Tube and Fittings:

● Annealed-Temper Copper Tubing: ASTM B 88, Type K.

● DWV tubing in first paragraph below is intended for non-pressure applications and is applicable for condensate drains.

● DWV Copper Tubing: ASTM B 306, Type DWV.

B. Steel Pipe and Fittings:

● Steel Pipe: ASTM A 53/A 53M, black steel with plain ends; type, grade, and wall thickness as indicated in Part 3 "Piping Applications” article.

C. Hydronic Piping Specialties:

● Y-Pattern Strainers:
  ○ Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
  ○ End Connections: Threaded ends for NPS 2 and smaller, flanged ends for NPS 2-1/2 and larger.
  ○ Strainer Screen: 60-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.

● Stainless-Steel Bellow, Flexible Connectors:
○ Body: Stainless-steel bellows with woven, flexible, stainless steel, wire-reinforcing protective jacket.

○ End Connections: Threaded or flanged to match equipment connected.

3. Execution

A. Piping Applications:

● Hot-water heating piping, above-ground, NPS 2-1/2 and smaller, shall be any of the following:
  ○ Type K, annealed-temper copper tubing, wrought-copper fittings, and brazed joints.
  ○ Schedule 40 steel pipe; Class 150, malleable-iron fittings; cast-iron flanges and flange fittings; and threaded joints.

● Hot-water heating piping, above-ground, NPS 3 shall be the following:
  ○ Schedule 40 steel pipe, wrought-steel fittings and wrought-cast or forged-steel flanges and flange fittings, and welded and flanged joints. Grooved fittings may be used at equipment connections only.

● Hot-Water Heating Piping Installed Belowground and within Slabs: Welded pre-insulated piping system. For underground connections to existing HW and CHW lines, standard weld fittings with insulation kits may be used in lieu of pre-insulated fittings.

● Chilled-water piping, above-ground, NPS 2-1/2 and smaller, shall be any of the following:
  ○ Type K, annealed-temper copper tubing, wrought-copper fittings, and brazed joints.
  ○ Schedule 40 steel pipe; Class 150, malleable-iron fittings; cast-iron flanges and flange fittings; and threaded joints.

● Chilled-water piping, above-ground, NPS 3 and larger, shall be the following:
  ○ Schedule 40 steel pipe, wrought-steel fittings and wrought-cast or forged-steel flanges and flange fittings, and welded and flanged joints. Grooved fittings may be used at equipment connections only.

● Chilled-Water Piping Installed Belowground and Within Slabs: Welded pre-insulated piping system. For underground connections to existing HW and CW
lines, standard weld fittings with insulation kits may be used in lieu of pre-insulated fittings.

- Condensate-Drain Piping: Type DWV, drawn-temper copper tubing, wrought-copper fittings, and soldered joints.

B. Piping Installations:

- Contractor shall verify existing piping prior to making connections to existing systems. The contractor shall not assume that pipe labels correctly identify supply and return lines.

- Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

- Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

- Install piping to permit valve servicing.

C. Chemical Treatment:

- Fill system with fresh water and add liquid alkaline compound with emulsifying agents and detergents to remove grease and petroleum products from piping. Circulate solution for a minimum of 24 hours, drain, clean strainer screens, refill with fresh water and pre-treat. No equipment shall be put into service prior to initiation of water treatment.

- Piping shall be initially treated by the contractor in accordance with the procedures of the University’s water treatment vendor at the time the system is put into service. Costs to replace chemicals due to system losses associated with construction shall be the responsibility of the contractor.
23 31 13 Metal Ducts

1. General

   A. **Summary:** Section includes:
      
      ● Ductwork.
      
      ● Ductwork accessories.

   B. **Performance Requirements:**
      
      ● Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible" and performance requirements and design criteria indicated.
         
         ○ Leakage Class: Leakage rate shall be less than 3 percent.

2. Products

   A. **Ductwork:**
      
      ● Hvac duct shall be fabricated from metal. Flexible duct may be used only for short runs of 6 feet or less to air outlets.
      
      ● Duct board is not an acceptable material for ductwork.

   B. **Ductwork Accessories:**
      
      ● Volume Dampers: Multi-blade dampers shall be aluminum construction, low-leakage, airfoil type, on galvanized steel shafts within synthetic or ball-type bearings.
      
      ● Fire Dampers: Fire dampers shall be dynamic rated for all applications.

3. Execution

   A. **Seam And Joint Sealing:**
      
      ● Seal Classes: Comply with SMACNA's “HVAC Duct Construction Standards – Metal and Flexible,” Table 1-2, “Standard Duct Sealing Requirements.”

   B. **Duct Schedule:**
      
      ● Fabricate ducts with galvanized sheet steel except as follows:
○ Commercial Kitchen Hood Exhaust Ducts: Comply with NFPA 96:
   ➔ Exposed to View: Type 304, stainless-steel sheet.
   ➔ Concealed: Carbon-steel sheet.
   ➔ Welded seams and joints.

○ Dishwasher Hood Exhaust Ducts:
   ➔ Type 304, stainless-steel sheet.
   ➔ Welded seams and flanged joints with watertight EPDM gaskets.

○ Fume Hood Exhaust Ducts:
   ➔ Shall be compatible with the chemicals being exhausted.
   ➔ Welded seams and joints.
   ➔ Ductwork shall be kept under negative pressure within the building envelope.

C. Field Quality Control:

- Perform tests and inspections.
- Leakage Tests:
  ➔ Comply with SMACNA’s “HVAC Air Duct Leakage Test Manual.”
  ➔ Test the following systems:
     ➔ All supply duct between the AHU’s and within three feet of the terminal units.
  ➔ Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
  ➔ Test for leaks before insulation application.
  ➔ Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test entire system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give seven days' advance notice for testing.

- Duct System Cleanliness Tests:
○ Visually inspect duct system to ensure that no visible contaminants are present.
23 34 16 Centrifugal Hvac Fans

1. General

A. Summary: This section includes the following:
   - Backward-inclined centrifugal fans.

B. Extra Materials: Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents:
   - Belts: One set(s) for each belt-driven unit.

2. Quality Assurance

A. AMCA Compliance: Products shall comply with performance requirements and shall be licensed to use the AMCA-Certified Ratings Seal.

B. NEMA Compliance: Motors and electrical accessories shall comply with NEMA 1.

3. Products

A. Backward-Inclined Centrifugal Fans:
   - Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
     ○ Acme Engineering & Mfg. Corp.
     ○ Loren Cook Company.
     ○ Greenheck.
   - Description: Factory-fabricated, -assembled, -tested, and -finished, belt-driven centrifugal fans consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, and support structure.
   - Housings: Formed panels to make curved-scroll housings with shaped cutoff, with doors or panels to allow access to internal parts and components.
     ○ Panel Bracing: Steel angle- or channel-iron member supports for mounting and supporting fan scroll, wheel, motor, and accessories.
○ Spun inlet cone with flange.
○ Outlet flange.

- Backward-Inclined Wheels: Single-width-single-inlet and double-width-double-inlet construction with curved inlet flange, backplate, backward-inclined blades welded or riveted to flange and backplate, and fastened to shaft with set screws.

- Shafts: Statically and dynamically balanced and selected for continuous operation at maximum rated fan speed and motor horsepower, with final alignment and belt adjustment made after installation.
  ○ Turned, ground, and polished hot-rolled steel with keyway. Ship with a protective coating of lubricating oil.
  ○ Designed to operate at no more than 70 percent of first critical speed at top of fan's speed range.

  ○ Ball-Bearing Rating Life: ABMA 9, L10 at 120,000 hours.

- Belt Drives: Factory mounted, with final alignment and belt adjustment made after installation.
  ○ Service Factor Based on Fan Motor Size: 1.15.
  ○ Fan Pulleys: Cast iron or cast steel with split, tapered bushing; dynamically balanced at factory.
  ○ Motor Pulleys: Adjustable pitch for use with motors through 5 hp, fixed pitch for use with larger motors. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions. Use adjustable sheaves for test and balance work. After all systems are set and final test and balance is approved, install fixed sheaves on all fans.
  ○ Belts: Oil resistant, nonsparking, and nonstatic; matched sets for multiple belt drives.
  ○ Belt Guards: Fabricate to comply with OSHA and SMACNA requirements of diamond-mesh wire screen welded to steel angle frame or equivalent, prime coated. Secure to fan or fan supports without short circuiting vibration isolation. Include provisions for adjustment of belt tension, lubrication, and use of tachometer with guard in place.
Motor Mount: Adjustable for belt tensioning.

- Motors: Comply with requirements in Division 23 Section “Common Motor Requirements for Hvac Equipment.”
  
- Enclosure Type: Totally enclosed, fan cooled.
23 36 00 Air Terminal Units

1. General

A. Summary: Section includes:
- Dual-duct air terminal units.
- Single-duct air terminal units.

2. Products

A. Air Terminal Units:
- Acceptable Manufacturers:
  - Trane.
  - Enviro-tec/Johnson Control ETI.
  - Titus.
- Configuration: Volume dampers inside unit casing with mixing attenuator section and control components located inside a protective metal shroud.
- Casing: 22 gauge.
  - Casing Lining: 1-inch thick, matte-faced, fibrous-glass duct liner complying with ASTM C 1071; secured with adhesive. Cover liner with nonporous foil and perforated metal.
  - Access: Removable panels for access to dampers and other parts requiring service, adjustment, or maintenance; with airtight gasket.
- Volume Damper: Galvanized steel with peripheral gasket and self-lubricating bearings. Nylon bearings are not acceptable.
  - Maximum Damper Leakage: ARI 880 rated, 3 percent of nominal airflow at 3-inch wg inlet static pressure. Units must carry ARI seal.
- DDC Controls: Controls shall be factory-mounted. Provide transformer for control power.
23 37 13 Diffusers, Registers, and Grilles

1. General

   A. Summary: Section includes:
      - Diffusers, registers, and grilles.

2. Products

   A. Ceiling Diffusers: Rectangular and Square Ceiling Diffusers:
      - Material: Aluminum.
      - Finish: Baked enamel, white.
      - Face Size: 24 inches by 24 inches.
      - Face Style: Louvered, equal to Titus type TDC.

   B. Registers and Grilles: Fixed Face Return Air Grille:
      - Material: Aluminum.
      - Finish: Baked enamel, white.
      - Face Arrangement: 1/2 inch by 1/2 inch by 1 inch grid core.
      - Core Construction: Integral.
      - Mounting: Lay in.

   C. Layout:
      - Diffusers, registers, and grilles shall be selected and located to ensure maximum throw and avoid short-circuiting, for maximum user comfort.
      - Devices shall not have any user adjustment. Balancing dampers shall be located at branch take-offs and not at the device.
      - Diffusers (supply or return) shall not be located on the end of a duct run. Branches are permitted near the end of a run.
23 73 13 Modular Indoor Central-Station Air Handling Units

1. General

A. Summary: Section includes:
   ● Variable-air volume, single-zone Air Handling Units.

B. Service Clearance: Adequate clearance shall be provided for all service, repairs and component replacement. For new buildings, the unit shall be placed such that the service personnel can freely walk to at least three sides of the unit. For renovations, the unit arrangement shall be reviewed with Physical Facilities.

2. Quality Assurance

A. ARI Certification: Air Handling Units and their components shall be factory tested according to ARI 430 “Central-Station Air Handling Units” and shall be listed and labeled by ARI.

3. Products

A. Manufacturers:
   ● Carrier.
   ● McQuay International.
   ● Temtrol.
   ● Trane Custom.
   ● YORK International Corporation.

B. Unit Casings:
   ● General Fabrication Requirements for Casings:
     ○ Galvanized sheet metal.
     ○ 2-inch double wall construction with an inner galvanized liner. Panel deflection shall not exceed L/240 at 125 percent of design pressure.
     ○ Finish: Factory-primed and painted. Unit shall be shrink-wrapped for protection during shipping.
Base Frame: Formed structural channel supports, welded with integral lifting lugs. Frame shall be high enough to allow for proper condensate trap depth.

Floor: Accessible sections shall be furnished with a 0.125 inch thick aluminum tread plate.

Casing Insulation:

- Injected foam insulation for an R-value of not less than R-13.
- Fiberglass insulation may be used on large custom units with the approval of Physical Facilities.

Inspection and Access Panels and Access Doors:

- All components (such as filters, motors, and belts) requiring regular service shall be accessible without disassembly of the unit. Provide hinged doors with windows for coils, fan and air plenums that are large enough for easy access.
- Each section of an Air Handling Unit meant for access by service personnel, or equipped with a viewing window, shall be provided with at least one vapor-proof light fixture and switch. Circuiting shall be separate from other loads. Switches shall be external to the unit.
- Panel and Door Fabrication: Formed and reinforced, double wall and insulated panels of same materials and thicknesses as casing.
  - Hinges: A minimum of two 6-inch stainless steel piano hinges and two wedge-lever-type latches, operable from inside and outside. Arrange doors to be opened against air-pressure differential.
  - Gasket: Neoprene, applied around entire perimeters of panel frames.
  - Fabricate windows in doors of double-glazed, wire-reinforced safety glass with an air space between panes and sealed with interior and exterior rubber seals.

Condensate Drain Pans:

- Provide stainless steel, double wall, insulated drain pans that are sloped for positive drainage.
- Provide intermediate pans and copper drop tubes for stacked coils.
- Drain pan shall extend from upstream of the coil face continuously to 3 feet downstream of the coil.
○ Drain pans shall be drained by a trapped, insulated copper drainpipe that remains the full size (diameter) of the drain pan connection to the floor drain.

C. Fan, Drive, and Motor Section:

● Provide airfoil fans, select for high efficiency.

● Provide premium efficiency motors (refer to Section 23 05 13 for electric motor requirements).

● Provide heavy-duty belts and sheaves selected for a 1.5 safety factor. Provide spare belt set.

● Provide externally accessible lubrication fittings.

● Provide L-50 life at 400,000-hour heavy-duty pillow block, self-aligning bearings.

● Provide spring type vibration isolation.

● Provide variable frequency drive (refer to Division 26 for VFD requirements).

D. Coil Section:

● Preheat Coils: Provide preheat coils on all units with more than 30 percent outdoor air or otherwise as required to protect the chilled water coil from freezing.

● General Requirements for Coil Section:
  ○ Comply with ARI 410.

  ○ Clearance: Provide a minimum of two feet of clearance between coil faces on both heating and cooling coils for cleaning access.

  ○ Air Velocity Across Coil: Coil face air velocities must be limited to 450 FPM; this shall allow an increase in airflow without replacing the coils.

  ○ Coil headers shall be sealed to the casing with a rubber gasket.

● Chilled Water Coils: Design chilled water coils for 16 Deg F temperature rise. Design chilled water temperature is 45 Deg F. Select coils such that flow does not become laminar at 50 percent turndown from design.

● Hot Water Coils: Design hot water coils for a 20 Deg F temperature drop. Design hot water temperature is 120 Deg F.
• Construction: Seamless 0.035-inch wall thickness copper, expanded into 0.0095-inch thick aluminum fins. Coil frames shall be constructed of stainless steel.

• Coating: Coils exposed to unconditioned outside air shall be dipped and baked with Bronze Glow - Husky Coil Coat. Coils shall ship as an assembled section from the factory to be coated. Field application is not acceptable.
  ○ Special Warranty: 5 years from date of Substantial Completion on coating and coil.

E. Air Filtration Section:

• General Requirements for Air Filtration Section:
  ○ Provide minimum arrestance according to ASHRAE 52.1, and a minimum efficiency reporting value (MERV) according to ASHRAE 52.2.
  ○ Provide filter holding frames arranged for flat or angular orientation, with access doors on both sides of unit. Filters shall be removable from one side or lifted out from access plenum.
  ○ Provide two sets of filters. One set shall ship installed in the Air Handling Unit.

• Pre-Filters: 2 inch Cartridge MERV 8 (35 percent dust spot efficiency).

• Final Filters: 12 inch Cartridge MERV 13 (80 percent dust spot efficiency).

• Filter Gage: 3-1/2 inch diameter, diaphragm-actuated dial in metal case for each filter bank.
23 82 19 Fan Coil Units

1. General

A. Summary: This section includes fan coil units and accessories.

2. Products

A. Fan Coil Units:

- Description: Factory-packaged and -tested units rated according to ARI 440.
- Insulation: 1-inch thick, foil-covered, closed-cell foam or neoprene coated glass fiber.
- Main and Auxiliary Drain Pans: Plastic or stainless steel formed to slope from all directions to the drain connection as required by ASHRAE 62.
- Cabinet: Galvanized steel, with baked-enamel finish where exposed to view in manufacturer’s standard paint color.
- Filters: Minimum arrestance according to ASHRAE 52.1, and a minimum efficiency reporting value (MERV) according to ASHRAE 52.2.
  - Pleated Cotton-Polyester Media: 2-inch MERV 8.
- Hydronic Coils: 1/2-inch copper tube, with mechanically bonded aluminum fins spaced no closer than 0.1 inch, rated for a minimum working pressure of 25 psig and temperature of 300 Deg F. Include manual air vent and drain valve.
- Fan and Motor Board: Removable.
  - Fan: Forward curved, double width, centrifugal; directly connected to motor. Galvanized-steel fan scrolls.
  - Motor: Permanently lubricated, multi-speed with built-in thermal overload and automatic reset.
- Electrical Connection: Factory wire motors and controls for a single electrical connection.
25 00 00 Integrated Automation
25 50 00 Integrated Automation Facility Controls

1. General

A. Summary: This section includes control equipment for HVAC systems and components.

B. General Requirements:

- Test and Balance Support: Provide support to test and balance contractor to insure that their correction factors have been updated in the Andover Building Management System (BMS) and have been properly backed up.

- Campus Door Management and Lockdown System: Exterior doors and other selected doors required by the University shall be connected to the Campus Door Management System. Doors shall be scheduled for occupancy in the BMS and shall be incorporated into the Campus Master Lockdown System. The controls contractor shall provide and install the Direct Digital Control (DDC) controllers, panels, low voltage wiring, programming, and graphics necessary to add controlled and monitored doors to the BMS.

- Secondary Fire Alarm Device Reporting: Simplex Fire Alarm System devices shall be tied as “read only” inputs into the BMS through the existing Fire Alarm Interface Panel. The devices shall be reported and displayed graphically at the BMS workstation located in the University Police Department. The system shall be used for secondary monitoring only. All fire alarm life-safety and related functions such as fan shutdown, elevator recall, door release, resetting, etc. shall remain a function of the Fire Alarm System.

- Lighting Control Interface:
  - The BMS shall control all exterior lighting and interior lighting not controlled by sensor switch devices. Exterior lighting points shall be added to the Campus Sentry Logic System for testing and maintenance by Physical Facilities.
  - All lighting circuits shall have a method of bringing on the controlled circuit in the event of an emergency. This shall be accomplished with either a local override switch or a switch located within the associated DDC Controller. (This applies to exterior and interior lighting circuits that do not have a Hand/Off/Auto provided and installed by the electrical contractor.)

- FAMIS System Interface: Provide programming to add meters and alarms to the Campus “FAMIS” work order system.
• Sentry Logic System: Provide programming to incorporate the Andover BMS information into the Sentry Logic system to add critical point alarming, trending, paging, and email notification to selected individuals as requested by Physical Facilities.

• Energy Reporting & Utility Information:
  ○ Chilled Water Tonnage Calculations: Entering each building there shall be a chilled water flow meter and matched supply and return water temperature sensors. Energy calculations shall be performed to report the tonnage back to the BMS.
  ○ Hot Water BTU Calculations: Entering each building there shall be a hot water flow meter and matched supply and return water temperature sensors. Energy calculations shall be performed to report the BTU consumption back to the BMS.
  ○ Electrical Monitoring and Consumption: Provide interface hardware and MODBUS communications bus wiring necessary to interface the BMS system to the switchgear integral meters. Create and map electrical information to the BMS and perform electrical consumption calculations. Display the information graphically on the BMS. Add metered information to the Andover Campus “MeterView” program.
  ○ Miscellaneous Metering and Monitoring: Provide meters / monitoring for the following systems:
    ▸ Irrigation Water Metering.
    ▸ Potable Water Metering.
    ▸ Gas Metering.
    ▸ Miscellaneous Monitored Systems.
    ▸ Lift Station Monitoring.
    ▸ Elevator Monitoring.
    ▸ Emergency Generators.
    ▸ Fuel Tank Monitoring.
    ▸ Fountain Control.
    ▸ Variable Frequency Drive Monitoring.
25 50 00 Integrated Automation Facility Controls

- All primary equipment (Chillers/Boilers) shall have a local override switch which will bring on the associated piece of equipment in the event of an emergency.

- The control contractor shall coordinate alarm notification options with Physical Facilities. This applies to the alarm selections, thresholds and the delivery locations.

2. Products

A. Control System:

- Acceptable Manufacturer:
  - Andover Controls Corporation.

- The control contractor shall have an office within a 50-mile distance of the project site and offer complete maintenance and support services on a 24-hour, 365 day/year basis. This office shall have direct access to inventory of spare parts and all necessary test equipment required to install, commission, and service the BMS provided.

- The manufacturer products apply to operator workstation software, controller software, the custom application programming language, building controllers, custom application controllers, and application specific controllers. All other products specified herein, including sensors, valves, dampers, and actuators, do not need to be manufactured by Andover.

- Control system shall consist of sensors, indicators, actuators, final control elements, interface equipment, other apparatus, accessories, and software connected to distributed controllers operating in multi-user, multitasking environment on the campus network and programmed to control mechanical systems. Operator workstation permits interface with the network via dynamic color graphics with each mechanical system, building floor plan, and control device depicted by point-and-click graphics.

B. DDC Equipment:

- Operator Workstation: Consult with Physical Facilities at the start of the project to determine if additional operator workstations are required. Workstation shall comply with current Information Technology Systems (ITS) standards for the University.

- Control Units: Modular, comprising processor board with programmable, nonvolatile, random-access memory; local operator access; integral interface equipment; and backup power source.
● Power Supplies: Transformers with Class 2 current-limiting type or overcurrent protection; limit connected loads to 80 percent of rated capacity. DC power supply shall match output current and voltage requirements of the connected equipment and be full-wave rectifier type.

● Surge Protection: Three-stage, in-line, power line protector with L to N, L to G, and N to G protection.
  ○ Manufacturer \ Model: Kele \ HSP-121BT1RU.

● Control Cabinet: NEMA 1 enclosure with internal perforated panel for equipment mounting sized to accommodate all control components and wiring in a clean and orderly fashion.
  ○ Manufacturer \ Model: Kele \ RET Series.

C. Electronic Sensors:

● Description: Vibration and corrosion resistant; for wall, immersion, or duct mounting as required.

● Thermistor Temperature Sensors and Transmitters:
  ○ Acceptable Manufacturers:
    ⇒ Andover Controls.
    ⇒ Precon; Kele.
    ⇒ Greystone.
  ○ Accuracy: Plus or Minus 0.5 Deg F at calibration point.
  ○ Wire: Twisted-pair cable.
  ○ Insertion Elements in Ducts: Length as appropriate for duct size; use where not affected by temperature stratification or where ducts are smaller than 9 sq. ft.
  ○ Averaging Elements in Ducts: Length as appropriate for duct size. Use where prone to temperature stratification or where ducts are larger than 10 sq. ft.:
    ⇒ Manufacturer \ Model: Precon \ ST-FZ Series or approved equal.
  ○ VAV/FTU Temperature Sensors: Provide 4-inch temperature sensors on the discharge of all Variable Air Volume boxes and Fan Terminal units with reheat:
Manufacturer \ Model: Greystone \ TE200 series or approved equal.

- Insertion Elements for Liquids: 304 stainless-steel probe and socket with minimum insertion length of 2-1/2 inches. Well mounted sensors shall include thermal conducting compound within the well to insure good heat transfer to the sensor. All immersion sensors that are utilized in conjunction with flow meters in energy calculations shall be a matched pair.

Manufacturer \ Model: Precon \ ST/W Series or approved equal.

- Room Sensor:
  - Set-Point Adjustment: None.
  - Set-Point Indication: None.
  - Color: White.
  - Orientation: Vertical.

- Humidity Sensors: Bulk polymer sensor element:
  - Manufacturer: Veris Industries.
  - Accuracy: 5 percent full range with linear output.
  - Sensor Range: 0 to 100 percent relative humidity.

- Room Sensor:
  - Set-Point Adjustment: None.
  - Set-Point Indication: None.
  - Color: White.
  - Orientation: Vertical.

- Carbon Dioxide Sensors: Non-dispersive infrared; 0-2000 ppm range, +/- 20 ppm accuracy, 4 to 20 milliamps output, 5-year calibration interval.
  - Manufacturer \ Model: Veris Industries \ CDE/CWE Series.

- Pressure Transducers:
  - Air Pressure Transducers: High-impact ABS plastic panel with LCD display, 0-10” w.c. range, 1 percent of full scale accuracy, 4 to 20 milliamps output.
    - Manufacturer \ Model: Veris Industries \ PX Series.
○ Water Differential-Pressure Transducers: Stainless-steel diaphragm construction, suitable for service; minimum 150-psig operating pressure and tested to 300-psig; linear output 4 to 20 mA.
  ⇒ Manufacturer \ Model: Veris Industries \ PX Series.

○ Differential-Pressure Switch (Air or Water): Snap acting, with pilot-duty rating and with suitable scale range and differential.
  ⇒ AIR – Manufacturer \ Model: Kele \ Model P32 Series.
  ⇒ Water – Manufacturer \ Model: Penn \ P74 Series or approved equal.

● Airflow Measuring Station: Station shall be sized to provide steady airflow measurement over all operating ranges.
  ⇒ Manufacturer \ Model: Ebtron \ Silver Series.

● Chilled Flow Sensor: Vortex, retractable insertion type suitable for fluid velocities between 0.5 and 15 ft/s. 316 Stainless steel construction with EPDM o-rings.
  ⇒ Manufacturer \ Model: Fluidyne \ Hydro-Flow 3100.

● Hot Water Flow Sensor: Turbine, retractable insertion type suitable for fluid velocities between 0.4 and 20 ft/s.
  ⇒ Manufacturer \ Model: Onicon \ F-1110 Series.

● Safeties:
    ⇒ Manufacturer \ Model: Johnson Controls \ A11 Series.

  ○ Air Pressure Switch: Snap acting, diaphragm with calibration spring and manual reset button.
    ⇒ Manufacturer \ Model: Cleveland Controls \ AFS-460.

D. Status Sensors:

● Current Switches: Split-core, self-powered, solid-state, selected to match current and system output requirements.
  ⇒ Manufacturer \ Model: Hawkeye \ 600.
E. Relays:

- Pilot Duty Relays: Provide relay with the proper voltage and current ratings most suitable for the controlled application.
  - Manufacturer \ Model:
    - Functional Devices \ RIB Series.
    - Air Products \ PAM Series.
    - IDEC \ RH Series with SH Bases.

- Power Duty Relays: Provide power rated relays in applications where there is no contactor or starter required in applications to control low horsepower motors and lighting circuits.
  - Manufacturer \ Model: Functional Devices \ RIB Power Series.

F. Actuators:

- Manufacturer: Belimo.

- Electric Motors: Size to operate with sufficient reserve power to provide smooth modulating action or two-position action.

- Electronic Actuators: Direct-coupled type designed for minimum 60,000 full-stroke cycles at rated torque. Actuators for terminal unit damper control shall be tri-state; all others shall be analog with position feedback.

G. Control Valves:

- Manufacturer: Belimo.

- Control Valves: Factory fabricated, of type, body material, and pressure class based on maximum pressure and temperature rating of piping system, unless otherwise indicated.

- Valves 2 inches and smaller shall be PICCV type. Actuators for terminal unit heating coil control shall be tri-state; all others shall be analog with position feedback.

H. Dampers:

- Acceptable Manufacturers:
  - TAMCO (T.A. Morrison & Co. Inc.).
  - Ruskin.
Dampers: AMCA Class 1A listed, opposed-blade design; 0.125 inch minimum thick, extruded-aluminum frames with holes for duct mounting; airfoil damper blades with neoprene blade seals mounted on 1/2 inch diameter, zinc-plated axles, with nylon blade bearings and linkages concealed in the frame. Maximum leakage of 3 cfm/sq. ft. at 1 inch w.g. static pressure.

I. Exterior Lighting Wireless Control:
- Enclosure: Fiberglass 16 inch by 14 inch by 8 inch enclosure with hinged cover and stainless snap latches with the ability to place a padlock.
  - Manufacturer: Allied Molded Products, Inc.
- Network Interface: Wireless 802.11b network interface to RS485 device which supports enterprise–class WPA2/802.11i security.
  - Manufacturer / Model: Digi Connect / WI-SP.
- Relay Module: SG2 Series programmable relay module sized to support the number of lighting circuits being controlled.
  - Manufacturer: TECO.
- Power Supply: Din rail mounted DC power supply sized to support the voltage and current requirements of the equipment being powered.
  - Manufacturer: IDEC.
- Provide and install any pilot relays necessary to energize the lighting contactors.
- Provide a local override switch for each lighting circuit controlled for local testing and emergency operation of the lights.
- Provide and install a local photocell to be used as backup to the Andover BMS Schedule in the event of a communications failure.
- All devices listed shall be mounted in their own enclosure separate from the high voltage lighting contactors.
- Update the Campus Andover Sentry Logic monitoring program to add new control points.

J. Wiring, Conduit, and Cable:
- All wiring requirements shall conform to the standards outlined in the Electrical Specifications.
• Conduit is required in all mechanical rooms, equipment rooms, and all concealed spaces.

• Where the space above the ceiling is a supply or return air plenum, the wiring shall be plenum rated. Plenum rated wiring can be run without conduit above suspended ceilings.

• Control cable installed in walls shall be in conduit, terminated above ceiling with a bushing.

• Network cabling shall be run as CAT5 plenum rated cable, pink color.

• All wire shall be copper and meet minimum wire size and insulation class as listed below:
### K. Identification:

- All control enclosures shall be identified with a phenolic nameplate. The lettering shall be white against a black background unless otherwise directed by the Owner.

- Ceiling grids shall be tagged with a label tag identifying the terminal box number in coordination with the tag located on the associated temperature sensor.
26 00 00 Electrical
26 00 00 Electrical Project Requirements

1. General

A. Summary: This section contains the Owner’s project requirements for the design of electrical systems.

B. Codes and Standards: The latest IEEE and ASHRAE Standards shall be utilized in the design and construction of the electrical systems.

C. Submittals: A copy of the electrical submittals shall be provided to Physical Facilities concurrent with the engineer’s review, not for contract compliance-related approval, but to allow Physical Facilities to become familiar with the products to be maintained.

D. General Requirements:

- All systems shall be designed in a manner to facilitate ease of maintenance. Adequate access to accomplish all normally required maintenance without removal of other than access panels is mandatory.

- The electrical system shall be designed to facilitate the installation of components in a serviceable manner. Complete wiring and component diagrams shall be included in the construction documents to verify that the design intent is constructible and maintainable.

- Clearances suggested by manufacturers for equipment maintenance, removal, and replacement shall be indicated on 1/4 inch scale electrical room drawings and accommodated by the layout. Larger and heavier components that may require future removal or replacement shall be identified on the drawing and a clear path identified to the building exterior. Door sizes, lifting supports, and other pertinent information shall be identified on the drawings.

E. Design Loads:

- For offices, 120 volts / 20A circuits shall be designed on the basis of a maximum of four (4) desk locations per circuit or two (2) offices per circuit (i.e., 5 or more desk locations on a circuit or 3 or more offices on a circuit are not acceptable). Provide a minimum of one receptacle on each wall.

- General purpose receptacles shall not be on the same circuit with office receptacles.
F. Power:

- Power to the University is provided by the local utility (JEA) via pad-mounted transformers. The University maintains the secondary distribution system. Physical Facilities in conjunction with JEA shall be consulted at the start of the project to determine the impact of the project on the existing primary/secondary distribution system. Any increases in distribution capacity must be addressed as part of the project design.

- Raceways:
  - Underground raceways shall have a minimum of 30 inches of cover.
  - Underground raceways shall be PVC. Secondary service conduits may be required to be concrete encased; consult with Physical Facilities at the start of the project.
  - All electrical ductbanks shall contain reinforcing steel run parallel with the conduits. The number, size and locations of rebar incorporated into the ductbank shall be sufficient to allow a minimum ten foot span of undermined ductbank to be self-supporting. All underground ductbanks shall be designed, configured and installed to eliminate standing water, directing drainage to manholes, pull boxes, switch vaults, etc. Provide a minimum of one spare 4 inch conduit in each ductbank. The use of Directional Drilling and Jack & Boring will be considered on a case-by-case basis in lieu of underground ductbanks.
  - New building raceways and raceways added to existing buildings shall be concealed, except in Mechanical and Electrical Rooms.
  - Consult with Physical Facilities to determine need for spare conduits.

- Electrical Distribution:
  - System shall be designed with 20 percent spare spaces available in switchboards, distribution panels, and panelboards.
  - Feeders to panels shall be sized for the full panel bus ampacity. Feeders shall not be down-sized. For example, a 225A rated panel with 150A design load shall not be fed with a 150A breaker and feeder; upsize feeder and breaker to 225A.

- TVSS:
  - Provide Transient Voltage Surge Suppression (TVSS) on service entrances, and all panelboards serving plug loads.
G. Metering and Instrumentation:

- University Policy: It is the policy of the University that all utilities be metered. All new buildings and renovations shall include installation of permanent metering of all utilities. This is in addition to the utility required metering.

- Temporary Utilities: All utilities (including electricity) consumed during construction shall be metered and paid for with project funds. The contractor shall be billed for consumption, unless specifically stated otherwise in writing.

- Absent or Improper Metering: Installations found either to be unmetered, or having incorrectly working meters, shall be disconnected from service immediately, and shall remain that way until properly working meters are installed. In the absence of metering, a flat rate based on the maximum connected load shall be charged. This calculation is solely at the discretion of Physical Facilities.

- The building main power shall be metered at the main service and connected to the Energy Management System (EMS). Consult with Physical Facilities during design to determine sub-metering requirements.

H. Lighting:

- The lighting system shall be designed in compliance with ASHRAE Standard 90.1.

- Provide cut sheets of all proposed fixtures to Physical Facilities for review and approval.

- Interior:
  - Voltage: 277 volts / 1PH.
  - Interior fixtures in general shall utilize T8, T5 or compact fluorescent bulbs. Consult with Physical Facilities for existing lamp inventory.
  - Emergency fixtures shall be powered from the emergency generator. Battery packs shall not be used without prior approval of Physical Facilities.

- Switching:
  - Consideration shall be given to the full range of lighting control options including occupancy sensors, dual level control, and separate switching of daylight zones.
  - Dual-technology (passive infrared and ultrasonic) wall-type sensor switches shall be used in all offices, conference rooms, and similar small
spaces. Classrooms, computer labs, auditoriums, and other large spaces shall be ceiling-mount with wall-mount override control. Sensor location must be considered based upon the size of the room and the installation requirements.

○ Emergency fixture switching: Emergency fixtures shall not burn continuously in classrooms, computer labs, auditoriums, conference rooms, and other teaching or presentation spaces where the light may interfere with a projection presentation. Fixtures shall be configured to allow the occupant to turn off the fixture but will turn on automatically when there is a loss of power to the space.

○ Theater Step Lighting: Consult with Physical Facilities and EH&S.

- Site Lighting:
  ○ It is the responsibility of each project to provide all security, walkway, plaza and parking lot lighting necessitated by that project.
  ○ For energy conservation, extensive architectural lighting shall be avoided.
  ○ Voltage: 480 volts / 1PH. Other voltages may be acceptable; consult with Physical Facilities.
  ○ Lighting Levels (Footcandles / Uniformity Ratio): Light levels should be as recommended in the IES Lighting Handbook. A photometric plan shall be provided that clearly demonstrates conformance with these standards. The below footcandles are average maintained at grade. Uniformity ratio is the average footcandle level to the minimum footcandle level.
    - Walkways: 5.0 / 3.0:1.
    - Plazas: 3.0 to 5.0 / 4.0:1.
    - Roadways and Parking Lots: 3.0 / 4.0:1.
  ○ Switching: Site lighting shall be controlled via contactors tied into the campus Energy Management System. Individual photocells or time clocks shall not be used.
  ○ Metering: Consult with Physical Facilities for metering requirements.

I. Emergency Generator:
- Location: Generators shall be located such that exhaust from the engine does not become entrained in the building outside air intakes or otherwise be a nuisance.
• Screening: Generators shall be hidden from view by a fence, landscaping or other building element.

• All new facilities to be provided with an emergency generator. Fuel type to be determined on a project-by-project basis.

J. Lightning Protection: Provide UL Master Label or Lightning Protection Institute (LPI) certified lightning protection system for all new buildings.

K. Telecommunications:

• Electrical contractor to provide for data conduit, “back-boxes” and cable tray only.

• Cabling supply and installation by Owner.
26 05 00 Common Work Results For Electrical

1. General

A. Summary: Section includes:

- Electrical equipment coordination and installation.
- Common electrical installation requirements.

B. Coordination:

- Coordinate arrangement, mounting, and support of electrical equipment:
  - To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
  - To provide for ease of disconnecting the equipment with minimum interference to other installations.
  - To allow right of way for piping and conduit installed at required slope.
  - So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

- Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

- Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed.

- Coordinate sleeve selection and application with selection and application of firestopping. Note: All visible piping and conduit penetrations must be sealed smoke tight or better.

C. Trenching:

- All trenching shall be done by hand unless other methods have been approved by Physical Facilities.
26 05 19 Low-Voltage Electrical Power Conductors and Cables

1. General

A. Summary: This section includes the following:
   - Building wires and cables rated 600 volts and less.

B. Wiring Methods: Receptacles serving computers or any other location where the type and quantity of devices on a circuit are known to be a significant source of harmonics, neutrals for receptacles on circuits that feed offices shall not be shared by different circuits. Each circuit serving computer plug loads shall have its own dedicated neutral. Neutral shall be sized according to harmonic load.

2. Products

A. Conductors and Cables:
   - All conductors shall be copper.
   - Provide an insulated grounding conductor in all feeder and branch circuits.
   - Crimp type connectors shall only be used on stranded wire.
   - Conductors for 120/208 volt shall be black/red/blue/white and green. Conductors for 277/480 volt shall be brown/orange/yellow/gray and green with yellow stripe.
   - All neutral conductors shall be considered current carrying when considering pipe fill.
   - Metalclad Cable: Metalclad (MC) cable shall not be used without approval from Physical Facilities, and then it can only be used for branch circuit wiring within walls and up to junction boxes in the ceiling. Homeruns to an electrical panel shall be wire in rigid conduit.
26 05 33 Raceway and Boxes for Electrical Systems

1. General

   A. Summary: This section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

   B. Wiring Methods:
     ● Boxes:
       ○ Location: Back-to-back and through-the-wall boxes are not acceptable. When boxes share the same partition they shall be offset a minimum of 12 inches for sound attenuation.

       ▶ Boxes below suspended ceiling shall be “readily accessible” per NEC. No removal of equipment or furnishings shall be necessary for access.

       ▶ Boxes above suspended ceilings shall be “accessible” per NEC. They must be accessible from below or aside, and the access opening may not be less than 18 inches from a duct or structural component (excluding the ceiling grid). Junction boxes located above ceiling shall be installed facing down and shall be accessible after installation.

       ▶ Do not recess boxes deeper than 5 inches into a wall (finished/furred out or not). Do not install multiple extension rings on one box. Do not install extension rings that will limit access to the back of the box, except for a trim ring. Boxes shall be sized so extension rings are not needed.

       ○ Cover Plates: All cover plates shall be high abuse resistant nylon or stainless steel. All device cover plates that are served by the emergency generator shall be red in color.

       ○ Unless indicated otherwise, communication boxes shall be 4-11/16 inches by 4-11/16 inches by 2-1/8 inches deep with single device cover plates.

   ● Install warning tape 12 inches above all underground electrical raceways.

2. Products

   A. Rigid Conduit:
     ● Minimum Size: 3/4 inch.

   B. Flexible Conduit:
• Flexible conduit shall be steel or aluminum with a minimum diameter of 1/2 inch, except where supplied by a manufacturer with a lighting fixture or as part of a pre-manufactured wiring system.

• Metalclad (MC) cable shall not be used without approval from Physical Facilities.

• Separate green grounding conductors shall be installed in ANY length of flex.

• Flex shall not be used in lengths greater than 6 feet.

• Flex shall not be used inside walls or as a replacement for EMT.

• Flex shall not be looped between light fixtures, except for wiring whips provided with light fixtures.

• Flex shall not pass through walls or ceilings. A junction box is required at the point of transition.

C. Handholes And Boxes For Exterior Underground Wiring:

• Description: Factory-fabricated, reinforced-concrete, monolithically poured walls and bottom. Frame and cover shall form top of enclosure and shall have load rating consistent with that of hand hole or box.

• Frame and Cover: Weatherproof galvanized steel frame, with steel cover with recessed cover hook eyes and tamper-resistant, captive, cover-securing bolts.

• Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.

• Cover Legend: Molded lettering – “ELECTRIC,” “TELEPHONE” – as indicated for each service.

• Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall. Conduit openings shall be sealed.

• Handholes 12 inches wide by 24 inches long and larger shall have inserts for cable racks and pulling-in irons installed before concrete is poured.

• Depth: Boxes shall be less than 48 inches deep. Consult with EH&S if deeper boxes are required.
26 05 53 Identification for Electrical Systems

1. General

A. Summary: Section includes:
   - Identification for raceways.
   - Identification of power and control cables.
   - Identification for conductors.
   - Underground-line warning tape.
   - Warning labels and signs.
   - Equipment identification labels.

B. Labeling:
   - Switches: Label panel and circuit number inside outlet box.
   - Receptacles: Label panel and circuit number inside outlet box and on face of cover plate using preprinted alphanumeric adhesive markers, 1/4-inch minimum height.
   - Boxes: Label panel and circuit number on face of the cover plate.
   - Control Wiring: Tagged at each enclosure.
   - Emergency switches and outlets shall have red cover plates.

C. Identification Of Underground Conduit:
   - Warning Tape: All underground wiring and ductbanks shall have metalized warning tape installed above a conduit, ductbank or electrical line that identifies the specific system buried below. Tape shall be installed 18 inches above the conduit, ductbank or electrical line and in no case less than 6 inches below grade.
   - Tracer Wire: Tracer wire is not required for underground electrical lines.
   - ID Tags: ID tags shall be installed on all splices and terminations in manholes with: Name of the Splicer, Name of the Electrical Contractor performing the work, and Date of Installation of the Splice.
2. Products

A. Power Raceway Identification Materials:

- Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.

- Colors for Raceways Carrying Circuits at 600 volts or less:

<table>
<thead>
<tr>
<th>System</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Safety</td>
<td>Bright Yellow</td>
</tr>
<tr>
<td>Normal Power</td>
<td>Royal Blue</td>
</tr>
<tr>
<td>Miscellaneous Communications</td>
<td>Brown</td>
</tr>
<tr>
<td>Fire Alarm</td>
<td>Red</td>
</tr>
<tr>
<td>Telephone/Computer</td>
<td>Black</td>
</tr>
<tr>
<td>TV</td>
<td>Light Pink</td>
</tr>
<tr>
<td>Paging</td>
<td>Grey</td>
</tr>
</tbody>
</table>

- Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 Volts or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

- Snap-Around Bands or Labels for Raceways Carrying Circuits at 600 Volts or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

B. Floor Marking Tape:

- 2-inch wide, 5-mil pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.

- Marking tape shall be applied in front of and/or around all electrical equipment per NFPA requirements for arc flash protection.

C. Underground-Line Warning Tape: 6-inch wide, minimum 3.5-mil solid foil core encased in a protective plastic jacket (total thickness 5.5 mils) with black lettering imprinted on a color coded background that conforms to APWA color code specifications.
26 09 23 Lighting Control Devices

1. General

A. Summary: This section includes the following lighting control devices:

- Indoor occupancy sensors.

2. Products

A. Indoor Occupancy Sensors:

- General Description: Wall- or ceiling-mounting, solid-state units.
  
  ○ Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
  
  ○ Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.
  
  ○ Bypass Switch: Override the on function in case of sensor failure.

- Dual-Technology Type: Ceiling and wall mounting; detect occupancy by using a combination of PIR and ultrasonic detection methods in area of coverage. Particular technology or combination of technologies that controls on-off functions shall be selectable in the field by operating controls on unit. Manufacturer: Wattstopper or equal.
  
  ○ Sensitivity Adjustment: Separate for each sensing technology.
26 24 13 Switchboards

1. General

A. Summary: Section includes:
   - Service and distribution switchboards rated 600 volts and less.
   - Disconnecting and overcurrent protective devices.
   - Instrumentation.

B. Warranty:
   - Special Warranty: Five years from date of Substantial Completion.

2. Products

A. Switchboards:
   - Acceptable vendors: General Electric, Square D, Siemens, Cutler Hammer.
   - Busses shall be copper.
   - Future Devices: Equip compartments with mounting brackets, supports, bus connections, and appurtenances at full rating of circuit-breaker compartment.

B. Disconnecting And Overcurrent Protective Devices:
   - Main Overcurrent Protective Device: Switchboards shall be equipped with an automatic electrically-operated Molded-Case Circuit Breaker (MCCB). Each main breaker shall be equipped with devices to automatically open on phase imbalance, ground fault and overload. They shall return to normal operation five minutes after power has been restored. There shall be read-out devices to indicate the cause of an open breaker condition.

C. Instrumentation:
   - Multifunction Digital-Metering Monitor: Microprocessor-based unit with the following features:
○ Phase currents, each phase.
○ Phase-to-phase voltages, three phase.
○ Phase-to-neutral voltages, three phase.
  ○ Megawatts.
  ○ Megavars.
○ Power factor.
○ Frequency.
○ Accumulated energy, megawatt hours.
○ Megawatt demand.
○ MODBUS communication interface to campus building automation system.
26 24 16 Panelboards

1. General

A. Summary: Section includes:
   - Distribution panelboards.
   - Lighting and appliance branch-circuit panelboards.

B. Warranty:
   - Special Warranty: Five years from date of Substantial Completion.

2. Products

A. General Requirements For Panelboards:
   - Acceptable vendors: General Electric, Square D, Siemens, Cutler Hammer.
   - Covers shall be “door in door” type.
   - Busses shall be copper.
   - All panels shall be installed “readily accessible” without having to remove anything.
   - Stub and cap three each 3/4-inch empty conduits to above ceiling from each recessed mounted panelboard. These conduits shall be accessible for future circuit installations.
   - Directory Card: Inside panelboard door, mounted in metal frame with transparent protective cover. All cards to be neatly typed with descriptive labels including what type of load they serve and the room number. Provide copy of each card in the operation and maintenance manual.
   - Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices shall be included. “Spaces” in panels shall be prepared spaces.
   - Metering: All sub-panels and circuits that require monitoring shall be sub-metered. Refer to Section 262713 for additional information.
   - All sub-panels shall be equipped with a main breaker unless protected by an upstream circuit breaker in the distribution panel located within line of sight in the same room.
B. Distribution Panelboards:

- Panelboards: NEMA PB 1, power and feeder distribution type.

C. Lighting And Appliance Branch-Circuit Panelboards:

- Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.
- Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

D. Disconnecting And Overcurrent Protective Devices:

- All 480 volt and below circuit breakers shall be bolt on type. Plug in devices are not acceptable.
- Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.
  - Molded-Case Circuit-Breaker (MCCB) Features and Accessories:
    - Standard frame sizes, trip ratings, and number of poles.
    - Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
    - Application Listing: Appropriate for application – Type SWD for switching fluorescent lighting loads, Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
    - Multipole units enclosed in a single housing or factory assembled to operate as a single unit.
26 27 13 Electricity Metering

1. Products

A. Equipment For Electricity Metering By Utility Company:
   - Meters will be furnished by utility company.
   - Current-Transformer Cabinets: Comply with requirements of JEA.
   - Meter Sockets: Comply with requirements of JEA.
   - Meter Sockets: Steady-state and short-circuit current ratings shall meet indicated circuit ratings.
   - JEA Contact: Gabor Acs at (904)665-7729, email: acsg@jea.com.

B. Building Entrance (Main Service) Metering:
   - Meter shall be integral to the switchboard with MODBUS output to the campus Energy Management System (EMS). Where a switchboard is not part of the job, see C. Submetering below; consult with Physical Facilities to determine application.

C. Submetering:
   - E-Mon / D-Mon Class 3000 Energy Meters with “P2 Pulser” option and connected to the campus EMS.
   - Meter can with a GE model KV2C meter with MODBUS enabled output to the campus EMS.
26 27 26 Wiring Devices

1. General

   A. Summary: This section includes the following:
      - Receptacles, receptacles with integral GFCI, and associated device plates.
      - Snap switches and wall-box dimmers.
      - Combination floor boxes.

2. Products

   A. Straight Blade Receptacles:
      - Convenience Receptacles, 125 volts, 20 amps: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.

   B. Gfci Receptacles:
      - General Description: 125 volts, 20 amps. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.

   C. Snap Switches:
      - Comply with NEMA WD 1 and UL 20.
      - Switches, 120/277 volts, 20 amps.

   D. Wall-Box Dimmers:
      - Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on-off switches, with audible frequency and EMI/RFI suppression filters.
      - Control: Continuously adjustable slider, with single-pole or three-way switching. Comply with UL 1472.
      - Incandescent Lamp Dimmers: 120 volts, control shall follow square-law dimming curve. On-off switch positions shall bypass dimmer module.
      - Fluorescent Lamp Dimmer Switches: Modular, compatible with dimmer ballasts, trim potentiometer to adjust low-end dimming, dimmer-ballast combination capable of consistent dimming with low end not greater than 20 percent of full brightness.
E. Combination Floor Boxes:

- Manufacturer / Model: Wiremold / RFB Series.
- Compartments: Barrier separates power from voice and data communication cabling.
- Service Plate: Rectangular die-cast aluminum with satin finish.
- Power Receptacle: NEMA WD 6 configuration 5-20R.
- Voice and Data Communication Outlet: Modular, keyed, color-coded, RJ-45 (Panduit) Category 5e jacks for structured cable.
26 29 23 Variable-Frequency Motor Controllers

1. Products

A. Manufacturers: Acceptable Manufacturers:
   - ABB Power Distribution, Inc.; ABB Control, Inc. subsidiary.
   - Toshiba International Corporation.

B. Variable Frequency Controllers:
   - Description: Provide unit suitable for operation of premium-efficiency motor as defined by NEMA MG 1.
   - Design and Rating: Match load type such as fans, blowers, and pumps -- and type of connection used between motor and load such as direct or through a power-transmission connection.
   - Output Rating: 3-phase; 6 to 60 hertz, with voltage proportional to frequency throughout voltage range.
   - Isolated control interface to allow controller to follow control signal over an 11:1 speed range:
     - Electrical Signal: 4 to 20 milliamps at 24 volts.
   - Communications: Provide an RS485 interface.
   - Manual Bypass: Magnetic contactor arranged to safely transfer motor between controller output and bypass controller circuit when motor is at zero speed. Controller-off-bypass selector switch sets mode and indicator lights give indication of mode selected. Unit shall be capable of stable operation (starting, stopping, and running), with motor completely disconnected from controller (no load).
   - Integral Disconnecting Means: NEMAKS 1, nonfusible switch with lockable handle.

   • Automatic [Reset].

C. Accessories:
   - Devices shall be factory installed in controller enclosure, unless otherwise indicated.

• Current-Sensing, Phase-Failure Relays for Bypass Controller: Solid-state sensing circuit with isolated output contacts for hard-wired connection; arranged to operate on phase failure, phase reversal, current unbalance of from 30 to 40 percent, or loss of supply voltage; with adjustable response delay.
26 32 13 Engine Generators

1. General

A. Summary: This section includes packaged engine-generator sets for emergency power supply with the following features:

- Diesel engine.
- Unit-mounted cooling system.
- Unit-mounted control and monitoring.
- Outdoor enclosure.

B. Warranty:

- Special Warranty: 2 years from date of Substantial Completion.

2. Products

A. Manufacturers: Acceptable Manufacturers:

- Caterpillar; Engine Div.
- Generac Power Systems, Inc.


C. Engine:

- Fuel: Fuel oil, Grade DF-2 or Natural Gas. Fuel selection to be reviewed with Physical Facilities.
- Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements:
  - Sound level measured at a distance of 10 feet from exhaust discharge after installation is complete shall be 85 dBA or less.

D. Fuel Oil Storage:

- Consult with Physical Facilities to determine required storage capacity to support continuous run time without refueling.
• Integral, double-wall base tank.

**E. Control And Monitoring:**

• Provide MODBUS interface to campus Building Management System (BMS).

**F. Outdoor Generator-Set Enclosure:**

• Description: Vandal-resistant, weatherproof aluminum housing. Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Service panels shall open without tools. Instruments and controls shall be mounted within enclosure.

**G. Finishes:**

• Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.
26 36 00 Transfer Switches

1. General

   A. Summary: This section includes transfer switches rated 600 volts and less, including the following:
      - Automatic transfer switches.

2. Products

   A. Manufacturers:
      - Acceptable Manufacturers:
        - Emerson; ASCO Power Technologies, LP.
        - Generac Power Systems, Inc.
        - Russelectric, Inc.

   B. Automatic Transfer Switches:
      - Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.
      - Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism, mechanically and electrically interlocked in both directions.
      - Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.

   C. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are not acceptable:
      - Switch Action: Double throw, mechanically held in both directions.
      - Contacts: Silver composition or silver alloy for load-current switching. Conventional automatic transfer-switch units, rated 225 A and higher, shall have separate arcing contacts.
Switch shall be solid-state, programmable-time switch and push-button programming control with digital display of settings; sound attenuated.

Neutral Switching: Where four-pole switches are indicated, provide neutral pole switched simultaneously with phase poles.

D. Remote Annunciator System:

Functional Description: Remote annunciator panel shall annunciate conditions for indicated transfer switches. Annunciation shall include the following:

- Sources available, as defined by actual pickup and dropout settings of transfer-switch controls.
- Switch position.
- Switch in test mode.
- Failure of communication link.

Annunciator Panel: LED-lamp type with audible signal and silencing switch:

- Indicating Lights: Grouped for each transfer switch monitored.
- Label each group, indicating transfer switch it monitors, location of switch, and identity of load it serves.
- Mounting: Flush, modular, steel cabinet, unless otherwise indicated.
- Lamp Test: Push-to-test or lamp-test switch on front panel.
26 41 13 Lightning Protection for Structures

1. General

   A. **Summary:** This section includes lightning protection for buildings and building elements.

   B. **Definitions:**
      - LPI: Lightning Protection Institute.

   C. **Coordination:**
      - Coordinate installation of lightning protection with installation of other building systems and components, including electrical wiring, supporting structures and building materials, metal bodies requiring bonding to lightning protection components, and building finishes.
      - Coordinate installation of air terminals attached to roof systems with roofing manufacturer and installer.

2. Quality Assurance

   A. **Installer Qualifications:** Engage an experienced installer who is certified by LPI as a Master Installer/Designer.

   B. **Listing and Labeling:** As defined in NFPA 780 “Definitions” Article.

3. Products

   A. **Manufacturers:**
      - Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
          - Harger Lightning Protection, Inc.
          - Independent Protection Co.
          - Thompson Lightning Protection, Inc.

   B. **Lightning Protection System Components:**
      - Comply with UL 96.
- Roof-Mounting Air Terminals: NFPA Class I, aluminum, solid tubular, unless otherwise indicated.
- Stack-Mounting Air Terminals: Stainless steel.
- Ground Rods, Ground Loop Conductors, and Concrete-Encased Electrodes: Comply with Division 26 Section “Grounding and Bonding for Electrical Systems” and with standards referenced in this section.
26 43 13 Transient-Voltage Suppression for Low-Voltage Electrical Power Circuits

1. General

A. Summary:
   - This section includes Transient Voltage Surge Suppressor (TVSS) or Surge Protective Device (SPD) for low-voltage power, control, and communication equipment.
   - TVSS or SPD is the equipment required for the protection, within specified and tested limits, of AC electrical circuits and electronic equipment from the effects of lightning induced voltages, external switching transients and internally generated switching transients.

B. Definitions:
   - SPD: Surge Protective Device.
   - TVSS: Transient Voltage Surge Suppressor.

C. Warranty:
   - Surge suppression, grounding, and bonding shall effectively protect, within tested limits, against lightning transients, internal and external switching transients, and other surge transients throughout a ten year unconditional warranty period. Surge Protective devices (SPD) and related grounding and bonding systems shall be designed and installed in such a manner that normal operation, performance ratings, and listing of the system is not impaired by the installation of such devices, wiring or connections.
   - Any SPD which shows evidence of failure or incorrect operation during the ten year warranty period shall be repaired or replaced at no expense to Owner including labor and materials. Since “Acts of Nature” or similar statements include the lightning threat to which these suppression devices shall be exposed, any such general clause limiting warranty responsibility in the general conditions of this specification shall not apply to this section. The warranty shall cover the entire device, not just the modules.

2. Products

A. Manufacturers: Subject to compliance with requirements, provide AC power suppressors (SPD) products by one of the following:
26 43 13 Transient-Voltage Suppression for Low-Voltage Electrical Power Circuits

- Advanced Protection Technologies, Inc.
- Atlantic Scientific.
- EFI Electronics Corp.
- General Electric Company.
- Leviton Mfg. Company Inc.
- Square D Surgelogics.

B. Components:

- Main Service and Distribution Equipment Suppressors (SPD): The AC Voltage Surge Protective Devices shall be a high speed, high current solid-state device designed to protect electronic equipment and electrical systems from transient overvoltages. It shall safely limit the magnitude of a transient overvoltage present on the AC service or distribution power lines. The suppressor shall provide continuous bi-polar, bi-directional, non-interrupting protection and be capable of instant automatic reset with a maximum of 0.5 percent degradation in protection capabilities. Gas tubes are not acceptable. The suppressor shall be solid state, utilizing silicon junction avalanche diodes or MOV's. At maximum surge current dissipation, the device shall not exceed the maximum voltage protection level (MXVPL). The suppressor assembly shall be installed on the load side and in parallel with the service main disconnect, distribution or branch panel main lugs or breaker as shown. Connect suppressor to overcurrent protection sized as shown with an AIC rating equal to panel or switch gear rating. The suppressor shall be contained in an enclosure appropriate for the environmental application. In addition, it shall have status indicator lights, dry contacts with remote alarm capabilities and an audible alarm. Suppressors shall be assembled as modular units to permit quick, easy replacement of failed components. Provide one spare “module” of each type suppressor for Owner’s use. If entire suppressor is one module, provide one complete spare.

- Disconnect: Main service suppressors shall be provided with an integral fused disconnect switch or external branch circuit breaker as shown or required by UL. Breakers and suppressors shall have an AIC fault interrupting rating (AIC) equal or greater than the AIC rating of the equipment to which it is connected. The length of wiring from the tap at the service conductors to the suppressor being protected, however, shall not exceed the maximum length permitted by manufacturer, to maintain the maximum voltage protection level. Suppressors
may be installed within switchgear or panelboards where permitted under UL label or listing, providing that suppressors are completely and easily accessible for replacement of module(s), indicator lights are visible exterior to the enclosure, and audible alarm can be easily heard.

• Enclosures: Enclosures for main service suppressors shall be minimum 14 gauge painted steel or suitable enclosure to meet the NEMA selected requirements as listed with fully hinged door and lockable latch.
26 51 00 Interior Lighting

1. General

   A. Summary: Section includes:
   - Interior lighting fixtures, lamps, and ballasts.
   - Exit signs.

2. Products

   A. Lighting Fixtures:
   - Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit re-lamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during re-lamping and when secured in operating position.
   - Parabolic Troffer: 3-lamp, 18-cell, nominal 3 inches deep, Semi-Specular Silver finish.
   - Traditional Acrylic Lens Troffer.
   - Linear, Indirect or Direct-Indirect pendant/cable hung fixtures.
   - Round, recessed “can” fixtures.

   B. Ballasts:
   - Ballast shall be electronic, high frequency (at least 20kHz), designed specifically for use with T5, T5 HO or T8 bulbs.
   - Ballasts shall be UL listed (Class P) with a Class A sound rating.
   - Ballasts shall produce less than 20 percent Total Harmonic Distortion (THD) in the input current waveform and shall operate at a power factor of at least 90 percent.
   - Two, three and four-lamp ballasts are acceptable.
   - Qualifying manufacturers shall have been manufacturing electronic fluorescent ballasts for a minimum of five years with a satisfactory performance record.
   - Special Warranty: Three years from date of Substantial Completion.
C. Lamps:

- Consult with Physical Facilities for existing lamp inventory. New lamp types shall not be introduced to the campus without prior approval of Physical Facilities.

- Fluorescent lamps shall have a rated life of 20,000 hours with rapid start ballast and 15,000 hours with instant start ballast.

- Any lamps in permanent fixtures used for construction lighting shall be replaced with new lamps at Substantial Completion. Lamps that burn out within 12 months of Substantial Completion shall be replaced at the contractor’s expense.

- Fluorescent lamps shall have a correlated color temperature of 4100 Kelvin and a minimum CRI of 75.

D. Exit Signs:

- Internally Lighted Signs: Exit signs shall be completely solid state with Light Emitting Diodes (LED) as the light source, 70,000 hours minimum rated lamp life. Lexan covers with red letters, dual voltage.

- Exit signs shall not have “stick on” chevrons for directional arrows.

- Special Warranty: Five years on fixture, batteries and lights from date of Substantial Completion.
26 56 00 Exterior Lighting

1. General

   A. Summary: This section includes the following:
      - Exterior lighting fixtures and lamps.

2. Products

   A. General Requirements:
      - All fixtures shall be identified inside of pole handhole cover with name of fixture, manufacturer, and model number.
      - Identification: All poles shall be numbered. Consult with Physical Facilities for numbering scheme.
      - Mounting: Fixtures shall be fastened with galvanized hardware through cast holes. Field cut holes are forbidden. All hardware shall be made of non-rusting, non-corroding material.
      - Grounding: Poles shall have all conductive metal parts bonded together and connected to an equipment grounding conductor, and connected to the fixture at the top. Connect also to the branch circuit equipment grounding conductor, and to a ground rod at the bottom of each pole.
      - All fixtures shall be full cut-off type and shall not allow any light to leave the fixture above horizontal.
      - Poles with fixture shall have a wind rating of 120 mph.

   B. Lighting Fixtures:
      - Internal Campus Primary Walkways and Plazas:
         - Manufacturer / Model:
            - Pacific Lighting / KH Series.
         - Lamp: 150W.
         - Pole:
            - Height: 12 feet.
Style: Square – 6 inches.
Material: Aluminum.
Mount fixture to face of pole / not tendon mount.
Finish: Bronze.

Roadways and Parking Lots:
Manufacturer / Model:
- Gardco / Gullwing G18.
- Pacific Lighting / KH Series.
Lamp: 400W.
Pole:
- Height: 30 feet.
- Style: Round.
Material: Aluminum.
Finish: Bronze.

Bollards:
Manufacturer / Model: Louis Poulson Lighting, Inc./ Waterfront.
Lamp: Consult Project Manager.
Height: Consult Project Manager.
Style: Round with Dome Top.
Material: Aluminum.
Finish: Bronze.

C. Lamps: Lamps shall be pulse start Metal Halide, except where other provisions apply.
27 00 00 General Communication Requirements
# 27 00 00 Technology Legends and Symbols – EXHIBIT 1

## BASIC MATERIALS

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>$S_a$</td>
<td>SINGLE POLE SWITCH (SUBSCRIPT INDICATES ITEM CONTROLLED)</td>
</tr>
<tr>
<td>$S_{LV}$</td>
<td>LOW VOLTAGE SWITCH</td>
</tr>
<tr>
<td><img src="image" alt="Junction Box Icon" /></td>
<td>JUNCTION BOX</td>
</tr>
<tr>
<td><img src="image" alt="Floor Mounted Junction Box Icon" /></td>
<td>FLOOR MOUNTED JUNCTION BOX</td>
</tr>
<tr>
<td><img src="image" alt="Pedestal Mounted Junction Box Icon" /></td>
<td>PEDESTAL MOUNTED JUNCTION BOX</td>
</tr>
<tr>
<td>---</td>
<td>EXISTING CONDUIT ABOVE HARD CEILING BETWEEN CEILING BOXES</td>
</tr>
<tr>
<td></td>
<td>CONDUIT CONCEALED ABOVE CEILING OR IN WALL</td>
</tr>
<tr>
<td></td>
<td>CONDUIT CONCEALED IN SLAB, UNDERGROUND OR UNDER FLOOR</td>
</tr>
<tr>
<td></td>
<td>CONDUIT EXPOSED</td>
</tr>
<tr>
<td><img src="image" alt="Conduit Turning Up Icon" /></td>
<td>CONDUIT TURNING UP</td>
</tr>
<tr>
<td><img src="image" alt="Conduit Turning Down Icon" /></td>
<td>CONDUIT TURNING DOWN</td>
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# BASIC MATERIALS (CONTINUED)

<table>
<thead>
<tr>
<th>SYMBOL</th>
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</thead>
<tbody>
<tr>
<td><img src="image" alt="Conduit Stub" /></td>
<td>CONDUIT STUB</td>
</tr>
<tr>
<td><img src="image" alt="Conduit Continued" /></td>
<td>CONDUIT CONTINUED</td>
</tr>
<tr>
<td><img src="image" alt="Flexible Conduit" /></td>
<td>FLEXIBLE CONDUIT</td>
</tr>
<tr>
<td><img src="image" alt="Ground or Ground Rod as Noted" /></td>
<td>GROUND OR GROUND ROD AS NOTED</td>
</tr>
<tr>
<td><img src="image" alt="Telecommunications Cable Tray" /></td>
<td>TELECOMMUNICATIONS CABLE TRAY. DIMENSIONS SHOWN ON DRAWINGS.</td>
</tr>
<tr>
<td><img src="image" alt="Surface Channel Raceway with Outlets" /></td>
<td>SURFACE CHANNEL RACEWAY WITH OUTLETS, 18&quot; O.C. UNLESS OTHERWISE NOTED.</td>
</tr>
<tr>
<td><img src="image" alt="Wall Penetration Sleeve" /></td>
<td>WALL PENETRATION SLEEVE.</td>
</tr>
</tbody>
</table>
## AUDIOVISUAL SYSTEMS

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="LCD Projector" /></td>
<td>LCD PROJECTOR</td>
</tr>
<tr>
<td><img src="image" alt="Teleconferencing Camera" /></td>
<td>TELECONFERENCING CAMERA; PAN-TILT-ZOOM</td>
</tr>
<tr>
<td><img src="image" alt="Document Camera" /></td>
<td>DOCUMENT CAMERA</td>
</tr>
<tr>
<td><img src="image" alt="Projection Screen; Manual" /></td>
<td>PROJECTION SCREEN; MANUAL</td>
</tr>
<tr>
<td><img src="image" alt="Projection Screen; Motorized; 120 VAC Power and Low Voltage Control Contacts" /></td>
<td>PROJECTION SCREEN; MOTORIZED; 120 VAC POWER AND LOW VOLTAGE CONTROL CONTACTS.</td>
</tr>
<tr>
<td><img src="image" alt="Interface Plate. Outlet Consists of a Deep 4&quot; Square Back Box and a 1&quot; Conduit Extending from the Back Box to the Accessible Ceiling Space. Provide a 2 Gang Mud Ring." /></td>
<td>INTERFACE PLATE. OUTLET CONSISTS OF A DEEP 4&quot; SQUARE BACK BOX AND A 1&quot; CONDUIT EXTENDING FROM THE BACK BOX TO THE ACCESSIBLE CEILING SPACE. PROVIDE A 2 GANG MUD RING.</td>
</tr>
<tr>
<td><img src="image" alt="Integrated Room Control Panel" /></td>
<td>INTEGRATED ROOM CONTROL PANEL</td>
</tr>
</tbody>
</table>
AUDIOVISUAL SYSTEMS (CONTINUED)

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>XX</td>
<td>PLASMA SCREEN – xx DENOTES THE SCREEN SIZE. DESIGN SELECTION, SAMSUNG. 40” = SAMSUNG # 400CXN 46” = SAMSUNG # 460CXN</td>
</tr>
<tr>
<td></td>
<td>SURFACE MOUNTED SPEAKERS FOR AUDIO REINFORCEMENT</td>
</tr>
<tr>
<td></td>
<td>2x2 CEILING MOUNTED SPEAKERS FOR AUDIO REINFORCEMENT</td>
</tr>
<tr>
<td></td>
<td>ROUND CEILING MOUNTED SPEAKERS FOR AUDIO REINFORCEMENT</td>
</tr>
<tr>
<td></td>
<td>SURFACE MOUNTED MICROPHONE.</td>
</tr>
<tr>
<td></td>
<td>CEILING MOUNTED MICROPHONE.</td>
</tr>
</tbody>
</table>
AUDIOVISUAL SYSTEMS (CONTINUED)

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>MEDIA CART TO BE PROVIDED AND INSTALLED BY THE AUDIO VISUAL SYSTEMS CONTRACTOR. THE CART SHALL BE AS MANUFACTURED BY;</td>
</tr>
<tr>
<td></td>
<td>MEDIATECH</td>
</tr>
<tr>
<td></td>
<td>829 CARSWELL AVE.</td>
</tr>
<tr>
<td></td>
<td>HOLLY HILL, FL 32117</td>
</tr>
<tr>
<td></td>
<td>(386) 258-9958</td>
</tr>
<tr>
<td></td>
<td>THE BASE CART SHALL INCLUDE;</td>
</tr>
<tr>
<td></td>
<td>MT-100-30 LECTERN SHELL - 30&quot;, NATURAL OAK, INCLUDES CASTERS AND POWER</td>
</tr>
<tr>
<td></td>
<td>MT-STD-IO-PWR LAPTOP I/O - POWER, VGA, AUDIO, LAN</td>
</tr>
<tr>
<td></td>
<td>MT-100-FS ADDITIONAL FLIPPER SHELF FOR DOCUMENT CAMERA</td>
</tr>
<tr>
<td></td>
<td>MT-DOC-IO DOCUMENT CAMERA I/O - VGA, S VIDEO, POWER</td>
</tr>
<tr>
<td></td>
<td>MT-100-RR RACK RAILS</td>
</tr>
<tr>
<td></td>
<td>MT-100-ST STAIN (MT-100)</td>
</tr>
</tbody>
</table>

(PRIOR TO ORDERING COORDINATE FINAL FINISH WITH THE ARCHITECT.)

X = ELECTRONIC AUDIOVISUAL COMPONENTS THAT ARE TO BE INCLUDED IN THE MEDIA CART FOR WALL CONNECTION TO THE SPACE PRESENTATION SYSTEMS. REFER TO DETAILS ON SHEETS T703 AND T709.

PROVIDE A CABLEING WHIP WITH A MINIMUM LENGTH OF 15 FEET TO CONNECT THE CART TO THE WALL INTERFACE PLATE. ALL CABLES SHALL BE NEATLY WRAPPED AND COVERED WITH A 6 FOOT SECTION OF WIREMOLD CABLE COVER TO PREVENT TRIPPING.
# Communications System

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
</table>
| ![Symbol] X 1 2 3 4 | **STANDARD INFORMATION MANAGEMENT OUTLET.** OUTLET CONSISTS OF A 2 1/2" DEEP 4" SQUARE BACK BOX AND A 1" CONDUIT EXTENDING FROM THE BACK BOX TO THE APPROVED HORIZONTAL RACEWAY SYSTEM. IMO LABEL DENOTES BOTH MOUNTING AND CABLE TYPE/QUANTITY AS FOLLOWS:  
  
  **X** = MOUNTING (F)LUSH, (S)URFACE, (M)ODULAR FURNITURE, F(L)OOR, (W)ALL, (C)OUNTER, (E)XISTING  
  1 = # OF VOICE JACKS  
  2 = # OF DATA JACKS  
  3 = # OF DUPLEX FIBER OPTIC CONNECTORS  
  4 = # OF COAX "F" TYPE CONNECTORS FOR VIDEO |

| ![Symbol] X 1 2 3 | **SPECIALTY INFORMATION MANAGEMENT OUTLET OUTLET CONSISTS OF A 2 1/2" DEEP 4" SQUARE BACK BOX AND A 1" CONDUIT EXTENDING FROM THE BACK BOX TO THE APPROVED HORIZONTAL RACEWAY SYSTEM. IMO LABEL DENOTES BOTH SPECIALTY AND CABLE TYPE/QUANTITY AS FOLLOWS:  
  
  **X** = (P)AY PHONE, (H)OUSE PHONE, (ELV)ELEVATOR PHONE, (EM)ERGENCY PHONE,  
  1 = # OF VOICE JACKS  
  2 = # OF DATA JACKS  
  3 = # OF DUPLEX FIBER OPTIC CONNECTORS |
COMMUNICATIONS SYSTEM (CONTINUED)

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td>CEILING INFORMATION MANAGEMENT OUTLET OUTLET CONSISTS OF A 2 1/2&quot; DEEP 4&quot; SQUARE BACK BOX AND A 1&quot; CONDUIT EXTENDING FROM THE BACK BOX TO THE APPROVED HORIZONTAL RACEWAY SYSTEM. IMO LABEL DENOTES BOTH SPECIALTY AND CABLE TYPE/QUANTITY AS FOLLOWS: X = MOUNTING (F)LUSH, (S)URFACE, (A)BOVE CEILING (WAP) WIRELESS ACCESS POINT 1 = # OF VOICE JACKS 2 = # OF DATA JACKS 3 = # OF DUPLEX FIBER OPTIC CONNECTORS</td>
</tr>
<tr>
<td><img src="image2.png" alt="Image" /></td>
<td>FLOOR OUTLET BOX WITH DUPLEX RECEPTACLE AND CONNECTIONS FOR VOICE AND DATA. PROVIDE ONE (1) ⁷⁄₈&quot; CONDUIT FOR POWER AND FOUR (4) 1&quot; CONDUITS STUBBED INTO THE ACCESSIBLE CEILING SPACE OF THE ROOM THAT THE FLOOR BOX IS IN FOR COMMUNICATIONS CABLELING. DESIGN SELECTION; WIREMOLD RFB9.</td>
</tr>
<tr>
<td><img src="image3.png" alt="Image" /></td>
<td>FLOOR OUTLET BOX WITH DUPLEX RECEPTACLE AND CONNECTIONS FOR VOICE, DATA AND AUDIO VISUAL. PROVIDE ONE (1) ⁷⁄₈&quot; CONDUIT FOR POWER AND FOUR (4) 1&quot; CONDUITS STUBBED INTO THE ACCESSIBLE CEILING SPACE OF THE ROOM THAT THE FLOOR BOX IS LOCATED IN FOR COMMUNICATIONS AND AV CABLELING. DESIGN SELECTION; WIREMOLD RFB9. COORDINATE EXACT LOCATION WITH FF&amp;E LOCATION PRIOR TO INSTALLATION.</td>
</tr>
</tbody>
</table>
COMMUNICATIONS SYSTEM (CONTINUED)

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PLYWOOD BACK BOARD, 3/4&quot; AC GRADE WITH THE BEST SIDE OUT AND PAINTED ON ALL 6 SIDES WITH TWO COATS OF FIRE RETARDANT PAINT. TREATED PLYWOOD SHALL NOT BE USED.</td>
</tr>
<tr>
<td></td>
<td>TELECOMMUNICATIONS RACK</td>
</tr>
<tr>
<td></td>
<td>TECHNOLOGY GROUND BAR</td>
</tr>
<tr>
<td></td>
<td>PROVIDE A 4 INCH SQUARE 2 1/2&quot; DEEP BACKBOX WITH A SINGLE GANG PLASTER RING FLUSH MOUNTED IN THE CEILING. PROVIDE A 3/4 INCH CONDUIT TO THE CABLE TRAY. THE STRUCTURED CABLING CONTRACTOR WILL PROVIDE ONE (1) CAT 5E CABLE FROM THE JUNCTION BOX TO THE NEAREST IDF AND TERMINATE THE CABLE ON A DEDICATED PATCH PANEL FOR CAMERAS. THE END IN THE JUNCTION BOX WILL BE TERMINATED WITH A MALE RJ45 WITH 12&quot; OF SLACK CABLE.</td>
</tr>
<tr>
<td></td>
<td>PROVIDE ONE CAT 5E CABLE WITH A MALE RJ45 CONNECTOR AND ONE RG6 CABLE TO THE EXTRON MEDIA LINK CONTROLLER BEING INSTALLED BY THE AUDIO VIDEO SYSTEMS CONTRACTOR. THE OTHER END WILL BE TERMINATED IN THE TELECOMMUNICATIONS ROOM ON THE DATA PATCH PANEL.</td>
</tr>
</tbody>
</table>
27 00 00 Communications

1. General

A. Summary:

- This section contains the Owner’s project requirements for the design of telecommunications systems. Each project’s technology design is to be included in the project documents. Designer to consult with Owner (ITS Dept.) for specific project requirements and coordinate project documents for inclusion of all required components to develop a complete technology design.

- Procurement and installation of all network wiring / cabling will be by Owner.

B. Codes and Standards: The latest IEEE, NEC, and TIA/EIA standards shall be utilized in the design and construction of the electrical systems.

C. Submittals: A copy of the telecommunications submittals shall be provided to Information Technology Systems (ITS) concurrent with the engineer’s review, not for contract compliance-related approval, but to allow ITS to become familiar with the products to be maintained.

D. General Requirements:

- All systems shall be designed in a manner to facilitate ease of maintenance. Adequate access to accomplish all normally required maintenance without removal of other than access panels is mandatory.

- The telecommunications system shall be designed to facilitate the installation of components in a serviceable manner. Complete wiring and component diagrams shall be included in the construction documents to verify that the design intent is constructible and maintainable.

- Clearances suggested by manufacturers for equipment maintenance, removal, and replacement shall be indicated on 1/4 inch scale telecom room drawings and accommodated by the layout. Larger and heavier components that may require future removal or replacement shall be identified on the drawing and a clear path identified to the building exterior. Door sizes, lifting supports, and other pertinent information shall be identified on the drawings.

- See EXHIBIT 1 for UNF preferred Technology Sheet Legend symbols.

E. Horizontal Cabling:
• Drops – Information Management Outlet (IMO) provide the following:
  ○ Offices:
    → 1 IMO with 1 voice, 2 data outlets.
  ○ Conference Room:
    → 1 IMO with 1 voice, 2 data outlets.
  ○ Building Automation Facility Controls:
    → 1 IMO with 1 data outlet.
  ○ Vending machines:
    → 1 data outlet.
• Cable tray requirement for all new construction language.

F. Fiber Optics (OFOI):
• Campus Fiber Backbone:
  ○ Air Blown Fiber provides connectivity from existing campus fiber loop to individual facilities via termination in MDF closets.
• Building Fiber Optic Cabling Requirements:
  ○ Single mode for voice and data needs.

G. Cable TV (OFOI):
• CATV trunk line furnished and installed by CATV provider, COMCAST.
• CATV distribution wiring (OFOI).

H. Emergency Phones:
• Code Blue (OFCI)
  ○ Exterior / Site Requirements:
    → Location:
    To be placed on flat surface – ADA compliant.
    To be placed within a line of site 300 feet.
  → Infrastructure requirements:
Requires one 1-inch data conduit. Owner to install data (voice) connectivity (cat 5 or fiber).
Requires one 3/4-inch conduit for 110 electrical feed.

⇒ Types (consult with ITS Dept.):

Bollard.
Wall mount.

○ Interior requirements – Emergency Call Stations, consult with ITS Dept. / project specific.

I. Wireless Access Points (WAP): required for all new facilities (OFOI). Designer to consult with ITS Dept. for specific locations.

J. Audio Visual:

• General Purpose Technology Classroom / Auditorium:
  ○ Digital Projector (OFCl).
  ○ Electric Projector Screen (CFCI).
  ○ Instructional Podium with equipment control unit (OFOI).
  ○ Computer (OFOI).
  ○ Document Camera (OFOI).
  ○ DVD Player (OFOI).
  ○ Speakers (OFOI).
  ○ Miscellaneous control devices as required (OFOI).

• Discipline Specific Technology Classroom / Lab:
  ○ Digital Projector (OFCl) with Electric Projector Screen (CFCI) or Flat Panel Display (OFOI).
  ○ Instructional Podium with equipment control unit (OFOI).
  ○ Computer (OFOI).
  ○ Document Camera – consult with ITS (OFOI).
  ○ DVD Player (OFOI).
  ○ Speakers (OFOI).
○ Miscellaneous control devices as required (OFOI).

● Conference Room:
  ○ Digital Projector (OFCl) with Electric Projector Screen (CFCI) or Flat Panel Display (OFOI).
  ○ Computer (OFOI).
  ○ DVD Player (OFOI).
  ○ Speakers (OFOI).
  ○ Miscellaneous control devices as required (OFOI).

● Multipurpose Combining Room:
  ○ Consult with ITS.

● Assisted listening device equipment only provided in large lecture room areas, not standard size classrooms.

● Equipment Provided by UNF for Each Room Type:
27 00 00 Communications – EXHIBIT 1

INSTRUCTIONAL TECHNOLOGY CLASSROOM

NEC NP3250W
RS 232 CONTROL
COMPOSITE
RGBHV

CEILING INSTALLED OWM IC6-7300SET SPEAKERS

EXTRON MLS 406MA
RS 232 CONTROL
COMPOSITE w/AUDIO
RGBHV w/AUDIO

SAMSUNG UF-80ST DOCUMENT CAMERA

SUPLL DELL COMPUTER

LAPTOP NOT INCLUDED

SONY DVD PLAYER

Podium installed A/V equipment

MEDIA TECH PODIUM
27 00 00 Communications – EXHIBIT 2

DISCIPLINE SPECIFIC CLASSROOM

CEILING INSTALLED OWI 1562

AUDIO

NEC NP905

RS 232 CONTROL

RGBHV

RGBHV WAUDIO

RGBHV WAUDIO

RGBHV

COMPOSITE WAUDIO

DELL COMPUTER

DELL LAPTOP

NOT INCLUDED

Podium Installed A/V equipment

DOCUMENT CAMERA

SONY DVD PLAYER

MEDIA TECH PODIUM

MLC-52

MLC-104 OPTIONAL

Revised: 12/16/2010
Conference Room FLAT PANEL DISPLAY A/V infrastructure

1” conduit stubbed in above the drop ceiling. This conduit is used to receive the control wiring from the MLC 62 controller.

Single gang box positioned 18” above the fixed floor accompanied by data and a duplex power socket. Needs to be positioned in one of the conference room corners opposite from the door entrance.

Single gang box positioned 66” from the fixed floor accompanied by data and a duplex power socket.

1” conduit connected between the two single gang A/V boxes.
Conference Room Projector A/V infrastructure

- Drop ceiling installed quad electrical power socket for ceiling mounted projector. The location is to be determined.

- Single gang box positioned 18" above the fixed floor accompanied by data and a duplex power socket. Needs to be positioned in one of the conference room corners opposite from the door entrance.

- 1" conduit stubbed in above the drop ceiling.
27 00 00 Communications – EXHIBIT 6

CONFERENCE ROOM AV EXTRON CONTROL INFRASTRUCTURE

¾” conduit stubbed in above the drop ceiling

Extron MLC 52RS projector wall control unit shall be positioned adjacent to the room light switch at the room entrance
27 05 00 Common Work Results For Communications

1. General

   A. Summary: Section includes:
      - Sleeves for pathways and cables.
      - Sleeve seals.
      - Grout.
      - Common communications installation requirements.

2. Products

   A. Sleeves for Pathways and Cables:
      - Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

   B. Sleeve Seals:
      - Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and pathway or cable.

   C. Grout:
      - Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, non-corrosive, non-staining, mixed with water to consistency suitable for application and a 30-minute working time.

3. Execution

   A. Common Requirements for Communications Installation:
      - Comply with NECA 1.
      - Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both communications equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

   B. Sleeve Installation for Communications Penetrations:
Communications penetrations occur when pathways, cables, wireways, or cable trays penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with fireproofing system used are fabricated during construction of floor or wall.

Extend sleeves installed in floors 2 inches above finished floor level.

Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and pathway or cable, unless indicated otherwise.

Seal space outside of sleeves with grout for penetrations of concrete and masonry: Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and pathway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section “Joint Sealants.”

Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pathway and cable penetrations. Install sleeves and seal pathway and cable penetration sleeves with fireproofing materials. Comply with requirements in Division 07 Section “Penetration Firestopping.”

Above-Ground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between pathway or cable and sleeve for installing mechanical sleeve seals.

C. Sleeve-Seal Installation:

Install to seal exterior wall penetrations.

Use type and number of sealing elements recommended by manufacturer for pathway or cable material and size. Position pathway or cable in center of
sleeve. Assemble mechanical sleeve seals and install in annular space between pathway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

D. Firestopping:

- Apply firestopping to penetrations of fire-rated floor and wall assemblies for communications installations to restore original fire-resistance rating of assembly. Sleeved walls that are rated will be treated as a smoke wall as a minimum and sealed accordingly.
27 11 00 Communications Equipment Room Fittings

1. General

   A. Summary: Section includes:
      ● Telecommunications mounting elements.
      ● Backboards.
      ● Telecommunications equipment racks and cabinets.
      ● Telecommunications service entrance pathways.
      ● Grounding.

2. Products

   A. Pathways:
      ● General Requirements: Comply with TIA/EIA-569-A.
      ● Cable Ladder:
         ○ Manufacturers: Subject to compliance with requirements, provide products by the following: Chatsworth (CPI).
         ○ Cable Ladder Materials: Metal, suitable for indoors and protected against corrosion by a factory coating of flat black rust resistant paint. Ladder must be UL 1863 listed.

   B. Backboards:
      ● Plywood, 3/4 by 48 by 96 inches, AC grade with best side out. All voids shall be filled and sanded flat. Paint all six sides with two coats of fire-retardant paint. Fire-retardant treated plywood shall not be used.

   C. Equipment Frames:
      ● Manufacturers: Subject to compliance with requirements:
         ○ Panduit Corp.
      ● General Frame Requirements:
Distribution Frames: Freestanding and wall-mounting, modular-steel units designed for telecommunications terminal support and coordinated with dimensions of units to be supported.

Module Dimension: Width compatible with EIA 310 standard, 19-inch panel mounting.

Finish: Manufacturer's standard, baked-polyester powder coat.

Floor-Mounted Racks: Modular-type, aluminum construction.

Vertical and horizontal cable management channels, top and bottom cable troughs, grounding lug, and a power strip.

Baked-polyester powder coat finish.

Design Selection: Panduit NetFrame NFR84, with NFBRFK vertical cable managers (front and rear), NFD484 4-inch door on a single side, NFD884 8-inch door when used between two racks, NFLRB ladder support bracket, CRMPSVD20 power strip and RGS grounding kit.

Modular Wall Cabinets:


Steel and aluminum construction.

Treated to resist corrosion.

Cable access provisions top and bottom.

Grounding kit. Design selection: Panduit RGS.


Cable Management for Equipment Frames:

Metal, with integral wire retaining fingers.

Baked-polyester powder coat finish.

Provide horizontal cable manager at the top of each rack and between each component within the rack with a minimum height of two rack units each.

Design Selection: Panduit Net Manager NCMH2.

D. Grounding:
• A grounding bar shall be provided in each telecommunications room by the electrical contractor. Connections from the grounding bar to the individual racks shall be made by the telecommunications contractor.

• Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.

• Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.
  ○ Bond the shield of shielded cable to the grounding bus bar in communications rooms and spaces.

• Telecommunications Main Bus Bar:
  ○ Ground Bus Bar: Copper, minimum 1/4 inch thick by 10 inches wide with 6-32 holes spaced 1-1/8 inches apart.
  ○ Stand-Off Insulators: Comply with UL 891 for use in switchboards, 600 volts. Lexan or PVC, impulse tested at 5000 volts.

E. Labeling:

• Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

• Each cable in the patch panel shall be identified on the patch panel and on the cable itself as to where the other end of the cable is located. This information shall include the room number (this number shall be the actual room number as on the signage schedule developed by the architect), wall plate identification, and port identifier.
  ○ Example: XXXX (Room Number), 1, 2, 3, etc. (Location in room starting at primary entrance door and going around the room clockwise), A, B, C, D, etc. (Port location in the face plate starting at top left).
27 13 00 Communications Backbone Cabling

1. General

A. Summary: Section includes:
   - Pathways.
   - UTP cable.
   - 9/125-micrometer, optical fiber cabling.
   - Coaxial cable.
   - Cable connecting hardware, patch panels, and cross-connects.
   - Cabling identification products.

B. Backbone Cabling Description: Backbone cabling system shall provide interconnections among communications equipment rooms, main terminal space, and entrance facilities in the telecommunications cabling system structure. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.

C. Performance Requirements: Backbone cabling system shall comply with transmission standards in TIA/EIA-568-B.1, when tested according to test procedures of this standard.

D. Coordination: Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.

2. Quality Assurance

A. Installer Qualifications: Cabling installer must have personnel certified by BICSI on staff.
   - Installation Supervision: Installation shall be under the direct supervision of BICSI Registered Technician, who shall be present at all times when work of this section is performed at project site.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. Products

A. Pathways:

- General Requirements: Comply with TIA/EIA-569-A.
- Cable Support: NRTL labeled for support of Category 5e cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.
  - “J” hooks shall be spaced every 5 feet and supported from the structure with a manufacturer’s approved support device. With bundles of cables exceeding 18 cables every 20 feet, these supports will need to be a minimum of a 1/4-inch threaded rod or attached directly to the building structure. The use of ceiling support wires or other systems support devices is not allowed.
- Cable Trays:
  - Manufacturers: Subject to compliance with requirements, provide the following:
    - Basket Cable Trays: 12 inches wide and 4 inches deep. Wire mesh spacing shall not exceed 2 by 4 inches.
    - All cable trays will use a trapeze type support system.
- Conduit and Boxes: Comply with requirements in Electrical Specification Section “Raceway and Boxes for Electrical Systems.” Flexible metal conduit shall not be used.
  - Outlet boxes shall be no smaller than 4 inches wide, 4 inches high, and 2-1/2 inches deep with a single or double gang plaster ring to match the requirement of the faceplate being used.
  - The minimum conduit size shall be 1 inch from the outlet box to the accessible ceiling space or to the cable tray.

B. Backboards: Plywood, 3/4 by 48 by 96 inches, AC grade with the best side out. All voids shall be filled and sanded flat. Paint all six sides with two coats of fire-retardant paint. Fire-retardant treated plywood shall not be used.

C. UTP Riser Cable:

- Manufacturers: Subject to compliance with requirements, provide products by one of the following:
○ Belden CDT Inc.; Electronics Division.

○ CommScope, Inc.

● Description: 100-ohm, 100-pair UTP, formed into 25-pair binder groups covered with a gray thermoplastic jacket and overall metallic shield.
  ◦ Communications, Plenum Rated: Type CMP, complying with NFPA 262.
  ◦ Communications, Riser Rated: Type CMR, complying with UL 1666.

D. UTP Riser Cable Hardware:

● Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  ○ Panduit Corp.
  ○ Leviton.

● General Requirements for Cable Connecting Hardware: Comply with TIA/EIA-568-B.2, IDC type, with modules designed for punch-down tools. Cables shall be terminated with connecting hardware of same category or higher.

● Connecting Blocks: 66-style IDC for Category 5e. Provide blocks for the number of cables terminated on the block, plus 20 percent spare. Integral with connector bodies, including plugs and jacks where indicated. This termination shall be in the TR.

● Patch Panel: Modular panels housing multiple-numbered jack units with IDC-type connectors at each jack for permanent termination of pair groups of installed cables. Riser cabling shall be terminated on patch panels in the equipment rack, terminate one pair per port.

● Patch Cords: Shall be provided by the Owner.

E. Optical Fiber Cable:

● Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  ○ CommScope, Inc.
  ○ Corning Cable Systems.
  ○ Optical Cable Corporation.

F. Optical Fiber Cable Hardware:
● Manufacturers: Subject to compliance with requirements by the following manufacturer:
  ○ Panduit.

● Cross-Connects and Patch Panels: Modular panels housing multiple-numbered, duplex cable connectors.
  ○ Number of Connectors per Field: One for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to suit specified expansion criteria.

● Patch Cords: Shall be provided by the Owner.

● Cable Connecting Hardware:
  ○ Quick-connect, simplex and duplex, Type LC connectors. Insertion loss not more than 0.75 dB.
  ○ Type SFF connectors may be used in termination racks, panels, and equipment packages.

G. Coaxial Riser Cable:

● Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  ○ Belden CDT Inc.; Electronics Division.
  ○ CommScope, Inc.

● General Coaxial Cable Requirements: Broadband type, recommended by cable manufacturer specifically for broadband data transmission applications. Quad shield coaxial cable and accessories shall have 75-ohm nominal impedance with a return loss of 20 dB maximum from 7 to 806 MHz.

H. Coaxial Cable Hardware:

● Manufacturers: Subject to compliance with requirements for specific cable.

I. Grounding:

● Comply with requirements in Electrical Specifications Section “Grounding and Bonding for Electrical Systems” for grounding conductors and connectors.
4. Execution

A. Entrance Facilities: Coordinate backbone cabling with the protectors and demarcation point provided by communications service provider.

B. Wiring Methods:
   - Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters and in accessible ceiling spaces.
     - Install plenum cable in environmental air spaces, including plenum ceilings.
     - Comply with requirements for raceways and boxes specified in Electrical Specifications Section “Raceway and Boxes for Electrical Systems.”

C. Installation of Pathways:
   - Cable Trays: Comply with NEMA VE 2 and TIA/EIA-569-A.
   - Comply with requirements for demarcation point, pathways, cabinets, and racks specified in Division 27 Section “Communications Equipment Room Fittings.”
   - Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.
   - Comply with requirements in Electrical Specifications Section “Raceway and Boxes for Electrical Systems” for installation of conduits and wireways.
   - Install manufactured conduit sweeps and long-radius elbows whenever possible.
   - Pathway Installation in Communications Equipment Rooms:
     - Install cable trays to route cables if conduits cannot be located in these positions.
     - Secure conduits to backboard when entering room from overhead.
     - Extend conduits 2 inches above finished floor.
     - Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

D. Installation of Cables:
Comply with NECA 1.

General Requirements for Cabling:

- Comply with TIA/EIA-568-B.1.
- Comply with BICSI ITSIM, Ch. 6, “Cable Termination Practices.”
- Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
- Cables may not be spliced. Secure and support cables at intervals not exceeding 60 inches and not more than 12 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.

UTP Cable Installation:

- Comply with TIA/EIA-568-B.2.
- Do not untwist UTP cables more than 1/2 inch from the point of termination to maintain cable geometry.

Optical Fiber Cable Installation:

- Comply with TIA/EIA-568-B.3.
- Cable may be terminated on connecting hardware that is rack or cabinet mounted.

Open-Cable Installation:

- Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
- Suspend UTP cable not in a wireway or pathway, a minimum of 8 inches above ceilings by cable supports not more than 60 inches apart.

Installation of Exposed Cable Routed Beneath Raised Floors:

- Install plenum rated cable only.
- Install cabling after the flooring system has been installed in raised floor areas.
- Coil cable 6 feet long not less than 12 inches in diameter below each feed point.

Separation from EMI Sources:
○ Comply with BICSI TDMM and TIA/EIA-569-A recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.

E. Firestopping:
● Comply with requirements in Division 07 Section “Penetration Firestopping.”

F. Grounding:
● Install grounding according to BICSI TDMM “Grounding, Bonding, and Electrical Protection” Chapter.
● Comply with ANSI-J-STD-607-A.
● Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.
● Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

G. Identification:
● Cable and Wire Identification:
  ○ Label each cable at both ends within 4 inches of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated. Example: XXXX (Room Number), 1, 2, 3, etc. (Location in room starting at primary entrance door and going around the room clockwise), A, B, C, D, etc. (Port location in the face plate starting at top left).
  ○ Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA/EIA 606-A, for the following:
    ○ Cables use flexible vinyl or polyester that flexes as cables are bent.

H. Field Quality Control:
● Perform tests and inspections.
● Tests and Inspections:
○ Visually inspect UTP and optical fiber jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color coding for pin assignments, and inspect cabling connections for compliance with TIA/EIA-568-B.1.

○ Optical Fiber Cable Tests:
  ➔ Link End-to-End Attenuation Tests:

  Single-mode link measurements: Test at 1310 or 1550 nm in 1 direction according to TIA/EIA-526-7, Method B, One Reference Jumper.

  Attenuation test results for links of less than 100m shall be less than 2.0 dB links of more than 100m shall be less than 3 dB. Attenuation test results shall be less than that calculated according to equation in TIA/EIA-568-B.1.

● Data for each measurement shall be documented. Data for submittals shall be printed in a summary report, or transferred from the instrument to the computer, saved as text files.

● Remove and replace cabling where test results indicate that they do not comply with specified requirements.

● End-to-end cabling will be considered defective if it does not pass tests and inspections.

● Prepare test and inspection reports.
27 13 43 Communications Services Cabling

1. General

A. Summary: Section includes:
   - MATV equipment using cable television service as the signal source.
   - Distribution components.

B. Definitions:
   - CATV: Community antenna television. A communication system that simultaneously distributes several different channels of broadcast programs and other information to customers via a coaxial cable.
   - User Interface: End point of contractor's responsibility for work of this section. User interfaces are the 75-ohm terminals on device plates.

C. System Description:
   - System shall consist of cable television service and a coaxial cable distribution system.
     - Distribution of cable television service signals, which includes coordinating with Owner's selected service provider for installation of cable to the service point ready for connection into the distribution system. Obtain signal levels and noise and distortion characteristics from service provider as the point of departure for system layout and final equipment selection.
     - Cable distribution system consisting of coaxial cables, user interfaces, signal taps and splitters, RF amplifiers, signal equalizers, power supplies, and required hardware, complying with CEA-310-E and CEA-2032 and resulting in performance parameters specified in this section. System shall be capable of distributing television channels according to CEA-542-B.

D. Coordination:
   - Coordinate work of this section with requirements of the cable television service provider.

E. Distribution Components:
   - Signal Power Splitters and Isolation Taps:
## 27 13 43 Communications Services Cabling

- **Manufacturers:** Subject to compliance with requirements, provide products by one of the following manufacturers:
  - Blonder Tongue Laboratories, Inc.
  - Scientific-Atlanta, Inc.; a subsidiary of Cisco Systems, Inc.

- **Distribution System Amplifiers:**
  - **Manufacturers:** Subject to compliance with requirements, provide products by one of the following manufacturers:
    - Blonder Tongue Laboratories, Inc.
    - Scientific-Atlanta, Inc.; a subsidiary of Cisco Systems, Inc.

- **User-Interface Device:** Flush, female-type outlets, designed to mimic power duplex outlet; for mounting in standard outlet box; with metallic parts of anodized brass, beryllium copper, or phosphor bronze:
  - **Manufacturers:** Subject to compliance with requirements, provide products by one of the following manufacturers:
    - Blonder Tongue Laboratories, Inc.
    - Leviton Manufacturing Co., Inc.; Leviton Voice & Data Division.
    - Quality RF Services, Inc.; a member company of ATX Networks.

### 2. Quality Assurance

#### A. Electrical Components, Devices, and Accessories:
- Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

### 3. Execution

#### A. Field Quality Control:
- Tests and Inspections:
  - Align and adjust system and pretest components, wiring, and functions to verify that they comply with specified requirements.
27 15 00 Communications Horizontal Cabling

1. General

A. Summary: Section includes:

● Pathways.
● UTP cabling.
● Coaxial cable.
● Cable connecting hardware, patch panels, and cross-connects.
● Telecommunications outlet/connectors.
● Cabling system identification products.

B. Horizontal Cabling Description:

● Horizontal cable and its connecting hardware provide the means of transporting signals between the telecommunications outlet/connector and the horizontal cross-connect located in the communications equipment room. This cabling and its connecting hardware are called “permanent link,” a term that is used in the testing protocols.

○ UNF requires that a minimum of three telecommunications outlet/connectors be installed for each work area.

○ Horizontal cabling shall contain no more that one transition point or consolidation point between the horizontal cross-connect and the telecommunications outlet/connector.

● The maximum allowable horizontal cable length is 295 feet. This maximum allowable length does not include an allowance for the length of 16 feet to the workstation equipment. The maximum allowable length does not include an allowance for the length of 16 feet in the horizontal cross-connect.

C. Performance Requirements: Horizontal cabling system shall comply with transmission standards in TIA/EIA-568-B.1, when tested according to test procedures of this standard.

2. Quality Assurance

A. Installer Qualifications: Cabling installer must have personnel certified by BICSI on staff.
B. **Installation Supervision:** Installation shall be under the direct supervision of BICSI Registered Technician, who shall be present at all times when work of this section is performed at project site.

C. **Electrical Components, Devices, and Accessories:** Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

3. **Products**

A. **Pathways:**

- **General Requirements:** Comply with TIA/EIA-569-A.

- **Cable Support:** NRTL labeled for support of Category 5e cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.

- **Cable Trays:**
  - Manufacturers: Subject to compliance with requirements of the following:
  - Cable Tray Materials: Metal, suitable for indoors, and protected against corrosion by electroplated zinc galvanizing, complying with ASTM B 633, Type 1, not less than 0.000472 inches thick.
    - Basket Cable Trays: 12 inches wide and 6 inches deep. Wire mesh spacing shall not exceed 2 by 4 inches.
    - All cable trays will use a trapeze type support system.
  - Conduit and Boxes: Comply with requirements in Electrical Specification Section “Raceway and Boxes for Electrical Systems.” Flexible metal conduit shall not be used.
    - Outlet boxes shall be no smaller than 4 inches wide, 4 inches high and 2-1/2 inches deep.
    - The minimum conduit size shall be 1 inch from the outlet box to the accessible ceiling space or the cable tray. Where accessible spaces are not available, the conduit shall run from the communications outlet to the telecommunications room.

B. **Backboards:** Plywood, 3/4 by 48 by 96 inches, AC grade with the best side out. All voids shall be filled and sanded flat. Paint on all six sides with two coats of fire retardant paint. Fire-retardant treated plywood shall not be used.
C. UTP Cable:

- Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - Belden CDT Inc. Data Twist Plenum UTP, Part #1501A.
  - CommScope, Inc. 568 Ultra II Plenum UTP, Part #5504M.
  - Panduit, Part #PUP5504.
- Color of the cable shall be as follows:
  - The color of the jacket for the voice and data cable shall be blue.
  - The color of the jacket for the wireless access points shall be yellow.
  - The color of the jacket for camera cable shall be green.
- Description: 100-ohm, 4-pair UTP, covered with a blue thermoplastic jacket:
  - Communications, Plenum Rated: Type CMP, complying with NFPA 262. Cat5E Cable.

D. UTP Cable Hardware:

- Manufacturers: Subject to compliance with requirements by the following manufacturer:
  - Panduit Corp.
- General Requirements for Cable Connecting Hardware: Comply with TIA/EIA-568-B.2, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.
- Modular Patch Panels for Category 5e Data and Optical Fiber:
  - Modular panels for data, design selection; Panduit Mini-Com patch panel #CPPL 48BL.
  - Number of Jacks per Field: One for each four-pair UTP cable indicated, plus spares and blank positions adequate to suit specified expansion of 20 percent.
  - Optical Fiber patch panel, design selection: Panduit Opticom Rack Mount Series FRME 2, 3, or 4 with FAP 6WBUDSCZ.
  - Wall mount fiber enclosures shall be Panduit, FWME4 or FWME8.
● Workstation Modular Jacks:
  ○ Jacks and Jack Assemblies: Modular, color-coded, eight-position modular receptacle units with integral IDC-type terminals.
  ○ The modular jacks shall be Panduit Mini-Com modular jack #CJ5E88TGRD (Red) for data, #CJ5E88TGEI (Electrical Ivory) for voice, #CJ5E88TGYL (Yellow) for wireless applications, and #CJ5E88TGGR (Green) for cameras.

● Patch Cords: Shall be provided by the Owner.

E. Coaxial Cable:

● Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  ○ Belden CDT Inc.; Electronics Division.
  ○ CommScope, Inc.

● RG6/U (Plenum Rated): NFPA 70, Type CMP.
  ○ No. 18AWG, solid, copper-covered steel conductor, foam fluorinated ethylene propylene insulation.
  ○ Quad shield with 100 percent aluminum-foil shield and 65 percent aluminum braid.
  ○ Copolymer jacket.
  ○ CATV Plenum Rated: Type CATVP, complying with NFPA 262.
  ○ CATV Riser Rated: Type CATVR, CATVP, or CATV, complying with UL 1666.

F. Coaxial Cable Hardware:

● Manufacturers: Subject to compliance with requirements for specific cables.

G. Telecommunications Outlet/Connectors:


● Workstation Outlets: Four-port-connector assemblies mounted in single faceplate. Design selection: Panduit Mini-Com Executive Series, 4 position, #CFPE4EI and Mini-Com blank modules #CMBEI-X. The color of the faceplate shall match the color of the electrical device cover plates used in the same space.
H. Grounding:

- Comply with requirements in Electrical Specifications Section “Grounding and Bonding for Electrical Systems” for grounding conductors and connectors.
- Comply with ANSI-J-STD-607-A.

4. Execution

A. Wiring Methods: Install cables in raceways and cable trays except within consoles, cabinets, desks, counters and in accessible ceiling spaces.

- Comply with requirements for raceways and boxes specified in Electrical Specifications Section “Raceway and Boxes for Electrical Systems.”

B. Installation of Pathways:

- Cable Trays: Comply with NEMA VE 2 and TIA/EIA-569-A-7.
- Comply with requirements for demarcation point, pathways, cabinets, and racks specified in Division 27 Section “Communications Equipment Room Fittings.” Drawings indicate general arrangement of pathways and fittings.
- Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.
- Install manufactured conduit sweeps and long-radius elbows whenever possible.
- Pathway Installation in Communications Equipment Rooms:
  - Install cable ladder to route cables.
  - Secure conduits to backboard when entering room from overhead.
  - Extend conduits two inches above finished floor.
  - Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

C. Installation of Cables:

- Comply with NECA 1.
- General Requirements for Cabling:
  - Comply with TIA/EIA-568-B.1.
  - Comply with BICSI ITSIM, Ch. 6, Cable Termination Practices.
○ Terminate conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.

○ Cables may not be spliced. Secure and support cables at intervals not exceeding 60 inches and not more than 12 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.

● UTP Cable Installation:
  ○ Comply with TIA/EIA-568-B.2.
  ○ Do not untwist UTP cables more than 1/2 inch from the point of termination to maintain cable geometry.

● Open-Cable Installation:
  ○ Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
  ○ Suspend UTP cable not in a wireway or pathway a minimum of 8 inches above ceilings by cable supports not more than 60 inches apart.

● Installation of Exposed Cable Routed Beneath Raised Floors:
  ○ Install plenum rated cable only.
  ○ Install cabling after the flooring system has been installed in raised floor areas.
  ○ Coil cable 6 feet long not less than 12 inches in diameter below each feed point.

● Group connecting hardware for cables into separate logical fields.

● Separation from EMI Sources:
  ○ Comply with BICSI TDMM and TIA/EIA-569-A for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.

D. Fireproofing:

● Comply with requirements in Division 07 Section “Penetration Firestopping.”


E. Grounding:
• Install grounding according to BICSI TDMM “Grounding, Bonding, and Electrical Protection” Chapter.

• Comply with ANSI-J-STD-607-A.

• Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.

• Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

F. Identification:

• Cable and Wire Identification:
  ○ Label each cable within 4 inches of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated. Example: XXXX (Room Number), 1, 2, 3, etc. (Location in room starting at primary entrance door and going around the room clockwise), A, B, C, D, etc. (Port location in the face plate starting at top left).
  ○ Label each terminal strip and screw terminal in each cabinet, rack, or panel.
  ○ Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.
  ○ Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA/EIA-606-A.
    ○ Cables use flexible vinyl or polyester that flex as cables are bent.

G. Field Quality Control:

• Perform tests and inspections.

• Tests and Inspections:
  ○ Visually inspect UTP and optical fiber cable jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA/EIA-568-B.1.
Optical Fiber Cable Tests:

- Link End-to-End Attenuation Tests:
  
  Single-mode backbone link measurements: Test at 1310 or 1550 nm in 1 direction according to TIA/EIA-526-7, Method B, one Reference Jumper.

  Attenuation test results shall be less than that calculated according to equation in TIA/EIA-568-B.1. All fiber links less than 100m shall be less than 2.0 dB.

UTP Performance Tests:

- Test for each outlet. Perform the following tests according to TIA/EIA-568-B.1 and TIA/EIA-568-B.2:

  - Wire map.
  - Length (physical vs. electrical, and length requirements).
  - Insertion loss.
  - Near-end crosstalk (NEXT) loss.
  - Power sum near-end crosstalk (PSNEXT) loss.
  - Equal-level far-end crosstalk (ELFEXT).
  - Power sum equal-level far-end crosstalk (PSELFEXT).
  - Return loss.
  - Propagation delay.
  - Delay skew.

Optical Fiber Cable Performance Tests: Perform optical fiber end-to-end link tests according to TIA/EIA-568-B.1 and TIA/EIA-568-B.3.

Coaxial Cable Tests: Conduct tests according to Division 27 Section "Master Antenna Television System."

Final Verification Tests: Perform verification tests for UTP and optical fiber systems after the complete communications cabling and workstation outlet/connectors are installed.

Document data for each measurement. Data for submittals shall be printed or saved to disk and submitted.
End-to-end cabling will be considered defective if it does not pass tests and inspections.

Prepare test and inspection reports.
27 32 26 Ring-Down Emergency Telephones

1. General

   A. Related Documents: Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section.

2. Quality Assurance

   A. Summary: Section includes:

   - Infrastructure requirements.
   - Emergency phones types.
   - ADA requirements.

   B. Infrastructure Description:

   - Power: 110 volt circuit. One (1) 1-inch conduit from power source to mounting base for bollard unit or to wall unit mounting location.

   - Voice Connection: one (1) PE 89 4pr voice cable from closest voice source to bollard base or wall mount location installed in a 1-inch conduit.

   C. Emergency Phone Types:

   - Bollard Type: Talk A Phone ETP-MT/P Radius Tower Mount e/w Blue Light Strobe, Color – Safety Blue, Signage – White lettering “EMERGENCY.”

   - Wall Type: Talk A Phone ETP-WM/E Economy Wall Mount unit, with Blue Light, Color – Safety Blue, Signage – White lettering “EMERGENCY.”

   - Phone Units: Talk A Phone ETP 400 type units used for bollard and wall units.

   - ADA Requirements: Refer to 01 42 19 – EXHIBIT 1.
27 32 26 Ring-Down Emergency Telephones - EXHIBIT 1

Code Blue Phone Minimum Clearance Requirements

96" (MIN) CONCRETE SLAB

60" (MIN) CONCRETE SLAB

24" 12" 24"

24"
Code Blue Tower – Front Approach – Maximum Panel Height
Code Blue Tower – Side Approach – Maximum Panel Height
Code Blue Wall Unit – Side Approach – Maximum Panel Height
1. Code Blue Wall Unit – Front Approach – Maximum Panel Height
27 41 00 Audio-Video Systems

1. General

A. Summary: Section includes:

- Audio Visual equipment.
- Cabling and wiring specifications.
- Installation requirements.
- Misc.

B. Definitions:

- General Purpose Technology Classroom/Auditorium: Classroom equipped with enhanced audio and visual technology use for classroom instruction.
- Instructional Podium: Podium used for instructional enhancement and equipped with instructional audio visual peripheral equipment.
- Digital Projector (Optional): Projection unit used to project images via an instructional audio visual peripheral device (computer, DVD player, document camera).
- Document Camera/Visual Presenter: Visual peripheral device used to display transparencies and 3D objects via the digital/analog projection display device.
- DVD player: Visual and audio instructional peripheral device used to display videos with or without sound or to play music CDs.
- Component Switcher Unit: Unit used to display images via a digital projector from a connected audio visual instructional peripheral devices.
- Speakers: Amplification units used to amplify sound from the digital projector.
- Projector/Instructional Peripheral Equipment Control Panel: Podium mounted device unit used to select an audio visual instructional peripheral device which is displayed via a digital/analog projection display device.
- Ceiling Recessed Electrical Projector Screen: An installation consisting of a surface and a support structure used for displaying a projected image for the view of an audience.
• Cabling/Wiring: Use to connect all of the various audio visual components and instructional audio visual peripheral devices.

C. System Description:

• Discipline Specific Classroom/Lab: Equipment configuration shall consist of a ceiling installed digital projector, ceiling recessed electrical projector screen, ADA compliant Instructional Technology podium, computer, document camera/visual presenter, a DVD player unit, and a podium installed projector/peripheral control panel.

• Cabling Requirements: A cable set consisting of plenum rated cabling/wiring will be used to connected all A/V components.

2. Products

A. Equipment Requirements:

• Discipline Specific Classroom and Labs:
  ○ Instructional Technology Podium:
    ⇒ ADA Compliant.
  ○ Digital Projector:
    ⇒ 4:3 (standard) or 16:10 wide screen format.
    ⇒ Liquid Crystal Display (LCD).
    ⇒ 3000 lumen or better.
    ⇒ WXGA/XGA (will be determined by UNF’s Audio Visual Coordinator).
    ⇒ Four year warranty.
    ⇒ Projector connections:
      2 VGA with at least one 3.5 inch mini audio jack.
      1 composite with L/R RCA audio jacks.
  ○ Document Camera/Visual Presenter (Optional):
    ⇒ (1024 X 768) analog unit.
    ⇒ RGBHV.
  ○ DVD Player:
Composite or component cable configuration with sound.

- **Component Switcher:**
  - **Display Inputs:**
    - 1 RGBHV Monitor out.
    - 2 RGBHV.
  - **Display Outputs:**
    - 1 RGBHV WITH 3.5 audio follow-up.
    - 1 Composite.

- **Speakers (Self-Amplified Speakers):**
  - 1 Line Level Input/Sources.
  - Up to 25 watts of Class AB Power – Right at the speaker.
  - 12 volt AC power supply (UL rated) included.
  - Plenum rated back can assembly or all-in-one plenum rated speaker (preferred).

- **Ceiling Recessed Electric-Operated Projector Screen:**
  - DA-LITE Advantage Deluxe Electrol/Large Advantage Deluxe Electrol:
    - Plenum rated.
    - White matte.
    - Screen format/aspect ratio:
      - 16:10 wide screen.
      - Square format/aspect ratio if screen requirement exceeds 12 feet by 12 feet.

- Instructional Technology Classroom:
  - **Instructional Technology Podium:**
    - ADA compliant.
  - **Digital Projector:**
    - 16:10 wide screen format.
⇒ Liquid Crystal Display (LCD).
⇒ 3000 lumen or better.
⇒ WXGA/XGA (will be determined by UNF’s Audio Visual Coordinator).
⇒ Four year warranty.
⇒ Projector connections:

  2 VGA with at least one 3.5 inch mini audio jack.
  1 composite with L/R RCA audio jacks.

⇒ Projector Filter Accessibility:

  Filter must be accessible from either side or from the top of the projector.

○ Document Camera/Visual Presenter:
  ⇒ (1024 X 768) analog unit.
  ⇒ RGBHV.

○ DVD Player:
  ⇒ Composite or component cable configuration with sound.

○ Amplifier/Component Switcher:
  ⇒ Amplifier Input/Outputs:

    Amplified output:

    20 watts MONO.

    Speaker output type:

    4/8 ohms, 70 volts, 100 volts.

    Audio input:

    Two 3.5 mini stereo jacks to follow two of the three VGA display input signals.

    One L/R RCA audio to follow the composite display input signal.

⇒ Display Inputs:

  1 RGBHV Monitor out.
3 RGBHV.
2 Composite with L/R RCA or BNC audio.

⇒ Display Outputs:
   1 RGBHV WITH 3.5 audio follow-up.
   1 Composite.

○ Speakers:
   ⇒ 70/100 volts.
   ⇒ 2-way, 6-1/2 inch woofer, 1 inch tweeter, 7.5/15/30/60 watt power.
   ⇒ Speaker, transformer, housing, grill and T-Bar support bracket.
   ⇒ Plenum rated back can assembly/or all-in-one plenum rated speaker (preferred).

○ Ceiling Recessed Electrical Projector Screen:
   ⇒ DA-LITE Advantage Deluxe Electrol/Large Advantage Deluxe Electrol:
      Plenum rated.
      White matte.
      Screen format/aspect ratio:
      16:10 wide screen.
      Square format/aspect ratio if screen requirement exceeds 12 feet by 12 feet.

● Conference Rooms:
   ○ Digital Projector:
      ⇒ 4:3.
      ⇒ Liquid Crystal Display (LCD).
      ⇒ 3000 lumen or better.
      ⇒ XGA (will be determined by UNF’s Audio Visual Coordinator).
      ⇒ Four year warranty.
      ⇒ Projector connections.
2 VGA with at least one 3.5 inch mini audio jack.
1 composite with L/R RCA audio jacks.

○ DVD Player:
  → Composite or component cable configuration with sound.

○ Component Switcher:
  → Display Inputs:
    1 RGBHV Monitor out.
    2 RGBHV.
  → Display Outputs:
    1 RGBHV with 3.5 audio follow-up.
    1 Composite.

○ Speakers (Self-Amplified Speakers):
  → 1 Line Level Input/Sources.
  → Up to 25 watts of Class AB Power – Right at the speaker.
  → 12 volt AC power supply (UL rated) included.
  → Plenum rated back can assembly or all-in-one plenum rated speaker (preferred).

○ Ceiling Recessed Electric-Operated Projector Screen:
  → DA-LITE Advantage Deluxe Electrol/Large Advantage Deluxe Electrol:
    Plenum rated.
    White matte.
    Screen format/aspect ratio:
    16:10 wide screen.
    Square format/aspect ratio if screen requirement exceeds 12 feet by 12 feet.

**B. Wire, Cable, Connectors, and Accessories:** Contractor will supply and install all appropriate cables using Owner-provided conduit pull boxes, or cable paths.
Contractor shall supply and attach all appropriate connectors for cabling and equipment installed under this scope of work.

- **Cable:** All cabling shall be plenum rated cabling used throughout unless specifically noted otherwise.

- **Baseband Video Cable for Local Origination:** Coaxial type cable with copper center conductor, Teflon dielectric, tinned copper double braid shield providing 98 percent shield coverage, and plenum rated jacket. Cable shall have 75 ohm impedance, and it shall have within the 0-50 MHz band. Submit sweep test certification before installation.

- **RGBHV Cables:** RGB signals shall be communicated over super high resolution 75 ohm BNC cables with color-coded red, green, blue, and black insulation within a single surrounding jacket.

- **Male Cable Connectors:** All male connectors to be one-piece, crimp/pressed-on connectors with separate ferrules.

- **Cable Marker Labels:** All labels must be machine printed, typed or marked with permanent clearly visible non-erasable marker and/or attached to the cables.

### C. Submittals

- Provide a complete listing of all components, materials and services required for a complete and fully operational system. List the manufacturer, model number, quantity provided, and short description of each item.

- Provide product specifications for each component and detail drawings of overall system/subsystem design.

### D. Project Record Documents

- Submit two (2) complete sets of all “Rough-In” drawings revised to “As-Built” status at the completion of the project. Drawings are to show:
  - Final “As-Builds” shall include all Vendor-supplied and Owner-supplied components, wiring, devices including, but not limited to:
    - Control system.
    - Video system.
    - Audio system.
    - RGBHV/VGA system(s).
Video/data projector.

Power distribution system.

Hard copy of control system programming/code (Crestron system).

- Any changes or modifications to the contract documents.
- Locations of all equipment, pull boxes, termination, wiring with tag numbers/descriptors of all cables.

Submit all custom programming, software, and documentation developed for project in appropriate digital and hard copy format(s).

Provide verification, signed by Owner's designated representative, stating that system documentations and manuals have been received, and operation training has been completed.
28 00 00 Electronic Safety and Security
28 00 00 General Safety and Security Requirements

1. General

   A. Summary: This section contains the Owner’s project requirements for the
design of fire alarm systems, as well as equipment and installation.

   B. Submittals: A copy of the electrical submittals shall be provided to Physical
Facilities concurrent with the engineer’s review, not for contract compliance-
related approval, but to allow Physical Facilities to become familiar with the
products to be maintained.

   C. General Requirements:

   • All systems shall be designed in a manner to facilitate ease of maintenance.
Adequate access to accomplish all normally required maintenance without
removal of other than access panels is mandatory.

   • The electrical system shall be designed to facilitate the installation of
components in a serviceable manner. Complete wiring and component
diagrams shall be included in the construction documents to verify that the
design intent is constructible and maintainable.

   • Clearances suggested by manufacturers for equipment maintenance, removal,
and replacement shall be indicated on 1/4 inch scale electrical room drawings
and accommodated by the layout. Larger and heavier components that may
require future removal or replacement shall be identified on the drawing and a
clear path identified to the building exterior. Door sizes, lifting supports, and
other pertinent information shall be identified on the drawings.

   • UNF does not allow stand alone security systems. All independent facility
security systems are to be remotely monitored by UNF’s Police Department.
This monitoring is achieved via each security system’s connection to the
facility’s fire alarm panel.

   • For individual areas occupant protection, UNF utilizes panic buttons which are
connected to the facility’s fire alarm panel. See EXHIBIT 1 for standard hold-
up (panic alarm) device.
269R/270R/269SN

ADEMCO’s series of hold-up devices have been designed for silent operation. Available in a stainless steel cover or hardwired, V-Plex and wireless versions, they mount quickly and easily in discreet locations. They are ideally suited for use in locations such as banks, jewelry stores, retail establishments or any situation that requires hold-up notification.

FEATURES:
- Silent operation
- Double-pole double-throw contacts for multi-notifications
- Two 45" screw terminals with EOL resistor splicing terminal
- Adhesive pads for temporary positioning while installing
- Stainless steel cover (269R and 269SN)
- Fully supervised
- Convenient reset key for testing and/or reset of alarm

SPECIFICATIONS:
- Switch type: Plunger type DPDT
- Switch action: Selectable latching or momentary
- Switch rating: 0.2A @ 30VDC max.
- Connections: four position 45" screw terminal block for each output side with EOL resistor splicing terminal
- Operating temp: 4°F to 140°F
- Dimensions: 3.5"L x 2.0"W x 1.25"D
- Listed for UL/ES Hold-Up alarm units and systems

ORDERING:

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>269R</td>
<td>Hardwired Hold-Up switch with stainless steel cover</td>
</tr>
<tr>
<td>270R</td>
<td>Hardwired Hold-Up switch in plastic case</td>
</tr>
<tr>
<td>269SN</td>
<td>V-Plex Hold-Up switch with stainless steel cover (polishing loop only)</td>
</tr>
<tr>
<td>5869</td>
<td>5800 Series Wireless Hold-Up Switch</td>
</tr>
</tbody>
</table>

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105 Elmway Way, South, NY 11781

Page 310 of 330 Revised: 12/16/2010
**269R/270R/269SN**

**Front with Cover Removed**
- Latching Arm can be removed to convert the device to a momentary type switch
- Wiring Guides
- Double pole double throw contacts for multiple notifications
- Stainless steel cover (269R/269SN)

**Back**
- Adhesive pads for temporary positioning while installing
- Opening for wire entry, with removable area for surface mount wiring

**Side**
- Low profile sides for easy wiring
- 45° Screw Terminals

**Hold-up Devices**

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University of North Florida
Design Guidelines and Standards

28 00 00 General Safety and Security Requirements – EXHIBIT 1

Page 311 of 330 Revised: 12/16/2010
28 31 00 Fire Detection and Alarm

1. General

A. The campus fire alarm system is tied into a central head computer located in the University Police Department dispatch office. New fire alarm systems shall be integrated into the existing campus Simplex fire alarm fiber token ring. Update the head end points list and graphics as required.

B. Exterior Devices:

   ● Provide horns and strobes on exterior wall at building entry locations.

C. Voice Annunciation:

   ● The campus fire alarm system also serves as an emergency notification system via the fire alarm speakers. All building fire alarm systems shall have voice evacuation capability. Prior to Substantial Completion, a voice test of the emergency notification system shall be conducted by the State Fire Marshal.

D. Basic Requirements for Installation: All new buildings, and buildings undergoing major renovations, shall be equipped with a complete fire alarm system compliant with current code requirements. Provide all hardware necessary to tie in with the existing campus monitoring and emergency notification system located in University Police Department.

E. Coordination: Coordinate all installations with Physical Facilities and University Police Department.

F. Licensing: All work on fire alarm systems shall be performed by an individual or firm licensed as an “Alarm System Contractor I” as required by Florida Statute 489.505(a), other parts of said statute, and complies with all other licensing requirements of relevant codes and laws. Further, this individual or firm shall be either the prime constructor on such work or a subcontractor to the prime constructor.

2. Products

   A. Equipment:

      ● Manufacturer: Simplex.

      ● Panels:
Fire Alarm Control Panel (FACP): Provide programmable FACP with programmable field devices. Fire control panel shall meet NFPA 72 detector sensitivity readout/printout requirements. A history of a minimum of 200 events shall be readable on the fire alarm control panel display (200 events for alarm and 200 events for trouble).

Annunciator Panel: Annunciator panel shall be located where the Fire Department will enter the building. Annunciation panel shall duplicate all functions of the FACP.

Pull Stations: Pull stations shall be single action type. Glass rods for pull stations are prohibited. Pull stations shall be mounted 42 inches above finished floor to center of the device.

Alarm Units: Alarm units shall be combination speaker and strobe. Alarm units shall be mounted 80 inches above finished floor to center of the device.

Air Handling Unit Shutdown Relay: The Air Handling Unit shutdown relay shall be supervised.

Junction Boxes And Conduit: All junction boxes on the fire alarm system shall be painted fire-truck red and all conduit shall be spot painted red or pre-painted.

Duct-Mounted Smoke Detectors: Non-radioactive smoke detectors and duct detectors are preferred (i.e., photoelectric). The operation shall be to shut down the unit, and provide notification.

B. Systems Operational Description:

Signal initiation from:
- Heat detectors.
- Flame detectors.
- Smoke detectors.
- Duct smoke detectors.
- Verified automatic alarm operation of smoke detectors.
- Automatic sprinkler system water flow.
- Heat detectors in elevator shaft and pit.
- Fire-extinguishing system operation.
○ Fire standpipe system water flow.

• Signal initiates the following actions:
  ○ With the exception of the 5th and 6th items above; display banner message on graphics stating “Call JFRD.”
  ○ Continuously operate alarm notification appliances.
  ○ Identify alarm at the FACP.
  ○ Transmit an alarm signal to University Police Department.
  ○ Unlock electric door locks in designated egress paths.
  ○ Release fire and smoke doors held open by magnetic door holders.
  ○ Activate voice/alarm communication system.
  ○ Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
  ○ Activate smoke-control system (smoke management) at firefighter smoke-control system panel (where applicable).
  ○ Close smoke dampers in air ducts of designated air conditioning duct systems.
  ○ Recall elevators to recall floors.
  ○ Activate emergency lighting control.
  ○ Activate emergency shut-offs for gas and fuel supplies.
  ○ Record events in the system memory.

• Supervisory signal initiation by:
  ○ Valve supervisory switch.
  ○ Low-air-pressure switch of a dry-pipe sprinkler system.
  ○ Elevator shunt-trip supervision.

• Trouble signal initiation by:
  ○ Open circuits, shorts, and grounds, in designated circuits.
  ○ Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
○ Loss of primary power at FACP.
○ Ground or a single break in FACP internal circuits.
○ Abnormal AC voltage at the FACP.
○ Break in standby battery circuitry.
○ Failure of battery charging.
○ Abnormal position of any switch at the fire-alarm control unit or annunciator.
○ Fire-pump power failure, including a dead-phase or phase-reversal condition.
○ Low-air-pressure switch operation on a dry-pipe or preaction sprinkler system.

● System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at FACP and remote annunciators.

3. Execution

A. Field Quality Control:

● Nomenclature: Final University room numbers and names shall be used when programming the system. Coordinate with Facilities Planning prior to programming.

Testing: Prior to Substantial Completion, the fire alarm and emergency notification systems shall be completely tested and certified by the installing contractor prior to the contractor’s request for a final inspection by the State Fire Marshal and Building Official.
32 00 00 Exterior Improvements
32 00 00 General Landscape and Irrigation Information

1. General

A. General Landscape Design:

- Landscape architects are encouraged to be innovative as they blend new landscapes into the UNF campus. New plant species contribute to the educational opportunities on campus. A list of existing campus plant species is available on request. UNF horticulturists welcome conversations with landscape architects and other planners.

- The primary role of the campus landscape is to provide a welcoming and safe environment for the UNF community. UNF expects the landscape architect to blend new landscape projects into the overall campus landscape, follow campus hardscape and furnishing standards, and address the following:
  - Add color while minimizing use of annuals.
  - Minimize future trimming demands by using plants of appropriate maximum size.
  - Reduce future irrigation, fertilization, and pesticide demands by selecting plants appropriate to campus soil and climate conditions.
  - Restrict plantings to Duval County native plants in spaces adjacent to natural areas (especially the Sawmill Slough Preserve).
  - Support education by introducing new plant species to the campus landscape.

- Security concerns require the maintenance of sight lines through campus. In general, shrubs and herbaceous perennials will be no more than three feet high and tree canopies will have at least seven feet of clearance.

- Exceptions to this general rule are:
  - Young trees that can be trimmed to a seven foot clearance as they grow.
  - Open, airy plants that do not create a visual barrier.
  - Specimen shrubs in open areas that do not provide hiding places.

- Every effort should be made to conserve existing trees every day and, especially, during construction activities. Before vehicles and equipment enter a landscape area, all trees that are not scheduled for removal will be protected...
with fencing. Protection for existing trees will encompass 1.5 times the radius of the drip line of the tree for the duration of the project. Depending upon circumstances and the sensitivity of the tree species, UNF horticulturists may approve a minimum protected area equal to the drip line of the tree. Tree roots within this area are not be disturbed. The grade will not be changed in this area. Nothing will be parked or stored within this area. If the tree cannot be properly protected, it should be removed as part of the project.

- Landscape plans should incorporate new trees into landscape beds to protect their trunks from future injury by vehicles and lawn maintenance equipment. Maintain the natural campus edges wherever possible.

- City of Jacksonville code will guide the planting of trees in parking lots. Parking lot islands tend to be small, hot and dry. Smaller, heat and drought tolerant trees, such as crape myrtle, *Acacia stenophylla* and *Parkinsonia aculeata*, are well suited to these situations. Trees for narrow spaces must be of an appropriate mature size to avoid future problems with raised curbs and sidewalks, asphalt damage and blocked security lights. Palms and large, drought tolerant shrubs limbed up into arborescent form, such as *Acca, Loropetalum, Pittosporum* and *Ternstroemia*, are appropriate for small spaces. Larger shade trees like live oaks should be planted where sufficient space exists for them to develop to full size.

- As a general rule, bahai sod can be utilized in parking area islands where no irrigation is provided.

- Bollards shall be 6 inches in diameter.

**B. Miscellaneous Items Related to Landscape:**

- Each outdoor trash receptacle will be accompanied by a beverage container recycle receptacle.

- Installing landscapes, including sod, below building overhangs is not sustainable. Where overhangs are necessary, provide appropriate hardscape features below.

- Provide hose bibs on each building exterior.

- Provide adequate sidewalk width for carts and pedestrians (where carts are permitted).

- Flair sidewalk ends and intersections to help reduce worn areas at these points. Avoid ‘T’ intersections in sidewalks where no barrier exists to stop
pedestrian traffic. Provide for adequate cart and maintenance access around buildings. Space bollards for cart access.

- Mulch (recycled wood or cypress - dyed red) all landscape beds after planting for control of weeds and minor erosion. Apply an appropriate pre-emergent before application of mulch.

C. Sidewalks:

- General: Separate sidewalks shall be provided with all new construction, or major re-construction in accordance with FDOT standards.

- Construction Requirements:
  - Concrete sidewalks shall be a minimum of 6 inches thick, 4000 psi, with welded wire or fiber mesh reinforcement. Welded wire shall be supported on “chairs” for proper placement in the concrete.
  - Sidewalk width shall be a minimum of 6 feet, or should match surrounding sidewalk patterns and widths.
  - Expansion joints shall be a maximum of 10 feet apart, with saw cuts midway between each expansion joint.
  - Provide light broom finish.
  - Sidewalks shall be placed on undisturbed soil wherever possible, otherwise a sub-base compacted to 90 percent and a limerock base compacted to 95 percent of maximum density.
  - For UNF main campus pedestrian sidewalks, a brick banding pattern is to be utilized to provide a visual indicator that the sidewalk is a “connecting” campus sidewalk.
32 17 00 Paving Specialties – EXHIBIT 1

NOTE:
FOR SPECIAL EMPHASIS CROSSWALK
REFER TO F.D.O.T. STANDARD INDEX
17348 (SHEET 8 OF 14)

SPECIAL EMPHASIS CROSSWALK

RAISED CROSSWALK DETAIL

SECTION "A-A"
32 17 26 Tactile Warning Surfacing

1. General

A. UNF utilizes clay fired bricks with truncated domes. Style / type is Whitacre-Greer ADA Paver #30 (available at Cash Building Supply) as basis of design. These units are to be utilized at all sidewalk intersections with paved vehicular drive areas.
32 80 00 Irrigation

1. General

A. Irrigation: Reclaimed water shall be utilized for all irrigation unless potable water is required in specific areas to meet Health Department requirements.

B. Sprinklers:
   ● Turf Areas: Rotor type.
   ● Planting Beds: Misters or drip type.
   ● Coverage: 100 percent.
   ● Sprinklers of different types shall not be combined on the same zone.
   ● Provide bubblers for trees 2-inch caliper and larger.

C. Available Pressure and Flow: The designer shall consult with the University to determine the available flow and pressure from the existing distribution system.

D. Contractor shall consult with the University before programming the irrigation system clocks.

E. Every new landscape installation will be irrigated. In most cases, new trees should have bubblers.

F. All applicable St. John’s Water Management District irrigation rules apply at UNF.

G. All components are for reclaimed water.

H. Minimize aerosol from reclaimed water irrigation around designated eating areas.

I. Use Rainbird Maxicom controllers (ESP-12 through numbers 40 SAT).

J. Work through UNF’s IT Department to provide communication from the MaxiCom CCU to the controller (data line if possible, or wireless).

K. Install master valves on both potable and reclaimed on down side of main lines at least ten inches away from any T’s or elbows.
L. Install flow sensors at least ten inches per 1 inch of pipe diameter away from master valves.

M. Run IP-19-6P wire from flow sensors to controller.

N. Run 2 single direct burial wires (different colors) from master valves to controller.

O. Install grounding wires, plates, and rods. Grounding rod needs to be ten feet from the controller (6 solid copper wire). Grounding plate to be installed twenty-five feet from the grounding rod.

P. Tracer wire to be placed on top of all irrigation main lines.

Q. Glued fittings are only acceptable with 2-1/2 inch irrigation pipe and below. Any larger pipe diameter to be connected with mechanical lug type fittings with gaskets.

R. Valve boxes to be chosen by number of valves located in box. Boxes to be supported by bricks with gravel placed in bottom.

S. Wire to be 14 gauge direct burial wire with proper wire nut and grease filled cap (DBY). All zone wire to be run back to closest junction box; avoid splices.

T. All wire repairs are to be made by a Maxicom certified contractor and all work is to be tested by UNF’s Physical Facilities irrigation group before final acceptance.

2. Products

A. All irrigation pipe to be PR200 (purple pipe).

B. Spray heads to be Rainbird 1800 series.

C. Rotors for athletic fields to be Rainbird Falcon 6504, and for all common campus areas to be Rainbird 5000. All rotors to be connected with flex hose only.

D. Valves to be PESB-R (Scrubber valve).

E. Valve boxes are generally VP 10 inch, 12 inch, or 24 inch.
32 90 00 Planting

1. General

A. Planting Preparation:

- Remove “black” burlap, plastic, or any inorganic covering from root balls prior to planting.
- Remove rope or strapping from top of root ball after placing in ground.
- Slit burlap root ball cover after placing in ground.
- Remove top of wire basket.
- Handling the root ball or container instead of strapping the trunk when unloading will avoid most of the commonly observed trunk injuries and scarring. While burlap may be left on a plant’s root ball, all non-biogradable and slowly biodegradable materials will be removed (containers, plastic wraps, ropes, flagging tape on the branches, plant labels, etc.). Wire baskets may be left in the ground but above-ground portions must be cut away. Care must be taken also to avoid damaging or weakening the root balls. Containerized plants that are overgrown and rootbound must be avoided. The installer should backfill the planting hole with native soil without amendments. Plants will be planted so the base of the plant is planted at surrounding grade, not higher or lower. The root balls of all plants should be free of weeds. A water well should then be constructed around trees at planting to contain water. Mulch depth should be no more than three inches deep around large trees (less with smaller plants). Mulch will be spread to, but not against, the bases of woody trees, shrubs and vines. Stake all trees that have a caliper of three inches or more. Stake otherwise as needed without nailing into the trunk. In particular, newly planted cabbage palm, *Sabal palmetto*, at the proper depth require staking.
- Provide minimum 4 inches of topsoil. Perform pH test, adjust pH level of soil to 6.5.
- Before sodding, the soil surface should be raked and leveled. Sod squares will be placed edge to edge. Sod installations will be rolled and top dressed as needed and will include low-nitrogen fertilization after installation. Mowing shall be the responsibility of the contractor for the first 30 days after installation.
- Slopes for mowed turf will be 15 degree slopes or lower. Steeper slopes must be landscaped.
B. Turf and Grasses:

- In general, Floratam St. Augustine grass is the standard turf in the irrigated campus core. “High activity” lawns are Certified Tifway 419 Bermuda grass. Unirrigated perimeter and roadside turf is Bahia grass. UNF horticulturists will consider new, low maintenance turf grasses as new selections and species come available. Consult with the University on grass selections during design.

C. Plants:

- Plans for new building landscapes will be reviewed and adjusted by horticulturists in Landscape and Grounds. UNF horticulturists will approve substitutions and help contractors locate sources.

D. Shrubs & Trees:

- Shrubs and trees will be Florida #1 quality or higher (Florida Division of Plant Industry Grades and Standards). Herbaceous perennials should be healthy, full, and established in the container. The installer will make every effort to avoid injury to tree trunks.

- Several plants are undesirable on campus. As of 2009, they are:
  - All plants listed as exotic pest plants by the Florida Exotic Pest Plant Council (FLEPPC, http://www.fleppc.org).
  - *Paspalum quadrifolium* (syn. *Paspalum quadrifarium*, possibly not a problem but a USDA scientist is concerned about the potential for weediness).
  - King sago, *Cycas revoluta*, and other *Cycas* species (due to aulacaspis scale).
  - Callery pear, *Pyrus calleryana* “Bradford” and other cultivars (poor branching, poor color in our area and susceptibility to fire blight disease).

- Ground covers will be planted close enough that they will grow in to compete with weeds within one year.
- Tree grates will be not be used.
- Trees 2-inch caliper and larger shall be staked.