SECTION 0101-A
ALTERNATES TO THE CONTRACT

THE GENERAL CONTRACTOR SHALL INDICATE ON THE PROPOSAL FORM, IN THE APPROPRIATE SPACE PROVIDED, THE AMOUNT OF MONIES TO BE DEDUCTED FROM THE BASE BID FOR THE FOLLOWING ALTERNATE WORK ITEMS.

1. ALTERNATE G-1: DEDUCT

The General Contractor shall stipulate where indicated on the proposal form the amount of monies to be DEDUCTED FROM the Base Bid to delete the Performance and Labor/Material Payment Bond from the Contract.

2. ALTERNATE G-2: DEDUCT

The General Contractor shall stipulate where indicated on the proposal form the amount of monies to be DEDUCTED FROM the Base Bid to delete the materials, labor, and equipment to install the asphalt shingles to the existing building and the new addition. Under this alternate, the GC shall install the roof sheathing and roof wrap only to the new addition. The roof shingles, ice & water shield, drip edge, and ridge vent shall be applied under separate contract by the Owner.

SECTION 0010
SUPPLEMENTARY GENERAL CONDITIONS

1. APPLICATION

1.1 The General Conditions of the Contract for Construction (Standard Form of the American Institute of Architects, Document A201), Supplementary General Conditions, Special Conditions, and General Requirements shall apply to all trades and divisions of the Construction Contract and all sections of the Specifications.

2. MODIFICATIONS

The following modifications of the General Conditions (AIA) shall be in addition and take precedence over the original provisions in the event of conflict.

2.1 PAYMENTS

2.11 Immediately after execution of the Contract, each Contractor shall submit for approval a breakdown of the Contract sum.

2.12 Unless explicitly stipulated differently in the Contract Agreement, the Contractor shall receive payments monthly, based on the work completed and the evaluation in accordance with the approved breakdown.

2.13 The payments shall be in the amount of ninety percent (90%) for completed work and seventy-five (75%) for materials and equipment delivered to and properly stored on the project site.

2.14 The Owner shall retain ten percent (10%) of the total cost of the Contract until final acceptance of the building.

2.2 INSURANCE

2.21 Each Prime Contractor shall carry Workmen's Compensation Insurance for every person employed by him on the premises and shall maintain such insurance in full force during the entire time of this Contract.

2.22 Each Prime Contractor shall carry Comprehensive General and Automotive Liability Insurance of $ 500,000.00 Combined Single Limit (Minimum).

2.23 Any exclusions in the policy as to "loss resulting from excavation, pile driving, shoring, underpinning, razing, or demolition of any building or structure" shall be specifically deleted from the policy.

2.24 Each Prime Contractor shall deliver to the Owner, within ten days after award and prior to execution of the Contract, Certificates of Insurance, and except where prohibited by law, a properly executed and duly registered Stipulation Against Liens.

2.25 The Owner shall purchase and maintain property insurance upon the entire work at the site to the full insurable value thereof. This insurance shall include the interests of the Owner, the Contractors, the Sub-Contractors and the Sub-Subcontractors in the work and shall insure against the perils of fire and extended coverage and shall include "all risk" insurance for physical loss or damage including, without duplication of coverage, theft, vandalism and malicious mischief.

2.3 PERFORMANCE AND PAYMENT GUARANTY

2.31 It shall be stipulated in the Contract Agreement the guaranty for faithful performance and payment of all obligations.

2.32 If performance bond guaranty is stipulated, the Contractor shall execute and deliver to the Owner, within ten days after the award and before signing the Contract, a corporate surety bond (to be executed by a surety company which is satisfactory to the Owner) in the sum of one hundred percent (100%) of the amount of the Contract and the payment of all obligations arising from the Contract. The cost of executing the bond guaranty shall be paid by the Contractor.

2.33 Any other form of guaranty for faithful performance of the Contract and payment of all obligations arising from the Contract shall be stipulated in the Contract Agreement.

2.4 COMPLETION

2.41 All work shall be substantially completed at time stipulated in the Contract Agreement or in time extended for justifiable delays, if any.

2.42 A building or any other construction work shall be considered substantially completed when ninety-five percent (95%) of work is completed and the building is ready for occupancy or the premises for use.

2.5 LIQUIDATED DAMAGES

2.51 If so stipulated in the Contract Agreement, the Contractor shall pay liquidated damages, in the amount stipulated, for every calendar day beyond the Contract completion time or granted extension.

2.52 Refer to the Special Conditions Section of this Specification to determine if liquidated damages apply to this project.

SECTION 0015
GENERAL REQUIREMENTS

1. EXAMINATION OF SITE

1.1 Contractor is requested to visit the site, compare the drawings and specifications with any work in place, and inform himself as to all conditions, including other work, if any, being performed. Failure to visit the site will in no way relieve the Contractor from the necessity of furnishing any materials or performing any work that may be required to complete work in accordance with drawings and specifications without additional cost to the Owner.

2. TEMPORARY FIELD OFFICE

2.1 The General Contractor shall provide and maintain a temporary field office at the site, equipped with heat, telephone, plan desk and file plan. Office shall be of sufficient size for use by Contractor and Owner's Representative. Locate office on site where directed and remove when work is completed. Contractor may provide other office and storage facilities as they may consider essential to their operation.

3. DATA AND MEASUREMENTS

3.1 The data given herein and on the drawings is as exact as could be secured. Their absolute accuracy is not guaranteed, and the Contractor shall obtain exact locations, measurements, levels, etc., at the site and shall satisfactorily adapt his work to the actual conditions at the building. Do not scale blueprints. Verify all dimensions with the Architect prior to commencing work. Only Architectural Drawings may be utilized in calculation. Other (mechanical, etc.) are diagrammatic or schematic.

4. TEMPORARY SERVICE FACILITIES

4.1 The General Contractor shall pay the cost of all utilities for all services used by and for all trades during construction of the project. The costs of furnishing, installing and operating the equipment for these services shall be provided by the various contractors as herein described.

A. Water: Unless specified otherwise in the Special Conditions the Mechanical Contractor shall provide meter and minimum 1" water service from main to building where directed. When requested by local officials, provide standpipes where and as required. Piping removed when no longer needed.

B. Electricity: Unless specified otherwise in the Special Conditions the Electrical Contractor shall provide temporary power service and meter; grounded type duplex outlet, minimum #12 wire, located every 60 feet throughout; wiring fixtures and lights to adequately light building areas for all trades. All installed in such manner as not to endanger life or property.

C. Toilets: Unless specified otherwise in the Special Conditions the General Contractor shall provide and maintain temporary chemical toilet facilities for use of all workmen.

D. Temporary Heat: The Heating Contractor mentioned hereinafter shall refer to the Mechanical or Electrical Contractor, or both, and applies to the contractor who provides the permanent heating system. All heating required by Contractor prior to enclosure of the building shall be furnished and paid for by the Contractor requiring same. Heating units must be of approved types kept in safe condition. All heating required after temporary enclosure of the building including completion of roof, enclosure of doors and

windows and other openings to provide a reasonable heat retention, shall be classified as "Temporary Heat". The General Contractor shall pay all fuel costs and direct the use of heating system to provide temperatures as required for construction needs. The Heating Contractor shall furnish, install, and operate the system to provide for temporary heat, and be responsible for the heating system until acceptance of the building. He shall maintain a temperature above freezing at all times, provide temperature as required by all trades during workings hours and as specified for various stages of the work, maintain a minimum temperature of 60 degrees after finishing work is begun and until acceptance of the building by the Owner. If for any reason the permanent heating system is not operable, the Heating Contractor shall provide, install and operate approved heating units for temporary heat as required. General Contractor shall pay fuel costs.

If the Heating Contractor fails to provide heat when and as required, the Owner's Representative may authorize the General Contractor to provide same and costs thereof shall be charged back to the Heating Contractor.

Heating Contractor shall clean all coils and change all filters in permanent heating units when the building is ready for occupancy.

All costs (including fuel) for operation of the permanent heating system for testing purposes, shall be paid by the Heating Contractor.

Any operation of all or any part of the heating system shall not constitute acceptance of the system, or a waiver of warranty on any part of the system. The one-year guarantee period shall not commence until final acceptance, by the Owner, of the Contractor's work on the total project.

5. DELIVERY AND STORAGE OF MATERIAL

5.1 Each Contractor shall make provisions for the delivery and safe storage of all his materials and shall make the required arrangements with the other contractors for the introduction into the building of equipment too large to pass through finished openings. Materials shall be delivered at such stages of the work as will expedite the work as a whole and shall be marked and stored in such a way as to be easily checked and inspected.

6. DRAWINGS AND SPECIFICATIONS

6.1 These Specifications are intended to supplement the drawings and it will not be the province of the Specifications to mention any part of the work which the drawings are competent to fully explain in every particular and such omission is not to relieve the Contractor from carrying out portions indicated on the drawings, they are to be supplied even if of such nature that they could have been indicated thereon.

6.2 In case of disagreement between drawings and specifications, or within either drawings or specifications, the better quality or greater quantity of work shall be estimated and the matter referred to the Architect or Engineer for decision.

7. SHOP DRAWINGS

7.1 No work shall be fabricated by the Contractor, save at his own risk, until approval of the shop drawings has been obtained. Not later than sixty days after "Notice to Proceed" shop drawings shall be received by the Architect.

7.2 Drawings and schedules shall be accompanied by "Shop Drawings for Approval" form and a letter of transmittal which shall give a list of the numbers and dates of the drawings submitted. Drawings shall be complete in every respect and bound in sets.

7.3 The Contractor shall submit all drawings and schedules sufficiently in advance of construction requirements to allow ample time for checking, correcting, re-submitting and rechecking.

7.4 The drawings submitted shall be marked with the name of project, numbered consecutively and bear the stamp of approval of the Contractor as evidence that the drawings have been checked by the Contractor. Any drawings submitted without this stamp of approval will not be considered and will be returned to the Contractor for re-submission. If the shop drawings show variations from the requirements of the contract because of standard shop procedures, these variations shall be noted in his letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment; otherwise the Contractor will not be relieved of the responsibility for executing the work in accordance with the contract even though such shop drawings have been approved.

7.5 If a drawing as submitted indicates a departure from the contract requirements which the Architect finds to be in the interest of the Owner and to be so minor as not to involve a change in the contract price or time for performance, he may approve the drawings.

7.6 The approval of shop drawings will be general, and except as other wise provided, shall not be construed:

a) As permitting any departure from the Contract requirements;

b) As relieving the Contractor of the responsibility for any error in details, dimensions or otherwise that may exist;

c) To constitute a blanket approval of all dimensions, quantities, and details of the materials and equipment shown;

d) As approving departures from additional details or instruction previously furnished by the Architect.

7.7 At least five (5) copies of all shop drawings and layout drawings and schedules shall be submitted to the Architect.

7.8 The Architect will keep two copies of the approved drawings for his file, and return the rest to the Contractor.

7.9 Samples: The Contractor shall furnish for approval all samples as directed. The work shall be in accordance with approved samples. Sample items upon their approval may be incorporated into the work where applicable.

8. EQUIPMENT AND CONSTRUCTION METHODS

8.1 The Contractor shall be responsible for the equipment and methods used in the erection of his work covered by the contract, but the Owner reserves the right to approve such equipment and methods.

8.2 If, at any time, the Contractor's working force, in the opinion of the Owner's Representative, shall be inadequate for securing the necessary progress, as herein stipulated, the Contractor shall, if so directed, increase the work force or equipment to such extent as to give reasonable assurance of compliance with the schedule of progress, but the failure to make such demand shall not relieve the Contractor of his obligation to secure the quality, the safe conduct of the work, and the rate of progress required by the contract. The Contractor alone shall be responsible for the safety, efficiency and adequacy of his plant, appliance and methods.

8.3 Workmanship shall be of the best. The good appearance of finished work shall be of equal importance with its mechanical efficiency. No makeshifts will be permitted anywhere in the work, and all portions of the work shall be laid out and installed that the work as a whole is of uniform quality and appearance.

9. COOPERATION

9.1 It is the intention of the Contract Documents that the various trades engaged in the work shall cooperate in the execution of the work. The Contractors will be expected and required at all times to require cooperation from all subcontractors engaged in the work. The Contractors shall plan the work in such manner that all parts of the construction will fit in with other parts or sections in a proper manner and at the proper time.

9.2 Prime Contractors shall afford other contractors and subcontractors reasonable opportunities for making measurements, for the introduction and storage of their materials and equipment and for the timely execution of their work.

9.3 Prime Contractors and all subcontractors shall properly connect and coordinate their work with the work of other contractors as so to avoid unnecessary cutting and patching and delays in the work of other contractors.

9.4 In the event timely delivery of materials and equipment cannot be made and to avoid delay in the work of the other contractors, the affected contractor may arrange with other contractors for the later introduction of his materials or equipment. Costs of these arrangements shall be paid by the contractor requesting them.

SECTION 0020
SPECIAL CONDITIONS

1. GENERAL

1.1 The Special Conditions included herein shall be made a part of this contract.

2. ARCHITECT

2.1 The administration of the contract shall be performed by the person or company listed in the contract agreement. In the event that administration by an Architect is not provided in the contract, the functions of the Architect, wherever called for in the Specifications, shall be exercised by the Owner.

3. PERMITS AND LOCAL CODES

3.1 Contractors shall comply with all applicable local codes and regulations.

3.2 The Contractor shall procure all necessary building permits. The Owner shall pay for the permits.

3.3 Inspection services required by local authorities shall be scheduled and paid for by the contractor.

4. UTILITIES

4.1 Utilities as required for construction shall be as hereinbefore stipulated in Section 0015 "General Requirements" paragraphs 4.1 (A) thru 4.1 (D) except as follows:

Water: Water for construction may be obtained from the Owner's existing water service within the existing building. The Plumbing Contractor shall extend a 3/4" C. W. branch to a hose bibb located in the area of the new work as directed by the Architect.

All Contractors are cautioned to take measures to avoid mis-use or waste of water on this project.

5. PROTECTION

5.1 Safety barricades, fences, temporary walks, signals shall be erected in compliance with the local building code and police regulations.

5.2 If work is performed in the existing building, the Contractor shall provide adequate protection for all parts of the building. All items on the premises shall be protected, moved as necessary, and properly replaced.

5.3 The Contractor shall provide dustproof enclosures where dusty work is performed.

6. MATERIALS

6.1 All materials shall be as shown on drawings and noted in the Description of Work and in the Specifications.

6.2 Any substitution shall be permitted only upon receiving a written consent from the Architect or the Owner.

6.3 Upon request by the Architect or the Owner for furnishing samples other than those listed in the Specifications, the Contractor shall submit the requested samples for approval.

7. LABOR

7.1 All work shall be performed in the best and most professional manner by mechanics skilled in their respective trades.

7.2 Mechanics, considered by the Architect to be unskilled, shall be dismissed from the work upon notice from the Architect.

7.3 This contract shall be subject to the labor laws of the state where the project is located and subject to labor rules and regulations of the local authorities.

8. PERFORMANCE

8.1 By submitting a bid, the bidder agrees and warrants that he has examined the drawings and specifications and found that they are adequate for proper completion of the project.

8.2 No claim for any extra charges will be allowed because of alleged impossibilities due to inadequate drawings or specifications.

8.3 The Contractor shall be responsible for verifying field measurements before ordering materials and prefabricated items. Any necessary adjustments between field measurements or between field measurements and drawings shall be made in accordance with the decisions of the Architect.

8.4 The Contractor shall coordinate the work of all trades and schedule the timing as not to cause delays to any phase of construction due to late scheduling of interconnected work.

8.5 After substantial completion of the project, the Contractor shall complete all defects and omissions noted at the final inspection in the time period agreed upon at the inspection.

8.6 The building and grounds shall be kept clean at all times. After completion of the contract and before receiving the final payment, the Contractor shall have all parts of the building cleaned wherever such cleaning is needed. The Contractor shall remove from the premises trash, rubbish, tools, equipment, and excess materials. The building and grounds shall be left in perfectly clean condition.

8.7 Unless specifically authorized by the Owner, radios shall not be 'played' on the site by the Contractor's personnel or his sub-contractors.

8.8 The Owner hereby reserves the right to discharge and bar any person or persons from the work site, who after verbal notification, would continue to practice conduct which is deemed to be profane in the opinion of the Architect or the Owner.

SECTION 0211
SITE PREPARATION

1. STIPULATIONS

1.1 The specifications sections "General Conditions", "Supplementary General Conditions", "Special Conditions", and "Special Requirements" form a part of this section by this reference thereto and shall have the same force and effect as if printed herewith in full.

2. WORK INCLUDED

2.1 The work covered by this section consists of furnishings all labor, equipment and appliances necessary to complete all site preparation and demolition required for the project in strict accordance with this section of the specifications and the drawings, including, but not limited to:

a) Top soil removal, clearing and grubbing.
b) Removing obstructions to new work.

3. PRECAUTIONS

3.1 Perform work in a manner to prevent damage or injury to property or the public. Provide barriers, warning lights and other protection as required and protect as necessary any existing monuments, bench marks or utilities that are to remain in service. Restore any damage to original condition or repair as directed at no additional cost.

3.2 Before starting work, protect any trees or shrubs shown or designated to be saved by boxing or wire fencing staked securely in place or other approved means, maintained until completion of work, or until removal may be directed by the Owner.

3.3 The exact location of water, sewer, gas and electric underground utilities has not been determined and those locations shown on the drawings are approximate. The Contractor shall contact each utility to have exact locations determined and 'staked-out' on the site. Provide (3) three days prior notice to utility companies prior to commencing excavation.

3.4 Contractors shall take adequate precautions during site preparation work to minimize dust in compliance with Federal and State Regulations pertaining to this work.

4. DISPOSITION OF UTILITIES

4.1 Make all necessary arrangements and pay all charges for relocating active utilities in the way of new work that must be moved and for shutting off and disconnecting utilities that are to be abandoned.

5. TOP SOIL REMOVAL, CLEARING AND GRUBBING

5.1 At the start of operations, strip and remove all top soil strata to the full depth, covering the areas of construction of the entire project. Top soil shall be deposited and stored at a location where directed by the Owner for reuse in final finish grading. The depth of top soil to be removed and reused will be determined after inspection and subject to the approval of the Owner. Provide straw bale dikes about top soil stockpile as required to contain erosion.

5.2 Clear the site of all obstructions to the work. Break up and remove existing paving where required. Remove trees and shrubs not designated to be saved and stumps and roots to a depth of at least one foot below grade, and other vegetation to a depth of at least 6". Clear off all stones, debris and rubbish. This material shall be removed from the site and properly disposed.

6. SALVAGE

6.1 Unless otherwise noted or directed, materials resulting from demolition operations shall be property of the Contractor, shall not be used in the work and shall be promptly removed from the site.

6.2 Any piping and/or conduits encountered that are not required to be removed shall be temporarily supported and maintained until permanent support has been restored.

SECTION 0220
EXCAVATING, BACKFILL AND ROUGH GRADING

1. GENERAL

1.1 The work covered by this section consists of all earthwork and related and incidental operations required to complete the project as indicated on the drawings and specified herein including but not limited to:

a) Stripping and stock piling topsoil
b) Excavating
c) Filling
d) Foundation drains and storm drainage piping
e) Backfilling
f) Porous fill under floor slabs on earth
g) Rough grading
h) Catch basins (Area Drains)
i) Soil conservation measures (As noted and/or detailed on the drawings)

2. WORK NOT INCLUDED

2.1 The following items of work are included in other sections of these specifications or in separate contracts:

a) Site preparation
b) Excavating for mechanical and electrical work
c) Finish grading and seeding

3. BASIS OF CONTRACT

3.1 All excavation under the Contract is classified earth excavation.

3.2 Definitions:

a) Earth excavation is excavation in all materials of whatever nature except excavation in rock as defined herein.
b) Rock is defined as any material which cannot be dislodged by a D-7 dozer equipped with a single tooth ripper or a CAT 235 hydraulic backhoe or equivalent without the use of drilling and blasting. Masses of rock exceeding 1/2 cubic yard in volume shall also be considered rock excavation. This classification does not include materials that can be removed by means other than drilling and blasting, but which for reasons of economy in excavating the Contractor chooses to remove by drilling and blasting.
c) Surplus excavated material is material which is not used as fill on the site.
d) Authorized excavation is excavation to the neat lines and limits shown and as specified. It includes excavation of material which the Geotechnical Engineer considers to be unsuitable as encountered.
e) Unauthorized excavation is excavation of materials which would otherwise be left in place but are required to be removed because they have been rendered unsuitable due to the Contractor's operations. It includes excavation which is not "authorized excavation" as defined herein.
f) Unsuitable material is material that cannot be used or backfill and is not topsoil all as determined by the Geotechnical Engineer.

3.3 Contractor shall stipulate unit price on the proposal form for removal of rock as defined herein.

3.4 Any test boring data or other substrate information which may be shown on drawings or mentioned in the specifications or which may be made available to Contractor is not guaranteed to be either accurate or complete and does not form a part of the Contract Documents. Contractor must assume all risks in excavating and make his own investigation of subsurface conditions.

4. PRECAUTIONS

4.1 Do not damage or disturb any existing monuments, bench marks, or other marks. Provide suitable protection where required before staring work. Restore any damage to original condition or repair as directed at no additional cost.

4.2 Before starting work protect any trees or shrubs shown or designated to be saved by boxing or wire fencing staked securely in place or other approved means, maintained until completion of work or until removal may be directed by the Architect.

4.3 The exact location of water, sewer, gas and electric underground utilities has not been determined and those locations shown on the drawings are approximate. The Contractor shall notify all utilities in accord with applicable State or Local Regulations prior to the start of excavation work.

4.4 Contractors shall take adequate precautions during earthwork operations to minimize dust in accordance with Federal and State Regulations pertaining to this work.

5. UTILITIES

5.1 Any piping and/or conduit encountered shall be temporarily supported and maintained until permanent support is restored, or piping and conduit to be removed shall be cut off and capped outside the limits of excavation.

6. STRIPPING TOPSOIL

6.1 Before starting excavation, remove topsoil to its full depths, as approved, from the site, and stockpile at suitable locations where directed for use in future finish grading. Provide straw-bale dikes about stockpiles as required to contain erosion.

7. EXCAVATING

7.1 The Contractor shall perform all excavation to the dimensions and elevations indicated on the drawings, for all buildings and structure, and for all work incidental thereto. Excavation shall extend 2 feet from the neat lines of structures to the face or bank of shoring, to allow working spaces for mason, for forms, except where concrete is authorized to be deposited directly against excavated surfaces. All loose material shall be removed from excavations and bottoms carefully leveled to grade.

7.2 Excavated material to be reused for backfill or other purposes shall be piled away from the edge of the excavated area a sufficient distance to prevent overloading the bank and graded in such a way as to prevent surface water from entering the excavated area. Excess material from excavation not suitable nor required for backfill or other purposes shall be hauled from the site as excavated. Such waste excavation shall be disposed of as directed by the Architect.

7.3 Carry footing excavations down to satisfactory, undisturbed earth which shall be at least 1 foot below previously existing ground surface as indicated on the drawings.

7.4 Do not excavate to full depth when rain or freezing conditions are imminent. Completed foundation soil surfaces shall be protected from frost. Where foundation soil surfaces are damaged by water, mud or otherwise disturbed, all loose mud or other materials shall be removed and the surface regraded, as described below.

7.5 Where foundation excavation has been carried below plan grade due to errors in excavation, or due to freezing or to the removal of mud, or other loose materials, the foundation soil shall be restored to plan grade with the same concrete as that specified for the footing above it at no additional cost to the Owner.

7.6 Furnish adequate advance notification to the Architect of times when footing excavations are to be completed so that the bearing quality of bottoms may be inspected and/or tested before forms are constructed or concrete poured.

7.7 Should the bearing at the levels indicated be found by the Architect to be inadequate, he may order the excavation carried down to sound bearing. Such excavation shall be classed as additional work and payment made on the basis of an agreed price according to the "General Conditions. Should suitable bearing be found at a lesser depth than indicated, the Architect may order the reduction of excavation specified or shown on the drawings. The Contractor shall then allow a credit for work thus omitted on the basis of the above agreed price.

7.8 Where rock is encountered, footing trenches shall be undercut (carried down) 12" minimum below specified footing bearing and backfilled to specified bearing elevation with structural fill as hereinafter specified. Rock surfaces shall be leveled off to a clean, hard surface. Sloping rock shall be leveled off in steps.

8. BLASTING

8.1 Blasting where required shall comply with all requirements of the "General Conditions" and "Special Conditions" and "Special Requirements" with regard to explosives and blasting.

9. SHORING AND PROTECTION

9.1 Provide and maintain sheathing, shoring and bracing as necessary to prevent cave-ins.

9.2 Erect and maintain guard rails, fences, warning lights, other protection required for safety of all persons at excavations according to requirements of "General Conditions" and "Special Requirements".

9.3 Remove temporary sheathing, shoring, bracing and protection when no longer required by adjacent conditions and completion of foundation construction or backfill and rough grading as determined and approved by the Architect.

10. PUMPING AND DRAINAGE

10.1 The Contractor shall pump out or other wise remove any water which may be found in the excavation, and he shall provide drainage ditches, underdrains, flumes, well points and pumping equipment, as necessary, to keep the excavation entirely clear of water while foundations are being built or other operations are being performed requiring a dry condition.

11. BACKFILLING AND ROUGH GRADING

11.1 No backfilling shall be done around any parts of the structure until such parts have been inspected and the backfilling authorized by the Architect. No filling inside the building, or backfilling against foundations, walls, footings or areaways shall be done until concrete forms have been removed and pointing and dampproofing of concrete and masonry work has been completed and the concrete is thoroughly cured. Filling and backfilling inside of the building lines (depending on elevation of subgrade to footing level) or within a dimension encompassed by a 45 degree line drawn from footing level to working surface shall be installed in 8 inch layers, dampened and tamped solid with pneumatic tampers to a minimum of 95% "Proctor" at optimum moisture content. Filling more than five feet outside of building lines shall be installed in 12 inch layers, uniformly spread and tamped and rolled and then leveled or sloped as required. All backfill shall be clean earth. No puddling will be allowed.

Where required by the Architect, exposed materials shall be proof-rolled utilizing a heavily loaded dump truck or another pneumatic-tired vehicle of similar size and weight, to provide surficial densification and to locate any isolated areas of soft or loose soils requiring undercutting.

Over excavated areas resulting from the removal of unsuitable material shall be backfilled with properly compacted, approved material in accordance with the procedures specified herein. This work will be authorized by change order and basis for cost shall be in accordance with the unit prices stipulated in the proposal form.

11.2 Rough grade the lawn areas around all of the building to the limits of contract indicated on the drawings to a level 4" below the finished grades shown on the drawings. In rough grading, bases for all terraces, banks, lawns and paved areas shall be formed and compacted as specified or as noted on drawings.

11.3 Areas to be paved shall be graded to the depth required for the placing of paving material. Subgrade for drives, parking areas and service areas shall be compacted with a 3 wheel power roller of weight as specified in Section 0240, "Bituminous Paving".

11.4 Subgrade for walks hall be compacted with a 2 wheel roller of weight as specified in Section 0240, "Bituminous Paving".

11.5 Subgrade for lawns shall be compacted with a 2 wheel roller weighing not less than 3 tons subject to limitations of paragraph 11.1 above.

11.6 Where wood sheet piling from work, bracing or shoring is used, it shall be removed as the work progresses and the voids left shall be backfilled with 2,500 lbs. concrete below the top of adjacent footings and foundations. Above the level, the backfill shall be as described above.

11.7 Where additional soil is deposited upon the site to reach subgrade beneath terrace entrance platforms or paving and where trenches are overfilled under other contracts, these areas shall be compacted and rolled with power roller or pneumatic tamper as specified above. Upon completion of work under this specification, rough grading as required by specification for subgrade for bituminous paving shall be completed. Hauling or moving or equipment shall not be allowed over the finish subgrade.

11.8 Fill and backfill material shall be clean earth containing no vegetable matter, rubbish or debris but may contain sound rocks, pieces of concrete and masonry material not over 6" in size if well-distributed in the earth, but not in the top 12" or against foundation, walls, grade beams or similar construction. All materials to be used as fill shall be inspected, and approved by the Architect prior to use. The existing natural soils can be re-used for structural fill only if they are free of organic matter or debris and if they are not excessively wet. The material to be utilized as fill shall have a plasticity index (PI) less than 30. Borrowed fill material shall be a sand-gravel mixture approved by the Architect.

11.9 Clean excavating and areas to be filled of all topsoil, vegetable matter, refuse and debris before placing any fill or backfill. Do not backfill excavations against walls to be waterproofed until waterproofing is completed, protected and approved.

11.10 Perform filling and backfilling carefully so as not to damage other work or affect the stability of any construction. Do backfilling only when the structure is fully capable of withstanding the resulting pressure.

11.11 Do not fill or backfill over frozen subgrade or use any frozen material in fill or backfill.

11.12 In all areas where, due to undercutting, foundations will be supported on a new structural fill, the structural fill shall extend a minimum distance of 9 inches laterally beyond a footing perimeter for each one foot of structural fill below the bearing level. Prior to fill placement, the contractor shall verify that organic and other deleterious matter is removed. Full-time inspection by the Architect or his representative is recommended at this time in order to certify the quality of the fill.

11.13 STRUCTURAL FILL

a) Structural fill shall be placed in lifts which are eight inches or less in loose thickness and shall be compacted to at least 95 percent of the Standard Proctor maximum dry density (ASTM D-698). Adjustments to the natural moisture contents of the soils may be required in order to obtain specified compaction levels. Select, granular fill shall be used where required to effectively bridge soft or saturated subgrade areas, should any develop, prior to conventional filling.

b) In building areas, the fill shall extend a minimum of ten feet beyond building lines where floor slabs are constructed on fill. Fill slopes no steeper than 2.0 (H):1.0 (V)shall be used. A sufficient number of in place density tests shall be performed by an Engineering Technician to verify that the proper degree of compaction is being obtained.

c) The General Contractor shall allow in his contract, a minimum of (5) in-place soil density tests. The contract amount shall be adjusted on the basis of the unit-price stipulated in the proposal form, in accordance with the actual number of tests required by the Architect.

12. STONE BASE UNDER SLABS

12.1 Provide crushed stone or crushed gravel base course under all floor slabs or platforms on earth, around foundation drains and elsewhere as indicated on drawings. Concrete walks or pavements shall be laid directly on prepared subgrade. Stone or gravel shall be graded from 3/4 inch to 1-1/2 inches in size. Over the top of the base course, spread a fine stone tailing to ease rolling and compacting of base course and provide a relatively smooth surface for reception of vapor barrier (as specified under Section 0330, "Concrete", for interior slabs on grade).

13. DISTURBED AREAS

13.1 See section "Special Conditions" for restoration of paving, roadways, walkways, parking areas and similar items disturbed by work of this contract section.

14. CLEAN-UP

14.1 Any paved area (either new or existing) over which hauling operations or other moving equipment are conducted shall be kept clean and any soil or other material, which may be brought upon the paved surfaces shall be removed promptly by the General Contractor. Upon completion of rough grading clear away all debris and remove from the site.

15. Where Corrugated Metal Pipe (CMP) is designated on the drawings provide 16 gauge Corrugated Galvanized Metal Circular Pipe (ASSHO Designation M-36), with flared outlet, in the diameter (site) indicated.

16. Unless other wise noted, stone rip-rap indicated on drawings shall be #4 crushed stone 6" deep spread over area as noted on the drawings.

17. Provide 4" diameter rigid PVC perforated foundation drain piping where indicated on the drawings. Drains shall be pitched and unless noted otherwise shall be run to flow out on grade.

18. Provide catch basins (area drains) as detailed on the drawings.

19. STIPULATIONS

19.1 The specifications section "General Conditions", "Supplementary General Conditions", and "Special Conditions" and " Special Requirements" form a part of this Section by this reference thereto and shall have the same force and effect as if printed herewith in full.

SECTION 0240
BITUMINOUS PAVING

1. STIPULATIONS

1.1 The specifications sections, "General Conditions", "Supplementary General Conditions", "Special Conditions", and "Special Requirements" form a part of this section by this reference thereto and shall have the same force and effect as if printed herewith in full.

2. GENERAL

2.1 The work covered by this section consists of furnishing all labor, materials equipment, appliances necessary to complete all the bituminous paving and attendant and incidental work in strict accordance with this section of the specifications and the drawings.

3. WORK NOT INCLUDED

3.1 The following items of work are included in other sections of these specifications:

a) Excavation
b) Rough Grading

4. STANDARD SPECIFICATIONS

4.1 Materials and workmanship shall conform to applicable requirements of Pennsylvania Department of Transportation Specifications, Form 408, hereinafter noted as "PENN D.O.T.".

5. GENERAL REQUIREMENTS

5.1 Do all rolling with a power roller. Weight of roller shall be at least 10 tons for bituminous paving. Use thorough hand or power tamping to obtain proper compaction on any areas not accessible to roller.

5.2 This Contractor shall patch, repair and/or replace all bituminous and concrete paving, curbs and walkways as affected by the new construction within the contract limits as shown on the drawings and any adjacent existing paving, curbs or inlets damaged by the operations of the work for bituminous paving. All work shall be installed under the requirements of applicable sections as herein specified.

5.3 Protect adjacent work from splashing of paving materials.

5.4 Protect paving against traffic until surface has properly cured.

5.5 Provide temporary barriers, warning lights and other protection as necessary. Remove when no longer required.

5.6 All paving work under this section shall consist of a bituminous base course and a surface course as hereinafter specified.

5.7 The Owner shall obtain highway access permits where required and pay all fees related to same. The Contractor shall be required to perform all work in highway right-of-way in strict accord with the specifications of applicable state or local agencies including traffic control requirements while work is in progress.

5.8 Where it is required to match into existing paving, bring new work into existing along neat lines having even surfaces.

5.9 Seal all joints between new paving and existing paving or curbs with poured hot bitumen.

6. SUBGRADE PREPARATION

6.1 Before placing base and paving, check subgrade and do all necessary excavating, rolling and compacting to obtain a true, even, firm surface. Fill and consolidate any traces of dented or depressed areas. Remove any boulders or ledge rock to a depth of 6" below subgrade. Remove all spongy material, replace with clean material and compact solidly. Roll and cross-roll subgrade until thoroughly compacted to proper profile.

7. BASE COURSE (NEW PAVING)

7.1 All paving methods and materials shall be in accord with PENN D.O.T. Specifications Form 408 (current edition).

7.2 Provide 6" thick compacted sub-base of 2-A modified stone, rolled to a hard, even, unyielding surface that does not creep or wave under the roller.

7.3 Provide a 2-1/2" compacted base course of bituminous concrete (BCBC).

7.4 Do not apply base course over wet or frozen subgrade.

8. SURFACE COURSE (NEW PAVING)

8.1 Unless noted otherwise, surface course for all areas designated to receive paving shall be PENN D.O.T. Type 1D-2A hot-mixed, hot-laid asphalt concrete applied in one course at least 1-1/2" thick after compaction.

8.2 Apply surface course only when base course is dry and air temperature is 50 degrees F or above.

8.3 Merge new paving evenly with existing at edges where new and existing abut.

8.4 Finished paving shall be true and even, free of low spots or humps. All areas must drain to established drainage points. No puddles will be permitted.

SECTION 0250
FINISH GRADING AND SEEDING

1. STIPULATIONS

1.1 The specifications sections, "General Conditions", "Supplementary General Conditions", "Special Conditions", and "Special Requirements" form a part of this section by this reference thereto and shall have the same force and effect as if printed herewith in full.

2. WORK INCLUDED

2.1 The work covered by this section consists of furnishing all labor, materials, equipment and appliances necessary to complete topsoil spreading, finish grading and lawn planting to existing grass areas within the contract limits which are distributed by the new construction and elsewhere as designated on the drawings as required to produce a uniform, weed-free stand of grass, in strict accordance with this section of the specifications and the drawings.

3. MATERIALS

3.1 New topsoil required for finish grading in addition to topsoil stockpiled on the site shall be natural, fertile, friable, loamy soil from a well drained site, free of coarse sand, weeds, roots or any sticks, stones or other extraneous matter over 1-1/2" in size. Source of topsoil shall be approved in advance by the Owner's Representative.

3.2 Lime shall be pulverized agricultural limestone containing a minimum of 85% total carbonates ground so that at least 90% passes a No. 20 sieve and at least 50% passes a No. 100 sieve.

3.3 Fertilizer shall be standard 5-10-5 commercial product in bags showing weight, analysis and manufacturer's name. Availability of the various elements shall conform to the standards of the Association Official Agricultural Chemists.

3.4 Grass seed shall be clean and fresh, packed in sealed bags showing net weight, composition of mix, date of germination tests and supplier's name. Composite of mix shall be:

Kentucky Blue Grass (Poa pratensis)	60 %
Bent Grasses (Agrostis)	15 %
Fescues (Festuca)	10 %
Red Top (Agrostis alba)	8 %
Perennia rye (Lolium perenne)	7 %

3.5 Where discrepancies existing between the site drawings specifications and this specification as to material types, quantities and spreading rates, the site drawing specifications shall take precedence.

4. DELIVERY AND STORAGE OF MATERIALS

4.1 Topsoil shall not by muddy or frozen. Limestone shall be dry and not lumpy.

4.2 Fertilizers and seed shall be delivered and stored in original unopened packages, kept dry and not opened until needed for use. Damaged or faulty packages shall not be used.

5. FINISH GRADING

5.1 Perform all finish grading necessary to bring site to required finished elevations. Finish grading shall consist of preparing subgrade and spreading earthwork operations and provide any additional topsoil required at no additional cost to the Owner. Do not start work until underground utilities are completely installed and heavy hauling finished.

5.2 If general area is hard pan or heavy shale, subgrade shall first be plowed at least 6" deep to permit proper loosening and preparation of ground.

5.3 Subgrade shall be loosened and graded by harrowing, descrying or dragging, as indicated by the condition of the subgrade. The entire subgrade shall then be raked by hand and all stones over 1-1/2", grade stakes, rubbish and general debris removed.

5.4 Topsoil shall be dumped in piles, uniformly spaced or otherwise distributed by approved equipment. The piles shall be spread with blade grader or by any other approved method, to a minimum depth of 5" on areas to be seeded and 4" on areas to be sodded to permit 1" of settlement. Correct any surface irregularities to prevent formation of low spots and pockets that would retain water.

5.5 Topsoil shall not be placed when the subgrade is frozen, excessively wet, or extremely dry and no topsoil shall be hauled when in a frozen or muddy condition. during all operations following topsoil spreading, the surface shall be kept free from stones over 1-1/2" in size or any rubbish, debris or other material which would be detrimental to seeding or to maintenance.

5.6 After completion and approval of finish grading, remove any excess topsoil from site, unless otherwise directed, and leave finish graded clean and well raked, ready or lawn work.

6. PREPARATION FOR SURFACE FOR LAWNS

6.1 Apply lime at the rate of 50 pounds per 1,000 sq. ft. Wait at least one full week after lime has been spread before applying fertilizer.

6.2 Spread fertilizer uniformly, using 20 pounds of bone meal plus 10 pounds of cottonseed meal or 30 pounds of 5-10-5 commercial fertilizer per 1,000 sq. ft.

6.3 Go over entire area with a spike drag or rototiller and loosen surface at least 3" deep and then hand rake to a smooth, even surface.

6.4 Where discrepancies existing between the site drawings specifications and this specification as to material types, quantities and spreading rates, the site drawing specifications shall take precedence.

7. SEEDING

7.1 As soon as ground has been properly prepared, sow grass seed at the rate of 8 pounds per 1,000 sq. ft., total, in two operations at right angles to each other, using a suitable mechanical seeder or sowing by hand on small areas.

7.2 Unless seeder covers the seed with soil as it sows, rake to obtain a light covering of soil over the seed after sowing and roll and cross-roll very lightly with an empty water roller.

7.3 Do seeding between April 1st and May 15th or between September 1st and October 15th, unless particularly otherwise permitted.

7.4 Do no seeding in windy weather or on wet frozen ground.

8. MAINTENANCE

8.1 All lawn areas shall be kept constantly wet, close to the saturation point for the 10 days immediately following seeding or sodding.

8.2 All areas and spots which do not show a prompt catch of grass shall then be re-seeded, and this operation repeated until a compete coverage is obtained. When the area does not need to be re-seeded, it shall be thoroughly wetted every time the surface shows evidence of drying out, and this shall continue throughout the entire period of maintenance.

8.3 When the overall height is about 2-1/2", grass shall be cut to 1-1/2" high, and any depressions or irregularities in the lawn surface shall be leveled off and re-seeded.

8.4 Maintenance shall cease after all grass area are properly established and free of washouts, depressions, bare spots, weeds and large off-color areas. If seeding is done in the autumn, the Contractor shall complete the maintenance in the following spring as required.

SECTION 0330
CONCRETE

1. STIPULATIONS

1.1 The specifications section "General Conditions", "Supplementary General Conditions", "Special Conditions", and "Special Requirements" are hereby made a part of this section.

2. GENERAL

2.1 The Contractor shall furnish all labor, material, equipment, and services required for the installation of all plain and reinforced concrete work indicated on the contract drawings and/or described in these specifications. Included are the furnishings and installing of all appliances, scaffolding, runways, forms, reinforcing steel, welded wire fabric, and all reinforcing accessories.

2.2 The Contractor shall coordinate his work with the work of the other trades requiring anchor bolts, sleeves, chases, conduits, and other items which must be installed prior to the placing of concrete.

3. WORK NOT INCLUDED

3.1 Not included under this section of the contract, unless otherwise stipulated herein, or indicated on the drawings, are the following items:

(a) Foundations and footings for boilers, pumps, machinery, transformers, etc., or other mechanical or electrical equipment, which will be furnished and installed by their respective trades.

4. CODES AND REGULATIONS

4.1 Except as herein qualified, matters pertaining to measuring, mixing, placing and testing of concrete, construction of formwork, detailing, fabricating, and placing of reinforcing and accessories shall be governed by the following codes and regulations:

a) Current Building Code Regulations for Reinforcing Concrete (ACI 318)
b) Current "Manual of Standard Practice for Detailing Reinforced Concrete Structures" (ACI 315)
c) Current "Recommended Practice for Measuring, Mixing, and Placing Concrete" (ACI 304)
d) All matters in connection with concrete work, not otherwise specified shall conform to the applicable sections of the Pennsylvania Department of Transportation Spec. Form 408.

5. CLASS OF CONCRETE

5.1 Concrete shall develop a minimum compression strength of 3000 P.S.I. in 28 days.

5.2 Concrete shall be obtained from a batch plant currently approved by the Department of Highways, or an accredited testing laboratory.

6. SHOP DRAWINGS

6.1 Shop drawings, showing all the dimensions necessary for fabrications and placing of the reinforcing steel and accessories, without preference to the project drawings shall be submitted for approval in accordance with the "General Conditions" and "Special Requirements".

7. MATERIALS

7.1 Cement for all items of concrete work, except for exterior concrete work exposed to weathering, shall be normal strength Portland cement, type I or type II, conforming to A.S.T.M. Designation C150.

7.2 Cement for all items of exterior concrete work exposed to weathering, such as sidewalks, retaining walls, etc., shall be one of the following types:

a) normal strength air-entraining Portland cement, type C, conforming to current specifications of the Department of Highways.
b) normal strength air-entraining Portland cement, type 1A or type IIA, conforming to A.S.T.M. Designation C175.

7.3 Admixtures: Approved types of admixtures meeting A.S.T.M. C494 increasing the plasticity and workability of the concrete may be used; however, the Contractor must submit certification from the manufacturer, together with complete test data from an accredited laboratory, showing that the admixture meets all requirements for chemical admixtures for concrete, A.S.T.M. C494. This data must establish, and the testing laboratory and the manufacturer must certify to the satisfaction of the Architect/Engineer that, when used with the materials for this project, the admixture meets A.S.T.M. C494 requirements with respect to water reduction, compression strength, and time of set for the proposed type of admixture.

7.4 Water for concrete shall be clean and free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances.

7.5 Aggregates for concrete of normal weight shall conform to "Specifications for Concrete Aggregates" (ASTM C33).

7.6 Metal reinforcement shall be steel bars of cold drawn steel wire or fabricated forms of these materials, as required by the drawings or the specifications or both. All bars shall be deformed, new billet steel or rail steel. These materials shall conform in quality to Standard Specifications of the American Society for Testing Materials of the following applicable titles and serial designations:

Billet Steel Bars for Concrete Reinforcement	A615)Grade
Rail Steel Bars for Concrete Reinforcement	A616)60
Welded Steel Fabric for Concrete Reinforcement	A185

7.7 Provide 6% (+/- 1%) air entrainment for all concrete exposed to the weather ASTM C-200.

8. PROPORTIONING

8.1 When using Pennsylvania Size No. 2B (No. 4 to 1") coarse aggregate, not less than 6 sacks (564 pounds) of cement shall be used per cubic yard of concrete and not more than 6 gallons of water, including the surface moisture or free water on the aggregates, per 94 pounds (one sack) of cement.

8.2 Concrete of normal weight which will be subject to potentially destructive exposure (other than wear or loading) such as freezing and thawing, severe weathering or chemicals shall contain entrained air. For any such concrete, not more than five and six tenths (5.6) gallons of water shall be used, including the surface moisture or free water on the aggregates, per 94 pounds (one sack) of cement.

9. SAMPLES AND TESTING

9.1 At least one set of four standard test cylinders for each day's pour shall be taken and forwarded to an approved laboratory for testing. Two cylinders shall be tested at the age of 7 days and two cylinders tested at the age of 28 days. Five copies of tabulated results of such tests shall be forwarded to the Architect for approval and distribution. All costs in connection with tests of concrete shall be borne by the Contractor.

10. FORMWORK

10.1 Forms shall conform to the shape, lines, grades and dimensions of the concrete as called for on the drawings. They shall be sufficiently tight to prevent leakage of mortar and shall be properly braced or tied together so as to maintain the desired position and shape during and after placing concrete. Forms shall be removed in such a manner as to assure the complete safety of the structure. Remove all metal within one inch of surface.

10.2 Premolded expansion joint material shall be 1/2" thick except as otherwise noted, full depth of slab and shall conform to ASTM D1751.

11. FINISHES

11.1 Concrete slabs exposed to view or scheduled to receive resilient flooring shall be trowelled to an even finish having true planes within 1/8" in 10 feet as determined with a 10 foot straight edge placed anywhere on the slab in any direction.

11.2 All slabs shall have applied, a chemical curing compound in accord with the manufacturer's printed directions. NOTE: Where concrete slabs are scheduled to receive paint finish, the use of non-paintable curing agents must be avoided. (See finish schedule on drawings.)

11.3 Where concrete slabs are to receive no other finish they shall have applied a chemical hardener/dust proofer in accord with the manufacturer's directions.

11.4 Sidewalks, stoops and exterior concrete stair treads shall have a broom finish (a coarse, transverse texture).

11.5 Concrete walls exposed to view and concrete curbs shall have a "rubbed" finish of Portland cement mixture to fill all voids and leave the surface with a smooth, even texture. Remove all fins and all traces or marks left by forms.

12. CONCRETE SIDEWALKS AND PADS

12.1 Sidewalks and pads shall be 3000 PSI air entrained concrete; sidewalk slabs 4" thick, pads of thickness indicated.

12.2 Subgrade shall be properly prepared and thoroughly wetted before placing concrete.

12.3 Construct sidewalks in separate slabs 20' in length except for closers. Slabs separated by 1/4" thick transverse expansion joints. Between expansion joints, divide slabs into blocks 5' in length, scoring transversely. Slabs more than 5' in width, score longitudinally in center. Scoring shall extend at least a third of slab thickness into slab.

12.4 Where adjacent to public streets, concrete sidewalks shall be installed according to local Government requirements.

13. EXPANSION JOINTS

13.1 Provide where indicated on drawings:

General: Do not run reinforcement or other fixed metal items embedded in or bonded continuously through expansion joints. Finish concrete slab edges along expansion joints neatly with slightly rounded edging tool.

13.2 Slabs: joints between slabs on earth and vertical surfaces including walls and other fixed structures.

Install premolded expansion joint filler strips at proper level below finished floor with slightly tapered, dressed, oiled wood strip secured temporarily to top thereof. Install wood strip of depth to form groove at least 1" deep. After concrete has set, remove strip; fill groove with light colored caulking compound for poured application. Fill joint grooves flush, to be slightly concave, after drying.

14. CONTROL JOINTS

14.1 Concrete slabs on grade: Install control (contraction) joints in slabs; space at a maximum of 25' o.c. At each joint, cut reinforcing mesh so only alternative wires extend through joint.

15. CONCRETE CURBS

15.1 Construct of 3000 PSI concrete with air entrainment, where indicated on drawings; use expansion material between curbs and sidewalks and at control joints. Curbs shall include one construction joint every 10' and one expansion joint every 30'. Concrete curbs adjacent to public thoroughfares or within public right of way shall be installed according to local Government requirements.

16. CONCRETE FILL FOR METAL PAN STEPS

16.1 Poured in place, using 3000 PSI concrete. Interior steps shall have steel trowelled finish.

17. FIELD QUALITY CONTROL

17.1 Field Tests of Concrete During Construction:

Contractor shall take samples as stipulated in Paragraph 9.1 of this section; make cylinders and cylinder tests to determine compliance with project requirements. Furnish cylinder moulds and pay expenses for shipping and testing cylinders.

Samples shall be taken; cylinders made and cured according to ASTM C31 and ASTM C172 procedures.

Tests shall be make of cylinders in accordance with ASTM C39.

SECTION 0400
CONCRETE MASONRY CONSTRUCTION

1. STIPULATIONS

1.1 The specifications sections, "General Conditions", "Supplementary General Conditions", "Special Conditions", and "Special Requirements form a part of this section by this reference thereto and shall have the same force and effect as if printed herewith in full.

2. GENERAL

2.1 The work covered by this section of the specifications consists of furnishing all labor, materials, equipment, and appliances and in performing all operations in connection with the installation of concrete masonry, complete, in strict accordance with this section of the specifications and the applicable drawings.

2.2 Without intending to limit and/or restrict the volume of work required by this section of the specifications and the applicable drawings, the work generally consists of:
- a) Concrete block masonry
- b) Joint reinforcing
- c) Anchors and ties

3. WORK NOT INCLUDED

3.1 The following work items are included in other sections of these specifications:
- a) Mortar - Section 0440: "Masonry Mortars"
- b) Flashing - Section 0700: "Roofing, Insulating and Sheet Metal"
- c) Caulking - Section 0790: "Miscellaneous and Ornamental Metal"

4. STANDARDS

4.1 The following publications of the American Society for Testing and Materials form part of this section of the specifications to the extent indicated by reference thereto:

A82	Cold Drawn Steel Wire for Reinforcement
A153	Zinc Coating (Hot Dipped) on Iron and Steel Hardware
A185-56T	Welded Steel Wire Fabric for Concrete Reinforcement
C129	Hollow Non-Load-Bearing Concrete Masonry Units
C90	Hollow Load-Bearing Concrete Masonry Units
C140	Sampling and Testing Concrete Masonry Units
C55	Lightweight Concrete Brick
C145	Solid Load Bearing Concrete Masonry

5. MATERIALS

5.1 Aggregate used in manufacturing concrete masonry units, concrete brick shall conform to ASTM Designation C33, as modified hereinafter. Aggregates shall comply with the following when tested for stain producing iron compounds. When determined by visual classification method, iron stain deposited on filter paper shall not exceed "Light Stain" classification. When determined by chemical analysis method and reported as FE203, iron stain deposited on filter paper from 200-gram sample shall not exceed 1.2 mg FE203.

5.2 Reinforcing steel bars shall conform to the ASTM Designation (A615) (A616). Deformation shall conform to ASTM Designation A305.

5.3 Anchors, ties and joint reinforcement shall be approved design and, except as otherwise specified herein, shall be zinc-coated metal of types noted below. Zinc coating of anchors and ties shall conform to ASTM Designation A153, Class B-1, B-2 or B-3, as required. Zinc coating of wire for joint reinforcing shall conform to ASTM Designation A116, Class 1.

5.4 Wire mesh ties shall be of steel wire not lighter than 0.0625 inches in nominal diameter (16 gauge), 1/2" mesh, 3" wide.

5.5 Wire ties shall be of steel wire not lighter than 0.350 inches nominal diameter (10 gauge) looped at both ends.

5.6 Corrugated or crimped metal ties shall be not more than 7/8" wide and of sheet steel not lighter than 0.0299 inches nominal thickness (22 gauge).

5.7 Joint reinforcement shall be fabricated from steel wire conforming to ASTM Designation A82, zinc-coated before fabrication as noted above. Joint reinforcement shall be "Dur-O-Wal" Truss, Standard Class (unless otherwise noted on the drawings), "composite" type in widths required by wall thickness. Provide special shapes for corners and wall intersections.

6. CONCRETE MASONRY UNITS

6.1 Concrete masonry units shall be of modular dimensions where available and shall include all closer, jamb units, headers and special shapes and sizes required to complete work as shown. Units shall be of same manufacture, composition, size and appearance and shall be cured by same process throughout the job. Units shall be sound and free from cracks, chipped edges and other defects that would interfere with their proper setting or impair strength, appearance, or durability of construction. Units shall be free of any deleterious matter that will stain plaster or corrode metal, shall be adequately cured before shipment, shall be delivered to job site conforming to physical requirements as determined by tests hereinafter specified and shall be classified into Grades A or B as stipulated.

6.2 Permissible variations in dimension: no overall dimension (width, height and length) shall differ more than 1/8" from the specified standard dimensions.

Nominal dimensions of non-modular size units are equal to the standard dimensions plus 3/8", the thickness of one standard mortar joint.

6.3 Visual Inspection: All units shall be sound and free of cracks or other defects that would interfere with the proper placing of the unit or impair the strength or permanence of the construction. Minor cracks incidental to the usual method of manufacture, or minor chipping resulting from customary methods of hauling in shipment and delivery, shall not be deemed grounds for rejection.

6.4 Units that are intended to serve as a base for plaster or stucco shall have a sufficiently rough surface to afford good bond.

6.5 Where units are to used in exposed wall construction, the face or faces that are to be exposed shall be free of chips, cracks, or other imperfections, except that if not more than 5% of a shipment contains slight cracks or small chips not larger than 1", this shall not be deemed grounds for rejection. Where concrete masonry units are to be exposed or scheduled to receive a paint finish, exposed surfaces shall be uniform in color, texture and density. Units not conforming to this requirement shall be rejected.

6.6 Marking: All units shall bear a distinctive mark of the manufacturer or shall be other wise readily identified as to origin.

6.7 Hollow non-load-bearing concrete masonry units conforming to ASTM Designation C120 shall be used in interior non-load-bearing walls and partitions, furring, and other non-load-bearing work.

6.8 All exposed outside corners and jamb units shall have bull-nosings.

6.9 Mortar shall comply with minimum strength specification for Type "S" mortar as set forth in Section 0440, "Masonry Mortars", of these specifications: Contractor shall furnish evidence that mortar used meets minimum strength requirements specified. Additional check tests for compliance may be required by the Architect.

a) Workability: Mortar shall be mixed with water to produce workability desired regardless of initial flow. Where materials, proportions and mixing of mortars used in the work differ from those used in the laboratory tested samples, the Contractor shall furnish evidence that minimum specifications are complied with.
b) Use for all exterior masonry, interior bearing walls and all masonry in contact with fill materials.

7. WORKMANSHIP

7.1 Masonry shall not be erected when, in the opinion of the Architect, the sun, heat, wind, or limitations of facilities furnished by the Contractor prevent proper setting and curing of mortar joints or obtaining proper bond in mortar. Units having a film of water or frost on its surface shall not be laid in walls. Masonry shall be laid plumb, true to a line, with level and accurately spaced courses and with each course breaking joints with course next below, unless otherwise shown or specified. Bond pattern shall be kept plumb throughout. Corners and reveals shall be plumb and true. Structural bond shall extend not less than four inches into backup masonry. Courses shall be so spaced that backing masonry will level off flush with face work at all bonding courses and at joints where metal ties are used in lieu of masonry bond. Spaces around metal door frames and other built-in items shall be solidly filled with mortar. Anchors, frames, centers, steel lintels, conduits, sleeves, pipes, scuppers, wall plugs, accessories, flashings, and other items required to be built into masonry shall be built as work progresses. Cutting and fitting of masonry required to accommodate work of other trades shall be done by masonry mechanics with masonry saws.

7.2 Unfinished work shall be stepped back for jointing with new work; toothing may be resorted to only when specifically approved. Before new work is started, all loose mortar shall be removed and exposed joints thoroughly cleaned.

7.3 Protection: Surfaces of masonry not being worked on shall be protected at all times during the construction period. At such time as rain or snow is imminent and work is discontinued, tops of exposed masonry shall be covered with strong waterproof membrane well secured in place.

7.4 Erection: Do not wet concrete masonry units before laying. Unless otherwise shown or specified, lay units with vertical joints centering over units in course below. Mortar joints shall be approximately 3/8" wide. Mortar joints in piers, columns, and pilasters, and starting courses on footings, solid foundation walls, and beams, except the first course in panels of cavity walls containing weep holes shall be full-bedded under both face shells and webs. Other joints in exterior walls, and starter joints containing weep holes, shall have full mortar coverage on horizontal and vertical face shells, but mortar shall not extend through the unit on the web edges. Solid units shall be completely bedded.

Mortar joints on the weather side of the exterior walls and on all exposed-to-view or painted interior walls and partitions, except control joints, shall be tooled slightly concave so that the mortar will be thoroughly compacted and pressed against the edges of the units. Control joints on the weather side of exterior walls shall be raked out 3/4" and left ready for caulking.

Control joints in exposed-to-view or painted interior walls and partitions shall be carefully pointed. Units terminating against soffits of beams or slab construction shall have 1/2" min. expansion joint filler between the top of the masonry and the soffit. Each course shall be bonded at corners and intersections and shall be either bonded into adjacent construction or anchored thereto with metal anchors spaced not over two feet on centers in each direction. Jamb units shall be of shapes and sizes required to bond with wall units and shall be built in where shown or required. No cells shall be left open in face surfaces. Masonry unit walls or partitions supporting plumbing or heating fixtures or other items, voids at door or window jambs and other spaces requiring grout fill shall be filled solid with mortar mixed to pouring consistency.

8. SHRINKAGE CRACKING CONTROL

8.1 Control joints: Shrinkage cracking in concrete masonry unit partitions and walls shall be controlled by combinations of control joints and joint reinforcing as herein specified and as shown on drawings or details. Control joints and joint reinforcing shall be provided and generally spaced at the locations shown in Table QQ and shall be constructed by using either special control joint units or regular units at the option of the Contractor. They shall allow freedom of movement in a horizontal line parallel to the wall and must be capable of resisting lateral forces which may cause wall adjacent to control joint to be come out of line with each other. Bond beams shall be interrupted at control joints.

8.2 Control joints must be placed at junction of interior partitions and exterior walls, at junction of walls and columns, changes in wall thickness, changes in wall heights, in walls weakened by pipe and column chases and openings, and above lintels extending from edges of lintels up to ceiling and at bond beam breaks. In every case, the spacing and type of control joint shall be first approved by the Resident Inspector and the Architect. The Resident Inspector and the Architect may modify these requirements to use other combinations of crack control design measures, such as the use of bond beam method above openings and the control joint method below openings. Control joints and joints where concrete masonry units join or abut concrete construction shall be raked out 3/4" and left ready for caulking as specified in Section 0790, "Caulking".

8.3 Provide joint reinforcement in the first two full mortar joints above and below openings in concrete masonry unit partitions. Reinforcement shall extend not less than 24" beyond the ends of bottom of opening or casings, sills and lintels or to the end of the panel, if less than 24". Reinforcement shall be lapped not less than 6" and the lap shall contain at least one wire of each piece of cross reinforcement. Laps, corners, shapes and intersecting wall reinforcement shall be installed.

8.4 All partitions constructed of all type of masonry units as specified herein shall have joint reinforcement coursed and spaced 16" on centers vertically. Reinforcement shall be continuous the full length of the partition, except that it shall not be continuous through control joints. In partitions of 4" thickness, provide continuous 1/4" diameter vertical steel reinforcement full height of partitions, at each opening. Reinforcement shall be placed in the cell adjacent to the opening and the cells shall be filled solid with mortar grout.

a) For non-load-bearing interior walls, provide the following:
Three courses of joint reinforcing immediately below the top of the wall.
As an option to the use of three courses of joint reinforcing as top of non-load-bearing walls, provide control joints spacing as shown in Table QQ.

TABLE QQ

CONTROL JOINTS AND JOINT REINFORCING FOR PARTITIONS
CONTROL JOINT SPACING (FEET)

	GROUP 1 UNITS						GROUP 2 UNITS					
	JOINT REINFORCING											
Wall Height	NONE		16"o.c.		8"o.c.		NONE		16"o.c.		8"o.c.	
(feet)	Ave.	Max.	Ave.	Max.	Ave.	Max.	Ave.	Max.	Ave.	Max.	Ave.	Max.
up to 8	15	20	25	30	35	40	25	30	35	40	45	50
8 to 12	20	25	30	35	40	45	30	35	40	45	50	55
over 12	25	30	35	40	45	50	35	40	45	50	55	60

"Ave." = Average length of wall panels into which walls are subdivided by control joints.
"Max." = Maximum length of wall panels into which walls are subdivided by control joints.

9. COLD WEATHER INSTALLATION

9.1 Masonry shall no be erected during freezing weather or when it appears probable that freezing weather will be encountered before the mortar has set, unless, subject to written approval, suitable precautionary measures are taken. When masonry work is authorized by the Authority and the Architect during temperature 35 degrees F., special protective provisions as follows must be provided.

9.2 Temperatures between 32 degrees F. and 35 degrees F.: When the outside air temperature is between 32 degrees F. and 35 degrees F., all masonry units shall be kept completely covered and free from ice and snow at all times. The mixing water or sand shall be heated not to exceed 160 degrees F. nor under 70 degrees F. The air temperature on both sides of the masonry shall be maintained above 40 degrees F. for a period of at least 72 hours. The Contractor shall submit for approval, the methods he proposes to use for protection the masonry against low temperature. Building upon frozen work is prohibited.

9.3 Temperatures between 25 degrees F. and 32 degrees F.: When the outside air temperature is between 25 degrees F. and 32 degrees F., in addition to requirements noted above, the mixing water and sand shall be heated not to exceed 160 degrees F. or under 70 degrees F.

10. STORING AND HANDLING MASONRY UNITS

10.1 All masonry units upon delivery to the site, shall be immediately piled free of the ground and protected from weather by tarpaulins or other suitable and approved means. Concrete masonry units shall be carefully handled when taken from piles to scaffold.

11. POINTING AND CLEANING

11.1 At completion of work, all holes in joints of exposed masonry surfaces shall be filled with mortar and suitably tooled. After pointing has set and hardened, all surfaces shall be wetted and cleaned with a solution of 10% by volume of commercial muriatic acid, applied with stiff fiber brushes. Immediately after cleaning, rinse surfaces thoroughly with clear water. All exposed-to-view masonry surfaces shall be left clean, free of mortar daubs and with tight mortar joints throughout.

SECTION 0410
CAST STONE

1. WORK INCLUDED

1.1 The work covered by this section of the specifications consists in furnishing all labor, materials, scaffolding equipment, and appliances and in performing all operations in connection with the installation of cast stone, complete, in strict accordance with this section of the specifications and the applicable drawings.

1.2 Without intending to limit and/or restrict the volume of work required by this section of the specifications and the applicable drawings, the work generally consists of:
a) Furnishing and setting all cast stone.
b) Anchors and other fastening devices for cast stone.

2. WORK NOT INCLUDED

2.1 The following items are included in other section of these specifications as noted below:
a) Caulking - Section 0790, "Caulking"
b) Flashing - Section 0700, "Roofing and Sheet Metal"
c) Mortar - Section 0440, "Masonry Mortars"

3. MATERIALS

3.1 Cast stone shall be homogeneous stone meeting requirements of the current "Specifications for Cast Stone" of the American Concrete Institute, except as otherwise specified herein.

3.2 Color and texture of cast stone shall be uniform throughout the project unless otherwise indicated on the drawings. Cast stone shall have the color of [white] limestone.

3.3 Before delivery to the site, cast stone shall be properly cured and shall have a minimum compressive strength of 7,000 psi and a maximum average water absorption of 5 per cent. Stone shall be made from aggregates of known durability, proportioned to produce maximum density. White cement and white aggregates shall be used in all exposed surfaces. All colors added shall be mineral oxide pigments guaranteed by the manufacturer to be sun-fast and lime-proof.

3.4 Cast Stone shall be a product of an approved manufacturer who has facilities for furnishing stone without delaying progress of work and whose products have been used and exposed to weather with satisfactory results at least five years.

3.5 Reinforce lintels with deformed steel rods as required to provide proper strength. Lintels shall have a minimum bearings of 4 inches, and more than 4 inches for openings greater than 7 feet.

3.6 All stone shall be sound and perfect. Make all arises sharp and true. Provide all holes for anchoring devices; also all reglets, rebates and other features, as required. Provide setting loops where necessary for hoisting. Back check stone in contact with structural work.

3.7 Joints shall have a uniform width of 1/4 inch with an allowance tolerance of 1/32 inch.

4. SAMPLES

4.1 Submit the following samples:
Cast stone - 4" x 12" x 1", showing color, texture and finish
Anchors, dowels and cramps - each type

5. SHOP AND SETTING DRAWINGS

5.1 Submit shop and setting drawings showing sizes, sections, details, jointing, bonding, anchoring and other necessary information. Show complete details of anchors, dowels, cramps and all other fastenings required for securing stone. Show full size sections of moldings. Indicate each stone by number on setting drawings. Mark stones with corresponding non-staining numbers painted on backs.

6. ANCHORS, DOWELS AND CRAMPS

6.1 Provide all anchors, dowels, cramps and other items required for securing cast stone. Fabricate anchors and cramps, unless specified other wise herein; of zinc-coated metal. Zinc coating shall conform to ASTM Designation A 153, Class B1, B2 and or B3, as required. Material shall be at least 3/16 inch by 1-1/2 inches by 8 inches long after fabrication. Turn each end up 1 inch into stone and into masonry backing.

6.2 Dowels shall be 3/8 inch by 6 inches long brass rods or IPS red brass pipe.

7. HANDLING, STORING AND PROTECTING

7.1 Carefully transport and handle cast stone so as to prevent soiling or damage. Store clear of ground. Protect from damage, dirt and rain, by tarpaulins or non-staining, reinforced waterproof paper and boards.

8. PATCHING

8.1 Repairing of chipped or damaged cast stone will not be permitted. Remove chipped, cracked or otherwise damages stone from premises and replace with perfect stone.

9. SETTING

9.1 Set all stone in non-staining mortar as specified in Section 0440, "Masonry Mortars".

9.2 Clean all stone immediately before setting. Dampen all surfaces which will contact mortar. Set each piece of stone accurately, true to line, level or plumb, in full beds of fresh mortar. Fill all joints with fresh mortar. Set ends only of lug-type sills in full beds of mortar. Leave balance of bed open and point joints later. Set slip sills in full beds of mortar. Secure stones with anchors, dowels and cramps in accordance with approved shop drawings.

9.3 After stones are set in mortar, do not move or disturb in nay manner which might destroy bond between stones and mortar. Remove from the wall any stones which must be disturbed; reset in fresh mortar.

9.4 Keep faces of stone free of mortar. Promptly remove all mortar splashed on faces of stone, by sponging with clean water. Rake all joints 3/4 inch deep for caulking.

9.5 Set coping, projecting courses and sills, with vertical joints dry. Fill joints to within 3/4 inch of top of stone with mortar grout specified in Section 0440, "Masonry Mortars".

Temporarily caulk profiles of these joints with dry non staining oakum to depth of 3/4 inch. Dampen joints before pouring grout. After grout has set, remove oakum and clean joints ready for caulking as specified in Section 0790, "Caulking".

9.6 Set all flashing occurring in connection with cast stone, in full beds of fresh mortar.

10. CLEANING AND PROTECTING

10.1 After setting, thoroughly clean all stone with fiber brushes and mild soap and water. Rinse thoroughly. protect stone at all times from dirt and from damage by workmen or weather. At the end of each day's work, provide waterproofing covering from stonework. Remove protection when directed.

SECTION 0420
BRICK CONSTRUCTION

1. STIPULATIONS

1.1 The specifications sections, "General Conditions", "Supplementary General Conditions", "Special Conditions", and "Special Requirements form a part of this section by this reference thereto and shall have the same force and effect as if printed herewith in full.

2. WORK INCLUDED

2.1 The work of this section includes the furnishing of all labor, materials, scaffolding, equipment and incidentals to complete all brick construction as indicated on the drawings and as specified herein, but not necessarily limited to the following:

a) Face brickwork
b) Building in flashings, sleeves and inserts, lintels, door bucks, and other items occurring in brick construction furnished by other trades
c) Furnishing anchors and ties to other trades for securing masonry to other materials and for various types of wall construction
d) Furnish and install control joints and joint and tie reinforcing as specified, detailed and/or indicated on the drawings
e) Cutting and patching of work in this division as required to accommodate work of other trades.

3. WORK NOT INCLUDED

3.1 The following items are included in other section of these specifications as noted below:

a) Caulking - refer to Section 0790 - "Caulking"
b) Concrete masonry construction - refer to Section 0400 - "Concrete Masonry Construction"
c) Mortar - refer to Section 0440 - "Masonry Mortars"

4. STANDARDS

4.1 The following publications of the American Society for Testing and Materials form a part of this section of the specifications to the extent indicated by reference thereto:

A82 Cold Drawn Steel Wire for Reinforcement
A153 Zinc Coating (Hot Dipped) on Iron and Steel Hardware
A185 Welded Steel Wire Fabric for Concrete Reinforcement
C216 Face Brick
A116 Zinc Coating of Wire

5. MATERIALS

5.1 Face brick shall conform to ASTM Designation C216, except as otherwise specified herein. Face brick may be cored, but with not more than 10 holes. When brick are laid over lintels or in projecting or recessed course, or in other locations where the bed will be partially exposed, no holes will be permitted to show.

5.2 Face brickwork shall be selected by the Owner. The Contractor shall submit manufacturer's sample board showing full range of pattern for Owner's approval prior to commencing this work.

5.3 For new construction the Contractor shall provide an allowance of $ 650.00 per thousand for face brick delivered on-site including any applicable taxes as per A.I.A. General Conditions A-201, Section 3.8 'Allowances'.

5.4 For building additions or renovations where drawings indicate (brick to match existing), brick shall be of the same quality and have exposed faces of same color, pattern, and texture as adjoining brickwork of same kind, unless otherwise indicated on drawings.

5.5 Anchors, ties and joint reinforcement shall be of approved design and except as otherwise specified herein, shall be zinc-coated metal of types noted below.

5.6 Brick ties for walls having masonry back-up shall be Dur-O-Wal "Composite" joint reinforcement as specified in Section 0400, "Concrete Masonry Construction", and shall be spaced not to exceed 16 inches on center vertically.

5.7 Brick veneer over frame walls shall be secured thereto with corrugated or crimped metal ties shall be not more than 7/8" wide and of sheet steel not lighter than 0.0299 inches in nominal thickness (22 gauge). Ties shall be spaced not to exceed 16 inches on center vertically and 24 inches on center horizontally.

6. SAMPLES

6.1 The Contractor shall provide a sample brick panel for the Owner's approval, approximately 4 feet high by 6 feet wide to show the full range of the brick, joint type and color. Upon approval, this panel shall remain as a standard until completion of the brick work at which time it shall be dismantled and removed from the site.

7. MORTAR

7.1 Mortar shall comply with the requirements of the sections of the specifications covering "Masonry Mortars", Section 0440.

7.2 Type "S" mortar shall be used for all work.

7.3 Mortar color shall be as selected by the Owner.

8. WORKMANSHIP

8.1 Masonry shall not be erected when, in the opinion of the Architect, atmospheric conditions or limited facilities of the Contractor prevent proper setting, bonding and curing of masonry. Units may be damp when laid, but no unit having a film of water or frost shall be laid.

8.2 Protection: Surfaces of masonry not being worked on shall be properly protected at all times during construction operations. At such time as rain or snow is imminent and work is discontinued, cover tops of exposed masonry walls with a strong waterproof membrane wall secured in place. This requirement will be rigidly enforced so that moisture from rain or snow will not enter the wall.

8.3 Unfinished work shall be stepped back for joining with new work; toothing may be resorted to only when specifically approved. Before new work is started, remove all loose mortar and thorougy clean the exposed Joint before laying new work.

8.4 Build in all metal and sheet metal furnished by others, as the work progresses.

8.5 Lay all masonry facing from side of wall on which facing occurs. Erect and maintain scaffolding as necessary to meet this requirement.

8.6 Chases for pipes, conduits and other work shall be plumb and smooth on the inside, free of obstructions and cleaned out on completion. Leave at least 8" of masonry between chases and jambs of openings. Cutting and fitting of masonry required to accommodate the work of others shall be done by masonry mechanics with masonry saws.

8.7 Recesses: provide suitable recesses for built-in cabinets, junction boxes and other equipment. Exact size and location of recesses not indicated shall be as required by mechanical equipment.

9. COLD WEATHER INSTALLATION

9.1 Masonry shall not be erected when the ambient temperature is below 35 degrees F, or when there is a probability of such temperature occurring within 48 hours, unless such work is authorized by the Architect and special protective measures are taken.

10. LAYING BRICK

10.1 Each brick shall be laid in a full level bed of mortar, not furrowed. Trowel ends of stretcher brick full of mortar and shove into place. Lay recessed brick with frog side down. Fill all joints and interstices in masonry and joints next to other materials.

10.2 Bond: Unless otherwise indicated, all brick facing shall be running bond. When abutting existing adjacent brickwork, new brickwork shall be toothed into existing.

10.3 Joints: Unless otherwise shown on drawings, finish joints in exterior brick facing with a concave jointer to compact mortar into joints, force it tight against brick and close all hair cracks and crevices. Finish joints as soon as possible after mortar has attained its initial set. Do not use "cut-off" joints in exterior brick facing.

10.4 Joints in brick facing shall be 3/8" wide unless otherwise shown on the drawings or otherwise required to suit coursing. Variations in width of vertical joints shall be inconspicuous and made only as necessary to obtain the bond.

11. STORAGE OF MASONRY MATERIALS

11.1 Handle all masonry units at all times in a manner to prevent spalling, chipping and other damage. Upon delivery to the site, brick shall be immediately stored free of the ground and protected from the weather by tarpaulins or other suitable and approved means.

12. POINTING AND CLEANING

12.1 At completion of work, fill all holes in joints of exposed exterior masonry surfaces with mortar and tool suitably. After pointing has hardened, wet all exposed clay-brick masonry surfaces. Then clean with solution of 10% by volume of commercial muriatic acid, applied with stiff fiber brushes. Immediately after cleaning, rinse thoroughly with clear water. Leave clean, free of mortar daubs, and with tight mortar joints throughout. When cleaning masonry, protect all other work against damage or disfigurement.

SECTION 0440
MASONRY MORTARS

1. STIPULATIONS

1.1 The specifications sections, "General Conditions", "Supplementary General Conditions", "Special Conditions", and "Special Requirements" form a part of this section by this reference thereto and shall have the same force and effect as if printed herewith in full.

2. WORK INCLUDED

2.1 The work covered by this section of the specifications consists in furnishing all labor, material, equipment, and appliances and in performing all operations in connection with the supplying of mortars required for masonry work specified under other sections of these specifications.

3. STANDARDS

3.1 The following publications of the American Society for Testing and Materials form part of this section of the specifications to the extent indicated for reference thereto:

C150	Portland Cement
C91	Masonry Cement
C207	Hydrated Lime
C144	Sand (Aggregate for Masonry Mortars)
C270	Mortar for Unit Masonry
C190	Tensile Strength of Hydraulic Cement Mortars
C28	Gypsum Plasters
C266	Method of Test for Time of Setting of Hydraulic Cement by Gilmore Needles

4. MATERIALS

4.1 Portland cement shall meet requirements of ASTM Designation C150, type I.

4.2 High early strength Portland cement shall meet requirements of ASTM Designation C150, type III.

4.3 White Portland cement shall be non-staining white cement meeting requirements of ASTM Designation C150, type I.

4.4 Nonstaining cement shall meet requirements of ASTM Designation C150, type I, with added requirements that it shall not contain more than .030 percent by weight of soluble alkali calculated as Na2O.

4.5 Masonry cement shall meet requirements of ASTM Designation C91, type II.

4.6 Gypsum cement shall be neat gypsum plaster retarded for 4-hour set.

4.7 Hydrated lime shall meet requirements of ASTM Designation C207, type S.

4.8 Sand shall meet requirements of ASTM Designation C144, except that for grout and pointing mortar, 100% shall pass a No. 30 sieve, and not more than 15% shall pass a No. 100 sieve and shall be uniformly graded. Where specified, sand shall be white.

4.9 Coloring pigments shall be high-purity, finely ground, chemically inert, unfading, lime-proof mineral oxides, specially prepared for use in mortar.

4.10 Water shall be clean enough to drink, and free from injurious amounts of oil, soluble salts, alkali, acids, organic impurities, and other deleterious materials.

4.11 Waterproofing admixtures shall be an approved brand. In lieu of waterproofing admixture, Contractor has the option of using an approved brand of cement which has been waterproofed at mill.

4.12 Admixtures shall not be used without the approval of the Architect.

4.13 Anti-freeze compounds shall not be used.

5. TYPES OF MORTAR

5.1 Mortars are referred to by type in other sections of this specification. Mortar shall be mixed in the proportions set forth in Table I below. Where more that one proportion is specified under a type designation in Table I, the Contractor has the option of using either proportion under that type; however, only one proportion shall be used for a particular type mortar throughout the work. In lieu of mortar mixed in the proportions set forth in Table I, mortar will be accepted if certified data is presented showing that the mortar meets the requirements for minimum compression strength as set forth in Table I. Certified data shall be the results of compression strength tests of mortar mixed in the same proportions as are to be used in the work and tested in accordance with the requirements set forth in ASTM Designation C91.

TABLE I - TYPES OF MORTAR

MORTAR TYPE	PORTLAND CEMENT	MASONRY CEMENT	LIME PUTTY OR HYDRATED	MAXIMUM DAMP LOOSE SAND	MINIMUM COMPRESSIVE STRENGTH*
M	1		1/4	3	2500
S	1		1/2	4	1800
S	1/2	1		4	1800
N	1		1-1/4	6-3/4	750
N		1		2-3/4	750

*measured in pounds per square inch

5.2 Nonstaining mortar shall be Class N except that nonstaining cement shall be used in lieu of Portland cement.

5.3 Quantities of materials in Table I above are in parts by volume. If materials are to be measured by weight, use Table II to determine quantities:

TABLE II - WEIGHTS PER CUBIC FOOT

MATERIALS	POUNDS PER CUBIC FOOT
Portland Cement	94
Masonry Cement	Weight printed on bag
Hydrated Lime	40
Sand, damp	85

5.4 Pointing mortar shall consist of one cubic foot nonstaining cement and two cubic feet damp loose sand with only sufficient hydrated lime to make as stiff a mixture as can be worked. Where specified in other sections of this specification, sand shall be white.

5.5 Mortar grout shall consist of equal parts Portland cement and sand with addition of sufficient water to produce proper consistency.

5.6 Neat grout shall consist of Portland cement and water and shall be of pouring consistency.

6. HANDLING, STORING AND PROTECTING

6.1 Deliver cementitious materials to job site in original unopened packages with manufacturer's name and brand thereon. Handle, store and protect all materials so as to prevent deterioration or intrusion of foreign matter. Do not use material which has deteriorated or which has been mixed with foreign matter. Bagged cement stored for more than 6 months shall be rejected at Contractor's expense.

7. MEASURING AND MIXING

7.1 Measuring and mixing mortar shall meet requirements of ASTM Designation C270, except as otherwise specified herein. Measure all materials accurately. Use automatic measuring devices that will consistently maintain specified proportions within a plus or minus tolerance of not more than five percent.

7.2 Except as otherwise approved for small batches, mix mortar in mechanically operated drum-type batch mixers in which water can be accurately and uniformly controlled. Mix all dry ingredients for at least two minutes, then add water and mix for at least three additional minutes. Do not permit volume of mixed material per batch to exceed manufacturer's rated capacity of mixer. Empty mixer completely after each batch. Keep mixer and all other equipment clean.

7.3 Mortar shall have flow after suction (water retention) of at least 75% of that immediately after mixing.

7.4 Add water to hydrated lime at least 24 hours before mixing with other materials.

8. USING

8.1 Use mortar as soon as practicable after mixing. At air temperatures in excess of 80 degrees F., use mortar within 2-1/2 hours after introduction of water to mix; at lower temperatures this time may be increased to 3-1/2 hours. Discard all mortar not used within time limits noted above. Discard all mortar that has stiffened because of chemical reaction (hydration). Mortar which has stiffened within time limits noted above due to evaporation of moisture from mortar, may be re-tempered to restore workability by adding water as frequently as needed. As much water may be added as is practicable without impairing workability of the mortar.

SECTION 0570
MISCELLANEOUS AND ORNAMENTAL METAL

1. STIPULATIONS

1.1 The specifications sections, "General Conditions", "Supplementary General Conditions", "Special Conditions", and "Special Requirements" form a part of this section by this reference thereto and shall have the same force and effect as if printed herewith in full.

2. WORK INCLUDED

2.1 The work covered by this section consists of furnishing all labor, materials, equipment and appliances necessary to complete all miscellaneous metal work in strict accordance with this section of the specifications and the drawings, including generally metal items of a utilitarian nature other than structural framing (see schedule of items herein specified).

3. MATERIALS

3.1 Structural steel shall conform to ASTM A7 or A36.

3.2 Aluminum generally shall be extrusions of alloy 6063-T5. Cast aluminum shall be alloy 214-F.

3.3 Other materials shall be the best commercial quality except as more particularly specified.

4. SHOP PAINTING

4.1 After fabrication, miscellaneous iron and steel not specified to receive other finish shall be thoroughly cleaned of all loose rust, scale, dirt and foreign matter by wire brushing or sandblasting and solvent cleaning or other effective means and painted all over except on any surfaces to be encased in concrete.

4.2 Paint for shop painting shall be red lead paint meeting Federal Specifications TT-P-86c.

5. FIELD TOUCH-UP

5.1 After delivery in field, clean and touch-up any damaged or abraded areas in shop prime coat that will not be accessible after erection. When erection is completed, clean and touch-up any other such areas.

6. SHOP DRAWINGS

6.1 Submit complete, detailed shop and erection drawings of all this work for approval before starting fabrication or delivering any materials.

7. MEASUREMENTS

7.1 Obtain or check all necessary measurements at the job and assume full responsibility for proper fit of all this work.

8. WORKMANSHIP

8.1 Workmanship shall be first class in all respects.

8.2 Edges shall be straight and true, angles sharp and surfaces smooth. Shearing and punching shall leave clean, true edges and surfaces.

8.3 All work shall be neat and smooth and made strong, stiff and rigid. Joints shall be strong and secure. Exposed joints shall be accurate and close fitting.

8.4 Fastenings shall be concealed where possible. Exposed welds shall be ground smooth. Exposed rivets, bolts and screws shall be countersunk. Provide lock washers for all bolts.

8.5 Furnish to others for installation all necessary anchors, bolts, inserts and other items in connection with miscellaneous metal work which are to be built into other work. Wherever possible, use expansion bolts and anchors for securing miscellaneous metal to masonry.

8.6 Do all drilling, tapping, cutting and fitting required for installation or attachment of engaging work, and furnish bolts, screws or other fastenings as necessary for attachment of other work to miscellaneous metal.

9. SCHEDULE OF ITEMS

9.1 The work of this section shall include but not limited to the following items as they are required by the drawings:

a) Loose Lintels
b) Metal Stairs
c) Pipe Railings
d) Gratings
e) Ornamental Aluminum Columns
f) Expansion Joint Covers
g) Thresholds

9.2 Where angle lintels are required to support masonry but are not shown or noted, provide one angle for each 4" of wall thickness in accord with the following table:

Masonry Opening	Angle
up to 3'-4"	3-1/2 x 3-1/2 x 3/8
3'-4" to 4'-8"	3-1/2 x 4 x 3/8 LLV
4'-8" to 6'-0"	3-1/2 x 5 x 3/8 LLV

9.3 Metal stairs:

a) Where required by the drawings, provide metal stairs as detailed on the drawings, designed to support a live load of 100 psf minimum. Insofar as possible, make joints by welding rather than riveting or bolting.

b) Strings shall be not less than 12" structural steel channels. Extend well strings around openings to form base and fascia. Provide 3/16" steel plates neatly welded in place to close open ends of strings.

c) Platforms shall be 10 ga. sheet steel formed into 4" deep pans with lipped edge to receive concrete fill. Reinforce underside with integrally formed ribs or applied tees or angles on not over 2 foot centers. Provide all beams and hangers as indicated or required to support platform.

d) Treads and risers shall be 12 ga. sheet steel formed into 2" deep pans with lipped edge to receive concrete fill.

9.4 Aluminum pipe railing shall be 1-1/4 or 1-1/2 inch o.c. as noted on the drawings. Schedule 40 aluminum pipe with clear anodized finish. Railings shall be installed plumb and true with tight joints, free from blemishes, marks or scratches. Installation shall be rigid and in accord with manufacturer's specifications.

9.5 Where required by the drawings, provide steel grating type area wall covers capable of supporting 100 lb./sq. ft.. live loading. Gratings shall be primed and painted two coats of black enamel and installed recessed flush with the top of the concrete area wall.

9.6 Where required by the drawings, provide ornamental aluminum columns as detailed and specified on the drawings. Columns shall be installed plumb and true, complete in all respects, in strict accord with the manufacturer's installation specifications.

9.7 Provide aluminum expansion cover assemblies where required by the drawings. Expansion cover assemblies shall be a specified on the drawings. Alloy shall be 6063-T5 and T6, mill finish. Aluminum surfaces in contact with cement shall have zinc chromate finish.

9.8 Provide extruded aluminum thresholds at all exterior doors. Thresholds shall be thermal barrier type, appropriate to the door type and operation and provided with weatherstripping. Provide handicap types where designated on the drawings. Aluminum shall be Alloy 6063-T5, mill finish. Sponge neoprene shall be closed-cell type, solid neoprene shall be low temperature grade. Vinyl shall meet commercial standard CS 230-60. All thresholds shall be complete with appropriate fasteners as specified by the manufacturer.

SECTION 0600
CARPENTRY & MILL WORK

1. GENERAL

1.1 All applicable provisions of "General Conditions", "Supplementary General Conditions", "Special Conditions", and "Special Requirements" form a part of this section of specifications.

1.2 Scope: The extent of work shall be as shown on drawings and called for herein. Performance shall meet the requirements of the specifications. The work covered by this section of the specifications consists of the following:

a) All rough and finished carpentry work and millwork as required by the drawings and as specified under this section.
b) Installation of all rough and finished hardware.
c) Installation of metal and other items furnished by other trades if specifically noted in the Description of Work.
d) Over and above the direct carpentry work, the work under this section includes the general supervision of the construction work of the entire project and coordination with all other trades. A representative with authority chosen by the Contractor and approved by the Architect and the Owner shall give general supervision and superintendence.

2. PRODUCTS

The lumber shall be classified and grade marked to the following codes and requirements:

2.1 Cedar, Douglas Fir, White Fir, Western Hemlock, Western Larch, Idaho White Pine, Ponderosa Pine, Sugar Pine and Englemann Pine - Requirements of Western Wood Products Association. Unless otherwise indicated the grades shall be "standard" for non-stress graded members and "#3 Comm." for subflooring and wall and roof sheathing.

2.2 Eastern Hemlock, Northern White Pine and Norway Pine - Requirements of Northern Hardwood and Pine Manufacturer's Association. Unless otherwise indicated the grades shall be "#2 Dim" for non-stress graded members and "#2 Comm." for subflooring and wall and roof sheathing.

2.3 Redwood - Requirements of Redwood Inspection Service.

2.4 All lumber shall be as shown on drawings or called for in this section.

2.5 Lumber shall live stock, thoroughly seasoned, and well manufactured. Materials generally shall be free from warp that cannot be corrected by bridging or nailing. Wood work exposed to view shall be dressed.

2.6 All structural load-bearing lumber beams, columns, rafters, joists and lintels shall be of quality to provide 1,500 p.s.i. units fiber stress (bending); 1,700,000 PSI mod of elasticity load bearing studs shall have fiber stress 800 PSI (bending) and 1,500,000 PSI mod of elasticity.

2.7 The lumber shall bear the official grade and trademark of the association under whose rules it was graded.

2.8 Woodwork which is to be painted shall have exposed surfaces free of defects that would show after being painted.

2.9 Woodwork that is to finished to show the grain shall be bright, uniform in color, and free from blemishes.

2.10 The following species of lumber shall be used as noted below:

a) Douglas Fir Construction Grade J & P (1,500 p.s.i.)
Southern Pine No. 1 Grade (1,500 p.s.i.)
1) Plates
2) Nailing blocks bolted to structural steel
3) Load-bearing wood members (joists)

b) Douglas Fir Construction Grade, Southern Pine No. 1 Grade:
1) Studs
2) Plates
3) Caps
4) Blocking not bolted to steel

c) Douglas Fir Standard Grades, Southern Pine No. 2 Grade:
1) Ground
2) Furring

d) Structural plywood shall meet the requirements of the Douglas Fir Plywood Association for the grades as specified. Each piece of fir plywood shall bear the grade mark of the Douglas Fir Plywood Association. Plywood for subflooring shall be "underlayment INT-APA" 3/4" thick, tongue and groove with exterior glue. Subflooring shall be glued and nailed to joists using an approved construction adhesive. Plywood roof and wall sheathing shall be C-D INT-DFPA exterior glue in thickness noted on drawings, and where support spacing on roofs exceeds 24" o.c., provide blocking, tongue and groove edges or Ply-clips.

2.11 Boards and dimension lumber not over 2" in nominal thickness shall be kiln-dried or air-dried, and moisture content shall not exceed 19%. Upon application by the Contractor, the Architect may permit the Contractor to furnish boards and dimension lumber having moisture content in excess of 19%, subject to the following conditions:

a) That the lumber be suitably piled under cover for air drying on the site.

b) That the lumber be air-dried to a moisture content not in excess of 19% prior to placement in the structure.

2.12 Moisture content of lumber over 2" in nominal thickness shall conform to the rules of the association under which it is graded and may be incorporated in the structure without further seasoning. Exterior and interior finishing lumber shall be kiln-dried and, at the time of delivery to the building site, the moisture content shall not exceed 12 per cent for material 1" or less in thickness and shall not exceed 14 per cent for material over 1" in thickness. Millwork, which is assembled or built-up of more than one piece at the mill, except doors, shall have a moisture content not in excess of 12 per cent.

2.13 Wood blocking and nailers used in conjunction with roofing and masonry work shall be given a pressure preservative treatment in a closed retort. The treatment shall conform to Federal Specification TT-W-571, and the minimum net retention of preservatives shall be as specified hereinafter. Any of the following preservatives will be acceptable, except that coal-tar creosote solutions shall not be used.

Preservative	Minimum net retention: Lbs./Cu. Ft.	
Pentachlorophenol solution		6.0
Copper naphthenate solution		6.0
Wolman salts (tanaith)	Dry salt	.35
Chromated zinc chloride	Dry salt	.75
Calcure (acid cupric chromate)	Dry salt	.50
Chemonite (ammoniacal copper arsenite)	Dry salt	.30

2.14 After using a salt treatment, the moisture content of the lumber shall be reduced to not over 19%. Lumber sawed or cut after treatment shall have the cut surfaces well brushed-coated with the same preservative that was used at the plant. Lumber shall be accompanied by a certificate from a recognized lumber treatment company certifying the amount of treatment and percentage of moisture after kiln-drying.

2.15 Shop and/or layout drawings shall be submitted for approval of all cabinet and/or millwork and all paneling showing all dimension, clearances, finishes, anchoring and hardware as required.

2.16 Before leaving the shop or mill, all millwork included in this contract shall be primed and back painted.

2.17 Lumber delivered to the site shall be carefully piled off the ground in such a manner as to insure proper drainage, ventilation and protection from the weather as approved by the Architect.

2.18 Provide, paint with red lead, and set all rough building hardware, such as shoes, dogs, spikes, bolts, stirrups, joist hangers, nails, lag screws, lagging bolts and anchors, as called for or required to hold woodwork together or to anchor it to other material.

3. EXECUTION

3.1 General: The Contractor shall carefully lay out and erect all structural members of rough carpentry, framing, sheathing, bridging and other items of work as necessary to install the finished work as shown on plans or noted in this section. All members shall be properly braced, plumbed and leveled. A sufficient number of nails, screws and bolts shall be used to insure the rigidity of the construction.

3.2 All items of millwork shall be carefully erected with tight fitting joints, carefully cut and secured. Exposed nails shall be set for putty. Back-prime all millwork before installation and protect against dampness. Moulds and faces shall be clean cut and true pattern. All work shall be thoroughly cleaned and sanded to receive the finish. Sharp corners of small members of finish woodwork shall be slightly rounded. Provide return miters on window stool aprons.

3.3 Framing lumber and other rough work shall be closely fitted, accurately set to required lines and levels, and rigidly secured in place. Studs shall be sized to give true surfaces for finish. Members shall be framed for the passage of pipes and ducts to avoid cutting structural members. No framing members shall be cut, notched or bored for the passage of pipes and conduits without permission from the Architect. Special framing or construction, not explicitly shown or specified, shall be provided as required to complete work in the best and most workmanlike manner. Nailing and spiking shall be done in a thorough manner, using nails and spikes of ample size and in proper quantity as per the recommended nailing schedule of the National Lumber Manufacturer's Association.

3.4 Temporary centering, bracing and shoring for the support and protection of the structure during construction shall be strongly made, properly installed and well secured in place to serve the intended purpose.

3.5 Grounds and nailing pieces shall be placed wherever they are required for installing woodwork of every description.

3.6 Finish hardware shall be fitted and installed in wood doors, such built-in features and other millwork shown on drawings, and shall be protected from damage. Provide and install finish hardware for cabinets and similar work. Hardware shall be fitted prior to the application of painter's finish, removed during the finishing operation and reset after the completion of the finish, except for the last coat. All hardware shall be accurately and securely installed. Metal knobs and handles shall be protected by wrappers of tough paper or cloth maintained in place until acceptance of the work, and shall be left in perfect working order at the time of acceptance of the work, when all keys shall be delivered to the Owner.

3.7 Trim and moulds having finger joints shall be used only where they are designated to receive opaque finishes.

3.8 Columns shall be continuous without splices from base to girder. Wood columns shall rest on concrete or masonry base. In basements, top of the base shall be at least three inches above the floor.

3.9 Girders shall have 1/2" air space at ends and sides. Joints of girders shall be over supports.

3.10 Floor joists shall not be placed over 16" o.c.

3.11 Framing joist into side of wood beams or girder shall be done with steel angles 3 x 3 inches, with steel joist hangers or with wood ledger strip at least 2 x 2 inches and toe-nailed to girder.

3.12 Framing joists into side of steel base shall be done resting the joist on lower flange with a minimum of 1-1/2 inch bearing or with 2 x 2 inch ledger strips bolted to beam.

3.13 Framing into masonry: Minimum bearing shall be 3". Provide 1/2" air space at the end and sides of the joist. Joists shall be fire cut.

3.14 Framing over girders and bearing partitions: Joists may be butted together over the center bearing, provided joists are tied together, or joists may be lapped and nailed together. Minimum lap, 4": maximum overhang, 12".

3.15 Joists shall be doubled under all parallel partitions.

3.16 Bridging: Maximum spacing, 8 feet o. c. Bridging shall be crossbridging using 1 x 3 inch boards or solid bridging using for bridging joist dimension lumber in offset fashion.

3.17 Wall and partition framing: Unless otherwise shown, space studs 16" o.c.. Double studs at openings. Construct partition corners of not less than three full members. Walls and bearing partitions shall have double top plates. Plates resting on masonry or concrete shall be anchored with bolts.

3.18 Roof framing with rafters: Valleys, hips and ridges shall be true intersections of roof planes. Rafters shall be spiked to wall plate and ceiling joists. Hip and valley rafters shall be secured to wall plates by clip angles.

Sill plates shall be anchored to foundations with 1/2" diameter anchor bolts x 15 inches in length having 1" minimum diameter washers.

Bolts shall be located 48" o. c. and 12" maximum from the end of each wall section. Each wall section shall have a minimum of two (2) anchor bolts.

3.19 Blocking shall be provided as necessary for the application of siding, sheathing, wallboard, subflooring, and other items and to provide fire stopping.

Provide blocking as required for the support or attachment of toilet partitions; toilet room accessories; wall mounted plumbing and electrical fixtures; wall mounted shelving and coat racks; fire extinguishers; wall mounted door bumpers and related items.

3.20 Stair framing shall be well spiked together. Rough carriages shall be cut to exact shape as required to receive finish treads and risers.

3.21 Provide nailers, nailing strips and grounds as necessary and rigidly secure in place for attachment of trim, finish and other work.

3.22 Provide furring strips at locations shown on plans. Install at 16" o. c. unless shown otherwise, butt jointed and rigidly secured.

3.23 Set rough bucks and frames in masonry or concrete straight, true and plumb. Secure with anchors near top and bottom of each wood member and at intermediate intervals not exceeding three feet.

3.24 Plywood sheathing shall be 1/8" apart at side joints and 1/8" apart at end joints. Nailing shall be 6" o. c. at supported edges and 12" o. c. at intermediate supports, alternate joints. Plywood sheathing for roof construction shall be CDX - Douglas Fir. (Provide plyclips between each rafter or truss when spacing exceeds 16" o. c.)

3.25 Fir wood and plywood siding accurately into position without springing or otherwise forcing the siding in place. Ends of horizontal siding shall be over framing members. The shorter pieces shall be uniformly distributed throughout each area. Pre-drill ends of siding if necessary to prevent splitting when nailed.

3.26 Finish: Exterior finish, trim and door frames: Install straight, plumb, level and with closely fitted joints and rigidly secured. Blind nailing shall be used to the extent practicable; face nailing shall be set and stopped with a non-staining putty to match the finish. Stagger, conceal or place joints in unobjectionable locations. Securely anchor door frames to the supporting construction.

3.27 Finish: Interior finish, trim and door frames: Secure work with fine finishing nails and glue where required to assure permanent, tight joints. Set wood base after finish flooring is in place.

3.28 Finish stair work: Fit, nail, bolt and glue stair work together to form a rigid structure without squeaks and vibrations. Anchor newels and posts securely to rough stair framing.

3.29 Where indicated or scheduled on the drawings, provide prefinished plywood paneling 1/4" thick with genuine hardwood veneers as manufactured by Georgia Pacific Weldwood or approved equal. Panels shall be as selected by the Owner. Contractor shall provide an allowance of $ 40.00 (forty dollars) per 4' x 8' panel in accordance with Paragraph 4.8.1 of the General Conditions.

3.30 Where shown on the drawings provide wood shelving. Unless noted otherwise, wood shelving shall be 3/4" plywood with 1-1/2" x 3/4" hardwood nosing. Provide mounting brackets as required to rigidly support shelving.

3.31 Wood cabinet work shall be indicated on the drawings as to manufacturer and style number or equal as approved by the Owner and the Architect. Cabinets of other manufacture must be approved one sample cabinet showing construction methods, materials and finish. Upon approval, the sample cabinet may be incorporated into the new work. Cabinet hardware shall be as selected by the Owner. Countertops, aprons and backsplashes shall be Formica brand or approved equal, laminated plastic in colors selected by the Owner.

3.32 When noted on the drawings, provide fire-retardant treated lumber where indicated. Fire-retardant treated wood shall be pressure treated with fire-retardant chemicals in accordance with AWPA recommended practice C20, "Structural Lumber - Fire-Retardant Treatment by Pressure Processes", and have a flame spread rating not higher than equivalent of 25 with no evidence of significant progressive combustion when tested for 30 minutes duration under the Standard Test Method for Fire Hazard Classification of Building Materials, UL 723, NFPA 225, ASTM E84. Fire retardant treated lumber and plywood shall be labeled and tested by an approved testing agency showing the performance rating thereof. After treatment, all plywood and lumber, 2" nominal or less, shall be dried to a moisture content of 19% or less. Except where exterior-grade treatment complying with rain testing is specified, fire-retardant treated wood shall not be used where it will be exposed directly to the weather. FRT wood and plywood shall be 'Flame Proof' LHC-HTT treated lumber by Osmose Wood Preserving, Inc., Griffen, GA. The Contractor shall furnish certification of this product to the Architect.

3.33 When noted on the drawings, provide wood trussed rafters. Wood trusses shall be accord with designs prepared by Alpine Engineered Products, Inc., or approved equal, and fabricated in accordance with said designs by an authorized manufacturer. Engineering drawings conforming to the design load and deflection criteria indicated on the drawings shall be submitted for approval prior to fabrication. Design drawings shall bear the seal of a registered professional engineer. When noted on the drawings, trusses shall be fire-retardant treated.

a) Design Standards: Design standards shall conform with the applicable provision of the National Design Specification for Wood Construction, published by the National Forest Products Association, and the Design Specification for Metal Plate Connected Wood Trusses , published by the Truss Plate Institute.

b) Connector Plates: All connector plates shall be a minimum thickness of 0.036" and shall be manufactured from steel meeting the requirements of ASTM A446 Grade A, and shall be hot dipped galvanized according to ASTM A525. Coating Designation G60. In highly corrosive environments or when fire retardant lumber is specified, stainless steel connector plates are required. Galvanized plates may be used on fire-retardant treated lumber, when the fabricator certifies to the Architect that "Dri-Con" or other lumber treated with non-corroding chemicals and which are approved by the Architect is to be used for truss fabrication.

c) Quality Control: Lumber defects such as wane or knots occurring in the connector plate area must not effect more than 10% of required plate area or number of effective teeth required for each truss member. Connect plates shall be applied to both faces or truss at each joint, and should provide firm, even contact between the plate and wood. All wood members have good bearing and all completed truss units are uniform. See Truss Plate Institute Quality Control Manual QMC-77 for tolerances and other special requirements.

d) Bracing: All trusses must be securely braced both during erection and after permanent installation in a building in accordance with Bracing Wood Trusses: Commentary and Recommendations (BWT-76) as published by the Truss Plate Institute. Erection bracing shall hold trusses straight and plumb and in safe condition until decking and permanent truss bracing has been fastened forming a structurally sound roof framing system. All erection and permanent bracing shall be installed and all trusses permanently fastened before application of any loads. Permanent structural cross-bracing to ensure overall rigidity of the roof system shall be in accordance with the architectural/engineering plans for the building structure. See truss design drawings for any additional special bracing requirements. Materials used in bracing are to be furnished by the Erection Contractor. See Appendix "A" pages 1 thru 6 of the specifications.

3.34 Unless specifically noted otherwise, all plywood roof and wall sheathing shall be covered on the exterior face with an approved #15 building felt. Exterior roof and wall sheathing shall be "papered-in" (covered) #15 building felt at the end of each working day to avoid exposure of plywood sheathing to the elements.

3.35 Where required by the drawings, provide 1" thick "Tectum" wall panels with beveled edge fastened to wood furring with construction adhesive and bugle-head screws 8" o.c.. Panels shall be furnished "in manufacturer's standard 'white' finish". Panels shall be furnished in maximum lengths available to eliminate or minimize butt joints.

This safety alert symbol is used to attract your attention! PERSONAL SAFETY IS INVOLVED! When you see this symbol - BECOME ALERT - HEED ITS MESSAGE.

DANGER: A DANGER designates a condition where failure to follow instructions or heed warning will most likely result in serious personal injury or death or damage to structures.

CAUTION: A CAUTION identifies safe operating practices or indicates unsafe conditions that could result in personal injury or damage to structures.

WARNING: A WARNING describes a condition where failure to follow instructions could result in severe personal injury or damage to structures.

HIB-91 Summary Sheet

COMMENTARY and RECOMMENDATIONS for HANDLING, INSTALLING & BRACING METAL PLATE CONNECTED WOOD TRUSSES©

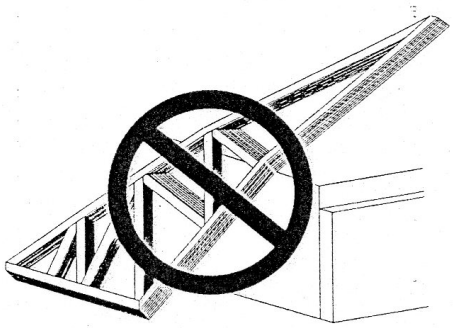
TRUSS PLATE INSTITUTE
583 D'Onofrio Dr., Suite 200
Madison, Wisconsin 53719
(608) 833-5900

It is the responsibility of the builder, building contractor, licensed contractor, erector or erection contractor to properly handle and install metal plate connected wood trusses to protect life and property. The installer must exercise the same high degree of safety awareness as with any other structural material. TPI does not intend these recommendations to be interpreted as superior to the project Architect's or Engineer's design specification for handling, installing and bracing wood trusses for a particular roof or floor. These recommendations are based upon the collective experience of leading technical personnel in the wood truss industry, but must, due to the nature of responsibilities involved, be presented as a guide for the use of a qualified building designer, builder, or erection contractor. Thus, the Truss Plate Institute, Inc. expressly disclaims any responsibility for damages arising from the use, application or reliance on the recommendations and information contained herein by building designers, builders, installers, and others.

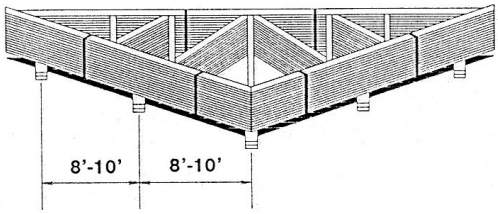
CAUTION: The builder, building contractor, licensed contractor, erector or erection contractor is advised to obtain and read the entire booklet "Commentary and Recommendations for Handling, Installing & Bracing Metal Plate Connected Wood Trusses, HIB-91" from the Truss Plate Institute.

CAUTION: All temporary bracing should be no less than 2x4 grade marked lumber. All connections should be made with minimum of 2-16d nails. All trusses assumed 2' on-center or less. All multiply trusses should be connected together in accordance with design drawings prior to intallation.

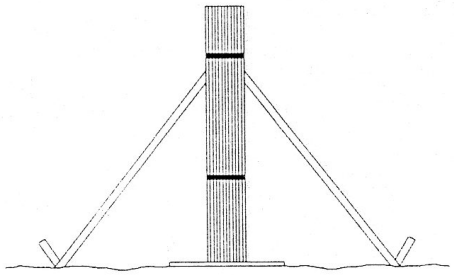
TRUSS STORAGE



CAUTION: Trusses should not be unloaded on rough terrain or uneven surfaces which could cause damage to the truss.



Trusses stored horizontally should be supported on blocking.



Trusses stored vertically should be braced to prevent toppling or tipping.

WARNING: Do not break banding until installation begins or lift bundled trusses by the bands.

DANGER: Do not store bundles upright unless properly braced.

WARNING: Do not use damaged trusses.

DANGER: Walking on trusses which are lying flat is extremely dangerous and should be strictly prohibited.

Frame 1

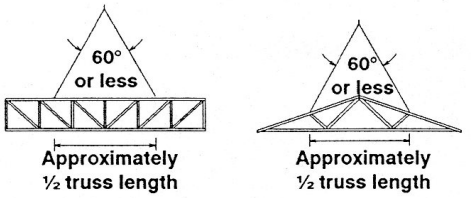
APPENDIX A

TRUSS PLATE INSTITUTE
HIB-91 Summary Sheet

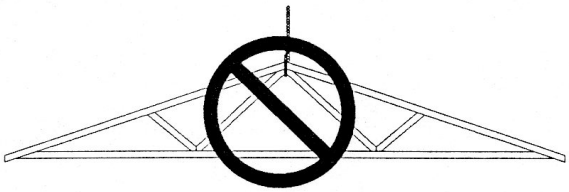
WARNING: Do not attach cables, chains, or hooks to the web members.

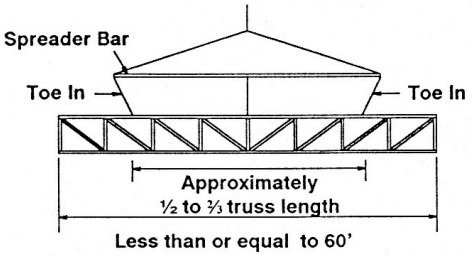
WARNING: Do not lift single trusses with spans greater than 30' by the peak.

MECHANICAL INSTALLATION

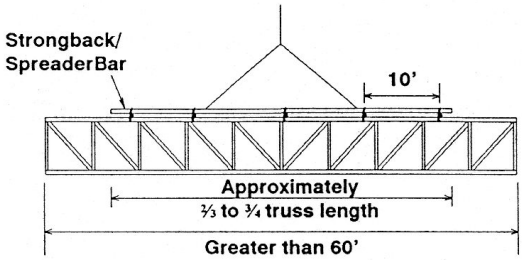


Truss spans less than 30'.

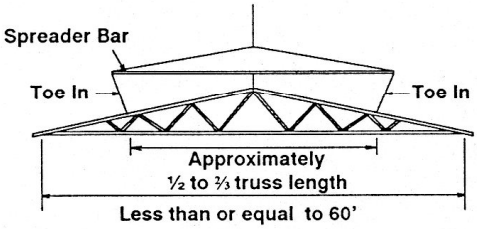




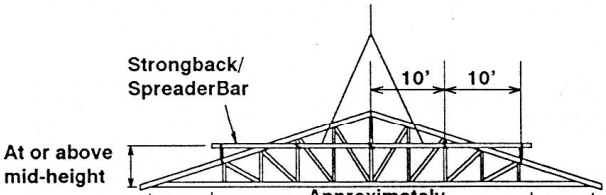
Less than or equal to 60'



Greater than 60'



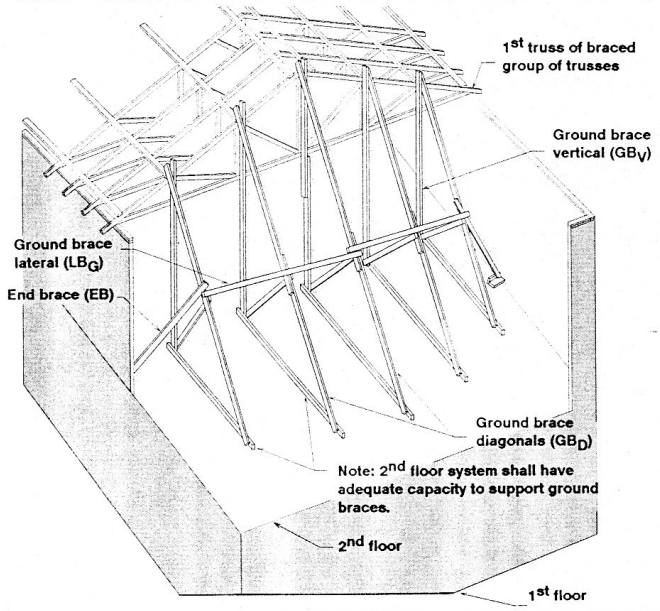
Less than or equal to 60'



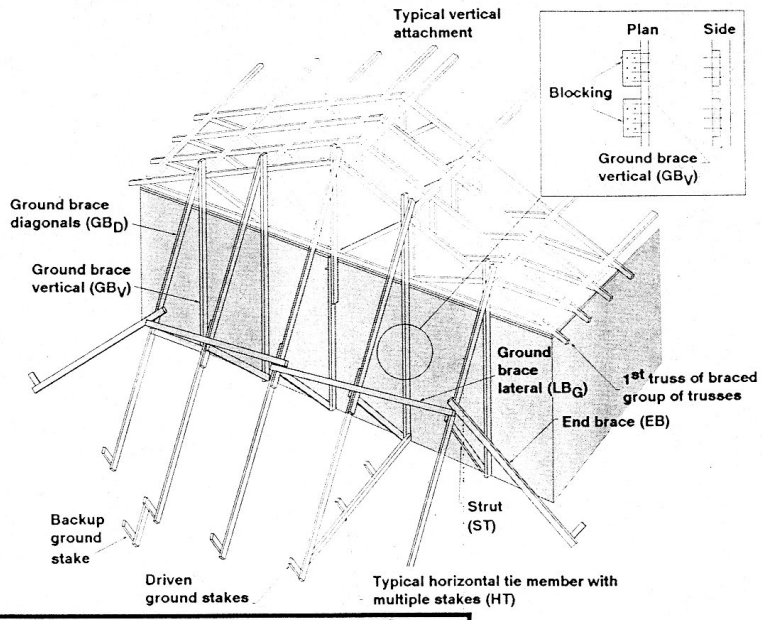
Greater than 60'

CAUTION: Temporary bracing shown in this summary sheet is adequate for the installation of trusses with similar configurations. Consult a registered professional engineer if a different bracing arrangement is desired. The engineer may design bracing in accordance with TPI's *Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses, DSB-89*, and in some cases determine that a wider spacing is possible.

GROUND BRACING:BUILDING INTERIOR



GROUND BRACING: BUILDING EXTERIOR



CAUTION: Ground bracing required for all installations.

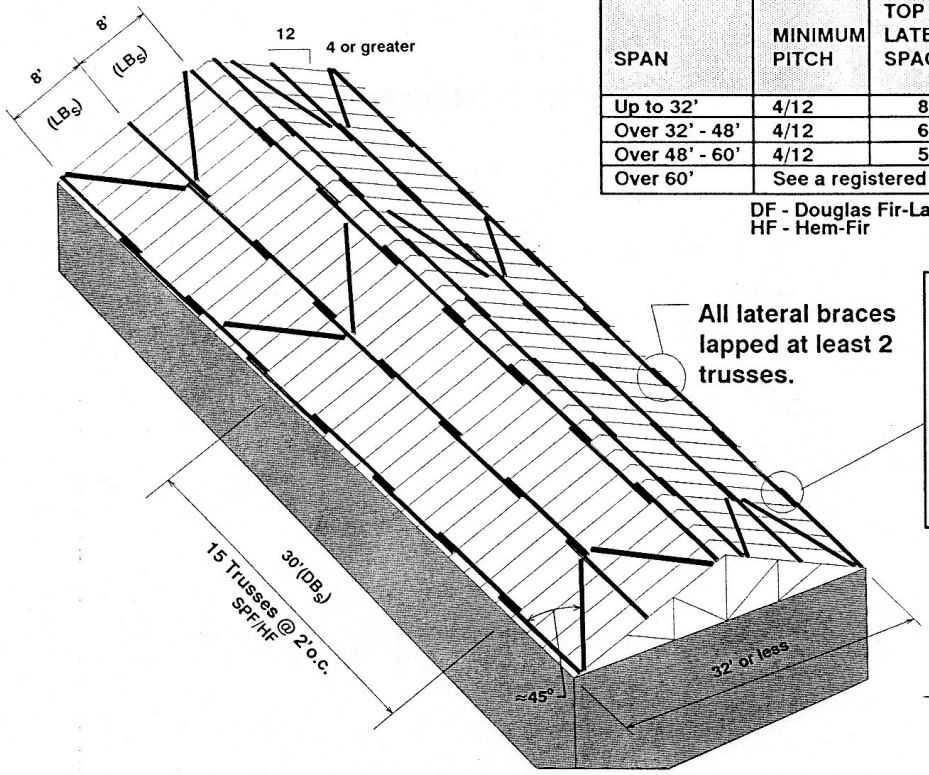
Frame 2

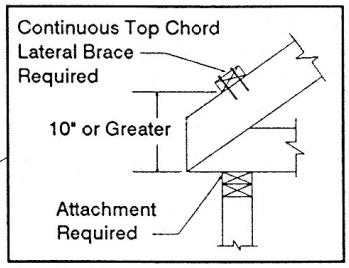
APPENDIX A

TRUSS PLATE INSTITUTE
HIB-91 Summary Sheet

SPAN	MINIMUM PITCH	TOP CHORD LATERAL BRACE SPACING(LB_S)	TOP CHORD DIAGONAL BRACE SPACING (DB_S) [# trusses]	
			SP/DF	SPF/HF
Up to 32'	4/12	8'	20	15
Over 32' - 48'	4/12	6'	10	7
Over 48' - 60'	4/12	5'	6	4
Over 60'	See a registered professional engineer			

DF - Douglas Fir-Larch SP - Southern Pine
HF - Hem-Fir SPF - Spruce-Pine-Fir



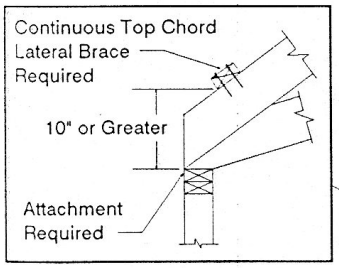


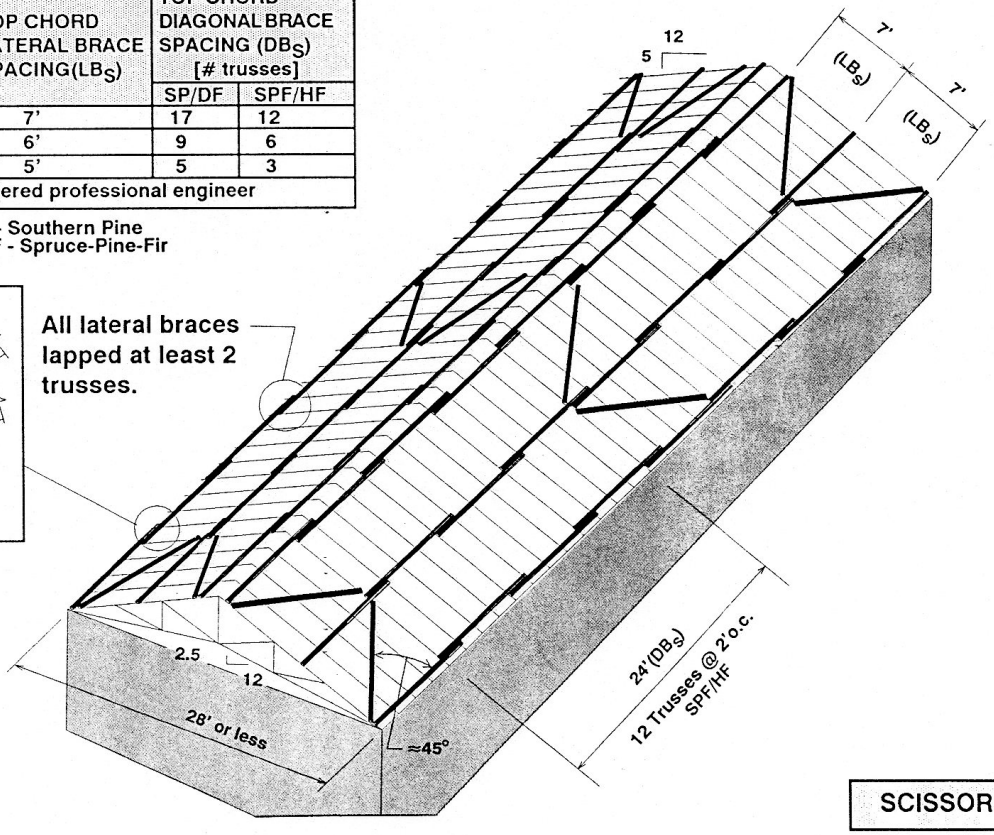
PITCHED TRUSS

WARNING: Failure to follow these recommendations could result in severe personal injury or damage to trusses or buildings.

SPAN	MINIMUM PITCH DIFFERENCE	TOP CHORD LATERAL BRACE SPACING(LB_S)	TOP CHORD DIAGONAL BRACE SPACING (DB_S) [# trusses]	
			SP/DF	SPF/HF
Up to 28'	2.5	7'	17	12
Over 28' - 42'	3.0	6'	9	6
Over 42' - 60'	3.0	5'	5	3
Over 60'	See a registered professional engineer			

DF - Douglas Fir-Larch SP - Southern Pine
HF - Hem-Fir SPF - Spruce-Pine-Fir



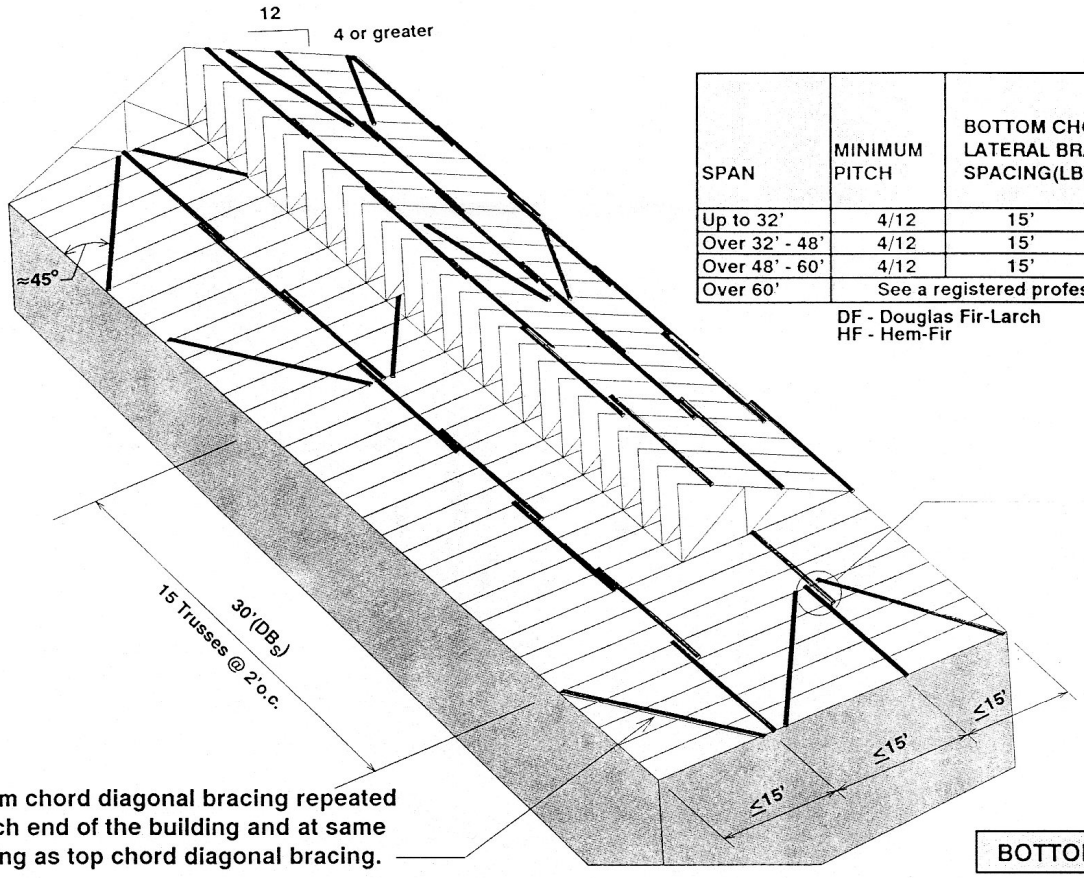


SCISSORS TRUSS

Frame 3

APPENDIX A

TRUSS PLATE INSTITUTE
HIB-91 Summary Sheet



SPAN	MINIMUM PITCH	BOTTOM CHORD LATERAL BRACE SPACING(LB_S)	BOTTOM CHORD DIAGONAL BRACE SPACING (DB_S) [# trusses]	
			SP/DF	SPF/HF
Up to 32'	4/12	15'	20	15
Over 32' - 48'	4/12	15'	10	7
Over 48' - 60'	4/12	15'	6	4
Over 60'	See a registered professional engineer			

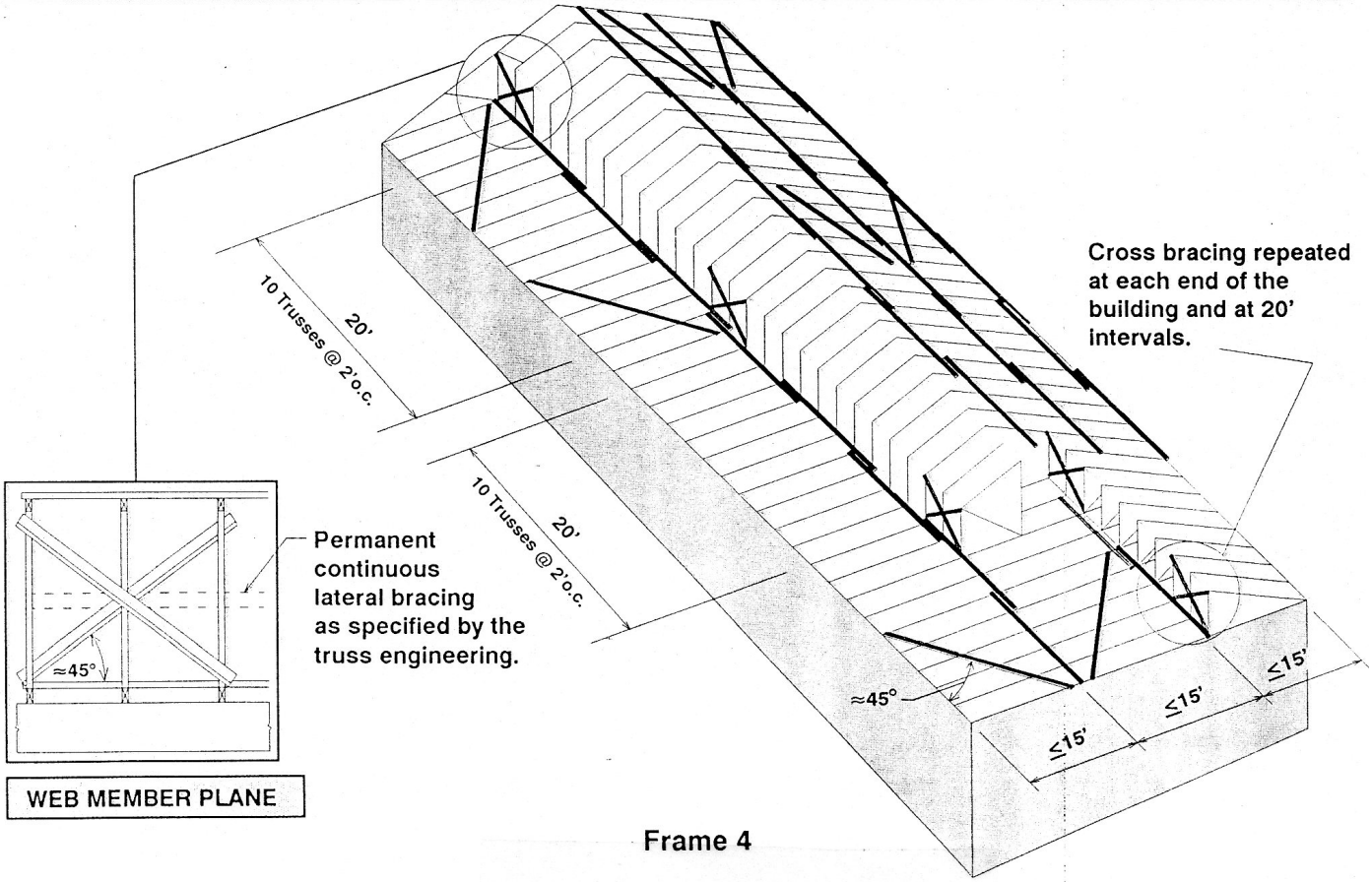
DF - Douglas Fir-Larch
HF - Hem-Fir
SP - Southern Pine
SPF - Spruce-Pine-Fir

All lateral braces lapped at least 2 trusses.

Bottom chord diagonal bracing repeated at each end of the building and at same spacing as top chord diagonal bracing.

BOTTOM CHORD PLANE

WARNING: Failure to follow these recommendations could result in severe personal injury or damage to trusses or buildings.



WEB MEMBER PLANE

Frame 4

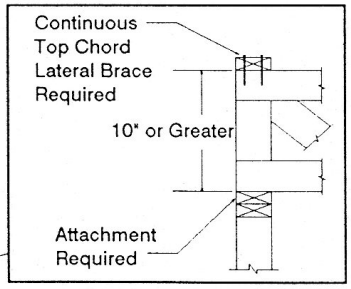
APPENDIX A

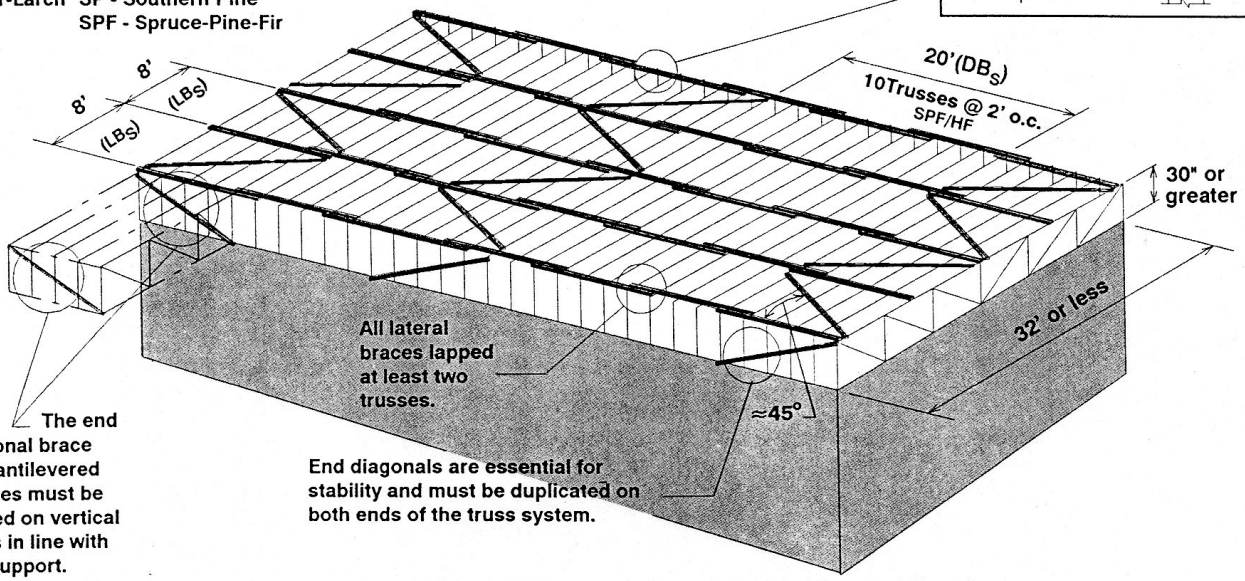
TRUSS PLATE INSTITUTE
HIB-91 Summary Sheet

SPAN	MINIMUM DEPTH	TOP CHORD LATERAL BRACE SPACING(LB_S)	TOP CHORD DIAGONAL BRACE SPACING (DB_S) [# trusses]	
			SP/DF	SPF/HF
Up to 32'	30"	8'	16	10
Over 32' - 48'	42"	6'	6	4
Over 48' - 60'	48"	5'	4	2
Over 60'	See a registered professional engineer			

DF - Douglas Fir-Larch SP - Southern Pine
HF - Hem-Fir SPF - Spruce-Pine-Fir

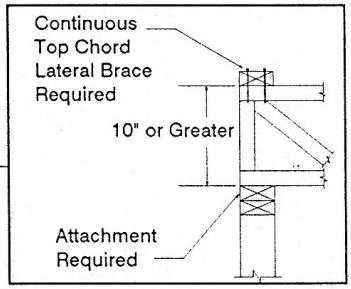
2x4/2x6 PARALLEL CHORD TRUSS

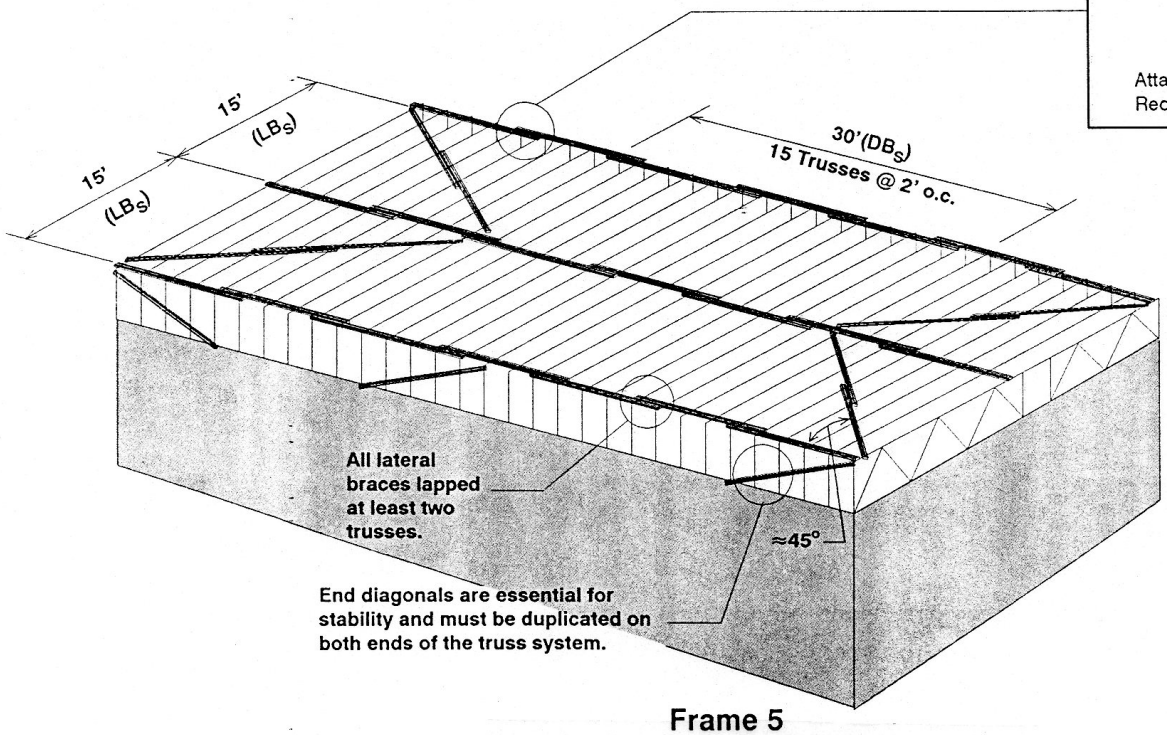


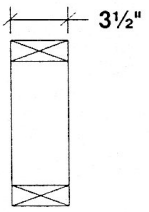


WARNING: Failure to follow these recommendations could result in severe personal injury or damage to trusses or buildings.

4x2 PARALLEL CHORD TRUSS:TOP CHORD







Trusses must have lumber oriented in the horizontal direction to use this brace spacing.

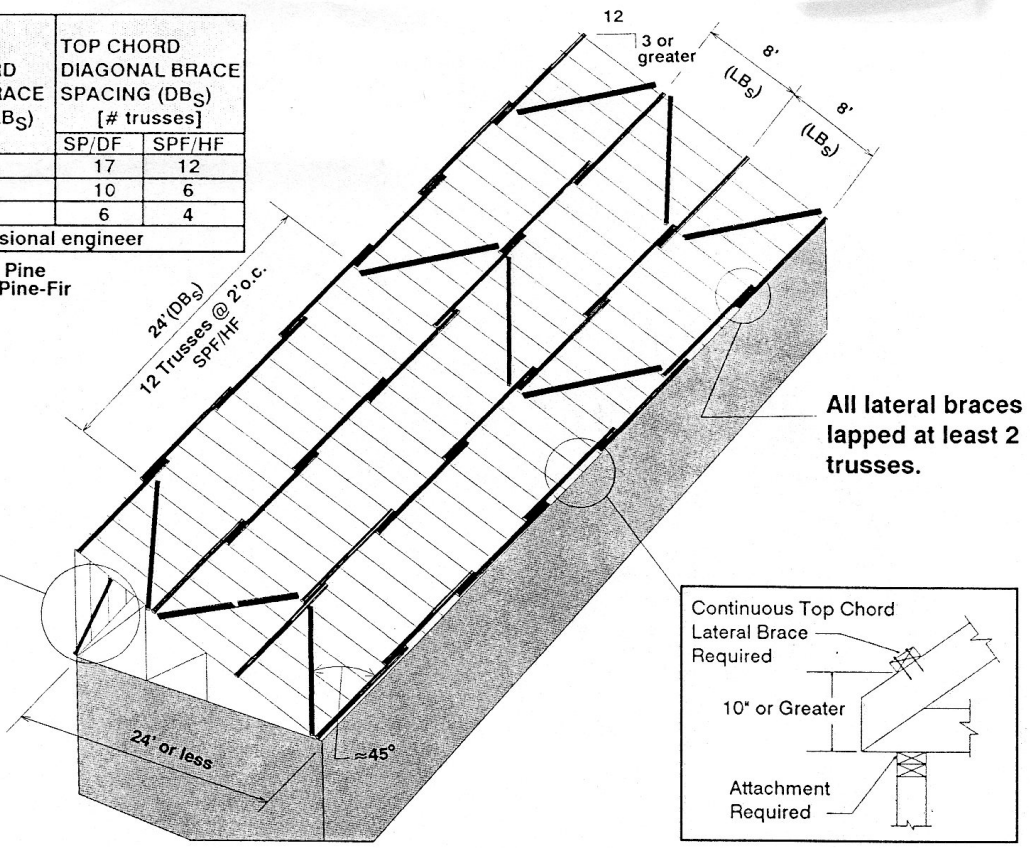
Frame 5

APPENDIX A

TRUSS PLATE INSTITUTE
HIB-91 Summary Sheet

SPAN	MINIMUM PITCH	TOP CHORD LATERAL BRACE SPACING(LB_S)	TOP CHORD DIAGONAL BRACE SPACING (DB_S) [# trusses]	
			SP/DF	SPF/HF
Up to 24'	3/12	8'	17	12
Over 24' - 42'	3/12	7'	10	6
Over 42' - 54'	3/12	6'	6	4
Over 54'	See a registered professional engineer			

DF - Douglas Fir-Larch
HF - Hem-Fir
SP - Southern Pine
SPF - Spruce-Pine-Fir

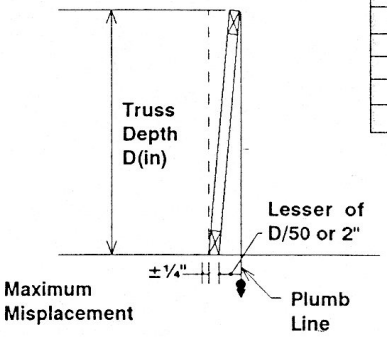


MONO TRUSS

WARNING: Failure to follow these recommendations could result in severe personal injury or damage to trusses or buildings.

INSTALLATION TOLERANCES

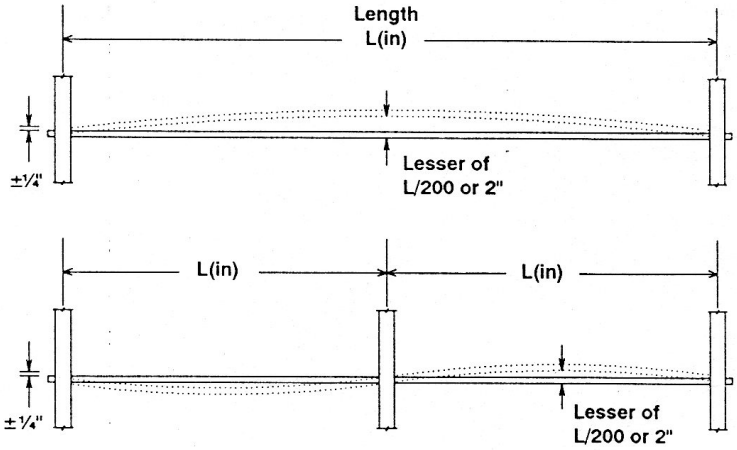
PLUMB



D(in)	D/50	D(ft)
12"	1/4"	1'
24"	1/2"	2'
36"	3/4"	3'
48"	1"	4'
60"	1-1/4"	5'
72"	1-1/2"	6'
84"	1-3/4"	7'
96"	2"	8'
108"	2"	9'

OUT-OF-PLUMB INSTALLATION TOLERANCES.

BOW



L(in)	L/200	L(ft)
50"	1/4"	4.2'
100"	1/2"	8.3'
150"	3/4"	12.5'

L(in)	L/200	L(ft)
200"	1"	16.7'
250"	1-1/4"	20.8'
300"	1-1/2"	25.0'

OUT-OF-PLANE INSTALLATION TOLERANCES.

WARNING: Do not cut trusses.

DANGER: Under no circumstances should construction loads of any description be placed on unbraced trusses.

Frame 6

APPENDIX A

TRUSS PLATE INSTITUTE
HIB-91 Summary Sheet

SECTION 0700
ROOFING AND SHEET METAL WORK

1. GENERAL

1.1 All applicable provisions of the "General Conditions", "Supplementary General Conditions", "Special Conditions", and "Special Requirements" form a part of this section of specifications.

1.2 SCOPE: The extent of work shall be as shown on drawings. Performance shall meet the requirements of the specifications. The work covered by this section of specifications consists of the following:

a) Complete installation of roofing as shown on drawings, or called for in this specification;
b) Installation of all flashings as required to make the roof water-tight;
c) Installation of flashings in connection with work of other trades and flashings furnished by others in connection with roof work;
d) Installation of gravelstops, fascias, louvers and ventilators;
e) Installation of roof gutters and downspouts, aluminum soffits and trim.
f) Installation of ridge vents.

1.3 The roofing installation of warranted roofs shall be inspected by a representative of the manufacturer of the roofing materials. The Contractor shall furnish to the Owner an affidavit signed by the manufacturer's representative that all materials and work compiles with the prescribed manufacturer's instructions.

2. PRODUCTS

2.1 The Contractor shall submit for approval and color selection, samples of materials as called for in this specification.

2.2 Materials shall be delivered bearing the manufacturer's name and brand.

2.3 Shingle roofing shall be Owens Corning Fiberglass 'Oakridge Pro 30' or approved equal asphalt shingle, 13-1/4" x 38-3/4", self-sealing, Class "A" with 30 year limited warranty. Color shall be as selected by Owner. Shingle roofing shall be installed in strict accord with manufacturer's printed specifications by authorized mechanics.

2.4 Membrane roofing, where required by the drawings, shall be as manufactured Carlisle Syntec Systems, Carlisle, Pennsylvania and shall be the material, thickness and system type as specified on the drawings. Roof insulation for adhered membranes shall be polyisocyanurate as approved by the membrane manufacturer and furnished under this section of the specifications.

The complete installation shall be in strict accordance with the membrane manufacturer's current specifications and installation details.

The General Contractor shall furnish to the Owner a 15 (fifteen) year membrane systems warranty from the membrane manufacturer.

2.5 Exposed flashing and counter flashings shall be copper or aluminum as specified on the drawings. Concealed flashings may be of other suitable material.

2.6 All other sheet metal items and accessories - gutters, downspouts, fascias, gravelstops, louvers and ventilators - shall be as shown on the drawings. The Contractor shall submit catalog cuts or samples.

2.7 Ridge vents shall be 'Cobra II' rigid roof vents as manufactured by G.A.F. or approved equal, installed in strict accordance with manufacturer's installation directions. Submit samples for Architect's approval.

3. EXECUTION

3.1 Roofing Contractor shall examine all roof decks on which his work is to be applied and shall notify the Owner's representative in writing, prior to starting work, of any defects which he considers detrimental to the proper installation of his materials.

3.2 Contractor shall turn over to the Owner, properly executed copies of required warranties.

3.3 Furnish and install all flashings, gutters, downspouts, gravel stops, fascias, ridge vents and related items necessary to provide a complete and weatherproof roof system. Install flashings provided by other trades, e.g., plumbing vents, etc. Fascia systems shall be as noted on the drawings.

3.4 Shingle roofing shall be installed in strict accord with the manufacturer's printed specifications by authorized mechanics.

3.5 Membrane roofing shall be installed in strict accord with Carlisle 'system' type as specified and detailed on the drawings.

3.6 Install flashings at roof surface intersections and at intersections of roof surface with other parts of the building.

3.7 Valley flashings for asphalt shingle roofing, shall be single strip of #85 mineral surfaced roll-roofing. Valleys shall be closed/cut type as shown on the drawings.

3.8 Install roof-to-wall flashings at all intersection. On shingle roofs, install sheet metal flashing in 'step' fashion. In masonry walls install counter-flashing embedded in masonry. Flashings for membrane roof shall conform to manufacturer's specifications using approved materials.

3.9 Flash pipes projecting through roof with one piece preformed with a flange which extends at least six inches on all sides. Plumbing Contractor shall furnish vent flashing to Roofing Contractor for installation.

3.10 Except as otherwise shown on the drawings gutters shall be 5" type "K" aluminum, continuous, with expansion joints at 33'-0" o.c. max. Downspouts shall be size and type shown on the drawings and specified herein.

3.11 Gutters shall be Alcoa or approved equal made of 3005-H25 Aluminum sheet. Gutter gauge shall be .032" nominal with 3" x 4" downspouts of .027" gauge. End caps shall be .024" gauge. Expansion joints shall be Aluminum/EPDM as provided by Alcoa. Hangers shall be Alcoa #OG9 spaced not to exceed 32" o.c. Downspout clips shall be Alcoa #RT23 with anchor and screw, spaced as required to firmly support downspout. (Spike and ferrules will not be permitted.)

3.12 Install louvers, ventilators, fascias, gravelstops and other accessories incidental to the roofing as shown on drawings.

3.13 Provide Royston #108AGN ice guard under shingle roofing at valleys and continuous at eaves, as manufactured by Royston Laboratories Div., 128 First Street, Pittsburgh, PA 15238 (412) 828-1500. Install 6' lengths centered in valleys and 48" wide continuous roll at eaves in accord with manufacturer's 'Guide Specifications'.

3.14 Clean up: After completing the roofing installation, the Roofing and Sheet Metal Contractor shall remove all excess materials and all trash and debris caused by his work.

SECTION 0710
WATERPROOFING

1. GENERAL

1.1 All applicable provisions of the "General Conditions", "Supplementary General Conditions", "Special Conditions", and "Special Requirements" form a part of this section of specifications.

1.2 All work shall be done strictly in accordance with the requirements noted on the drawings and specified herein.

1.3 SCOPE: The extent of work shall be as shown on drawings. Performance shall meet the requirements of the specifications. The work covered by this section of specifications consists of the following:

a) Installation of foundation drains, as shown or noted on the drawings. This work may also be done under other sections of the specifications.

b) Dampproofing below grade. Installation of vapor barriers if not scheduled under other sections of the specifications.

c) Waterproofing below grade. Waterproofing above grade. Waterproofing interior surfaces.

2. PRODUCTS

2.1 Asphalt for dampproofing & waterproofing shall comply with ASTM-D449, Type A.

2.2 Coal tar pitch, ASTM-D450.

2.3 All materials shall be delivered in sealed containers bearing manufacturer's name and brand.

2.4 Use only one kind of bitumen, coal tar pitch or asphalt with compatible primer throughout the project.

2.5 Asphalt saturated felt, ASTM-D226.

2.6 Coal tar saturated felt, ASTM-D227.

2.7 Upon request by the Architect, the Contractor shall furnish a certificate of compliance from the manufacturer or supplier.

2.8 All other materials and admixtures for special types of treatment shall be recommended by the manufacturer of the product.

3. EXECUTION

3.1 The Waterproofing Contractor shall examine the surfaces to receive waterproofing and shall not apply materials if he considers that the surfaces are not in proper condition to receive the waterproofing.

3.2 Application of any materials shall be considered as acceptance of the surfaces to be treated.

3.3 Do not apply dampproofing or waterproofing on wet surfaces.

3.4 Do not work when temperature is below 35 degrees F.

3.5 If perimeter drainage is called for on drawings, install foundation drains around foundations enclosing basements or habitable spaces below grade.

3.6 Drains shall be installed below the level of the area to be protected and shall discharge to a positive outfall by gravity or mechanical means.

3.7 Drains shall be rigid, perforated P.V.C. specifically manufactured for underground drainage.

3.8 Lay tile on a three inch layer of coarse gravel or crushed stone and cover with 6" of aggregate.

4. DAMPPROOFING

4.1 To masonry walls below grade apply a coat of portland cement, parging at least 3/8" thick before applying bituminous materials. Concrete walls below grade shall receive direct bituminous application.

4.2 Apply two coats of bituminous material from footing to finish grade at a rate recommended by the manufacturer.

4.3 Slab on ground: If slab is placed on the ground, install a continuous membrane below slab. The membrane shall be one layer of 6 mil polyethylene lapped 12" minimum at joints.

4.4 Install membrane of other material as recommended by the manufacturer, where specifically noted on the drawings.

4.5 In all cases the membranes shall be of one piece or having a jointing system which will insure a waterproof joint. At edges turn up membranes to the top of slab.

4.6 Install vapor barrier on roof decks when a wood plank, fiber board, or other roof deck material is also the finished surface of the ceiling. Transmission rate of the vapor barrier shall comply with the standards of the ASTM. Install vapor barrier in all other locations shown on the drawings.

4.7 Install DuPont 'Tyvek' Commercial wrap over wall sheathing in strict accordance with the manufacturer's instructions with taped joints and utilizing DuPont self-adhered flashings at openings.

4.8 Install 'Typar' Roof wrap 30 roof underlayment where indicated on the drawings in accordance with the manufacturer's instructions.

5. WATERPROOFING

5.1 Waterproof walls and floor slabs of all below grade habitable rooms where specifically noted on the drawings.

5.2 If called for on the plans, waterproofing foundation walls below grade for habitable rooms shall consist of applying waterproof membrane from the footing to the finish grade elevation. Masonry walls shall receive a 3/8" parging coat before membrane application.

5.3 Membrane shall be firmly affixed to wall. All laps shall be sealed. Materials and brand shall be as called for on the drawings. Application as recommended by the manufacturer.

5.4 Slab on ground waterproofing: Install moisture-protective membrane where directed by the drawings in accord with manufacturer's specifications.

5.5 If called for on plans, waterproofing inside of the exterior walls in accordance with the recommendations of the manufacturer of the particular products specified on the drawings.

6. CLOSURES

6.1 If corrugated or ribbed metal or fiberglass panels are required by the drawings, provide "Rubatex" closed-cell closure strips of proper configuration to seal panels against water or air infiltration.

SECTION 0750
THERMAL / ACOUSTICAL INSULATION

1. GENERAL

1.1 All applicable provisions of the "General Conditions", "Supplementary General Conditions", "Special Conditions", and "Special Requirements" form a part of this section of specifications.

2. SCOPE

2.1 The work covered by this section of the specifications consists in furnishing all labor, materials, equipment and appliances and in performing all operations in connection with the installation of plastic foam insulation board on exterior walls and blanket or batt insulation above ceilings and in stud walls, where designed on the drawings, complete and in strict accordance with this specification and the manufacturer's printed instructions.

3. PRODUCTS

3.1 Perimeter insulation shall be DOW Styrofoam SM in thickness as noted on the drawings.

3.2 Batt or blanket insulation shall be fiberglass rolls or batts installed in thickness noted or required to achieve "R" values shown on the drawings.

3.3 Cavity wall insulation shall be 2" thick (R-16) Thermax as manufactured by Celotex Corp., installed with 3.4" reflective air-space between the face brick and the foil-side of the insulation.

3.4 Where required by the drawings, air filtration barrier shall be "Tyvek" as manufactured by Dupont Co.

3.5 Where indicated on the drawings, on below grade walls, provide 1-1/2" thick 'Perimate' insulation as manufactured by DOW Corp. installed in accord with the manufacturer's current specifications.

3.6 In partitions indicated on the drawings as 'sound attentuating' provide Owens Corning SAB Sound Attentuating Batts 3-1/2" thick, complying with ASTM C665, Type I and ASTM E 136.

4. EXECUTION

4.1 Blanket or batt insulation shall be installed where indicated on the drawings. Insulation shall be arranged with vapor barriers toward the conditioned space, tightly abutted and fitted between joists or studs, so as to provide a continuous thermal barrier.

4.2 Rigid insulation shall be installed in strict accordance with the manufacturer's current printed specifications.

4.3 Where required at roof eave soffits, provide insulation baffles to allow free air movement in attic spaces.

4.4 Fiberglass insulation in wood stud walls shall be full width, thickness as noted on drawings with Kraft-faced vapor barrier.

Where drywall is to be directly applied to studs, vapor barriers shall be stapled to sides of studs, to permit direct contact between face of stud and back of drywall.

Metal studs shall receive 'friction-fit' fiberglass insulation. Channel section of metal studs shall be filled with fiberglass. Provide 4 mil polyethylene vapor barrier over metal studs.

4.5 All interior and/or occupied spaces shall be thermally insulated from the exterior. Where this work is not specifically shown or noted on the drawings, such as wall/ceiling offsets, blind gables and similar areas, provide insulation having a minimum "R" value of 19. The type of insulation shall be compatible with the installation and have a vapor barrier on the internal face.

4.6 Where the interior face of insulation is not in contact with walls or ceilings, provide a foil type vapor barrier having a Class 25 flame spread.

4.7 Exterior Insulation and Finish Systems (E. I. F. S.) where detailed or indicated on the drawings shall be as manufactured by Dryvit Systems Inc. or equal as approved by the Architect. E. I. F. S. applied over masonry surfaces shall be Dryvit Outsulation. E. I. F. S. applied over plywood or gypsum board shall be Dryvit Outsulation MD having moisture drainage capabilities.

All materials and installation shall be in strict accord with the manufacturer's requirements. All work shall be performed by workmen skilled in the trade having a minimum of five (5) years experience.

Finish colors and textures shall be as selected by the Owner.

SECTION 0790
CAULKING

1. GENERAL

1.1 All applicable provisions of the "General Conditions", "Supplementary General Conditions", "Special Conditions", and "Special Requirements" form a part of this section of specifications.

1.2 SCOPE: The extent of work shall be as shown on drawings and called for in the Description of Work. Performance shall meet the requirements of the specifications. The work covered by this section of specifications consists of the following:
a) Caulking of all exterior joints around windows, door frames and spandrels;
b) Caulking masonry joints at copings, sills and ledges;
c) Caulking joints at other junctions as necessary to obtain complete watertight construction.

2. PRODUCTS

2.1 Sealing compound shall be "DOW" or equal as approved by the Architect.

2.2 Dow curing 795 Silicon Building Sealant for exterior door, window frames and control joints.

2.3 Interior caulking shall be acrylic latex with silicone.

2.4 Backing for compound shall be foam rod of type recommended by manufacturer.

2.5 Compounds shall be furnished, in colors to match adjacent surfaces as near as possible.

3. EXECUTION

3.1 If not specified differently, use caulking compound for frames set in masonry or concrete. For frames set in stone use sealant.

3.2 Joints at shelf angles and vertical, exterior building expansion joints shall be continuously sealed with sealing compound.

3.3 Prime porous surfaces before application of the caulking, as recommended by the manufacturer of the caulking compound.

3.4 Joints and spaces to be caulked shall be dry and free from dust and loose mortar.

3.5 All joints more than 3/4" deep and joints without a suitable backstop shall be packed with backer rod to within 1/2" of surface.

3.6 Set sills and thresholds in a full bed of caulking compound.

3.7 Finish all caulked joints with proper tool and remove excess compound.

3.8 Complete all caulking work before finish coat of paint is applied.

3.9 Provide non-adhering backer rod or bond-break tape to prevent three-side adhesion.

3.10 Provide acoustical sealant where sound-retardant partitions abut floors and masonry walls as indicated on the drawings.

SECTION 0800
DOORS AND HARDWARE

1. GENERAL

1.1 All applicable provisions of "General Conditions", "Supplementary General Conditions", "Special Conditions" and "Special Requirements" form a part of this section of specifications.

1.2 All doors subject to fire exit regulations shall be installed according to requirements of state and local codes.

1.3 Doors of special designations, such as soundproof or fire retardant, shall be as called for on the drawings or in the door schedule.

1.4 SCOPE: The extent of work shall be shown on drawings. Performance shall meet the requirements of the specifications. The work covered by this section of specifications consists of the following:

a) Furnishing and installing all door frames as called for on drawings or noted in the door schedule;
b) Furnishing and installing all wood and metal doors as specified;
c) Installing hardware furnished complete with doors by the door manufacturer, standard or optional, as specified;
d) Furnish and install all architectural hardware as scheduled.

2. PRODUCTS

2.1 All doors and frames shall be of the material, type and finish as called for on the drawings. All dimensions shall be as shown by door schedule on drawings.

2.2 Doors identified by manufacturer's name and type or brand name may be substituted by others of equal quality only with the approval of the Architect or the Owner.

2.3 The Contractor shall submit for approval catalog cuts or shop drawings showing details of manufacturing and installation.

2.4 Exterior doors shall have full weatherstripping.

3. WOOD DOORS

3.1 All wood doors shall be NP7 Rotary Cut - Premium Grade Birch Doors. They shall meet or exceed the ANSI/NWMA Industry Standard I.S 1-80 Series and AWI Quality Standard for Architectural Flush Doors. All species 80 Series and AWI Quality Standard for Flush Doors. All series and grade of lumber and wood veneers shall be as described in these standards.

The moisture content of all wood components shall average from 6 to 12 percent at the time of fabrication and shall be at equilibrium with the same relative humidity condition at the time of door fabrication.

3.2 The particle core shall meet or exceed the requirements of grade "1-L1" as described in the latest edition of ANSI A208.1 "Mat-Formed Wood Particleboard".

The stiles shall be thoroughly kiln-dried lumber and shall be 1" wide by core thickness and shall be laminated to the core with Type II glue.

The rails shall be thoroughly kiln-dried lumber and shall be minimum of 1-1/4" wide by core thickness. Rails shall be laminated to the core with Type II glue.

3.3 Doorskins shall be laminated by hot press method with a Type II glue. Doorskins shall be laminated to the edge bonded core with Type II Casein glue by the cold press method.

3.4 Doors shall be prefit to provide maximum clearance of 3/22" at sides, 1/8" at top and 3/4" at bottom. All doors are to be prepared for hardware in accordance with this hardware schedule. All doors shall be factory finished on all six sides and shall be AWI Finish System No. 3, with stain finish as selected by the Owner.

3.5 When wood panel doors are shown or scheduled on the drawings the doors shall meet the requirements of Section 1400 of "Quality Standards, Guide Specifications and Quality Certification Program" of the Architectural Wood Work Institute.

3.6 Where shown, prepare door for reception of glass or louvers.

3.7 When required by the drawings, furnish specialty doors as detailed.

4. HOLLOW METAL DOORS AND FRAMES

4.1 SCOPE

a) Specifications apply to steel doors, steel door frames, and steel frame components such as sidelights, borrowed lights, transom frames, and architectural stick assemblies as shown on architects' plans and schedules, as manufactured by Amweld Building Products, Inc., Garrettsville, Ohio or equal as approved by the Architect.

4.2 REFERENCES

a) General: Standards listed by reference, including revisions by issuing authority, form a part of this specification section to the extent indicated.

b) American Society for Testing and Materials (ASTM):

1. ASTM A366 Standard Specification for Commercial Steel (CS) Sheet, Carbon (0.15 Maximum Percent) Cold-Rolled.
2. ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
3. ASTM A924 Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
4. ASTM D610 Standard Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces.
5. ASTM D714 Standard Test Method for Evaluating Degree of Blistering of Paints.
6. ASTM D1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
7. ASTM D1622 Standard Test Method for Apparent Density of Rigid Cellular Plastics.
8. ASTM D1623 Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
9. ASTM D1654 Standard Test Method for Evaluation of Painted or Coated Specimens Subject to Corrosive environments.
10. ASTM D2126 Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
11. ASTM D2863 Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index).

c) American National Standards Institute (ANSI):
   1. ANSI/DHI A115.IG Installation Guide for Doors and Hardware
   2. ANSI/SDI Standard A224.1 Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
   3. ANSI A250.8 Standard Steel Door Frames

d) Federal Specification (Fed Spec):
   1. Fed Spec C578 Bead Fusion Test

e) National Fire Protection Association (NFPA):
   1. NFPA 80 Fire Doors and Windows
   2. NFPA 252 Fire Tests of Door Assemblies

f) Underwriters Laboratories, Inc. (UL):
   1. UL 10(b) and UL 10(c) Fire Tests of Door Assemblies
   2. UL Building Materials Directory

g) Warnock Hersey, Inc.
   1. WHI Directory of Listed Products
   2. WHI Directory of Positive Pressure Rated Door Assemblies and Components

4.3 SUBMITTALS

a) General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.

b) Product Data: Submit product data, including manufacturer's SPEC-DATA TM product sheet, for specified products.

c) Shop Drawings: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories and finish colors
   1. Indicated door type, frame, steel, core, material thickness, reinforcements, anchorages, exposed fasteners locations, openings (Glazed, paneled or louvered) and hardware arrangement.
   2. Include schedule identifying each unit, with door marks or numbers referencing numbering in schedules or drawings.

4.4 DELIVERY, STORAGE AND HANDLING

a) Delivery: Deliver material in manufacturer's original, unopened, undamaged containers with identification labels intact.
   1. Handle and store products according to Amweld recommendations published in technical materials. Leave product wrapped or otherwise protected and under clean, dry storage conditions until required.

b) Storage and Protection: Store materials from exposure to harmful weather conditions, at temperature and humidity conditions recommended by manufacturer.

4.5 WARRANTY

a) Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official.. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.
   1. Warranty Period: Two (2) years commencing on Date of Substantial Completion.

4.6 INTERIOR DOORS

a) Amweld 47LE, Laser Edge, honeycomb core, 1-3/4", fabricated from two sheets of 20 gauge steel (ASTM A366) with no visible seams on the vertical face. Lock edge shall be beveled. Tops and bottoms shall be not less than 18 GA. channels. Tops shall be flush. Bottoms shall have inverted channel.

4.7 EXTERIOR DOORS

a) Amweld 83LE, Laser Edge, polyurethane core, 1-3/4", fabricated from two sheets of 18 gauge galvanized (A-40) steel with no seams on the vertical face. Lock edge shall be beveled. Top and bottom channels shall be 18 GA. (minimum). Tops shall be flush. Bottom channel shall have inverted.

4.8 REINFORCING

a) Lock reinforcing 14 GA.

b) Closer reinforcing 14 GA.

c) Hinge reinforcing 7 GA. 1-1/4" x 10" steel plates welded to edges and tapped for template hinges.

4.9 MATERIALS

a) Steel Materials

1. Cold-rolled Steel: Comply with ASTM A366 cold-rolled carbon steel sheet
2. Galvanized Steel: Comply with ASTM A924 general requirements for steel sheet metallic coated by hot dip process (formerly ASTM A525).

b) Primer Materials: Comply with ANSI A250.10 test procedures and acceptance criteria for prime painted steel surfaces for steel doors and frames.

4.10 LABELED DOORS

Where noted, provide Underwriters Laboratories, Inc. (UL) or Warnock Hersey Inc. (WHI) labels with appropriate fire resistance and temperature rise ratings for the class opening indicated. Construction details and hardware applications authorized by labeling authorities shall take precedence over project details or specifications.

4.11 HARDWARE LOCATIONS

Unless otherwise specified, the location of locks, hinges, latches, push/pull plates and bars, exit devices, handle sets, closer reinforcing, roller latches and arm pulls shall conform to the recommendations of the Steel Door Institute.

4.12 GLAZING

Provide doors with formed steel kits of screw-in type, to permit selection of secure side in field. Glazing arrangements shall accommodate 1/4" (6.4 mm) thick glass.

4.13 PRIME PAINTED DOORS

Exposed surfaces shall be cleaned, treated with Bonderite chemical and given 1 baked-on shop coat of EPA compliant gray synthetic primer.

4.14 METAL DOOR FRAMES

Fabricate from 16 gauge steel (ASTM A366) for 1-3/4" (45 mm) doors. Frames shall be designed with integral stop and trim. Frame corners shall be mitered, arc welded and ground smooth per ANSI A250.8.

Equip frames with 1 welded in floor anchor in each jamb. Provide 3 field inserted steel lock-in or welded-in anchors (Maximum of 24" (610 mm) oc) for each jamb. Anchors shall be type for particular construction involved (i.e., wood stud, masonry or steel stud).

Hardware Preparation: Frames shall be mortised, reinforced, drilled and tapped to received specified mortise hardware and reinforced only for specified surface hardware. Drilling and tapping for surface hardware shall be done in the field. Plaster guards shall be installed on applicable hardware cutouts in 400 Series frames. Strike jambs shall be prepared for 3 rubber silencers.

Labeled Frames: when noted or required, provide for frame, windows, and/or transoms and sidelights Underwriters Laboratories, Inc. (UL) or Warnock Hersey Inc. (WHI) labels for class of opening indicated. Construction details and hardware applications authorized by labeling authorities shall take precedence over project details or specifications.

Exterior Frame members shall be of ASTM A40 hot dipped 16 gauge galvanized materials in 0.4 class conforming to ASTM A924 and A653. Treat materials in mill to ensure superior prime paint adhesion.

All frames shall be cleaned, treated with Bonderite chemical and given 1 baked-on shop coat of EPA compliant gray synthetic primer.

4.15 ERECTION

Erect all the metal frames plumb, square, rigid and true. Anchor floor clips in place with expansion bolts, power-driven fasteners or other approved devices. Anchor ceiling struts to construction above with fasteners to suit the conditions. Provide all fasteners, accessories and incidentals required for installation. Brace frames as necessary until built into permanent construction. Remove bracing when no longer required.

4.16 WORKMANSHIP

a) Work shall be carefully assembled, square, straight, true, properly reinforced, stiff, rigid and free of defects. Miters shall be accurately formed.

b) Clearance at jambs and heads of doors shall be uniform and not over 3/32", and 3/16" at door bottoms with thresholds; and at bottom of doors without thresholds, shall be 3/4" unless otherwise indicated or specified. Note that the thickness of any resilient floor covering is included in the 3/4" clearance.

c) Submit complete schedule and shop details of this work for the Architect's approval and obtain approval before starting fabrication.

d) Shop drawings shall show metal thickness, details of construction, profiles of moldings, connections to other work, fastenings, anchors, reinforcement and location of hardware.

4.17 HARDWARE TEMPLATES

After approval, furnish a set of the approved schedule and shop drawings of the hollow metal work to the hardware supplier (See Section 0810 "Finish Hardware Schedule") who will then furnish to the manufacturer of this work a copy of the approved hardware schedule, and necessary templates for completing the hollow metal work.

5. ALUMINUM DOORS

5.1 When required by the drawings, aluminum frames and doors shall be of the type, material and finish as noted on the drawings. Aluminum doors shall be Kawneer "Narrowstile" or equal as approved by the Architect. Lock cylinders for aluminum doors shall be by the hardware supplier. Provide shop drawings and color samples.

5.2 Aluminum doors and frames shall be furnished complete with the hardware, standard or optional, as specified on the drawings.

6. HARDWARE

6.1 Finish hardware for doors, which are furnished without complete, factory fitted standard or optional hardware sets, shall be supplied and installed by the Contractor. The hardware supplier will furnish hardware schedules and all required templates to the Contractor as necessary for completion of the hardware installation.

7. LOUVERS

7.1 Furnish door louvers as schedule on the drawings in the "Door Schedule".

7.2 Louvers shall be Anemostat #AFDL, inverted 'Y' 22 gauge louvers in 16 gauge frame or equal as approved by the Architect.

7.3 Louvers shall be baked enamel finish in manufacturers standard colors as selected by the Owner.

7.4 Louvers in labeled or fire-rated doors shall have U/L rating equal to or exceeding that of the door into which it is installed and shall be equipped with fusible-link damper.

8. EXECUTION

8.1 Install doors after completion of all other work which would raise the moisture content of the wood doors or damage door surfaces. Fit, hang and trim as required by the opening the doors will close.

8.2 Provide clearance as herein before specified.

8.3 Install hardware as required.

8.4 Install weatherstripping at exterior openings.

8.5 Install hollow metal frames plumb and true to line and level and securely anchored to studs or masonry.

8.6 Place anchors near top and bottom of each jamb and at intermediate points.

8.7 Do not install doors prior to completion of plastering or drywall work.

8.8 Install aluminum doors complete with hardware as directed by the door manufacturer.

8.9 Doors shall be installed by mechanics experienced in their trade.

SECTION 08 71 00 – DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware for:

    a. Swinging doors.

2. Field verification, preparation and modification of existing doors and frames to receive new door hardware.

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 Section “Alternates” for alternates affecting this section.
2. Division 06 Section “Rough Carpentry”
3. Division 06 Section "Finish Carpentry”
4. Division 07 Section “Joint Sealants” for sealant requirements applicable to threshold installation specified in this section.
5. Division 08 Sections:

    a. “Metal Doors and Frames”
    b. “Flush Wood Doors”
    c. “Stile and Rail Wood Doors”
    d. “Interior Aluminum Doors and Frames”
    e. "Aluminum-Framed Entrances and Storefronts"
    f. “Stainless Steel Doors and Frames”
    g. “Special Function Doors”
    h. "Entrances”

6. Division 09 sections for touchup, finishing or refinishing of existing openings modified by this section.
7. Division 26 “Electrical” sections for connections to electrical power system and for low-voltage wiring.

1.02 REFERENCES

A. UL - Underwriters Laboratories

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Keying Systems and Nomenclature

C. NFPA – National Fire Protection Association

1. NFPA 70 – National Electric Code
2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
3. NFPA 101 – Life Safety Code
4. NFPA 105 – Smoke and Draft Control Door Assemblies
5. NFPA 252 – Fire Tests of Door Assemblies

D. ANSI - American National Standards Institute

1. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
2. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems

1.03 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Prior to forwarding submittal:

a. Comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, “EXAMINATION” article, herein.
b. Review drawings and Sections from related trades to verify compatibility with specified hardware.
c. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:

a. Wiring Diagrams: For power, signal, and control wiring and including:
1) Details of interface of electrified door hardware and building safety and security systems.
2) Schematic diagram of systems that interface with electrified door hardware.
3) Point-to-point wiring.
4) Risers.

3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.

    a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.

4. Door Hardware Schedule:

    a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
    b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
    c. Indicate complete designations of each item required for each opening, include:
        1) Door Index: door number, heading number, and Architect’s hardware set number.
        2) Quantity, type, style, function, size, and finish of each hardware item.
        3) Name and manufacturer of each item.
        4) Fastenings and other pertinent information.
        5) Location of each hardware set cross-referenced to indications on Drawings.
        6) Explanation of all abbreviations, symbols, and codes contained in schedule.
        7) Mounting locations for hardware.
        8) Door and frame sizes and materials.
        9) Degree of door swing and handing.
        10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.

5. Key Schedule:

    a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
    b. Use ANSI/BHMA A156.28 “Recommended Practices for Keying Systems” as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
    c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
    d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
    e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
    f. Prepare key schedule by or under supervision of supplier, detailing Owner’s final keying instructions for locks.

6. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory or shop prepared for door hardware installation.

C. Informational Submittals:

1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
2. Provide Product Data:

a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
b. Include warranties for specified door hardware.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:

a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
b. Catalog pages for each product.
c. Factory order acknowledgement numbers (for warranty and service)
d. Name, address, and phone number of local representative for each manufacturer.
e. Parts list for each product.
f. Final approved hardware schedule edited to reflect conditions as-installed.
g. Final keying schedule
h. Copies of floor plans with keying nomenclature
i. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
j. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

E. Inspection and Testing:

1. Submit a written report of the results of functional testing and inspection for fire door assemblies, in compliance with NFPA 80.

a. Written report to be provided to the Owner and be made available to the Authority Having Jurisdiction (AHJ).
b. Report to include the door number for each fire door assembly, door location, door and frame material, fire rating, and summary of deficiencies.

2. Submit a written report of the results of functional testing and inspection for required egress door assemblies, in compliance with NFPA 101.

a. Written report to be provided to the Owner and be made available to the Authority Having Jurisdiction (AHJ).
b. Report to include the door number for each required egress door assembly, door location, door and frame material, fire rating, and summary of deficiencies.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.

a. Warehousing Facilities: In Project's vicinity.
b. Scheduling Responsibility: Preparation of door hardware and keying schedules.
c. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
d. Coordination Responsibility: Assist in coordinating installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.
1) Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.

2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:

a. For door hardware: DHI certified AHC or DHC.
b. Can provide installation and technical data to Architect and other related subcontractors.
c. Can inspect and verify components are in working order upon completion of installation.
d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.

4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

1. Fire-Rated Door Openings:

a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
b. Provide only items of door hardware that are listed products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.

2. Smoke and Draft Control Door Assemblies:

a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105
b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.

3. Electrified Door Hardware

a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.

4. Accessibility Requirements:

a. Comply with governing accessibility regulations cited in “REFERENCES” article, herein for door hardware on doors in an accessible route.

C. Pre-Installation Meetings

1. Keying Conference

a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
2) Preliminary key system schematic diagram.
3) Requirements for key control system.
4) Requirements for access control.
5) Address for delivery of keys.

2. Pre-installation Conference

a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
b. Inspect and discuss preparatory work performed by other trades.
c. Inspect and discuss electrical roughing-in for electrified door hardware.
d. Review sequence of operation for each type of electrified door hardware.
e. Review required testing, inspecting, and certifying procedures.
f. Review questions or concerns related to proper installation and adjustment of door hardware.

3. Electrified Hardware Coordination Conference:

a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.

B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer’s original packaging.

C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.

D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

E. Existing Openings: Where existing doors, frames and/or hardware are to remain, field verify existing functions, conditions and preparations and coordinate to suit opening conditions and to provide proper door operation.

1.07 WARRANTY

A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.

1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer’s published listings

a. Mechanical Warranty
1) Locks
a) Sargent 10 Line Series: 7 year
2) Exit Devices
a) Falcon: 10 year
3) Closers
a) LCN 4050 Series: 25 year
4) Accessories
a) Ives Continuous Hinges: Lifetime

1.08 MAINTENANCE

A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The Owner requires use of certain products for their unique characteristics and project suitability to insure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: “No Substitute.”

   1. Where “No Substitute” is noted, submittals and substitution requests for other products will not be considered.

B. Approval of manufacturers and/or products other than those listed as “Scheduled Manufacturer” or “Acceptable Manufacturers” in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.

C. Approval of products from manufacturers indicated in “Acceptable Manufacturers” is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer’s product.

D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fasteners

   1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
   2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
   3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru-bolts are required.
   4. Install hardware with fasteners provided by hardware manufacturer.

B. Modification and Preparation of Existing Doors: Where existing door hardware is indicated to be removed and reinstalled.

   1. Provide necessary fillers, Dutchmen, reinforcements, and fasteners, compatible with existing materials, as required for mounting new opening hardware and to cover existing door and frame preparations.
   2. Use materials which match materials of adjacent modified areas.
   3. When modifying existing fire-rated openings, provide materials permitted by NFPA 80 as required to maintain fire-rating.

C. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

   a. Ives 5BB series

2. Acceptable Manufacturers and Products:

   a. McKinney TA/T4A series
   b. Stanley FBB Series.

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:

   a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
   b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high

4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:

   a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
   b. Interior: Heavy weight, steel, 5 inches (127 mm) high

5. 2 inches or thicker doors:

   a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
   b. Interior: Heavy weight, steel, 5 inches (127 mm) high

6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
8. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
9. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

   a. Steel Hinges: Steel pins
   b. Non-Ferrous Hinges: Stainless steel pins
   c. Out-Swinging Exterior Doors: Non-removable pins
   d. Out-Swinging Interior Lockable Doors: Non-removable pins
   e. Interior Non-lockable Doors: Non-rising pins

10. Provide hinges with electrified options as scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.04 CONTINUOUS HINGES

A. Manufacturers:

1. Scheduled Manufacturer:

   a. Ives

2. Acceptable Manufacturers:

   a. Select
   b. Stanley

B. Requirements:

1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
6. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware.
7. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 FLUSH BOLTS

A. Manufacturers:

1. Scheduled Manufacturer:

   a. Ives

2. Acceptable Manufacturers:

   a. Burns
   b. Rockwood

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.06 COORDINATORS

A. Manufacturers:

1. Scheduled Manufacturer:

   a. Ives

2. Acceptable Manufacturers:

   a. Burns
   b. Rockwood

B. Requirements:

1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers, surface vertical rod exit device strikes or other stop mounted hardware. Factory-prepared coordinators for vertical rod devices as specified.

2.07 CYLINDRICAL LOCKS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

   a. Sargent 10 Line series

2. Acceptable Manufacturers and Products:

   a. No Substitute

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3 hour fire doors.
2. Cylinders: Refer to “KEYING” article, herein.
3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2 inch latch throw. Provide proper latch throw for UL listing at pairs.
4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Provide electrified options as scheduled in the hardware sets.
8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.

   a. Lever Design: Sargent – Match Existing.

2.08 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

    a. Falcon 24/25 series

2. Acceptable Manufacturers and Products:

    a. Detex Advantex series
    b. Precision Apex series

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to “KEYING” article, herein.
3. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide flush end caps for exit devices.
7. Provide exit devices with manufacturer’s approved strikes.
8. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
9. Mount mechanism case flush on face of doors, or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
10. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
11. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
12. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
13. Provide electrified options as scheduled.
14. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.09 CYLINDERS

A. Manufacturers:

1. Scheduled Manufacturer and Product:

    a. Sargent Lock

2. Acceptable Manufacturers and Products:

    a. No Substitute

B. Requirements:

1. Provide cylinders/cores to match Owner’s existing key system, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer’s series as indicated. Refer to “KEYING” article, herein.
2. Provide the following keyway: RL.

C. Construction Keying:

1. Temporary Construction Cylinder Keying.

a. Provide construction cores that permit voiding construction keys without cylinder removal, furnished in accordance with the following requirements.
1) Split Key or Lost Ball Construction Keying System.
2) 3 construction control keys, and extractor tools or keys as required to void construction keying.
3) 12 construction change (day) keys.

b. Owner or Owner's Representative will void operation of temporary construction keys.

2.10 KEYING

A. Provide cylinders/cores keyed into Owner's existing factory registered keying system. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Requirements:

1. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.

a. Master Keying system as directed by the Owner.

2. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
3. Provide keys with the following features:

a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm)

4. Identification:

a. Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
b. Identification stamping provisions must be approved by the Architect and Owner.
c. Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
d. Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
e. Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.

5. Quantity: Furnish in the following quantities.

a. Change (Day) Keys: 3 per cylinder/core.
b. Master Keys: 6.

2.11 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

   a. LCN 4050 series

2. Acceptable Manufacturers and Products:

   a. Falcon SC70A series
   b. Norton 7500 series

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with cast aluminum cylinder.
3. Closer Body: 1-1/2 inch (38 mm) diameter with 11/16 inch (17 mm) diameter heat-treated pinion journal and full complement bearings.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and all weather requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and back check.
7. Pressure Relief Valve (PRV) Technology: Not permitted.
8. Provide stick on templates, special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.12 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer:

   a. Ives.

2. Acceptable Manufacturers:

   a. Trimco
   b. Burns
   c. Rockwood.

B. Requirements:

1. Provide push plates, push bars, pull plates, and pulls with diameter and length as scheduled.

2.13 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:

   a. Ives

2. Acceptable Manufacturers:

   a. Trimco
   b. Rockwood

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.14 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:

   a. Glynn-Johnson

2. Acceptable Manufacturers:

   a. Rixson
   b. Sargent

B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.
2. Provide friction type at doors without closer and positive type at doors with closer.

2.15 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:

   a. Ives

2. Acceptable Manufacturers:

   a. Burns
   b. Rockwood

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.16 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer:

a. Zero International

2. Acceptable Manufacturers:

a. National Guard
b. Reese

B. Requirements:

1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.

2.17 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer:

a. Ives

2. Acceptable Manufacturers:

a. Burns
b. Rockwood

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.18 ROLLER LATCHES

A. Manufacturers:

1. Scheduled Manufacturer:

   a. Ives

2. Acceptable Manufacturers:

   a. Burns
   b. Rockwood

B. Requirements:

1. Provide roller latches with 4-7/8 inches (124 mm) strike at single doors to fit ANSI frame prep. If dummy levers are used in conjunction with roller latch mount roller latch at a height as to not interfere with proper mounting and height of dummy lever.
2. Provide roller latches with 2-1/4 inches (57 mm) full lip strike at pair doors. Mount roller in top rail of each leaf per manufacturer's template.

2.19 MAGNETIC HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:

   a. LCN

2. Acceptable Manufacturers:

   a. Rixson
   b. Sargent

B. Requirements:

1. Provide wall or floor mounted electromagnetic door release as specified with minimum of 25 pounds of holding force. Coordinate projection of holder and armature with other hardware and wall conditions to ensure that door sits parallel to wall when fully open. Connect magnetic holders on fire-rated doors into the fire control panel for fail-safe operation.

2.20 FINISHES

A. Finish: BHMA 626/652 (US26D); except:

1. Continuous Hinges: BHMA 628 (US28)
2. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
3. Protection Plates: BHMA 630 (US32D)
4. Overhead Stops and Holders: BHMA 630 (US32D)
5. Door Closers: Powder Coat to Match
6. Wall Stops: BHMA 630 (US32D)
7. Weatherstripping: Clear Anodized Aluminum
8. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.

B. Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.

C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

D. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Where on-site modification of doors and frames is required:

1. Carefully remove existing door hardware and components being reused. Clean, protect, tag, and store in accordance with storage and handling requirements specified herein.
2. Field modify and prepare existing doors and frames for new hardware being installed.
3. When modifications are exposed to view, use concealed fasteners, when possible.
4. Prepare hardware locations and reinstall in accordance with installation requirements for new door hardware and with:

    a. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
    b. Wood Doors: DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."
    c. Doors in rated assemblies: NFPA 80 for restrictions on on-site door hardware preparation.

3.03 INSTALLATION

A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.
3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each hardware item in compliance with manufacturer’s instructions and recommendations, using only fasteners provided by manufacturer.

C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.

D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.

G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.

H. Wiring: Coordinate with Division 26, ELECTRICAL sections for:

1. Conduit, junction boxes and wire pulls.
2. Connections to and from power supplies to electrified hardware.
3. Connections to fire/smoke alarm system and smoke evacuation system.
4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
5. Testing and labeling wires with Architect’s opening number.

I. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

J. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.

K. Closer/Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.

L. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.

M. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."

N. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.

O. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

P. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

Q. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.04 FIELD QUALITY CONTROL

A. Inspection and Testing:

1. Provide functional testing and inspection of fire door assemblies by a qualified person in accordance with NFPA 80.

   a. Schedule fire door assembly inspection within 90 days of Substantial Completion of the Project.
   b. Submit a signed, written final report as specified in Paragraph 1.03.E.1.
   c. Correct all deficiencies and schedule a reinspection of fire door assemblies noted as deficient on the inspection report.
   d. Inspector to reinspect fire door assemblies after repairs are made.

2. Provide inspection of required egress door assemblies by a qualified person in accordance with NFPA 101.

   a. Schedule egress door assembly inspection within 90 days of Substantial Completion of the Project for the required openings.
   b. Submit a signed, written final report as specified in Paragraph 1.03.E.2.
   c. Correct all deficiencies and schedule a reinspection of egress door assemblies noted as deficient on the inspection report.
   d. Inspector to reinspect required egress door assemblies after repairs are made.

3.05 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.06 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items per manufacturer’s instructions to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.07 DOOR HARDWARE SCHEDULE

A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier’s responsibility to thoroughly review existing conditions, schedules,

specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.

B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.

C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.

D. Hardware Sets:

Hardware Group No. 1

1	EA	BIFOLD TRACK & HDWE	9860	AL	HAG
1	EA	DUMMY TRIM	10U93	626	SAR

Hardware Group No. 2

2	EA	CONT. HINGE	224XY	628	IVE
2	EA	MANUAL FLUSH BOLT	FB458	626	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	DEADLOCK	4877	626	SAR
2	EA	ROLLER LATCH	RL36	630	IVE
1	EA	RECESSED PULL	94P X 94L	630	ROC
2	EA	OH STOP	450S	652	GLY
2	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 3

3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	DEADLOCK	4877	626	SAR
1	EA	PUSH PLATE	8200 4" X 16"	630	IVE
1	EA	SURFACE CLOSER	4050A RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

Hardware Group No. 4

3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	652	IVE
1	EA	DEADLOCK	4877	626	SAR
1	EA	PUSH PLATE	8200 4" X 16"	630	IVE
1	EA	SURFACE CLOSER	4050A EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

Hardware Group No. 5

1	EA	CONT. HINGE	224HD	628	IVE
1	EA	PANIC HARDWARE	CD-25-R-NL-OP	626	FAL
2	EA	CYLINDER	CYLINDER AS REQUIRED	626	SAR
1	EA	90 DEG OFFSET PULL	8190EZHD 12" O	630-316	IVE
1	EA	SURFACE CLOSER	4050A SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	GASKETING	328AA-S	AA	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	655A-223	A	ZER

DOOR HARDWARE INDEX:

Door Numbers	Hardware Set#
103-1	2
104-1	5
104-2	5
104-3	4
104-4	3
104-5	1

End Of Section

SECTION 0850
WINDOWS

1. GENERAL

1.1 All applicable provisions of "General Conditions", "Supplementary General Conditions", "Special Conditions" and "Special Requirements" form a part of this section of specifications.

1.2 SCOPE: The extent of work shall be as shown on the drawings and window schedule. Performance shall meet the requirements of the specifications. The work covered by this section of specifications consists of the following:

a) Furnishing and installing all windows as shown on the drawings.
b) Furnishing and installing all window hardware, operators and other accessories.
c) Furnishing window screens in all operating sashes.
d) Furnishing and installing storm, panels, if specified.
e) Adjusting the windows for smooth and faultless operation.

2. PRODUCTS

2.1 All windows shall be of the material, type and finish as called for on the drawings. All dimensions shall be as shown by window schedule on the drawings.

2.2 Windows identified by manufacturer's name and type or brand name may be substituted by others of equal quality only with the approval of the Architect or the Owner.

2.3 All windows shall have weatherstripping.

2.4 Screens and storm panels shall be compatible with the window type in accordance with the manufacturer's recommendation or option.

2.5 Hardware and window finish shall be selected by the Architect or Owner from the manufacturer's recommendation or option.

2.6 Vinyl sheathed wood windows shall be tested in accord with ASTM E283 and shall not exceed .50 CFM/L.F. sash crack when tested at a static air pressure of 1.56 lbs./sq. ft. (25mph).

2.7 Where aluminum windows are scheduled on the drawings, they shall have a low-conductance thermal break between all exterior and interior metal surfaces and shall meet or exceed AAMA performance requirements and specifications applicable to their type. Finish shall be as schedule on the drawings.

2.8 Aluminum frames for fixed glazing and curtain-wall shall be by Kawneer or approved equal. Frames sections and glazing systems shall be as noted on the drawings. Curtain-wall systems shall be designed for 20 p.s.f. wind loading with a maximum deflection of L/175 or 3/4", which ever is less. All materials shall be in accordance with the recommendations of the curtain-wall guide published by the Architectural Aluminum Manufacturers' Association (AAMA) and the glazing manual of the Flat Glass Marketing Association (FGMA).

There shall be no uncontrolled water penetration. All horizontals and glazing cavities shall be pressure equalized to permit positive drainage of all water to the exterior when subjected to static and dynamic tests of 15 p.s.f. Any possible condensation in concealed areas of the wall shall be drained to the exterior through baffled weeps. Air infiltration shall not exceed 0.06 cfm per square foot of fixed wall area when tested at 6.24 p.s.f. in accordance with ASTM E283-73. Provide for re-glazing of all glass lights from exterior or interior without damage to any finished materials.

Installation of all materials shall be accomplished by skilled workmen by and under the supervision of the manufacturer. Erection tolerances shall comply to AAMA curtain-wall standards using off-set lines and bench marks provided by the General Contractor. All materials shall be left clean and free of all smears and excess sealants at time of installation. Protection of installed work from damage by other trades and final cleaning shall be the responsibility of the General Contractor.

Manufacturer shall warrant all installed work for five (5) years after completion, against defective workmanship or materials that do not meet the specified criteria. Insulated glass and other proprietary materials specified will be warranted in accordance with their published literature.
Finish of metal components and type of material shall be as noted or scheduled on the drawings.

3. EXECUTION

3.1 Windows shall be installed by a specialty contractor or by workmen experienced in this kind of work.

3.2 Set frames plumb, level and square, within clearance limits of the respective openings.

3.3 Fasten frames securely to the wall masonry or wall framing. For metal windows, use anchors or clips as directed by the manufacturer.

3.4 Treat wood frames with water repellent preservative.

3.5 Aluminum frames, where in contact with masonry, shall have a protective coating.

3.6 Window frames, glazing and other installation materials shall be handled carefully at all times and shall be protected from all possible sources of damage such as dampness, dirt, mortar, etc. Windows shall be stacked standing on edge on wood strips to prevent contact with the ground.

3.7 Installation shall strictly follow the manufacturer's recommendation.

3.8 After the windows are installed and before glazing, the windows shall be checked for operation and adjustment as necessary

3.9 After glass is installed, remove protective coatings and coverings and check again operation of vents and frames.

3.10 Leave all installed windows clean, tight and weatherproof.

SECTION 0880
GLASS AND GLAZING

1. GENERAL

1.1 All applicable provisions of "General Conditions", "Supplementary General Conditions", "Special Conditions" and "Special Requirements" form a part of this section of specifications.

1.2 SCOPE: The extent of work shall be as shown on the drawings and called for in the Description of Work. Performance shall meet the requirements of the specifications. The work covered by this section of the specifications consists of the following:

a) Furnish and install glass of every kind as may be shown on the drawings or noted in this section of specifications.
b) Glass shall be stored in safe, dry locations and shall not be unpacked until needed for installation.
c) Each light of glass shall be factory labeled stating manufacturer's name, quality and thickness.
d) Glazing materials shall be delivered in sealed packages and shall be used in accordance with the manufacturer's directions.

2. PRODUCTS

2.1 Materials shall comply with the scheduled type and quality as shown on the drawings and noted in this section of specifications.

2.2 Unless otherwise specified, glazing shall be as follows:

a) Exterior windows shall be factory glazed with double-pane insulating glass as per factory standards.
b) Glazing of doors and sidelights shall be tempered glass meeting state and local code requirements. Exterior doors and sidelights shall be double-glazed with tempered glass.
c) Tinted or reflective glazing shall be as noted or scheduled on the drawings.
d) Glazing of curtain walls or other fixed glazing shall be as noted or scheduled on the drawings.

2.3 Mirrors shall be glazing quality plate glass 1/4" thick. Mirror backs shall be silvered two coats, heavily electroplated with copper and given a prime coat and a coat of mirror backing paint. Mirrors shall bear labels indicating electro-copper plated mirror. Mirrors shall be mounted in polished stainless steel or polished nickel chrome plated brass frames of channel section with mitered, welded corners and shall have plywood, hardboard or steel backing with vandal-proof fastening devices.

3. EXECUTION

3.1 The Contractor shall set the glass in the best manner of the trade and in such a way that there will be an equal bearing over the entire width of the pane.

3.2 Glazing points or clips shall be zinc-coated steel or nonferrous metal.

3.3 Glazing of metal windows shall be done as recommended by the manufacturer.

3.4 All glass shall be cut, handled and installed in accordance with the particular manufacturer's directions and in accordance with the standards of the Flat Glass Manufacturer's Association.

3.5 This Contractor shall be responsible for the procuring of all measurements or verification of same on the premises, and for accurately fitting glass in position.

3.6 Glass shall have smooth straight edges and be of accurate size with proper clearances for expansion and contraction.

3.7 Glazing work shall not be started until the outdoor temperature is above 40 degrees F on a rising thermometer and shall not be performed during rainy or damp weather.

3.8 Sash and doors shall be glazed in closed positions and shall not be operated until compound has set.

3.9 Carefully remove and replace glazing beads and stops as necessary, taking care not to damage or mar any finished work.

3.10 Rabbets shall be made clean, dry, solventless and properly primed.

3.11 Maintain face and edge clearances for all glass using setting blocks and spacers.

3.12 This Contractor shall properly protect all glass installed by him from injury or breakage during construction of the buildings. The Contractor shall assume all responsibility for breakage, by whomsoever caused, and shall replace all cracked, broken, scratched or otherwise defective glass when directed to do so by the Architect. All glass shall be cleaned carefully at the time of final acceptance removing all labels, excess putty, grease, paint and other foreign substances and leaving work in perfect condition. Glass having scratches or defects which show after cleaning shall be removed and replaced with perfect glass at no additional cost to the Owner. The Contractor will be held responsible for all glass remaining in perfect condition until the work has been finally accepted by the Architect and the Owner.

SECTION 0910
DRYWALL

1. STIPULATIONS

1.1 The specifications sections, "General Conditions", "Supplementary General Conditions", "Special Conditions" and "Special Requirements" form a part of this section by this reference thereto and shall have the same force and effect as if printed herewith in full.

2. GENERAL

2.1 The work covered by this section of the specifications consists of furnishing all labor, materials, equipment and appliances and in performing all operation in connection with the installation of Gypsum Wallboard, complete, in strict accordance with this section of the specifications and the applicable drawings.

2.2 Without intending to limit and/or restrict the volume of work required by this section of the specifications and the applicable drawings, the work generally consists of :
- a) Drywall Panel Components
- b) Fasteners
- c) Joint Reinforcing and Treatment
- d) Caulking (Sound Retardant Partitions)
- e) Sound Attenuation Blankets (Sound Retardant Partitions)
- f) Accessories

3. STANDARDS

3.1 Products and materials in this section of the specifications shall be by U.S.C., Gold Bond, Georgia Pacific or other manufacturers approved by the Architect.

3.2 All items under this section shall be installed in strict accord with the manufacturer's printed specifications which shall take precedence when in conflict with this specification.

3.3 Application procedures and workmanship shall be in accordance with GA-216 and ASTM C840.

4. MATERIALS

4.1 Drywall panels shall be regular gypsum wallboard (fire-rated where required by the drawings) furnished in thickness indicated on the plans.

4.2 Joint compound shall be ready mixed.

4.3 Sound Attenuation Blankets shall be 2" fiberglass as manufactured Owens-Corning or approved equal.

4.4 Accessories
1. Corner beads shall be galvanized steel (1" x 1" for 1/2" and 3/8" board) (1" x 1-1/4" for 1/2" and 5/8" board) (1-1/4" x 1-1/4" for 2 layer construction).
2. Casing Beads and Trim shall be galvanized steel.
3. E-Z Strip Expansion Joint.
4. Acoustical Sealant, Tremco or equal.
5. Screw Furring Channels.
6. Resilient Furring Channels.

5. INSTALLATION

5.1 Preparation for Work

Examine and inspect materials to which gypsum board is to be applied. Remedy all defects prior to installation of drywall. Any defects in the finished installation due to misaligned framing or other cause will be the responsibility of the work performed under that section of the specifications and such defects shall be remedied under that section of the specifications.

During cold weather maintain a room temperature of not less than 40 degrees F application of gypsum wallboard. For joint temperature the room temperatures, during cold weather, should be maintained between 50 degrees and 70 degrees f for 48 hours before application and continuously thereafter until completely dry. Provide adequate ventilation.

5.2 Cutting Wallboard

Gypsum wallboards shall be cut by scoring and breaking, or by sawing, working from the face side. Where board meets projecting surfaces, it shall be scribed neatly.

5.3 Caulking

For sound rated partitions, acoustical sealant shall be non-hardening, non-staining and easily applied with a caulking gun.

Beads shall be 1/4" diameter minimum but bead must be increased in size as necessary to assure positive seal. Sealant is required at the following locations:

a) Serpentine bead under floor track or sole plate in all cases. (A single straight bead under center of track is acceptable if positive seal is accomplished.)

b) A similar bead under ceiling or wall track if junction is not otherwise sealed. (When wall or ceiling is taped, caulking is not required.)

c)Where partition is finished with a casing bead at junction of ceiling or wall, use 500 VB casing bead or a bead of caulking located so the inner edge of casing bead compresses the caulking.

d) A similar bead at floor line after finish layer of wallboard is applied and before installation of base.

6. INSTALLING WALLBOARD

6.1 Gypsum wallboard shall be applied first to ceiling at right angles to framing members then to walls. Boards of maximum practical length shall be used so that an absolute minimum number of end joints occur. Board edges shall be brought into contact with each other but shall not be forced into place.

6.2 Wallboard joints at openings shall be located so that no end joint will align with edges of opening unless control joints will be installed at these points. End joints shall be staggered, and joints on opposite sides of a partition shall not occur on the same stud.

6.3 Gypsum wallboard shall be in firm contact with the framing member while fasteners are being driven. Fastening shall proceed from center portion of the wallboard toward the edges and ends. Fasteners shall be set with the heads slightly below the surface of the wallboard in a dimple formed by the hammer or power screwdriver. Care shall be taken to avoid breaking the face paper of the wallboard. Improperly drive nails or screws shall be removed.

7. SINGLE LAYER WALLBOARD APPLICATION (ALSO BASE LAYER OF DOUBLE LAYER)

7.1 NAILS - Nails shall be GWB-54 or cooler type located 3/8" min. to 1/2" max. from edges and ends of wallboard. Nails shall be a max. of 7" o.c. on ceilings and a max. of 8" o.c. on walls.

7.2 SCREWS - Drywall screws for attaching gypsum wallboard to wood framing shall be 1-1/4" Type "W" spaced not to exceed 12" o.c. on ceilings, 16" o.c. on sidewalls. Screws for attaching gypsum wallboard shall be Type "G" spaced as required. Where studs are spaced 24" o.c. sidewall screw spacing shall not exceed 12" o.c..

7.3 CORNER BEADS - Corner Bead shall be nailed with gypsum wallboard nails spaced no greater than 9" apart on each flange of the bead with nails opposite.

8. DOUBLE LAYER WALLBOARD APPLICATION

8.1 Base Layer - The first layer shall be as specified above except that fasteners shall be driven flush with the board surface and joints will not be treated.

8.2 Mechanical attachment of face layer for fire rated construction shall be made in accordance with the specifications for the system selected.

9. JOINT AND CORNER FINISHING

9.1 A uniformly thin layer of Joint Compound shall be applied over the joint approximately 4" wide. The tape shall be centered over the joint and embedded into the compound leaving sufficient Joint Compound under the tape to provide proper bond. Ceiling and wall angles and inside corner angles shall be reinforced with tape folded to conform to the angle and embedded into the compound.

9.2 After compound is thoroughly dry, or hard (approximately 24 hours) the tape shall covered with a coat of Joint Compound spread over the tape approximately 3" on each side of the tape, and feathered out at the edge. After thoroughly dry, another coat of Joint Compound shall be applied with a slight, uniform crown over the joint. This coat shall be smooth and the edges feathered approximately 3" beyond the preceding coat.

9.3 All inside corners shall be coated with at least one coat of Joint Compound with the edges feathered out.

9.4 All nail or screw head dimples shall receive three coats. This may be applied as each coat is applied to the joints.

9.5 Flanges of wallboard corner bead shall be concealed by at least two coats of compound feathered out approximately 9" on both sides of the exposed metal nose.

9.6 Allow each application of compound to joints and fastener heads to dry, or harden then wet sand if necessary. Caution shall be used to avoid roughing of the wallboard paper. All wallboard and treated areas shall be smooth and ready for decoration.

10. SCREW STUD SYSTEM

10.1 Materials (especially for this system).
a) Drywall Screws Type "S".

10.2 Installation

a) Single Layer of First Ply - Apply gypsum wallboard with the length (parallel) to the studs. Center abutting ends or edges over the stud flanges.

For non fire-rated construction, locate all attaching screws 12 in. o.c.. For fire-rated construction, vertical application, space screws 12 in. o.c. in the field and 8 in. o.c. along the vertical abutting edges unless otherwise specified. Attach the gypsum wallboard to Screw Studs with Type "S" Drywall Screws using an electric screw driver with a #2 Phillips bit. For vertical wallboard application with studs 24" o.c. erect the wallboard on one side of the partition, screwing it to the studs at vertical wallboard joints. The first row of screws to be driven at a wallboard joint should be in the face (flange) of the stud adjacent to the stud web. Complete the wallboard application to the entire side of the partition in this manner. For the opposite side, cut the first wallboard panel 2 ft. wide so that joints will be staggered. Fasten this and succeeding wallboard panels to all studs on this side. When partition face is complete, return to the first side and complete screw attachment of wallboard to all intermediate studs.

Make door and window framing openings of such size that when the wallboard is secured to the studs, it will fit snugly into the steel frames.

11. COMPLETION OF WORK

11.1 All work of this section shall be completed in all respects and protected and maintained in perfect condition until accepted by the painting contractor for finish painting or wall covering.

11.2 Upon completion of this work, this contractor shall remove from he site all trash or debris resulting from the work of this section and leave the premises broom-clean.

SECTION 0930
QUARRY TILE AND CERAMIC TILE

1. GENERAL

1.1 The specifications sections, "General Conditions", "Supplementary General Conditions", "Special Conditions" and "Special Requirements" form a part of this section by this reference thereto and shall have the same force and effect as if printed herewith in full.

2. WORK INCLUDED

2.1 The work of this section includes all materials and labor for, but not necessarily limited to, the following:
a) Ceramic tile floors and bases
b) Quarry tile floors and bases
c) Ceramic tile walls

3. WORK NOT INCLUDED

3.1 The following items are included in other section of these specifications as noted below:
a) Mortar setting beds and grouting - See Section 0440 "Masonry Mortars".
b) Plaster scratch coat back of wainscots - See Section "Furring, Lathing and Plastering".

4. APPLICABLE STANDARDS

4.1 Tile shall comply with requirements of U.S. Department of Commerce and National Bureau of Standards "Simplified Practice Recommendation R6", "Federal Specification SS-T-308" and modifications as specified herein. Tile shall be of grade specified and all containers grade-sealed in accordance with minimum grade specifications described in SPR-R61. In addition to grade seal, furnish the Architect with master grade certificate starting grade, kind of tile, identification marks for tile packages and the name and location of job; certificate shall be signed by the manufacturer and issued before shipment of tile is made. Deliver containers to site with seals unbroken.

5. MATERIALS

5.1 Unglazed natural clay ceramic mosaic tile shall be standard grade, unglazed natural clay type, meeting ANSI A137.1 as manufactured by American Olean or equal as approved by the Architect. Provide all necessary shapes for curbs, depressions and corners. Tile shall be of size, color and patterns as scheduled on the drawings.

5.2 Glazed wall tile shall be standard grade, glazed tile meeting ANSI A137.1 as manufactured by American Olean, or equal as approved by the Architect. Tile shall be of size, color and patterns as scheduled on the drawings. Provide spacer lugs as scheduled or indicated on the drawings.

5.3 Quarry tile shall be standard grade "V-Bak" meeting ANSI A137.1 as manufactured by American Olean and of color and size as scheduled on the drawings or equal approved by the Architect. Tile shall furnished with abrasive "non-slip" surface. Tile shall be ground four sides. Install cove base 5" x 6" x 1/2" where indicated on the room finish schedule and as detailed on the drawings.

5.4 Marble thresholds shall be hard domestic marble of species selected by the Architect. Marble shall be free of defects which would impair the strength, durability or appearance. Thresholds shall be shaped as detailed or directed and shall have a honed finish.

5.5 Standards for all mortar and grouting materials shall be as herein specified in Section 0440 "Masonry Mortars".

5.6 Dry-set mortar shall be powered mix complying with requirements of ANSI Specification A 118.1 for "Dry-Set Portland Cement Mortar". The mortar shall be manufactured under license by the Tile Council of America, Inc. and containers shall bear their Hallmark. The powered mortar mix may be furnished pre-mixed with portland cement as a sanded mix, or as a concentrate to be job-mixed with portland cement, at the Contractors' option.

Portland cement shall meet ASTM C150 Type 1 Gray or White.
Hydrated lime shall meet ASTM C206 or C207 Type S.
Sand shall meet ASTM C144.
Water shall be clean and potable.

5.7 Primers, sealers, underlayment and solvents shall be of type and consistency as recommended by manufacturers dry-set mortar mix. Prime or seal wall surfaces before applying dry-set mortar. The application of underlayment over floor or wall surfaces shall be required only where it is necessary to level or straighten the surfaces to provide a satisfactory tile installation.

6. MORTAR AND JOINTS

6.1 Mortar setting bed for thresholds and floor tile shall be not less than 1-1/4 inch thick. Provide additional thickness of setting bed as required on depressed slabs. Marble thresholds shall be set in full beds or mortar. Setting mortar not otherwise specified shall be mixed in the volumetric proportions of one part portland cement and four parts sand, with the addition of approved integral waterproofing in accordance with the manufacturer's printed directions.

6.2 Pointing mortar for joints 1/8 inch and more in width shall be mixed in the volumetric proportions of one part portland cement and two parts sand with the addition of approved integral waterproofing in accordance with the manufacturer's printed directions.

6.3 Grout not otherwise specified, for joints less than 1/8 inch in width shall be a mixture of neat portland cement with the addition of approved integral waterproofing in accordance with the manufacturer's current printed directions.

7. SAMPLES

7.1 When the Contractor intends to substitute materials of other manufacturers than those scheduled on the drawings, he shall submit full size samples of tile showing textures and colors. Submit 6 inch samples of marble thresholds showing color range, pattern and finish.

8. SHOP DRAWINGS

8.1 Submit shop and/or layout drawings of special tile work, as directed, for approval by the Architect.

9. SETTING OF TILE

9.1 Prior to installing any tile this Contractor shall inspect subfloors and wall surfaces which are to receive tile covering; he shall notify the Architect in writing of any serious defects or condition that will prevent a satisfactory tile installation and he shall not proceed with installation until such defects or conditions have been corrected. The starting of installation work in a room or space shall imply acceptance of the surfaces to receive the tile.

9.2 Except as otherwise indicated on drawings or specified herein, the installation of all tile shall be in accordance with the applicable general requirements for inspection, preparation, protection, workmanship and application as described in the following adopted and proposed current American Standard Specifications:

A 108.1 Glazed Ceramic Wall Tile installed in portland cement mortars.
A 108.2 Ceramic Mosaic Tile installed in portland cement mortars.
A 108.3 Quarry Tile installed in portland cement mortars.
A 108.5 Installation of Ceramic Tile with Dry-Set portland cement mortar.

ASA Project Proposed Standard Specification for Installation of Ceramic Tile with Water-Resistant Organic Adhesives.

9.3 Where possible, lay out work so that no tile less than half size occurs. For wainscot heights maintain full courses to produce nearest attainable heights without cutting tile. Align joints in wall tile vertically and horizontally except where other patterns are shown or specified. Align all joints in floor tile at right angles to each other and straight with walls to conform to patterns selected.

10. CUTTING OF TILE

10.1 Do all cutting and fitting of tile to permit installation of built-up accessories and other equipment and piping. All cutting of tile shall be done with carborundum power saw.

11. CLEANING

11.1 After the pointing has sufficiently set or hardened, all tile shall be thoroughly cleaned in an approved manner. All trades of cement or dust accumulations shall be completely removed. Acid solution shall not be used for cleaning glazed tile.

11.2 Give all work a thorough cleaning upon completion of the building. Cleaning shall meet the approval of the Architect. If surfaces show marks, scratches or cracks or other imperfections which cannot be removed by cleaning, the defective material shall be removed and replaced with new material.

12. PROTECTION

12.1 All floors shall be protected after cleaning until acceptance of the project. Areas from which foot traffic cannot be restricted shall be covered with kraft paper, lapped and cemented and maintained in unbroken surfaces. The Contractor shall provide all other items of protection necessary to prevent damage to all work under this section at all times during the progress of the work until its final acceptance.

SECTION 0950
ACOUSTICAL WORK

1. STIPULATIONS

1.1 The specifications sections, "General Conditions", "Supplementary General Conditions", "Special Conditions" and "Special Requirements" form a part of this section by this reference thereto and shall have the same force and effect as if printed herewith in full.

2. WORK INCLUDED

2.1 The work of this section includes, but is not necessarily limited to, the acoustical treatment listed below. Refer to drawings and schedules for location of the various types of acoustical treatment specified herein.
a) Acoustical tile;
b) Suspension and support systems for all acoustical and ceiling treatment as scheduled and detailed on drawings, and as specified herein.

3. WORK NOT INCLUDED

3.1 The following items are included in other sections of these specifications as noted below:
a) Wood furring (where applicable) - See Section 0600, "Carpentry and Millwork".

4. MATERIALS

4.1 All materials shall be of brand, trade name and manufacturer noted on plans or called for in the specifications. Materials specified may be substituted by others of equal quality only with the approval of the Architect or the Owner.

4.2 The Contractor shall submit to the Architect for approval samples of acoustical tile units and samples of the suspension system members.

4.3 Acoustical tile units shall be as shown on drawings or noted in schedules for size, color texture and grade.

4.4 The units shall have fire resistance rating and sound absorption rating as specified.

4.5 Ceiling suspension system shall be in strict accordance with the manufacturer's recommendation.

4.6 If tile installed by adhesive method, the adhesive shall be of the kind recommended for the particular tile.

5. INSTALLATION

5.1 Hangers shall not penetrate ductwork or piping. Insulation and acoustical ceilings shall not be suspended from heating and ventilating ductwork or plumbing equipment, but shall be hung from the building structure by hangers and support members, which shall not interfere with heating and ventilating equipment and its maintenance. The Plumbing and Heating and Ventilating Contractors will not utilize the hanger or framing of the acoustical suspension system.

5.2 The Electrical Contractor will utilize the acoustical ceiling grid for lay-in of lighting fixtures, but the Electrical Contractor will furnish any separate primary support or secondary frame members required to anchor and support lighting fixtures and equipment and to supplement and strengthen the standard ceiling grids specified herein.

Provide openings for flush lighting fixture in acoustical ceiling as shown on electrical drawings and reflected ceiling drawings. Frame or reinforce for these openings and fixtures.

5.3 All concealed members used for support and attachment of acoustic treatment shall be of steel, either galvanized after fabrication, or primed with rust inhibitive paint, or other approved noncorrosive material or coating.

5.4 All fastenings, clips, bolt and screws shall be either galvanized or other approved noncorrosive material or (rust corrosion inhibitor) prime coat painted, for compatibility with the support suspension system and members.

5.5 All acoustical treatment, shall be erected by experienced acoustical installers approved by the manufacturer of the acoustical treatment. The suspension systems shall be rigid and in perfect alignment so that the finished ceilings will be in a true plane, with adjacent members flush and in alignment in both directions. Entire installation shall be left whole, undamaged perfect and free of finger marks and other defacement or soiling.

5.6 Acoustical ceilings shall be installed only when normal temperature and humidity conditions approximate the interior conditions that will exist when the building is occupied. The building temperature shall be maintained above 60 degrees F without excessive humidity before, during and after acoustical work is in progress. All glazing shall be in place, all openings shall be closed and all concrete, plastering and terrazzo work shall be dry.

5.7 A baked enamel off-white finish galvanized steel moulding (wall angle) shall be used where acoustical ceilings abut the wall or other vertical surfaces. At exposed CMU walls having bull-nose corners, provide factory-made radius corners for wall angles.

5.8 The Contractor shall furnish shop drawings consisting of a reflected ceiling plan, to the Architect for approval. Shop drawings shall show ceiling grid arrangement, lighting fixtures and size and location of all ceiling penetrations.

5.9 Provide retention clips as required by the manufacturer at fire-rated or impaction type ceilings.

5.10 Suspension systems shall be installed in accord with ASTM C636, "Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels".

5.11 For fire-rated installation, install tile, light fixture protection and suspension systems in accord with U/L Fire-Rated Assemblies as noted on the drawings.

5.12 Where required by the drawings, provide drywall suspension systems as manufactured by Donn Corp. or equal as approved by the Architect for screw application of drywall panels. Where systems are required by the drawings to be fire-rated, the installation shall be in accord with U/L assemblies as noted. Installations shall be in accord with all requirements of the manufacturer and furnished with all accessories necessary to complete the suspension system.

SECTION 0965
VINYL FLOORING AND VINYL BASE

1. STIPULATIONS

1.1 The specifications sections, "General Conditions", "Supplementary General Conditions", "Special Conditions" and "Special Requirements" form a part of this section by this reference thereto and shall have the same force and effect as if printed herewith in full.

2. WORK INCLUDED

2.1 The work covered by this section of the specifications consists in furnishing all labor, materials, equipment and appliances and in performing all operations in connection with the installation of sheet vinyl and vinyl composition tile flooring, rubber stair treads and vinyl base, complete, in strict accordance with this section of the specifications and the applicable drawings.

2.2 Without intending to limit and/or restrict the volume of work required by this section of the specifications and the applicable drawings, the work generally consists of:
a) Vinyl composition tile flooring and sheet vinyl;
b) Vinyl cove base;
c) Vinyl protective edging at exposed edges of floor tile;
d) Metal division strips between resilient floor tile and non-resilient flooring;
e) Rubber stair treads and risers;
f) Rubber flooring at stair landings.

3. MATERIALS

3.1 Vinyl composition tile shall be Armstrong 'Standard Excelon' 1/8" gauge 12" x 12", meeting the requirements of Federal Specifications, SS-T-312 B (1) Type IV, Comp. 1. Color and pattern shall be selected by the Owner.

3.2 Underlayment shall be type approved by the manufacturer of the tile.

3.3 Adhesive for resilient tile shall be water resistant type approved by the manufacturer of the tile.

3.4 Vinyl base shall meet applicable requirements of Federal Specification SS-W-40a Type II. Face of base shall be highly polished; back shall be patterned to provide adhesion.

3.5 Base shall be set-on cove, .080" gauge, 4" high, except as noted otherwise on the drawings, with rounded top. Exposed edge of floor lip of set-on cove base shall be rounded. Provide molded inside and outside corners.

3.6 Base color shall be non-fading and homogeneous throughout. Color shall be as selected by the Architect. Base shall be furnished in maximum coil lengths to minimize joints.

3.7 Adhesive for vinyl base shall be latex cement approved by the manufacturer of the base.

3.8 Protective edging shall be moulded vinyl strips 1-1/4" wide, beveled to protect edge of tile. Edging shall match thickness of the tile and shall terminate in a beveled edge not more than 1/16" thick.

3.9 Sheet vinyl shall be Armstrong 'Classic Corlon' .085" gauge 6'-0" wide meeting Federal Specifications L-F-475A (3) Type II, Grade A. Color and pattern shall be selected by the Owner.

3.10 Rubber tile flooring shall be Musson #888 3/16" gauge 24" x 24" size, fully homogeneous and uniform throughout or equal as approved by the Architect and furnished in colors as selected by the Owner.

3.11 Rubber stair treads, where required by the drawings, shall be as scheduled on the drawings or equal as approved by the Architect. Colors shall be selected by the Owner.

3.12 Where noted on the drawings, provide coved stair risers, as scheduled on the drawings or equal as approved by the Architect.

3.13 Where noted on the drawings, provide Musson #500 R stringer material in colors selected by the Owner.

4. SAMPLES

4.1 Submit following samples:

a) Tile - 2 of each color proposed for use of all types of floor tile. Tile samples shall be full size and thickness specified.
b) Base - 6" long.
c) Division strips - each type.
d) Vinyl edging - 6" long.
e) Rubber stair treads and risers - 2" wide section.
f) Sheet vinyl 12" x 12" section or larger if required to show full pattern.

5. DELIVERY AND STORAGE

5.1 Deliver all materials in manufacturer's original unopened containers with the manufacturer's brand name clearly marked thereon. Store all materials at a minimum temperature of 70 degrees F for at least 24 hours immediately before installation.

6. PREPARATION OF SURFACES FOR TILE AND BASE

6.1 Clean all surfaces of grease, dirt, paint, loose material and other objectionable matter. Fill small holes, cracks and depressions in subfloors with underlayment.

6.2 Carefully examine subfloors and wall surfaces. Repair all projections above normal plane of floor or other conditions (except the small holes, cracks and depressions specified above to be filled) which would prevent satisfactory execution of work.

6.3 Before installing tile and base maintain a minimum temperature of 70 degrees F in all rooms for at least 48 hours before, during and for 48 hours after installation.

WARNING: When work indicated on the drawings requires renovation in existing buildings, DO NOT sand existing resilient tile and sheet flooring. These products may contain asbestos fibers that are not readily identifiable. Inhalation of dust from such operations may cause serious bodily harm.

Removal of resilient tile and sheet goods shall be performed in accord with Armstrong publication FO5061 and F-5071.

7. COLOR SELECTION AND FEATURE STRIP

7.1 A 1" wide feature strip shall be installed at location where tile color changes if threshold is not provided. Strip shall be centered on door so it will not be visible when door is closed.

7.2 Colors for tile shall be as selected by the Owner.

8. INSTALLATION OF VINYL COMPOSITION AND VINYL SHEET FLOORING

8.1 Unless otherwise specified therein, install all tile and sheet vinyl in strict accordance with the tile manufacturer's current printed directions.

8.2 Do not begin installation of this work until work of all other trades, including painting has been completed.

8.3 Provide continuous metal division strips at all points of intersection between resilient flooring and non-resilient types of flooring which finish flush with tile, except where thresholds are required. Cut strips to exact required lengths and deliver to the project site in sufficient time to permit anchorage into fresh concrete. Division strips at doorways shall center on the doors. Piecing of division strips will not be allowed.

8.4 Install protective edging at all exposed edges of resilient tile, except where thresholds are required. Secure edging to subfloor with latex cement. Protective edging at doorways shall center on the door.

8.5 Unless specifically indicated to the contrary on drawings or finish schedule, do not install tile under radiator enclosures or under fixed cabinet work or equipment having an enclosed base.

8.6 Apply a thin film of adhesive and spread evenly with a notched steel trowel. Adhesive shall be tacky, but not hard or dry, when tile are laid.

8.7 Start laying tile from midpoint of long axis of room so that tile on opposite sides of room will be equal width. Lay tile with grain of all tile laid parallel.

8.8 Lay tile with close joints. Fit neatly into recesses and to protective edging, division strips, pipes, equipment and other abutting work. Cement securely and solidly into place. Bevel bottom of tile so that top will finish flush with protective edging. Finished surfaces shall be in true plane and flush throughout.

8.9 Lay sheet flooring with a minimum number of seams consistent with prudent use of the material, avoiding cross seams. Seal all seams in the flooring and between the flooring and border cove base, using tools, materials and methods, and sequencing of work in accord with the manufacturer's printed directions. Finish all seams flush to the floor, free from voids, recesses and raised areas.

9. INSTALLATION OF VINYL BASE

9.1 Install vinyl base in accordance with current printed instruction of manufacturer of the base. Install base with minimum number of joints. Cement solidly in place with adhesive. All joints shall be flush and completely sealed. Fit base tightly against walls and flooring. On completion, remove all adhesive, stain and dirt and leave base in perfect condition.

10. CLEANING AND WAXING

10.1 When flooring has seated sufficiently, clean with neutral cleaner recommended by the flooring manufacturer to remove all cement, dirt and other foreign substances. Apply two coats of wax. Polish with machine buffer between coats.

11. RUBBER STAIR TREADS, RISERS AND LANDING TILES AND CORRIDORS

11.1 The Contractor shall install new rubber stair treads, risers and landing tiles, where specified on the drawings. Rubber treads, risers, nosing and floor tiles shall be the products of one manufacturer and approved by the Architect.

11.2 Furnish and install where scheduled or noted on the drawings, 12" x 12" x 3/16" thick smooth rubber tile at stair landings in color to match rubber stair treads.

11.3 Furnish and install moulded cove, rubber stair risers in colors to match new rubber treads.

11.4 At top of nosing of all flights furnish and install matching rubber nosings to finish flush with flooring.

11.5 Installation of all rubber flooring shall be in strict accordance with the manufacturer's printed instructions.

12. PROTECTION

12.1 The General Contractor shall be responsible to protect and maintain flooring from damage until final acceptance by the Owner.

13. ADJUSTMENTS

13.1 When directed by the Architect, remove protection from floors and examine all tile. Apply heat to tile which have not seated to a level plane flush with surrounding tile. Roll while warm.

13.2 Remove tile which have broken corners and fracture lines. Substitute new tile, cement in place, and wax and polish to match surrounding tile.

SECTION 0975
CARPET FLOORING

1. STIPULATIONS

1.1 The specifications sections, "General Conditions", "Supplementary General Conditions", "Special Conditions" and "Special Requirements" form a part of this section by this reference thereto and shall have the same force and effect as if printed herewith in full.

2. WORK INCLUDED

2.1 The work covered by this section of the specifications consists in furnishing all labor, materials, equipment and appliances and in performing all operations in connection with the installation of CARPET FLOORING complete, in strict accordance with this section of the specifications and the applicable drawings.

3. WORK NOT INCLUDED

3.1 The following items are included in other sections of these specifications as noted below:
- a) Vinyl composition tile flooring and sheet vinyl;
- b) Vinyl cove base;
- c) Vinyl protective edging at exposed edges of floor tile;
- d) Metal division strips between resilient floor tile and non-resilient flooring;
- e) Rubber stair treads and risers;
- f) Rubber flooring at stair landings.

4. MATERIALS

4.1 All materials shall be of brand, trade name and manufacturer noted on plans or called for in the specifications. Materials specified may be substituted by others of equal quality only with the approval of the Architect and the Owner.

4.2 Refer to the *Room Finish Schedule* on the drawings for areas to receive carpet flooring.

4.3 The Contractor shall submit samples of all carpet flooring materials and for the Owner's approval and color selection.

4.4 The Contractor shall provide technical data on all underlayments, adhesives, and all other related products to be used on the project, for approval by the Architect prior to ordering any of the materials. All materials used in the installation of carpet flooring shall be approved for use by the manufacturer and be compatible with the manufacturer's products.

4.5 The Contractor shall provide the Owner with test certification, from a nationally recognized testing laboratory, for all materials installed by the Contractor. Finish materials shall meet or exceed Section 6-5 of NFPA 101 and the following requirements: (1) Assembly, lobby, narthex, stairs, and corridors shall be Class A or B (flame-spread 75 or less, smoke developed 450 or less) (2) Individual rooms shall be Class A, B, or C (flame-spread 200 or less, smoke developed 450 or less).

4.6 All underlayments shall be of a type, approved by the carpet manufacturer.

4.7 Adhesives for carpet flooring shall be water resistant type, approved by the manufacturer.

5. DELIVERY AND STORAGE

5.1 Deliver all materials in manufacturer's original unopened containers with the manufacturer's brand name clearly marked thereon. Store all materials at a minimum temperature of 70 degrees F for at least 24 hours immediately before installation.

5.2 Carpet materials shall be properly stored in accordance with the manufacturer's recommendations.

6. PREPARATION OF SURFACES FOR CARPET

6.1 Clean all surfaces of grease, dirt, paint, loose material, and other objectionable matter. Fill small holes, cracks, and depressions in subfloors with underlayment.

6.2 Carefully examine ALL surfaces scheduled to receive carpeting. Repair all projections above normal plane of floor or other conditions (except the small holes, cracks, and depressions) which would prevent satisfactory execution of work.

6.3 Before installing carpet maintain a minimum temperature of 70 degrees F in all rooms for at least 48 hours before, during, and for 48 hours after installation.

WARNING: *When work indicated on the drawings requires renovation in existing buildings, DO NOT sand existing resilient tile and sheet flooring. These products may contain asbestos fibers that are not readily identifiable. Inhalation of dust from such operations may cause serious bodily harm. Removal of resilient tile and sheet goods shall be performed in accord with Armstrong publication FO5061 and F-5071*.

7. INSTALLATION OF CARPET FLOORING

7.1 All carpet flooring shall be installed in strict accordance with the tile manufacturer's current printed directions, specifications, and/or recommendations.

7.2 Do not begin installation of this work until work of all other trades, including painting has been completed.

7.3 Provide continuous vinyl or rubber division strips at all points of intersection between carpet flooring and other types of flooring. Division strips at doorways shall center on the doors. Piecing of division strips will not be allowed.

7.4 Lay carpet flooring with a minimum number of seams consistent with prudent use of the material, avoiding cross seams.

8. CLEAN-UP

8.1 Upon completion of the work, the Contractor shall remove from the premises all trash or debris resulting from the work of this section. All carpet flooring shall be vacuumed clean and perfect in all respects prior to being turned over to the Owner.

SECTION 0990
PAINTING AND FINISHING

1. STIPULATIONS

1.1 The specifications sections, "General Conditions", "Supplementary General Conditions", "Special Conditions" and "Special Requirements" form a part of this section by this reference thereto and shall have the same force and effect as if printed herewith in full.

2. WORK INCLUDED

2.1 The work of this section requires the furnishing of all labor, materials, equipment and services to apply painter's finish to all wood, plaster and ferrous metal; to masonry, cement and concrete where so scheduled; all as shown on drawings, scheduled, specified or required, to completely finish the painting work; and generally includes, but is not limited to, the following work as noted below (for exceptions, see "Work Not Included"):

a) Finish painting of existing structural steel, where same is exposed in areas designated to receive painter's finish;
b) Interior concrete unit masonry, including lintels;
c) Hollow metal doors, pressed steel frames, associated panels and trim;
d) Access panels, registers, grilles, steel louvers, electrical panels, pull boxes, diffusers, valve boxes and covers, new, existing and similar metal equipment built into place in walls, ceilings, fascias, soffits of areas noted to receive painter's finish (Note that factory finished items such as unit heaters, unit ventilators and fin radiation are noted on the drawings as to color and finish and are specified under Heating and Ventilating Contract.)
e) All miscellaneous steel and iron, and similar items in areas noted to receive finish painting;
f) Steel lintels, or other exposed supported hangers;
g) Painting of certain piping, conduit or similar mains or conductors (See "General Instructions" below);
h) Interior plastering;
i) Priming off all millwork;
j) Finish on all millwork;
k) Painting of drywall.

2.2 GENERAL INSTRUCTIONS: The Contractor shall examine the specifications for the various other trades and/or separate contracts and shall thoroughly familiarize himself with all their provisions regarding the painting. All items of heating and ventilating, plumbing or the electrical work such as piping, conduit or equipment which will be exposed in the finished areas (including existing areas or rooms having existing painted finishes and in which no other general construction work may be required) shall be painted by this Contractor in a manner to match adjacent surfaces. All items of heating and ventilating, plumbing and drainage and the electrical work of similar nature which will be exposed in the unfinished, normally unoccupied areas such as transformer vaults, mechanical rooms, pipe shafts, elevator shafts and similar spaces shall be painted by the respective Heating and Ventilating, Plumbing or Electrical Contractors. Cabinet unit heaters, convectors and convector fronts, fin radiation covers, unit ventilators, and side extensions, and exposed back members will be furnished with a baked enamel factory finish as shown on the drawings, and as specified under the Heating and Ventilating Contract.

3. WORK NOT INCLUDED

3.1 Painting or finishing of the following items is included in other sections of these specifications or other contracts as noted below:

a) Painting of ductwork, piping and conduits and painting of mechanical and electrical equipment in unfinished (unoccupied) areas, pipe trenches, and where not enclosed within furring chases, walls and ceiling construction. See drawings and mechanical and electrical specifications. See Paragraph 2.2, "General Instructions" of this section.

3.2 The following items will not be painted:
a) Exterior concrete;
b) Concrete floors and platforms, except as specifically noted;
c) Nonferrous metal and nonferrous sheet metal such as aluminum, stainless steel, copper and lead-coated copper;
d) Interior walls of pipe spaces;
e) Acoustic tile ceilings.

3.3 Laminated wood members such as arches, beams, purlins, and laminated wood decking shall have a combination sealer/stain applied at the factory and shall not receive field finishing unless specifically noted on the drawings.

4. MATERIALS

4.1 All materials shall be first grade products of well known manufacturers and delivered to the building in original containers, with the seals unbroken and the labels intact, bearing the brand and name of the manufacturer and subject to inspection, analysis and approved by the Architect and the Owner.

4.2 Brand names, where specified, are for the purpose of establishing standards of type and quality for estimating purposes. Similar approved materials as manufactured by others and approved by the Architect will be acceptable.

5. SAMPLES OF MATERIALS

5.1 The Contractor shall submit color chips showing full range of manufacturer's standard colors for selection by the Owner.

5.2 Generally, paint samples will not be required except for special finishes or textures or where matching of existing finishes may be required.

5.3 Samples of natural finishes shall be required applied to woods or veneers matching those types incorporated into the project.

6. COLORS

6.1 Colors of undercoats shall be slightly lighter that the succeeding coat or colors of finish coat. Colors of natural finishes shall be as directed by the Architect. Areas noted on the drawings as "patch to match existing adjacent surfaces" shall be construed as including finish painting. Generally, this painting may be limited to the disturbed area, except when, in the opinion of the Owner, a satisfactory color match cannot be achieved. In this case, painting shall extend beyond disturbed areas to the nearest intersection or break in the wall or ceiling surface planes.

7. STORAGE AND PROTECTION

7.1 Space for storage of equipment and materials must be kept in a clean and orderly condition during the execution of the work. All waste and paint rags must be kept in metal containers, tightly covered. All such material must be gathered up and burned or safely disposed of at the end of each working day. Every precaution to avoid fire must be taken. An approved type of fire extinguisher shall be kept and mounted immediately outside of each area or room space approved by the Owner as a paint storage room.

7.2 The Contractor shall furnish and lay drop cloths in all areas where painters finish work is being done, to protect floors and all other work from defacement. All temporary protections or covering removed too early from any part to do shall be made good at the Contractor's expense.

8. PREPARATION OF SURFACES

8.1 Before painters finish is begun, the Contractor shall carefully inspect the surfaces to be painted or varnished and shall see that they are dry and in proper condition to receive the painters finish. Any surface not satisfactory shall be put in proper condition by the Contractor before work under this section proceeds, as he will be held responsible for any finish or any improperly prepared surface and shall make good any defective work at his own expense to the satisfaction of the Architect. Surfaces which are in poor condition so that a proper finish cannot be produced by the number of coats described, shall receive such special treatment or additional coats as necessary to produce a smooth durable and satisfactory finish.

8.2 All dust, dirt, rust, scale, cementitious material and erection marks shall be carefully removed from the metal work before applying, paint, using benzene, steel wool and wire brushes, if necessary. Damaged areas of shop applied prime coats shall be cleaned and repainted with metal primer.

8.3 Wood and metal surfaces to be finished shall be sandpapered smooth without injury to arises and mouldings. All nail holes, intersections between wood and steel or plaster and all joints of woodwork shall match the color of the final finish.

8.4 Woodwork shall be sanded before each coat is applied and shall be puttied after the first coat. The putty used in varnished woodwork shall match the color of the final finish.

8.5 All plaster and concrete block shall be tested for moisture content before painting is commenced. Tests shall be made with an approved type electrical moisture meter. Moisture content of the above materials shall not exceed 15% when painting is commenced. However, none of the provisions of this section shall relieve the Contractor from the responsibility of performing all painting operations in a manner which will produce satisfactory finished surfaces free from scaling, peeling, discoloring, efflorescence or other defects.

8.6 All existing surfaces which are to receive painter's finish shall be thoroughly cleaned of dust, dirt, oil or grease by using solvents if necessary. Abraided spots on existing plaster surfaces shall be properly patched and sealed with thinned shellac prior to receiving new finish.

8.7 Verify that concrete floors which are to be painted have not been treated with curing compounds or contain admixtures which are not compatible with paint finish (see paragraph 11.2, Section 0330, "Concrete").

9. BACK PAINTING AND PUTTY STOPPING

9.1 All surfaces of woodwork in contact with masonry or plaster, or which are concealed in finish work shall, in addition to the priming coat, have a heavy coat of back paint applied at the mill.

9.2 Paint shall be thoroughly worked into all corners, cracks and crevices. Care shall be taken not to extend over into surfaces that are to have a stained or natural finish.

9.3 After all work is dry and the priming coat is thoroughly dry, all nail holes, checks, open joints or other defects shall be completely filled with white lead whiting putty, applied with a knife and the work left smooth and even, so as to be unnoticeable in the finished work.

9.4 Shop coats no metal and wood materials shall be of materials as herein specified and called for in other section of these specifications.

10. WORKMANSHIP

10.1 No finishing shall be done when the temperature is below 50 degrees F, or during wet atmospheric conditions or on surfaces that are not absolutely dry. The elapsed time between coats shall not be less than 24 hours for interior work.

10.2 Surfaces finishes shall be uniform in thickness, texture and color and shall be free from sagging, corduroy, brush marks and other imperfections. Finish coats shall be free from noticeable laps and brush marks. Should any coat be judged unsatisfactory by the Architect, the Contractor shall sandpaper or clean off this coat and apply another.

10.3 Spray painting will not be permitted.

10.4 The Contractor shall repair all damage to surface finishes, masonry and any other surfaces. He shall repair all damage to painter's finish by whomsoever caused and shall leave his work clean and perfect, and remove all paint and varnish spots from the floors, glass and all other surfaces.

10.5 All materials shall be applied strictly in accordance with manufacturer's current printed directions.

11. APPLICATION OF MATERIALS

11.1 All coats shall be thoroughly dry before applying succeeding coats.

11.2 All work where a coat of material has been applied must be inspected and approved before the application of the succeeding specified coat, otherwise no credit for the coat applied will be given and the Contractor automatically assumes the responsibility for the work in question.

11.3 All suction spots or "hot spots" in plaster after the application of the first coat, shall be touched-up before applying the second coat, to produce an even result in the finish coat.

11.4 Paste wood filler, applied on wood veneers when "set" shall be wiped across grain of wood, then with the grain to insure a clean, blended surface.

11.5 All existing exterior iron and steel work except as otherwise specified, shall be painted one coat. This work shall include such metal work as pipe rails, gratings, hollow metal doors and frames, grilles and other metal items.

11.6 All new exposed iron and steel work shall be painted and enameled over a priming or shop coat, with one tinted undercoat and one final coat. This work includes interior metal work such as door bucks and frames, access doors and frames, access panels and frames, lintels and all other required miscellaneous metal items.

11.7 If metal which is to be painted is galvanized, it shall be chemically treated with a compound designated for this purpose such as Dithoform, Stibloy, Solfo Metallic Coating or approved equal, in accordance with the manufacturer's directions for use.

11.8 Priming coats applied under this or other section shall be touched-up and left ready for finishing coat.

11.9 All interior millwork to be painted shall be coated all over at the mill with a priming coat. Before erection, the surfaces to be concealed shall be painted one additional primer coat. After erection, all exposed surfaces shall be painted one undercoat and one final coat.

11.10 Woodwork noted stained or natural on drawings and schedules, shale be stained with permanent non-fading colors to match approved samples. Before staining is started, the face of all woodwork shall be put in proper condition to receive it. All stained woodwork shall be sanded and painted one full coat of clear sealer as specified. Surfaces shall then be varnished with two coats of satin varnish sanded between coats as necessary to procure a perfectly smooth stain finish. Except as otherwise noted, all wood doors and interior wood trim shall receive stain and varnish finish.

12. SCHEDULE OF FINISHES

12.1 Surfaces to be painted (for extent of work, see "Work Included") shall be given the following types of finishes. All such surfaces which are not listed in "Work Not Included" shall be given a painter's, even though such surfaces are not mentioned hereinafter; the finish to be used shall be as specified for similar materials in similar locations. The finishes specified shall be in addition to any prime coats or undercoats specified shall be in other sections of these specifications. Colors of undercoats shall be similar to the final coat; however, they shall differ sufficiently from the final coat to permit inspection by the Architect.

12.2 EXTERIOR PAINTING: Unless otherwise directed, the paint shall be applied in the following number of coats:

a) Concrete block walls - emulsion blockfiller and one coat of masonry paint;
b) Exterior wood - one coat wood primer and two coats exterior enamel;
c) Exterior ferrous metal - one coat red primer and two coats exterior enamel (delete primer on shop primed drawings);
d) Wood trim, doors and windows - wood primer and two coats of exterior enamel;
e) Exterior door frames shall be primed before setting. All exterior wood work shall receive the prime coat before being put in place;
f) Galvanized metal - one coat of galvanized steel primer and one coat of metal protective paint.
g) Provide line painting of parking areas in accord with the layout on the site plan. Lines shall be white, 3" min. wide and consists of one coat of PPG Traffic and Zone Marking paint. Line painting shall be machine applied, straight, true and uniformly spaced.

12.3 INTERIOR PAINTING: Unless other wise directed, the paint shall be applied in the following number of coats:

a) Plaster walls and ceilings - one coat of primer-sealer and two coats of flat acrylic latex wall paint;

b) Drywall - one coat of acrylic latex primer-sealer and two coats of flat acrylic latex wall paint;
c) Interior concrete masonry:
   1) All other CMU - one coat of blockfiller and two coats flat latex.
d) Interior ferrous metals - same as for exterior;
e) Interior woodwork (other than Paragraph 11.10 herein before) - one coat primer and two coats enamel;
f) Epoxy paint on drywall or concrete masonry where noted on Room Finish Schedule on the Drawings:
   1) One coat Pratt Lambert Vinyl Acrylic Wall Primer
   2) Two coats Pratt Lambert 'Tech-Guard' Water Borne Epoxy (Satin)

13. CLEANING AND TOUCH-UP

13. At the end of each day, the Contractor shall place in covered metal containers, or destroy, all cloths, waste and refuse which have been used in the application of inflammable paint materials. At completion of work, all staging, scaffolding, containers and debris shall be removed from the premises, leaving all painting in perfect and clean condition. Touch-up and finish any part of the work requiring sane after all other trades have finished repairing any damage to the work. Upon completion, leave the work clean and free from blemishes. Hardware, tile, marble and similar materials shall be thoroughly cleaned of all paint to the satisfaction and approval of the Architect.

SECTION 1510
MECHANICAL, BASIC MATERIALS & METHODS

1. GENERAL

1.1 This section encompasses products, assemblies and methods as listed below and as necessary to complete all installations particularly specified in other corresponding section of the specifications.

1.2 All applicable provisions of "General Conditions", "Supplementary General Conditions", "Special Requirements" and "Special Conditions" form a part of this section of the specifications.

1.3 In general, the drawings for mechanical work shall be considered diagrammatic, showing the location, type and fittings and accessories for proper installation of the complete work.

1.4 The Contractor shall be familiar with the construction site and anticipate the conditions under which he will be obligated to work. No allowance will be made in this respect for any error or misinterpretation.

2. PRODUCTS

2.1 Within 30 days after the date of the contract, the Contractor shall submit for the Architect's approval a complete list called the "Material Schedule" showing the products he proposes to use in the project. Do not order any materials prior to receiving such approval.

2.2 It shall be the decision of the Architect to accept or reject any later proposals for substitution.

2.3 All materials shall be products by nationally recognized manufacturers.

2.4 Unless directed differently on the plans or prohibited by local codes, the piping materials in compliance with the articles below shall be at the discretion of the Contractor. The piping materials and installation shall comply with prevailing local rules and regulations.

a) Storm lines below ground inside the building lines and 5'-0" beyond shall be schedule 40 P.V.C.. Outside the building, lines shall be schedule 30 P.V.C. except under walks or drives where schedule 40 P.V.C. shall be used.

b) Sanitary drain, waste and vent piping in the building shall be schedule 40 P.V.C.. Sanitary piping outside building shall be schedule 40 P.V.C. except as otherwise indicated on the drawings or required by local codes.

c) Waste piping and fittings exposed below fixtures in toilet rooms and in other finished areas shall be chromium plated brass. Provide matching escutcheons at floor and wall penetrations.

d) Water service piping below ground and under concrete floors shall be galvanized steel pipe, wrought iron pipe, or type K copper tubing. Water distribution piping shall be galvanized steel pipe or wrought iron pipe or copper type L for above ground installations and type K for below ground. Water supply pipes to fixtures and waste pipes from fixtures shall be centered in the proper place relative to the center line of the fixture. No off-sets will be allowed. All pipes shall be run mechanically straight and square with building lines, except for required pitch on horizontal lines, and all changes in direction shall be made with fittings. Water piping to be routed in walls, above suspended ceilings, or in crawl spaces unless otherwise noted. Where water lines must be routed under the floor slab, no joints are to be made under this slab.

e) NATURAL GAS PIPING: Type: Black steel, schedule 40, rolled seamless, suitable for painting without prior preparation. Where called for, pipe to be primed coated for enamel finish. For above ground installations, all fittings to be jointed with Teflon Tape Seal or other suitable seal and made in conformance with the best practices of AGA and NFPA 54. Unions shall be cast black iron and installed in a manner such that little or no stress will be placed on the male-female sealing surfaces. Proper alignment will be made at time of installation. All joints and connections shall be thoroughly cleaned of oil, thread cutting and residuals to accept enamel paint. Rough or sharp exposed thread surfaces shall be filed smooth. Testing shall be as outlined under Section 1540, paragraph 4, Tests.

Fittings: Malleable iron, standard weight, black.

Pipe shall be installed in accordance with NFPA 54 for natural gas systems.

f) PROPANE GAS PIPING: Where propane tanks are required, install underground pipe from tanks to building of size and type as shown on site plan. Pipe and tanks shall be installed in accordance with NFPA 58.

All fittings under 1/2" to be Compression-Ferrule type or flared with locking nut (flareless bite type not permitted). Underground piping past the reducing station shall be run in schedule 40 steel pipe, as specified in ANSI B36.10, in a continuous run. Pressure regulating valves, gauges and shut-off valves shall be installed in a readily visible location. Sleeves shall be required through floors, footing and walls and shall be of schedule 40 black steel pipe sized to accommodate the gas line. Where fittings are brazed, both fitting and tubing shall be thoroughly cleaned of copper oxide and flux with a suitable caustic cleanser. Testing procedure shall be as outlined under Section 15A, paragraph 18, Tests. If frosting of the propane line is anticipated, appropriate insulation shall be applied. Install propane energizers where required.

Gas Valve: Style: #80-101 to 108 U/L listed, bronze body, glass filed Teflon bearing, Teflon seat repackable while under pressure, level handle, rated #250 gas or LPG.

2.5 Fittings, unions and other jointings in the piping shall be of materials compatible with the material of the pipe line. Jointing of copper to steel or copper to iron pipes shall be done with copper alloy unions or copper alloy flanges.

Jointing and caulking compounds, gaskets and other jointing materials to be of types recommended by the manufacturer of the pipes. Where coating is required, use black bitumen solution of cold application.

Jointing of copper tubing and pipe shall be done by methods and with materials prescribed by the pipe manufacturer.

2.6 Supports: Hangers, brackets, clamps or clips of compatible material shall be used for anchoring the piping to wall or ceiling construction. Anchors shall be suitable for the location and designation to withstand five times the anchor load. Submit catalog cuts or samples for the Architect's approval.

2.7 Valves: Gate valves, check valves and globe valves shall be installed where specified or where necessary for proper operation of the system or equipment. Non-slamming check valves shall be installed if recommended by the manufacturer of the equipment, whether shown on the drawings or not. Valves 1-1/2" and smaller size shall be bronze; 2" to 3" shall be bronze or cast iron; valves 4" and larger size shall be cast iron. Submit samples for the Architect's approval.

2.8 Identification: All piping shall be identified by identification markers stenciled or applied after piping insulation and painting is completed. The marking shall have an arrow indicating the flow. Identifications shall be no more than 30 feet apart and at controlling valves.

3. EXECUTION

3.1 All work shall be installed by experienced mechanics and according to the rules of the trade. The Contractor shall verify the field dimensions and install his items with the necessary clearances for his work and for the work of other trades.

3.2 Pipework below ground: The plumbing contractor shall do all excavating and backfilling for his work. Excavate immediately before laying pipes. Remove mud and rock projections. Harden soft spots by tamping in bedding material. Lay pipes singly, straight to line, and true to gradients. Lay bell and spigot pipe with barrel of the pipe resting evenly on the ground. Cut holes for the bells.

3.3 Make all connections and jointing according to the established methods and pipe manufacturer's recommendations.

3.4 Prevent entry of foreign matter into any part of the piping system by sealing openings during construction.

3.5 Lay water service pipe on solid ground below frost line (42" min. bury). Service pipe may be laid in the same trench with the sewer pipe, provided it is laid on a shelf at least one foot above the sewer pipe. Install gas service pipe in a separate trench.

3.6 Before backfilling conduct all tests in accordance with National Plumbing Code and local ordinance regulations. Notify the Architect prior to conducting testing so that the Architect's representative may be present.

3.7 Backfill pipe trenches with clean selected fill and compact by hand tamping. Do not lay pipe on cinders or use for backfill.

3.8 Pipework above ground: Install piping without critical damage to the structural members. No notching, cutting or drilling over 2" shall be done without permission of the Architect. Install piping properly sloped and protected from freezing. Install connections to risers and fixtures in a manner permitting the entire system to be drained at low point.

3.9 Exact location of piping, conduits, ductwork and fixtures shall be coordinated between subcontractors to avoid interference. Generally, run piping parallel with building lines. Water supply for drinking shall be from rising main.

3.10 Install different service pipes, valves, fittings, etc., so that after the covering is applied, there will be not less than 1/2" clearance between the covering and the other work.

3.11 Install gas service and gas piping in accordance with local ordinance and local gas company requirements.

3.12 Pipe supports and hangers shall be so placed as to prevent sags and insure proper drainage. Do not place hangers more than 10 feet apart unless a greater spacing is indicated on the drawings. A hanger shall be placed within one foot of each horizontal elbow. Vertical runs of pipe shall be supported not over one foot from the elbows on the connecting horizontal runs.

3.13 Install cast iron sleeves through all walls where pipe passes below grade. Caulk openings watertight. Install galvanized steel sleeves where pipe passes through interior masonry walls and floor slabs. Sleeves shall be of sufficient size to accommodate pipe covering and fitted with nickel plated escutcheons.

3.14 Install cleanouts on the horizontal sewer pipe at such intervals that the entire system can be rodded: on horizontal runs on more than 50 feet apart, at the base of all stacks, and at changes in direction.

3.15 Place a union at all pieces of equipment in order that such equipment may be readily disconnected. No union shall be placed in a location which will be inaccessible after completion of the building.

3.16 All excavation under this Contract is classified earth excavation. Claims for extra compensation on account of subsurface conditions encountered will be based upon unit prices stipulated by the Contractor on the bid form.

SECTION 1540
PLUMBING

1. GENERAL

1.1 All applicable provisions of "General Conditions", "Supplementary General Conditions", "Special Conditions" and "Special Requirements" and Section 1510 form a part of this section of the specifications.

1.2 It is intended under this contract to provide a complete and operating plumbing system as shown on the drawings, or hereinafter specified.

1.3 Obtain water, sewer, gas taps and any other required utilities and extended service from same to the building as shown on the drawings. Visit the site for understanding of the work to be done before submitting a bid.

1.4 Coordinate this work with the work of the other trades on the project. All plumbing is to be roughed in while the building is being constructed at such times as not to delay the General Contractor on the building.

1.5 The work covered by this section of specifications consists of the following installations:

a) Soil, waste and vent piping and connections to the sewer or to individual sewage disposal system. Rainwater conductors, unless scheduled to be installed by others.
b) Hot and cold water and gas piping. Water service and gas service to the building.
c) Valves, traps, cleanout drains and hose bibs.
d) Roof flashing for vent piping.
e) Installation of all plumbing fixtures and accessories.
f) Installation of domestic hot water heater.
g) All excavation and backfill for plumbing lines.
h) Topsoiling and seeding of all areas disturbed by the Plumbing work.

2. GENERAL REQUIREMENTS

2.1 Comply with all federal, state and local requirements, codes, rules and ordinances governing work of this character and obtain all permits and pay fees for same as required.

2.2 Perform all necessary excavating and backfilling required for this installation. All excavation under this contract shall be classified earth excavation. The Contractor shall stipulate unit prices for rock removal in the appropriate spaces on the Bid Form. Prepare a proper bed of sand or gravel or equivalent in rock screenings so as to eliminate shimming and void spaces under any of the utility service pipes. Bending of any hard pipe will not be permitted. All excavation below the bottom of footings shall be backfilled with 2000 psi concrete. Other backfill shall consist of 2-3 inches of sand or rock screenings and earth to a final level equal to its original condition. In the event the backfill should settle before the final top surface is applied, apply additional backfill to sustain the original level. Care should be taken to minimize the dust level when excavation and backfilling so as to comply with federal and state E.P.A. regulations relating to this type of work (Fugitive Dust).

Provide and install all plumbing fixtures shown on plans and hereinafter specified. Provide and install soil, waste and vent piping for all fixtures requiring same. Provide cold and hot water lines to all fixtures requiring same and rough-in for each piece of equipment requiring plumbing furnished by others and connect those as designated on plumbing plans and equipment specifications.

Pay for and obtain necessary certificates of inspection.

All materials shall be new and of the quality indicated by the specified brand names. Substitutions of material of equal quality by other first-line manufacturers may be acceptable provided a list of such substitutes is approved in writing by the Architect. A substitutions list shall be submitted in triplicate within five (5) days after the contract is let.

2.3 DRAWINGS: The plumbing plans are diagrammatic only and are not intended to show all fittings and details of the work. The location of the piping runs are approximate and the Contractor must make any necessary changes in the piping runs, etc., at no additional cost to the Owner. Coordinate this work with the installers of equipment furnished and installed by others. Refer to the drawings for details of the building construction and the other mechanical features.

2.4 COORDINATION AND WORKMANSHIP: Schedule this work so that it will be properly coordinated with all other trades. Workmanship shall be in accordance with the best practice for the class of work involved. Workmanship shall allow the appliance to operate as intended and present a neat and orderly appearance.

3. MATERIALS AND PERFORMANCE

3.1 Piping materials shall be as specified in Section 1510, "Mechanical, Basic Materials and Methods".

3.2 ESCUTCHEONS: Provide chrome plated escutcheons on all pipes passing through walls, floors or ceilings of finished rooms. Provide escutcheons on all waste lines from plumbing fixture, whether through walls, floors and whether concealed or exposed.

3.3 INSULATION: Insulate all cold and hot water piping. Insulate all underground piping to frost line depth. Insulate all roof drains being routed inside building.

3.4 PLUMBING fixtures: Furnish and install plumbing fixtures as scheduled on the drawings with all accessories and trim as listed. All fixtures shall be protected through the course of the construction. Any fixture damaged shall be replaced without additional expense to the Owner. Submit catalog cuts on all equipment items.

3.5 CONNECTION TO OTHER FIXTURES: Connect gas lines to heating and air conditioning units requiring same. Connect roof drains as installed by the General Contractor when required by the drawings. Connect service piping, including but not limited to water, drain and gas pipes, to food service equipment as indicated in equipment specifications.

3.6 Furnish and install a complete domestic hot water system as shown on the drawings. Provide P.V.C. or G.I. "safe-pans" under water heaters located above ceilings, or floors or on floors above occupied spaces. "Safe-pans" shall be piped to drain. Pipe T. & P. valves to floor of "safe-pans". Provide additional field-applied insulation to water heaters where called for on the drawings.

3.7 Provide electrical disconnects for all plumbing items requiring same. Final electrical connections shall be by the Electrical Contractor.

3.8 Coordinate the water service installation with the utility company or authority as to service taps piping, valving and metering and do all work and pay all costs related to same as required to complete the installation.

3.9 Provide shut-off valves to all water closets and to other fixtures as noted on the plans.

3.10 Furnish and install a complete system of gas supply including piping, connections to the gas company's tap, connections to all gas fired equipment with all necessary valves, cocks and other accessories needed for a complete installation. Coordinate this work with the utility company.

3.11 Provide frostproof type exterior sill faucets at locations indicated on drawings.

3.12 If normal street water pressure exceeds 80 psi, install a pressure reducing valve to reduce water pressure to not more than 80 psi.

3.13 Install cleanouts and floor drains at all locations shown on plans.

3.14 Install all fixtures securely supported so that no strain is placed on the connected piping.

3.15 Furnish, where required, vent flashings, to the General Contractor for installation into the roofing. These items shall be compatible with the roofing into which they are to be installed and shall be approved by the Architect. Make all final plumbing connections to same.

3.16 Provide disconnects with fuses for all pumps, ejectors, water heaters and like items. Provide motor starters for equipment requiring same. Furnish and install any signal devices or alarm systems including low-voltage wiring which are required by equipment furnished under this section.

3.17 Where access panels are required to access piping, valves or equipment, the Mechanical Contractor shall furnish same to the General Contractor for installation in the work

3.18 Any cutting or patching of existing work required by the Mechanical Contractor shall be performed by him and patched, repaired or restored to match original adjacent surfaces, including painting.

4. TESTS

4.1 DRAINAGE AND VENT PIPING: Drainage and vent piping shall be tested before the plumbing fixtures are installed by capping the openings and filling the entire system with water and allowing it to stand thus filled not less than one hour. Inspect water level to determine if piping is tight.

4.2 GAS PIPING: In lieu of local requirements, gas piping shall be filled with compressed air to 150 psi and held for a period of four hours. Each joint shall be checked by liquid soap or special liquid chemical for leaks.

4.3 CLEANING UP: Clean all plumbing fixtures and equipment thoroughly before final inspection, leaving all ready for use.

4.4 EXTENDED WARRANTY: Warrant in writing any equipment or materials used in the installation having an extended warranty as offered by the manufacturer. Provide new or rebuilt assemblies for any such equipment or materials which fail during this period to the site and install at no additional cost to the Owner.

4.5 OWNER'S MANUAL: Provide the Owner, at the completion of this contract, with an "Owner's Manual" so labeled. The manual shall consist of a three-ring loose-leaf binder containing all printed matter such as: guarantee cards, cleaning instructions, notices to the Owner, operating manuals and maintenance instructions, that may be contained in the shipping cartons of equipment and architectural specialties.

SECTION 1550
HEATING, VENTILATING AND AIR CONDITIONING

1. STIPULATIONS

1.1 Applicable requirements of the "General Conditions", "Supplementary General Conditions", "Special Conditions", "Special Requirements" and Section 1510 shall be considered part of this section and shall have the same force and effect as if printed herein in full.

2. WORK INCLUDED

2.1 The work covered by this section of the specifications consists in furnishing all labor, materials, equipment and appliances and in performing all operations in connection with the installation of heating and ventilating, complete, in strict accordance with this section of the specifications and applicable drawings.

2.2 Work under this section includes, but is not necessarily limited to:

a) Furnishing and installing the following:
HVAC Equipment and Curbs
Concrete equipment pads
Duct Installation and Duct Work for HVAC Systems
Registers and Grilles
Controls and Control Wiring
Refrigerant Work, Piping and Insulation

b) Exhaust fans and ducts for ventilation where required by the plans.

c) Excavation and backfill related to the installation of HVAC

3. GENERAL REQUIREMENTS

3.1 All work under this contract shall be accomplished in strict accordance with federal, state and local codes. Where these plans and specifications are in conflict with such codes, the codes shall govern.

3.2 Pay for and obtain necessary construction permits and certificates of inspection required by agencies or authorities having jurisdiction.

3.3 All materials shall be brand new and of the quality indicated by the specified brand names. Substitutions of material of equal quality by other first-line manufacturers may be acceptable provided a list of such substitutions list is approved in writing by the Architect. A substitutions list shall be submitted in triplicate within five (5) days after the contract is let.

3.4 INTENT: The intent of these specifications and the accompanying drawings are to convey, as reasonably as possible, the requirements for the completion of the job enabling the building to be ready for operation. Take this into consideration and include in your bid, such allowance for contingencies as to provide for minor pieces of equipment and labor, not specifically indicated but required, for the job to operate properly, at no additional cost to the Owner. This paragraph is not intended to hold the Contractor responsible for the design, or to require him to furnish equipment not remotely indicated, but to insure that a complete job will be provided without requests for minor "extras".

3.5 COORDINATION: Coordinate work with other trades. Locations shown are approximate. Refer to the architectural plans for exact measurements in the placement of equipment, fixtures, outlets etc. Where the locations are not clear, obtain the exact location from the Architect and field verify. The plans do not give exact details as to elevations and locations of various pipes, fittings, ducts, conduit, etc., and do not show all offsets and other installation details which may be required.

3.6 SHOP DRAWINGS: Shop drawings shall be submitted on all major items of equipment. These may consist of manufacturer's standard catalog or tearsheets, and shall have the exact item being offered clearly identified, and the submittal shall be identified with the project.

4. REMOVAL OF RUBBISH

4.1 Periodically and at the completion of the work contemplated under these specifications, the HVAC Contractor shall remove from the building all rubbish and accumulated materials of whatever nature not caused by other trades, and shall leave the work in a clean, orderly and acceptable condition.

5. RESPONSIBILITY FOR DAMAGE

5.1 The HVAC Contractor, at his own expense, shall make good, to the Architect's satisfaction, any damage to his work incurred by the action of the elements or any other cause due to neglect on the part of the HVAC Contractor or his representative.

6. MATERIALS AND EQUIPMENT

6.1 All material and equipment to be furnished under this contract shall be new and shall conform to the grade, quality and standards specified herein. Major items of equipment shall be the latest standard product as advertised in printed catalogs by reputable manufacturers for the purpose intended and shall have replacement parts available.

6.2 All equipment or apparatus of any one system must be the product of one manufacturer, or equivalent products of a number of manufacturers which are suitable for use in a unified or assembled system.

6.3 Equipment shall be installed in strict accordance with the manufacturer's instructions for type and capacity of each piece of equipment. The HVAC Contractor shall obtain these instructions from the manufacturer and such instructions shall be considered a part of these specifications. Type, capacity and application of equipment shall be suitable and capable of satisfactory operation for the purpose intended.

6.4 Rotating parts shall be fully enclosed or properly guarded. Protection facilities shall comply with Federal, State and Local regulations.

6.5 Provide legs or supports for outdoor condensing units which will support the unit eight inches clear of concrete pads to prevent ice or snow built-up which would interfere with operation of the unit. Refrigerant piping to condensing units shall be run concealed to the fullest extent possible and shall not be jointed in concealed or unaccessible spaces. Insulation or refrigerant piping shall be in accord with the unit manufacturer's specifications.

6.6 Provide P.V.C. condensate piping from fan/coil units to grade. Where location of fan/coil prohibits gravity-type drainage, provide individual condensate lift pump to achieve drainage.

All fan/coil units shall be equipped with filter racks and filters except as specifically noted otherwise on the drawings.

7. MATERIAL AND EQUIPMENT SCHEDULE

7.1 As soon as practical, and within thirty (30) days after the date of contract, and prior to installation of any equipment or materials, a complete schedule of equipment and material proposed for installation shall be submitted for the Architect's approval.

8. STANDARD OF QUALITY

8.1 All materials shall be strictly in accordance with the quality, style and sizes as specified herein. Manufacturer's names and plate numbers are given in the specifications for the purpose of establishing a standard of quality, style, size and type and shall not be construed to exclude equipment or material of other manufacturers.

8.2 When the Contractor elects to substitute materials or equipment other than that specified, the Contractor will be held responsible for all structural, mechanical and electrical changes required for their installation of substituted materials at no additional cost to the Owner. All changes shall be subject to architectural, mechanical, electrical and structural engineer's complete approvals.

8.3 When the Contractor desires to furnish equipment of another manufacturer, he shall include a complete specification of the substituted item along with each submission copy of shop drawings indicating the necessary modifications to his standard product to satisfy the requirements of the contract specifications. Manufacturer's specifications shall be written as close as possible over the contract specifications.

9. REGULATIONS

9.1 The entire installation shall conform with all pertinent codes and regulations and local municipal, county and state authorities, the National Board of Fire Underwriters, the National Electrical Code and other regulatory bodies having jurisdiction over this class of work. Where applicable, materials and equipment shall bear stamps or seals of the NBFU, ASME, AMCA, NEMA, AIBE and other recognized regulating agencies. All wiring shall be in accordance with the electrical specifications of this project.

10. PERFORMANCE OF EQUIPMENT

10.1 All materials, equipment and appurtenances of any kind shown on the drawings, herein specified or required for completion of the work in accordance with the intent of these specifications, shall be completely satisfactory and acceptable in operation, performance and capacity.

10.2 All moving parts of equipment and appurtenances shall be properly lubricated by the HVAC Contractor and shall be started up and tested by him. Belts shall be inspected and properly field adjusted for tension.

10.3 Mechanical equipment shall be provided with isolation mounting and boots so as not to transmit objectionable vibration to the building structure or ductwork and piping.

11. ELECTRICAL CONNECTIONS

11.1 This Contractor shall furnish and install line starters, magnetic controls, start and stop switches, and thermal protection for all equipment furnished under this section.

11.2 The HVAC Contractor shall furnish and install disconnect switches for all equipment furnished under this section, and shall provide all controls and control wiring for same.

11.3 The Electrical Contractor shall complete all electrical connections to the disconnect. He shall be responsible only for final connections.

11.4 All electrical work, equipment and materials furnished under this section shall be installed in accordance with the National Electrical Code and local code requirements.

12. FINISH AND ACCESSORIES

12.1 The HVAC Contractor shall carefully investigate the structural work and all finish conditions affecting his work. He shall arrange his work in accordance with such conditions furnishing all accessories to meet such conditions. Care must be taken in areas where revisions to existing equipment occur.

12.2 Grille and registers shall be supported from the building structural elements and shall not impart any load to ceilings or ceiling systems.

13. ANCHORS

13.1 Wrought iron or steel anchors shall be provided on all piping where shown on the drawings or as may be required for the proper control of the stress in the piping due to expansion. These anchors must be made of material of heavy cross sections and securely fastened to the building construction by anchor bolts set in concrete before pouring, or attached to the structural steel framing of the building in an approved manner.

14. SLEEVES

14.1 All pipes passing through masonry construction shall be fitted with sleeves. Each sleeve shall extend through its respective floor, wall or partition and shall be cut flush with each surface unless otherwise required. Except where otherwise specified or shown, sleeves shall be two pipe sizes larger than the pipe when uncovered and of sufficient size to allow for the covering without binding.

14.2 Sleeves through exterior walls below grade shall have the space between pipes and sleeve caulked watertight.

14.3 Penetrations thru floor and rated wall assemblies by piping and/or ductwork shall be sealed with firestopping materials as approved by the Architect.

15. ACCESS PANELS

15.1 Furnish and install access panels not smaller than 12" x 16" for access to concealed valves, P-traps, clean-outs, steam traps, unions, expansion joints, dampers and/or smoke detectors in ductwork and related items, where no other means of access is provided.

16. UNIONS

16.1 No union shall be placed in a location which will be inaccessible after completion of the building unless so shown on the contract drawings or so specified.

16.2 Unions shall be installed adjacent to all equipment and wherever their use will facilitate easy removal of equipment for repair and replacement.

17. HANGERS, SUPPORTS AND FASTENINGS

17.1 All piping shall be arranged to maintain the required pitch and provide for proper expansion and contraction.

17.2 All pipe lines shall be rigidly and firmly installed to prevent swaying, vibrating and sagging.

18. PIPING

18.1 All pipes shall be cut accurately to measurements established at the building and shall be worked into place without springing or forcing, properly clearing all windows, doors and other openings. Excessive cutting or other weakening of the building structure to facilitate piping installation will not be permitted. Threaded pipe shall have full clean-out threads. All pipes shall have burrs removed by reaming. All pipe shall be so installed as to provide proper drainage and to permit free expansion and contraction without causing damage. All changes in direction shall be made with fittings. All open ends of pipe lines and equipment shall be properly capped or plugged during installation to keep dirt or other foreign matter out of the system. All pipe shall be thoroughly cleaned before erection and, if necessary, must be cleaned after erection to remove any foreign material.

18.2 Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings, valves or similar items, which may be required to make a complete operating system. The drawings are generally diagrammatic and indicative of the work to be installed. The HVAC Contractor shall carefully investigate all conditions affecting his work and shall install his work in such a manner that interferences between pipes, conduit, ducts, equipment, architectural and structural features will be avoided, and shall furnish and install all such offsets, fittings or drips as may be required to meet the conditions at the building, so as to avoid such interference without additional cost to the Owner.

18.3 Insulation shall be applied over clean, dry pipe with all joints butted firmly together.

18.4 Where pipes are located in wall chases and space does not permit the installation of sectional covering, the pipes may have the covering omitted, provided the chases are packed full of mineral or rock wool.

19. VALVES

19.1 The HVAC Contractor shall furnish and install all valves shown on the drawings and specified herein. All valves and check valves are not shown in every instance on the drawings, but, whether shown or not, all valves and check valves necessary to the proper operation of the system shall be furnished and installed by the HVAC Contractor. A valve shall be placed where each branch leaves the main and at such other points as required for the proper control and shut-off of all lines.

19.2 Valves offered under these specifications shall be limited to products of type regularly produced and recommended by the manufacturer for the services intended and capacities required. All capacities, ratings and service recommendations shall be in accordance with the manufacturer's latest catalog and engineering data, or other literature made available by the manufacturer to the public and in effect at the time of opening bids.

20. DUCTWORK

20.1 The HVAC Contractor shall furnish and install all ductwork as shown on the drawings. All ductwork shall be done in a first class workmanlike manner, free of dents and all seams shall be air tight and free from raised or uneven edges. Ductwork shall be fabricated in accord with current SMACNA and ASHRAE Specifications.

20.2 Provide sheet metal ductwork as follows:

DUCTWORK GAUGES

All ductwork shall conform in gauge with this table.

Duct size Long Size	Thickness U.S. Gauge Gal. Steel	Inches
Up to 30"	24	.025
31" to 60"	22	.031

20.3 Horizontal rectangular ducts generally shall be supported by 1" x .109" band hangers on 8'-0" max. spacing.

20.4 Use 90 degree turning vanes in all elbows of supply ductwork. Vanes to be properly spaced in accordance with the ASHRAE Guide.

20.5 Balancing dampers shall be built of 20 gauge metal. Blade to be riveted, or welded to square rod or assembled on fabricated pivots. Locking quadrant shall be on accessible area of duct. Locking quadrant damper to have exterior handle similar to H & C kwik set.

20.6 Flexible connections shall be maximum 3" wide, of fireproof material and used to isolate noise and vibration between equipment and ductwork on supply and return side of all units.

20.7 Round run-outs, where used, shall be built in accordance with SMACNA and ASHRAE standards. Each run-out shall have manufactured side take off and adjustable quadrant damper mounted in a round collar. Quadrant damper to be 20 gauge metal and easily adjustable manually. Quadrant damper to have exterior handle similar to H & C kwik set.

Flex duct runs may be used only on diffuser take offs or where specifically indicated on the drawings. These shall run as straight and direct as possible and shall not contain any right angles or "S" bends. Flexible round duct shall be as manufactured by CertainTeed or equal as approved by the Architect.

20.8 Ductwork run below grade shall be Perry FRP duct #20S or #20S-IRT as indicated, or equal approved by the Architect, fiberglass reinforced plastic duct installed in strict accordance with the manufacturer's specifications.

20.9 All supply and return ductwork in unconditioned spaces shall be insulated to a valve of R-6. All ductwork exposed to the exterior, i.e. outside the insulated building envelope shall be insulated to a value of R-8.

Duct insulation shall be Owens Corning ‘Fiberglass Duct Wrap’ Type 75 (0.75 pcf) or approved equal in thickness as requried to achieve an installed ‘R’ value as specified (2”=R5) (3”=R8) and in compliance with ASTM C 1290.

Ducts which are exposed in finished spaces shall be lined in lieu of external insulation. Duct lining shall be AP Armaflex 'SA' black duct liner or approved equal, 1" thich (R=4.2) installed in accordance with manufacturer's specifications.

21. ELECTRICAL

21.1 Furnish and install all controls, control wiring, motor starters, relays and disconnect switches, including power wiring on the equipment side of the disconnect switch. The Electrical Contractor shall wire and connect to the disconnects and to motors and items not requiring disconnects.

21.2 Verify power wiring and breaker sizes with the Electrical Contractor. Costs due to changes resulting from availability or substitutions of equipment shall be borne by the HVAC Contractor.

22. ROOF CURBS

22.1 The HVAC Contractor shall furnish roof curbs for his equipment requiring same, as called for on the drawings. Curbs shall be installed and flashed into roofing membranes by the General Contractor.

23. TESTING AND ADJUSTING OF HVAC SYSTEM

23.1 Upon completion of the installation, the project shall be tested and adjusted as follows:

1) Adjust fan drives to get required and rated cfm and specified RPM.
2) Take anemometer readings at supply outlets, return inlets and exhaust systems to achieve specified cfm.
3) Adjust entire temperature and fan control sequence.
4) Adjust the entire installation as to minimize noise and vibration from fans, compressors, starters and relays.
5) Eliminate any duct pulsation by use of stiffeners, flexible connections or additional supports as required.
6) Correct any equipment or component which is generating objectionable noise in the opinion of the Owner or Architect.
7) Balance HVAC system, both exhausts and air conditioning so building is under a positive pressure.

23.2 The initial "start-up" and testing of heat pump HVAC system shall be under the direct supervision of "factory personnel" and a written report furnished in triplicate to the Architect. "Factory personnel" shall be a person normally and regularly employed by the equipment manufacturer on a full-time basis.

23.3 All persons employed by the HVAC Contractor in the work of installing equipment and controls shall have a minimum of five years experience in work of this kind.

23.4 All instruments and appliances required for tests shall be furnished by the Contractor.

23.5 Settings of dampers, splitters and other volume adjusting devices shall be permanently marked so that they can be restored if disturbed.

24. REFRIGERANT PIPING

24.1 Piping to be hermetically sealed and pre-charged tubing with 0 ring seals as provided by the refrigerant equipment manufacturer with adequate foamed neoprene insulation. Charge and test system for leaks using micron gauge and leak detector to insure against leaks and proper evacuation prior to charging. Do not exceed manufacturer's recommended charge schedule.

25. FANS

25.1 Power Exhausters: Contractor shall furnish and install exhausters as indicated on the drawings. This work shall be limited to that shown or specified on the HVAC Drawings and shall not include toilet room exhausters. Exhausters and make-up-air fans for kitchen hoods are by others.

25.2 All fans shall be quiet in operation and free from objectionable vibration. Each fan shall be suitable for the space available and shall be installed without damage to the building equipment, or the fan.

26. CLEAN UP

26.1 After completion of the work and before final inspection, clean HVAC equipment.

27. OPERATOR'S MANUAL AND DIAGRAMS

27.1 Prepare in two copies, a manual describing the proper maintenance and operation of the system. This manual shall not consist of standard factory printed instructions, although these may be included, but shall be prepared to describe this particular project.

27.2 The manuals shall be bound, indexed, dated and signed by the HVAC Contractor. One copy shall be sent to the Architect and the other to the Owner.

27.3 Qualified representatives of the HVAC Contractor shall meet with the designated representatives of the Owner. The Owner's representative shall be instructed in the proper operation and maintenance of the control system.

28. GUARANTEE

28.1 Materials and workmanship shall be guaranteed for one year from date of completion. In addition, motor compressors shall bear a non-pro-rated 5-year factory warranty.

29. SERVICE ACCESS

29.1 Provide service access as required in manufacturer's installation instruction. If such access is not available, notify the Architect and attempt to see if necessary changes can be worked out with other trades. If not, do not install equipment which does not meet manufacturer's requirements for accessibility. In no case bid, submit or install equipment in situations that do not meet that manufacturer's warranty requirements.

30. EXCAVATION

30.1 The HVAC Contractor shall perform all excavation and backfill work required to install underground ductwork and related items as indicated on the drawings and herein before specified.

30.2 All excavation under the Contract is classified earth excavation. Claims for extra compensation on account of subsurface conditions encountered will be based upon unit prices stipulated by the Contractor on the Bid Form in the spaces provided.

30.3 Trenches and related excavation under this contract shall be backfilled in layers not to exceed 12" in depth with each layer properly tamped. Disturbed areas shall receive 6" minimum topsoil seeded and maintained until lawn is re-established.

SECTION 1600
ELECTRICAL

1. GENERAL

1.1 All applicable provisions of "General Conditions", "Supplementary General Conditions", "Special Conditions" and "Special Requirements" form a part of this section of specifications.

1.2 All work done under this section of specifications shall comply with the National Electric Code and the local code regulations. The Contractor shall perform all work in conformity with these requirements whether or not such work is specifically shown on the drawings.

1.3 SCOPE: The extent of work shall be as shown on the drawings. Performance shall meet the requirements of the specifications. The work covered by this section of specifications consists of the following:

a) Furnishing and installing feeders, panel boards, branch circuit wiring, wall switches, receptacles, outlet boxes, plates, conduits, wire, as all shown on the drawings and called for in this specification.
b) Furnishing and installing complete wiring for motors, exhaust fans, and pumps as shown on the drawings.
c) Furnishing and installing line voltage connections for heating and air conditioning equipment.
d) Furnishing and installing lighting fixtures as shown on the drawings.
e) Provide all fastenings, supports , hangers, anchor bolts, inserts and sleeves required for a complete installation.
f) Furnish access panels where required to the General Contractor for installation.
g) Provide electrical service to the building as indicated on the drawings. The Electrical Contractor shall contact the Utility Company to determine the scope of work to be performed by the Utility Company. All work not performed by the Utility Company shall be included in the electrical contract. All fees charged by the utility Company to provide new service shall be paid by the Owner.
h) Provide underground conduit for telephone service to the building as required by the utility company.
i) Provide emergency lighting and fire alarm system where required by the drawings.
j) Provide, where required by the drawings, electric resistance heat.
k) Provide all excavation, backfill, topsoil and seeding of areas disturbed by the work of this Contract.

2. MATERIAL AND EQUIPMENT

2.1 Major items of equipment shall be the best grade and quality used for the purpose in commercial practice and shall have the manufacturer's name, address and catalog number on a plate securely affixed in a convenient place. All electrical equipment or apparatus of any one system must be the product of one manufacturer, or equivalent products of a number of manufacturers, which are suitable for use in a unified system.

2.2 Where applicable, all materials and equipment shall bear the label of approval of the Underwriters Laboratory, Inc.

3. PERFORMANCE OF EQUIPMENT

3.1 All materials, equipment and appurtenances of any kind, shown on the drawings, hereinafter specified or required for the completion of the work in accordance with the intent of these specifications, shall be completely satisfactory and acceptable in operation, performance and capacity.

4. INSPECTION AND TESTS

4.1 All connections at panels and switches, including all splices must be made, all fuses shall be in place, and all circuits continuous from point of service connections to switches, receptacles and outlets, at the time of final inspection.

4.2 Upon completion of the work, all parts of the electrical installation shall be tested and proved free of unwanted grounds and other defects.

4.3 The Electrical Contractor shall arrange for and pay all fees related to inspection of the electrical work.

5. EXAMINATIONS

5.1 This Contractor shall carefully examine the architectural, structural, heating-ventilating and plumbing drawings. If any discrepancies occur between the drawings or between the drawings and specifications, he shall report such discrepancies to the Architect in writing and obtain written instructions as to the manner in which to proceed. No departures from the contract drawings shall be made without prior written approval of the Architect.

6. CONDUCTORS

6.1 Unless otherwise directed, all conductors for lighting and feeders and branch circuit wiring shall be rated 600 volts and 98 per cent conductivity copper. Insulation of conductors shall be type THW.

6.2 Wire size #10 and smaller shall be solid. Wire size #8 and larger shall be stranded.

7. CONDUIT

7.1 Where required by the N.E.C. or other applicable codes, secondary wiring shall be run in heavy wall conduit and/or electrical metallic tubing as specified herein. Wherever the word, "conduit", appears herein, it shall refer to either rigid conduit or electrical metallic tubing, whichever is applicable. All conduit shall conform to federal specifications.

7.2 Where codes required conduit, the Contractor may furnish and install electrical metallic tubing in lieu of rigid conduit in all locations, except:

a) exposed in any weatherproof area;
b) subject to damage; and
c) for service and distribution work.

7.3 Rigid conduit shall be installed in all areas and locations where EMT is not permitted by the NEC.

7.4 A separation of at least six (6) inches shall be maintained between conduits and hot water and steam lines.

7.5 Flexible metallic conduit of the liquid-tight type shall be used for connections to motors and equipment as required. This conduit shall be sized in accordance with NEC and shall not exceed eighteen (18) inches in length.

7.6 Conduits shall be securely supported from building structure at 10 foot intervals by straps or pipe hangers on supporting assemblies.

7.7 Conduit shall be employed for all service work and main distribution feeders. Rigid PVC conduit may be substituted for rigid metal in all locations as permitted by NEC.

7.8 All branch circuit wiring shall be non-metallic sheathed cable to the extent permitted by the NEC. All other branch circuits shall be MC cable.

8. SPLICES

8.1 All splicing shall be done in outlet boxes or junction boxes and not in conduits. Splices of #10 wire and smaller shall be made with approved type pressure connectors and insulating caps. Splices in #8 wire and larger shall be made by means of compression type sleeves and installed with a proper tool and then insulated to the same thickness as the original insulation with an approved type tape having high dielectric strength.

9. OUTLET BOXES

9.1 At all locations shown on the drawings, an outlet box of proper type and size to satisfy the intended requirements shall be provided. Boxes shall be rigidly secured in position, set true and square.

10. LOCAL SWITCHES

10.1 Local wall switches shall be heavy duty, specification grade, flush, quiet operating tumbler type, rated 20 amperes, 120/277 volts. All switches shall have wide plaster ears and shall be single or double pole, three-way or four-way as indicated on the drawings.

10.2 Where more than one switch is installed in an outlet, they shall be covered by a common wall plate.

11. CONVENIENCE RECEPTACLES

11.1 Receptacles shall be specification grade single and/or duplex, rated 20 amperes, 125 volts, three wire, grounding type for parallel-blade two or three prong attachment caps. All receptacles shall be enclosed in high heat, non-flammable, non-hygroscopic moulded compound case provided with wide plaster ears. Each terminal shall be provided with three binding screws located on the side of the receptacle and so arranged that back or side wiring is possible.

12. BALANCING

12.1 The system of branch circuits for power and lighting shall be connected to panel boards busses in such a manner that loads connected thereto will be balanced on all phases as closely as practicable. Should there be any unfavorable condition of balance on any part of the electrical systems, the Electrical Contractor shall make such changes that may be suggested to remedy the unbalanced condition.

13. LIGHTING BRANCH CIRCUIT WIRE

13.1 The grouping of outlets in individual circuits as shown on the drawings shall be adhered to. Lighting outlets and receptacles or miscellaneous power receivers shall not be connected to the same circuit unless so indicated. Branch circuit wiring may be trunked to the extent allowable by the National Electric Code.

14. PANELBOARD

14.1 Panelboards shall be dead front automatic circuit type suitable for connection to the system characteristics as indicated in the panel schedule and with circuit breakers as called for in the panel schedule. Circuit breakers shall be thermal-magnetic type with quick-make, quick-break operating mechanism and with trip indication. Trip indication shall be clearly indicated by breaker handle taking a position between "on" and "off". All two-pole breakers shall be common trip. Breakers shall be of the screwed-to-bus type.

14.2 Panelboard box shall be made of code gauge galvanized steel and shall provide ample wiring space. Panel box must be factory assembled as a complete unit.

14.3 Panelboard front shall be complete with door and catch. All components of the panelboard shall be Underwriters Laboratories listed.

14.4 Contractor shall furnish and install a typed list identifying all circuits and insert in frames provided for same inside of panel door.

15. MOUNTING HEIGHTS, LOCATIONS

15.1 Except where otherwise shown on the drawings, the mounting height from the floor to device center line shall be for wall switches, 42 inches; wall receptacles, 18 inches; telephone outlets, 18 inches.

15.2 The drawings indicate branch circuit runs, outlets and locations of equipment diagrammatically. In the event changes in the locations have to be made due to development conditions in the construction or due to the changes in the Owner's plans for the arrangement of the furnishings and equipment, such changes shall be made at no extra cost to the Owner. The Architect or the Owner shall notify the Contractor of the changes desired before the corresponding work is installed.

15.3 The Electrical Contractor shall coordinate his work with work of the other trades and have his work scheduled so as not to delay the work of others.

16. SUPPORT OF FIXTURES

16.1 Suspended grid systems for acoustic tile ceilings shall not be used for the support of lighting fixtures. Primary support for light fixtures shall be provided by the Electrical Contractor from building structural elements.

17. FINAL CONNECTIONS TO EQUIPMENT

17.1 The Electrical Contractor shall make final connections to equipment furnished by other trades (see Plumbing and HVAC drawings). Verify wiring and circuit breaker requirements prior to installing same. Connections shall be made to disconnects furnished by others and directly to motors and related items not requiring disconnects.

18. MOUNTING BOARDS

18.1 Provide 3/4" plywood mounting boards for surface mounted panel boards, time clocks and other electrical items of adequate dimension to allow for proper placement of equipment. Mounting boards shall be painted two coats of enamel.

18.2 Provide similar mounting boards for mounting of telephone equipment. Verify size requirements with Owner.

19. TIME CLOCKS

19.1 Provide time clocks as indicated on the drawings, seven-day with spring carry-over unless otherwise indicated. Electronic types of time clocks with similar function will be acceptable.

20. EMERGENCY LIGHTING SYSTEMS

20.1 Where required by the drawings, provide an emergency lighting system, battery operation, approved by and meeting the requirements of the appropriate state or local authority of jurisdiction, installed in accordance with the NEC.

21. ELECTRIC RESISTANCE HEAT

21.1 Provide all electrical resistance heat as scheduled on the "Electrical Resistance Heater Schedule" on the drawings including all wiring and controls for same.

22. GUARDS

22.1 Provide wire guards for fixtures, thermostats, emergency lighting units, exit signs, emergency lighting remote heads and similar items furnished under this section of the specifications for Multi-Purpose Rooms or Family Life Centers and elsewhere as required by the drawings.

23. COMMUNICATION WIRING

23.1 Provide telephone conduit and phone outlet boxes as required by the drawings. Generally, conduit will be required in walls and floors with no access with stubs into concealed, but accessible areas. Provide underground conduit for service to building.

23.2 Sound reinforcement wiring shall be by the Owner. Provide conduit where indicated on the drawings.

24. EXTERIOR WIRING

24.1 Branch circuit wiring run underground outside of the building may be direct burial except under driveways, parking areas, concrete walks and paved areas wiring shall be run in conduits.

25. FIRE ALARM SYSTEM

25.1 Where required by the drawings, provide a fire alarm system. The system shall be electrically supervised, non-coded as manufactured by Simplex or equal as approved by the Architect.

25.2 Fire alarm control shall be Simplex Series as noted on the drawings with 2081 Series, rechargeable, sealed lead-acid battery emergency power.

25.3 Provide complete shop drawings of system and components in accordance with Specification Section 0015, paragraphs 7.1 thru 7.9.

25.4 The fire alarm system equipment supplier shall provide technical support as follows:

a) Preconstruction review of submittals and drawings with the installer
b) Technical support during initial start-up of control panels
c) Review of panel wiring
d) Initial programming of control equipment
e) Program editing to correct minor errors and omission
f) Assistance with a functional system test
g) One training session with the Owner's representative

25.5 Peripherals and Accessories

a) Smoke or heat detectors shall be Simplex Series 2098
b) Manual stations shall be Simplex Series 2099, non-coded single action
c) Duct smoke detectors shall be Simplex 2098-6949 housing with #2098-9201 photo electric smoke detector, detector baffle, and correct length sampling tube. Duct detectors shall actuate a relay (by others) to shut down HVAC equipment fans in accordance with NFPA 90A.
d) Audible/Visual alarms shall be Simplex Series 4903, red with white "Fire" lettering
e) Audible alarms shall be Simplex 4901 Series, red with white "Fire" lettering

25.6 The fire alarm system shall be complete in all respects and in accordance with the current applicable requirements of the NFPA and all State and Local Agencies of jurisdiction.

26. EXCAVATION

26.1 The Electrical Contractor shall perform all excavation and backfill work required to install underground conduit and related items as indicated on the drawings or herein specified. The Electrical Contractor shall include topsoil and seeding of all areas disturbed by the work of this Contract.

26.2 All excavation under the Contract is classified earth excavation. Claims for extra compensation on account of subsurface conditions encountered will be based upon unit prices stipulated by the Contractor on the Bid Form in the spaces provided.

26.3 Trenches and related excavation under this contract shall be backfilled in layers not to exceed 12" in depth with each layer properly tamped. Disturbed areas shall receive 6" minimum topsoil seeded and maintained until lawn is re-established.

27. FINAL ACCEPTANCE

27.1 The Contractor shall be responsible for inspection and approval of wiring, installation of fixtures and equipment, and for final acceptance of the complete electrical installations by the Underwriters or by local electrical inspectors.