1.0 - GENERAL

1.1 Scope

A. Materials and procedures for construction of embankment, backfill, and bridge approach embankments.

1.2 Related sections

A. Section 02072: Selective Demolition

1.3 References

A. AASHTO M 145: Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes

B. AASHTO T 11: Materials Finer than 75 μm (No. 200) Sieve in Mineral Aggregates by Washing

C. AASHTO T 27: Sieve Analysis of Fine and Coarse Aggregates

D. AASHTO T 99: Moisture-Density Relations of Soils Using a 2.5 kg (5.5-lb) Rammer and a 305 mm (12 inch) Drop

E. AASHTO T 180: Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 inch) Drop

F. ASTM D 2487: Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)

G. ALDOT Minimum Sampling and Testing Requirements

1.4 Definitions

A. Well-graded material – Material with a gradation having all particle sizes represented, with a smooth shaped grain-size distribution curve and coefficient of uniformity greater than four and a coefficient of curvature between one and three inclusive. Refer to ASTM D 2487.

1. Coefficient of uniformity $C_u = D_{60}/D_{10}$
2. Coefficient of curvature $C_c = (D_{30})^2/(D_{10}D_{60})$
3. D_{xx} The diameter for which xx percent of the particles are finer.

1.5 Submittals

A. Provide the following before delivering material to the project:

1. Supplier and source of materials.
2. Gradation analysis. Refer to AASHTO T 27 and T 11.
3. Soil classification when applicable. Refer to AASHTO M 145.
4. Coefficient of uniformity and the coefficient of curvature when applicable. Refer to ASTM D 2487.
5. Maximum Dry Density and Optimum Moisture Determination

a. Use AASHTO T 180 Method D for A-1 soils and AASHTO T 99 Method D for all other soils.

1.6 Acceptance

A. Acceptance sampling and testing of material is according to ALDOT Minimum Sampling and Testing Requirements.

B. Engineer reserves the right to select and test material randomly from any location at the construction site.

C. Density Requirement – Acceptance is on a lot-by-lot basis when average density is not less than 96 percent of maximum laboratory density and no single determination is lower than 92 percent.
   1. Use AASHTO T 180 Method D for A-1 soils and AASHTO T 99 Method D for all other soils.
   2. Maintain appropriate moisture for compaction during processing.

D. Remove any material found defective and replace with acceptable material at no additional cost to the Department.

2.0 - PRODUCTS

2.1 Materials

A. Provide materials free of contamination from chemical or petroleum products for embankment and backfill placements. Materials may include recycled portland cement concrete.
   1. Do not include asphalt pavement materials.

2.2 Borrow

A. Classifications A-1-a through A-4. Refer to AASHTO M 145.

2.3 Granular Borrow

A. Classification A-1-a. Refer to AASHTO M 145.

B. Non-plastic, well-graded, 3 inch maximum.

2.4 Granular Backfill Borrow

A. Classification A-1-a. Refer to AASHTO M 145.

B. Non-plastic, well-graded, 2 inch maximum.

2.5 Embankment

A. Borrow or suitable roadway excavation materials excluding organic, frozen, or contaminated soils. Refer to this Section, article 2.1.

2.6 Embankment for Bridge

A. Granular Borrow

2.7 Free Draining Granular Backfill

A. Meet the following gradation:

Table 1

Free Draining Granular Backfill Gradation	
Sieve Size	Percent Passing
1½ inch	100
1 inch	95 to 100
½ inch	25 to 60
No. 4	0 to 10
No. 200	0 to 5

2.8 Flowable Fill

A. Refer to Section 03575.

2.9 Pipe Bedding and Backfill

A. Pipe Foundation (As Required)
1. Use Granular Backfill Borrow.
2. Use Free-Draining Granular Backfill or other uniformly graded materials only with the approval of the engineer and only if enclosed with an appropriate separation geotextile.

B. Pipe Bedding and Backfill
1. Use Granular Backfill Borrow or on-site material excluding unsuitable material.

C. Unsuitable material includes organic materials, frozen lumps, soils such as peat or bog, and over-saturated silts, clays, or sands whose water content prevents appropriate compaction.

3.0 - EXECUTION

3.1 Preparation

A. Complete clearing, grubbing, stripping, and stockpiling topsoil before placing embankment.

B. Excavate and dispose of unsuitable material as directed by the Engineer.

3.2 Embankment Placement

A. Place roadway excavation or borrow in embankment section with the highest quality material in the top portion of the embankment.

B. Scarify and compact the top 8 inches of the surface to at least 90 percent of maximum laboratory density when the embankment height is 6 ft or less.

C. Break and scarify all underlying road surfaces so that pieces do not exceed 3 ft^2 before placing embankment over an existing pavement that is outside the limits of removal or excavation shown on the plans.

D. Maintain Drainage
1. Grade and maintain the roadway to ensure adequate drainage.
2. Maintain pipe culverts and drainage ditches or provide temporary facilities when interrupting items such as irrigation systems, sewers, and underdrainages.

E. Place an initial layer to act as a working platform over soft, wet ground when approved by the Engineer.
   1. Density specifications do not apply to the working platform.
   2. Meet density requirements for embankment placed above the working platform.

F. The Engineer inspects and accepts the working platform or foundation before embankment is placed.

G. Spread embankment materials uniformly in layers not exceeding 1 ft (uncompacted depth) and compact to the specified density. Reduce the lift thickness if tests show unsatisfactory density.

H. Finish subgrade surface within ±0.1 ft of line and grade.

I. Do not use rock or pavement materials over 1 ft in any dimension. Distribute so space exists for placing and compacting embankment material between large rocks or pavement materials.

J. Do not place large rock within 1 ft of the subgrade surface. Do not allow rocks to protrude above the subgrade surface.

K. Do not use compacting equipment that causes shear failure in the embankment.

3.3 Granular Borrow and Backfill Placement

A. Finish granular borrow surface within ± 0.1 ft of line and grade.

B. Compact borrow and backfill material in 6 inch layers to the specified density.

C. Structural Backfill Placement includes bridges, foundation, box culverts, pipe culverts, drains, and other structures.
   1. Place suitable backfill material in structural backfill sections. Refer to Section 02317.
      a. Use granular backfill borrow when specified.
   2. Use appropriate compaction equipment adjacent to abutments, backwalls, approach slabs, wing walls, retaining walls, and other structures.

D. Pipe Bedding and Backfill
   1. Refer to Section 02317 and DG Series Standard Drawings for excavation and over-excavation requirements.
   2. Place uniform layers of pipe backfill on both sides of the pipe.
   3. Use compaction equipment smaller than the trench width between the pipe and the trench wall. Fully compact the haunch areas. Hand-tamp areas where compaction equipment cannot compact the soil.

3.4 Embankment For Bridge Placement

A. Construct approach embankments from the original existing ground up with the specified material to the limits defined in this Section and according to DD Series Standard Drawings.
   1. Approach Embankments
   a. Place embankment beneath the bridge except riprap or other specified materials used for MSE walls.
   b. Place embankment from the bridge abutment centerline station to a point measured at least 150 ft away from the abutment along the approach

roadway centerline and placed for embankment on the inside of abutments.

c. Use the specified material throughout the length of the walls where retaining walls are located beyond this delineation.

2. Intersecting Roadway Embankments

a. Place embankment from approximate edge of approach roadway at least 60 ft along intersecting roadway centerline.

3. Adjoining Embankments

a. Place embankment at least 10 ft outward from edge of approach roadway pavement when adjoining embankment is not an approach embankment.

B. Over-excavate unsuitable material such as soft, springy, organic, or otherwise yielding material at natural ground level as directed by the Engineer.

C. The Engineer inspects and accepts the working platform or foundation before embankment is placed.

D. Spread embankment materials uniformly in layers not exceeding 1 ft (uncompacted depth) and compact to an average of 96 percent maximum laboratory density before placing the next layer. Reduce the lift thickness if tests show unsatisfactory density.

E. Finish surface within ±0.1 ft of line and grade.

3.5 Limitations

A. Requirements when working during freezing or snowy conditions:

1. Do not place embankment on frozen or snow-covered areas.
2. Do not deliver or use frozen material in embankments.
3. Remove snow and frozen material from embankments, foundations, and borrow areas and furnish embankment material that can be compacted to the specified density.
4. Remove waste and replace frozen embankment material at no additional cost to the Department.
5. Measure wasted material and provide quantities to the Engineer.

END OF SECTION

1.0 – GENERAL

1.1 Scope

A. Contractor shall demolish all work as shown on Drawings to be demolished and work which must be removed.

B. Contractor shall remove all demolition and other matter and/or equipment from site under this Contract, as directed by Owner. The Contractor shall assume ownership of all items to be demolished, unless noted otherwise by these specifications.

C. Any material salvaged by the Contractor shall become the property of the Contractor unless designated otherwise by the Engineer. The Owner shall not be responsible for security of salvaged materials temporarily stored on the site. Any material salvaged by the Owner shall be removed by and stored, at a location designated by the Engineer, by the Contractor.

D. All areas that have been disturbed by demolition and/or all other areas to receive construction and/or all other areas generally being part of this Contract shall be ready to receive new work and/or finish in a first-class manner.

E. Contractor shall inspect the site, note all conditions, and include all work of every character necessary to comply with the requirements of this Section and the Drawings.

F. All demolished and excavated materials, trash, construction debris, etc., shall be completely removed as it accumulates, and at the completion of the Work before final acceptance.

1.2 General Requirements

A. Contractor shall take care so as not to unnecessarily disturb all other areas and/or adjoining areas.

B. Dust, debris, etc., shall be totally isolated during construction. Extreme care must be taken to ensure this.

C. All necessary barricades, signs, fences shall be constructed to afford total protection by users.

1.3 Related Work

A. Contractor shall take care in excavation of existing earth. Contractor shall notify Engineer immediately if unlocated utilities or obstructions are found during excavation operations. Contractor shall consult Engineer during bidding if there are any questions or during construction if there are any questions concerning this matter.

B. Utilities: Before any Work is begun, any and all existing utilities shall be located and carefully preserved throughout construction.

C. Risk: The Contractor shall accept the site as he finds it and shall inform himself of its character. Damage or loss shall be at the risk of the Contractor from the time he

starts construction until the completed project is finally accepted. Damages and/or losses shall not relieve the Contractor from any obligations under this Contract.

1.4 Measurement

A. No measurement will be made for selective demolition.

1.5 Payment

A. This contract does not contain an item for selective demolition as described in this section. Any required selective demolition will be at no direct pay and included in the lump sum price for site preparation.

2.0 – PRODUCTS

NOT USED

3.0 – EXECUTION

A. Provide adequate protection to persons and property. Execute all work in such a manner as to avoid interference with the use, or passage and from adjacent facilities.

B. Disposal of debris by burning and demolition by explosives shall be allowed by regulatory permit only.

C. Disposal of trash, debris, etc., shall be in accordance with the requirements of the governing body having jurisdiction.

3.1 Existing Work to Remain

A. Contractor shall note the existing work to remain, and employ demolition methods that will not cause damage to same.

B. Contractor shall examine existing work and determine what items need shoring, etc., during demolition and/or rebuilding phases. Such shoring, guy, etc., shall be furnished as required and included in the Contractor's bid.

C. The design of shoring, etc., shall be the responsibility of the Contractor.

D. Existing work shown to remain in place that has been damaged by demolition activity shall, at the discretion of the Engineer, be removed from the site and rebuilt new or repaired to his satisfaction.

E. Permission to repair does not waiver the Engineers right to require removal and replacement, if in his opinion the repair has not restored the original appearance and strength of the item.

F. Regarding removal and replacement and/or repairs as mentioned in this Section, the Engineer's decision is final.

G. Cost of removal and replacement and/or repairs shall be borne by the Contractor.

END OF SECTION

1.0 - GENERAL

1.1 Scope

A. It is anticipated that the site will be up to subgrade elevation prior to beginning of construction. However, certain areas may require minor excavation and/or preparation prior to placement of base or final elevation. This work consists of required site preparation, including clearing, grubbing, structure demolition and removal, removing and disposing of vegetation, trees, and debris within the limits of the project areas, except such objects that are designated to remain or to be removed in accordance with other sections of the specifications.

1.2 Related Sections

A. Section 02276 – Temporary Erosion Control

1.3 Regulatory Requirements

A. Conform to all applicable City, County, State and Federal laws, ordinances, regulations, rules and codes for disposal of debris, grubbed trees, shrubs, stumps and trash off-site.

B. Coordinate clearing work with utility companies.

1.4 Measurement

A. There shall be no separate measurement for Site Preparation and/or Unclassified Excavation. In the event item is required, Contractor shall request prior approval from Construction Manager with requested fee amount for approval. Request shall also include estimated quantity of work required that may fall outside of general surface preparation for base layer or other final surfaces.

1.5 Payment

A. This item shall be paid based upon pre-approval by Construction Manager. Amount shall be deducted from maximum contingency amount provided in Bid Documents.

2.0 - PRODUCTS

NOT USED

3.0 - EXECUTION

3.1 Preparation

A. The Contractor shall stake or otherwise verify the limits of clearing and review the clearing limits in the field with the Construction Manager before work begins. All survey work and staking shall be done at the Contractor's expense. Verify that existing plant life and features designated to remain (if any) are tagged or identified.

B. Before clearing or grubbing operations begin, the Contractor shall install temporary and permanent erosion and sediment control measures.

3.2 Protection

A. The Contractor shall provide temporary fences, silt fences, barricades, coverings, or other protections necessary to prevent damage to existing items indicated to remain and to prevent injury or damage to persons or property. There shall be no direct payment for protection.

B. The Contractor shall protect utilities that remain from damage. The Contractor shall use caution around all existing utilities so as not to cause damage or destruction. The Contractor shall be responsible for any damage caused by his work.

C. Trees not on the line of construction or trees which in the opinion of the Engineer can be avoided by minor adjustments in the field, shall be protected from damage by the Contractor during construction as follows:

1. The Contractor shall install a protective barrier around trees to remain. The barrier shall be maintained until completion of the project at which time it shall be removed and disposed of by the Contractor.

2. The barrier shall be at least three feet high and be placed at least six feet away from the base of any tree to remain. Fifty percent of the area under the drip line shall be included within the temporary barrier.

3. The barrier shall consist of a wood fence with 2" x 4" posts spaced at eight feet on center with a 2" x 4" toe rail. A wire mesh fabric or other similar barrier meeting local and state laws or ordinances shall be attached to the wood frame.

4. The Contractor shall not disturb the ground within six feet of the base of trees located outside of the clearing limits and meeting the diameter requirements (for trees to remain) shown on the plans or as directed by the Engineer.

5. No materials, trailers, equipment, or chemicals shall be stored within the protective area for trees.

D. The Contractor shall protect benchmarks, property markers, fences, pavements and existing structures from damage or displacement.

E. The Contractor shall restore damaged work to its original condition at his own expense.

F. The Contractor shall not interfere with normal traffic on roads, streets, walks, and other adjacent occupied facilities.

3.3 Clearing

A. All areas of trees and vegetation over one inch in diameter, as measured six inches above grade, within the clearing limits of the clearing work, shall be cleared and grubbed.

B. Clearing shall consist of cutting, removing and clearing trees, shrubs, stumps, and debris from within the clearing limits, or as directed by the Engineer.

C. Remove trees, shrubs, and undergrowth within the clearing limits or as indicated on the plans.

3.4 Grubbing

A. Grubbing shall be performed in all areas of vegetation. Grubbing shall consist of excavation and removal to a depth determined below all stumps, debris, roots, perishables, and objectionable materials.

B. All excavations or grubbing performed below subgrade surface shall be backfilled with select backfill material. All fill material shall be leveled so as to achieve positive drainage and compacted to same as existing, adjacent subgrade.

3.5 Site Burning

A. Burning is not permitted on the site.

3.7 Removal and Disposal

A. Contractor shall clean site and remove all debris, vegetation, loose concrete, trash and waste from the site. No materials shall be buried onsite. All removal shall follow governing laws and procedures.

B. Local, Federal and State laws shall be followed in handling and removal.

C. Disposal shall coincide with site preparation so that everyday activities are not affected.

D. Contractor shall be responsible for all disposal fees.

3.8 Cleanup

A. Site shall be cleared of remnants and debris after materials have been removed.

B. All voids and holes shall be backfilled.

C. Once operations are complete, site shall be clean and clear, as determined by Construction Manager. In the event additional cleanup is required, cost shall be borne by Contractor.

END OF SECTION

B. Clearing shall consist of cutting, removing and clearing trees, shrubs, stumps, and debris from within the clearing limits, or as directed by the Engineer.

C. Remove trees, shrubs, and undergrowth within the clearing limits or as indicated on the plans.

3.4 Grubbing

A. Grubbing shall be performed in all areas of vegetation. Grubbing shall consist of excavation and removal to a depth determined below all stumps, debris, roots, perishables, and objectionable materials.

B. All excavations or grubbing performed below subgrade surface shall be backfilled with select backfill material. All fill material shall be leveled so as to achieve positive drainage and compacted to same as existing, adjacent subgrade.

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A. Burning is not permitted on the site.

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END OF SECTION

1.0 – GENERAL

1.1 Related Documents

A. Section 02100 – Site Preparation

1.2 Summary

A. This Section of specifications covers materials, installation, and procedures for temporary erosion control.

B. Contractor shall be responsible for all Best Management Practices (BMP's).

C. Contractor shall be responsible for all fines, penalties, notices, or other enforcement actions that may be levied due to erosion control measures and stormwater management.

D. Contractor shall be responsible for maintaining BMP's throughout life of project. BMP concepts are provided on the plans, however, Contractor is responsible for modifying and/or supplementing, as he deems necessary.

E. Installation and removal of BMP's shall be sequenced with Contractor's sequence of work.

F. Contractor shall take care to ensure that oil, grease, and other construction fluids are contained. Equipment shall be maintained so as to prevent spills and leaks.

1.3 Measurement

A. There shall be no separate measurement for silt fence.

B. There shall be no separate measurement for straw wattle.

1.4 Payment

A. There shall be no separate payment for silt fence. Item shall be included in lump sum bid.

B. There shall be no separate payment for straw wattle. Item shall be included in lump sum bid.

2.0 – PRODUCTS

2.1 Materials

A. All materials shall meet or exceed the Alabama Department of Environmental Management standards – *Alabama Handbook for Erosion Control, Sediment Control, and Stormwater Management on Construction Sites and Urban Areas.*

B. All materials used shall meet or exceed the City of Winfield stormwater management requirements.

C. Silt fence shall be Type A, with 13 GA ring fasteners for attachment of woven material.

D. Straw wattle shall be sized appropriately, and placed as shown on plans and inlet locations

2.2 Quality Assurance

A. Manufacturer's shop drawings, technical specifications, testing certifications, and/or other necessary quality assurances shall be submitted for approval, prior to materials being onsite.

B. All materials shall be new and labeled appropriately.

2.3 Handling/Storage

A. Materials shall be handled in a way that no tears, rips, cracks, or other deficiencies may occur to the materials.

B. All materials shall be stored in a way that is protective of the elements.

C. Damaged materials shall be immediately removed from site.

E. All materials shall be stored in a safe and secure method.

F. Materials shall not be stored in direct sunlight.

3.0 - EXECUTION

3.1 Installation

A. All BMP's shall be installed prior to land disturbance.

B. Contractor shall take care not to damage or disturb existing utilities.

C. Contractor shall maintain all BMP's throughout life of project and stabilization has been achieved.

D. Erosion control measures shall be placed so that sediment will be controlled and maintained and will not leave the construction area. Sediment shall not enter roadways, waterways, drainage structures, adjacent properties, driveways, or other impervious areas.

E. As a measure of maintenance, BMP's shall be checked immediately following rainfall events. Sediment shall be removed and BMP's shall be reestablished.

F. Contractor shall be responsible for removal of BMP's upon project completion and the achievement of stabilization.

END OF SECTION

1.0 - GENERAL

1.1 Scope
The work included under this section consists of furnishing all labor, material and equipment necessary to chemically treat the soil for termite control.

1.2 Applicator
The chemical shall be applied by an approved Pest Control Operator, bonded and licensed in the state in which the work is performed.

1.3 Guarantee
Upon completion of the soil treatment and as a condition for its final acceptance, the Pest Control Operator shall furnish to the Owner a written guarantee providing:

A. The Pest Control Operator will furnish the Owner with a Repair and Retreatment policy which has annual inspections included within the cost of policy at no additional cost to the Owner as outlined in Items B-E below.

B. That the chemical having at least the required concentration and the rate and method of application complies in every respect with the standards contained herein.

C. That the Pest Control Operator guarantees the effectiveness of the soil treatment against termite infestation for a period of not less than five (5) years from date of treatment.

D. Pest Control Operator will re-inspect at least once annually during protection period. Cost of Guarantee will include annual inspections for a period of five (5) years at no additional cost to Owner.

E. Evidence of re-infestation within the five (5) year guarantee period will be retreated without cost to the Owner. Any damage caused by termite infestation during the five (5) year guarantee period will be repaired or replaced by the Pest Control Operator at no additional cost to the Owner.

2.0 - PRODUCTS

Provide chemicals in accordance with current laws and regulations. Notify Architect of any discrepancies.

2.1 Chemicals

BASF - Termidor (Fipronil)
Taurus SC - Control Solutions (Fipronil)
Bayer Environmental Science - Premise

2.2 Mixing of Chemicals
Shall be observed on site by the Contractor's Superintendent.

1.0 - GENERAL

1.1 Scope

The work under this section consists of all finish grading, topsoil, lawns, seeding, sodding and planting.

1.2 Extent of Lawn Area

A. As indicated.

B. If not specifically indicated the Lawn Area shall include the building site to the extent that will cover any area of the site disturbed by construction and/or grade change areas.

Blend new Lawn Area into areas of the site which are not covered under this Section.

1.3 Time for Planting

When other portions of the work have progressed sufficiently the contractor may begin work for lawns and planting including the placing of topsoil. Operations shall be conducted under favorable weather conditions during the seasons which are normal for such work. Planting seasons generally shall be October 1 to March 1 for trees and plant materials, and April 1 to July 1 for planting permanent lawns.

1.4 Inspection for Acceptance

A. Inspection of the work of lawns and planting to determine the degree of completion of contract work, will be made by the architect at the conclusion of planting operations. Inspection of the work for final acceptance will be made at the end of the maintenance period.

B. After final inspection the Contractor will be notified of acceptance of all lawn and/or planting work, or if there are any deficiencies, of the requirements for completion of the work.

1.5 Guarantee and Replacement

A. The lawn shall be guaranteed for the duration of one full growing season after planting. The lawn shall be alive and in satisfactory growth at the end of the guarantee period.

B. All plantings shall be guaranteed for a period of one growing season to be healthy and viable. Any plant which is dead or which is not in satisfactory growth shall be removed from the site and replaced as soon as conditions permit, except when conditions or events are beyond human control.

2.0 - PRODUCTS

2.1 Materials

A. Fertilizer shall be 12-4-8 commercial fertilizer or equal and shall be uniform in composition, dry, and free-flowing. Fertilizer shall be delivered to the site in original unopened containers, each bearing the manufacturer's guaranteed analysis.

B. Lime shall be agricultural lime (Dolomite), or equal, containing not less than 85% of total carbonates, and shall be ground to such fineness that 50% will pass through a 100 mesh sieve and 90% will pass through a 20 mesh sieve.

C. Soil additive shall be 1/4" diameter or less pine bark mulch "Planting Mix".

D. Mulch shall be shredded pine bark to depth specified on plans or pine straw as determined by architect.

E. Water used in this work shall be suitable for irrigation and free from ingredients harmful to plant life. Furnish hose and watering equipment as required.

F. Materials for staking, guying and wrapping shall be as follows:

1. Stakes for supporting trees shall be 3 - 3" x 8' old creosote posts for trees greater than 2" caliper. For smaller caliper trees, use 1 - 2" x 2" x 4' Wolmanized Pine stake, driven at 60 degrees angle.

2. Wire for fastening trees to stakes shall be 10 gauge, pliable, galvanized iron with 6" turnbuckle spliced into each wire for tightening or loosening guy tension as needed.

3. Hose to encase guy wires or wires used for fastening trees to stakes shall be 8" sections of reinforced rubber garden hose.

4. Notched stakes and deadmen for anchoring guy wires shall be about 2" x 2" x 3' Wolmanized Southern Pine.

5. Wrapping materials for tree trunks shall be approved asphaltic base tree wrap material 4" wide.

2.2 Topsoil

Topsoil shall be a fertile, friable soil possessing physical and chemical characteristics typical of productive soils in the vicinity. Topsoil shall have an acidity range between ph 6.0 and ph 6.5 or shall be conditioned to fall within this range. Topsoil shall contain not less than 3% organic matter as determined by loss on ignition of moisture-free samples dried at 100 degrees C. Topsoil shall be without admixture of subsoil and shall be clean and reasonably free from clay lumps, stones, stumps, roots or similar substances 2" or more in diameter, debris or other objects which might be a hindrance to planting operations or plant growth. A laboratory soils test to be provided by the contractor when requested.

2.3 Seed

A. Seed for most areas shall be 100% hulled Bermuda or Fescue as per plans.

B. Seed for temporary seeding shall be 100% Annual Rye Grass.

C. See for non-mowed slopes as detailed on plan.

D. At the contractor's option, areas to be seeded may be sprigged with approved Bermuda grass stolons at the rate of three (3) cubic yards per 1,000 sq. ft. of lawn. Spacing shall be maximum of 8" o.c. each way in rows.

E. Seed shall meet the requirements of the Federal Seed Act. Seed mixtures shall be delivered in the original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity germination, and weed seed content.

2.4 Sod

Sod shall be Tifton 419 Bermuda grass. Each piece of sod shall have a dense stand of the specified grass and shall be strongly rooted and free of pernicious weeds. It shall be mowed to a height not to exceed 3" before lifting and shall be of uniform thickness with not over 1-

1/2" nor less than 1" of soil.

2.5 Plant Materials

A. Planting shall be as specified by Drawings. If a species of plant becomes unavailable, Architect will approve suitable substitute.

B. See ALLOWANCES - SECTION 01020 for the amount of allowance for shrubs and/or trees. Planting shall be part of the base bid and not the allowance.

C. Plants shall have a habit of growth that is normal for a well-maintained specimen of the species and shall be sound, healthy, vigorous and free from insect pests, plant diseases and injuries. The American Nurseryman Association Standard approval certificate shall be presented to Architect or Owner before planting operations commence.

3.0 - EXECUTION

3.1 Preparation of Subgrade

The subsoil shall be graded uniformly and lightly compacted so that it will be parallel to proposed finish grade. Stones over 2" in size, sticks and rubbish shall be removed. No heavy objects except lawn rollers shall be moved over the lawn areas after the subgrade has been prepared.

3.2 Finished Grading

After the subgrade soil has been prepared, 4" of topsoil shall be spread evenly and lightly compacted. Topsoil other than that stockpiled shall be provided under this Section. No topsoil shall be spread in a frozen or muddy condition. Commercial fertilizer and lime shall then be scarified with a tiller into the top 3" of topsoil at the rate of 10 lbs. per 1000 sq. ft.

A. Areas to be seeded shall be brought to finished grade and smoothed.

B. Areas to be sodded shall be brought to within the thickness of the sod of finish grade.

C. Areas where the topsoil has not been removed shall be scarified, smoothed, and sticks, stones and rubbish shall be removed.

3.3 Sowing of Seed

Immediately before any seed is to be sown, the ground shall be scarified as necessary and shall be raked until the surface is smooth, friable and of uniformly fine texture. Lawn areas shall be seeded evenly with a mechanical spreader at the rate of 5 lbs. of grass seed per 1000 sq. ft. of area, lightly raked and watered with a fine spray so as not to create runoff until thoroughly soaked. Fifty percent of the seed shall be sown in one direction, and the remainder at right angles to the first sowing. The method of seeding may be varied at the discretion of the contractor on his own responsibility to establish a smooth uniform turf.

3.4 Laying of Sod

Except as noted, the contractor shall lay sod in all lawn areas having a slope of 3 to 1 or steeper; a 6' diameter circle of sod around all lawn drain inlets; and where shown on the Drawings. Before any sod is laid, all soft spots and inequalities in grade shall be corrected. Sod shall be laid so that no voids occur and tamped or rolled. Topsoil shall be brushed or raked over the sodded area, rolled with 200# roller and the sod thoroughly watered.

A. Sod on slopes 3 to 1 or steeper shall be held in place by wooden pegs driven through the sod into the soil until they are flush with the top of the sod.

B. Strip or spot sod shall be placed so that the surface of the compacted sod will be

slightly below the surrounding surface soil.

3.5 Temporary Seeding

Temporary seeding shall be provided should the project be completed at a time when permanent grass cannot be planted. Seeding shall be seeded at the rate of 5 lbs. to 1000 sq. ft. of area. The contractor shall be responsible for erosional damage during the period of temporary planting. The specified fertilizer shall not be used for the Rye Grass planting. Prior to planting permanent lawn, the lawn bed shall be prepared as specified, and the Rye Grass growth shall be scarified in such a manner as to incorporate it into the soil. Should the temporary lawn be planted, it shall be maintained by occasional mowing and necessary repairs to all eroded areas until the beginning of the specified season for constructing permanent lawns.

3.6 Mulching of Seeded Areas

All seeded or sprigged areas having a slope of 4 to 1 or greater shall be mulched with a spray mulch of an approved latex-type material. Other areas may be mulched with wheat straw at the contractor's option. Spray mulch of a latex-type material shall be applied by hydroject method at the rate of 75 gals. of concentrate mixed in 1000 gals. of water per acre (23 gals. per 1000 sq. ft.).

3.7 Planting

A. The location of all trees and shrubs shall be approved before the digging of pits.

B. Planting pits shall be dug and soil for planting ready before plants are delivered. The diameter of pits for trees shall be at least 2' greater than the diameter of the ball or spread of the roots and 6" greater than ball diameter for shrubs and 1" greater than diameter for vines. The depth of pits for trees, shrubs and vines shall accommodate the ball when the plant is set to finished grade allowing for 3" of compacted topsoil and prepared soil in the bottom of the pit. Larger tree pits shall be no deeper than height of ball. Add 2" prepared soil mix in order that top of ball will be 2" above finished grade. Prepare a saucer at circumference of pit and immediately soak in topsoil to control settling.

C. Soil used in planting shall be a mixture of 2 parts soil, 1 part 1/4" pine park mulch and 1 part expanded shale. This planting soil mixture shall be thoroughly mixed with 3 lbs. of specified commercial fertilizer per cu. yd.

D. Trees shall be supported immediately after planting. Trees of a caliper of 2" and over must be secured by means of guy wires and anchor stakes. All trees of a caliper under 2" must be staked. Stakes shall be equally spaced about each tree and driven into the ground to a depth of 2-1/2' to 3' in such a manner as not to injure the ball or roots. Trees shall be fastened to each stake above first branching by means of three strands of wire. Wire shall be encased in hose to prevent direct contact with bark of the trees and shall be placed around the trunk
of the tree in a single loop. Wires shall be spliced with turnbuckle and tightened by twisting the turnbuckle. Stakes shall be uniform in height and placed at the rate of three stakes per 2" or greater caliper tree and 1 stake for all trees less then 2" caliper.

E. All plants shall be mulched with a 2" layer of shredded pine bark mulch immediately after planting. This mulch shall entirely cover the area of the planting pit, bed or saucer around each plant.

F. Tree wrapping shall be performed in such a manner as to leave no voids on trunk from ground line to above first set of branches.

3.8 Pruning and Repair

Upon completion of the planting, all trees and shrubs shall be pruned to eliminate any injuries. The amount of pruning shall be limited to the minimum necessary to remove dead or injured twigs and branches and to compensate for the loss of roots as a result of transplanting operations. Pruning shall be done in such a manner as not to change the natural habit or shape of the plant. Cuts shall be made flush, leaving no stubs. On all cuts over 1" in diameter and bruises or scars on the bark, the injured cambium shall be traced back to living tissue and removed; wounds shall be smoothed and shaped so as not to retain water; and the treated area shall be coated with approved tree coating material.

3.9 Clean-Up

Any soil, mulch or similar material which has been brought onto paved areas by hauling operations or otherwise shall be removed promptly keeping these areas clean at all times. Upon completion of the planting, all excess soil, stones and debris which has not previously been cleaned up shall be removed from the site or disposed of as directed.

3.10 Lawn Maintenance

Lawn shall be protected and maintained by watering, mowing and replanting as necessary for at least 30 days after approximately 60% germination is evident.

END OF SECTION

1.0 - GENERAL

1.1 Related Sections

A. Section 02100 - Site Preparation

B. Section 02222 – Excavation

1.2 Description

A. This work consists of furnishing and constructing aggregate surface courses for roadways, shoulders, drives or other facilities in accordance with these specifications, and in conformity with the lines, grades, thickness and typical sections shown on the plans or as directed by the Engineer.

B. The Contractor shall provide all labor, materials and equipment for the placement and compaction of aggregate surface course.

1.3 Measurement

A. There shall be no direct measurement for aggregate surface course. Item shall be included in lump sum bid.

1.4 Payment

A. There shall be no direct payment for aggregate surface course. Item includes furnishing, placing, and compacting required aggregate materials, water and lime.

2.0 – PRODUCTS

2.1 Aggregate Surface Course

A. Aggregate Surface Course shall be coarse aggregate conforming to ALDOT #825B stone backfill gradation requirements of Section 801 of the Alabama Standard Specifications for Highway Construction, latest edition.

2.2 Equipment

A. Equipment necessary to produce a finished product meeting specification requirements shall be furnished and maintained by the Contractor. Equipment will be approved prior to use.

3.0 – EXECUTION

3.1 Placement of Materials

A. The material shall be placed directly on the prepared and approved subgrade from hauling vehicles or spreading equipment. No surface course shall be placed on damaged subgrade until repairs as directed by the Engineer have been completed and approved.

B. Aggregate surfacing materials shall not be placed on or spread on adjacent Portland cement concrete or asphaltic concrete pavements. Aggregate surfacing operations shall be conducted so that pavement surfaces, edges and joints are not damaged.

3.2 Mixing

A. Stone shall be a uniform blend, sampled in dedicated stockpiles and approved prior to placement.

3.3 Shaping and Compacting Aggregate Surface Course

A. The material shall be shaped by suitable means and compacted. Shaping and compacting shall continue until the surface conforms to the required sections and is free from ruts and waves.

B. Aggregate surfacing shall be compacted to the satisfaction of the Engineer by approved methods. After initial compaction, the surface shall be wetted as necessary and rolled with a pneumatic-tire or steel wheel roller to a tight uniform surface. Aggregate shall be compacted to 98% standard proctor density.

C. Percentage of Standard Proctor Density:

1. Compacted aggregate shall be compacted to 98% Standard Proctor in accordance with ASTM D 698.

3.4 Dimensional Tolerances

A. When net section measurement is specified, the thickness and width of completed aggregate surface course will be checked for acceptance. The Engineer will take measurements to ensure the work's conformance to plan dimensions. Areas with thickness and width deficiencies in excess of the following tolerances shall be corrected to plan dimensions by furnishing, placing, reworking, shaping, and compacting additional materials as required at no direct pay.

1. Thickness: Under thickness shall not exceed 1/2 inch. Over-thickness may be waived at no additional cost to the Owner.

2. Width: Under width on roadways shall not exceed 3 inches. Over width may be waived at no additional cost to the Owner.

3.5 Maintenance

A. Protection of Aggregate Surface Course:

1. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.

2. Where completed areas are disturbed by subsequent construction operations or adverse weather, Contractor shall remove and replace

aggregate surface course and reshape and compact to required density prior to further construction at no direct cost to the Owner.

END OF SECTION

1.0 – GENERAL

1.1 Scope

A. Section covers requirements for trenching, backfill and compaction where trenches are utilized in utility placement.

1.2 Related Sections

A. Section 03230 Watermain Installation

B. Section 03340 Ductile Iron Pipe and Fittings

C. Section 03220 Gate Valves

D. Section 03200 Fire Hydrants

1.3 Measurement

A. Trenching: There shall be no direct measurement. Item shall be considered incidental to other items of work.

B. Standard Backfill: There shall be no direct measurement. Item shall be considered incidental to other items of work.

C. Select Backfill: There shall be no direct measurement.

D. Bedding: There shall be no direct measurement. Item shall be considered incidental to other items of work.

1.4 Payment

A. Trenching: There shall be no direct payment. Item shall be considered incidental to other items of work.

B. Standard Backfill: There shall be no direct payment. Item shall be considered incidental to other items of work.

C. Select Backfill: There shall be no direct payment.

D. Bedding: There shall be no direct payment. Item shall be considered incidental to other items of work.

1.5 References

A. Alabama Department of Transportation (ALDOT) Standard Specifications for Highway Construction, Latest Edition.

1.6 Agencies Governing This Installation

A. The City of Winfield: Any work required on right of way owned and maintained by The City of Winfield shall follow all City regulations, guidelines, and permitting requirements. Contractor shall follow requirements of approved permit for this work. Appropriate traffic control measures and erosion control measures shall meet the requirements of The City of Winfield. The Contractor shall be responsible for his/her own traffic control during construction.

B. OSHA: Contractor shall comply with all applicable regulations during project.

2.0 - PRODUCTS

A. Standard Backfill: Consists of native earth from the site. Large rocks and stones, debris, and vegetation shall be removed from backfill before installing.

B. Select Backfill: Consists of Number 57 stone.

C. Bedding: Consists of 8910 material.

3.0 - EXECUTION

A. Before trenching and excavation begins, all clearing and grubbing must be complete.

B. Contractor shall protect all existing utilities, structures, trees, shrubs, and adjacent properties during exaction operations. In the event damage occurs, Contractor is responsible for all associated costs.

C. Contractor shall protect all signs, street signs, and utility poles during exaction. In the event of damage, Contractor must replace at own expense, in cooperation with owner of damaged property.

D. Proper alignment and grade shall be checked throughout excavation. The Engineer reserves the right to modify alignment during construction, if deemed appropriate. The Contractor shall request to modify the alignment to the Engineer, if deemed appropriate.

E. Roots growing into trench shall be removed before installation of pipe.

F. Public roads and driveways are to remain open at all times.

G. In the event saw cutting is required, Contractor shall be responsible for cost of such.

H. All existing utilities shall be verified by Contractor prior to excavation.

I. Contractor has sole responsibility for maintaining safety during construction. Contractor has responsibility to meet and exceed the regulations and standards as set forth by OSHA.

J. Sides of excavation or trench shall be excavated so that they are stable and prevent caving and sloughing.

K. Excess material removed from excavations shall be placed on job site and away from edges of excavation so as to not impede work or cause possible danger or damage.

L. Water shall be removed from excavations at all times. In the event of dewatering, removed water shall be disposed of appropriately, so as not to damage and affect property and nearby waterways.

M. In the event Bedding is required, placement shall follow directions on plans. Bedding shall not be placed on wet material.

N. Backfilling may not proceed before Engineer has inspected trench, pipe, fittings, concrete work, or other items related to construction. Backfill shall meet a minimum of 95% compaction. Contractor shall take care when backfilling as not to damage pipe. When backfilling above utility, backfill shall be place 6" above pipe and compacted. No voids shall remain. Backfilling shall be performed in 1-foot lifts to ensure compaction.

O. In the event excess material is remaining, Contractor shall be responsible for removal from site at no additional cost to Owner.

P. Trench depths shall provide a minimum of 30" of cover above the installed utility.

END OF SECTION

1.0 - GENERAL

1.1 Scope
The work of this section shall include all labor, material and equipment necessary to furnish and install Fences, Gates and accessories hereafter specified and/or designated on the drawings.

1.2 Manufacturer
Fence and Gate Assembly shall be Anchor, Cyclone, Allied or approved equal.

1.3 Substitutions
Fence and Gates of other manufacturers may be substituted, provided that in the architect's opinion, the Fence and Gates are equal to that specified, and approval is obtained not less than seven (7) days prior to date set for opening bids.

1.4 Shop Drawings
Shop drawings will be submitted to the Architect for approval before fabrication. These drawings to show: size, arrangement and type of material, connections and relationship to adjacent work.

1.5 Guarantee
The Fence and Gate Contractor shall guarantee all materials and workmanship covered by this section for a period of one (l) year from Date of Acceptance, normal wear and tear excepted.

1.6 Finish
Provide unfinished galvanized material unless noted otherwise. If a color is indicated, provide finished galvanized material accordingly.

2.0 - PRODUCTS

2.1 Materials

A. Mesh: 2" weave, composed of No. 9 wire of 1,200 lb. minimum breaking strength. Heavy zinc coat after weaving by hot dip smelter process. Mesh to be 6'-0" high.

B. Corner terminal and gate posts: 2-1/2" sq. tubing of 5.70 lb. per ft. or 2-7/8" round tubing of 5.79 lb. per ft. galvanized steel.

C. Line posts: 2-1/4" sq. H-beam of 4.1 lbs. per foot or 2-3/8" round tubing of 3.65 lbs. per ft., galvanized steel.

D. Top rail: 1-5/8" diameter o.d. galvanized steel, 18'-0" minimum length with 6" long couplings.

E. Middle rail: None required.

F. Extension Arms: Pressed steel, zinc coated after fabrication, formed with sleeve for top rail and tongue for permanently attaching 3 strands of barbed wire at 45 degree angle.

G. Barbed Wire: Zinc coated 4 point thickset with barbs spaced 5" apart.

H. Truss Braces: 1-5/8" o.d., galvanized steel at mid height of fence with 3/8" truss rod

and turnbuckle attachment. Install between each gate post and adjacent line post. Install two at each corner post (one on each side.)

I. Bottom Wires: At bottom of all fence furnish No. 7 gauge coil spring bottom tension wire.

J. Gates: Sizes as shown with frame made up of either 1-1/2" square tubing (min. weight 1.90 lbs. per ft.) or 1-5/8" o.d. round tubing (min. weight 1.806 lbs. per ft.). Join corners at corners by welding to form a rigid panel. Fill with same mesh as used on fence, attached on all four sides with adjustable hook bolts and tension rods. Provide fulcrum latch with provision for padlocking. On double gates provide lift rod and securely anchored keeper.

3.0 - EXECUTION

3.1 Installation

Install corner and gate posts into 12" diameter x 40" deep hole filled with concrete. Install line posts on 10'-0" maximum centers into 10" diameter x 32" deep holes filled with concrete. Attach top rail, truss braces and gates to posts with standard malleable fittings. Install mesh with stretcher bars and top wire clips.

3.2 Clean Up

A. The contractor shall promptly remove from the site all excess excavated materials and other debris resulting from fence construction.

B. Construction fencing shall be removed from job site prior to final inspection.

END OF SECTION

1.0 – GENERAL

1.1 Section Includes

A. Fertilizing

B. Sod installation

C. Maintenance

1.2 References

A. TPI (SPEC) - Guideline Specifications to Turfgrass Sodding; Turfgrass Producers International 1995.

1.3 Definitions

A. Weeds: Includes Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak. Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

B. Plants: Living trees, plants, and ground cover specified in this Section, and described in ANSI Z60.1.

1.4 Quality Assurance

A. Sod Producer: company specializing in sod production and harvesting with minimum five years' experience, and certified by the State of Alabama.

B. Installer Qualifications: Company specializing in installing and planting plant material with three years' experience. Adequate numbers of skilled workmen trained and experienced in the work and familiar with the requirements and methods for the performance of the work. On-site superintendent knowledgeable of horticultural practices at all times. Contractor to provide all labor, equipment, materials and services necessary to complete the Work of this Section.

1.5 Regulatory Requirements

A. Comply with regulatory agencies for fertilizer and herbicide composition.

B. Sod shall be cut from fields that have been certified to variety by the Alabama State Department of Agriculture.

1.6 Submittals

A. Certification: Submit certification of grass species and location of sod source.

1.7 Delivery, Storage, And Handling

A. Deliver sod on pallets. Protect exposed roots from dehydration.

B. Do not deliver more sod than can be laid within 24 hours.

1.8 Maintenance Service

A. Maintain sodded areas immediately after placement until grass is well established and exhibits a vigorous growing condition until date of Substantial Completion.

1.9 Measurement And Payment

A. There shall be no separate measurement for sodding.

B. There shall be no separate payment for sodding, complete and in place, including all labor and incidentals required to meet this specification.

PART 2 – PRODUCTS

2.1 Plant Materials

A. Sod: TPI, Certified Turfgrass Sod quality; cultivated grass sod; type indicated in plant schedule on Drawings; with strong fibrous root system, free of stones, burned or bare spots; containing no more than five weeds per 1000 sq ft (100 sq m). Minimum age of 18 months, with root development that will support its own weight without tearing, when suspended vertically by holding the upper two corners.

2.2 Soil Materials

A. Topsoil shall be supplied, and placed by the landscape contractor.

B. Topsoil shall be a fertile, loamy, friable sandy loam, typical for locality, containing 2 to 5 percent by weight organic matter, free from subsoil, refuse, roots, heavy or stiff clay, hardpan, stones larger than one inch, noxious seeds, litter, and other deleterious substances; suitable for the germination of seeds and the support of vegetative growth. All extraneous matter measuring 1.5 inches or greater in any direction shall be removed from topsoil.

C. The pH value should be between 5.0 to 7.0. Should regenerative materials be present in the soil, contractor shall eradicate and remove all such surface and root growth, which may appear in the imported material within one year of acceptance of the material.

D. Soil Texture with the following particle size distribution:

1. Organic Matter - 5% to 10%

2. Gravel - less than 10%

3. Coarse Sand - 50% to 70%

4. Silt - less than 20% 5. Clay - 20% to 30%

E. Sample and test 1 soil sample per 500 CY of material required. Tests shall be performed by soil testing laboratory approved in advance by Engineer. Submit soil test reports for approval prior to transport of topsoil. Test to include: percent organic and inorganic matter, mineral and nutrient content and pH. Topsoil shall be amended as recommended in the soil test report in order to meet specified characteristics.

F. Provide a minimum of one soil sample with the accompanying soil test report per 500 CY of material required from samples obtained randomly throughout the source field location or stockpile.

2.3 Soil Amendment Materials

A. Fertilizer: Containing fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, as indicated in analysis. Fertilizer shall be uniform in composition, dry and free flowing, supplied to site in the original, un-opened container, bearing the Manufacturer's guaranteed analysis. Fertilizer shall not be stored in direct contact with the ground.

B. Acceptable fertilizer manufacturers: Sta-Green- Nursery Special Scott's, or approved equal.

C. Decomposed organic matter: well-rotted organic matter of uniform composition, containing no weeds, grasses, plants, or their seeds, nor any substance harmful to plant pH.

D. Lime: Ground limestone, dolomite type, minimum 95 percent carbonates. Apply at a rate specified in soil test report.

E. Water: Clean, fresh, and free of substances or matter which could inhibit vigorous growth of plants.

F. Coarse Sand: Fine aggregate meeting ASTM C-33; free of substances harmful to plant growth.

G. Expanded shale: Acceptable Manufacturer, Vulcan Materials Co., Shale #540 or approved equal.

2.4 Accessories

A. Wood Pegs: Softwood, sufficient size and length to ensure anchorage of sod on slope.

B. Wire Mesh: Interwoven hexagonal metal wire mesh of two-inch (50mm) size.

C. Herbicide: Chemical pre-emergent, approved. Chemical contact spray, Roundup or approved equal.

2.5 Harvesting Sod

A. Machine cut sod and load on pallets in accordance with TPI Guidelines.

B. Sod shall be cut into strips of uniform width and thickness with square ends.

C. Cut sod in area not exceeding one sq yd (1 sq m), with minimum 1/2-inch (13mm) and maximum one-inch (25 mm) topsoil base.

PART 3 – EXECUTION

3.1 Examination

A. Verify that prepared soil base is ready to receive the work of this Section. Sod bed shall be fine-graded with positive drainage and a firm soil surface.

3.2 Preparation

A. Prior to installing any topsoil or planting mix, the Engineer shall approve the condition of the subgrade and subsurface drainage material.

B. Place topsoil and Planting Mix during dry weather and on dry unfrozen subgrade.

C. Remove vegetative matter and foreign non-organic material from topsoil while spreading.

D. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.

E. Fine grading: Grade the finish surface of all areas to be planted or sodded to meet the grades shown on the drawings after settling. Provide for positive drainage from all areas toward inlets and drainage structures. Provide smooth transitions between slopes of different gradients and direction. Modify grade so that the finish grade is flush with all paving surfaces or as directed by the drawings. The tolerance for dips in lawn areas is 1/2-inch deviation from the plane in 10 feet. The tolerance for dips in planting areas is 1-inch deviation in 10 feet.

F. Thoroughly soak the soil after installation but prior to sodding or planting. Let soil stand for a minimum of three days after soaking to accommodate initial settling. Reset grades after soil has settled.

3.3 Fertilizing

A. Apply fertilizer in accordance with manufacturer's instructions.

B. Apply after smooth raking of topsoil and prior to installation of sod.

C. Apply fertilizer no more than 48 hours before laying sod.

D. Mix thoroughly into upper two inches (50 mm) of topsoil.

E. Lightly water to aid the dissipation of fertilizer.

3.4 Laying Sod

A. Moisten prepared surface immediately prior to laying sod.

B. Lay sod immediately after delivery to site to prevent deterioration. Prevent sod from drying out. Sod damaged from heat or dry conditions shall not be used.

C. Lay sod tight with no open joints visible, and no overlapping; stagger end joints 12 inches (300 mm) minimum. Do not stretch or overlap sod pieces.

D. Lay smooth. Align with adjoining grass areas.

E. Place top elevation of sod 1/2-inch (13 mm) below adjoining edging.

F. On slopes six inches per foot (500 mm per m) and steeper, lay sod perpendicular to slope and secure every row with wooden pegs at maximum two feet (600 mm) on center. Drive pegs flush with soil portion of sod.

G. Prior to placing sod, on slopes exceeding eight inches per foot (666 mm perm) or where indicated, place wire mesh over topsoil. Securely anchor in place with wood pegs sunk firmly into the ground.

H. Water sodded areas immediately after installation. Saturate sod to four inches (100 mm) of soil.

I. After sod and soil have dried, roll sodded areas to ensure good bond between sod and topsoil and to remove minor depressions and irregularities. Roll sodded areas with roller not exceeding 112 lbs (50 kg).

3.5 Clean-Up And Protection

A. Keep project site clean and orderly during planting operations.

B. Clear grounds of debris, superfluous materials and all equipment upon completion of work. Remove from site to the satisfaction of the Engineer and Owner.

C. Protect all work and materials from damage due to landscape operations and operations by other contractors, trades and trespassers. Maintain protection until Date of Substantial Completion.

D. Contractor is responsible for theft of equipment and material at the job site before, during and after installation, until Date of Substantial Completion of Work.

3.6 Maintenance

A. Water landscape areas not covered by automatic irrigation system as necessary to maintain proper moisture level.

B. Fertilize plant material using the following guide:

1. Mid-March application of 23-3-3 (slow release nitrogen)

2. April 1 application of iron chelate

3. Mid-June application of 12-6-6

4. August 1 application of 15-0-15

C. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Two applications (Spring and Fall) of chemical pre-emergent spray, approved. Two applications during growing season of chemical contact spray,

approved. Two days per month manual weeding (by hand) during the period from March 1 to September 30, remove all visible weeds.

D. Observe all applicable laws, statutes, and ordinances regulating the purchase, use application and licensing for all pesticides.

E. Clean up adjacent walks and pavement where littered as a result of maintenance operations.

F. Mowing: Mow grass at regular intervals to maintain a height of 1.5-2 inches. Never remove more than 1/3 of leaf blade at a time. Seeded and sodded lawns should have at least one mowing before receiving Substantial Completion.

G. Immediately remove clippings after mowing and trimming.

H. If thatch exceeds 1/2-inch depth, use a vertical mower, de-thatcher or other suitable equipment to remove excess buildup.

I. Re-sodding: Rework and re-sod areas which fail to show a uniform stand of grass. Perform work with the same sod type until all areas are covered with a uniform stand of grass.

END OF SECTION 02923

1.0 – GENERAL

1.1 Work Included

A. The Contractor shall furnish all labor and materials necessary for preparation of seed beds, mulching, furnishing and sowing grass seeds, furnishing and applying commercial fertilizer and water, and maintenance on the areas designated on the Contract Drawings, or as directed by the Engineer and as specified herein.

B. Refer to all applicable sections of ALDOT Standard Specifications for Highway Construction, Latest Edition.

1.2 Related Work

A. Section 02072 – Selective Demolition

1.3 Definitions

A. Weeds: Includes Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry,Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.4 Regulatory Requirements

A. Comply with regulatory agencies for fertilizer and herbicide composition.

B. All seed used shall comply with the Alabama Seed Law, Act No. 424, General Acts, 1963, Vol. 2, page 931, and rules and regulations promulgated thereunder, and any revisions to the ACT.

C. All fertilizers shall comply with Alabama Fertilizer Laws, Title 2, Sections 282 through 300, Code of Alabama.

1.5 Quality Assurance

A. Provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

B. Installer Qualifications: Adequate numbers of skilled workmen trained and experienced in the work and familiar with the requirements and methods for the performance of the work. On-site superintendent knowledgeable of horticultural practices at all times.

Contractor to provide all labor, equipment, materials and services necessary to complete the Work of this Section.

C. Maintenance Services: Performed by installer.

1.6 Maintenance Data

A. Submit maintenance data for continuing Owner maintenance

B. Include maintenance instructions, cutting method and maximum grass height, types, application frequency, and recommended coverage of fertilizer and herbicide for controlling weeds.

1.7 Delivery, Storage and Handling

A. Deliver products to site.

B. Store and protect products under provisions of Section 01620.

C. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.

D. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.8 Maintenance Service

A. Maintain and water seeded areas immediately after placement until grass is well established and exhibits and vigorous growing condition. Provide a minimum of three cuttings. Provide maintenance for one year after the Date of Substantial Completion or longer until grass is accepted.

1.9 Measurement

A. Seeding and fertilizing will not be measured.

B. Mulching will not be measured.

1.10 Payment

A. There shall be no separate payment for completed and accepted seeding. Item shall be included in lump sum bid, which includes full compensation for all top soil, fertilizing and ground preparation, furnishing and preparing all fertilizers, seeds and inoculants, including water needed in mixing, planting and maintaining of the seeded areas until final acceptance, and for all materials, equipment, tools, and labor necessary to complete the work.

B. There shall be no direct payment for fertilizing or mulching. Fertilizing and mulching are a subsidiary obligation of seeding.

2.0 - PRODUCTS

2.1 Seed Mixture

A. Seed Mixture:

1. Grass Seed Mix 48 (April thru June): Shall be 25% maximum Bermuda grass (Cynodon dactylon) (Hulled) minimum 85% by weight of pure live germinable seed, minimum 98% purity, 37.5% maximum Kentucky 31 or Alta Fescue minimum 85% by weight of pure live germinable seed, minimum 98% purity, and 37.5% maximum Kobe minimum 80% by weight of pure live germinable seed, minimum 95% purity. Seed shall be labeled in accordance with the latest U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act.

2. Grass Seed Mix 58 (July and August): Shall be 28% maximum Bermuda grass (Cynodon dactylon) (Hulled) minimum 85% by weight of pure live germinable seed, minimum 98% purity, 33% maximum Pensacola Bahiagrass minimum 85% by weight of pure live germinable seed, minimum 90% purity, and 39% maximum Reseeding Crimson Clover (Certified or Affidavit Grown) minimum 85% by weight of pure live germinable seed, minimum 99% purity. Seeds shall be labeled in accordance with the latest U.S. Department of Agriculture Rules and Regulation under the Federal Seed Act.

3. Grass Seed Mix 68 (September thru March): Shall be 27% maximum Bermuda grass (Cynodon dactylon) (Unhulled) minimum 85% by weight of pure live germinable seed, minimum 98% purity, 23% Kentucky 31 or Alta Fescue minimum 85% by weight of pure live germinable seed, minimum 98% purity, 27% maximum Reseeding Crimson Clover (Certified or Affidavit Grown) minimum 85% by weight of pure live germinable seed, minimum 99% purity, and , 23% Annual Ryegrass minimum 85% by weight of pure live germinable seed, minimum 98% purity. Seeds shall be labeled in accordance with the latest U.S. Department of Agriculture Rules and Regulation under the Federal Seed Act.

4. Seed mixture shall follow ALDOT specifications, latest edition.

2.2 Accessories

A. Fertilizer: Type 8-8-8 meeting the requirements of Sections 652 and 860 of the Alabama Department of Transportation Specifications, 2001 Edition.

B. Water: Clean, fresh and free of substances or matter which could inhibit vigorous growth of grass.

C. Mulch: Material shall follow the requirements of ALDOT Specifications 652 and 860, latest edition.

2.3 Submittals

A. Submit seed product information, instructions and guaranteed analysis showing seed variety, percentage of seed purity, percentage of germination, percentage of weed and inert matter, net weight, date of packaging or date last tested for germination.

B. Submit manufacturer's product literature, instructions and guaranteed analysis for fertilizer.

3.0 – EXECUTION

3.1 Inspection

A. The Contractor shall notify the Engineer at least twenty-four (24) hours in advance of the time he intends to start inoculating and mixing seed or begin sowing seed and shall not proceed with such work until permission to do so has been given.

B. All ground preparation, incorporation of fertilizer, inoculation of seed, seed mixing, and other work preparatory to planting as well as the operation of sowing, covering, and rolling shall be done in the presence of the Inspector.

C. The Inspector shall verify that prepared soil base is ready to receive the work of this Section.

D. Beginning of installation means acceptance of existing site conditions.

3.2 Ground Preparation

A. Prepare subsoil to eliminate uneven areas and low spots. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

B. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated subsoil.

C. Ground preparation shall consist of cultivation of prepared subsoil grades by disking, harrowing, or plowing to a loose depth of four inches.

D. Stockpiled topsoil shall be spread on the cultivated grades to a minimum depth of four inches and then the area shall be disked or harrowed through the layer of topsoil and at least two inches into the subsoil.

E. If adequate topsoil is not available on the project site, the Contractor shall import topsoil to the site.

F. Excess stockpiled topsoil at the end of seeding and fertilizing operations shall be disposed of as excess soil as directed in Section 02222.

3.3 Fertilizing

A. Fertilizer shall be applied as specified in Section 652.03 of the Alabama Department of Transportation Standard Specifications, Latest Edition to provide a minimum of 120 pounds of nitrogen, 120 pounds of available phosphoric acid and 120 pounds of total potash per acre as computed from the nominal contents of fertilizing ingredients.

B. Apply fertilizer in accordance with manufacturer's instructions at a rate of 1500 lbs per acre.

C. Apply after smooth raking of topsoil and prior to roller compaction.

D. Do not apply fertilizer at same time or with same machine as will be used to apply seed.

E. Lightly water to aid the dissipation of fertilizer.

3.4 Seeding

A. Seed Mixture 48 shall be applied at a rate of 80 lbs. per acre. Seed Mixture 58 shall be applied at a rate of 90 lbs. per acre. Seed Mixture 68 shall be applied at a rate of 110 lbs. per acre. Rake in lightly. Do not seed area in excess of that which can be mulched on same day. Apply same day finish grading is complete.

B. No operations involving seeding shall be undertaken when the weather conditions are unfavorable, such as high winds or rain. The Contractor shall obtain approval of the Engineer prior to undertaking any seeding operations.

C. Apply water with a fine spray immediately after each area has been seeded. Saturate to 4 inches of soil.

3.5 Seed Protection

A. Protect seeded areas from foot and vehicular traffic by placing string around area periphery. Maintain until grass is established.

B. Mulching operations shall follow ALDOT Specification Section 656, Latest Edition.

3.6 Maintenance

A. The Contractor shall produce a dense, vigorous, well established lawn and shall maintain lawn areas until the Owner's acceptance of Substantial Completion.

B. Mow grass at regular intervals to maintain at a maximum height of 7 inches.

C. Water to prevent grass and soil from drying out. A minimum amount of water would be two, one-inch applications of water or rain per week.

D. Roll surface to remove minor depressions or irregularities.

E. Immediately reseed areas which show bare spots. An acceptable lawn is defined as a cover of living grass in which gaps larger than 4" do not occur.

F. Protected seeded areas with warning signs during maintenance period.

3.7 Clean Up and Protection

A. Keep project site clean and orderly during planting operations.

B. Clear grounds of debris, superfluous materials and all equipment upon completion of work. Remove from site to the satisfaction of the Engineer and Owner.

C. Protect all work and materials from damage due to landscape operations and operations by other contractors, trades and trespassers. Maintain protection until Date of Substantial Completion.

D. Contractor is responsible for theft of equipment and material at the job site before, during and after installation, until Date of Substantial Completion of Work.

END OF SECTION

1.0 - GENERAL

1.1 Summary

A. This Section specifies shall cover the work related to concrete formwork. Contractor shall provide all labor, materials, and equipment related to construction of forms that are required for completion of concrete work.

1.2 Measurement

A. There shall be no separate measurement for concrete formwork.

1.3 Payment

A. There shall be no separate payment for concrete formwork. Work shall be considered incidental to concrete work.

2.0 – PRODUCTS

2.1 Materials

A. Forms:
1. Forms shall be constructed with a minimum of mortar-tight joints.
2. Forms shall be straight and not warped or bent.
3. Forms shall be removed after completion of concrete work.
4. Placement of forms shall be such that removal will not damage finished work.
5. Forms shall withstand a minimum of 150 PCF.
6. If spreaders are used, they shall be removed during placement of concrete.
7. Forms shall not be reused unless clean and in good condition.
8. Forms shall be wetted prior to placement of concrete.

3.0 – EXECUTION

3.1 Removal Of Forms

A. Forms shall not be removed until concrete has hardened to the point of being able to sustain its own weight, as well as any additional live loads or other weights that it will be subject to.

B. Forms shall remain in place for a minimum of 24 hours after concrete has been placed.

C. Removal of forms shall be supervised by an experience Foreman or Superintendent.

D. Patching of honeycombed areas shall not be performed until Engineer has inspected.

E. Patching/repair work shall be performed before payment for work.

END OF SECTION 3100

1.0 – GENERAL

1.1 Related Work

A. DIVISION 1

B. Section 03300 - Portland Cement Concrete

C. Section 03100 - Concrete Formwork

1.2 Scope

A. The Contractor shall provide all labor, materials, services, supervision, transportation and equipment necessary to supply and place all reinforcing steel meeting the requirements of this Section.

1.3 References

A. ALDOT Standard Specifications for Highway Construction, Latest Edition.

1.4 Submittals

A. Shop Drawings

1. Prior to fabrication, the Contractor shall submit for review and approval, detailed shop drawings showing the complete layout, bar sizes, spacing, spacing devices, splices, bends and shapes, and arrangements of reinforcing steel and support devices therefor proposed for installation. Include sections and details as required.

2. The Contractor shall also submit shop billings indicating the markings, size, weights, etc., for reinforcing steel.

1.5 Quality Assurance

A. Perform all concrete reinforcing work in accordance with ALDOT Standard Specifications for Highway Construction, Latest Edition, Section 502 and all articles referenced therein.

1.6 Qualifications

A. Steel reinforcements shall be detailed and shop drawings shall be produced by experienced, trained and skilled detailers, who are completely familiar with all requirements and recommendations of all applicable ALDOT Standard Specifications for Highway Construction, Latest Edition, Section 502 and Section 835 along with all related articles.

1.7 Storage

A. Steel reinforcement shall be stored above the surface of the ground upon platforms, skids, or other supports and shall be protected as far as practical from mechanical injury and surface deterioration caused by exposure to conditions producing rust. When placed in work, it shall be free from dirt, scale, dust, paint, oil, and other foreign material.

1.8 Measurement

A. No separate measurement shall be made for reinforcement steel.

1.9 Payment

A. Payment for reinforcing steel in the Curb Inlets, Junction Boxes, Manholes, Headwalls, Thrust Blocks, etc. shall be included in the cost of the pay item being installed. There shall be no direct payment for any reinforcing steel.

2.0 - PRODUCTS

2.1 Material

A. Reinforcing bars shall be intermediate grade open hearth, new steel, Grade 60, deformed billet steel bars conforming to the Standard Specifications for Highway Construction, Latest Edition, Division 800, Materials. Specific reference is made to Section 835, Steel Reinforcement.

2.2 Fabrication

A. Conform to ALDOT Standard Specifications for Highway Construction Section 502 and Section 835 along with all other related Articles referenced therein.

B. Bending shall be done in the shop except when otherwise permitted by the Engineer. Steel reinforcement shall not be bent or straightened in a manner which will injure the material.

C. Bends shall be true to the shapes indicated. Unless otherwise shown on the Plans, bends for stirrups and ties shall be made around a pin having a diameter of not less than 5 times the least dimension of the bar.

D. Reinforcing bars bent in the field shall be bent around a pin not less than six (6) times the diameter of the bar. Reinforcing partially embedded in concrete or mortar in dowel holes shall not be field bent, except as permitted by the Engineer.

E. Bundle reinforcement and tag with suitable identification to facilitate sorting and placing, and transport and store at site so as not to damage material. Keep a supply of approved reinforcement at site to avoid delays.

F. Except as shown on the Plans, bars shall not be spliced without permission of the Engineer. Splices not shown shall be located at points of minimum stress and shall be reviewed by the Engineer. Stagger splices.

3.0 - EXECUTION

3.1 General

A. Reinforcing Steel shall be handled and installed in accordance with ALDOT Standard Specifications for Highway Construction, Latest Edition, Section 502.03 and all articles referenced therein.

B. Verify placement of Work of all other trades which must place work prior to reinforcement.

C. Turn ends of tie wires away from forms and concrete surfaces.

D. Reinforcing bars shall be located and secured tight to the corners of stirrups and ties.

E. Tie splices securely.

F. Support and tie reinforcing steel in design position to prevent displacement from construction load or concrete placement.

3.2 Field Quality Control

A. Notify Engineer when concrete reinforcing steel placement is nearing completion for review. Give a minimum of twenty-four (24) hours notice.

B. Before concrete is placed, carefully check reinforcing, remove all tags, and all bars displaced or bent during the Work shall be fully restored to their intended shape and position.

C. At each location during concrete placing, assign a competent mechanic to inspect reinforcement and maintain bars and mesh in correct position.

END OF SECTION 03110

1.0 - GENERAL

1.1 Related Documents

A. Section 02072 Ductile Iron Watermains and Ductile Iron Fittings

1.2 Summary

A. This Section of specifications covers materials and installation for fire hydrants on City right of way and/or private property.

1.3 Measurement

A. There shall be no separate measurement for fire hydrants.

1.4 Payment

A. There shall be no separate payment for fire hydrants. Item shall be included in lump sum bid. Cost shall include all labor, overhead, and materials associated with the operation. Cost for fire hydrant includes hydrant, stem, sleeves, valves, and other appurtenances required for connection to main.

2.0 – PRODUCTS

2.1 Materials

A. All materials shall meet or exceed AWWA standards.

B. All materials used shall be approved by the City of Winfield and follow the *"City of Winfield Water Distribution System Engineering Standards"*. Contractor is encouraged to review these standards prior to bidding.

C. Type/Model: AWWA C502

D. Approved Manufacturers:
   a. American Cast Iron Pipe Co. Mark 73
   b. Mueller Centurion
   c. M&H Valve Co. Model 129
   d. Clow Valve Company Medallion
   e. U.S. Pipe Company Metropolitan 250 M-94

E. Test pressure requirement of 300 psi. Working pressure requirement of 175 psi.

F. 4 ½" Valve opening required.

G. Two 2 ½" hose nozzles thread spec NST.

H. One 4 ½" pumper nozzle, thread spec GA 4-556.

I. Operating nut shall be 1 ½" pentagonal bronze left opening.

J. 6" mechanical joint or flanged shoe required.

K. Fire hydrant shall be painted red enamel.

L. Fire hydrant shall include break-away traffic model safety flanges.

M. Fire hydrant shall include non-kinking chains, rubber gasket sealed caps, double drain valves and double drain openings, and positive stop stem.

N. All operating parts shall be bronze.

O. Bonnet assembly shall be one piece and provided with an oil reservoir and lubrication system that automatically lubricates each use.

P. Drain valve system shall be fully automatic and not requiring field adjustment, sealed when hydrant is fully open and forced-flushed when hydrant is opened and closed.

2.2 Quality Assurance

A. Manufacturer's shop drawings, technical specifications, testing certifications, and/or other necessary quality assurances shall be submitted for approval, prior to materials being onsite.

B. All materials shall be new and labeled appropriately.

2.3 Handling/Storage

A. No pipe, fitting, valve, or other materials shall be stored on ground. Materials shall be stored on pallets, timbers, or other methods so that they are stored above the ground.

B. All materials shall be stored in a way that is protective of the elements.

C. Damaged pipe, fittings, valves, or other related appurtenances shall be immediately removed from site, in the event of damage.

E. All materials shall be stored in a safe method.

F. Materials shall not be stored in direct sunlight.

3.0 - EXECUTION

3.1 Installation

A. All materials shall be examined for defects and damage before installation.

B. Contractor shall take care not to damage or disturb existing utilities.

C. Trenches shall be prepared to proper grade and alignment prior to installation. The bury length shall have been sized and depth of trench shall be matched so that proper height setting is achieved.

D. Trenches shall be clean and free of debris, refuse, roots, loose material, or other obstructions before installation.

E. Trench bottom shall be prepared, as presented in plans. In the event bedding material is required, proper material type and thickness shall be achieved before placement.

F. Sand, debris, moisture, or any other foreign materials shall be removed from all gaskets prior to placement of hydrant and related appurtenances.

G. Hydrant pipe, valves, taps, and fittings shall be handled with care. Contractor shall not allow equipment and/or tools to damage materials, including but not limited to, scratches and broken pieces or parts.

H. Contractor shall follow Manufacturer's recommendations for installation and connection of materials.

I. Contractor shall follow Manufacturer's recommendations for cutting or modifying materials.

J. In the event placed materials do not meet line and grade, as deemed appropriate by Engineer, materials shall be removed immediately and replaced.

K. During backfill operations, care shall be taken to prevent damage or movement of the hydrant installation. Backfill material shall meet the requirements of the plans and specifications.

L. Thrust blocks shall be placed as indicated in plans. No separate payment shall be made for thrust blocks.

M. Hydrant shall be plumb and at a finished grade such that the ground line is below (2" maximum) the safety flange connection.

N. Hydrant shall be positioned such that the 4 ½" hose connection faces the normal fire apparatus route.

END OF SECTION

1.0 – GENERAL

1.1 Related Documents

A. Section 02072 Ductile Iron Watermains and Ductile Iron Fittings

1.2 Summary

A. This Section of specifications covers materials and installation for watermain taps.

1.3 Measurement

A. Tapping valves shall have no separate measurement and shall be considered incidental to watermain tap. This includes labor, materials, operations, and other material items associated with tap.

B. Valve boxes shall have no separate measurement and shall be considered incidental to watermain tap and shall be included, as such.

C. Tapping sleeves shall have no separate measurement and shall be considered incidental to watermain tap and shall be included, as such.

D. Restraint glands shall have no separate measurement and shall be considered incidental to watermain tap and shall be included, as such.

E. Watermain taps shall be measured per each, installed and accepted.

1.4 Payment

A. There shall be no separate payment for tapping valves. Tapping valves shall be considered incidental to watermain tap and shall be included, as such.

B. There shall be no separate payment for valve boxes. Valve boxes shall be considered incidental to watermain tap and shall be included, as such.

C. There shall be no separate payment for tapping sleeves. Tapping sleeves shall be considered incidental to watermain tap and included, as such.

D. There shall be no separate payment for restraint glands. Restraint glands shall be considered incidental to watermain tap and included, as such.

E. There shall be no separate payment for watermain taps. Cost shall include all labor and materials associated with the operation and be included in the lump sum bid.

1.5 References

A. AWWA C509

B. AWWA C102-53

C. AWWA C105-53

D. AWWA C108-53

2.0 – PRODUCTS

2.1 MATERIALS

A. All materials shall meet or exceed AWWA standards.

B. All materials used shall be approved by the City of Winfield and follow the *"City of Winfield Water Distribution System Engineering Standards"*. Contractor is encouraged to review these standards prior to bidding.

C. Tapping Valves:

a. Valves shall have a non-rising stem.

b. Valve shall provide a counter-clockwise opening, 2" square operating nut, and "O" ring seals.

c. Valves shall be asphalt varnish coated (or approved equal). The connection end shall be mechanical joint. Seat opening shall be larger than nominal size to allow for full diameter cuts.

d. Type/Model: AWWA C509

e. Tapping Valve Approved Manufacturers:

a. American Cast Iron Pipe Company
b. U.S. Pipe
c. Mueller
d. Clow
e. M&H Valve Company

D. Valve Boxes:

a. Valve boxes shall have cast iron adjustable screw top. Shall be adjustable from 18"- 24" and 24"-36".

b. Valve box caps shall have the word "WATER" cast in.

c. Valve box caps shall have two slots for hooks.

d. Valve box inside diameter shall be 5 ¼".

e. Valve box bottom shall have a flared end, in order to prevent settling.

f. Type/Model: Cast Iron Adjustable Screw Top

g. Valve Box Approved Manufacturers:

a. Opelika Foundry (#4905)
b. Tyler Foundry (#6850)
c. Bingham and Taylor (#4905)

E. Tapping Sleeves:

a. Tapping sleeves shall be mechanical joint type.

b. Tapping sleeves shall be rated for 200 psig.

c. Type/Model: AWWA C102-53, C105-53, C108-53

d. Tapping Sleeve Approved Manufacturers:

a. Mueller
b. M&H
c. Clow
d. U.S. Pipe

F. Restraint Glands, Mechanical Joint

a. Shall be heat-treated to minimum hardness of 370 BHN.

b. Shall fit standard bell and tee-headed bolts.

c. Shall use twist-off nut heads to ensure correct bolt torque.

d. Shall have a working pressure rating of 250 psi, with 2:1 FOS.

e. Type/Model: Ductile Iron
ASTM A536-80
ANSI/AWWA C111/A21.11 (Gaskets)
ANSI/AWWA C153/A21.53-84 (Compact Fittings)
ANSI/AWWA C110/A21.10

f. Approved Manufacturers:

a. EBAA Iron, Inc.
b. MEGALUG
c. STAR Pipe Products

2.2 Quality Assurance

A. Manufacturer's shop drawings, technical specifications, testing certifications, and/or other necessary quality assurances shall be submitted for approval, prior to materials being onsite.

B. All materials shall be new and labeled appropriately.

2.3 Handling/Storage

A. No pipe, fitting, valve, or other materials shall be stored on ground. Materials shall be stored on pallets, timbers, or other methods so that they are stored above the ground.

B. All materials shall be stored in a way that is protective of the elements.

C. Damaged pipe, fittings, valves, or other related appurtenances shall be immediately removed from site, in the event of damage.

E. All materials shall be stored in a safe method.

F. Materials shall not be stored in direct sunlight.

3.0 - EXECUTION

3.1 Installation

A. All materials shall be examined for defects and damage before installation.

B. Contractor shall take care not to damage or disturb existing utilities.

C. Trenches shall be prepared to proper grade and alignment prior to installation.

D. Trenches shall be clean and free of debris, refuse, roots, loose material, or other obstructions before installation of pipe.

E. Trench bottom shall be prepared, as presented in plans. In the event bedding material is required, proper material type and thickness shall be achieved before pipe placement.

F. Sand, debris, moisture, or any other foreign materials shall be removed from pipe gasket prior to placement of pipe.

G. Pipe, valves, taps, and fittings shall be handled with care. Contractor shall not allow equipment and/or tools to damage pipe, including but not limited to, scratches and broken pieces or parts.

H. Contractor shall follow Manufacturer's recommendations for installation and connection of materials.

I. Contractor shall follow Manufacturer's recommendations for cutting or modifying materials.

J. In the event placed materials do not meet line and grade, as deemed appropriate by Engineer, materials shall be removed immediately and replaced.

K. During backfill operations, care shall be taken to prevent damage or movement of the tap. Backfill material shall meet the requirements of the plans and specifications.

L. All fittings and valves shall be installed with restrainer glands.

M. Tapping sleeves shall be blocked during tapping.

N. Tapping sleeves shall be static tested with water or air prior to tapping the watermain. The coupon shall be presented to IPS and approved before proceeding.

END OF SECTION

1.0 – GENERAL

1.1 Related Documents

A. Section 02072 Ductile Iron Watermains and Ductile Iron Fittings

1.2 Summary

A. This Section of specifications covers materials and installation for gate valves in watermains.

1.3 Measurement

A. There shall be no separate measurement for gate valves.

1.4 Payment

A. There shall be no separate payment for gate valves. Item shall be included in lump sum bid. Cost shall include all labor, overhead, and materials associated with the operation. Cost for gate valves includes all thrust blocks and other appurtenances required for installation.

2.0 – PRODUCTS

2.1 Materials

A. All materials shall meet or exceed AWWA standards.

B. All materials used shall be approved by the City of Winfield and follow the *"City of Winfield Water Distribution System Engineering Standards"*. Contractor is encouraged to review these standards prior to bidding.

C. Type/Model: AWWA C509

D. Approved Manufacturers:
   a. American Cast Iron Pipe Co.
   b. Mueller Centurion
   c. M&H Valve Co. Model 129
   d. Clow Valve Company Medallion
   e. U.S. Pipe Company Metropolitan 250 M-94

E. A non-rising stem is required, capable of removal without disassembly and interchangeable with like-size valve stems.

F. Requires a counter-clockwise opening, 2" square operating nut and "O" ring seals.

G. Requires an asphalt varnish coat or approved equal.

H. Gate valves shall be of the mechanical joint variety. Flanged joints shall be used in the event the valve is located inside a box or structure.

2.2 Quality Assurance

A. Manufacturer's shop drawings, technical specifications, testing certifications, and/or other necessary quality assurances shall be submitted for approval, prior to materials being onsite.

B. All materials shall be new and labeled appropriately.

C. Once installed, torque on bolts shall be verified with a torque wrench.

D. Valves shall be pressure-tested at same pressure as carrier pipe, but in no case greater than two times the working pressure of the valve.

2.3 Handling/Storage

A. No pipe, fitting, valve, or other materials shall be stored on ground. Materials shall be stored on pallets, timbers, or other methods so that they are stored above the ground.

B. All materials shall be stored in a way that is protective of the elements.

C. Damaged pipe, fittings, valves, or other related appurtenances shall be immediately removed from site, in the event of damage.

E. All materials shall be stored in a safe method.

F. Materials shall not be stored in direct sunlight.

3.0 - EXECUTION

3.1 Installation

A. All materials shall be examined for defects and damage before installation.

B. Contractor shall take care not to damage or disturb existing utilities.

C. Trenches shall be prepared to proper grade and alignment prior to installation. Valves shall be set and adjusted according to finished ground elevation.

D. Trenches shall be clean and free of debris, refuse, roots, loose material, or other obstructions before installation.

E. Trench bottom shall be prepared, as presented in plans. In the event bedding material is required, proper material type and thickness shall be achieved before placement.

F. Sand, debris, moisture, or any other foreign materials shall be removed from all gaskets prior to placement of valve and related appurtenances.

G. Pipe, valves, taps, and fittings shall be handled with care. Contractor shall not allow equipment and/or tools to damage materials, including but not limited to, scratches and broken pieces or parts.

H. Contractor shall follow Manufacturer's recommendations for installation and connection of materials.

I. Contractor shall follow Manufacturer's recommendations for cutting or modifying materials.

J. In the event placed materials do not meet line and grade, as deemed appropriate by Engineer, materials shall be removed immediately and replaced.

K. During backfill operations, care shall be taken to prevent damage or movement of the valve installation. Backfill material shall meet the requirements of the plans and specifications.

L. Thrust blocks shall be placed as indicated in plans. No separate payment shall be made for thrust blocks.

M. Valve shall be plumb and at finished grade.

N. Valve shall be installed in the closed position.

O. Valves shall be installed with a footing for support. At no time during construction shall valve be unsupported.

END OF SECTION

1.0 - GENERAL

1.1 Scope

A. Section covers requirements for installation and testing of watermain and related appurtenances. When completed, system shall be free from leaks and complete for operation by the Owner.

1.2 Related Sections

A. Section 03340 Ductile Iron Pipe and Fittings

B. Section 03350 Polyvinyl Chloride Pipe

1.3 Measurement

A. There shall be no separate measurement for watermain installation.

1.4 Payment

A. There shall be no separate payment for watermain installation. Item shall be included in lump sum for project. Work shall include all labor and materials, including all related work, including but not limited to trench excavation, backfill and compaction, testing and procedures.

1.5 References

A. AWWA C600

B. AWWA C900

1.6 Agencies Governing This Installation

A. The City of Winfield.

B. Alabama Department of Environmental Management (ADEM).

2.0 – PRODUCTS

2.1 Materials

A. All materials and products shall meet the requirements of these specifications.

B. All materials shall meet the requirements of the City of Winfield.

C. All materials and products shall be new and unused.

D. The Contractor is responsible for providing all testing equipment for this project.

E. Watermains two inches in diameter shall be PVC, Class 200. Watermains four inches in diameter through twelve inches in diameter shall be Ductile Iron, Cass 52. Watermains fourteen inches and greater shall be Ductile Iron, Class 50.

3.0 – EXECUTION

3.1 Installation

A. Before installation, trench shall be cleared of all debris, loose material, or other items and objects that may affect proper installation.

B. Proper alignment and grade shall be checked before installation.

C. Pipe shall be inspected for defects or abnormalities before installation. Proper handling and storage shall be used to ensure the reduced risk of possible damage to the materials, including delivery. In the event pipe is damaged, it shall be removed from jobsite.

D. Trenching, Backfill and Compaction shall comply with Section of the specifications.

E. Pipe shall be inspected for dirt and debris and cleaned accordingly.

F. Once spigot end is clean, apply lubricant. Lubricant shall be from manufacturer of pipe.

G. Detector wire shall be installed in the same trench with the pipe. Material shall be 12-gauge T.W. copper wire. Wire shall be connected to the pipe every 20 feet and to all fittings.

H. All pipe shall have a minimum cover of 30".

I. Valves, double detector checks, and Siamese connections shall be installed at locations shown on the drawings.

J. Trench shall be covered as work progresses. Trench shall not remain open for extended periods of time, including overnight.

K. Separation from Existing Utilities:

1. A horizontal separation of 5 feet shall be maintained.

2. When crossing sanitary sewer lines, the line shall be installed at minimum of 18" above the sanitary sewer line.

L. Thrust Restraints:

1. Thrust restraints are required for this project. Thrust restraints shall be provided at all fittings, turns, and bends.

2. Shall consist of concrete thrust blocks, including restraining rods, at all fittings, bends, elbows, and valves.

3. Bearing area for thrust blocks are shown on plans.

4. Concrete shall be 3000 psi in 28 days.

5. Contractor shall take care, when placing concrete, not to damage fittings. Contractor shall make sure that placement of concrete does not prohibit future maintenance and access to fittings, bolts, etc.

M. Restrainer Glands are required at all fittings, valves, and hydrants.

3.2 Testing Procedure

A. No section of system, or its entirety, will be accepted by Owner until proper flushing and testing procedures have been performed and accepted by Engineer. A written plan shall be submitted to the Engineer prior to testing.

B. Debris shall be removed and line flushed before beginning testing. Flushing shall be of adequate velocity to remove dirt and debris. A minimum velocity of 2.5 FPS shall be used.

C. Any entrained and trapped air shall be expelled from the line prior to testing.

D. Hydrostatic Pressure Testing:

1. Contractor shall notify the Engineer 48 hours in advance of planned testing.

2. Line shall be filled with water at a slow and steady rate.

3. Line shall be pressurized to 1.5 times the working pressure of the line installed. In no event shall the line be pressure tested less than 150 psi. Owner and Engineer shall provide working pressure.

4. Test shall last a minimum of 6 hours.

5. Contractor shall provide a pressure recording device that will be installed and record for the entire period of time.

6. Engineer shall have access to testing while ongoing.

7. In the event leakage exceeds the maximum allowable, line shall be repaired and retested, and so on.

8. Charts shall be provided to the Engineer upon completion of test.

9. Maximum Allowable Leakage shall be determined as follows:

$$L = \frac{SDP^{1/2}}{148{,}000}$$

L = Allowable Leakage in Gallons Per Hour
S = Length of Pipe Tested in Feet
D = Diameter of Pipe in Inches
P = Average Test Pressure in Pounds Per Square Inch

E. Disinfection:

1. No watermain shall be accepted or placed into service until it has been property disinfected, following AWWA C651.

2. Prior to sampling, all lines shall be flushed at a minimum velocity of 2.5 FPS.

3. Bacteriological samples shall be provided to an approved laboratory for testing.

4. In the event of a failed test, lines shall be flushed again and another sample shall be submitted for testing.

5. Engineer shall be notified 48 hours in advance of any sampling and testing.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

1. Footings.
2. Slabs-on-grade

B. Related Sections include the following:

1. Section 02300 "Earth Work" for drainage fill under slabs-on-grade.
2. Section 02751 for concrete pavement and walks.
3. Division 5 for metals.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 SUBMITTALS

A. Shop Drawings, General:

1. Submit all shop drawings on one reproducible print and two copies only. The reproducible print will be returned. All other reproductions required by the Contractor are the responsibility of the Contractor and shall be made after reproducible is returned.
2. The contractor shall fill out the Concrete Submittal Checklist and include it as part of his mix design and/or shop drawing submittal package(s). Submittals without the checklist will be returned unchecked as an incomplete submittal. The checklist sheet is located at the end of this specification section.
   a. If there Pare questions, clarifications, modifications, or other items where information, a response, or approval is requested, such items must be written on the checklist. Only indicating such items on the shop drawings or within the calculations is not sufficient. Where items are not specifically listed on the checklist and subsequently not explicitly approved by the Structural Engineer of Record, such items are not to be considered approved or considered.
3. All shop drawings which are resubmitted for any reason shall have all revised items clouded or identified for each submittal.

4. Contract documents shall not be used for shop drawing, including erection plans or details.

B. Product Data: For each type of product indicated.

C. Design Mixtures: Prepare design mixes for each type and strength of concrete by either laboratory trial mixtures or field experience methods as specified in ACI 318-05 Section 5.3. If trial mixtures method used, the contractor is to provide and use an independent testing facility for preparing and reporting proposed mix designs.

1. All concrete mix designs shall include the following information:
   a. Proportions of cement, fine and coarse aggregate and water.
   b. Water/cement ratio, design strength, slump and air content.
   c. Type of cement and aggregates.
   d. Type and dosage of all admixtures.
   e. Type, color and dosage of integral coloring compounds, where applicable.
   f. Special requirements for pumping.
   g. Any special characteristics of the mix which require precautions in the mixing, placing or finishing techniques to achieve the finished product specified.
   h. Dated test data for the laboratory trial mixture or filed experience method.
   i. Material certifications (materials shall meet the requirements of section 2.5 below)
      1) Cementitious materials.
      2) Admixtures.
      3) Aggregates

2. Submit written reports to Architect and Structural Engineer of Record of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until proposed mix designs have been reviewed and approved by Architect and Structural Engineer of Record.

D. Contract documents shall not be used for shop drawing, including erection plans or details.

E. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

F. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.
1. Shop drawings for formwork, prepared for fabrication and erection of forms for specific finished concrete surfaces. Show form construction including jointing, special form joint or reveals, location and pattern of form tie placement, and other items that affect exposed concrete visually.
   a. Architect's review is for general architectural applications and features only. Design of formwork for structural stability and efficiency is Contractor's responsibility.

G. Samples: Submit samples of materials as requested by Architect, including names, sources, and descriptions for waterstops, vapor retarder and other products indicated by Architect.

H. Welding certificates.

I. Qualification Data: For Installer, manufacturer and testing agency.

J. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

K. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Fiber reinforcement.
6. Waterstops.
7. Curing compounds.
8. Floor and slab treatments.
9. Bonding agents.
10. Adhesives.
11. Vapor retarders.
12. Semirigid joint filler.
13. Joint-filler strips.
14. Repair materials.

L. Floor surface flatness and levelness measurements to determine compliance with specified tolerances.

M. Field quality-control test and inspection reports.

N. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

D. The Owner shall employ an approved Testing Agency to perform concrete and concrete related tests and inspections (that are not specifically noted as the contractor's responsibility) as required by the Building Code, Project Documents, the Architect, and the Structural Engineer of Record.

E. The contractor shall employ at his expense an approved Testing Agency as defined above to perform the following:
   1. Evaluation of trial mixtures and/or concrete testing for mix design submission.
   2. Qualification of proposed materials and establishment of concrete mixtures.
   3. Other testing services needed or required by the contractor.

F. Materials and installed work may require testing and retesting at any time during progress of work. Tests, including retesting of rejected materials for installed work, shall be done at Contractor's expense.

G. Testing Responsibilities of the Contactor:
   1. Submit data on qualifications of Contractor's proposed testing agency. Use of testing services will not relive the Contractor of the responsibility to furnish materials and construction in full compliance with the Contract Documents.
   2. Furnish any labor necessary to assist Owner's testing agency in obtaining and handling samples at the project site or at the source of materials.
   3. Advise Owners Testing Agency at least 24 hours in advance of operations to allow for completion of quality tests and assignment of personnel.
   4. At the Contractor's expense, provide and maintain for the sole use of the Owner's Testing agency adequate facilities for the safe storage and proper curing of concrete test specimens on the project site for initial curing as required by ASTM C31.

H. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

I. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."

J. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

   1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5.
   2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
   3. ACI 302 "Guide for Concrete Floor and Slab Construction".
   4. ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete".
   5. ACI 305 "Hot Weather Concreting".
   6. ACI 306 "Cold Weather Concreting".
   7. ACI 309 "Guide for Consolidation of Concrete".
   8. ACI 347 "Recommended Practice for Concrete Formwork".
   9. Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice."

K. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

L. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

a. Contractor's superintendent.
b. Independent testing agency responsible for concrete design mixtures.
c. Ready-mix concrete manufacturer.
d. Concrete subcontractor.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
2. Products: Subject to compliance with requirements, provide one of the products specified.
3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

a. High-density overlay, Class 1 or better.
b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
c. Structural 1, B-B or better; mill oiled and edge sealed.

d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.

E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces, and adhesion of membranes to concrete.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

B. Galvanized Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420) ASTM A 706/A 706M, deformed bars, ASTM A 767/A 767M, Class I zinc coated after fabrication and bending.

C. Epoxy-Coated Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420) ASTM A 706/A 706M, deformed bars, epoxy coated, with less than 2 percent damaged coating in each 12-inch (300-mm) bar length.

D. Plain-Steel Wire: ASTM A 82, as drawn.

E. Deformed-Steel Wire: ASTM A 496.

F. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

G. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.

2.4 REINFORCEMENT ACCESSORIES

A. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 775M.

B. Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

2.5 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I, gray or white. Supplement with the following:

   a. Fly Ash: ASTM C 618, Class C or F.
      1) Limit use of fly ash to not exceed 25 percent of cementitious content by weight.
   b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
      1) Limit use of Ground Granulated Blast-Furnace Slag to not exceed 50 percent of cementitious content by weight.

2. Blended Hydraulic Cement: ASTM C 595, Type [IS, portland blast-furnace slag] [IP, portland-pozzolan] [I (PM), pozzolan-modified portland] [I (SM), slag-modified portland] cement.

B. Silica Fume: ASTM C 1240, amorphous silica.

C. Normal-Weight Aggregates: ASTM C 33, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 3/4 inch (19 mm) nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Water: ASTM C 94/C 94M and potable.

2.6 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride. Use of admixture must be approved by the Structural Engineer of Record. Include admixtures as part of mix design submittal.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

C. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C. Set-Accelerating Corrosion-Inhibiting Admixtures must be approved by the Structural Engineer of Record. Include admixtures as part of mix design submittal.

1. Available Products:

    a. Boral Material Technologies, Inc.; Boral BCN.
    b. Euclid Chemical Company (The); Eucon CIA.
    c. Grace Construction Products, W. R. Grace & Co.; DCI.
    d. Master Builders, Inc.; Rheocrete CNI.
    e. Sika Corporation; Sika CNI.

D. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete. Non-Set-Accelerating Corrosion-Inhibiting Admixture must be approved by the Structural Engineer of Record. Include admixtures as part of mix design submittal.

1. Available Products:

    a. Axim Concrete Technologies; Catexol 1000CI.
    b. Boral Material Technologies, Inc.; Boral BCN2.
    c. Grace Construction Products, W. R. Grace & Co.; DCI-S.
    d. Master Builders, Inc.; Rheocrete 222+.
    e. Sika Corporation; FerroGard-901.

E. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis. See architectural drawings and site plan for concrete requiring color pigment.

1. Available Manufacturers:

    a. Bayer Corporation.
    b. ChemMasters.
    c. Conspec Marketing & Manufacturing Co., Inc.; a Dayton Superior Company.
    d. Davis Colors.
    e. Elementis Pigments, Inc.
    f. Hoover Color Corporation.
    g. Lambert Corporation.

h. Scofield, L. M. Company.
i. Solomon Colors.

2. Color: As selected by Architect from manufacturer's full range.

2.7 WATERSTOPS

A. Flexible PVC Waterstops: CE CRD-C 572, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

1. Available Manufacturers:

a. Bometals, Inc.
b. Greenstreak.
c. Meadows, W. R., Inc.
d. Tamms Industries, Inc.
e. Vinylex Corp.

2. Profile: As indicated.
3. Dimensions: As indicated; nontapered.

2.8 VAPOR RETARDERS

A. Underslab Vapor Barrier 1: 15 mil minimum thickness, Multi-layer, fabric-, cord-, grid-, or aluminum-reinforced, high density polyethylene, or polyolefin equivalent, complying with ASTM E 1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Single ply polyethylene is prohibited.
1. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations in vapor retarder.
2. Basis of Design Product:
a. STEGO INDUSTRIES LLC Product Stego Wrap (15-mil) Vapor Barrier ; www.stegoindustries.com
3. Other Acceptable products
a. Fortifiber Building Systems Group Product Moistop Ultra® 15; www.fortifiber.com.
b. Reef Industries Product Griffolyn 15 Mil ; www.reefindustries.com.
c. W.R. Meadows Inc. Product PERMINATOR 15 ; www.wrmeadows.com.
d. Substitutions: See Section 01 6000 - Product Requirements.

B. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

C. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a 3/8-inch (9.5-mm) sieve, 10 to 30 percent passing a No. 100 (0.15-mm) sieve, and at least 5 percent passing No. 200 (0.075-mm) sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

2.9 FLOOR AND SLAB TREATMENTS

A. General: The contractor shall coordinate and insure that all floor and slab treatments, curing materials and compounds, finish floor materials, related materials, paints, and repair compounds are compatible.

B. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces. To be applied where concrete indicated to be sealed in Architectural Drawings.

1. Available Products:

a. Burke by Edoco; Titan Hard.
b. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Intraseal.
c. Dayton Superior Corporation; Day-Chem Sure Hard.
d. Euclid Chemical Company (The); Euco Diamond Hard.
e. L&M Construction Chemicals, Inc.; Seal Hard.
f. Meadows, W. R., Inc.; Liqui-Hard.
g. Nox-Crete Products Group, Kinsman Corporation; Duranox.

C. For additional information on color stained concrete see 03032 Color Stained concrete specifications.

2.10 CURING MATERIALS

A. General: The contractor shall coordinate and insure that all floor and slab treatments, curing materials and compounds, finish floor materials, related materials, paints, and repair compounds are compatible. Evaporation retarder shall not be used where epoxy floor covering is to be placed; slab shall be wet cured with Absorptive Cover or Moisture-Retaining Cover as indicated below.

1. The contractor shall verify and be responsible for insuring the VOC emission limits of authorities having jurisdiction are not exceeded during the project.

B. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

1. Available Products:
a. Burke by Edoco; BurkeFilm.
b. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Aquafilm.
c. Dayton Superior Corporation; Sure Film.
d. Euclid Chemical Company (The); Eucobar.
e. L&M Construction Chemicals, Inc.; E-Con.
f. Meadows, W. R., Inc.; Sealtight Evapre.
g. Nox-Crete Products Group, Kinsman Corporation; Monofilm.
h. Sika Corporation, Inc.; SikaFilm.

C. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

D. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet or natural fiber matting attached to plastic sheet backing. Acceptable product is Aquacure by DRC, exclusive distributor - Greenstreak Group, Inc. 800-325-9504, or equal.

E. Water: Potable.

F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating. Review curing compounds with manufacturer and waterproofing manufacturer to make sure curing compound does not inhibit adhesion.

1. Available Products:

a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
b. Burke by Edoco; Aqua Resin Cure.
c. ChemMasters; Safe-Cure Clear.
d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; W.B. Resin Cure.
e. Dayton Superior Corporation; Day Chem Rez Cure (J-11-W).
f. Euclid Chemical Company (The); Kurez DR VOX.
g. Kaufman Products, Inc.; Thinfilm 420.
h. Lambert Corporation; Aqua Kure-Clear.
i. L&M Construction Chemicals, Inc.; L&M Cure R.
j. Meadows, W. R., Inc.; 1100 Clear.
k. Nox-Crete Products Group, Kinsman Corporation; Resin Cure E.
l. Symons Corporation, a Dayton Superior Company; Resi-Chem Clear Cure.
m. Tamms Industries, Inc.; Horncure WB 30.
n. Unitex; Hydro Cure 309.
o. US Mix Products Company; US Spec Maxcure Resin Clear.
p. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.

G. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

1. Available Products:

a. Anti-Hydro International, Inc.; AH Clear Cure WB.
b. Burke by Edoco; Spartan Cote WB II.
c. ChemMasters; Safe-Cure & Seal 20.
d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Cure and Seal WB.
e. Dayton Superior Corporation; Safe Cure and Seal (J-18).
f. Euclid Chemical Company (The); Aqua Cure VOX.
g. Kaufman Products, Inc.; Cure & Seal 309 Emulsion.
h. Lambert Corporation; Glazecote Sealer-20.
i. L&M Construction Chemicals, Inc.; Dress & Seal WB.
j. Meadows, W. R., Inc.; Vocomp-20.
k. Metalcrete Industries; Metcure.
l. Nox-Crete Products Group, Kinsman Corporation; Cure & Seal 150E.
m. Symons Corporation, a Dayton Superior Company; Cure & Seal 18 Percent E.
n. Tamms Industries, Inc.; Clearseal WB 150.
o. Unitex; Hydro Seal.
p. US Mix Products Company; US Spec Hydrasheen 15 percent
q. Vexcon Chemicals, Inc.; Starseal 309.

H. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 18 to 25 percent solids, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

1. Available Products:

a. Burke by Edoco; Spartan Cote WB II 20 Percent.
b. ChemMasters; Safe-Cure Clear.
c. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; High Seal.
d. Dayton Superior Corporation; Safe Cure and Seal (J-19).
e. Euclid Chemical Company (The); Diamond Clear VOX.
f. Kaufman Products, Inc.; SureCure Emulsion.
g. Lambert Corporation; Glazecote Sealer-20.
h. L&M Construction Chemicals, Inc.; Dress & Seal WB.
i. MBT Protection and Repair, Div. of ChemRex; MasterKure-N-Seal VOC.
j. Meadows, W. R., Inc.; Vocomp-20.
k. Metalcrete Industries; Metcure 0800.
l. Nox-Crete Products Group, Kinsman Corporation; Cure & Seal 200E.
m. Sonneborn, Div. of ChemRex; Kure-N-Seal.
n. Symons Corporation, a Dayton Superior Company; Cure & Seal 18 Percent E.
o. Tamms Industries, Inc.; Clearseal WB STD.
p. Unitex; Hydro Seal 18.
q. US Mix Products Company; US Spec Radiance UV-25
r. Vexcon Chemicals, Inc.; Starseal 0800.

I. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

1. Available Products:

a. Burke by Edoco; Cureseal 1315.
b. ChemMasters; Spray-Cure & Seal Plus.
c. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Sealcure 1315.
d. Dayton Superior Corporation; Day-Chem Cure and Seal (J-22UV).
e. Euclid Chemical Company (The); Super Diamond Clear.
f. Kaufman Products, Inc.; Sure Cure 25.
g. Lambert Corporation; UV Super Seal.
h. L&M Construction Chemicals, Inc.; Lumiseal Plus.
i. Meadows, W. R., Inc.; CS-309/30.
j. Metalcrete Industries; Seal N Kure 0.
k. Sonneborn, Div. of ChemRex; Kure-N-Seal 5.
l. Tamms Industries, Inc.; LusterSeal 300.
m. Unitex; Solvent Seal 1315.
n. US Mix Products Company; US Spec CS-25
o. Vexcon Chemicals, Inc.; Certi-Vex AC 1315

J. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

1. Available Products:

a. Burke by Edoco; Cureseal 1315 WB.
b. ChemMasters; Polyseal WB.

c. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Sealcure 1315 WB.
d. Euclid Chemical Company (The); Super Diamond Clear VOX.
e. Kaufman Products, Inc.; Sure Cure 25 Emulsion.
f. Lambert Corporation; UV Safe Seal.
g. L&M Construction Chemicals, Inc.; Lumiseal WB Plus.
h. Meadows, W. R., Inc.; Vocomp-30.
i. Metalcrete Industries; Metcure 30.
j. Symons Corporation, a Dayton Superior Company; Cure & Seal 31 Percent E.
k. Tamms Industries, Inc.; LusterSeal WB 300.
l. Unitex; Hydro Seal 25.
m. US Mix Products Company; US Spec Radiance UV-25.
n. Vexcon Chemicals, Inc.; Vexcon Starseal 1315.

K. For additional information on finishing and sealing floor surfaces to receive color stained concrete see COLOR STAINED CONCRETE - RESURFACING - SECTION 03032

2.11 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 typically unless noted or aromatic polyurea at traffic areas with a Type A shore durometer hardness range of 90 to 95 per ASTM D 2240.

C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

E. Reglets: Fabricate reglets of not less than 0.0217-inch- (0.55-mm-) thick, galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

2.12 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested according to ASTM C 109/C 109M.

2.13 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Concrete type, slump, air content, and maximum water to cementitious content shall be as shown on the Structural Drawings.

C. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent. Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 25 percent.
2. Combined Fly Ash and Pozzolan: 25 percent.
3. Ground Granulated Blast-Furnace Slag: 50 percent.
4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.
5. Silica Fume: 10 percent.
6. Combined Fly Ash, Pozzolans, and Silica Fume: 35 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
7. Combined Fly Ash or Pozzolans, Ground Granulated Blast-Furnace Slag, and Silica Fume: 50 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.

D. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.

E. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use of admixture must be approved by the Structural Engineer of Record. Include admixtures as part of mix design submittal
2. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
3. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

4. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
5. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

F. Slump Limits: Proportion and design mixes to result in slump at point of placement as shown on the drawings.
1. When use of a Type I or II plasticizing admixture conforming to ASTM C 1017 or when a Type F or G high range water reducing admixture conforming to ASTM C494 is permitted, concrete shall have a slump of 2 to 4 inches before the admixture is added and a maximum slump of 8 inches at the point of delivery after the admixture is added.

G. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.14 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Building Members: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: As indicated in drawings.
2. Maximum Water-Cementitious Materials Ratio: As indicated in drawings.
3. Slump Limit: As indicated in drawings. 8 inches (200 mm), plus or minus 1 inch (25 mm), for concrete with verified slump indicated in drawings before adding high-range water-reducing admixture or plasticizing admixture].
4. Air Content: As indicated in drawings, at point of delivery for 3/4-inch (19-mm) nominal maximum aggregate size.

2.15 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.16 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. Mixing and delivery time shall not exceed 90 minutes.
2. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:

1. Class A, 1/8 inch (3.2 mm) for smooth-formed finished surfaces.
2. Class C, 1/2 inch (13 mm) for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 75 percent of its 28-day design compressive strength.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 VAPOR RETARDERS

A. Plastic Vapor Retarders: Convene preconstruction meeting prior to starting work. Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

B. Bituminous Vapor Retarders: Place, protect, and repair vapor retarders according to manufacturer's written instructions.

3.5 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" and Structural Drawings for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Weld reinforcing bars according to AWS D1.4, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

F. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.

G. Zinc-Coated Reinforcement: Repair cut and damaged zinc coatings with zinc repair material according to ASTM A 780. Use galvanized steel wire ties to fasten zinc-coated steel reinforcement.

3.6 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Space vertical joints in walls no further than 90' on center. Locate joints midway between piers integral with walls, near corners, and in concealed locations where possible.
6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete

when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

3. Slab reinforcement shall not cross contraction joints.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Division 07 Section "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.7 WATERSTOPS

A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

3.8 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

F. Cold-Weather Placement: Comply with the recommendations and intent of ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301. Deliver concrete to meet the following minimum temperatures immediately after placement:
   a. 55 deg F for sections less than 12in. in the least dimension.
   b. 50 deg F for sections 12in. to 36in. in the least dimension.
   c. 45 deg F for sections 36in. to 72in. in the least dimension.
   d. 40 deg F for sections greater than 72in. in the least dimension.
   e. The temperature of concrete as placed shall not exceed these values by more than 20 deg F.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

G. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.9 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces exposed to public view, to receive a rubbed finish, to be covered with a coating or covering material applied directly to concrete.

C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.10 FINISHING FLOORS AND SLABS

A. General: Comply with the recommendations and intent of ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch (6 mm) in 1 direction.

1. Apply scratch finish to surfaces indicated by Architect and to receive concrete floor toppings, to receive mortar setting beds for bonded cementitious floor finishes.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces indicated by Architect to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces indicated by Architect, exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
2. Finish surfaces to the following tolerances, according to ASTM E 1155 (ASTM E 1155M), for a randomly trafficked floor surface:
   a. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.
3. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-foot- (3.05-m-) long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed 3/16 inch (4.8 mm).

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated by Architect, where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.

1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

G. Slip-Resistive Finish: Before final floating, apply slip-resistive aggregate or aluminum granule finish where indicated and to concrete stair treads, platforms, and ramps. Apply according to manufacturer's written instructions and as follows:

1. Uniformly spread 25 lb/100 sq. ft. (12 kg/10 sq. m) of dampened slip-resistive aggregate or aluminum granules over surface in 1 or 2 applications. Tamp aggregate flush with surface, but do not force below surface.
2. After broadcasting and tamping, apply float finish.
3. After curing, lightly work surface with a steel wire brush or an abrasive stone and water to expose slip-resistive aggregate or aluminum granules.

H. Dry-Shake Floor Hardener Finish: After initial floating, apply dry-shake floor hardener to surfaces according to manufacturer's written instructions and as follows:

1. Uniformly apply dry-shake floor hardener at a rate of 100 lb/100 sq. ft. (49 kg/10 sq. m) unless greater amount is recommended by manufacturer.
2. Uniformly distribute approximately two-thirds of dry-shake floor hardener over surface by hand or with mechanical spreader, and embed by power floating. Follow power floating with a second dry-shake floor hardener application, uniformly distributing remainder of material, and embed by power floating.
3. After final floating, apply a trowel finish. Cure concrete with curing compound recommended by dry-shake floor hardener manufacturer and apply immediately after final finishing.

3.11 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-

place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel-finish concrete surfaces.

3.12 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with the recommendations and intent of ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

    a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.

c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project..

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

   a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.13 LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions to concrete floors indicated in Architectural Drawings to be troweled and sealed.

1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
2. Do not apply to concrete that is less than seven days' old unless otherwise required by manufacturer.
3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.14 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.15 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension in solid concrete, but not less than 1 inch (25 mm) in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt,

and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.16 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

C. Inspections:

1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Headed bolts and studs.
4. Verification of use of required design mixture.
5. Concrete placement, including conveying and depositing.
6. Curing procedures and maintenance of curing temperature.
7. Verification of concrete strength before removal of shores and forms from beams and slabs.

D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.

    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

3. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
6. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

7. Compression Test Specimens: ASTM C 31/C 31M.

    a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
    b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.

8. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

    a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days. Compression test specimens for days not specified shall be at the contractors expense.
    b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
11. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
12. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Structural Engineer of Record but will not be used as sole basis for approval or rejection of concrete.
13. Additional Tests: Testing and inspecting agency shall make additional tests of concrete at the Contractor's expense when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Structural Engineer of Record. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
14. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
15. Correct deficiencies in the Work that test reports and inspections indicate dos not comply with the Contract Documents.

E. Measure floor and slab flatness and levelness according to ASTM E 1155 (ASTM E 1155M) within 24 hours of finishing.

CONCRETE SUBMITTAL CHECKLIST

This submittal checklist must be provided with all concrete and reinforcing steel packages that are to be submitted to Structural Design Group. Absence of a properly completed checklist may result in the return of the submittal unchecked or as reuse and resubmit.

MIX DESIGN		
Included?	**Description**	**Location in project documentation where this requirement is located.**
☐	Field data or trial mixture strength data	Spec Section 03300, Part I, Subsection 1.4
☐	Verify Mix Design Constraints Limit Fly Ash to 25% Limit Proportions per Spec Section 03300, Part II, Subsection 2.5 W/C ratio, Air, Slump per General Notes	Spec Section 03300, Part II, Subsection 2.5 General Notes – Section 4.0
☐	Mix Design Data: 1. Proportions of cement, fine and coarse aggregate and water. 2. Water/cement ratio, design strength, slump and air content. 3. Type of cement and aggregates. 4. Type and dosage of all admixtures. 5. Type, color and dosage of integral coloring compounds, where applicable. 6. Special requirements for pumping. 7. Any special characteristics of the mix which require precautions in the mixing, placing or finishing techniques to achieve the finished product specified. 8. Material certifications 1) Cementitious materials. 2) Admixtures. 3) Aggregates .	Spec Section 03300, Part I, Subsection 1.4 Spec Section 03300, Part I, Subsection 2.5, 2.6

REBAR SHOP DRAWINGS		
Included?	**Description**	**Location in project documentation where this requirement is located.**
☐	Submit all shop drawings on one reproducible print and two reproductions only.	General Notes - Section 2.0 Spec Section 03300, Part I, Subsection 1.4
☐	Contract documents not used for shop drawing.	Spec Section 03300, Part I, Subsection 1.4
☐	Resubmitted shop drawings have all revised items clouded or identified.	Spec Section 03300, Part I, Subsection 1.4
☐	Any requested information, clarifications, requests for approvals, modifications, etc. as listed in Spec Section 03300, Part I, Subsection 1.4 are included by the contractor below.	Spec Section 03300, Part I, Subsection 1.4

FORMWORK, RE-SHORE, OTHER SHOP DRAWINGS		
Included?	**Description**	**Location in project documentation where this requirement is located.**
☐	Submit all shop drawings on one reproducible print and two reproductions only.	General Notes - Section 2.0 Spec Section 03300, Part I, Subsection 1.4
☐	Contract documents not used for shop drawing, including erection plans or details	Spec Section 03300, Part I, Subsection 1.4
☐	Resubmitted shop drawings have all revised items clouded or identified.	Spec Section 03300, Part I, Subsection 1.4
☐	Any requested information, clarifications, requests for approvals, modifications, etc. as listed in Spec Section 03300, Part I, Subsection 1.4 are included by the contractor below.	Spec Section 03300, Part I, Subsection 1.4
☐	Calculations stamped by an Engineer registered in the state where the project is located.	Spec Section 03300, Part I, Subsection 1.4
QUESTIONS, ETC. PER SECTION 03300, PART I, SUBSECTION 1.4		

END OF SECTION 03300

1.0 – GENERAL

1.1 Related Work

A. Section 03100 - Concrete Formwork

B. Section 03200 - Concrete Reinforcement

C. Section 03345 - Concrete Finishing

1.2 Scope

A. The Contractor shall provide all labor, material, services, supervision, transportation and equipment necessary for plain and reinforced concrete work as shown on the drawings and hereinafter specified.

B. To insure inclusion of all wall castings, conduits, anchor bolts, etc., the Contractor shall notify all other Contractors, Subcontractors, Manufacturers' Representatives and the Engineer in advance of his intentions to place any particular portion of the concrete work. He shall further cooperate with them in the coordination of the various phases of the work.

C. All concrete work shall meet the applicable portions of ALDOT Standard Specifications for Highway Construction, Latest Edition Division 500 and all articles that are referenced therein.

D. Include all concrete and related work shown or specified. Concrete work included in other Sections of the Specifications that is not specifically described, shall comply with the requirements of this Section.

1.3 Quality Assurance

A. Except as modified or supplemented by these specifications, the ALDOT Standard Specifications for Highway Construction, Latest Edition shall govern all Work in this section.

B. The mixing, placing and curing of all concrete shall be executed under the supervision of an experienced foreman. The Contractor shall have at least one foreman at each location where concrete is being placed to assure that placement, puddling, and spading of the concrete is in accordance with these Specifications or as directed by the Engineer.

C. Only highly skilled, thoroughly trained, fully competent and experienced workmen shall perform the work of this section.

D. Acquire cement and aggregate from same source for all work.

1.4 References

A. All applicable ALDOT Standard Specifications for Highway Construction, Latest Edition sections.

1.5 Testing

A. Inspection, testing and analysis will be performed by Engineer's approved testing laboratory.

B. Contractor shall provide free access to Work and cooperate with Testing Laboratory. Contractor shall provide samples of concrete to Testing Laboratory without charge.

C. Contractor shall submit proposed mix of each class of concrete to Engineer's approved testing laboratory for review and to Engineer prior to commencement of Work. Testing Laboratory shall control concrete mix. Advise laboratory of material sources.

D. Tests of cement and aggregates may be performed to ensure conformance with requirements stated herein.

E. Three (3) concrete test cylinders shall be taken for every 50 cubic yards or fraction thereof of each class of concrete, or at least 3 cylinders each day concrete is poured.

F. One (1) additional test cylinder will be taken during cold weather concreting, and be cured on job site under same conditions as the concrete it represents.

G. One (1) slump test shall be taken for each set of test cylinders taken. The Engineer reserves the right to perform a slump test on every concrete delivery vehicle.

H. Material not in full conformance with the specifications shall be reported immediately by the Testing Laboratory to the Engineer. Non-conforming material shall not be used.

1.6 Measurement

A. There shall be no measurement made for Portland Cement Concrete in sidewalks and driveways.

B. There shall be no measurement made for Portland Cement Concrete trust blocks, concrete collars, etc.

1.7 Payment

A. There shall be no separate payment for Portland Cement Concrete in sidewalks and driveways. Item shall be included as part of lump sum bid.

B. Cost of the Concrete in the Combination Curb and Gutter shall be included in the cost of the Curb and Gutter pay item. There shall be no payment made for Portland Cement Concrete used in Curb and Gutter and Thrust Blocks.

C. Cost of the Concrete in Curb Inlets, Junction Boxes, Manholes, Headwalls, Valves and Valve Collars, Thrust Blocks, Bollards, Fittings, etc. shall be included in the cost of the pay item being installed.

D. There shall be no direct pay for thrust blocks. Thrust blocks, including all associated work and required tie-rods, shall be included in the cost of the pay item being installed.

2.0 – PRODUCTS

2.1 Materials

A. Cement shall be Portland Cement of American manufacture, conforming to the Standard Specifications for Portland Cement, Type I or II, ASTM C150, low alkali.

B. The use of fly ash in the concrete mixture will be permitted only with approval of the Engineer. Fly ash shall consist of finely divided residue or ash that remains after burning finely pulverized coal at high temperatures and shall meet the requirements of AASHTO M 295. The Contractor will be permitted partial substitution on a pound for pound basis of fly ash for Portland Cement Type I or II in concrete mixes up to a maximum of 15% for structural concrete and a maximum of 20% for minor structure concrete.

C. Coarse aggregates shall be clean, uncoated processed gravel conforming to the Standard Specifications for Concrete Aggregate, ASTM C33, size No. 467, 57 or 67.

D. Store fine and coarse aggregate separately. Aggregates shall not be stored where contamination may occur.

E. Water used in making mortar or concrete shall be clean and free from oil, alkali, sugar, vegetable matter or other deleterious substances; potable.

F. Neither concrete nor any admixtures, curing compounds, etc. shall contain calcium chloride.

G. Admixtures shall not be used unless specifically approved in writing by the Engineer.

H. All grout for equipment, structural foundations and all other uses except in masonry shall be high strength, non-shrink, non-metallic, bleed free, 7000 PSI at 28 days (as per ASTM C109) premixed grout, Master Flow 713, as manufactured by Master Builders Company or approved equal. Preparation and application of grout shall be in accordance with manufacturer's directions.

I. Admixtures: ASTM C-494 Type A water reducing. Mix in accordance with manufacturer's directions. Obtain permission of the Engineer prior to using any admixtures. Calcium chloride shall not be used.

2.2 Mixes

A. Ready-mix Concrete

1. Conform to applicable portions of ALDOT Standard Specifications for Highway Construction, Latest Edition.

2. Mix shall be proportioned as specified in Section 501 of ALDOT Standard Specifications for Highway Construction, Latest Edition, for Concrete Class Type A-1a.

3. The proportions selected shall be such as to produce a plastic, workable and durable mix that will enter readily into the corners and angles of forms and around reinforcement with the methods of placing employed on the work, but without permitting the materials to segregate, or free water to collect on the surface. Concrete shall be designed using the minimum quantity of water necessary.

4. If approved, the schedule of deliveries of concrete to the job and the method of distribution in the forms shall be continually reviewed by the Engineer.

5. Consistency: Adjust quantity of water so concrete does not exceed maximum slumps specified; use minimum necessary for workability required by the part of the structure being cast. Measure consistency of concrete in accordance with ASTM C143.

B. Mixing

1. Unless specifically authorized by the Engineer, all concrete mixing shall be done in a batch mixer approved by the Engineer, of a type which will insure uniform distribution of the materials throughout the mix and which will insure a uniformly colored and homogeneous product. Re-tempering of concrete shall not be permitted.

2.3 Grout

A. General construction of grout shall be non-shrink, expanding type, and shall have the following characteristics: non-ferrous; non-staining; non-bleeding; high density; and not containing gas- generating agents.

B. The compressive strength at 28 days of grout mix of 50 pounds with 5¾ quarts of water shall not be less than 4,500 psi (ASTM C109-86). The mix shall retain high compressive strength when containing coarse aggregate crushed stone in size range ¼" to ¾". General construction grout shall be used for closing in box-outs, filling holes in concrete, patching walls, etc.

C. All prepared grout mixes shall be used in strict accordance with the manufacturer's recommendations.

3.0 – EXECUTION

3.1 Placing Concrete

A. Notify Engineer 48 hours before placing concrete.

B. Construction Loading: ACI 347

C. Place concrete in compliance with applicable Sections of ALDOT Standard Specifications for Highway Construction, Latest Edition and as herein specified. Deposit continuously or in layers of such thickness that no concrete will be placed on hardened concrete in a manner to cause seams or planes of weakness.

D. Before any concrete is deposited, all debris and water shall be removed from the space to be occupied by the concrete; all metal reinforcement shall be placed in its proper location and shall be clean; all inserts, hangers, metal ties, anchor bolts, plates, etc., shall be properly located in cooperation with other trades and secured in position before concrete is placed; and all forms shall be thoroughly wetted. Form work and reinforcement shall be inspected and approved by the Engineer immediately before placing concrete. No concrete shall be placed until all reinforcing steel is securely tied in its correct position.

E. Concrete shall be handled from the mixer to the place of deposit as rapidly as possible without segregation or separation of the materials or displacement of the reinforcement. It shall be deposited as near as possible to its final position in the forms to minimize segregation due to handling and flowing, and shall be so deposited as to maintain, until completion of the unit, a plastic surface approximately horizontal. Concrete shall not be dropped at a height greater than three (3') feet except where suitable equipment is provided to prevent segregation.

Forms for walls or other thin sections of considerable height shall be provided with openings or other devices to permit the concrete to be placed in a manner avoiding the accumulation of concrete on the forms or metal reinforcement. Under no circumstances shall partially hardened concrete be deposited in the work. Chutes, if used, shall be subject to approval of the Engineer.

F. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are properly placed, held securely and not disturbed during concrete placement. Embedded Items: Ensure completion of installation of work built into concrete such as sleeves, anchor bolts, wood nailers, reglets, frames and sleeves for piping conduit, etc.. Provide facilities and supervision required for installation of inserts specified under other sections and perform cutting and reinforcing of forms required to accommodate them. Do not place any concrete until all inserted items are installed in their proper locations, secured according to approved shop drawings and setting plans. Furnish ties and supports necessary to keep embedded items in place when concrete is placed.

G. All concrete shall be deposited continuously, as rapidly as practicable to pre-determined pour limits.

H. Pumped Concrete:

1. General: Do not use aluminum or aluminum lined pipe. Prevent concrete from contacting aluminum fittings.

2. Mix: Do not add more water to mix. Check that mix design entered on delivery ticket complies with that ordered. Check slump at end of hose.

3. Pumps: Use only piston type pumps. Insure they are reversible. Make a standby pump available of no less capacity than that in use for operation at the job within one hour's notice.

4. Cylinder test sample shall be taken at end of hose.

I. Foreign matter of any kind shall not be permitted to accumulate inside the forms, and openings in forms necessary for the removal of same shall be provided.

J. Cement mortar shall not be permitted to coat reinforcement prior to final embedment.

K. Excessive honeycomb or embedded debris in concrete is not acceptable.

L. Maintain minimum concrete cover around reinforcing.

M. When pouring against earth, lightly dampen earth 24 hours in advance of concrete placement; but do not muddy. Reroll where necessary for smoothness and remove all loose material.

3.2 Joints in Concrete

A. Joints in concrete shall be placed and designed as approved by the Engineer

B. Except where construction joints are detailed differently on the plans, they shall be square and normal to the forms. No joints shall be nearer than 24 bar diameters from splices in reinforcing.

C. Before joining plastic concrete to concrete that has already set, the surface of the concrete in place shall be roughened with 1/4" difference between high and low points, shall be free from all loose material, laitance, dirt or foreign materials, shall be washed and scrubbed clean with stiff brooms, shall be thoroughly drenched with

water until saturated, and shall be kept wet until the plastic concrete has been placed. Immediately prior to the placing of additional concrete, all forms shall be drawn tight against the concrete in place, and the surface of the concrete in place shall be flushed with a coating of an approved bonding compound.

D. Where new concrete is to be poured adjacent to old concrete structures, the existing concrete surface is to be scarified and sandblasted. Also prior to placing new concrete, the bonding area shall receive a coat of bonding agent applied per manufacturer's recommendations.

E. The forms shall provide a perfect alignment for exposed surfaces between the previously placed concrete and the new placement. They shall be tight enough to prevent mortar form streaking the exposed surfaces of previously places concrete.

F. Any penetration of the walls otherwise not shown on the Plans shall be approved in writing by the Engineer.

3.3 Compaction of Concrete

A. Conform to applicable Sections of ALDOT Standard Specifications for Highway Construction, Latest Edition.

B. All concrete shall be thoroughly compacted to force out all air pockets and voids during and immediately after depositing, thoroughly worked around reinforcement, embedded fixtures, and into the corners of forms and the mortar flushed to the surface by continuous working with concrete spading implements and/or high frequency mechanical vibrators of an approved type.

C. If vibrators are used, the consistency of the mixture and the period of vibration shall be such that the resulting concrete is free from segregation, honeycomb, and accumulation of water or laitance. If vibration is used, the maximum permissible slump shall be adjusted by the testing laboratory to meet this condition. The amount of mixing water used and the proportion of sand to gravel shall be the least which will produce uniformly dense concrete free from aggregate pockets and honeycomb.

D. Mechanical vibrators shall have a minimum frequency of 7000 revolutions per minute and shall be operated by experienced competent workmen. Over vibrating and use of vibrators to transport concrete within forms shall not be allowed. Vibrators shall be inserted and withdrawn at many points, at uniformly spaced locations from 18 to 30 inches apart. At each insertion, the duration shall be sufficient to consolidate the concrete but not sufficient to cause any segregation, generally from 5 to 15 seconds duration. Limit duration to the minimum time possible. A spare vibrator shall be kept on the job site during all concrete placing operations.

E. Tapping or other external vibration of forms shall not be permitted.

3.4 Concrete in Inclement Weather

A. In threatening weather which may result in conditions adversely affecting the quality of the concrete to be placed, the Engineer may order the postponement of concerning operations. Where work has been started and changes in weather conditions require protective measures, the Contractor shall furnish adequate measure to protect the concrete from rainfall or freezing temperatures during entire duration of cure period.

B. Concrete, when deposited, shall have a temperature not below fifty (50) degrees F., nor above ninety (90) degrees F. No concrete shall be placed when the air temperature is below 40 degrees F or when the temperature is expected to fall below 40 degrees F before placed concrete is 72 hours old.

C. The Contractor is responsible for the protection of concrete placed under all weather conditions. Permission given by the Engineer to place concrete during rain or freezing weather will not relieve the Contractor of the responsibility for satisfactory results. Concrete placed under such conditions proving unsatisfactory shall be removed and replaced.

3.5 Concrete Finishing

A. All exposed concrete surfaces, except floors and stair treads, shall immediately, upon removal of forms, be freed of all form marks, fins or projections and have all honeycombs, hollows, tie holes and bug holes filled with 1:2 cement mortar. Care shall be taken that patches exactly match the color of the previously poured concrete. A bonding agent shall be applied to all patched areas.

B. During the process of conditioning the completed structure for final acceptance, all exterior exposed concrete surfaces above grade shall be cleaned from drip marks and discolorations, washed down and broomed so that the entire structure is left with a neat, clean and uniform finish, texture, and color.

C. All concrete sidewalks, landings, and exterior walking surfaces shall have a light broom textured finish after floating.

3.6 Testing Materials and Concrete

A. The Engineer shall appoint and Owner will pay for the services of a competent testing laboratory of recognized standing for the testing of concrete and other materials where testing is called for in the Specifications.

B. The Contractor shall furnish, without additional compensation, samples of the various materials and the concrete mix for laboratory testing as required by the Laboratory or Engineer.

C. The selection of the testing laboratory by the Engineer shall be understood as in no way relieving the Contractor of his responsibility for satisfactory performance of the Contract. Excluding written protest by the Contractor in advance of processing or use of materials, services of the testing laboratory shall be understood as constituting full acceptance by and approval of the Contractor.

3.7 Protection and Curing

A. Conform to applicable Sections of ALDOT Standard Specifications for Highway Construction, Latest Edition.

B. All exposed concrete surfaces shall be protected from rapid or premature drying, and freshly placed concrete shall be protected against washing by rain.

C. Do not allow any walking on or loading of any kind on concrete until at least 24 hours after placement.

D. After concrete has taken its initial set care shall be exercised to avoid jarring forms or placing any stress or strain on forms and concrete.

3.8 Edges and Corners

A. 3/4" x 45 degree Chamfer strips shall be placed in forms to bevel all salient edges and corners, except the top edges of walls and slabs which are to be tooled and edges which are to be buried.

B. Equipment bases shall have formed beveled salient edges for all vertical and horizontal corners unless specifically indicated otherwise on the drawings. Unless otherwise noted, bevels shall be 3/4 inch wide.

3.9 Cleaning

A. Cleaning and wash out of concrete trucks on project site is not permitted unless a designated area is specifically approved in writing by Engineer. Any waste concrete shall be removed from the site. Waste concrete shall not be buried below site fill.

3.10 Completion

A. Fill in holes and openings left in concrete for the passage of Work of other trades after their Work is in place. Mix, place, and cure to blend with in-place construction. Provide other miscellaneous filling required to complete Work.

B. Repair or replace concrete not conforming to required lines, details and elevations or structural requirements.

C. Repair or replace concrete not properly placed resulting in excessive honeycomb and other defects. Do not patch, fill, touch-up, repair or replace exposed architectural concrete except upon express direction of Engineer for each individual area.

D. Dampen all areas to receive patching.

END OF SECTION

1.0 – GENERAL

1.1 Related Sections

A. Section 03230 Watermain Installation

B. Sections 03220 Gate Valves

C. Section 03210 Watermain Taps

D. Section 03200 Fire Hydrants

1.2 Summary

A. This Section of specifications covers materials and installation for ductile iron watermains and ductile iron fittings.

1.3 Measurement

A. There shall be no separate measurement for ductile iron pipe.

B. There shall be no separate measurement for ductile iron fittings.

1.4 Payment

A. There shall be no separate payment for ductile iron pipe, installed and accepted. Item shall be included in lump sum bid.

B. There shall be no separate payment for ductile iron fittings, installed and accepted. Weight of fittings installed shall be based upon the manufacturer's provided specifications for weights and measurements. There shall be no additional payment for thrust blocks, bolts, tie-rods, or other items necessary for installation. These items shall be considered incidental to the unit cost of work for ductile iron fittings.

1.5 References

A. ANSI/AWWA C150/A21.50

B. ANSI /AWWA C151/A21.51

C. ANSI/AWWA C104/A21.4

D. ANSI/AWWA C111/A21.11

E. ANSI/AWWA C110/A21.10

F. ANSI/AWWA C153/A21.53-84

G. ANSI/AWWA C600 AWWA

2.0 – PRODUCTS

2.1 Materials

A. All materials shall meet or exceed AWWA standards.

B. All materials used shall be approved by the City of Winfield and follow the *"City of Winfield Water Distribution System Engineering Standards"*.

C. Watermains four inches and greater shall be ductile iron pipe.
   a. Diameters 4" – 8" shall be Class 52.
   b. Diameters 12" and greater shall be Class 50.

D. Ductile iron fittings shall be pressure rated for 350 psi.

E. Tapping valves shall consist of non-rising stems, counter-clockwise opening, 2" square operating nut, and "O" ring seals. They shall be asphalt varnish coated (or approved equal). The connection end shall be mechanical joint. Seat opening shall be larger than nominal size to allow for full diameter cuts.

F. Ductile iron pipe and ductile iron fittings shall be cement mortar lined and sealed with asphaltic material.

G. Ductile Iron Pipe Approved Manufacturers:
   a. American Cast Iron Pipe Company
   b. U.S. Pipe

H. Ductile Iron Fittings Approved Manufacturers:
   a. American Cast Iron Pipe Company
   b. U.S. Pipe
   c. Mueller
   d. Clow
   e. Harco
   f. Trinity Valley
   g. Unison Foundry
   h. Tyler Foundry

2.2 Quality Assurance

A. Manufacturer's shop drawings, technical specifications, testing certifications, and/or other necessary quality assurances shall be submitted for approval, prior to materials being onsite.

B. All materials shall be new and labeled appropriately, indicating pressure class and thickness.

2.3 Handling/Storage

A. No pipe, fitting, or other materials shall be stored on ground. Materials shall be stored on pallets, timbers, or other methods so that they are stored above the ground.

B. All materials shall be stored in a way that is protective of the elements.

C. Damaged pipe, fittings, or other related appurtenances shall be immediately removed from site, in the event of damage.

E. All materials shall be stored in a safe method.

F. Materials shall not be stored in direct sunlight.

3.0 - EXECUTION

3.1 Installation

A. All pipe, fittings, and related appurtenances shall be examined for defects and damage before installation.

B. Contractor shall take care not to damage or disturb existing utilities.

C. Trenches shall be prepared to proper grade and alignment prior to installation of pipe.

D. Trenches shall be clean and free of debris, refuse, roots, loose material, or other obstructions before installation of pipe.

E. Trench bottom shall be prepared, as presented in plans. In the event bedding material is required, proper material type and thickness shall be achieved before pipe placement.

F. Sand, debris, moisture, or any other foreign materials shall be removed from pipe gasket prior to placement of pipe.

G. Pipe and fittings shall be handled with care. Contractor shall not allow equipment and/or tools to damage pipe, including but not limited to, scratches and broken pieces or parts.

H. Contractor shall follow Manufacturer's recommendations for installation and connection of materials.

I. Contractor shall follow Manufacturer's recommendations for cutting or modifying materials.

J. In the event placed materials do not meet line and grade, as deemed appropriate by Engineer, materials shall be removed immediately and replaced.

K. Placed pipes shall not remain open when operations are not ongoing. During times when installation has halted, pipes shall be plugged in order to protect from weather and prevent obstructions from entering the pipe.

L. Deflections in pipe shall not exceed manufacturer's limitations.

M. During backfill operations, care shall be taken to prevent damage or movement of installed pipe. Backfill material shall meet the requirements of the plans and specifications.

END OF SECTION

CONCRETE FINISHING - SECTION 03345

1.0 - GENERAL

1.1 Related Documents

A. Section 03300 – Portland Cement Concrete

B. Section 03375 – Curb and Gutter

1.2 Summary

A. Exposed surfaces shall have a smooth form finish, followed by a grout cleaned finish, unless otherwise stated.

B. Excepting sidewalks, stairs, and landings, floors and bottoms shall have a floated finish, followed by a troweled finish.

C. Sidewalks, landings, and stairs shall have a troweled floated finish, followed by a broom finish. Surface shall receive a coarse transverse scored texture by brooming or other approved methods.

1.3 Measurement

A. There shall be no direct measurement for Concrete Finishing.

1.4 Payment

A. There shall be no direct payment for Concrete Finishing. Cost for Concrete Finishing shall be considered an indirect cost of Pay Item being constructed.

2.0 – PRODUCTS

NOT USED.

3.0 – EXECUTION

3.1 General Requirements

A. Excluding floors and stairs, all exposed concrete surfaces, upon removal of forms, shall immediately have the following performed: No form marks, honeycombs, tie holes, bug holes, aggregate holes, etc. Minor repairs shall be performed immediately, utilizing a 1:2 cement mortar. All repairs and patches shall match color and consistency of original concrete. Bonding agents shall be applied to all patched areas. Excess

material shall be removed, and area shall be rubbed following construction industry standards. All repaired/rubbed areas shall be kept damp for a minimum of 36 hours.

B. No discolorations or excess material shall remain on finished surfaces. Surfaces shall be cleaned and washed before final acceptance. Finished surfaces shall have a clean and uniform look.

C. Concrete sidewalks, landings, ramps, and other walking areas shall have a broom textured finish.

3.2 Smooth Form Finish

A. Forms in contact with concrete shall have a smooth and uniformly textured surface.

B. Form surfaces shall be of the following materials: Lumber, plywood, metal, plastic, paper, or other approved materials, providing a smooth and uniform concrete surface may be provided.

C. Number of seams and joints on form surfaces shall be minimized, as much as practical.

D. As a protection to concrete surfaces, form surfaces consisting of dents, patches, raised grains, or other defects shall not be used.

E. Any defects, irregularities, holes, or minor deficiencies, shall be patched using approved methods.

3.3 Grout Cleaned Finish

A. Cleaning as work progresses will not be permitted. Cleaning operations shall commence once all contiguous surfaces to be cleaned are completed.

B. Grout consistency: 1 part Portland Cement and 1.5 parts fine sand. Sufficient water shall be utilized in order to produce a grout substance similar to thick paint.

C. To achieve color matching, white Portland Cement may be used instead of gray Portland Cement.

D. Concrete surface shall we wetted sufficiently to prevent absorption of water from grout. Apply grout uniformly with brush. Spray gun may be utilized.

E. Scrub surface with cork float or stone to ensure coating of surface and filling of air bubbles.

F. Remove excess grout with rubber float or other means. Work shall be performed while grout is in a plastic state.

G. Surface shall be rubbed once material whitens from drying.

H. Finish shall be kept damp for a minimum of 36 hours upon completion.

3.4 Floated Finish

A. Until ready for floating, concrete shall not be worked once placed consolidated, and leveled.

B. Floating shall commence when water sheen has disappeared and surface has stiffened to point that it is ready for floating operation. Dry cement shall not be used for absorption of bleedwater.

C. Surface shall be checked with ten-foot straightedge during or after first floating. It shall be applied to a minimum of two angles, in order to check for high and low spots.

D. High and lows spots shall be addressed to meet a Class B tolerance.

E. Second floating shall proceed in a timely manner to produce a uniform sandy texture.

3.5 d

A. Surface shall be float-finished first.

B. Power troweling shall be utilized first, followed by hand troweling.

C. First troweling shall produce smooth finish, relatively free of defects.

D. Additional hand troweling shall be performed after surface has hardened sufficiently.

E. Final troweling is complete when a ringing sound is produced when trowel is moved over surface.

F. Thorough consolidation shall be achieved by hand troweling.

G. Finished surface shall be free of trowel marks and uniform in texture and appearance. A Class A tolerance shall be achieved.

END OF SECTION 03345

1.0 - GENERAL

1.1 Scope

A. Section covers requirements for materials and installation of Polyvinyl Chloride Pipe (PVC) for Watermains.

1.2 Related Sections

A. Section 03340 Ductile Iron Pipe and Fittings

B. Section 03230 Watermain Installation

1.3 Measurement

A. There shall be no separate measurement for Polyvinyl Chloride Pipe. Item shall be included in lump sum bid.

1.4 Payment

A. There shall be no separate payment for Polyvinyl Chloride Pipe, installed and accepted. Item shall be included in lump sum bid, including, but not limited to, trench excavation, backfill and compaction, testing and procedures.

1.5 References

A. ASTM D1784-69 (PVC Resins)

B. ASTM D72.7-67 (PVC Pipe)

2.0 – PRODUCTS

2.1 Materials

A. Contractor shall submit Shop Drawings to Engineer including product data, with manufacturer's certification of compliance and installation instructions.

B. PVC pipe and compounds shall adhere to the above ASTM guidelines.

C. All materials shall meet the requirements and guidelines of the "*City of Winfield Water Distribution System Engineering Standards*".

C. Gaskets shall be of the permanently attached vaiety.

D. Detector Wire shall be T.W. 12 gauge solid copper.

E. PVC pipe shall be rated at SDR-21, with a pressure rating of 200 psi.

F. PVC pipe shall be acetone tested, conforming to ASTM D2152.

G. PVC pipe shall be marked, indicating manufacturer's name, material code, nominal pipe size, SDR, and pressure rating.

H. PVC pipe shall be manufactured domestically.

I. PVC pipe shall have undergone manufacturer testing, conforming to ASTM D2241.

3.0 – EXECUTION

3.1 Installation

A. Before installation, trench shall be cleared of all debris, loose material, or other items and objects that may affect proper installation.

B. Proper alignment and grade shall be checked before installation.

C. PVC pipe shall be inspected for defects or abnormalities before installation. Proper handling and storage shall be used to ensure the reduced risk of possible damage to the materials, including delivery. In the event pipe is damaged, it shall be removed from jobsite.

D. Trenching, Backfill and Compaction shall comply with Section of the specifications.

E. Pipe shall be inspected for dirt and debris and cleaned accordingly.

F. Once spigot end is clean, apply lubricant. Lubricant shall be from manufacturer of PVC pipe.

G. Detector wire shall be installed in the same trench with the PVC pipe. Material shall be 12-gauge T.W. copper wire. Wire shall be connected to the pipe every 20 feet and to all fittings.

H. Trench shall be covered as work progresses. Trench shall not remain open for extended periods of time, including overnight.

END OF SECTION

1.0 - GENERAL

1.1 Related Documents

A. Section 02223 – Embankment and Backfill

B. Section 02510 – Bituminous Concrete Pavement

C. Section 03100 – Concrete Formwork

D. Section 03300 – Portland Cement Concrete

E. Section 03345 – Concrete Finishing

1.2 Summary

A. This Section specifies shall cover the work related to construction of curb and gutter. Curb and gutter shall be constructed in accordance with the plan details and these specifications at locations shown on plans or established in conformity with the lines, grades, dimensions, and cross sections shown on the plans or designated.

1.3 Measurement

A. There shall be no separate measurement for curb and gutter.

1.4 Payment

A. There shall be no separate payment for curb and gutter.

2.0 – PRODUCTS

2.1 Materials

A. Products shall conform to Division 800 of ALDOT Specifications for Highway Construction, Latest Edition. Concrete shall conform to Section 501 of those same specifications. Expansion joint filler shall be as specified in Section 832. All products and concrete shall also conform to applicable sections of Division 3 – Concrete.

3.0 – EXECUTION

3.1 Concrete Mixes

A. Concrete mixes shall be provided, as per Section 501 of the ALDOT Standard Specifications for Highway Construction, Latest Edition. A class A, Type 2 mix shall

be used with standard forms. A Class A or Class C mix shall be used, modified as deemed appropriate by Testing Engineer, to fit the type curb machine being utilized.

3.2 Foundation

A. Foundation shall be constructed to the excavation, as shown on plans or as designated. Unsuitable material shall be removed and replaced with suitable material for foundation. Suitable material shall be placed in 4" layers, maximum, and compacted.

3.3 Foundation Backfill

A. Material shall be placed and constructed, as provided in Section 214 of ALDOT Standard Specifications for Highway Construction, Latest Edition. If no Unit Price Line Item is provided foundation backfill will have no direct payment.

3.4 Forms

A. Contractor shall use standard type metal forms, or if requested in writing and approved, an automatic extrusion type curb/gutter machine.

B. Standard forms shall be metal, except for radius runs. Shall be free of warps and bows, and true to line and grade. Forms shall be appropriate for depths and widths indicated on plans. Radius runs may be metal or wood form. Approved designs may also be used. At no time shall damaged forms be used. Forms shall be braced and secure, staked and held together.

C. Automatic extrusion curb/gutter machines shall be used, upon approval. Machine must be able to provide curb and gutter sections and grades, as demonstrated on the plans. Failure to consistently provide an acceptable product shall cause approval to be withdrawn. Curb and gutter must be placed in a single operation.

3.5 Sections

A. Curb and gutter shall be placed in lengths, as provided on plans. Shorter lengths or sections may be used for tie-in purposes.

3.6 Handling and Mixing

A. Handling and mixing shall follow appropriate construction standards, including Section 501 of the ALDOT Standard Specifications for Highway Construction, Latest Edition.

3.7 Joints

A. Expansion joints shall be placed in curb and gutter to match those in concrete pavement where the two are adjacent.

B. Expansion joints shall be ¾" width and be placed where curb and gutter is located against rigid objects.

C. Filler shall extend from bottom of curb and gutter to within one inch of top. Sealer shall be ¾" thick and shall be recessed ¼" from top.

D. Contraction joints shall be placed in curb and gutter. Joints shall match those in concrete pavement, if adjacent, but shall never be more than ¼" between joints. Contractor joints shall be sawed or cut two inches deep and 1/8" wide, extending two inches below pavement surface.

3.8 Concrete Placement and Finishing, Utilizing Standard Method

A. Forms and related subgrade shall be reviewed and approved before placement of concrete. Debris and substandard material shall be removed, including mud and trash. Mixed concrete shall be placed in forms and tamped and vibrated so that a homogenous mix is present. Honeycombing and separation are not allowed.

B. Alignment and grade shall follow control staking, with no variances greater than one-half inch. A true and even top surface shall be provided, through troweling and/or floating. Excess mortaring to reach finished grade will not be allowed. A textured finish shall be provided on all exposed surfaces, being performed just previous to concrete become nonplastic. Upper edges of curb and gutter shall be rounded, utilizing appropriate tools. Any joint templates used shall be placed during placement of concrete and shall remain in place until concrete has set up adequately, meaning holding shape. Forms shall remain in place until concrete has set adequately, meaning forms may be removed without damage to concrete. Forms shall be removed within 24 hours of concrete placement. Upon removal, any minor defects shall be repaired immediately.

3.9 Concrete Placement and Finishing, Utilizing Machine-Laid Method

A. Requirements of machine manufacturer shall be followed. Fixed forms are not required for this method. Concrete mix requirements shall be such so that concrete is stable and able to set.

3.10 Curing/Protection

A. Concrete shall be cured, immediately following finishing operations. If mats are used, mats shall be kept moist for a minimum of 72 hours. Curb and gutter shall be kept free from risk of damage during this time, including the elements and other construction activities.

3.11 Backfill Operations

A. No backfill operations shall take place until concrete has set sufficiently. All areas requiring backfill shall be backfilled to required elevations, utilizing suitable material. Material shall be tamped in layers no more than 4 inches thick, until compaction is reached. Care shall be taken to prevent damage to newly set concrete.

END OF SECTION

1.0 – GENERAL

1.1 Related Work

A. NA

1.2 Scope

A. Work described in this section includes new bituminous paving, a new base, and otherwise indicated on drawings.

1.3 Quality Assurance

A. Certifications: The contractor shall submit to the Engineer copies of certificates from suppliers of bituminous materials and other manufactured materials, certifying that these products comply with specifications and standards listed hereinafter.

1. All asphalt used for pavement shall be produced by a plant certified by the Alabama Department of Transportation (ALDOT).

B. Standard Specifications: Unless otherwise noted, all specifications refereed to shall be the "Alabama Highway Department Standard Specifications for Highway Construction," 2022 or latest edition. Note that the Asphalt index shall not apply to this contract.

1.4 References

A. All applicable ALDOT Standard Specifications for Highway Construction, Latest Edition sections.

1.5 Job Conditions

A. Any base or sub-base areas damaged by weather or construction operations shall be scarified, remixed, and recompacted in accordance with requirements before application of the prime coat.

B. Special care and attention shall be given to be certain that paving operations and/or equipment do not cause damage to any existing and/or new buildings, structures, or improvements which are to remain.

2.0 – PRODUCTS

2.1 Materials

A. Provide the paving systems indicated on the drawings, installed in accordance with Part 3 of this Section 02511, and referenced standards.

3.0-EXECUTION

3.1 Prime Coat:

A. Application rates and construction requirements shall be as specified in Alabama Highway Department Specification Section 401, Bituminous Surface Treatments, for a Bituminous Treatment Type "A" which is a prime coat.

3.2 Tack Coat:

A. Construction requirements, including preparation of the existing surface or substrate and maximum application rates, are specified in Article 405.03 of the Alabama Highway Department Specifications.

3.3 Plant Mix Bituminous Concrete Wearing Surface:

A.Construction details, including finished surface tolerance, density requirements, and maintenance and protection shall be as specified in Articles 410.03 through 410.07, and 327.03, as applicable.

END OF SECTION 03500

1.0 – GENERAL

1.1 Scope

The work under this section shall cover the striping of all streets and parking lots as indicated on the construction plans. The work shall include the layout of all parking spaces, legends, markings and roadway stripe.

1.2 Related Work

Alabama Department of Transportation Standard Specifications for Highway Construction, Latest Edition.

1.3 Payment

A. Payment shall be included in the lump sum project price. Removal of existing traffic stripes (both paint and thermoplastic) shall be a subsidiary obligation.

B. The lump sum price shall cover all materials, equipment, labor and other incidentals necessary for a complete job.

1.4 Performance Requirements:

A. A The CONTRACTOR shall allow newly placed bituminous concrete plant mix to cure for fourteen (14) days prior to any application of traffic stripe.

B. Cleaning of pavement shall be in accordance with Section 701.03(b) of the Alabama Department of Transportation Standard Specifications for Highway Construction, Latest ed.

C. The CONTRACTOR shall be required to prepare site for striping purpose. The work shall include but not limited to sweeping of pavement and removal of grass from top of curbs prior to paint application.

1.5 Construction Staking:

Layout of parking will be the same as that shown on plans. The CONTRACTOR will be responsible for parking layout. The OWNER will provide control points for parking layout.

2.0 – PRODUCTS

2.1 Materials:

All striping, arrows, legends, markings, etc. shall conform to Section 856.02 of the Alabama Department of Transportation Standard Specifications for Highway Construction, Latest Edition.

3.0 – EXECUTION

NOT USED

END OF SECTION

1.0 – GENERAL

1.1 Related Sections

A. Section 03300 – Portland Cement Concrete

1.2 Submittals

A. Include Material Safety Data Sheets, if applicable

B. Shop Drawings: For temporary shoring and supports, prepared by or under the supervision of a qualified professional engineer. Design and engineering of temporary shoring and supports are Contractor's responsibility. Indicate proposed schedule and sequence for removal of temporary shoring and supports.

C. Qualification Data: For installers, to demonstrate their capabilities and experience.

1.3 Quality Assurance

A. Cutting Contractor Qualifications: Retain cutting contractors that are licensed professionals.

B. Cutting Contractor shall adhere to applicable safety guidelines in accordance with Federal, State, and Local Ordinances.

2.0 – PRODUCTS

NOT USED

3.0 – EXECUTION

3.1 Examination

A. Notify Engineer seven days in advance of dates when areas of sawing or coring concrete and reinforcing bars will be located.

B. Mark areas of concrete for removal.

3.2 Preparation

A. Temporary support and shoring: Provide temporary support of Work to be cut.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting or coring operations.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Sawing Area: Lay out area to be cut using a color that does not conflict with color representing other utilities. Spray marking with a clear coat.

E. Coring Area: Lay out area to be cut using a color that does not conflict with color representing other utilities. Spray marking with a clear coat.

F. Over-cut: All cuts shall be within the perimeter of the area to be removed. Approval for any over- cut shall be given by the Engineer prior to any cutting.

3.3 Performance

A. General: Employ skilled workers to perform sawing and coring. Proceed with sawing and coring at the earliest feasible time, and complete without delay.

1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

2. Avoid existing utilities located in areas to be cut.

3. Excavating and Backfilling: Comply with requirements in these Specifications.

4. Utilities: Locate and turn off all services within the work area.

B. Sawing: Cut existing construction by sawing using methods least likely to damage elements retained or adjoining construction.

1. In general, use hand or small power tools designed for sawing. Cut holes and slots as small as possible. neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. Tools: Gas operated saws will only be permitted for use in the outdoors.

3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw.

4. Use water or a lubricant to cool the saw blades.

C. Coring: Core existing construction by using coring methods least likely to damage elements retained or adjoining construction.

1. Drill holes over one inch in diameter with a non-impact rotary tool in order to minimize spalling at the exit point.

2. Use diamond-core drill bits of the proper size.

3. Use rotary tools that operate below OSHA noise standards.

4. Use water or a lubricant to cool the drill bits.

5. Hole diameter requirements for installation of Ductile Iron Pipe:

PIPE SIZE (nominal inches)	INSIDE DIAMETER (inches)
2	4
4	8
6	10
8	12
10	14
12	18
14	20
16	22
18	24
24	30
30	36
36	43
42	49
48	56

6. Sealing:

   a. Install a watertight seal between the pipe and the cored hole.

   b. Seal shall be LINK-SEAL or approved equivalent.

D. Clean-up:

1. Wash or vacuum slurry or tailings generated from coring and/or sawing operations to remove them from work area. Slurry and tailing should be disposed of in a location approved by the Engineer.

2. Collect, treat, and dispose of water used in coring and/or operations.

3. Thoroughly clean removal areas of loose concrete, dust, and debris.

E. Patching: Complete any necessary patch work per Section 01045 "Cutting and Patching".

3.4 Field Quality Control

A. Testing Agency: Owner will engage a qualified testing agency to sample materials and perform tests specified in Section 03300 "Portland Cement Concrete".

END OF SECTION

1.0 - GENERAL

1.1 Scope

A. Section covers requirements for materials and installation of Polyvinyl Chloride Pipe (PVC) for gravity sanitary sewer.

1.2 Related Sections

A. Section 33330 Sanitary Sewer Installation

1.3 Measurement

A. Measurement for Polyvinyl Chloride Pipe shall be made per linear foot, installed and accepted.

1.4 Payment

A. Payment for Polyvinyl Chloride Pipe shall be made at the unit price provided per linear foot, installed and accepted. Payment for item shall include, but is not limited to, trench excavation, backfill, and compaction.

1.5 References

A. ASTM D1784

B. ASTM D3034

C ASTM D2412

D. ASTM D3212

E. ASTM F477

F. ASTM D2321

2.0 – PRODUCTS

2.1 Materials And Quality Control

A. Contractor shall submit Shop Drawings to Engineer including product data, with manufacturer's certification of compliance and installation instructions.

B. PVC pipe and compounds shall adhere to the above ASTM guidelines.

C. All materials shall meet the requirements and guidelines of the accepting sewer authority.

D. Pipe and related materials shall be inspected at the factory and the project site. No pipe shall be installed that contains cracks, fissures, holes, inclusions, or other defects.

E. Pipe color shall be green and uniform.

F. Spigot end of pipe shall contain a painted ring to indicate setting depth in the socket.

G. All pipe shall be marked with manufacturer name, lot number, ASTM designation, material code, standard dimension ratio, and nominal diameter.

H. No pipe will be accepted that is not new, without defect, and properly stored.

I. Previously stored pipe with a storage life of three months or greater cannot be used on the project.

J. Gaskets shall be of the permanently attached variety.

K. PVC pipe shall be rated at SDR-26, with a pressure rating of 160 psi.

L. PVC pipe shall be acetone tested, conforming to ASTM D2152.

M. PVC pipe shall be manufactured domestically.

N. PVC pipe shall have undergone manufacturer testing, conforming to ASTM D2241.

O. PVC pipe shall be made from compounds conforming to ASTM D1784. Testing shall conform to ASTM D3034.

P. Minimum pipe stiffness, assuming 5 percent deflection, shall be 115.

Q. Pipe shall be joined by means of an integral wall bell and spigot. Bell shall include a flexible watertight elastomeric seal.

R. PVC laterals shall be of same material as previously stated.

3.0 – EXECUTION

3.1 Installation

A. Before installation, trench shall be cleared of all debris, loose material, or other items and objects that may affect proper installation.

B. Proper alignment and grade shall be checked before installation. Alignment shall be performed with a correctly calibrated laser, or approved method.

C. Gravity sewer line depths are shown on contract plans, but should in no case be installed shallower than to provide 36 inches of cover.

D. PVC pipe shall be inspected for defects or abnormalities before installation. Proper handling and storage shall be used to ensure the reduced risk of possible damage to the materials, including delivery. In the event pipe is damaged, it shall be removed from jobsite.

E. Trenching, Backfill and Compaction shall comply with Section 02510 of the specifications.

F. Bedding material shall be ample to cradle the pipe for protection. Bedding shall be prepared so as to provide bedding for the entire length of pipe.

F. Pipe laying shall proceed in an up-grade fashion.

G. Pipe shall be inspected for dirt and debris and cleaned accordingly.

H. Once spigot end is clean, apply lubricant. Lubricant shall be from manufacturer of PVC pipe.

I. Spigot shall be on proper line and grade and sealed with bell by inserting spigot into bell through approved manner.

J. Trench shall be covered as work progresses. Trench shall not remain open for extended periods of time, including overnight.

END OF SECTION 033300

1.0 - GENERAL

1.1 Scope

A. Section covers requirements for installation of Polyvinyl Chloride Pipe (PVC) for gravity sanitary sewer.

1.2 Related Sections

A. 33300 Polyvinyl Chloride Pipe for Gravity Sanitary Sewer

B. 33320 Precast Concrete Manholes

C. 02510 Trenching, Backfill and Compaction

1.3 Measurement

A. There shall be no separate measurement for gravity sanitary sewer installation.

1.4 Payment

A. There shall be no separate payment for gravity sanitary sewer installation. Item shall include, but is not limited to, trench excavation, backfill, and compaction.

1.5 References

A. ASTM D1784

B. ASTM D3034

C. ASTM D2412

D. ASTM D3212

E. ASTM F477

F. ASTM D2321

2.0 – PRODUCTS

2.1 Materials And Quality Control

A. Refer to Section 33300.

3.0 – EXECUTION

3.1 Installation

A. Before installation, trench shall be cleared of all debris, loose material, or other items and objects that may affect proper installation.

B. Proper alignment and grade shall be checked before installation. Alignment shall be performed with a correctly calibrated laser, or approved method.

C. Gravity sewer line depths are shown on contract plans, but should in no case be installed shallower than to provide 36 inches of cover.

D. PVC pipe shall be inspected for defects or abnormalities before installation. Proper handling and storage shall be used to ensure the reduced risk of possible damage to the materials, including delivery. In the event pipe is damaged, it shall be removed from jobsite.

E. Trenching, Backfill and Compaction shall comply with Section 02510 of the specifications.

F. Bedding material shall be ample to cradle the pipe for protection. Bedding shall be prepared so as to provide bedding for the entire length of pipe.

G. Pipe laying shall proceed in an up-grade fashion.

H. Pipe shall be inspected for dirt and debris and cleaned accordingly.

I. Once spigot end is clean, apply lubricant. Lubricant shall be from manufacturer of PVC pipe.

J. Spigot shall be on proper line and grade and sealed with bell by inserting spigot into bell through approved manner.

K. Trench shall be covered as work progresses. Trench shall not remain open for extended periods of time, including overnight.

3.2 Testing

A. Overview:

1. 48-hour notice shall be given to the engineer prior to beginning testing. Engineer's representative must be present for testing. No test shall be accepted without observation of the Engineer's representative.

2. No testing may be performed unless all adjoining and adjacent work has been completed, including connections, trenching, backfilling, or other items of construction. If any section has achieved an approved test and is subsequently disturbed, an additional test shall be required.

3. Lines shall be flushed prior to testing. All debris collected shall be removed from downstream manhole. When flushing, care shall be taken so that debris and water do not enter existing system.

4. Contractor shall be responsible for providing all testing equipment.

5. Contractor shall provide all testing results and documentation to the Engineer.

B. Required Methods:

1. Mandrel Testing for Deflection

2. Low Pressure Air Testing

3. Manhole Vacuum Testing

C. Procedures

1. Mandrel Test

a. Mandrel testing shall be performed to determine roundness and proper installation.

b. Equipment shall state material type and size that is appropriate.

c. Mandrel testing shall not be allowed until backfill and bedding has settled.

d. Operations shall consist of pulling the mandrel through the pipe with a rope or cable, at the manufacturer's instructions. A second rope or cable shall be used on the opposite end of the mandrel for purposes of ensuring

correct position throughout the test, as well as for purposes of removal in the event the mandrel becomes lodged.

e. Deflection shall be limited to 5 percent of the base inside pipe diameter. In the event 5 percent is exceeded, the location shall be recorded and the defective section of pipe shall be replaced or corrected.

2. Low Pressure Air Testing

a. Low pressure air testing shall be performed to ensure that the installed pipes are free from significant leakage.

b. Testing may not proceed until trench has been backfilled.

c. No one shall be in adjoining manholes to testing while testing is ongoing.

d. Pneumatic plugs shall have a seal length equal to or greater than diameter of pipe being tested.

e. Air control equipment shall include a shut-off valve, pressure regulating valve, pressure relief valve, input pressure gauge, and continuous monitoring pressure gauge having a pressure range from 0 to 10 psi minimum.

f. Proper hoses shall be included for:

1. Inflation (control panel to pneumatic plugs)

2. Introduction of low pressure air (control panel to sealed line)

3. Continual monitoring (sealed line to control panel)

g. Procedure:

1. Insert plugs to seal off the test section.

2. Inflate to manufacturer's recommended pressure.

3. Introduce low air pressure until reaching desired pressure, in no case shall this pressure be less than 3.5 psig.

4. If pressure drops 1.0 psig before the length of test has been completed, the section of pipe is considered to have failed the test.

5. In the event of failure, contractor has option of repairing or replacing the defective materials causing the leakage. Upon completion or repair/replacement, the line shall be tested again.

Minimum Time Required for Analysis of 1.0 PSIG Pressure Drop								
Pipe Diameter	**Required Time for Length Shown (Length Provided in LF)**							
(Inches)	100	150	200	250	300	350	400	450
8	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	11:20	11:24	14:15	17:05	19:56	22:47	11:38
15	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33

END OF SECTION 33330

1.0 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 Summary

A. This Section includes unit masonry assemblies consisting of , but not limited to the following:

1. Concrete Masonry Units
2. Brick unit masonry
3. Mortar and Grout
4. Insulation in masonry walls

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 7 Section "Flashing and Sheet Metal" for exposed sheet-metal flashing installed in masonry
2. Division 7 Section-07910 - "Joint Sealants" for sealing joint in mockup
3. Division 7 - 07720 - Wall flashing
4. Division 7 - Section 07180 -Dampproofing
5. Division 8 - Section "FRP Doors"
6. Division 8 - Section 08110 -Hollow Metal Doors and Frames

C. Products installed but not furnished under this Section include the following:

1. Hot dip-galvanized Steel lintels for unit masonry
2. Wood nailers and blocking built into unit masonry
3. Manufactured reglets in masonry joints for metal flashing specified in Division 7 Section "Flashing and Sheet Metal."

1.3 Submittals

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product data for each different masonry unit, accessory, and other manufactured product specified.

C. Samples for initial selection of the following:

1. Unit masonry samples in full size form showing the full range of colors and textures available for each different exposed masonry unit required.

D. Samples for verification of the following:

1. Full-size units for each different exposed masonry unit required showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.

a. Include size-variation data for Type FBS brick, verifying that actual range of sizes for brick falls within ASTM C 216 dimension tolerances.
b. Weep holes/vents in color to match mortar color.

2. Accessories embedded in the masonry.

E. List of Materials Used in Construction Mockups: List generic names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.

1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents, unless such deviations are specifically brought to the attention of the Architect and approved in writing.

F. Material certificates for the following, signed by manufacturer and Contractor, certifying that each material complies with requirements.

1. Each different cement product required for mortar and grout, including name of manufacturer, brand, type, and weight slips at time of delivery.
2. Each material and grade indicated for reinforcing bars.
3. Each type and size of joint reinforcing.
4. Each type and size of anchors, ties, and metal accessories.

G. Material test reports from a qualified independent testing agency, employed and paid by Contractor or manufacturer, indicating and interpreting test results relative to compliance of the following proposed masonry materials with requirements indicated:

1. Mortar complying with property requirements of ASTM C 270.
2. Grout complying with property requirements of ASTM C 476.
3. Masonry units complying with property requirements of ASTM C90.

H. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.4 Quality Assurance

A. Clay Masonry Unit Test: For each clay masonry unit indicated, per ASTM C 67

B. Concrete Masonry Unit Test: For each different concrete mansory unit indicated, per ASTM C 140

C. Mortar Test: Test mortar properties per test methods of ASTM C 270

D. Evaluate mortar composition and properties per ASTM C 780

E. Grout Test: Test grout for compressive strength per ASTM C 1019

F. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by another means, as acceptable to authorities having jurisdiction.

G. Single-Source Responsibility for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one source and by a single manufacturer for each different product required.

H. Single-Source Responsibility for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

I. Mockup: Prior to installing unit masonry, construct sample wall panel(s) to verify selections made under sample submittals and to demonstrate aesthetic effects as well as other qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final unit of Work.

1. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

2. Locate mockups on site in the locations indicated or, if not indicated, as directed by Architect.
   a. Include exterior face brick wall with field and accent brick and a control joint.
   b. Seal control joint complying with Division 7 Section "Joint Sealants".

3. Build mockups for the following types of masonry full thickness, including face and back-up wythes as well as accessories. Include a sealant-filled joint at least 16 inches long in each mockup.
   a. Typical exterior face brick wall with through wall flashing installed for a 24 inch length in corner of mockup approximately 16" down from top of mockup with a 12 inch length of flashing left exposed to view (omit masonry above half of flashing).
   b. Typical interior masonry unit wall.
   c. Clean exposed faces of mockups with masonry cleaner "Sure Klean 600" or other masonry manufacturer approved cleaner.
   d. Protect accepted mockups from the elements with weather-resistant membrane.

4. Notify Architect one week in advance of the dates and times when mockups will be constructed.

5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed work.
   a. Acceptance of mockup is for color, texture and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship and other material and construction qualities specifically approved by Architect in writing.
   b. Approval of mockups does not constitute approval of deviations from Contract Documents contained in mockups, unless such deviations are specifically approved by Architect in writing.
   c. When directed, demolish and remove mockups from Project site.
   d. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 Special Inspections

Cooperate and adhere to the requirements of 2021 International Building Code - Special Inspections. All masonry and masonry reinforcing shall be subject to special inspections and

observations, at stage intervals deemed necessary, by the Owners' third party Inspector, Engineer and/or the Architect prior to grout filling.

1.6 Special Markings

A. The contractor shall chalk-line mark the floor slab for masonry wall locations.

B. The contractor shall mark on the floor slab location of reinforcing dowels to serve grouted cells so as to be clear as to locations of vertical cell reinforcement.

C. The contractor shall mark the concrete sub-floor with temporary marker paint to identify location of structural CMU reinforcing dowels so as to accurately locate reinforced cells during wall erection. Markings should be transferred to CMU surfaces as installation allows.

D. Prefabricated Corner and "T" Wall Reinforcing - upon arrival to the job site and while material is in bundle state, the ends shall be spray painted in the field with permanent bright red paint for easy recognition during site inspections.

1.7 Special Sequencing

A. After the special markings have been provided and prior to the start of CMU installation, an inspection of the concrete floor slab and CMU reinforcing dowels shall be required.

B. CMU wall construction designed to receive structural reinforcement and cell grouting shall be installed in such sequencing as to consolidate the work of placing reinforcement and cell grouting to minimum concentrate intervals encompassing such significant quantities as to warrant truck delivery of ready-mixed grout.

C. The work event of placing structural reinforcement and grouting shall require continuous special observation by the Owner's third party Inspector(s) as required by the 2021 International Building Code. Grout mix samples shall be required for testing purposes. The General Contractor shall directly schedule special masonry observations at least 24 hours in advance and notify Architect accordingly. Cost associated with special sequencing shall be considered and included in base bid.

1.8 Delivery, Storage, and Handling

A. Store masonry units on elevated platforms, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes. If units become wet, do not install until they are in an air-dried condition.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained, and contamination avoided.

D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.9 Project Conditions

A. Protection of Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on ground and over wall surface.

2. Protect sills, ledges, and projections from mortar droppings.

3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.

4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt on completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit masonry damaged by frost or freezing conditions. Comply with the following requirements:

1. Cold-Weather Construction: When the ambient temperature is within the limits indicated, use the following procedures:

a. 40 to 32 deg F: Heat mixing water or sand to produce mortar temperatures between 40 and 120 deg F

2. Cold-Weather Protection: When the mean daily temperature is within the limits indicated, provide the following protection:

a. 40 to 25 deg F : Cover masonry with a weather-resistant membrane for 48 hours after construction.
b. 25 to 20 deg F: Cover masonry with insulating blankets or provide enclosure and heat for 48 hours after construction to prevent freezing. Install wind breaks when wind velocity exceeds 15 mi./h.
c. 20 deg F and Below: Provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 48 hours after construction.

3. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried out, but not less than 7 days after completion of cleaning.

E. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg F and above.

2.0 - PRODUCTS

2.1 Manufacturers

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Brick:
   a. Acme Brick Co.
   b. Belden Brick Co.
   c. Cherokee Sanford Group, Inc.
   d. US Brick
   e. Boren
   f. Triangle
   g. Boral
   h. Tri-State

2. Portland Cement, Mortar Cement, Masonry Cement, and Lime:
   a. Essroc Materials, Inc.
   b. Glen-Gery Corporation
   c. Lafarge Corporation

3. Joint Reinforcement, Ties, and Anchors:
   a. Dur-O-Wal, Inc.
   b. Heckman Building Products, Inc.
   c. Hohmann & Barnard, Inc.
   d. Wire-Bond

2.2 Concrete Masonry Units

A. General: Provide shapes indicated and as follows for each form of concrete masonry unit required:

1. Provide special shapes for lintels, corners, jambs, sash, control joints, headers, bonding and other special conditions.

2. Bullnose units are required for all outside corners of vertical surfaces, unless otherwise indicated.

B. Concrete Masonry Units: ASTM C 90 and as follows:

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2,000 psi.
2. Weight Classification: **NORMAL**
3. Aggregates: Do not use aggregate made from pumice, scoria or tuff.
4. Provide Type N-I moisture-controlled units
5. Size: Manufactured to the actual dimensions indicated on Drawings within tolerances specified in the applicable referenced ASTM specification. Typical unit 8" nominal, 6" nominal, 4" nominal, or 12" nominal as indicated on drawings.

2.3 Brick

A. General: Provide shapes indicated and as follows for each form of brick required.

1. Provide units without cores or frogs and with exposed surfaces finished for ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces.

B. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.

1. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes and lintels.
2. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

C. Face Brick: ASTM C 216 and as follows:

1. Grade and Unit Compressive Strength: Provide units with grade and minimum average net-area compressive strength indicated below:
   a. Grade: SW. With color through brick to match existing school brick predominant on buildings in the school complex or as otherwise selected by the architect.
2. Type: FBS. With color through brick as selected by the architect.
3. Size: Bricks manufactured to the following actual dimensions within tolerances specified in ASTM C 216:
   a. Standard: 3-5/8 inches thick by 2-1/4 inches high by 7-5/8 inches long.
4. Application: Use where brick is exposed, unless otherwise indicated.
5. Color and Texture: As selected by the architect.

D. Brick Schedule
1. Contractor to provide an allowance (materials only) for the brick. See Section 01020 – Allowances.

2.4 Mortar and Grout Materials

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Masonry Cement: ASTM C91

C. Hydrated Lime: ASTM C 207, Type S (for CMU) Type N (for face brick).

D. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207.

E. Aggregate for Mortar: ASTM C 144; except for joints less than 1/4 inch, use aggregate graded with 100 percent passing the No. 16 sieve.

1. White-Mortar Aggregates: Natural white sand and or ground white stone.

F. Aggregate for Grout: ASTM C 404.

G. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortar.

H. Cold Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494, Type C; and recommended by the manufacturer for use in masonry mortar of composition indicated.

I. Ready-Mixed Mortar: Cementitious materials, water, and aggregate complying with requirements specified in this Article; combined with set-controlling admixtures to produce a ready-mixed mortar complying with ASTM C 1142.

J. Water: Potable.

K. Products: Subject to compliance with requirements, provide one of the following:

1. Cold Weather Admixture:
   a. "Accelguard 80"; Euclid Chemical Co.
   b. "Morset"; W. R. Grace & Co.

2. Mortar shall be approved equal to Lafarge as selected by Architect from full range of mortar colors available.

2.5 Ties and Anchors, General

A. General: Provide ties and anchors specified in subsequent articles that comply with requirements for metal and size of this Article, unless otherwise indicated. Provide ties that will extend into the brick veneer a minimum of one half of the veneer width.

B. Wire: As follows:
1. Galvanized Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating for wire ties and anchors in exterior walls.
2. Wire Diameter: 0.1875 inch.

2.6 Bent Wire Ties and Cornices

A. Individual units prefabricated from bent wire to comply with requirements indicated below:

1. Type for Masonry where Whythes are of Different Material: Adjustable ties composed of 2 parts; 1 with pintles, the other with eyes; with maximum misalignment of 1-1/4 inches. Ties shall be long enough to extend through rigid wall insulation and into outer wythe a minimum of 2 inches.

B. Joint Reinforcement: Provide welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10', with prefabricated corner and tee units, and complying with requirements indicated below:

1. Width: Fabricate joint reinforcement in units with widths of approximately 2" less than nominal width of walls and partitions as required to provide mortar coverage of not less than 5/8" on joint faces exposed to exterior and 1/2" elsewhere.
2. Ladder design with cross rods spaced not more than 16" o.c. One side rod for each face shell of concrete masonry back-up and one rod for brick wythe.
3. Wire Size: 0.1875" diameter for deformed rods; No. 9 cross rods. Hot dipped galvanized, Class 3. H. Reinforcing:
4. Brick to block ties: 3/16" diameter adjustable double hook & eye; Hohmann & Barnard Lox-All Adjustable Eye-Wire, Dur-o-wall or equal.

2.7 Embedded Flashing Materials

A. Vinyl Flashing:

1. Thickness: 40 mil thick.
2. Application: Use where flashing is fully concealed in masonry

B. Adhesive for Flashings: Of type recommended by manufacturer of flashing material for use indicated.

C. Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to the following:

1. Vinyl Flashing:
   a. Gibraltar
   b. Nervastral
   c. AFCO

2.8 Miscellaneous Masonry Accessories

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Type 2, Class A, Grade 1; compressible up to 35 percent; of width and thickness indicated; formulated from Neoprene.

B. Preformed Metal Control-Joints: Heckman 16 oz. copper – Type 93U, designed to fit brick size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

D. Weep Holes: Provide the following:

1. Wicking material: Cotton sash cord in length required to produce 2 inch exposure on exterior and 18 inches in cavity between wythes.

E. Sealer for Brick: Prosoco-Siloxane-Weather Seal

F. Rebar Positioners: 3/16" diameter, hot-dipped galvanized and provided at 48" vertical centers in each reinforced cell.

2.9 Wall Reinforcement and Anchors

A. Continuous wall reinforcement at 16" o.c. for all masonry walls shall be hot-dipped galvanized and of either truss or ladder design with tabs for exterior two Wythe walls. Reinforcement shall have not less than No. 9 steel wire cross rods and No. 9 deformed side rods. Wires shall conform to ASTM A82. Reinforcement shall have a drip when used in cavity walls, use rectangular pintle sections 16" o.c. in back-up masonry and adjustable double eyelet sections in face brick where rigid insulation is indicated or required in cavity space or where face brick and back-up masonry is not run up together. Use manufacturer's pre-formed corners and intersecting sections and splice as recommended. Basis of material selection shall be Hohmann & Barnard #270 or approved equals by Heckmann Building Products, Wire Bond and Dur-O-Wall.

2.10 Masonry Cleaners

A. Job Mixed Detergent Solution: Solution of ½ cup dry measure tetrasodium polyphosphate and 1/2 cup dry measure laundry detergent dissolved in 1 gallon of water.

B. Proprietary Detergent Solution: Manufacturer's standard strength cleaner designed for removing mortar/grout stains, efflorescence and other new construction stains from new masonry surfaces as acceptable to masonry material manufacturer. "Sure Klean" No. 600 Detergent; ProSoCo, Inc., or approved equal. Do not use acid cleaners.

2.11 Mortar and Grout Mixes

A. General: Do not add admixtures including coloring pigments, air-entraining agents, accelerators, retarders, water repellent agents, anti-freeze compounds or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.

B. Mixing: Combine and thoroughly mix cementitious, water and aggregates in a mechanical batch mixer; comply with referenced ASTM standards for mixing time and water content.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification, for types of mortar required, unless otherwise indicated.

1. Limit cementitious materials in mortar to portland cement-lime.

2. Use Type S or N mortar.

D. Colored Pigmented Mortar: Select and proportion pigments with other ingredients to produce color required. Do not exceed pigment-to-cement ratio of 1-to-10, by weight.

E. Grout for Unit Masonry: Comply with ASTM C 476 for grout for use in construction of reinforced and non-reinforced unit masonry. Use grout of consistency indicated or if not otherwise indicated, of consistency (fine or coarse) at time of placement which will completely fill all spaces intended to receive grout. Grout to have minimum 2,500 psi compressive strength at 28 days when tested in accordance with ASTM C1019.

1. Use fine grout in grout spaces less than 2" in horizontal direction, unless otherwise indicated.
2. Use coarse grout in grout spaces 2" or more in least horizontal dimension, unless otherwise indicated.

3.0 - EXECUTION

3.1 Examination

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of unit masonry. Do not proceed with installation until unsatisfactory conditions have been corrected.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of unit masonry.

2. Examine rough-in and built-in construction to verify actual locations of piping connections prior to installation.

3.2 General

A. Lay out all masonry work according to the dimensions shown on the drawings. No work shall be laid unless the temperature is 35° F. and rising.

B. All masonry work shall be laid straight, level, plumb, and true. Exterior walls shall be laid continuously around the entire structure and in no case racked up more than five (5) feet.

C. Build in all flashing, anchors, reinforcing, inserts, wall plugs, lintels, bearing plates, bond beams and items as required to accommodate the work of others.

D. All special details such as chases, openings, expansion joints, projections, corbels, etc., shall be built as required and/or indicated on the drawings.

E. Lay all masonry, brick and block in full bed of mortar completely filling all joints with mortar. Allow for caulking joints at all window and door frames, and at all wall intersections.

F. Joints of all exposed masonry surfaces shall be finished after the mortar has taken its initial set. Use a straight edge for horizontal joints. Vertical joints shall be in alignment from top to bottom.

G. At the end of each day or when rain or frost is imminent, the tops of masonry walls and similar surfaces shall be properly protected by covering top of wall with a strong waterproof membrane well secured in place.

H. Consult all other trades in advance and make provisions for the installation of their work to avoid cutting and patching. Do all cutting and patching of masonry required to accommodate work of others.

I. Unfinished work shall be stepped back to permit joining of new work. Masonry work may be toothed only when approved. Before connecting new work with work previously built, sweep clean, remove loose mortar and thoroughly wet the old brick.

J. As the work progresses, mortar daubs and smears shall be cleaned from masonry work.

K. Door frames shall be set before the masonry walls are built. As the masonry walls are built around these frames, the inside of the frames shall be grouted solid with mortar. NOTE: See HOLLOW METAL DOORS AND FRAMES - SECTION 08110 for requirements to coat interior of frames prior to grouting.

L. Extend all rated walls to the underside of structural deck above unless otherwise approved. Fit walls neatly with all joints filled where two levels of ceiling occur, extend walls to high level. Extend all partition walls to 8" above adjacent ceiling.

M. Weep holes: Provide weep holes in head joints 32" o.c. at thru wall flashing where air space is not open downward. Weep holes shall be below finish floor line and above finish grade.

N. MORTAR IN CONTACT WITH COPPER PIPING WILL NOT BE ACCEPTED. Coordinate with plumbing or mechanical contractor if copper is encountered without sleeving/insulation. Anticipate additional corrective work.

3.3 Installation, General

A. Thickness: Build cavity and composite walls and other masonry construction to the full thickness shown. Build single-wythe walls to the actual thickness of the masonry units, using units of thickness indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections of the Specifications.

C. Leave openings for equipment to be installed before completion of masonry. After installing equipment, complete masonry to match construction immediately adjacent to the opening.

D. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction. Use full-size units without cutting, where possible. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Mix units for exposed unit masonry from several pallets or cubes as they are placed to produce uniform blend of colors and textures.

F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

G. Wetting of Brick: Wet brick prior to laying if the initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb the water so they are damp but not wet at the time of laying.

3.4 Construction Tolerances

A. Variation from Plumb: For vertical lines and surfaces of columns, walls, and arrises, do not exceed 1/4 inch in 10 feet, nor 3/8 inch in 20 feet, nor 1/2 inch in 40 feet or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4 inch in 20 feet, nor 1/2 inch in 40 feet or more. For vertical alignment of head joints, do not exceed plus or minus 1/4 inch in 10 feet , nor 1/2 inch maximum.

B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4 inch in 20 feet, nor 1/2 inch in 40 feet or more. For top surface of bearing walls, do not exceed 1/8 inch in 10 feet, nor 1/16 inch within width of a single unit.

C. Variation of Linear Building Line: For position shown in plan and related portion of columns, walls, and partitions, do not exceed 1/2 inch in 20 feet, nor 3/4 inch in 40 feet) or more.

D. Variation in Cross-Sectional Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed minus 1/4 inch nor plus 1/2 inch.

E. Variation in Mortar-Joint Thickness: Do not vary from bed-joint thickness indicated by more than plus or minus 1/8 inch with a maximum thickness limited to 1/2 inch. Do not vary bed-joint thickness from bed-joint thickness of adjacent course by more than 1/8 inch. Do not vary from head-joint thickness indicated by more than plus or minus 1/8 inch. Do not vary head-joint thickness from adjacent head-joint thickness by more than 1/8 inch. Do not vary from collar-joint thickness indicated by more than minus 1/4 inch or plus 3/8 inch.

3.5 Laying Masonry Walls

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint widths and for accurate locating of openings, movement-type joints, returns, and offsets. Avoid the use of less-than-half-size units at corners, jambs, and where possible at other locations.

B. Lay walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other construction.

C. Bond Pattern for Exposed Masonry:

1. Lay CMU in stacked bond pattern

D. Lay concealed masonry with all units in a wythe as above. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

E. Stopping and Resuming Work: In each course, rack back 1/2-unit length for one-half running bond or 1/3-unit length for one-third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if required, and remove loose masonry units and mortar prior to laying fresh masonry.

F. Built-in Work: As construction progresses, build-in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.

G. Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.

H. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.

I. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

J. Build non load-bearing interior partitions full height of story to underside of solid floor or roof structure above and as follows:

1. Install compressible filler in joint between top of partition and underside of structure above.
2. Wedge non load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.

3.6 Mortar Bedding and Jointing

A. Lay hollow concrete masonry units as follows:

1. With full mortar coverage on horizontal and vertical face shells.
2. Bed all webs in mortar.
3. For starting course on footings where cells are not grouted, spread out full mortar bed, including areas under cells.
4. Maintain joint widths indicated, except for minor variations required to maintain bond alignment. If not indicated, lay walls with 3/8-inch joints.
5. Fill bottom course of all CMU solid with mortar.
6. Fill all courses of CMU adjacent to fill in area of ramp and stage solid with mortar.

B. Lay solid brick-size masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not furrow bed joints or slush head joints.
   1. Lay all brick with full head and bed joints.
   2. At cavity walls, bevel beds away from cavity to minimize mortar protrusions into cavity. As work progresses, trowel mortar fins protruding into cavity flat against cavity face of brick.
   3. Maintain joint widths indicated, except for minor variations required to maintain bond alignment. If not indicated, lay walls with 1/4-to-3/8-inch joints. Three brick courses and three mortar courses in 8-inch vertical to course with CMU.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

D. Cut joints flush for masonry walls that are to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

3.7 Structural Bonding of Multiwythe Masonry

A. Use individual metal ties installed in horizontal joints to bond wythes together. Provide ties as shown, but not less than 1 metal tie for 4 sq. ft. of wall area spaced not to exceed 24 inches o.c. horizontally and vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.

B. Corners: Provide interlocking masonry unit bond in each course at corners, unless otherwise shown. Provide continuity with horizontal joint reinforcing at corners by using prefabricated "L" units as well as masonry bonding.

C. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, provide same type of bonding specified for structural bonding between wythes and space by providing continuity with horizontal joint reinforcing at corners by using prefabricated "T" units.

3.8 Cavities

A. Keep cavities clean of mortar droppings and other materials during construction. Strike joints facing cavities flush.

   1. Use wood strips temporarily placed in cavity to collect mortar droppings. As work progresses, remove strips, clean off mortar droppings, and replace in cavity.
   2. Tie exterior wythe to back-up with individual metal ties. Stagger alternate courses.

3.9 Anchoring Masonry to Structural Members

A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:

   1. Space weldable rebar couplers at horizontal bond beams as indicated, but not more than 24 inches o.c. vertically.

3.10 Cavity Wall and Masonry Cell Insulation

A. On units of plastic board insulation, place small dabs of adhesive, spaced approximately 12 inches o.c. both ways on inside face or attach to inside face with plastic fasteners designed for his purpose. Verify compatibility of adhesive and bituminous damproofing specified in Division 7. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.

B. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.11 Horizontal Joint Reinforcement

A. General: Provide continuous horizontal joint reinforcement as indicated. Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, ½" elsewhere. Lap reinforcing a minimum of 6 inches.

1. Space reinforcement not more than 16 inches vertically o.c.
2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
3. Provide reinforcement in mortar joints 1 block course above and below wall openings and extending 12 inches beyond opening.
   a. Reinforcing above is in addition to continuous reinforcement.

B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

C. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.

3.12 Control and Expansion Joints

A. General: Install control and expansion joints in unit masonry where indicated. Build-in related items as the masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.

B. Form control joints in concrete masonry by installing preformed control-joint gaskets designed to fit standard sash block.

C. Form expansion joints in brick made from clay or shale by forming an open joint of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Division 7 Section "Joint Sealants." Maintain joint free and clear of mortar.

3.13 Lintels

A. Install steel lintels where indicated.

B. Provide pre-cast masonry lintels where shown and where openings of more than 12 inches for brick size units and 24 inches for block size units are shown without structural steel or other supporting lintels.

C. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

3.14 Flashing, Weep Holes, and Vents

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated.

B. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Place through-wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer before covering with mortar.

C. Install flashing as follows:

1. At composite masonry walls, including cavity walls, extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 4 inches and through the inner wythe to within 1/2 inch of the interior face of the wall in exposed masonry. Where interior surface of inner wythe is concealed by furring, carry flashing completely through the inner wythe and turn up approximately 2 inches unless otherwise indicated.
2. At lintels and shelf angles extend flashing a minimum of 4 inches into masonry at each end. At heads and sills, extend flashing 4 inches at ends and turn up not less than 2 inches to form a pan.
3. Flashing installation is to be inspected and approved in writing by Architect before proceeding with masonry work.

D. Install weep holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashing and as follows:

1. Form weep holes with product specified in Part 2 of this Section.
2. Form weep holes by keeping head joints free and clear of mortar.
3. Space weep holes 24 inches o.c.

E. Trim wicking material used in weep holes flush with outside face of wall after mortar has set.

1. Install through-wall flashing and weep holes above horizontal blocking.

F. Install reglets and nailers for flashing and other related construction where shown to be built into masonry.

3.15 Grouting of CMU Walls

A. Contractor to notify Owner's Testing Agent prior to all grouting of steel reinforced CMU.

B. All cavities with steel reinforcing to be cleaned of all debris and broken CMU prior to filling with grout.

C. All reinforcing steel in cells to be filled with grout or concrete to be continuous with laps as required by code.

D. Grout for filled masonry cells is not to be dropped more than five (5) feet.

3.16 Repairing, Pointing and Cleaning

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units. Install new units to match adjoining units; install in fresh mortar or grout, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point-up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for application of sealants.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears prior to tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film or waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing the surfaces thoroughly with clear water.
5. Clean brick by bucket and brush hand-cleaning method described in BIA Technical Note No. 20 Revised, using approved masonry cleaner.
6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain present on exposed surfaces.

E. Protection: Provide final protection and maintain conditions that ensure unit masonry is without damage and deterioration at time of Substantial Completion.

3.17 Sealing of Brick

A. Take precautions to avoid harm to building occupants, pedestrians, nearby property and all non-masonry surfaces from contact with sealer and fumes. Protect and/or divert auto and pedestrian traffic.

B. Test masonry (minimum 4 ft x 4 ft area) before overall application to assure compatibility and desired water repellent results. (Treated and cured masonry should shed water and not wet out.) Apply tests using the same equipment as for job application and allow to cure 24 to 48 hours. Test panels should remain available for inspection by Architect.

C. Surface Preparation:

1. Fill all cracks and voids to avoid penetration of fumes into the building. (Such openings may permit moisture, sealer or sealer fumes to penetrate wall.) Make sure that all caulks and sealants are in place and completely cured.
2. Clean dirt, oil and other contaminants from the surface. Use appropriate proprietary cleaners (do not use raw acids) where necessary. Rinse with pressure equipment at 500 to 1,500 psi to thoroughly remove all detergent residues. Do not apply to surfaces that are wet to the touch. Best results are obtained on dry surfaces. Internal moisture should also be dissipated.

3.18 Masonry Waste Disposal

A. Recycling: Undamaged, excess masonry materials are Contractor's property and shall be removed from the project site.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes fabrication and erection of structural steel work, as shown on drawings including schedules, notes, and details showing size and location of members, typical connections, and types of steel required.

1. Structural steel is that work defined in American Institute of Steel Construction (AISC) "Code of Standard Practice" and as otherwise shown on drawings.

2. Miscellaneous Metal Fabrications are specified elsewhere in Division 5.

3. Refer to Division 3 for anchor bolt installation in concrete and Division 4 for anchor bolt installation in masonry.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

1. Submit all shop drawings on three copies only unless specified otherwise in the general conditions. Two prints will be returned to the architect. All copies required by the Contractor are the responsibility of the Contractor and shall be made after reproducible is returned.

B. Product data or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards). This data is submitted for information only.

1. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties.

2. High-strength bolts (each type), including nuts and washers.

a. Include Direct Tension Indicators if used.

3. Structural steel primer paint.

4. Shrinkage-resistant grout.

C. Shop drawings including complete details and schedules for fabrication and assembly of structural steel members, procedures, and diagrams.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.

2. Include embedment drawings.

3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.

4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.

5. Contract documents shall not be used for shop drawing, including erection plans or details.

6. All shop drawings which are resubmitted for any reason shall have all revised items clouded or identified for each submittal.

7. All structural steel connections not specifically detailed on the drawings shall be designed to resist forces indicated, by the Contractor.

8. For structural-steel connections indicated to comply with design loads, include structural analysis data, signed and sealed by the qualified professional engineer responsible for their preparation.

9. For each connection, the following shall be noted on the shop drawings:
   a. Required design reaction
   b. Calculation sheet number for design
   c. Capacity of detailed connection
   d. Stamp of Engineer submitting calculations for the connection

10. All shop drawings which do not provide this information will be returned unchecked as an incomplete submittal.

D. Test reports conducted on shop- and field-bolted and welded connections. Include data on type(s) of tests conducted and test results.

1.4 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of following, except as otherwise indicated:

1. American Institute of Steel Construction (AISC) "Code of Standard Practice for Steel Buildings and Bridges", dated June 10, 1992.

   a. General: AISC "Code of Standard Practice" shall apply except to the extent that references are made to the responsibility of the Owner and/or Architect or Engineer in which event those references shall have no applicability. Where a conflict exists between the Code of Standard Practice and the Contract Documents, the Contract Documents shall govern.

2. AISC "Specifications for Structural Steel Buildings," including "Commentary".

3. AISC "Specifications for Structural Steel Buildings, Section 10, Architecturally Exposed Structural Steel".

4. "Specifications for Structural Joints using ASTM A325 or A490 Bolts" approved by the Research Council on Structural Connections.

5. American Welding Society (AWS) D1.1 "Structural Welding Code - Steel."

6. ASTM A6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use."

B. Qualifications for Welding Work: Qualify welding procedures and welding operators in

accordance with AWS "Qualification" requirements.

1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.

2. If re-certification of welders is required, retesting will be Contractor's responsibility.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site at such intervals to ensure uninterrupted progress of work.

B. Deliver anchor rods and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not to delay work.

C. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration. If bolts and nuts become dry or rusty, clean and relubricate before use.

1. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Metal Surfaces, General: For fabrication of work that will be exposed to view, use only materials that are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names, and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating, and applying surface finishes.

B. Structural Steel: ASTM A992, Grade 50 for wide flange beams; ASTM A36 elsewhere.

C. Cold-Formed Steel Tubing: ASTM A500, Grade B.

D. Hot-Formed Steel Tubing: ASTM A501.

E. Steel Pipe: ASTM A53, Type E or S, Grade B; or ASTM A501.

F. Moment Connection Material: Unless noted otherwise on the drawings, stiffener plates, doubler plates, gusset plates and the connecting plates shall be the same grade of steel as members being connected.

G. Headed Stud-Type Shear Connectors: ASTM A108, Grade 1015 or 1020, cold-finished carbon steel with dimensions complying with AISC Specifications.

H. Anchor Rods: ASTM A307 Grade A, headed type with supplementary requirements S1, unless otherwise indicated.

I. Unfinished Threaded Fasteners: ASTM A307, Grade A, regular low-carbon steel bolts and nuts.

1. Provide either hexagonal or square heads and nuts, except use only hexagonal units for exposed connections.

J. High-Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and

hardened washers, as follows:

1. Quenched and tempered medium-carbon steel bolts, nuts, and washers, complying with ASTM A325.

    a. Where indicated as galvanized, provide units that are zinc coated, either mechanically deposited complying with ASTM B695, Class 50, or hot-dip galvanized complying with ASTM A153.

2. Quenched and tempered alloy steel bolts, nuts, and washers, complying with ASTM A490.

K. Electrodes for Welding: Comply with AWS Code.

L. Structural Steel Primer Paint: Red oxide primer.

M. Cement Grout: Portland cement (ASTM C150, Type I or Type III) and clean, uniformly graded, natural sand (ASTM C404, Size No. 2). Mix at a ratio of 1.0 part cement to 3.0 parts sand, by volume, with minimum water required for placement and hydration.

N. Nonmetallic Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining product containing selected silica sands, Portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with CE-CRD-C621.

1. Available Products: Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to, the following:

    a. 100 Non-Shrink Grout (Non-Metallic); Conspec, Inc.
    b. Supreme Grout; Cormix, Inc.
    c. Sure Grip Grout; Dayton Superior.
    d. Euco N.S.; Euclid Chemical Co.
    e. Crystex; L & M Construction Chemicals, Inc.
    f. Masterflow 713; Master Builders.
    g. Sealtight 588 Grout; W. R. Meadows.
    h. Propak; Protex Industries, Inc.
    i. Set Non-Shrink; Set Products, Inc.
    j. Five Star Grout; U.S. Grout Corp.

2.2 FABRICATION

A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.

1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize field handling of materials.

2. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.

B. Connections: Weld or bolt shop connections, as indicated.

1. Bolt field connections, except where welded connections or other connections are indicated.

    a. Provide high-strength threaded fasteners for all principal bolted connections, except where unfinished bolts are indicated.

C. Simple Beam Connections: Standard double angle framed beam connections using bolts as specified.

1. Seated Beam Connections and Stiffened Seated Beam Connections shall not be used unless indicated on the drawings or unless Engineer approval is obtained to verify capacity of supporting member for the resulting eccentricity. The fabricator must verify and bear responsibility that the use of such connections does not interfere with Architectural or MEP requirements.

D. High-Strength Bolted Construction: Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints using ASTM A325 or A490 Bolts."

E. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.

F. Steel Wall Framing: Select members that are true and straight for fabrication of steel wall framing. Straighten as required to provide uniform, square, and true members in completed wall framing.

G. Holes for Other Work: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on final shop drawings.

H. Provide threaded nuts welded to framing and other specialty items as indicated to receive other work.

I. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.

2.3 SHOP PAINTING

A. General: Shop-paint structural steel, except those members or portions of members to be embedded in concrete or mortar. Paint embedded steel that is partially exposed on exposed portions and initial 2 inches of embedded areas only.

1. Do not paint surfaces to be welded or high-strength bolted with slip-critical-type connections.

2. Do not paint surfaces scheduled to receive sprayed-on fireproofing.

3. Apply 2 coats of paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

B. Painting: Provide a one-coat, shop-applied paint system complying with Steel Structures Painting Council (SSPC) Paint System Guide No. 7.00.

C. Painting of steel exposed to weathering in the finished configuration of the structure:

1. Surface Preparation: Clean surfaces to be painted. Remove rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning.

2. Prime Coat: Immediately after surface preparation, provide one coat of grey shop applied Organic Zinc Rich Urethane Primer, such as Tnemec 90-97, at 2.5 to 3.5 mils DFT which meets the following performance requirements:
   a. Solids by Volume: 63%

b. Zinc Content: 83% y weight.
c. Salt Spray (Fog): ASTM B 117, Scribed Panels, 50,000 hours exposure.
d. Adhesion: ASTM 4541 – Type V – no less than 2,083 psi(14.36 MPa) pull.
e. Prohesion: ASTM G85 Prohesion Cabinet Testing. 15,000 hours.
f. Cathodic Disbondment: ASTM G8, Method A.
g. Immersion: ASTM D 870 Potable Water Immersion. 7 year exposure.
h. AISC Static Fatigue: Primer shall meet requirements of a Class B surface with a mean slip coefficient no less than 0.50 and a tension creep not in excess of .005 inch over SSPC-SP6 prepared substrate.

3. Touch Up Primer/Preparation before Finish Coats: Immediately after erection all surfaces shall be cleaned per SSPC – SP1 followed by spot repair preparation of SSPC-SP11 Power tool clean to white metal. Remove all foreign materials and contaminates, clean field welds, bolted connections, and abraded areas of shop paint. All damaged and abraded areas shall have feathered edges. Field touch-up with one coat of Prime Coat, paint applied at 2.5-3.5 Mils DFT prior to finish coat.

4. Intermediate Coat: Provide one grey finish coat of an Aliphatic Acrylic Polyurethane, such as Tnemec Series 1075 Endura-Shield II, at 3.0 to 5.0 mils DFT which meets the following performance requirements:
   a. Solids by Volume: 71%
   b. Salt Spray (Fog): ASTM B 117, 2,000 hours exposure.
   c. Abrasion: ASTM 4060 (CS-17 Wheel, 1,000 gram load, 1,000 cycles). No more than 139 mg loss.
   d. Adhesion: ASTM 4541 – no less than 1,423 psi(9.81 MPa) pull.
   e. Flexibility: ASTM D 522 (Method A) – no less than 14.4% elongation.
   f. Hardness: ASTM 3363- no gouging with an HB or less pencil.
   g. Humidity: ASTM 4585- 4,000 hours exposure.
   h. Impact: ASTM B 2794 – no cracking or delamination of film after 35 inch-pounds direct impact.
   i. Prohesion: ASTM G85 – 10,000 hours exposure.

5. Finish Coat: Provide one finish coat (color to be selected by architect) of an Advanced Thermoset Solution Fluoropolymer, such as Tnemec Series 1070 Fluoronar, at 2.0 to 3.0 mils DFT which meets the following performance requirements:
   a. Solids by Volume: 60%
   b. Salt Spray (Fog): ASTM B 117 – 10,000 hours exposure
   c. Abrasion: ASTM 4060 – (CS-17 Wheel, 1,000 gram load, 1,000 cycles) no more than 103 mg loss.
   d. Adhesion: ASTM 4541 – Type V – no less than 1,930 psi(13.3 MPa) pull.
   e. Flexibility: ASTM D 522 (Method A)- no less than 14.83% elongation.
   f. Hardness: ASTM 3363 – no gouging with an 8H or less pencil.
   g. Humidity: ASTM 4585 – 3,000 hours exposure.
   h. Impact: ASTM B 2794 - no cracking or delamination of film after 35 inch-pounds direct impact.

6. Any Field Painting to be brush or roller applied.

7. Owners testing agent to continuously review the surface preparation and application of the painting of steel exposed to weathering in the finished configuration of the structure.

2.4 SOURCE QUALITY CONTROL

A. General: Materials and fabrication procedures are subject to inspection and tests in mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with

specified requirements.

1. Promptly remove and replace materials or fabricated components that do not comply.

B. Design of Members and Connections: Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay in the work.

1. Promptly notify Architect whenever design of members and connections for any portion of structure are not clearly indicated.

PART 3 - EXECUTION

3.1 ERECTION

A. Surveys: Employ a licensed land surveyor for accurate erection of structural steel. Check elevations of concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Architect. Do not proceed with erection until corrections have been made or until compensating adjustments to structural steel work have been agreed upon with Architect.

B. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.

C. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.

D. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.

1. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.

2. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.

3. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.

4. For proprietary grout materials, comply with manufacturer's instructions.

E. Field Assembly: Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

F. Level and plumb individual members of structure within specified AISC tolerances.

G. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean

temperature at which structure will be when completed and in service.

H. Splice members only where indicated and accepted on shop drawings.

I. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds, and grind smooth at exposed surfaces. Each erection bolt on shop drawings shall be noted "Erection Bolt".

1. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

2. Do not enlarge unfair holes in members by burning or by using drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.

J. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members that are not under stress, as acceptable to Architect. Finish gas-cut sections equal to a sheared appearance when permitted.

K. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.

1. Apply by brush or spray to provide minimum dry film thickness of 1.5 mils.

3.2 QUALITY CONTROL

A. Owner will engage an independent testing and inspection agency to inspect high-strength bolted connections and welded connections and to perform tests and prepare test reports.

B. Testing agency shall conduct and interpret tests, state in each report whether test specimens comply with requirements, and specifically state any deviations therefrom.

C. Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.

D. Testing agency may inspect structural steel at plant before shipment.

E. Correct deficiencies in structural steel work that inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as necessary to reconfirm any noncompliance of original work and to show compliance of corrected work.

F. Field Inspections and Tests:

1. Check steel as received in the field for possible shipping damage workmanship, piece making and verification of required camber.

G. Shop-Bolted Connections:

1. Inspect or test in accordance with AISC specifications.

2. For bolted connections (bearing-type), all connections shall be visually observed to assure that all bolts, nuts and washers are in place and that all plies of connection material have been drawn together. All bolts shall be verified to be snug tight only.

H. Shop Welding: Inspect and test during fabrication of structural steel assemblies, as follows:

1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.

2. Perform visual inspection of all welds, including but not limited to fit-up, intermediate passes and final weld.

3. Perform tests of welds as follows. Inspection procedures listed

    a. Ultrasonic Inspection: ASTM E164. Perform on all full and partial penetration welds.

I. Field-Bolted Connections:

1. Inspect in accordance with AISC specifications.

2. For bolted connections (bearing-type), all connections shall be visually observed to assure that all bolts, nuts and washers are in place and that all plies of connection material have been drawn together. All bolts shall be verified to be snug tight only.

3. Bolts in slotted holes at expansion joints shall have nuts finger tight with threads damaged.

J. Field Welding: Inspect and test during erection of structural steel as follows:

1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.

2. Perform visual inspection of all welds, including but not limited to fit-up, intermediate passes and final weld.

3. Perform tests of welds as follows:

    a. Ultrasonic Inspection: ASTM E164. Perform on all full and partial penetration welds.

END OF SECTION 05120.

1.0 - GENERAL

1.1 Scope
Furnish and install all miscellaneous metals as indicated on drawings, including that shown only on Architectural Drawings, and/or as specified.

1.2 Submittals
Submit shop drawings for approvals.

1.3 Applicable Standards
Fabrication and erection, except as specified otherwise, shall be in accordance with American Institute of Steel Construction (AISC) Specifications for the Design, Fabrication and Erection of Structural Steel for Building.

1.4 Qualification
Manufacturer's names, models, or catalog numbers, referred to herein are intended to show the type, quality and intent of items required. Products of other manufacturers equal or better in quality, similar in design are acceptable subject to the Architect's approval.

1.5 Substitutions
Substitutions of sections or modifications of details shall be submitted with the shop drawings for approval. Approved substitutions, modifications, and necessary changes in related portions of the work shall be coordinated by the contractor and shall be accomplished as no additional cost.

2.0 - PRODUCTS

2.1 General Materials

A. Metals shall be free from defects impairing strength, durability, or appearance and of the best commercial quality for the purposes specified. All materials shall be new materials and shall have structural properties to sustain safely or withstand strains or stressed to which normally subjected. All exposed fastenings shall be of same material, color and finish as the metal to which applied unless otherwise shown.

B. Provide all accessories such as anchors, hangers, belts, toggle bolts, expansion bolts, rods, shelf angles, clip angles, shims, connections, stiffeners, reinforcements, screws, etc., required for proper complete fabrication, assembly and installation of all miscellaneous steel, metal work and masonry. Bolts, screws, expansion bolts, toggle bolts, etc, shall be brass, bronze, stainless steel or aluminum when used with these metals.

C. Steel lintels and miscellaneous structural shapes where called for shall be of shapes, lengths and weights, as shown and detailed on the drawings, spanning openings where so indicated, shall be complete with bolts, anchors, etc., for building in. Lintels shall not have less than eight (8") inch bearing upon masonry.

D. Galvanized steel shall be hot-dipped galvanized in accordance with the Standard Specifications of the American Hot-Dip Galvanizing Association. Galvanizing shall be done after fabrication.

E. All materials shall be well formed to shape and size with sharp lines. Conceal fasteners where practical. Thickness of metals and details of assembly and

supports shall give ample strength.

F. Welding shall conform to American Welding Society's Standard Code for Arc and Gas Welding in Building Construction. Welding shall be continuous along entire area of contact, except where tack welding is specifically shown or specified. Tack welding will not be permitted on exposed surface. Grind all exposed welds smooth.

2.2 Painting and Protective Coating

A. Thoroughly clean off all miscellaneous metal, using power tool cleaning to remove all dirt, grease, rust, and scale and foreign matter.

B. Treat only concealed galvanized metal with galvanized metal primer as per manufacturer's directions before painting. Exposed galvanized metal to be primed and finished under Painting Section.

C. Unless otherwise specified, paint all metal items, including concealed galvanized metal, one shop coat of Red or Grey oxide zinc chromate TT-P-636-C. Surfaces inaccessible after assembly shall be painted before assembly. Work paint thoroughly into joints, etc. Do not paint bronze, aluminum or stainless steel.

D. Insulate faces of all metals in contact with different metals, wood, masonry, and/or concrete; give each contact surface one coat approved alkali-resistant bituminous paint. Let both surfaces dry before installing metals.

2.3 Miscellaneous Metal Items

The following items are intended as a guide to such work in this project and do not necessarily limit the scope of this section.

A. All structural shapes indicated and/or required.

B. Miscellaneous Steel Lintels. Provide miscellaneous steel lintels indicated on Architectural and/or Structural Drawings or as required. All miscellaneous steel lintels are subject to structural engineer's review and approval.

C. Interior and Exterior Round Member Stair And Ramp Handrail, Guardrails and Brackets as indicated and detailed. Handrail to be 3 ft. min. Wood handrail under CARPENTRY - SECTION - 06210.

D. Downspout Boots shall be equal to Jay R Smith MFG. Co. (Smith Industries) special downspout boots. Cast Iron Body with 3" Bronze Access Plug and Strap with 5/16" Dia. Cast Holes for flat head bolts, Typical. 5 x 4 Size.

E. Gutter Sidewalk Box shall be equal to McKinley Light Duty Type GBC with checker plate cover to Type GCG with grating. Cast iron asphalt coated, size and length as required to match downspout sizes shown. Note - Boxes may be fabricated from steel tubing, galvanized after fabrication.

F. Stair Nosings-Treads for concrete filled steel pan stairs and concrete stairs on grade slab shall be equal to American Safety Tread Co., Helena, Alabama, Abrasive Cast Metal Nosing # 820, full width of stairs with anchor devices as recommended by the manufacturer.

G. Structural Support System For Gymnasium Curtain - Frames to be fabricated with 2' x 2" x 1/4" steel angles and/or channels at 5.4 welded to detail and/or required. Spacing 4'-0".

3.0 - EXECUTION

3.1 Fabrication

A. Verify measurements in field for work fabricated to fit job conditions.

B. Fabricate form work true to detail with clean, straight, sharply defined profiles. Iron shall have smooth finished surfaces unless indicated otherwise. Shearing and punching shall leave clean, true lines and surfaces.

C. Fastenings shall be concealed where practical. Thickness of metal and details of assembly and supports shall give ample strength and stiffness. Joints exposed to the weather shall be formed to exclude water. Provide holes and connections for the work of other trades.

D. Joints shall be rigid at adjoining sections for a strong assembly. Weld or rivet permanent connections. Welds shall be continuous and finished flush and smooth on surfaces that will be exposed after installation. Do not use screws or bolts where it can be avoided; where screws or bolts are used, the heads shall be countersunk, screwed up tight and threads nicked to prevent loosening. Unexposed welded joints may be continuous or spot welded as required. Remove weld spatter from adjacent surfaces.

3.2 Installation

A. Erect work in thorough, first class manner with mechanics experienced in the erection of iron work.

B. Work shall be strong, secure, and adequate for the purpose intended.

C. Schedule delivery of items to be built into the masonry so as not to delay the progress of the work and to coordinate for proper installation.

D. Place and properly secure to form work items such as anchors, sleeves, and inserts which are to be cast in concrete.

END OF SECTION

1.0 - GENERAL

1.1 Scope
The work under this section consists of all rough carpentry work.

1.2 General
A. Rough carpentry shall generally include all rough framing, furring, grounds, bucks, blocking and such other wood work as required.

B. Carpentry shall also include all temporary bracing, shoring and centering as required for the support or protection of the work.

1.3 Cooperation With Other Trades
The work under this section includes the necessary cutting and patching required for the proper installation of work of other trades. Work which is to be built in by others shall be accurately positioned and properly built in to secure the work of this section. Temporary centering, bracing and shoring shall be provided as required for the support and protection of masonry work during construction.

1.4 Delivery and Storage
Lumber and other materials specified herein shall be delivered, handled and stored in order to prevent damage and absorption of excess moisture. Lumber shall be stored in such a manner as to insure proper ventilation and protection from the weather.

2.0 - PRODUCTS

2.1 Lumber
A. All dimensional lumber used under this section shall be thoroughly dried No. 2 Southern Yellow Pine or No. 2 Douglas Fir of sizes, shapes and lengths required. Moisture content shall not exceed 19% at time of installation.

B. All wood shall be sound, flat, straight, well-seasoned, thoroughly dry and free from structural defects. Warped or twisted wood shall not be used.

C. Lumber grades shall conform to the grading rules of the manufacturer's association under whose rules the lumber is produced. All lumber shall be grade-marked.

2.2 Plywood
A. Each panel of softwood plywood shall be identified with the DFPA grade trademark of the American Plywood Association and shall meet the requirements of Product Standard PS 1-66 for Softwood Plywood Construction and Industrial. All plywood which has any edge or surface permanently exposed to the weather shall be of the exterior type.

B. Plywood sheathing and/or decking shall be DFPA Standard with exterior glue, thickness as shown on the drawings or required for the intended use. Square edge or tongue and groove as approved.

C. Plywood for roof decking shall be 3/4" minimum CDX with C grade up. Provide "H" clips at mid-span of edge joints.

2.3 Oriented Strand Board (OSB)
A. Shall be used for floor, wall and roof sheathing in light commercial construction applications as indicated. Each panel is third-party certified

for quality and is rated for Exposure 1 bond durability for protected applications and limited exposure during normal construction delays. OSB shall be edge coated to limit absorption and pick-up of moisture. OSB shall be equal to Georgia -Pacific Blue-Ribbon OSB.

2.4 Wood Treatment

A. Lumber in contact with concrete or masonry, including roof blocking, cants and nailers and/or as indicated, shall be pressure preservative treated in accordance with American Wood Preservers Institute Standard No. LP-2. Creosote, oil or similar materials which bleed shall not be used.

B. Lumber for blocking and furring, located within interior concealed spaces shall be non-combustible. Treatment shall be equal to "Flame-Proof" by Osmose Wood Preservative; "Non-Con" by Koppers or approved equal. Lumber shall be UL certification marked.

C. Pressure Treated wood associated with roof and roof edge construction which will be in contact with steel or galvanized steel components shall be wrapped or covered with Ice & Water Shield to prevent direct contact between pressure treated wood and steel.

2.5 Fastening Devices

Nails, screws, bolts, anchors, washers, clips, shields, power actuated devices and other rough hardware shall be of the sizes and types indicated on the drawings or as required to adequately anchor all members. Anchors for nailing strips and blocking shall have nuts and washers countersunk and bolts cut off flush with the top of the wood nailer. All fasteners in contact with pressured treated wood shall be galvanized.

2.6 Temporary Closures

Provide batten doors with locks at all exterior openings. Appropriate protection against weather and life safety shall be maintained throughout the job.

2.7 Blocking

Provide solid blocking at all grab bars, millwork cabinets and wall mounted units. Coordinate with Installer and/or Manufacturer.

3.0 - EXECUTION

3.1 Installation

A. All work shall be installed plumb and true, and secured in place with proper fastenings so as to make rigid and firm.

B. The work of this section shall be performed in the best practice relating to the trade so as to carry out the intent of the drawings and to properly accommodate the work of all trades.

C. Cut ends or faces of all treated wood shall be brushed treated with preservative.

D. Wood Studs shall not exceed 16" o.c. Provide stud framing for walls to receive ceramic tile at 12" o.c.

E. Plywood Roof Decking shall be installed with a 1/8" expansion gap between abutting sheets, all sides.

F. All Roof Deck fasteners shall be 100% within roof framing. Nails missing or by-passing structural rafter members shall be subject to correction.

END OF SECTION

1.0 - GENERAL

1.1 Scope

A. The work under this section consists of all finish carpentry, millwork and related items.

B. Millwork shall be defined as follows: "All exterior and interior woodwork exposed to view in the finished building, except lumber yard or specialty items. All exposed wood, plywood, hard plastic and wood doors are included."

C. All millwork shall be produced by the same source of supply to coordinate matching of materials.

1.2 Submittals

A. Shop drawings shall be furnished on all millwork to the architect for approval prior to fabrication. These drawings to show size, arrangement, type of material, connections and relationship to adjacent work.

B. All shop drawings shall show species of woods and the manufacturer's name for all manufactured items.

C. When required, contractor shall submit a sample unit as requested.

D. Submit samples of decorative laminate colors, patterns, and textures for semi-exposed materials for architect's selection. Samples of other materials or hardware shall be available if requested.

1.3 Applicable Standards

A. The Quality Standards of the American Woodwork Institute (AWI) shall apply and, by reference, are made a part of this specification.

B. Millwork materials and workmanship not shown, specified, or normally furnished to a higher degree of quality shall conform to custom grade requirements of the AWI Quality Standards.

1.4 Delivery and Storage

A. When all millwork items are ready for shipment to the job site, the architect shall be notified through the contractor so that either may inspect the work in the mill prior to shipment.

B. All materials shall be inspected by the contractor's superintendent upon receipt at the job site. No faulty or damaged materials shall be received. It shall be the contractor's responsibility to produce finished items of work in first class condition.

C. No interior millwork shall be delivered until the building has been dried out. Heat shall be required in cold or humid weather.

D. No trim shall be delivered or placed until the areas of the building in which the trim is to be placed are thoroughly dry and ready for the installation. The building shall be enclosed and heated. Allow wood to acclimate for 7-10 days prior to installation.

2.0 - PRODUCTS

2.1 General

A. All materials shall be of the best of their respective kinds. All materials used in finished work shall be clear, free from cracks, checks, knots and other imperfections that may interfere with the proper completion of the work and any warped or otherwise imperfect work shall be removed and replaced.

B. All plywood shall have a grade-trademark which shall identify each panel of plywood as to type, grade and conformance to CS45 or CS122 (current issues). If use is exposed to weather or excessive moisture, plywood shall be of the exterior type. Exposed faces and faces to receive plastic laminates shall be "A" grade. Panels used for concealed cabinet parts may be C-D grade. Thickness and application details shall be as shown on drawings or required for the intended use.

2.2 Interior Woodwork

A. Lumber used for painted interior woodwork, unless otherwise indicated, shall be one of the following:

1. Fir - Coast or Inland Douglas White
2. Pine - Ponderosa, Southern
3. Redwood
4. Cypress
5. Yellow Poplar
6. Grade of lumber used shall be second grade for paint finish, except cypress may be third grade.

B. Hardwood: All references to hardwood shall imply stain grade oak.

C. All interior plywood to be painted shall be Natural Birch.

D. All interior woodwork and plywood to be stained or finished natural shall be Premium Grade Select White Birch or as specified on drawings. Veneer shall be rotary cut or as indicated on drawings or related specification sections. Semi-exposed parts, as defined by AWI, of natural or stained casework shall be Natural Birch.

E. Lumber shall be kiln dried with an average moisture content of 6% to 11%.

F. Particle board shall be U. S. Plywood Corp. "Novoply" Weyerhaeuser Company "Timblend", or approved equal of thickness shown. Factory sanded or sealed or filled, 2 sides.

2.3 Plastic Laminate

A. Plastic laminate shall be Nevamar, Wilson-Art, Formica, Laminart, Arborite, Pionite, 1/16" thick. See Finish Legend and Schedule for color selections.

B. Backing sheet shall be high pressure laminate, .020" minimum thickness. Plastic laminate to be used on all interior open shelves. Melamine is not acceptable unless it matches the selected plastic laminate.

C. The adhesive shall be that recommended by the manufacturer of the laminated plastic used.

D. Edging Materials:
   1. 1mm PVC banding, machine applied; match laminate as scheduled.
   2. 3mm PVC banding, machine applied and machine profiled to 1/8 inch radius; match laminate as scheduled

2.4 Rough Hardware
All exposed bolts or other anchors shall be chrome-plated brass.

2.5 Finish Hardware
Furnish and install all finish hardware for millwork items including, but not necessarily limited to, cabinet door and drawer pulls and latches, adjustable shelf standards and brackets, and hardware for doors less than 1-3/8" thick. Hardware finish shall match room door hardware finish.

2.6 Thickness of Members
All thicknesses shall be in accordance with the maximum possible dressed size from standard lumber. If widths or thicknesses are not available in hardwood, gluing may be used on widths over 5-1/4" or thicknesses over 1-1/6".

2.7 Workmanship

A. All exposed surfaces and edges shall be finished smooth and be free of saw cuts, marks or defacement. All joints shall be accurately and neatly made and fit.

B. End grain shall be concealed. Exposed edges of plywood shall present a finish the same as the finished sides.

C. Work shall be scribed and fit to other finished surfaces in a careful manner. Should other work be damaged or disturbed, it shall be made good at the expense of this contractor.

D. Work shall be assembled at the mill insofar as is practicable and delivered ready for erection. When necessary to cut and fit on job, the material shall be made up with ample allowance for cutting.

E. This contractor shall verify all measurements at the building and shall examine all adjoining work on which his work is dependent.

F. Millwork shall be executed in accordance with the approved shop drawings, the workmanship shall be of first quality and the construction of all parts shall be of the best current practice. The work shall be assembled so as to hold together with close joints, fastenings shall be concealed, and all work shall be properly and firmly backed and blocked as required. Provision shall be made for expansion and shrinkage.

G. Exposed surfaces shall be machine-sanded to an even, smooth surface, nails set, ready for finishing or pre-finishing when noted. All woodwork shall be dry, clean, and smooth before any finishing materials are applied. All nail holes, cuts, cracks and other defects shall be treated so as to be unnoticeable.

H. All wood surfaces to be set against masonry and/or concealed after erection shall be given a heavy coat of sealer. All woodwork to have paint finish shall be primed under the PAINTING SECTION.

I. All transparent finished (i.e., stained) woodwork shall be shop finished by Millwork Contractor.

J. All caulking to match laminate or stain color.

K. All millwork/casework cabinets in contact with finish floor shall receive scheduled base.

2.8 Carpentry and Millwork Items

A. The following millwork items are intended to guide such work in this project and do not necessarily limit the scope of this section.

B. Where not otherwise specified, shelving, cabinet work and millwork of all types shall conform with requirements of Premium Grade of "Quality Standards of the Architectural Woodwork Industry" (Architectural Woodwork Institute).

C. Wood Base and Shoe Mould - Shall be as detailed on drawings. Base shoe mould lengths to be maximized wherever possible. Wood scraps and remnants used for base material is NOT acceptable. Minimum 8' lengths.

2.9 Materials and Construction

A. MDF (Medium Density Fiberboard)
Shall be equal to Premier7 MDF, Plus Grade. MDF is to be shop finished by Millwork Contractor with a transparent stain. The actual surface of the MDF is to be visible through the stain color. Stain colors are to match paint selections indicated on drawings. Millwork Contractor to provide stain samples to Architect for approval prior to fabrication.

B. Panels - End panels, shelves, bottoms and partitions of 3/4" Birch plywood, "Good" grade on all surfaces or plastic laminate covered particle board as approved. All other surfaces may be A grade fir plywood. All edges exposed to sight shall be self edged and sanded smooth and flush.

C. Doors - Construction of 3/4" Birch plywood, "Good" grade or plastic laminate covered particle board as approved. All edges shall be self edge.

D. Drawers - Front identical to doors above. Back minimum of 1/2" A-A Grade fir plywood. Sides of solid hardwood of sound grade. Bottoms of 1/4" plywood or 1/4" brown welded fiber board. Front and back connection shall be rigid type. Bottoms shall be let into front, back and sides approximately 1/4 of an inch. Drawer interiors to be Melamine.

E. Backs - Backs shall be a minimum of 1/4" plywood or 1/4" brown welded fiber board. Open to view 1/4" Birch plywood. All open-to-view backs are to receive plastic laminate.

F. Adjustable Shelves - 3/4" thick for maximum spans of 30". 1-1/8" thick for maximum spans of 42". All open-to-view shelves are to receive plastic laminate.

G. Cabinet Base – Cabinet Base and tall units shall have a site-built toe base constructed of 3/4-inch (minimum) lumber unless otherwise shown on the drawings. Base is 96mm (nominal 4 inch) high unless otherwise indicated on the drawings. Particle board is not acceptable.

H. Finishes – Tops, edges, and backsplashes and any other areas noted shall be plastic laminate covered.

I. Cabinet Hardware - Contractor shall furnish hardware equal to that as

manufactured by Stanley, as hereinafter specified. All hardware to be Brushed Chrome, unless indicated otherwise on drawings.

Pull Handles -
4" wire pull, brushed chrome finish. Two pulls on drawers over 30" wide.

Drawer Guides -
Regular, knee space and pencil: 100-pound load rated epoxy coated steel, bottom corner mounted with smooth and quiet nylon rollers. Positive stop both directions with self-closing feature. Paper storage, 150-pound load rated epoxy coated steel slides.

File: Full extension, 150-pound load rated epoxy coated steel, bottom corner mounted with smooth and quiet nylon rollers. Positive stop both directions with self-closing feature.

Door Hinges - Five knuckle, epoxy powder coated, institutional grade, 2-3/4 inch overlay type with hospital tip. 0.095 inch thick. ANSI-BHMA standard A156.9, Grade 1.
Doors 48 inches and over in height have 3 hinges per door.

Magnetic door catch with maximum 5 pound pull provided, attached with screws and slotted for adjustment.

1. Finish to be selected by Architect.

3.0 - EXECUTION

3.1 Shop Assembly

When it is possible, all items of millwork which can be carried into the building through doorways or windows shall be shop assembled. When it is impractical to shop assemble the entire item in one piece, it shall be shop assembled in sections and perfectly fitted in place on the job by thoroughly experienced and competent mechanics. Where job joining requires gluing, it shall be done by the same method used in the Shop.

3.2 Installation

A. All finish carpentry and millwork of every sort shall be put up plumb or level, and straight and true. Trim put up with proper grounds and firmly secured. All work fitted and scribed to other work in a careful manner as not to injure the surface in any way. All nailing shall be blind wherever possible, but where not possible, the nailing driven and set so as to be not visible in the finish.

B. All trim to be free from defects impairing durability or fitness for receiving finish. All trim properly sanded at mill and hand sanded at the job.

C. Finished surfaces of interior millwork, detailed or scheduled to be painted, shall be left ready for treatment by the painter. The jointing and framing of all members of the finished millwork shall be executed in accordance with the best and latest recognized mill practice.

D. This contractor shall cooperate with contractors for other trades with which his work comes in contact.

3.3 Finish Hardware

A. Install items of hardware furnished under FINISH HARDWARE SECTION.

B. Hardware shall be accurately fitted and securely attached, without damage to metal or woodwork, and care shall be taken to not mar or injure any work.

C. Hardware shall be protected as approved or removed for painting.

D. Upon completion of the work, hardware shall be demonstrated to work freely, keys shall be fitted into their respective locks and upon acceptance of the work, all keys shall be tagged and delivered to the Owner.

E. All open -to- view shelves are to receive heavy duty, double cleated adjustable standard hardware.

END OF SECTION

1.0 - GENERAL

1.1 Section Includes

A. Surface preparation.

B. Application of a solvent type liquid applied dampproofing membrane.

Note: This product shall not be installed until adjacent roof construction has been dried-in. CMU walls must be dry on both sides before application.

1.2 Related Sections

A. Section 03300 - Cast-in-Place Concrete.

1.3 References

A. Spray or Brush-on dampproofing coating
   1. ASTM D4479-00 - Standard Specification for Asphalt Roof Coatings - Asbestos-Free.

B. Trowel applied dampproofing coating
   1. ASTM D4586-00 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.

1.4 Submittals

A. Comply with Section 01350 - Submittal Procedures.

B. Submit manufacturer's product data and application instructions.

1.5 Delivery, Storage, and Handling

A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Store materials in a clean dry area in accordance with manufacturer's instructions.

C. Store at temperatures of 40°F (5°C) and above to facilitate handling.

D. Do not store at temperatures above 90°F (32°C) for extended periods.

E. Keep away from sparks and flames.

F. Protect materials during handling and application to prevent damage or contamination.

1.6 Environmental Requirements

A. Product not intended for uses subject to abuse or permanent exposure to the elements.

B. Do not apply membrane when air or surface temperatures are below 35°F (2°C).

C. Do not apply to frozen concrete.

D. Do not apply when rain is imminent.

2.0 - PRODUCTS

2.1 Manufacturer

A. W.R. Meadows, Inc or pre- approved manufacturer with similar solvent based products.

2.2 Materials

A. Spray applied solvent dampproofing should be an asbestos-free, non-fibered asphalt compound that meets the U.S. EPA Architectural Coatings Rule requirements for VOC content.
   1. Spray-Mastic by W.R. Meadows.

B. Brush applied solvent dampproofing should be an asbestos-free, fibered, asphalt compound that meets the U.S. EPA Architectural Coatings Rule requirements for VOC content. For use to protect exterior below-grade masonry walls.
   1. Semi-Mastic by W.R. Meadows.

C. Trowel applied solvent dampproofing should be a heavy bodied, asbestos-free fibered, asphalt compound that meets the U.S. EPA Architectural Coatings Rule requirements for VOC content. For exterior below grade masonry wall surface application.
   1. Trowel-Mastic by W.R. Meadows.

2.3 Accessories

A. Waterproofing Protection Course: Protection Course.

B. Rolled Matrix Drainage System: Mel-Drain™ Rolled Matrix Drainage System.

3.0 - EXECUTION

3.1 Examination

A. Examine surfaces to receive membrane. Notify Architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

3.2 Surface Preparation

A. Protect adjacent surfaces not designated to receive dampproofing.

B. Clean and prepare surfaces to receive dampproofing in accordance with manufacturer's instructions.

C. Do not apply dampproofing to surfaces unacceptable to manufacturer.

D. Concrete surfaces must be clean, smooth and free of standing water.

E. Patch all holes and voids and smooth out any surface misalignments.

3.3 Application

A. Apply dampproofing in accordance with manufacturer's instructions.

B. Ensure accessory materials are compatible with membrane and approved by membrane manufacturer.

3.4 Protection

A. Protect membrane on vertical and horizontal applications with immediate application of protection course, if no drainage system is used, or rolled matrix drainage system.

B. Backfill within 24-48 hours using care to avoid damaging the dampproofing.

END OF SECTION

1.0 - GENERAL

1.1 Scope
The work under this section consists of all building insulation except rigid roof insulation.

1.2 Submittals
Submit samples of all materials hereinafter specified for approval.

1.3 Protection
All thermal insulation shall be maintained dry throughout construction. Wet insulation shall be rejected.

2.0 - PRODUCTS

2.1 Material

A. 1. Primary: FSK Thermal insulation shall be batt, or blanket type having a vapor barrier on one face which shall be extended to form a 1" flange to comply with requirements of International Building Code. ASTM - C665 Type III, Class A and ASTM E - 84. The insulating material shall be fire and decay-proof, moisture-resistant mineral or glass wool specifically designed for use in insulating batts. Vapor barrier side laps shall be lapped and taped over support members. Vapor barrier materials shall be FSK foil-type and also comply with requirements for a ceiling return air plenum regardless.

2. Supplemental: Unfaced Thermal insulation shall be allowed provided it is coupled with a layer of FSK faced insulation to achieve the total required r-value and shall be batt, or blanket type to comply with requirements of International Building Code. ASTM - C665 Type III, Class A and ASTM E-84. The insulating material shall be fire and decay-proof, moisture-resistant mineral or glass wool specifically designed for use in insulating batts.

Thermal Resistance Values (R) as follows:

R-19 6" - 6-1/2"
R-11 3-1/2" - 4"

B. Unfaced Thermal insulation shall be batt, or blanket type to comply with requirements of International Building Code. ASTM - C665 Type III, Class A and ASTM E - 84. The insulating material shall be fire and decay-proof, moisture-resistant mineral or glass wool specifically designed for use in insulating batts.

Thermal Resistance Values (R) as follows:

R-19 6" - 6-1/2"
R-11 3-1/2" - 4"

C. Masonry Foam Fill Insulation shall be approved equal to:
1. Core Foam Masonry Foam Insulation by cfiFOAM.
2. Other Pre-approved manufacturers:
   a. Applegate C Foam Insulation by Applegate R Foam, Inc.
   b. Core-Fill 500 by Tailored Chemical Products, Inc.
3. Minimum Product Performance Standards
   a. Fire-Resistance Ratings: Foam shall neither add to nor detract from fire-resistance ratings of insulated fire-resistance rated CMU walls per prevailing building codes.
   b. Surface Burning Characteristics: Class A per ASTM E84; Flame Spread Index ≤ 25; Smoke Developed Index ≤ 450.
   c. Thermal Resistance: R-4.6/inch @ 75°F per either ASTM C518 or ASTM C177
   d. Potential Heat: ≤ 100 Btu/lb. when tested per NFPA 259 (ASTM D5865).
4. Installation Guidelines
   a. Fill all open cells and voids in hollow concrete masonry walls where shown on the drawings.
   b. The foam insulation shall be pressure injected through a series of 5/8" to 7/8" diameter holes drilled to access each column of block cells e.g. 8" o/c beginning approximately four (4) feet above the finished floor.
   c. Repeat this procedure at 10' to 16' intervals above the first horizontal row of holes (or as needed) until the empty core cells are completely filled.
   d. In walls where horizontal bond beams occur, repeat the procedure above the bond beams to assure insulating the entire wall.
   e. If "Hi-Flow" nozzles by cfiFOAM, Inc. are used, foam may be injected at up to twenty (20) foot vertical intervals.
   f. Patch holes with mortar and score to resemble adjacent surfaces. Insulation shall not be injected into wet walls.
5. Quality Assurance
   a. Manufacturing Standards; Provide insulation from a single approved source. Product components shall be of the same brand from the same approved source arriving at the site either pre-mixed according to the manufacturer's printed instructions or in unopened factory sealed containers.
   b. Installer Qualifications for Foamed-In-Place Masonry Insulation:
      1.) Engage an authorized contract installer who has been trained, authorized and equipped by the product manufacturer.
   c. At the Architect's request, the Installer shall provide infrared scanned images of the work prepared by a "Block Wall Scan IR" or equivalent trained IR technician to confirm that empty core cells are filled with foam insulation.
      1.) Insulation voids shall be foamed at no added cost to the Owner.

D. Rigid thermal insulation shall be 1" thick by 16" wide for cavity walls and 24" wide if indicated for slabs. The insulating material shall have a minimum compressive strength of 25 psi and maximum water vapor transmission rate of 1.1 perm-inch and shall conform to ASTM C578, Type III-IV, R-value/inch @ 75 degrees F 5.0. Adhesive, in cavities, shall be equal to Styrofoam brand mastic #7 or #11 as distributed by Dow. All joints shall be taped.

E. Sound Attenuation Batt Insulation shall be 3-1/2" thick fiberglass insulation with a Noise Reduction coefficient of 1.05. Equal to Owens Corning.

F. Air/Vapor Barrier - Basis of Design: Spunbonded polyolefin, non-woven, non-perforated barrier equal to Dupont Tyvek Commercial Wrap, Class A and related assembly components. All seams, edges and penetrations shall be taped and sealed per manufacturer's recommendations.

1. Shall be allowed as a substitution and similar to FSK facing material. As such this material would be used in conjunction with unfaced insulation and shall be provided continuous and attached to applicable framing members. All seams, edges and penetrations shall be taped and sealed per manufacturer's recommendations.

3.0 - EXECUTION

3.1 Installation

A. Thermal Insulating material shall be laid tight and installed so as to avoid gaps and settlement. All voids, offsets, and bends shall be completely filled. R values shall be provided as indicated in single layer or multiple layers totaling the "R" value indicated. If multiple layers are used to meet total "R" value indicated, layers must be provided perpendicular to one another. The layer closest to the conditioned space must be provided with FSK facing on the interior face where visible for an Inspection.

Insulation shall be laid tight and continuous over all areas where indicated.

B. Masonry foam fill insulation shall be provided at all exterior wall assemblies and where indicated to thoroughly fill CMU cells and voids continuous from bottom to top of exterior and applicable masonry walls. Install in accordance with manufacturer's printed recommendations and procedures.

C. Rigid thermal insulation

1. Walls - Adhere insulation to walls in a horizontal position, closely butted and with vertical joints staggered. Provide joint mastic and joint tape to the foam and apply in accordance with manufacturer's recommendations.

2. Floor Slab - Lay insulation on vapor barrier butted end to end at full perimeter of exterior walls.

   Backfill against insulation with fill and gravel.

3. During storage and insulation, observe good fire safety practices, including job site housekeeping.

4. If adhesive is required, use mastic for bonding foam board to non-absorbent surfaces such as dense concrete, metal, brick, glass, and paint.

D. Sound Attenuation Batt Insulation shall be placed on ceiling or stud system and secured and sealed in accordance with manufacturer's recommendations and specifications. Place around or over mechanical equipment rooms, toilet rooms, window in-fill spaces, and other areas as indicated.

E. Mesh, shall be provided for supporting overhead horizontal insulation and attached to applicable framing members as required, not to exceed 16" o.c. Mesh material shall be provided to maximize width as project conditions permit. Mesh fabric shall be steel wire type with nominal 2" grid. Continuous metal straps at 16" o.c. shall be an acceptable substitute.

F. Air/Vapor Barrier - Shall be allowed as a substitution and similar to FSK facing material. As such this material would be used in conjunction with unfaced insulation and shall be provided continuous and attached to applicable framing members. All

seams, edges and penetrations shall be taped and sealed per manufacturer's recommendations. Basis of Design: Spunbonded polyolefin, non-woven, non-perforated barrier equal to Dupont Tyvek Commercial Wrap, Class A and related assembly components.

END OF SECTION

1.0 - GENERAL

1.1 Section Includes

A. Pre-Engineered Building Insulation for Existing Construction.

1.2 Related Sections

A. Section 13120 - Pre-Engineered Metal Buildings.

B. Division 15 - Fire Protection Systems.

C. Division 15 - Mechanical; Rough-in utilities.

D. Division 16 - Electrical; Rough-in utilities.

1.3 References

A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

B. ASTM E 96 - Standard Test Method for Water Vapor Transmission of Materials in Sheet Form (Procedure B).

C. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

D. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.

E. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

F. ASTM C 1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.

1.4 Design Requirements

A. Thermal Resistance of Installed System: R-Value of Roof 28.6, Walls R19.9.

B. Insulating system shall have a continuous vapor barrier inside of building purlins, girts, and insulation to provide complete isolation from inside conditioned air.

1.5 Submittals

A. Submit under provisions of Section 01300.

B. Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation instructions.

C. Shop Drawings: Indicate locations of connections and attachments, general details,

anchorages and method of anchorage and installation.

D. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square or long, representing actual products required for this project.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.6 Quality Assurance

A. Manufacturer Qualifications: Company specializing in manufacturing product systems specified in this section with minimum five years documented experience.

B. Installer Qualifications: Company specializing in performing work of this section.

C. Insulation system components to include a ten-year limited material warranty.

1.7 Delivery, Storage, And Handling

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store products indoors and protect from moisture, construction traffic, and damage.

1.8 Project Conditions

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

2.0 - PRODUCTS

2.1 Manufacturers

A. Acceptable Manufacturer: Thermal Design, Inc., Simple Saver System. Basis of Design.

B. Requests for substitutions will be considered in accordance with provisions of Section 01360 and must be submitted to Architect at least 10 days prior to Bid. Pre-Approved manufacturers shall be notified in writing via Addendum.

2.2 Materials

A. Simple Saver System consists of Batt Insulation, Roof Insulation, Wall Insulation, Vapor Barrier Liner Fabric, Thermal Breaks, Straps, and other devices and components in an insulation system as follows:
   1. Roof Insulation: Formaldehyde-free fiberglass batt or fiberglass blanket complying with ASTM C 991 Type 1 and ASTM E 84 with a thermal resistance and thickness as follows:
      a. As indicated on the drawings.
      b. R-29; 9 inches (229 mm), 6 inches (152 mm) plus 3 inches (76 mm) (two layers).
   2. Wall Insulation: Formaldehyde-free fiberglass blanket or batt complying with ASTM C 991 Type 1, ASTM E 136 and ASTM E 84 with a thermal resistance and thickness as follows:
      a. R-25; 8 inches (203 mm).

3. Vapor Barrier Liner Fabric: Syseal® type woven, reinforced, high-density polyethylene yarns coated on both sides with a continuous white or colored polyethylene coatings, as follows:
   a. Product complies with ASTM C 1136, Types I through Type VI.
   b. Perm rating: 0.02 for fabric and for seams in accordance with ASTM E 96.
   c. Flame/Smoke Properties:
      1) 25/50 in accordance with ASTM E 84.
      2) Self-extinguishes with field test using matches or butane lighter.
   d. Ultra violet radiation inhibitor to minimum UVMAX® rating of 8.
   e. Size and seaming: Manufactured in large custom pieces by extrusion welding from roll goods, and fabricated to substantially fit defined building area with minimum practicable job site sealing.
   f. Provide with factory triple, extrusion welded seams. Stapled seams or heat-melted seams are not acceptable due to degradation of fabric.
   g. Factory-folded to allow for rapid installation.
   h. Color:
      1) Custom color as selected by Architect.
4. Vapor Barrier Lap Sealant: Solvent-based, Simple Saver polyethylene fabric sealant
5. Vapor Barrier Tape: Double-sided sealant tape 3/4 inch (19 mm) wide by 1/32 inch (.79 mm) thick.
6. Vapor Barrier Patch Tape: Single-sided, adhesive backed sealant tape 3 inches (76 mm) wide made from same material as Syseal® type liner fabric.
7. Thermal Breaks:
   a. 3/16 inch (4.7 mm) thick by 3 inch (76 mm) wide white, closed-cell polyethylene foam with pre-applied adhesive film and peel-off backing.
   b. Polystyrene Snap-R snap-on thermal blocks.
8. Straps:
   a. 100 KSI minimum yield tempered, high-tensile-strength steel.
   b. Size: Not less than 0.020 inch (0.50 mm) thick by 1 inch (25 mm) by continuous length.
   c. Galvanized, primed, and painted to match specified finish color on the exposed side.
   d. Color:
      1) Custom Color. As selected by the Architect.
   e. Primed and painted to match specified finish color on the exposed side.
   f. Color:
      1) Custom Color. As selected by the Architect.
   g. High-tensile-strength stainless steel.
   h. Woven polyester plastic. Color as selected.
9. Fasteners:
   a. For light gage steel: #12 by 3/4 (19 mm) inch plated Tek 2 type screws with sealing washer, painted to match specified color.
   b. For heavy gage steel: #12 by 1-1/2 inch (38 mm) plated Tek 4 type screws with sealing washer, painted to match specified color.
   c. For wood, concrete, other materials: As recommended by manufacturer.
10. Wall Insulation Hangers: Fast-R preformed rigid hangers, 32 inch (813 mm) long galvanized steel strips with barbed arrows every 8 inches (203 mm) along its length.

3.0 EXECUTION

3.2 Examination

A. Verify that building structure including all bracing and any concealed building systems are completed and approved prior to installing liner system and insulation in the structure.

B. Correct any unsatisfactory conditions before proceeding.

C. If conditions are the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.3 Installation - General

A. Install pre-engineered building insulation system in accordance with manufacturer's installation instructions and the approved shop drawings.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Install in exterior spaces without gaps or voids. Do not compress insulation.

D. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

E. Fit insulation tight in spaces and tight to exterior side of the sealed liner fabric and around mechanical and electrical services within plane of insulation.

3.4 Roof Insulation Installation

A. Straps:
1. Cut straps to length and install in the pattern and spacings indicated on shop drawings.
2. Tension straps to required value.

B. Vapor Barrier Fabric:
1. Install vapor barrier fabric in large one-piece custom fabricated pieces to substantially fit defined building areas with minimum practicable job site sealing.
2. Position pre-folded fabric on the strap platform along one eave purlin.
3. Clamp the two bottom corners at the eave and also centered on the bay.
4. Pull the other end of the pleat-folded fabric across the building width on the strap platform, pausing only at the ridge to fasten the straps and fabric in position where plane of roof changes and to release temporary fasteners on the opposite ridge purlins.
5. Once positioned, install fasteners from the bottom side at each strap/purlins intersection.
6. Trim edges and seal along the rafters.
7. All seams must be completely sealed and stapled seams not acceptable.

C. Insulation:
1. Unpack, and shake to a thickness exceeding the specified thickness.
2. Ensure that cavities are filled completely with insulation.
3. Place on the vapor barrier liner fabric without voids or gaps.
4. Place thermal block on top of purlins or bottom of purlins for retrofit work, if

no other thermal break exists.

5. Place new insulation between purlins at the required thickness for the R-value specified.

D. Seal vapor barrier fabric to the wall fabric and elsewhere as required to provide a continuous vapor barrier.

3.5 Wall Insulation Installation

A. Insulation:
1. (Optional) Install self-sticking foam thermal break to interior surface of girts prior to installation of insulation.
2. Position and secure Fast-R hangers to girts on the inside face of the wall sheathing.
3. Cut insulation to required lengths to fit vertically between girts.
4. Fluff the insulation to the full-specified thickness.
5. Neatly position in place and secure to Fast-R hangers.
6. Ensure that cavities are filled completely with insulation.

B. Vapor Barrier Fabric:
1. Install vapor barrier fabric in large one-piece custom fabricated pieces to substantially fit defined building areas with minimum practicable job site sealing.
2. Apply the vapor barrier fabric by clamping it in position over eave strap and installing fasteners through the eave strap into each roof strap, permanently clamping the wall fabric between them.
3. Once in position, draw the vapor barrier fabric down over the column flanges to the base angle and install vertical straps along each column and 5 feet 0 inches on center, maximum, fastening to each girt to retain system permanently in place.
4. All seams must be completely sealed and stapled seams not acceptable.

C. Seal wall fabric to the roof fabric, to the base angle and up the columns to provide a continuous vapor barrier.

3.6 Cleaning

A. Clean dirt or exposed sealant from the exposed vapor barrier fabric.

B. Remove scraps and debris from the site.

3.7 Protection

A. Protect system products until completion of installation.

B. Repair or replace damaged products before completion of insulation system installation.

END OF SECTION

1.0 - GENERAL

1.1 Scope
The work under this section consists of caulking and sealants.

1.2 Work Included
See the drawings for all items and places requiring caulking. Completely seal with specified caulking compound joints around door frame and frame base and window frames (inside and outside); all other openings in masonry, concrete, or precast concrete joints in or between precast concrete panels; beneath all exterior thresholds; around plumbing fixtures; all places indicated on the drawings to be caulked; and all other places where caulking is required, whether specifically shown on the drawings or not.

1.3 Submittals
Submit for approval product literature and samples of all materials proposed for use. Colors to be approved in the field by the Architect to match adjacent construction color.

2.0 - PRODUCTS

2.1 Sealant

A. Exterior sealant shall be a gun grade one part silicone compound. Materials shall be Tremco Spectrem 1, Dow Corning No. 790 or Pecora No. 890, color as selected.

B. Primer, if required, for the silicone sealant shall be a quick drying clean primer as recommended by the manufacturer of the material used.

2.2 Caulking

A. Interior caulking compound shall be a paintable, one part, gun grade butyl rubber base material equal to Tremco Tremflex 834 Acrylic, Pecora BC-158 or DAP Butyl Flex or acrylic latex base caulking compound equal to Pecora AC-20 or DAP Latex Caulk.

B. Floor Caulking compound shall be a tintable, semi-self leveling polyurethane base equal to Tremco THC900/901. Colors shall be selected by Architect from manufacturers entire line of colors.

2.3 Fire Caulking
All locations indicated and/or all penetrations or openings into fire barriers shall be sealed with fire caulk material meeting UL requirements for such application. Submit product literature indicating UL compliance for approval. All trades shall use same fire caulk product. Installer shall be certified by the manufacturer.

2.4 Compressible Joint Sealant
Sealant shall be compressible polyurethane foam impregnated with polybutylene, Polytite as manufactured by Polytite Manufacturing Corporation, or other material as approved.

2.5 Filler
Filler shall be polyethylene foam, polyurethane foam, untreated jute, pointing mortar or other oil-free materials subject to approval of the manufacturer of the caulking or sealant compound.

2.6 Accessories

A. Bond breaker shall be polyethylene tape.

B. Solvents, cleaning agents, and other accessory materials shall be as recommended by the sealant manufacturer.

3.0 - EXECUTION

3.1 Joint Preparation

A. Joints deeper than 1/2" shall be built up to a depth of 3/8" below adjacent surfaces with approved filler material prior to applying sealant. All surfaces must be clean and dry. Any protective coating or foreign matter such as oil, dust, grease, dirt, or frost on building materials that will impair bond shall be removed. Masonry and concrete surfaces shall be sound. If required by manufacturer's instructions, apply brush coat of primer to surfaces and allow to dry before applying sealant.

B. At the option of the applicator, the surfaces next to the joints may be masked to obtain a clean neat line. Remove tape immediately after tooling the sealant.

3.2 Application

A. Caulking or sealant shall be used from manufacturer's original cartridge in a standard open type, hand operated caulking gun. Nozzle shall be cut to proper size to obtain a neat, smooth and uniform bead. When handling bulk material, manufacturer's instructions shall be followed.

B. A full bead of caulking or sealant shall be applied into joint under sufficient pressure, drawing nozzle across caulking or sealant to leave a slightly concave surface. Tool with a caulking tool or soft bristled brush moistened with solvent within 10 minutes after exposure. All sealed joints shall be watertight.

C. Joints shall be caulked before painting adjacent work. Do not paint over silicone sealant compound.

D. Fire caulk shall be installed to comply with manufacturer's requirements, UL requirements, and requirements of authority having jurisdiction.

3.3 Clean-up

On non-porous surfaces, excess uncured caulking shall be immediately removed with a solvent moistened cloth. On porous surfaces, excess caulking should be allowed to cure overnight, then remove by lightly wire brushing or sanding. All adjacent surfaces shall be clean and free from stains.

END OF SECTION

1.0 - GENERAL

1.1 Scope
Furnish and install all hollow metal doors and frames including view windows, as indicated on the drawings and herein specified.

1.2 Submittals
A. Submit shop drawings for approval.

B. Drawings shall show a schedule of openings using architectural opening numbers, all dimensions, jamb and head conditions, construction details, preparations for hardware, gauges, and finish.

1.3 Templates
A. Manufacturer shall obtain templates of all applicable hardware from the Finish Hardware Contractor and make proper provision for the installation of this hardware.

B. Unless otherwise specified in the hardware section of the specifications, hardware locations shall be in accordance with the recommendations of The National Builder's Hardware Association.

1.4 Marking and Storage
Mark each frame for intended location. Store frames off the ground and in a manner to protect them from damage.

1.5 Storage
A. Doors shall be stored in a dry, secure location to prevent exposure to weather and/or moisture.

B. Frames shall be stored off the ground and protected from weather until in place.

2.0 - PRODUCTS

2.1 Door Construction
A. Exterior Doors: Formed up sheets not less than 16 U.S. gauge rigidly connected and reinforced inside with continuous interlocking 20-gauge hat stiffeners, spaced a maximum of 6" apart. Interior Doors: Formed up sheets not less than 18 U.S. gauge rigidly connected and reinforced inside with continuous interlocking 20-gauge hat stiffeners, spaced a maximum of 6" apart. Sound deadening material of rock wool batts, insulites or other standard recognized available sound deadening materials shall be placed between all stiffeners and plates. Honeycomb doors are not acceptable. Suitable provision shall be made to receive glass panels or louvers. Edge seams are to be continuously welded and ground smooth. Bondo seams are not acceptable.

B. Louvers for interior metal doors shall be of sizes and types as indicated, inverted "V" with metal frame overlapping the door face.

C. Louvers for exterior doors shall be of sizes and types as indicated, rainproof, 20 ga. galvanized steel. Provide No. 16 wire mesh screen at inside of louvers.

D. Doors and frames shall be equal to Steelcraft, Curries, Republic or approved equal.

E. Doors shall be coordinated with thresholds specified under FINISH HARDWARE - SECTION 08710 to meet A.D.A. requirements. Doors shall be extended as required to seal against threshold.

F. Non-full height doors such as Toilet Stall Doors shall be provided with an inverted filler cap channel at head to maintain smooth uniformity at top of door surface.

G. Hollow metal doors shall be provided with beveled hinge and lock edges. Bevel hinge and lock door edges 1/8 inch (3 mm) in 2 inches (50 mm).

H. Exterior door face sheets shall be galvannealed steel, level A60 (ASTM A653).

I. Hardware preparation for hollow metal doors: hinge reinforcements shall be minimum 7-gauge x 9" length.

J. Hardware Reinforcements:

1. Hinge reinforcements for full mortise hinges: minimum 7 gage [0.180" (4.7mm)].

2. Lock reinforcements : minimum 16 gage [0.053" (1.3mm)].

3. Closer reinforcements : minimum 14 gage [0.067" (1.7mm)], 20" long.

4. Galvannealed doors: include Galvannealed hardware reinforcements. Include Galvannealed components and internal reinforcements with Galvannealed doors. Close tops of exterior swing-out doors to eliminate moisture penetration. Galvannealed steel top caps are permitted.

5. Projection welded hinge and lock reinforcements to the edge of the door.

6. Provided adequate reinforcements for other hardware as required.

K. Glass moldings and stops (both labeled and non-labeled doors):

1. Fabricate glass trim from 24 gage [.6mm] steel conforming to:
   a. Interior openings ASTM designation A 366 cold rolled steel.

   b. Exterior openings ASTM designation A 924 Zinc-Iron Alloy-Coated Galvannealed steel with a zinc coating of 0.06 ounces per square foot (A60) for exterior openings.

      1) Install trim into the door as a four-sided welded assembly with mitered, reinforced and welded corners.

      2) Trim: identical on both sides of the door.

      3) Exposed fasteners are not permitted. Labeled and non-labeled doors: use the same trim.

      4) Acceptable mounting methods:

a) Fit into a formed area of the door face, not extending beyond the door face, and interlocking into the recessed area.
b) Cap the cutout not extend more than 1/16" [1.6mm] from the door face.

L. Electrical Requirements for Doors:

General: Coordinate electrical requirements for doors and frames. Make provisions for installation of electrical items arranged so that wiring can be readily removed and replaced.

1. Doors with Electric Hinges:

a. General: Furnish conduit raceway to permit wiring from electric door hardware.

b. Hinge Locations: Provide electric hinge at intermediate or center location. Top or bottom electric hinge locations are not acceptable.

c. Refer to 08710 for electrified hardware items.

2.2 Frame Construction

A. Frames shall be of sizes as indicated, completely assembled, buck and frame formed from 14-gauge exterior, 16-gauge interior, steel with 2" face unless otherwise indicated and 5/8", minimum, integral stop. Exterior frames and interior frames at cafeteria, kitchen, locker room and shower areas shall be Galvannealed A60 (ASTM A653).

B. Corners of frames to be mitered and continuously welded full throat. Joints shall be pulled up tight, welded, and ground smooth with faces in correct alignment.

C. Provide adjustable "T" type anchors, three to each jamb; welded angle clips at bottom of frames for anchorage to floor construction; detachable type metal spreaders. Jamb anchors shall be T-shaped and of the same thickness as the metal of the frames. Where "T" anchors are not feasible, provide anchors as required and/or recommended.

D. Machine frames for attachment of hardware, including special reinforcing for extra heavy duty use, drilling, and tapping. Provide mortar tight metal dust boxes in back of lock location.

E. Frames for sidelights shall be integral with door frames; borrowed light window frames and other openings shall be as detailed.

F. Prepare frames for rubber silencers, three for single swing door and two for each pair of doors.

G. Frames not extending to the floor surface shall have a closed welded jamb bottom.

H. Electrical Requirements for Frames:

1. General: Coordination all electrical requirements for doors and frames. Make provisions for installation of electrical items arranged so that wiring can be readily removed and replaced.

a. Provide cutouts and reinforcements required for metal door frame to accept electric components.

b. Frame with Electrical Hinges: Weld UL listed grout guard cover box welded over center hinge reinforcing. Top or bottom hinge locations are not permitted. Contractor to reference 3.01.E, for continuous hinges.

c. Provide cutouts and reinforcements required to accept security system components.

d. Refer to 08710 for electrified hardware items.

2. Provide mortar box, welded in head of door frame at exterior frames for future door contact switch provided by Owner. Size, type, location and conduit requirements to be provided by Owner.

2.3 Labeled Assemblies

A. All openings shall be protected by assemblies which include doors, frames, hardware, closing devices, anchorage, sills, etc. installed in accordance with NFPA Standard "FIRE DOORS and WINDOWS, NFPA 80," as per Standard Building Code.

B. To further clarify the basic requirements and/or the correct method of labeling that will be acceptable; the labels will include, but not be limited to, the following:

1. **Labeling of Fire Doors and Frames**
All door openings in fire resistive walls and partitions requiring a rating shall be protected by assemblies which include doors, frames, hardware, closing devices, anchorage, sills, etc., installed in accordance with the National Fire Protection Association (NFPA) 80, Standard for "Fire Doors and Fire Windows" and the State Building Code.

To further clarify the basic requirements and the correct method of labeling that will be acceptable to the Division of Construction Management, the labels shall include the following:

a. Accessibility: Each component shall bear a label located to be accessible after installation.

b. Permanence: Each component shall bear a label of a type of material and be so attached that the life of the label and the attachment thereof can reasonably be expected to equal the life of the component to which it is attached. Labels shall be raised or embossed on metal labels or stamped into metal frames. Plastic or paper labels are unacceptable.

c. Legibility: The label design shall be such that it can always be visible and legible and must be clean of any paint or other coverage making the label illegible.

d. Fire Resistance: All approved labels on doors and on frames shall include thereon the fire resistance rating in hours and minutes for which the door or frame is labeled. Labels on frames with transoms or sidelights must identify that the

opening assembly includes same.

e. Other Requirements: The labels or stamps applied to frames must be provided by a manufacturer that has been approved by a laboratory or organization to provide testing and follow-up services for fire-rated opening assemblies.

2. Other Requirements - As directed by the approved laboratory or organization providing testing and follow-up services and labeling.

2.4 Finish

A. Metal doors and frames shall be thoroughly cleaned of dirt, grease, and impurities and shall be bonderized and finished with one coat of baked-on primer ready to receive finish paint.

B. Primer shall be manufacturer's standard in accordance with ASTM B117. **Do not prime paint labels**.

C. Final painting as specified and applied under Painting Section.

3.0 - EXECUTION

3.1 Installation

A. **BITUMINOUS COATING IS TO BE FIELD APPLIED TO THE INSIDE OF FRAMES THAT ARE TO BE INSTALLED IN MASONRY, OR TO BE GROUTED, PRIOR TO INSTALLATION.**

B. Install frames plumb, rigid, and in true alignment; properly brace until built in. Set spreader and attached jambs to floor through floor anchors.

C. In masonry openings, where required, install a second spreader at the mid-height of the door opening, and do not remove until the masonry jambs are in place. Spreader shall be notched wood of approximate jamb width and 1" minimum thickness. Install a minimum of three anchors per jamb to be imbedded in masonry joint as the wall is laid up.

D. Frames shall be grouted solid.

E. Doors shall be rigidly secured in frames, hardware applied, and adjusted to achieve smooth operation without forcing or binding. Doors shall be capable of maintaining any degree of opening.

3.2 Protection

After installation, doors and frames shall be protected from damage during subsequent construction activities. Damaged doors and frames shall be replaced.

END OF SECTION

PART 1 – GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 Section Includes

A. Flush Wood doors

B. Acoustical Rated Doors

C. Positive Pressure Fire Rated Wood Doors

D. Factory Glazing for Fire Rated Doors

1.3 Related Sections

A. Section 08110 – Hollow Metal Doors and Frames

B. Section 08710 – Finish Hardware

C. Section 08810 – Glass and Glazing

1.4 Requirements Of Regulatory Agencies

A. Wood Doors and installation shall comply with provisions and standards listed. The latest published edition of each standard applies.

B. ASTM - American Society for Testing and Materials

1. ASTM E 90-09 - Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements. (All doors tested shall be fully operable.)
2. ASTM E 413-10 - Classification for Rating Sound Insulation.
3. ASTM F 476 Section 18 - Security Test of Swinging Door Assemblies - Door Impact Test

C. ANSI - American National Standards Institute

1. ANSI/DHI A156.115W - Specifications for Hardware Preparation in Wood Doors and Frames.
2. ANSI/DHI A115.IG - Installation Guide for Doors and Hardware.
3. ANSI A156.7 - Hinge Template Dimensions.
4. ANSI/HPVA HP-1 Standards for Hardwood and Decorative Plywood
5. ANSI A208.1-Particleboard
6. ANSI A208.2-Medium Density Fiberboard (MDF)
7. ANSI-ASA S12.60 - Standard Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools
8. ANSI/A117.1 – Accessible and Useable Buildings and Facilities

D. ANSI/WDMA – Window and Door Manufacturers Association

1. WDMA I.S. 1A-13, Industrial Standards for Architectural Flush Doors

   a. J-1 – Job Site Information "How to Store, Handle, Finish, Install, and Maintain Wood Doors"
   b. P-1 – Performance Standards for Architectural Wood Flush Doors
   c. T-1 – Test for Telegraphing
   d. T-2 – Test for Warp
   e. T-3 – Test for Squareness

2. WDMA Test Methods - Provide documentation showing compliance to WDMA performance duty level.

   a. Adhesive Bonding Durability: WDMA TM-6
   b. Cycle Slam: WDMA TM-7
   c. Hinge Loading: WDMA TM-8
   d. Screw Holding: WDMA TM-10

E. Building Code references

1. IBC – 2021 International Building Code
2. NFPA 80 - Standard for Fire Doors and Other Opening Protective's.
3. NFPA 101 – Life Safety Code
4. NFPA 105 - Standard for the Installation of Smoke Door Assemblies and Other Opening Protective's
5. NFPA 252 – Standard Method of Fire Tests of Door Assemblies
6. ANSI/UL 10C - Standard for Safety for Positive Pressure Fire Tests of Door Assemblies
7. UL 1784 - Air Leakage Tests of Door Assemblies
8. Underwriters Laboratories (UL) - ULI0C Positive Pressure Fire Test of Door Assemblies
9. ITS/WH Certification - Certification Listings for Fire Doors
10. Consumer Products Safety Commission (CPSC) 16 CFR 1201 – Standard for Architectural Glazing
11. US Green Building Council (USGBC)

1.5 Supplier Qualifications

A. The Wood Door Supplier shall maintain at the location which will be managing the project, a credentialed Architectural Hardware Consultant (AHC) or Certified Door Consultant (CDC) as a full-time employee and member in good standing of DHI - Door Security + Safety Professionals.

B. The Architectural Hardware Consultant (AHC) or Certified Door Consultant (CDC) shall supervise other individuals employed by the Wood Door Supplier who work on the project and be available throughout the project to meet with the Contractor, Architect or Owner as needed.

C. Supplier shall be experienced and have completed projects with material, design and scope similar to that specified for this project. If requested by the Owner or Architect, submit a list of projects completed in the last five (5) years with the project name, location, Owner, Architect and Contractor.

D. As a requirement, the Wood Door Supplier shall maintain an office and warehouse complete with a wood door inventory within a one hundred (100) mile radius of the jobsite. The Supplier shall further have a qualified field service staff available to service the project.

E. After delivery of wood doors and prior to installation, the Hardware or Door Consultant shall meet with the Contractor to review templates, installation instructions, final hardware schedule, coordination with other trades and preview samples.

F. Failure to meet the above requirements will disqualify the bidder.

G. The Owner may visit the location of the Distributor's office and warehouse to observe if the intent of the requirements set forth in the specifications have been met.

1.6 Submittals

A. Submit complete copies of the wood door shop drawings covering complete details of items required for the project. Complete copies of technical data sheets and other pertinent data are required to indicate compliance with the specification.

1. Shop Drawings: Submit door and frame schedule using reference designations indicated on Drawings. Include opening size(s), handing of doors, details of each frame type, elevations of door design types, location, hardware group numbers, fire label requirements, including fire rating time duration, maximum temperature rise requirements, hardware mounting locations, glass beads/moldings, glass kits, internal blocking, vertical edge details, top and bottom rail details, undercuts, beveling and other pertinent data.

B. As part of the Shop Drawing submittal, provide copy of WDMA J1, Job Site Information, "How to store, handle, finish, install and maintain wood doors."

C. Data submitted shall be job specific and shall include product data and printed information in sufficient detail and scope to verify compliance with requirements of the contract documents.

D. Provide door construction details/drawings of vertical edges, top rail and SWE details for all doors.

E. Indicate location of cutouts for hardware and blocking to ensure doors are properly prepared and coordinated to receive hardware.

F. Shop drawings, product data, and samples: Contractor to stamp Shop Drawings verifying they have been coordinated and reviewed for completeness and compliance with the contract documents.

G. Shop drawings submitted without the above documentation will be considered incomplete, will not be reviewed, and returned directly to the Contractor.

H. Follow the same procedures for re-submittal as the initial submittal with the appropriate revised dates noted in the shop drawings.

1.7 Quality Assurance

A. Comply with the requirements of the referenced standards. Submit test reports upon request by the Owner or Architect.

B. Underwriters' Laboratories or Intertek Testing Services / Warnock Hersey, Positive Pressure - Category A labeled fire wood doors:

1. Label fire doors listed in accordance with Underwriters Laboratories standard UL10C, Positive Pressure Fire Tests of Door Assemblies and Air Leakage Tests of Door Assemblies - UL 1784.
2. Construct and install doors in accordance with the standards of NFPA 80.
3. Manufacture fire rated doors under the UL or ITS/WH factory inspection program providing the degree of fire protection capability indicated by the door schedule drawings.
4. Provide metal labels permanently fastened on each fire door at an authorized and licensed facility as evidence of compliance with procedures of the labeling agency.
5. No field modifications shall be made to the fire door assembly that would void the label. Field modifications to a fire door shall be in accordance with NFPA80. Work shall be done by a licensed labeling service approved by the manufacturer.
6. Labels are not to be removed, defaced or made illegible while the door is in service per NFPA 80. Fire labels are not to be painted or pre-finished.
7. Fire doors with continuous hinges shall have the physical label located on the top rail of the door.
8. Conform to applicable codes for fire ratings. It is the intent of this specification that wood doors comply or exceed the standards for labeled openings. In case of conflict between door types required for fire protection, furnish the type required by NFPA and UL.
9. Validate the Smoke and Draft Control ("S") Label for hardware sets that include Category H smoke and draft control seals.
10. All Category G seals required will be concealed in the door or applied to the top rail. No Category G seals will be allowed on the door frame.

C. Door Supplier shall provide one (1) extra door with 6" top rail and exit device blocking. The Contractor, Door Supplier and the Owner to observe and inspect destructive sampling for proper internal construction.

1.8 Warranty

A. Provide Manufacturer's standard warranty form, signed by manufacturer, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship for the life of the original installation of the door.

1.9 Samples

A. Sample Submittal

1. Color samples for factory pre-finishing shall consist of four (4) sets of three (3) finish samples per set. Samples to be minimum 5" x 8" size on specified veneer species. The sample should reasonably represent the color range of the veneer species expected in the finished work.

B. Fire Rated Wood Doors

1. Provide three (3) 10" x 10" cut away corner samples demonstrating door construction with provisions for vertical stiles and top rails as specified.

C. Non-Fire Rated Wood Doors

1. Provide three (3) construction samples demonstrating door construction with provisions for vertical stiles and top rails as specified herein.

1.10 Delivery, Storage, And Handling

A. Provide protective measures throughout the construction period to safeguard doors from damage or deterioration from the time of acceptance.

B. Store and protect doors in accordance with manufacturer's recommendations and Section J-1 of WDMA I.S. 1A-13 - "How to Store, Handle, Finish, Install and Maintain Wood Doors"

1. Store doors flat and off the floor on a level surface in a dry, well-ventilated building. Do not store on edge. Protect doors from dirt, water and abuse and allow for air circulation.
2. Protect all doors from exposure to direct sunlight and artificial light after delivery.
3. Do not subject interior doors to extremes of either heat or humidity. HVAC systems must be operational and balanced, providing a temperature range of 50 to 80 degrees Fahrenheit and 30% to 60% relative humidity.
4. When handling doors, lift and carry when moving. Do not drag across other doors or surfaces. Handle with clean, dry hands or while wearing clean dry gloves.
5. Manufacturer shall mark each door on the top rail and top hinge pocket with the door opening number. In addition, mark the top rail with manufacture's name, factory order number, and other additional markings to properly identify the door.

1.11 Coordination

A. Coordinate work with other sections involving manufacture or fabrication of internal cutouts and internal blocking for door hardware, electrified and mortised items. Provide necessary blocking in mineral core doors to prevent door failure from surface applied hardware.

B. The Contractor shall field verify existing door opening conditions, where existing doors or frames are to remain or be replaced in part, for coordination with the specified hardware and notify the Architect of conflicts prior to proceeding. Failure to notify the Architect of conflicts that result in additional work or material is the responsibility of the Contractor, with no cost to the Owner.

C. The supplier shall be responsible for proper coordination, templating, dimensions and all details required for doors, frames and hardware application.

PART 2 - PRODUCTS

2.1 Manufacturers

A. Acceptable manufacturers for wood doors specified are listed below. Only the products of the listed manufacturers will be accepted. No alternates will be

accepted. The manufacturers listed are acceptable providing they adhere to the quality standards as noted herein.

1. Eggers Industries
2. Marshfield-Algoma
3. V.T. Industries

B. **The manufacturers listed herein are capable of providing products that meet or exceed the specified requirements. Products that do not comply with the specified requirements and construction will be rejected.**

C. If doors are rejected, replacement doors shall be furnished expeditiously, at no cost to the Owner.

2.2 Doors

A. Quality Assurance Requirements: Flush Wood Doors: Comply with the ANSI/WDMA I.S. 1A–13 Industry Standard for Architectural Wood Flush Doors.

B. Non-Fire Rated Wood Doors - All solid core flush wood doors shall meet WDMA Door Grade and WDMA Performance Duty Level specified.

1. Grade-Custom Grade Construction and Face Grade.
2. WDMA Performance Duty Level-Extra Heavy Duty. All doors shall meet specified WDMA Performance Duty Level, including face screw holding requirement. Surface applied hardware shall be installed in accordance with Section 08710.
3. Door Type - PC-5 - Bonded Wood Based Particle Core, Stiles and rails securely bonded to the core and entire unit abrasively planed prior to application of faces to assure uniform thickness of all components.

C. Electrical Requirements:

1. General: Make provisions for installation of electrical items specified in Section 08710.

   a. Provide all cutouts and blocking required for wood doors to accept electrical door hardware and security system components.

D. Veneer and Veneer Matching

1. Veneer Species and Cut: Architect to specify veneer and cut.

   a. Veneer Face Grade WDMA: Grade "A" as described in WDMA I.S. 1A and HPVA Door Veneer tables ANSI/HPVA-1.

2. Matching Between Leaves: Book Match
3. Veneer match: Assembly of Spliced Veneer: Running Match
4. Pair match all pairs and set of pairs separated only by mullions.
5. Set match all groups of pairs and/or individual doors indicated on the door schedule or plans.
6. Veneer Cut: Plain Sliced.
7. Veneer Species: Select White Birch.

E. Non- Fire Rated Door

1. Provide wood based particleboard core. Core to be securely bonded to the stiles and rails with Type I Adhesive.
2. Crossbands

    a. Shall be a minimum thickness of 1/16".
    b. Extend the full width of the door and have no seams.
    c. Composite crossbands of either MDF or particleboard are only permitted provided they meet or exceed the following minimum requirements:

        1) Minimum properties for composite crossband must meet physical and mechanical properties of thin MDF - Grade 230 as described in ANSI 208.2
        2) Internal bond minimum strength of 150 psi.
        3) Linear expansion minimum of < 0.3 % measured between 50% and 80% relative humidity.

3. Vertical Edges

    a. Vertical Edges to be same species as face veneer, constructed of two ply laminate hardwood outer layer (outer stile) and hardwood lumber or SCL inner layer (inner stile). Outer ply to be minimum thickness of 1/2" after trim, same species lumber as face. Veneer or lumber less than 1/2" is not acceptable. The net stile width to be minimum 1" after trimming. Veneer edge banding is not acceptable.
    b. Provide detail/cross section drawing of door edge construction.

4. Horizontal Edges

    a. Rails must be present on all doors.
    b. Rails are solid hardwood lumber, with grain running perpendicular to stiles. SCL is allowed for rails. Minimum rail after trim to be 7/8". MDF is unacceptable.

5. Side Panels

    a. Fabricate matching panels with same construction as the door. Side panels will be pair matched to the associated door and receive the same finish.

2.3 Door Fabrication

A. Factory pre-fit and pre-machine doors to receive hardware as specified under Section 08710.

1. All doors shall be machined in accordance with manufacturer's procedures in order to maintain manufacturer's warranty and to avoid any machining conflicts.
2. Doors are to be beveled at both hinge and lock edges.
3. Factory pre-drill all hinge screw pilot holes for full mortise hinges.
4. Doors shall have a 3/8" undercut.
5. Coordinate door undercuts per architect's details and hardware specified under Section 08710.
6. All fire doors shall be in accordance with NFPA 80 for clearances and undercutting requirements.

B. Factory preparation for light openings:

1. Factory preparation for new wood doors glazing materials in vision panels shall be installed in labeled glass light kits or in accordance with the fire door listing and shall be installed in accordance with inspection service procedure and under label service per NFPA 80, 4.4.3.1.
2. Glass in new wood doors must be installed by the door manufacturer or in a licensed door shop.
3. Fire protection glazing and fire resistance glazing shall meet all applicable impact safety standards.
4. Provide metal vision kits at all fire labeled doors. Vision kits shall be Anemostat LoPro, 20 gage, with tamperproof screws and beige baked enamel finish. Install tamperproof screw heads on secure side of door. Vision kits shall have UL or W/H classification markings visible for inspection.
5. Wood beads for light opening in non-fire rated wood doors:

   a. Provide manufacturer's standard solid wood straight beads flush design, matching veneer species of door faces. Include finish nails for removable stops in accordance with manufacturers recommendations.

2.4 Factory Finishing

A. All doors, including light beads and moldings, to be factory finished where indicated in schedules or on drawings as factory finished.

B. Finish Requirements.

C. Manufacturer's standard UV Cured Acrylated Polyester/Urethanes, equal to WDMA TR-8.

1. Grade-Premium

2. Coating-Clear

3. Satin Gloss (Gloss range 30-40)

D. Package factory finished doors with manufacturers standard packaging to protect doors from damage during shipment.

PART 3 - EXECUTION

3.1 Installation

A. Install all wood doors in accordance with door manufacturer's instructions and all tolerances outlined in ANSI/WDMA I.S. 1A-13.

B. Install label doors in accordance with NFPA-80. Labels are not to be removed, defaced or made illegible while the door is in service.

C. Inspect doors prior to installation for any damage, manufacturing defects or pre-finish inconsistency.

D. Remove and replace doors that are damaged, warped, twisted or unacceptable to the Architect or Owner.

E. Should there be any door issues do not proceed with installation. Contact door supplier to correct unsatisfactory conditions and proceed with installation only after corrections have been made.

3.2 Adjusting

A. Final Adjustments: Adjust doors and hardware prior to final inspection and acceptance by the Architect and Owner. Replace defective items, including doors that are damaged or unacceptable to the Architect or Owner.

3.3 Protection

A. Provide protective measures required throughout the construction period to ensure that doors will be without damage or deterioration at time of acceptance.

END OF SECTION

1.0 - GENERAL

1.1 Section Includes

A. Overhead Coiling Counter Doors, manually operated.

B. Overhead Coiling Counter Doors, power operated.

1.2 Related Sections

A. Section 05500 - Metal Fabrications: Support framing and framed opening.

B. Section 06210 - Finish Carpentry: Wood jamb and head trim.

C. Section 08710 - Door Hardware: Product Requirements for cylinder core and keys.

D. Section 09900 - Painting: Field applied finish.

E. Division 16 -
1. Raceway and Boxes: Conduit from electric circuit to door operator and from door operator to control station.

2. Wiring Connections: Power to disconnect.

1.3 References

A. ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

B. ASTM A 666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

C. ASTM A 924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

D. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

E. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).

F. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

G. NEMA ICS 2 - Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC.

H. NEMA MG 1 - Motors and Generators.

1.4 Submittals

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Details of construction and fabrication.
   4. Installation methods.

C. Shop Drawings: Include detailed plans, elevations, details of framing members, required clearances, anchors, and accessories. Include relationship with adjacent construction.

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) long, representing actual product, color, and patterns.

F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.5 Quality Assurance

A. Manufacturer Qualifications: Company specializing in performing Work of this section with a minimum of five years experience in the fabrication and installation of security closures.

B. Installer Qualifications: Company specializing in performing Work of this section with minimum three years and approved by manufacturer.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
   1. Install in areas designated by Architect.
   2. Do not proceed with remaining work until workmanship and installation is approved by Architect.
   3. Refinish mock-up area as required to produce acceptable work.

1.6 Delivery, Storage, And Handling

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.

C. Store materials in a dry, warm, ventilated weathertight location.

1.7 Project Conditions

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 Coordination

A. Coordinate Work with other operations and installation of adjacent finish materials to avoid damage to installed materials.

1.9 Warranty

A. Warranty: Manufacturer's limited door warranty for 2 years for all parts and components.

B. Manufacturer's 2 year limited warranty for PowderGuard Premium Powder Coat Finish.

C. Manufacturer's 4 year limited warranty for PowderGuard Zinc Powder Coat Finish.

D. Manufacturer's 5 year limited warranty for PowderGuard Weathered Powder Coat Finish applied to complete door system.

2.0 - PRODUCTS

2.1 Manufacturers

A. Basis of Design is: Overhead Door Corporation., Similar counter doors manufactured by Kinnear/Cookson/Cornell are also pre-approved.

B. Requests for other substitutions will be considered in accordance with provisions of Section 01360.

C. Stainless Steel Counter Doors: Overhead Door Corporation, 651 Series.
   1. Wall Mounting Condition:
      a. Between jambs mounting.
   2. Curtain: Interlocking slats, Type F-158 fabricated of 22 gauge stainless steel. Endlocks attached to alternate slats to maintain curtain alignment and prevent lateral slat movement.
   3. Finish:
      a. Slats and hood stainless steel with a No. 4 stainless steel finish.
      b. Non-galvanized exposed ferrous surfaces shall receive one coat of rust-inhibitive primer.
   4. Bottom Bar: Single stainless steel angle bottom bar.
   5. Guides:
      a. Stainless steel shapes.
   6. Brackets: Steel plate to support counterbalance, curtain and hood.

7. Counterbalance: Helical torsion spring type housed in a steel tube or pipe barrel.
8. Hood: Provided with intermediate support brackets as required and fabricated of:
    a. Stainless steel.
9. Operation:
    a. Manual push up.
10. Locking:
    a. Two point dead locks with mortise cylinder/s.

PART 2 EXECUTION

2.1 EXAMINATION

A. Verify opening sizes, tolerances and conditions are acceptable.

B. Examine conditions of substrates, supports, and other conditions under which this work is to be performed.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

2.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

2.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.

D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

E. Coordinate installation of electrical service with Section 16150. Complete wiring from disconnect to unit components.

F. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07900.

G. Install perimeter trim and closures.

2.4 ADJUSTING

A. Test for proper operation and adjust as necessary to provide proper operation without binding or distortion.

B. Adjust hardware and operating assemblies for smooth and noiseless operation.

2.5 CLEANING

A. Clean curtain and components using non-abrasive materials and methods recommended by manufacturer.

B. Remove labels and visible markings.

C. Touch-up, repair or replace damaged products before Substantial Completion.

2.6 PROTECTION

A. Protect installed products until completion of project.

END OF SECTION

1.0 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 Summary

A. Section Includes: Kawneer Aluminum Entrances and Storefronts, glass and glazing, hardware and components.

1. Type of Aluminum Entrance:
   500 Swing Door; Wide stile, 5" (127 mm) vertical face dimension, 1-3/4" (44.5 mm) depth, high traffic applications.

2. Type of Storefront:
   Thermal Barrier (Trifab® VG 451T):
   Kawneer IsoLock® Thermal Break with a 1/4" (6.4 mm) separation

B. Related Sections:
1. Section 07910 "Joint Sealants" for joint sealants installed as part of the aluminum storefront system.
2. Section 08710 - Finish Hardware
3. Section 08810 - Glass and Glazing

1.3 Definitions

A. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufactures Association (AAMA) – AAMA Glossary (AAMA AG).

1.4 Performance Requirements

A. General Performance: Aluminum-framed entrance and storefront system shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:
1. Design Wind Loads: Determine design wind loads applicable to the Project from basic wind speed indicated in miles per hour, according to ASCE 7, Section 6.5, "Method 2-Analytical Procedure," based on mean roof heights above grade indicated on Drawings.

   a. Basic Wind Speed (MPH): (120)
   b. Importance Factor (I, II, III): (1.15)
   c. Exposure Category B

B. Entrance System Performance Requirements:

1. Wind loads: Provide entrance system; include anchorage, capable of withstanding wind load design pressures based on the 2021 International Building Code.
2. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/ft2 (0.3 l/s · m2) at a static air pressure differential of 6.24 psf (300 Pa).
3. Water Resistance: The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a minimum static air pressure differential of 8 psf (383 Pa) as defined in AAMA 501.
4. Uniform Load: A static air design load of 20 psf (958 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
5. Thermal Transmittance (U-factor): When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than: .60 with SHGC not to exceed .25.
6. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than:
   a. Glass to Exterior – 70 frame and 69 glass (low-e)
   b. Glass to Center – 62 frame and 68 glass (low-e)
   c. Glass to Interior – 56 frame and 67 glass (low-e)
7. Sound Transmission Class (STC) and Outdoor-Indoor Transmission Class (OITC): When tested to AAMA Specification 1801 and in accordance with ASTM E1425 and ASTM E90, the STC and OITC Rating shall not be less than:
   a. Glass to Exterior – 38 (STC) and 31 (OITC)
   b. Glass to Center – 37 (STC) and 30 (OITC)
   c. Glass to Interior – 38 (STC) and 30 (OITC)

1.5 Submittals

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, hardware, finishes, and installation instructions for each type of aluminum frame storefront system indicated.

B. Shop Drawings: Include plans, elevations, sections, details, hardware, and attachments to other work, operational clearances and installation details.

C. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.

D. Samples for Verification: For aluminum framed entrance system and components required.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for each type of aluminum-framed storefront.

F. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 12" (300 mm) lengths of full-size components and showing details of the following:

1. Joinery, including concealed welds.
2. Anchorage.
3. Expansion provisions.
4. Glazing.
5. Flashing and drainage.

G. Other Action Submittals:

1. Entrance Door Hardware Schedule: See Section 08710. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

1.6 Quality Assurance

A. Installer Qualifications: An installer which has had successful experience with installation of the same or similar units required for the project and other projects of similar size and scope.

B. Manufacturer Qualifications: A manufacturer capable of providing aluminum framed storefront system that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.

C. Source Limitations: Obtain aluminum framed storefront system through one source from a single manufacturer.

D. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum framed storefront system and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements." Do not modify size and dimensional requirements.
1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Build mockup for type(s) of storefront elevation(s) indicated, in location(s) shown on Drawings.

F. Structural-Sealant Glazing: Comply with ASTM C 1401, "Guide for Structural Sealant Glazing" for design and installation of structural-sealant-glazed systems.

G. Structural-Sealant Joints: Design reviewed and approved by structural-sealant manufacturer.

1.7 Project Conditions

A. Field Measurements: Verify actual dimensions of aluminum framed storefront openings by field measurements before fabrication and indicate field measurements on Shop Drawings.

1.8 Warranty

A. Manufactures Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty.
   1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.

2.0 - PRODUCTS

2.1 Manufacturers

A. Basis-of-Design Product:
   1. Kawneer Company Inc.
   2. Trifab® 451T (thermal) Storefront System
   3. 2" x 4-1/2" (50.8 mm x 114.3 mm) System Dimensions
   4. Glass: Center, Exterior or Interior

B. Subject to compliance with requirements, provide a comparable product by the following:
   1. Manufacturer: YKK to meet or exceed the criteria specified.

C. Substitutions: Refer to Substitutions Section 01360 for procedures and submission requirements
   1. For pre-approval: Submit written requests ten (10) days prior to bid date.
   2. Certificates: Submit certificate(s) certifying substitute manufacturer (1) attesting to adherence to specification requirements for storefront system performance criteria, and (2) has been engaged in the design, manufacturer and fabrication of aluminum storefronts for a period of not less than ten (10) years.

D. Substitution Acceptance: Acceptance will be in written form as an addendum or post bid documented by a formal change order signed by the Owner and Contractor and approved by Architect. No exceptions. No other substitutions will be considered post bid.

2.2 Materials

A. Aluminum Extrusions: Alloy and temper recommended by aluminum storefront manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.090" wall thickness at any location for the main frame and complying with ASTM B 221: 6063-T6 alloy and temper.

B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim hardware, anchors, and other components.

C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
   1. Weather Seals: Provide weather stripping with integral barrier fin or fins of semi-rigid, polypropylene sheet or polypropylene-coated material. Comply with AAMA 701/702.

E. Sealant: For sealants required within fabricated storefront system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.
Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.

2.3 Storefront Framing System

A. Thermal Barrier (Trifab® VG 451T):
   1. Kawneer IsoLock® Thermal Break with a 1/4" (6.4 mm) separation consisting of a two-part chemically curing, high-density polyurethane, which is mechanically and adhesively joined to aluminum storefront sections.
      a. Thermal Break shall be designed in accordance with AAMA TIR-A8 and tested in accordance with AAMA 505.

B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Where exposes shall be stainless steel.

D. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action

E. Packing, Shipping, Handling and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

F. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle storefront material and components to avoid damage. Protect storefront material against damage from elements, construction activities, and other hazards before, during and after storefront installation.

2.4 Glazing Systems

A. Glazing: As specified in Division 08810 Section "Glass and Glazing."

B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, extruded EPDM rubber.

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

E. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type, and as follows:

1. Structural Sealant: ASTM C 1184, single-component neutral-curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by a structural-sealant manufacturer for use in aluminum-framed systems indicated.
   a. Color: To be selected by Architect.

2. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.
   a. Color: Matching structural sealant as selected by Architect.

2.5 Entrance Door Systems

A. Entrance Door Hardware: As specified in Division 08710 Section "Finish Hardware."

2.6 Accessory Materials

A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section "Joint Sealants."

B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30 mil (0.762 mm) thickness per coat.

2.7 Fabrication

A. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
   1. Profiles that are sharp, straight, and free of defects or deformations.
   2. Accurately fit joints; make joints flush, hairline and weatherproof.
   3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
   4. Physical and thermal isolation of glazing from framing members.
   5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
   6. Provisions for field replacement of glazing.
   7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

B. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

C. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.

D. Storefront Framing: Fabricate components for assembly using manufactures standard installation instructions.

E. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.8 Aluminum Finishes

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Factory Finishing:
1. Kawneer Permafluor™ (70% PVDF), AAMA 2605, Fluoropolymer Coating (Color to be selected by Architect from full range of colors.) Submit hard copy of color chart.

3.0 - EXECUTION

3.1 Examination

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight framed aluminum storefront system installation.

1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
2. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Installation

A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing aluminum framed storefront system, accessories, and other components.

B. Install aluminum framed storefront system level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.

C. Set sill members in bed of sealant or with gaskets, as indicated, for weather tight construction.

D. Install aluminum framed storefront system and components to drain condensation, water penetrating joints, and moisture migrating within sliding door to the exterior.

E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 Field Quality Control

A. Manufacturer's Field Services: Upon Owner's written request, provide periodic site visit by manufacturer's field service representative.

3.4 Adjusting, Cleaning, And Protection

A. Clean aluminum surfaces immediately after installing aluminum framed storefronts. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

B. Clean glass immediately after installation. Comply with glass manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.

C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION

1.0 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 Summary

A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.

B. This Section includes the following:
   1. Architectural Hinges
   2. Continuous Hinges
   3. Key Control System, Cylinders and Cores.
   4. Locksets, Latchsets and Deadbolts
   5. Panic Devices and Fire Rated Exit Devices
   6. Closers and Door Control Devices
   7. Automatic Door Operators
   8. Overhead Door Stops and Holders
   9. Floor and Wall Stops
   10. Door Bolts and Coordinators
   11. Door Pulls, Push/Pull Plates and Push/Pull Sets
   12. Protective Plates
   13. Door Seals, Gasketing and Weatherstripping
   14. Thresholds
   15. Miscellaneous Door Control Devices
   16. Electromechanical Hardware
   17. Miscellaneous Access Control Components and Security Equipment

C. Related Sections: The following Sections contain requirements that relate to the following sections.
   1. Section 08110: Hollow Metal Doors and Frames
   2. Section 08215: Wood Doors
   3. Section 08420: Aluminum-Framed Entrances and Storefronts
   4. Division 16: Electrical
   5. Division 28: Electronic Safety and Security

D. Products furnished but not installed under this Section to include:
   1. Cylinders for locks on entrance doors.
   2. Final replacement cores and keys to be installed by Owner.

1.3 References

A. Standards of the following as referenced:
   1. American National Standards Institute (ANSI)
   2. Door and Hardware Institute (DHI)
   3. Factory Mutual (FM)
   4. National Fire Protection Association (NFPA)
   5. Underwriters' Laboratories, Inc. (UL)
   6. UL 10C - Fire Tests Door Assemblies
   7. Warnock Hersey

B. Regulatory standards of the following as referenced:
   1. Department of Justice, Office of the Attorney General, *Americans with Disabilities*

Act, Public Law 101-336 (ADA).

2. CABO/ANSI A117.1: *Providing Accessibility and Usability for Physically Handicapped People*, 2010 edition.

1.4 Submittals

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.

B. Product data including manufacturers' 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. For items other than those scheduled in the "Headings" of Section 3, provide catalog information for the specified items and for those submitted.

C. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into vertical format "hardware sets" indicating complete designations of every item required for each door or opening. Use specification heading numbers with any variations suffixed a, b, etc. Include the following information:
   a. Type, style, function, size, and finish of each hardware item.
   b. Name and manufacturer of each item.
   c. Fastenings and other pertinent information.
   d. Location of each hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.
   e. Explanation of all abbreviations, symbols, and codes contained in schedule.
   f. Mounting locations for hardware.
   g. Door and frame sizes and materials.
   h. Keying information.
   i. Cross-reference numbers used within schedule deviating from those specified.
   j. Column 1: State specified item and manufacturer.
   k. Column 2: State prior approved substituted item and its manufacturer.
2. Furnish complete wiring diagrams, riser diagrams, elevation drawings and operational descriptions of electrical components and systems, listed by opening in the hardware submittals. Elevation drawings shall identify locations of the system components with respect to their placement in the door opening. Operational descriptions shall fully detail how each electrical component will function within the opening, including all conditions of ingress and egress. Provide a copy with each hardware schedule submitted for approval. Supply a copy with delivery of hardware to the jobsite and another copy to the Owner at the time of project completion.
3. Submittal Sequence: Submit final schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.
4. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.

D. Provide samples if requested of each type of exposed hardware unit in finish indicated and tagged with full description for coordination with schedule. Submit samples prior to submission of final hardware schedule.

1. Samples will be returned to the supplier. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after

final check of operation, be incorporated in the Work, within limitations of keying coordination requirements.

E. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

F. Contract closeout submittals:
   1. Operation and maintenance data: Complete information for installed door hardware.
   2. Warranty: Completed and executed warranty forms.

1.5 Quality Assurance

A. Single Source Responsibility: Obtain each type of hardware (latch and locksets, hinges, closers, etc.) from a single manufacturer.
   1. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced Architectural Hardware Consultant (AHC) who is available for consultation to Owner, Architect, and Contractor, at reasonable times during the course of the Work.

B. Coordination Meetings:
   1. Contractor to set up and attend the following:
      a. Lock distributor to meet with the Owner to finalize lock functions and keying requirements and to obtain final instructions in writing.
      b. Lock distributor and lock, closer and exit device manufacturer to meet with the installer prior to beginning of installation of door hardware. Instruct installer on proper installation of specified products.
   2. General Contractor to set up and attend the following:
   3. Meet with the Owner, General Contractor, Supplier, electrical and security contractors to coordinate all electrical hardware items. Supplier to provide riser diagrams, elevation drawings, wiring diagrams and operational descriptions as required by the General and sub-contractors.

C. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 requirements of authorities having jurisdiction.
   1. Provide only items of door hardware that are listed and tested by UL or Warnock Hersey for given type/size opening and degree of label. Provide proper latching hardware, door closers, approved-bearing hinges and seals whether listed in the Hardware Schedule or not. All hardware to comply with State and local codes and UL 10C.
   2. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors' UL labels indicating "Fire Door to be equipped with Fire Exit Hardware") provide UL label on exit devices indicating "Fire Exit Hardware".

D. All hardware is to comply with Federal and State Handicap laws.

E. Substitutions: Request for substitutions of items of hardware other than those listed as "acceptable and approved" shall be made to the architect in writing no later than fourteen (14) days prior to bid opening. Approval of substitutions will only be given in writing or by Addenda. Requests for substitutions shall be accompanied by samples and/or detailed information for each manufacturer of each product showing design, functions, material

thickness and any other pertinent information needed to compare your product with that specified. Lack of this information will result in a refusal.

F. Pre-Installation Coordination:
   1. Installation of hardware shall be installed or directly supervised and inspected by a skilled installer certified by the manufacturer of locksets, door closers, and exit devices used on the project, or with not less than 3 years' experience in successful completion of projects similar in size and scope.
   2. Schedule a hardware pre-installation meeting on site to review and discuss the installation of continuous hinges, locksets, door closers, exit devices, overhead stops, and electromechanical door hardware.
   3. Meeting attendees shall be notified 7 days in advance and shall include: Architect, Contractor, Door Hardware Installers (including low voltage hardware), Manufacturers representatives for above hardware items, and any other effected subcontractors or suppliers.
   4. All attendees shall be prepared to distribute installation manuals, hardware schedules, templates, and physical hardware samples.

1.6 Product Handling
A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.

B. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.

C. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.

D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).

E. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.

1.7 Warranty
A. Special warranties:
   1. Locksets: 10 Year Period
   2. Electromechanical Locksets: 3 Year Period
   3. Exit Devices: 10 Year Period
   4. Electromechanical Exit devices: 3 Year Period
   5. Surface Closers: 30 Year Period
   6. Automatic Door Operators: 2 Year Period
   7. Power Supplies: 3 Year Period
   8. Weather Stripping/Gasketing: 5 Year Period
   9. Overhead Stops: 10 Year Period

1.8 Maintenance
A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions that are packed in hardware items for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

B. Parts kits: Furnish manufacturers' standard parts kits for locksets, exit devices, and door

closers.

2.0 - PRODUCTS

2.1 Manufactured Units

A. Hinges:

1. Acceptable manufacturers:
   a. Ives*
   b. Stanley
   c. McKinney
2. Characteristics:
   a. Templates: Provide only template-produced units.
   b. Screws: Provide Phillips flat-head screws complying with the following requirements:
      1) For metal doors and frames install machine screws into drilled and tapped holes.
      2) For wood doors and frames install threaded-to-the-head wood screws.
      3) For fire-rated wood doors install #12 x 1-1/4 inch, threaded-to-the-head steel wood screws.
      4) Finish screw heads to match surface of hinges or pivots.
   c. Hinge pins: Except as otherwise indicated, provide hinge pins as follows:
      1) Out-Swing Exterior Doors: Non-removable pins.
      2) Out-Swing Corridor Doors with Locks: Non-removable pins.
      3) Interior Doors: Non-rising pins.
      4) Tips: Flat button and matching plug. Finished to match leafs.
   d. Size: Size hinges in accordance with specified manufacturer's published recommendations.
   e. Quantity: Furnish one pair of hinges for all doors up to 5'-0" high. Furnish one hinge for each additional 2-1/2 feet or fraction thereof, unless otherwise specified in Hardware Headings.

B. Geared Continuous Hinges:

1. Acceptable manufacturers:
   a. Ives*
   b. Select Products
   c. Markar
2. Characteristics:
   a. Continuous gear hinges to be manufactured of extruded 6063-T6 aluminum alloy with anodized finish, or factory painted finish as scheduled.
   b. All hinges are to be manufactured to template. Uncut hinges to be non-handed and to be a pinless assembly of three interlocking extrusions applied to the full height of the door and frame without mortising.
   c. Vertical door loads to be carried on chemically lubricated polyacetal thrust bearings. The door and frame leaves to be continually geared together for the entire hinge length and secured with a full cover channel. Hinge to operate to a full 180°.
   d. Hinges to be milled, anodized and assembled in matching pairs. Fasteners supplied to be steel self-drilling, self-tapping 12-24 x ¾" screws.
   e. Provide UL listed continuous hinges at fire doors. Continuous hinges at fire doors (suffix -FR) to meet the required ratings without the use of auxiliary fused pins or studs.

C. Cylinders and Keying:
   1. Acceptable manufacturers:
      a. Match existing keying system.
   2. Characteristics:
      a. Existing System: Grandmaster key the locks to the Owner's existing system, with a new master key for the Project.
      b. Review the keying system with the Owner and provide the type required (master, grandmaster or great-grandmaster), either new or integrated into Owner's existing system.
      c. Metals: Construct lock cylinder parts from brass or bronze, stainless steel, or nickel silver.
      d. Comply with Owner's instructions for master keying and, except as otherwise indicated, provide individual change key for each lock that is not designated to be keyed alike with a group of related locks.
      e. Permanently inscribe each key with number of lock that identifies cylinder manufacturer's key symbol, and notation, "DO NOT DUPLICATE".
      f. Key Material: Provide keys of nickel silver only.
      g. Furnish the following Key Quantities:
         1) Three (3) change keys for each lock.
         2) Five (5) master keys for each master system.
         3) Five (5) grandmaster keys for each grandmaster system.
         4) Ten (10) construction master keys.
         5) Two (2) construction Control Keys.
         6) One (1) extra blank for each lock.
      h. Furnish construction master keys to General Contractor.
         1) Deliver keys to Owner.

D. Mortise Locksets and Latchsets: as scheduled.
   1. Acceptable manufacturers:
      a. Schlage L9000 Series*
      b. Sargent 8200 Series
      c. Corbin Russwin ML2000 Series
   2. Required Features:
      a. Chassis: Cold-rolled steel, handing field-changeable without disassembly.
      b. Latchbolts: 3/4-inch throw stainless steel anti-friction type.
      c. Lever Trim: Through-bolted, accessible design, cast or solid rod lever as scheduled. Spindles: Independent break-away.
      d. Thumbturns: Accessible design not requiring pinching or twisting motions to operate.
      e. Deadbolts: Stainless steel 1-inch throw.
      f. Electric operation: Manufacturer-installed continuous duty solenoid.
      g. Strikes: 16 gage curved stainless steel, bronze or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.
      h. Scheduled Lock Series and Design: Schlage L Series 17A:
         1) Lever Design 17
         2) Rosette Design A.
      i. Certifications:
         1) ANSI A156.13, 1994, Grade 1 Operational, Grade 1 Security.
         2) ANSI/ASTM F476-84 Grade 30 UL Listed.

E. Exit Devices:
   1. Acceptable manufacturers:
      a. Von Duprin 98 Series*

b. Sargent 8000 Series
c. Precision Apex 2100

2. Characteristics:
   a. Exit devices to be UL Listed for life safety. Exit devices for fire rated openings to have "UL" labels for "Fire Exit Hardware."
   b. Exit devices mounted on labeled wood doors to be mounted on the door per the door manufacturer's requirements.
   c. All trim to be thru-bolted to the lock stile case.
   d. Lever trim to be solid case material with a break-away feature to limit damage to the unit from vandalism. Lever design to match locksets.
   e. All exit devices to be made of brass, bronze, stainless steel, or aluminum material, powder coated, anodized, or plated to the standard architectural finishes to match the balance of the door hardware.
   f. Provide glass bead conversion kits to shim exit devices on doors with raised glass beads.
   g. All exit devices to be one manufacturer. No deviation will be considered.
   h. All series exit devices to incorporate a fluid damper, which decelerates the touchpad on its return stroke and eliminates noise associated with exit device operation. All exit devices to be non-handed. Touchpad to extend a minimum of 1/2 of the door width and to extend to the height of the cross rail housing for a "no pinch" operation. Plastic touchpads are not acceptable. All latchbolts to be the deadlocking type. Latchbolts to have a self-lubricating coating to reduce wear. Plated or plastic coated latchbolts are not acceptable. Plastic linkage and "dogging" components are not acceptable.
   i. Surface vertical rod devices to be UL labeled for fire door applications without the use of bottom rod assemblies. Where bottom rods are required for security applications, the devices to be UL labeled for fire doors applications with rod and latch guards by the device manufacturer.
   j. Exit devices to include impact resistant, flush mounted end cap design to avoid damage due to carts and other heavy objects passing through an opening. End cap to be of heavy-duty metal alloy construction and provide horizontal adjustment to provide alignment with device cover plate. When exit device end cap is installed, no raised edges will protrude.

F. Closers and Door Control Devices:
1. Acceptable manufacturers:
   a. LCN Closers 4010/4110/4020 Series*
   b. Norton 9500 Series
   c. Corbin Russwin DC8000
2. Characteristics:
   a. Door closers to have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder.
   b. All closers to utilize a stable fluid withstanding temperature range of 120°F to -30°F without seasonal adjustment of closer speed to properly close the door. Closers for fire-rated doors to be provided with temperature stabilizing fluid that complies with standards UBC 7-2 (1997) and UL 10C.
   c. Spring power to be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Spring power adjustment (LCN Fast ™ Power Adjust) allows for quick and accurate power adjustment and visually shows closer power size settings by way of dial adjustment gauge located on closer spring tube. Hydraulic regulation to be by tamper-proof, non-critical valves. Closers to have separate adjustment for latch speed,

general speed and back check.

d. All closers to have solid forged steel main arms (and forearms for parallel arm closers) and where specified to have a cast-in solid stop on the closer shoe ("CUSH"). All parallel arm mounted closers to have "EDA" type arms or, where door travel on out-swing doors must be limited, use "CUSH" or "SCUSH" type closers. Auxiliary stops are not required when "CUSH" type closers are used. Provide drop plates where top rail of door is not sufficient for closer mounting. Provide "cush shoe supports" and "blade stop spacers" where dictated by frame details.

e. Overhead concealed closers to have spring power adjustable for 50% increase in closing power and fully mortised door tracks.

f. All surface closers to be certified to exceed ten million (10,000,000) full load cycles by a recognized independent testing laboratory. All closers (overhead, surface and concealed) to be of one manufacturer and carry manufacturer's ten year warranty (electric closers to have two year warranty).

g. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped provide adjustable units complying with ADA and ANSI A-117.1 provisions for door opening force.

h. Closers to be installed to allow door swing as shown on plans. Doors swinging into exit corridors to provide for corridor clear width as required by code. Where possible, mount closers inside rooms.

i. Powder coating finish to be certified to exceed 100 hours salt spray testing by ETL, an independent testing laboratory used by BHMA for ANSI certification.

G. Power Operators:

1. Acceptable manufacturers:
   a. LCN Senior Swing Series *
   b. Stanley Access Technologies
   c. Horton 4000LE series Series
2. Characteristics:
   a. Provide low energy automatic operator units that are electro-mechanical design complying with ANSI A156.19 where automatic operators are specified.
   b. Operator shall be powered with a DC motor working through reduction gears. Closing shall be spring force. No manual, hydraulic, or chain drive closer will be acceptable. The motor is to be off when the door is in closing mode. The door can be manually operated with the power on or off without damage to the operator. The operator shall include variable adjustments, including opening and closing speed adjustment. Operator shall be mounted in an aluminum cover.
   c. Provide units with manual off/auto/hold-open switch, push and go function to activate power operator, vestibule interface delay, electric lock delay, hold-open delay adjustable from 2 to 30 seconds, and logic terminal to interface with accessories, mats, and sensors.
   d. Provide drop plates, brackets, or adapters for arms as required to suit details.
   e. Provide hard-wired motion sensors and/or actuator switches for operation as specified. Actuators shall be weather-resistant type at exterior applications.
   f. Provide key switches, with LED's, recommended and approved by the manufacturer of the automatic operator as required for the function as described in the operation description of the hardware sets. Cylinders: Refer to "KEYING" article, herein.

g. Where automatic operators are scheduled, provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by the manufacturer of the automatic operator for each individual leaf. Actuators shall control both doors simultaneously at pairs. Exterior and vestibule doors with automatic operators shall be sequenced to allow ingress or egress through both sets of openings as directed by the Architect. Locate the actuators, key switches, and other controls as directed by the Architect.

h. Provide units with inputs for smoke evacuation doors, where specified, which allow doors to power open upon fire alarm activation and hold open indefinitely or until fire alarm is reset, a presence detector input, which prevents a closed door from opening or a door that is fully opened from closing, a hold open toggle input, which allows remote activation for indefinite hold open and close the second time the input is activated, vestibule inputs, which allow sequencing operation of two units, and a SPDT relay for interfacing with latching or locking devices.

H. Overhead Door Holders:
1. Acceptable manufacturers:
   a. Glynn Johnson*
   b. Rixson Firemark
2. Characteristics:
   a. Provide heavy duty concealed door holders of stainless steel.
   b. Provide heavy duty surface mounted door holders of stainless steel.
   c. Concealed holders to be installed with the jamb bracket mortised flush with the bottom of the jamb. The arm and channel to be mortised into the door.
   d. Surface holders to be installed with the jamb bracket mounted on the stop.

I. Floor Stops and Wall Bumpers:
1. Acceptable manufacturers:
   a. Ives*
   b. Trimco
   c. Rockwood Manufacturing
2. Characteristics: Refer to Hardware Headings.

J. Door Bolts/Coordinators:
1. Acceptable manufacturers:
   a. Ives*
   b. Trimco
   c. Rockwood Manufacturing
2. Characteristics:
   a. Flush bolts to be forged brass 6-3/4" x 1", with 1/2" diameter bolts. Plunger to be supplied with milled surface one side that fits into a matching guide.
   b. Self-latching flush bolts to be UL listed as top and bottom bolts on a pair of classified fire doors. Bolt construction to be of rugged steel and brass components.
   c. Automatic flush bolts and self-latching flush bolts to be UL listed for fire door application without bottom bolts (LBB).
   d. Furnish dust proof bottom strikes.
   e. Coordinator to be soffit mounted non-handed fully automatic UL listed coordinating device for sequential closing of paired doors with or without astragals.
   f. Provide filler piece to close the header. Provide brackets as required for

mounting of soffit applied hardware.

K. Push Plates:
1. Acceptable manufacturers:
   a. Ives*
   b. Trimco
   c. Rockwood Manufacturing
2. Characteristics:
   a. Exposed Fasteners: Provide manufacturers standard exposed fasteners.
   b. Material to be forged stainless steel, per the Hardware Headings.
   c. Provide plates sized as shown in Hardware Headings.

L. Door Pulls & Pull Plates:
1. Acceptable manufacturers:
   a. Ives*
   b. Trimco
   c. Rockwood Manufacturing
2. Characteristics:
   a. Provide concealed thru-bolted trim on back to back mounted pulls, but not for single units.
   b. Material to be forged stainless steel.
   c. Provide units sized as shown in Hardware Headings.

M. Push Pull Sets:
1. Acceptable manufacturers:
   a. Ives*
   b. Trimco
   c. Rockwood Manufacturing
2. Characteristics:
   a. Provide mounting systems as shown in hardware sets.
   b. Material to be tubular stainless steel.
   c. Provide Push/Pull sets sized as shown in Hardware Headings.

N. Protective Plates:
1. Acceptable manufacturers:
   a. Ives*
   b. Trimco
   c. Rockwood Manufacturing
2. Characteristics:
   a. Provide manufacturers standard exposed fasteners for door trim units consisting of either machine screws or self-tapping screws.
   b. Materials:
   c. Metal Plates: Stainless Steel, .050 inch (U.S. 18 gage).
   d. Fabricate protection plates not more than 2 inches less than door width on push side and not more than 1 inch less than door width on pull side.
   e. Sizes:
      1) Refer to hardware headings for specific sizes.
      2) Kick plates to be 10 inches in height.
      3) Mop plates to be 6 inches in height.
      4) Kick plates and Mop plates to be 1" less that bottom rail height where applicable.
      5) Armor plates to be 34 inches in height. Armor plates on fire doors to comply with NFPA 80.

O. Thresholds:

1. Acceptable manufacturers:
   a. Zero Weatherstripping Co., Inc.*
   b. Pemko
   c. Reese Industries
2. Types: Indicated in Hardware Headings.

P. Door Seals/Gasketing:
1. Acceptable manufacturers:
   a. Zero Weatherstripping Co., Inc.*
   b. Pemko
   c. Reese Industries
2. Types: Indicated in Hardware Headings.

Q. Silencers:
1. Acceptable manufacturers:
   a. Ives*
   b. Hager
   c. Rockwood Manufacturing
2. Provide three for each single door; two for each pair of doors.

R. Knox Box: (AS REQUIRED)
1. Acceptable manufacturers:
   a. Knox Box 3200 Series.
2. Provide one surface mount Knox Box 3200 Series.
3. Provide unit compatible with the local Fire Department Knox key system.
4. General contractor shall install in location provided by architect.

2.2 Materials and Fabrication

A. Manufacturer's Name Plate: Do not use manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise acceptable to Architect.
1. Manufacturer's identification will be permitted on rim of lock cylinders only.

B. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.

C. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
1. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
2. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. 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 as closely as possible including "prepared for paint" surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners.
4. Do not use thru-bolts or sex bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of adequately fastening the hardware, or otherwise found in Headings. Coordinate

with wood doors and metal doors and frames. Where thru-bolts are used, provide sleeves for each thru-bolt as a means of reinforcing the work, or use sex screw fasteners.

2.3 Hardware Finishes

A. Match items to the manufacturer's standard color and texture finish for the latch and lock sets (or push-pull units if no latch or lock sets).

B. Provide finishes that match those established by ANSI or, if none established, match the Architect's sample.

C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.

D. Provide protective lacquer coating on all exposed hardware finishes of brass, bronze, and aluminum, except as otherwise indicated. The suffix "-NL" is used with standard finish designations to indicate "no lacquer."

E. The designations used to indicate hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes," including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.

F. All hardware to be 626 (US26D), 652 (US26D) Satin Chrome Finish, with the following exceptions:
   1. Continuous Hinges: 628 (US28) Clear Anodized Aluminum
   2. Door Closers: 689 Powder Coat Aluminum
   3. Push Plates: 630 (US32D) Satin Stainless Steel
   4. Pull Plates: 630 (US32D) Satin Stainless Steel
   5. Protective Plates: 630 (US32D) Satin Stainless Steel
   6. Overhead Holders: 630 Satin Stainless Steel

3.0 - EXECUTION

3.1 Installation:

A. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect.
   1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
   2. "Recommended Locations for Builders Hardware for Custom Steel Doors and Frames" by the Door and Hardware Institute.
   3. NWWDA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors."

B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.

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

D. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

E. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 Section "Joint Sealers".

F. Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

3.2 Adjusting, Cleaning, and Demonstrating

A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.

1. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to function properly with final operation of heating and ventilating equipment.

B. Clean adjacent surfaces soiled by hardware installation.

C. Door Hardware Supplier's Field Service:

1. Inspect door hardware items for correct installation and adjustment after complete installation of door hardware.
2. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.
3. File written report of this inspection to Architect.

3.3 Hardware Schedule

HARDWARE SET: A
EACH TO HAVE:

1	CONT. HINGE	112XY EPT	IVE
1	POWER TRANSFER	EPT10	VON
1	ELEC PANIC HARDWARE	QEL-98-NL 24 VDC	VON
1	MORTISE CYLINDER	AS REQUIRED	
1	RIM CYLINDER	AS REQUIRED	
2	CORE	AS REQUIRED	
1	AUTO OPERATOR	9540 SERIES	LCN
1	MOUNTING PLATE	9540-18 (AS REQ'D)	LCN
1	JAMB MOUNT ACTUATOR	8310-818T	LCN
1	WALL MOUNT ACTUATOR	8310-853T	LCN
1	THRESHOLD	65A	ZER
1	KEY SWITCH	653-04 NS	SCE
1	DOOR CONTACT	679-05HM	SCE
1	POWER SUPPLY	PS904 900-4RL 120/240 VAC	VON

COORDINATE HARDWARE WITH ALUMINUM DOOR/FRAME MANUFACTURER/SUPPLIER.
BALANCE OF HARDWARE BY ALUMINUM DOOR/FRAME MANUFACTURER/SUPPLIER.
COORDINATE AUTO OPERATOR WITH ALUMINUM DOOR/FRAME MANUFACTURER/SUPPLIER. PROVIDE MOUNTING AND HEADER COMPONENTS AS REQUIRED.

COORDINATE HARDWARE WITH ELECTRICAL, SECURITY AND ACCESS CONTROL SYSTEMS.
BALANCE OF EAC COMPONENTS BY ELECTRICAL, SECURITY AND ACCESS CONTROL SYSTEMS.
ROUGH IN DOOR FOR FUTURE ACCESS CONTROL ADDITION.

OPERATION: EXTERIOR ACTUATOR ENABLED/DISABLED VIA LOCAL JAMB MOUNT KEY SWITCH. INTERIOR ACTUATOR ALWAYS ENABLED. LATCHES HELD RETRACT VIA LOCAL JAMB MOUNT KEY SWITCH. DOOR CONTACT MONITORED REMOTELY VIA SECURITY AND ACCESS CONTROL SYSTEMS. FREE EGRESS AT ALL TIMES.

HARDWARE SET: B
EACH TO HAVE:

1	CONT. HINGE	112XY EPT	IVE
1	POWER TRANSFER	EPT10	VON
1	PANIC HARDWARE	CD-98-DT	VON
1	MORTISE CYLINDER	AS REQUIRED	
1	CORE	AS REQUIRED	
1	OH STOP	100S	GLY
1	SURFACE CLOSER	4021 MC TBWMS	LCN
1	MOUNTING PLATE	4020-18/18G SRT (AS REQ'D)	LCN
1	THRESHOLD	65A	ZER

COORDINATE HARDWARE WITH ALUMINUM DOOR/FRAME MANUFACTURER/SUPPLIER.
BALANCE OF HARDWARE BY ALUMINUM DOOR/FRAME MANUFACTURER/SUPPLIER.

ROUGH IN DOOR FOR FUTURE ACCESS CONTROL ADDITION.

HARDWARE SET: C
EACH TO HAVE:

6	HINGE	5BB1HW 4.5 X 4.5 NRP 630	IVE
1	REMOVABLE MULLION	KR4954 STAB	VON
1	PANIC HARDWARE	CD-98-DT	VON
1	PANIC HARDWARE	CD-98-NL	VON
3	MORTISE CYLINDER	AS REQUIRED	
1	RIM CYLINDER	AS REQUIRED	
4	CORE	AS REQUIRED	
2	SURFACE CLOSER	4111 SCUSH MC TBWMS	LCN
2	KICK PLATE	8400 8" X 2" LDW B-CS	IVE
1	MULLION SEAL	139N PSA	ZER
1	RAIN DRIP	142AA (AS REQ'D)	ZER
2	MEETING STILE	328AA-S (PAIR)	ZER
1	GASKETING	8144SBK PSA	ZER
2	DOOR SWEEP	8198AA	ZER
1	THRESHOLD	65A	ZER

HARDWARE SET: D
EACH TO HAVE:

6	HINGE	5BB1HW 4.5 X 4.5 NRP 630	IVE
1	CONST LATCHING BOLT	FB51P (HMD)	IVE
1	STOREROOM LOCK	L9080	SCH
1	MORTISE CYLINDER	AS REQUIRED	
1	CORE	AS REQUIRED	
2	OH STOP & HOLDER	100H	GLY
1	SURFACE CLOSER	4111 SHCUSH MC TBWMS	LCN
2	ARMOR PLATE	8400 32" X 2" LDW B-CS	IVE
1	RAIN DRIP	142AA (AS REQ'D)	ZER
1	GASKETING	8144SBK PSA	ZER
1	ASTRAGAL	43STST (ACTIVE LEAF)	ZER
2	DOOR SWEEP	8198AA	ZER
1	THRESHOLD	65A	ZER

HARDWARE SET: E
EACH TO HAVE:

3	HINGE	5BB1HW 4.5 X 4.5 NRP 630	IVE
1	STOREROOM LOCK	L9080	SCH
1	MORTISE CYLINDER	AS REQUIRED	
1	CORE	AS REQUIRED	
1	OH STOP	100S	GLY
1	RAIN DRIP	142AA (AS REQ'D)	ZER
1	GASKETING	8144SBK PSA	ZER
1	DOOR SWEEP	8198AA	ZER
1	THRESHOLD	65A	ZER

HARDWARE SET: F
EACH TO HAVE:

6	HINGE	5BB1HW 4.5 X 4.5 NRP 630	IVE
1	CONST LATCHING BOLT	FB51P (HMD)	IVE
1	STOREROOM LOCK	L9080	SCH
1	MORTISE CYLINDER	AS REQUIRED	
1	CORE	AS REQUIRED	
2	OH STOP & HOLDER	100H	GLY
1	SURFACE CLOSER	4111 SHCUSH MC TBWMS	LCN
1	RAIN DRIP	142AA (AS REQ'D)	ZER
1	GASKETING	8144SBK PSA	ZER
1	ASTRAGAL	43STST (ACTIVE LEAF)	ZER
2	DOOR SWEEP	8198AA	ZER
1	THRESHOLD	65A	ZER

HARDWARE SET: G
EACH TO HAVE:

6	HINGE	5BB1 4.5 X 4.5	IVE
1	REMOVABLE MULLION	4954	VON
1	HALF DUMMY TRIM	L0170	SCH
1	PANIC HARDWARE	22-EO	VON
1	PANIC HARDWARE	22-NL-OP-110MD	VON
1	RIM CYLINDER	AS REQUIRED	
1	CORE	AS REQUIRED	
2	SURFACE CLOSER	1461 CUSH STD	LCN
1	MULLION SEAL	139N PSA	ZER

HARDWARE SET: H
EACH TO HAVE:

6	HINGE	5BB1 4.5 X 4.5	IVE
1	CONST LATCHING BOLT	FB51P (HMD)	IVE
1	DUST PROOF STRIKE	DP1	IVE
1	CLASSROOM LOCK	L9070	SCH
1	MORTISE CYLINDER	AS REQUIRED	
1	CORE	AS REQUIRED	
2	KICK PLATE	8400 8" X 2" LDW B-CS	IVE
2	FLOOR STOP	FS441	IVE

HARDWARE SET: J
EACH TO HAVE:

6	HINGE	5BB1 4.5 X 4.5	IVE
1	CONST LATCHING BOLT	FB51P (HMD)	IVE
1	DUST PROOF STRIKE	DP1	IVE
1	STOREROOM LOCK	L9080	SCH
1	MORTISE CYLINDER	AS REQUIRED	
1	CORE	AS REQUIRED	
1	OH STOP	100S	GLY
1	SURFACE CLOSER	1461 CUSH STD	LCN

HARDWARE SET: K
EACH TO HAVE:

6	HINGE	5BB1 4.5 X 4.5	IVE
1	CONST LATCHING BOLT	FB51P (HMD)	IVE
1	DUST PROOF STRIKE	DP1	IVE
1	OFFICE/ENTRY LOCK	L9050 L583-363	SCH
1	MORTISE CYLINDER	AS REQUIRED	
1	CORE	AS REQUIRED	
2	OH STOP	100S	GLY
2	KICK PLATE	8400 8" X 2" LDW B-CS	IVE

HARDWARE SET: L
EACH TO HAVE:

6	HINGE	5BB1 4.5 X 4.5	IVE
1	CONST LATCHING BOLT	FB51P (HMD)	IVE
1	DUST PROOF STRIKE	DP1	IVE
1	CLASSROOM LOCK	L9070	SCH
1	MORTISE CYLINDER	AS REQUIRED	
1	CORE	AS REQUIRED	
2	KICK PLATE	8400 8" X 2" LDW B-CS	IVE
2	WALL STOP	WS401/402CVX	IVE

HARDWARE SET: M
EACH TO HAVE:

3	HINGE	5BB1HW 4.5 X 4.5	IVE
1	PUSH PLATE	8200 4" X 16"	IVE
1	PULL PLATE	8303 10" 4" X 16"	IVE
1	SURFACE CLOSER	4011 MC TBWMS	LCN
1	MOP PLATE	8400 6" X 1" LDW B-CS	IVE
1	KICK PLATE	8400 8" X 2" LDW B-CS	IVE
1	WALL STOP	WS401/402CVX	IVE

HARDWARE SET: N
EACH TO HAVE:

3	HINGE	5BB1 4.5 X 4.5	IVE
1	PRIVACY LOCK	L9440 L583-363 OS-OCC	SCH
1	SURFACE CLOSER	1461 CUSH STD	LCN
1	KICK PLATE	8400 8" X 2" LDW B-CS	IVE

HARDWARE SET: P
EACH TO HAVE:

1	HINGE	3CB1 4.5 X 4.5 NRP	IVE
2	SPRING HINGE	3SP1 4.5 X 4.5	IVE
1	PRIVACY LOCK	ND40S OS-OCC	SCH
1	WALL STOP	WS401/402CCV	IVE

ADJUST SPRING HINGES TO CLOSE STALL DOORS JUST SHORT OF LATCHING THE STALL DOOR. PROVIDE WALL STOP WHERE APPLICABLE.

HARDWARE SET: Q
EACH TO HAVE:

3	HINGE	5BB1 4.5 X 4.5	IVE
1	STOREROOM LOCK	L9080	SCH
1	MORTISE CYLINDER	AS REQUIRED	
1	CORE	AS REQUIRED	
1	OH STOP	100S	GLY
1	KICK PLATE	8400 8" X 2" LDW B-CS	IVE

HARDWARE SET: R
EACH TO HAVE:

3	HINGE	5BB1 4.5 X 4.5	IVE
1	OFFICE/ENTRY LOCK	L9050 L583-363	SCH
1	MORTISE CYLINDER	AS REQUIRED	
1	CORE	AS REQUIRED	
1	OH STOP	100S	GLY
1	KICK PLATE	8400 8" X 2" LDW B-CS	IVE

HARDWARE SET: S
EACH TO HAVE:

3	HINGE	5BB1 4.5 X 4.5	IVE
1	CLASSROOM LOCK	L9070	SCH
1	MORTISE CYLINDER	AS REQUIRED	
1	CORE	AS REQUIRED	
1	WALL STOP	WS401/402CVX	IVE

HARDWARE SET: T
EACH TO HAVE:

3	HINGE	5BB1 4.5 X 4.5	IVE
1	OFFICE/ENTRY LOCK	L9050 L583-363	SCH
1	MORTISE CYLINDER	AS REQUIRED	
1	CORE	AS REQUIRED	
1	OH STOP	100S	GLY

HARDWARE SET: U
ALL HARDWARE BY OVERHEAD/COILING DOOR SYSTEM MANUFACTURER/SUPPLIER.

END OF SECTION

1.0 - GENERAL

1.1 Scope

The work under this section consists of all glass and glazing.

1.2 Quality

A. Glazing shall be provided to comply with Table 5.3.1 Building Envelope Requirements - Climate Zone 1 of the Alabama Building Energy Conservation Code, and the 2021 International Building Code.

B. Glazing for Fire-Rated Door and Window Assemblies: Glazing tested per NFPA 252 and NFPA 257, as applicable, for assemblies complying with NFPA 80 and listed and labeled per requirements of authorities having jurisdiction.

C. Safety Glazing Products: Comply with size, glazing type, location, and testing requirements of 16 CFR 1201 for Category I and II glazing products, and requirements of authorities having jurisdiction.

D. Glazing Industry Publications: Comply with glass product manufacturers' recommendations and the following:
   1. GANA Publications: GANA Laminated Division's 'Laminated Glass Design Guide' and GANA's 'Glazing Manual.'
   2. IGMA Publication for Insulating Glass: IGMA TM-3000, 'Glazing Guidelines for Sealed Insulating Glass Units.'

E. Insulating-Glass Certification Program: Indicate compliance with requirements of Insulating Glass Certification Council on applicable glazing products.

1.3 Samples

Submit for approval samples of each kind of glass required. Each sample shall bear a label indicating the kind and quality of the glass and the manufacturer. **Only 1 sample each is required.**

1.4 Warranty

A. Warranty for Coated-Glass Products: Manufacturer's standard form, signed by coated-glass product primary manufacturer or manufacturer/fabricator, as applicable, agreeing to replace coated-glass units that display peeling, cracking, and other deterioration in metallic coating under normal use, within 10 years of date of Substantial Completion.

B. Warranty for Laminated Glass: Manufacturer's standard form, signed by laminated-glass product manufacturer/fabricator, agreeing to replace laminated-glass units that display edge separation, delamination, and blemishes exceeding those allowed by ASTM C 1172, within five years of date of Substantial Completion.

C. Warranty for Insulating Glass: Manufacturer's standard form, signed by insulating-glass product manufacturer/fabricator, agreeing to replace insulating-glass units that exhibit failure of hermetic seal under normal use evidenced by the obstruction of vision by dust, moisture, or film on interior surfaces of glass, within 10 years of date of Substantial Completion.

D. Installer's Warranty: Form acceptable to Owner, signed by glass product Installer, agreeing to replace glass products that deteriorate, or that exhibit damage or

deterioration of glass or glazing products due to faulty installation, within 2 years of date of Substantial Completion.

2.0 - PRODUCTS

2.1 Manufacturer

Glass products shall be as manufactured by Vitro Architectural Glass., Guardian Industries, Inc., or Pre-approved equal. Laminated pattern glass shall be as manufactured by North American Glass Fabrication. Fire-rated, safety-rated wired glass shall be manufactured by Technical Glass Products, Pilkington or SaftFirst.

2.2 Materials

Glass shall be as defined in, and in accordance with Code of Federal Regulations 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.

A. Compound for face glazing, or where shown or indicated as compound shall be an oleo-resinous knife grade elastic glazing compound such as Tremco's Trem-glaze, Pecora's M-242, or Dap-1012.

B. Sealant where shown or indicated shall be Tremco "Mono," Dow Corning 780, or GE's construction sealant.

C. Tape where shown or indicated shall be Tremco's 440 Tape, Curtis 606 Tape, or Warflex's "Sealing Tape."

D. Neoprene setting blocks as approved by glass manufacturer Shore "A" Hardness approximately 70 to 90.

E. Neoprene spacer shims as approved by glass manufacturer Shore "A" Hardness approximately 40 to 60.

F. Neoprene glazing beads as approved for aluminum store front and doors.

G. Color of compound, sealant, tape, etc. shall be as selected.

H. Glare reducing glass shall be 1/4" thick Solargray, Solargreen, or Solarbronze as selected.

I. Glare reducing Tempered Safety glass shall be 1/4" thick Solargray, Solargreen, or Solarbronze as selected. When multiple small glass panes are used in the same door or sidelight, provide one (1) only Decal and furnish certificate verifying the use of Safety Glass in other panels.

J. Interior Tempered Safety Glass shall meet 16CFR1201 Test Requirements, Cat. 1 and/or Cat. 2 as applicable. Etch label and furnish certificate verifying the use of Tempered Safety Glass.

K. Interior laminated pattern safety glass shall be two (2) layers 1/4" thick tempered safety glass with adhesive sheets and light frost decorative interlayer with pattern as indicated.

L. Fire safety glass shall be 5/16" thick clear laminated fire rated and impact safety rated glass. Approved equal to Pilkington Fire-Lite Plus or SaftiFirst SuperLite and shall meet impact safety rating 16CFR1201 (Cat.1) if less than 9 sq. ft. and (Cat. 2) if greater than 9 sq. ft. Provide with label at all rated doors and frames..

M. Polished plate glass mirrors shall be 1/4" copper back, moisture resistant with ground edges and beveled face grooving. Secure with adhesive and clips. Sizes and locations indicated.

N. 1" insulating Glass - Pre-assembly Low-E unit consisting of 1/4" float glass exterior lite, 1/2" dehydrated air space and clear 1/4" float glass with Low-E interior lite meeting performance requirement for Class A or Class B Accelerated Test as specified in ASTM E744 with no visible fog. Match color on metal spacer to glazing frame. As selected by Architect. Provide minimum SHGC of .25.

1. Solarban 70 Solar Gray + Clear
2. Solarban 60 Solar Gray + Clear
3. Solarban 70 Solar Bronze + Clear

(See corresponding SHGC and U-Value below when used with metal frame)

O. Spandrel Glass - 1/4" thick, float glass with the opacifying coating on the number 2 (inboard) face. Temper or heat strengthen in accordance with the current Glass Tempering Association, Engineered Standard Manual. Opacifying coating shall be Opaci-Coat-300 Coating shall be Silicone water based glastomer with a min/max wet thickness of 8 mils. (0.008") and a protective coating of silicone rubber a minimum wet thickness of 13 mils (0.0013"). Color as selected by Architect. Provide minimum SHGC of .25.

1.	Solarban 70 Solar Gray + Clear	3-1870 "Solar Moon"
2.	Solarban 60 Solar Gray + Clear	3-1371 "West Lake"
3.	Solarban 70 Solar Bronze + Clear	4-2100 "Beach Bronze"

(See corresponding SHGC and U-Value below when used with metal frame)

"CENTER OF GLASS"

	SHGC	U-VALUE
1.	0.20	0.28
2.	0.25	0.29
3.	0.21	0.28

3.0 - EXECUTION

3.1 Preparation

A. Immediately prior to glazing, all surfaces shall be wiped clean and free of protective coatings, moisture, and dust. All glazing shall be done when the temperature is 35° F or above.

B. All sash shall be checked prior to glazing to make certain that the opening is square, plumb, and secured in order that uniform face and edge clearances are maintained. Inspect all butt and miter joints. If these joints are open, they shall be sealed with sealant prior to glazing. All ventilators shall be properly adjusted. Maintain 1/8" minimum bed clearance between glass and sash on both sides.

C. All glass indicated in non-rated doors shall be tempered with etched label.

D. All glass indicated in rated doors shall be fire safety glass with etched label.

3.2 Setting

A. Glazing preparation and procedures shall be as outlined in the Glazing Manual of the Flat Glass Jobbers Association.

B. Glass shall be set without springing, and with an equal bearing the entire width and length of each piece.

C. The actual sizes required shall be determined by measuring the frames to receive the glass. All glass shall be factory labeled.

D. Glass shall be properly cut and set in accordance with the best practice of the trade.

E. Center glass in glazing rabbet to maintain recommended clearances at perimeter for expansion and contraction, each face of glass.

3.3 Protection

Immediately after installation, a marker letter shall be placed upon each pane of glass for protection against careless breakage. All broken, cracked, scratched, or otherwise damaged glass shall be replaced.

3.4 Cleaning

A. Upon completion of the project, all glass shall have paint, dirt, and other stains removed; glass shall then be washed clean and polished.

B. Labels on glass shall not be removed until final approval is obtained, and glass is ready for cleaning.

END OF SECTION

1.0 - GENERAL

1.1 Related Documents

Drawings and general conditions of Contract, including General and Supplementary Conditions and Division-1 Specification sections apply to work of this section.

1.2 Summary

A. Section Includes:

1. Acoustical ceiling panels.
2. Exposed grid suspension system.
3. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings.

B. Related Sections:

1. Section 09260 - Gypsum Board
2. Section 09910 - Painting
3. Division 15 Sections - Mechanical Work
4. Division 16 Sections - Electrical Work

C. Substitutions:

1. Prior Approval: Unless otherwise provided for in the Contract documents, proposed product substitutions may be submitted no later than TEN (10) working days prior to the date established for receipt of bids. Acceptability of a proposed substitution is contingent upon the Architect's review of the proposal for acceptability and approved products will be set forth by the Addenda. If included in a Bid are substitute products which have not been approved by Addenda, the specified products shall be provided without additional compensation.

2. Submittals which do not provide adequate data for the product evaluation will not be considered. The proposed substitution must meet all requirements of this section, including but not necessarily limited to, the following: Single source materials suppliers (if specified in Section 1.5); Underwriters' Laboratories Classified Acoustical performance; Panel design, size, composition, color, and finish; Suspension system component profiles and sizes; Compliance with the referenced standards.
See Section 01360 – Product Substitution for submittal process information and Product Substitution Form.

1.3 References

A. American Society for Testing and Materials (ASTM):

1. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
2. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
3. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
4. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
5. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.

6. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
7. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
8. ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum.
9. ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems.
10. ASTM E 1264 Classification for Acoustical Ceiling Products.
11. ASTM E 1477 Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
12. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
13. ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Material.

B. ASHRAE Standard 62.1-2004, "Ventilation for Acceptable Indoor Air Quality"

1.4 Submittals

A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.

B. Samples: Minimum 6 inch x 6 inch samples of specified acoustical panel; 8 inch long samples of exposed wall molding and suspension system, including main runner and 4 foot cross tees.

C. Shop Drawings: Layout and details of acoustical ceilings. Show locations of items which are to be coordinated with, or supported by the ceilings.

D. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.

E. If the material supplied by the acoustical subcontractor does not have an Underwriter's Laboratory classification of acoustical performance on every carton, subcontractor shall be required to send material from every production run appearing on the job to an independent or NVLAP approved laboratory for testing, at the architect's or owner's discretion. All products not conforming to manufacturer's current published values must be removed, disposed of and replaced with complying product at the expense of the Contractor performing the work.

1.5 Quality Assurance

A. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

B. Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.

1. Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 for Class A products.
   a. Flame Spread: 25 or less
   b. Smoke Developed: 50 or less

2. Fire Resistance Ratings: As indicated by reference to design designations in UL Fire Resistance Directory, for types of assemblies in which acoustical ceilings function as a fire protective membrane and tested per ASTM E 119.
   a. Protect lighting fixtures and air ducts to comply with requirements indicated for rated assembly.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.6 Delivery, Storage, and Handling

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.7 Project Conditions

A. Space Enclosure:

All ceiling products and suspension systems must be installed and maintained in accordance with Armstrong written installation instructions for that product in effect at the time of installation and best industry practice. Prior to and after installation, the ceiling product must be kept clean and dry, in an environment that is between 32°F (0°C) and 120°F (49°C) and not subject to Abnormal Conditions within the space or with interfacing construction such as walls or soffits. Abnormal conditions include exposure to chemical fumes, vibrations, moisture, excessive humidity, or excessive dirt or dust buildup.

HumiGuard Plus Ceilings: Installation of the products shall be carried out where the temperature is between 32°F (0° C) and 120°F (49° C). It is not necessary for the area to be enclosed or for HVAC systems to be functioning. All wet work (plastering, concrete, etc) must be complete and dry. The ceilings must be maintained to avoid excessive dirt or dust buildup that would provide a medium for microbial growth on ceiling panels. Microbial protection does not extend beyond the treated surface as received from the factory, and does not protect other materials that contact the treated surface such as supported insulation materials.

1.8 Warranty

A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace acoustical panels that fail within the warranty period. Failures include, but are not limited to:

1. Acoustical Panels: Sagging and warping as a result of defects in materials or factory workmanship.
2. Grid System: Rusting and manufacturer's defects
3. Acoustical Panels with BioBlock Plus or designated as inherently resistive to the growth of micro-organisms installed with Armstrong suspension systems: Visible sag and will resist the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria.

B. Warranty Period Humiguard:

1. Acoustical panels and grid systems with HumiGuard Plus or HumiGuard Max performance supplied by one source manufacturer is thirty (30) years from date of substantial completion.

C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.9 Maintenance

A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.

1. Acoustical Ceiling Units: Furnish quality of full-size units equal to 5.0 percent of amount installed.
2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

2.0 - PRODUCTS

2.1 Manufacturers

A. Ceiling Panels:
Armstrong World Industries, Inc. USG or pre-approved equal.

2.2 Acoustical Ceiling Units

A. Acoustical Panels Type L1 (without fire guard): Product:
Fine Fissured, 1728
1. Surface Texture: Medium
2. Composition: Mineral Fiber
3. Color: White
4. Size: 24in X 24in X 5/8in
5. Edge Profile: Square Lay-In for interface with Prelude XL 15/16" Exposed Tee.
6. Noise Reduction Coefficient (NRC): ASTM C 423; Classified with UL label on product carton, 0.55.
7. Ceiling Attenuation Class (CAC): ASTM C 1414; Classified with UL label on product carton, 35
8. Emissions Testing: < 13.5 ppb of formaldehyde when used under typical conditions required by ASHRAE Standard 62.1- 2007, "Ventilation for Acceptable Indoor Air Quality"
9. Flame Spread: ASTM E 1264;
10. Light Reflectance (LR): ASTM E 1477; White Panel: Light Reflectance: 0.85.
11. Dimensional Stability: HumiGuard Plus - Temperature is between 32°F (0° C) and 120°F (49° C). It is not necessary for the area to be enclosed or for HVAC systems to be functioning. All wet work (plastering, concrete, etc) must be complete and dry.
12. Antimicrobial Protection: BioBlock Plus - Resistance against the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria.

B. Acoustical Panels Type ML: Product: Clean Room VL, 868

1. Surface Texture: Smooth
2. Composition: Mineral Fiber
3. Color: White
4. Size: 24in X 24in X 5/8in
5. Edge Profile: Square Lay-In for interface with Prelude Plus XL Fire Guard 15/16" Exposed Tee.
6. Noise Reduction Coefficient (NRC): ASTM C 423; Classified with UL label on product carton, N/A.
7. Ceiling Attenuation Class (CAC): ASTM C 1414; Classified with UL label on product carton, 40
8. Emissions Testing: < 13.5 ppb of formaldehyde when used under typical conditions required by ASHRAE Standard 62.1- 2007, "Ventilation for Acceptable Indoor Air Quality"
9. Flame Spread: ASTM E 1264; Fire Resistive
10. Light Reflectance (LR): ASTM E 1477; White Panel: Light Reflectance: 0.80.
11. Dimensional Stability: HumiGuard Plus - Temperature is between 32°F (0° C) and 120°F (49° C). It is not necessary for the area to be enclosed or for HVAC systems to be functioning. All wet work (plastering, concrete, etc) must be complete and dry.
12. Antimicrobial Protection: BioBlock Plus - Resistance against the growth of mold/mildew and gram positive and gram negative odor and stain causing bacteria.

2.3 Suspension Systems **(WITHOUT FIRE GUARD CEILING TILES)**

A. Components: All main beams and cross tees shall be commercial quality hot-dipped galvanized aluminum as per ASTM A 653. Main beams and cross tees are double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping pre-finished galvanized aluminum in baked polyester paint. Main beams and cross tees shall have rotary stitching (exception: extruded aluminum or stainless steel).

1. Structural Classification: ASTM C 635 HD.
2. Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.
3. Acceptable Product: Prelude XL 15/16" Exposed Tee as manufactured by Armstrong World Industries, Inc.

B. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

C. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper, pre-stretched, with a yield stress load of at least time three design load, but not less than 12 gauge.

D. Edge Moldings and Trim: Metal or extruded aluminum of types and profiles indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations, including light fixtures, that fit type of edge detail and suspension system indicated. Provide moldings with exposed flange of the same width as exposed runner.

2.4 Suspension System for Use with Clean Room VL, 868

A. Components: All main beams and cross tees shall be commercial quality hot-dipped galvanized aluminum as per ASTM A 653. Main beams and cross tees are double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping pre-finished galvanized aluminum in baked polyester paint. Main beams and cross tees shall have rotary stitching (exception: extruded aluminum or stainless steel).

1. Structural Classification: ASTM C 635 HD.
2. Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.
3. Acceptable Product: Prelude Plus XL Fire Guard 15/16" Exposed Tee as manufactured by Armstrong World Industries, Inc.

B. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

C. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper, pre-stretched, with a yield stress load of at least time three design load, but not less than 12 gauge.

D. Edge Moldings and Trim: Metal or extruded aluminum of types and profiles indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations, including light fixtures, that fit type of edge detail and suspension system indicated. Provide moldings with exposed flange of the same width as exposed runner.

3.0 - EXECUTION

3.1 Examination of Adjoining Work

Do not proceed with installation until all wet work or work that has become wet such as concrete, CMU, terrazzo, plastering and painting has been completed and thoroughly dried out.

3.2 Preparation

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

B. Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.

1. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.3 Installation

A. Install suspension system and panels in accordance with the manufacturer's instructions, and in compliance with ASTM C 636 and with the authorities having jurisdiction.

B. Suspend main beam from overhead construction with hanger wires spaced 4-0 on center along the length of the main runner. Install hanger wires plumb and straight. Main beams are to be supported with hanger wires within 8" of vertical surface terminations.

C. Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.

D. Vertical Wall or soffit surfaces intended to be paint finished shall receive the first coat of primer or block fill prior to installation of wall moulding.

E. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.

F. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

3.4 Adjusting and Cleaning

A. Replace damaged and broken panels.

B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage.

C. Ceiling Touch-Up Paint, (Item #5760, 8oz. bottles) (Item #5761, quart size cans), "global white" latex paint should be used to hide minor scratches and nicks in the surface and to cover field tegularized edges that are exposed to view.

D. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

1.0 - GENERAL

1.1 Summary

Section includes: Special wall surfaces, including fiberglass reinforced plastic panels at Kitchen 129.

1.2 Related Sections:

Sections related to this section include: 09260 Gypsum Drywall and Light Gauge Metal Stud Systems.

1.3 References

A. ASTM International:

1. ASTM D2583 Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.

2. ASTM D5420 Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact).

3. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.

1.4 System Description

B. Performance Requirements: Provide fiberglass reinforced plastic (FRP) panels which have been manufactured and installed to maintain performance criteria stated by manufacturer without defects, damage or failure.

C. Product Data: Submit product data, including manufacturer's product sheet, for specified products.

D. Shop Drawings: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories, finish colors, patterns and textures. Indicate location and dimension of joints and fastener attachment.

E. Samples: Submit selection and verification samples for finishes, colors and textures.

F. Quality Assurance Submittals: Submit the following:

1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

2. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics, criteria and physical requirements.

3. Manufacturer's Instructions: Manufacturer's installation instructions.

G. Closeout Submittals: Submit the following:

1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.
2. Warranty: Warranty documents specified herein.

1.5 Quality Assurance

Installer Qualifications: Installer should be experienced in performing work of this section and should be specialized in installation of work similar to that required for this project.

1.6 Delivery, Storage and Handling

A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Package sheets on skids or pallets for shipment to project site.

B. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer. Store panels indoors in a dry place at the project site.

1.7 Project Conditions

A. Environmental Requirements:

1. Installation shall not begin until building is enclosed, permanent heating and cooling equipment is in operation, and residual moisture from plaster, concrete or terrazzo work has dissipated.

2. During installation, and for not less than 48 hours before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer.

3. Provide ventilation to disperse fumes during application of adhesive as recommended by adhesive manufacturer.

B. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1.8 Warranty

A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.

B. 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: One Year commencing on Date of Substantial Completion.

1.9 Maintenance

A. Extra Materials: Deliver 2% of installed product to Owner from same production run as products installed. Package products with protective covering and identify with descriptive labels.

2.0 - PRODUCTS

2.1 Fiberglass Reinforced Plastic (FRP) Panels

A. Manufacturer: Kemlite Company, Inc. or approved equal.

B. Glassbord Panels: Fire-X

1. Color: White.

1. Size: 4' x 9'.

3. Mouldings: PVC. Color: White.

4. Rating: UL Class 1(A) Interior Finish Material.

5. Finish: Embossed

2.2 Installation

A. Fiberglass Reinforced Panel (FRP) Installation:

1. Cut and drill panels with carbide tipped saw blades or drill bits, or cut with snips.

2. Install panels with manufacturer's recommended gap for panel field and corner joints.

3. Pre-drill fastener holes in panels with 1/8 inch (3.2 mm) oversize.

4. For trowel type and application of adhesive, follow adhesive manufacturer's recommendations.

5. Use products acceptable to panel manufacturer and install FRP system in accordance with panel manufacturer's printed instructions.

2.3 Cleaning

A. Remove temporary coverings and protection of adjacent work areas. Repair or replace products that have been installed and are damaged. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project site and legally dispose of debris.

B. Remove any adhesive or excessive sealant from panel face using solvent or cleaner recommended by panel manufacturer.

END OF SECTION

1.0 – GENERAL

1.1 Description

A. Scope
   1. The complete installation of modular sports surfacing system including the interlocking suspended high-impact polypropylene copolymer tile of proprietary formulation, supportive acoustical underlayment and striping.

B. Related work specified under other sections.
   1. Concrete Subfloors - Section 03300
      a. The general contractor shall furnish and install the concrete subfloors.
      b. The slab shall be steel troweled to a medium-dense finish to a tolerance of ±1/8" (3.2mm) in any 10' (3m) radius. Floor Flatness and Floor Levelness (FF and FL) numbers are not recognized. High spots shall be ground level and low spots filled with approved leveling compound.
   2. Game Standard Inserts - Section 11480

1.2 References

A. ASTM (American Society for Testing & Materials)
   1. ASTM D 648
   2. ASTM G 21

B. NFPA (National Fire Protection)
   1. NFPA 253

1.3 Submittals

A. Sport Court Response TM HGHR-FR Specifications.

B. One sample of specified system.

C. Sport Court Modular Sports Flooring Installation Guide.

D. Sport Court Modular Sports Flooring Care and Maintenance Guide.

E. Sport Court Response HGHR - FR Warranty.

1.4 Quality Assurance

A. Material Supplier:
   1. Shall be Sport Court International, Inc. or pre-approved equal.
   2. Manufacturer must be ISO 9001:2008 and ISO 14001:2004 Certified to assure proper quality and environmental control.
   3. Manufacturer shall be a Zero Waste company.
   4. Manufacturer shall have produces sports surfaces for a longer time period than their stated warranty.
   5. Surfaces must be certified for competition by the international federations for basketball (FIBA), volleyball (FIVB), handball (IHF) and badminton (BWF).
   6. Product must have factory applied urethane coating.

B. Installer:
   1. The complete installation of the flooring system, as described in these specifications, shall be carried out by an experienced installer (Flooring

Contractor), and the work shall be performed in accordance with current installation instructions of Sport Court, International.

2. Installer (Flooring Contractor) shall be liable for all matters related to installation for a period of one year after the floor has been substantially installed and completed.
3. Successful bidder must submit a minimum of five (5) completed modular projects of similar magnitude and complexity within the last two (2) years.
4. Bidder must provide all sample tile, accessory products, and documentation.

1.5 Delivery, Storage And Handling

A. Materials must be delivered in manufacturer's original, unopened and undamaged packaging with identification labels intact.

B. Store material on a clean, dry, and flat surface, protected from exposure to harmful weather conditions or possible damage.

C. Storage conditions shall be 55°F to 80°F (13°C to 27°C).

1.6 Site Conditions

A. In order to prevent damage and not void the warranty, installation of modular materials shall not commence until all other finishes and overhead mechanical trades have completed their work in the modular floor areas.

B. Permanent heat, light and ventilation shall be installed and operating during and after installation.

C. Subfloors shall be clean, dry and free from dirt, dust, oil, grease, paint, old adhesive residue, or other foreign materials.

D. Flooring installation shall not begin until the levelness requirements of concrete subfloors have been met.

E. The installation area shall be closed to all traffic and activity for a period to be set by the flooring contractor.

F. Product shall be conditioned at temperatures between 55°F to 80°F (13°C to 27°C) and shall be maintained for 72 hours prior to, during, and 72 hours after installation.

G. Environmental Limitations
1. Comply with the Sport Court requirements.
2. Adhere to all MSDS requirements for materials employed in the work.
3. Protect all persons from exposure to hazardous materials at all times.

H. After modular floors are installed and the game lines painted, the area is to be closed to allow curing time for the system, typically 3-5 days. No other trades or personnel are allowed on the floor until it has been accepted by the owner.

1.7 Warranty

A. Sport Court provides a limited warranty of fifteen (15) years on the materials it has supplied. (A copy of the full warranty, with its Terms and Exclusions, is available from the authorized Sport Court Dealer.) This 15-Year Limited Warranty is subject to the Response HG Flooring Warranty and all of their provisions. This warranty is expressly limited to the flooring materials (goods) supplied by Sport Court. During the period covered under this Response HG Flooring Warranty, Sport Court shall repair/replace any tile(s) with a defective Response HG Flooring with the same or substantially similar product according to the schedule in the Response HG Flooring Warranty. This warranty does not cover floor damage caused (wholly or in part) by fire, winds, floods, moisture, other unfavorable atmospheric conditions or chemical action, nor does it apply to damage caused by ordinary wear, misuse, abuse, negligent or intentional

misconduct, aging, faulty building construction, concrete slab separation, faulty or unsuitable subsurface or site preparation, settlement of the building walls or faulty or unprofessional installation of Sport Court flooring systems.

B. Sport Court shall not be liable for incidental or consequential losses, damages or expenses directly or indirectly arising from the sale, handling or use of the materials (goods) or from any other cause relating thereto, and their liability hereunder in any case is expressly limited to the replacement of materials (goods) not complying with this agreement or, at their election, to the repayment of, or crediting buyer with, an amount equal to the purchase price of such materials (goods), whether such claims are for breach of warranty or negligence. Any claim shall be deemed waived by buyer unless submitted to Sport Court in writing within 30 days from the date buyer discovered, or should have discovered, any claimed breach.

2.0 - PRODUCTS

2.1 Materials

A. Sport Court Response HGHR-FR™ Patented Suspended Flooring shall be:
1. Solid-top design.
2. Metric-sized: 25cm x 25cm x 12.7mm (9.842" x 9.842" x ½").
3. High-impact polypropylene copolymer suspended modules.
4. 281 individual hexagonal cell support structure.
5. Proprietary Maple or solid color in-mold foil transfer, with a four layer factory applied, wear resistant polyurethane clear coat.
6. The tile shall have a patented positive locking system.

B. Standard Colors: Maple Select, Dark Maple Select, Pearl Gold, Pearl Burgundy, Pearl Royal Blue, Silver, Ultra Red, Black, Pearl Graphite, Pearl Beige, Pearl Evergreen, Pearl Navy Blue, Pearl Orange, Pearl Shamrock Green, Pearl Purple, Ice Blue, Pearl Silver Blue, Yellow

C. Color Consistency: E CMC < 1.0

D. Weight: 0.62 lbs. (280 grams)

E. Packaging: Product is shipped in pre-assembled sheets (2x4 modules per sheet, 6 sheets per box).

F. Product Test Results:
1. Force Reduction (DIN 18032-2): 0.12" (3mm) - 20% - 25%
   0.20" (5mm) - 25% - 30%
   0.35" (7mm) - 30% - 35%
2. Ball Rebound (DIN 18032-2): 0.12" (3mm)- >95%
   0.20" (5mm) - 95%
   0.35" (7mm) - >95%
3. Critical Radiant Flux: (ASTM E648 / NFPA 253) 0.52 Watts/cm ^{2} Class
4. Flatness: 0.0" +0.029" /-0.0" (0.0mm +0.74mm /-0.0mm)
5. Lateral Forgiveness™: +0.045" / -0.0" (+1.14mm / -0.0mm)

G. L oad Bearing Capacity: 220 psi

H. Dynamic Load
1. All systems must be able to show verification of passing a minimum 1,000,000 cycles in dynamic load testing with minimum 200 lbs. (91 kg) loading without deviation from flatness specification.

I. Underlayment
1. Multi-purpose recycled rubber underlayment
2. Thickness: 0.12" (1.5mm)

3. Durometer: 60 ±5 on the Shore M or Shore A scales.

J. Retrofit- existing floor systems, synthetic floors must not exceed a maximum thickness of 9mm.
Product must have a minimum durometer of 60 ± 5 on the Shore A scale. Flooring representative shall verify that the existing floor system meets these requirements by submitting core samples to the respective manufacturer for analysis and approval.

K. Sanitary Information
1. Resistance to fungi (when tested in compliance with ASTM G-21 and MIL standard 810-D procedure 508.3). All basic organisms tested (ATCC #6205-11797) and were found to have zero growth.
2. Resistance to the following:
   a. Bacteria and mildew resistance
   b. Gram-positive bacterial Staphylococcus Aureus
   c. Gram-negative Klebsiella Pneumoniae
   d. Pink-staining organism
   e. STV Reticulum
   f. Surface fungi growth prior to and following leaching

L. Game Line Paint
1. Paint: aliphatic polyurethane as supplied by Sport Court. Select from standard colors.

M. Bleacher Blocking
Blocking tile system must be used in areas where bleachers shall be stored or rolled onto suspended flooring system. This system must be integrally designed to be used with flooring tiles and helps to create a solid tile configuration for reinforcement of weight distribution. Blocking tile system must be manufactured by same flooring manufacturer being bid.

3.0 - EXECUTION

3.1 Inspection

A. Inspect concrete slab for contamination, dryness and levelness. Report any discrepancies to the general contractor.

B. Concrete slab shall be broom cleaned, mopped and dust free by the general contractor.

C. Installer (Flooring Contractor) shall document all working conditions as specified in 1.0 – GENERAL prior to starting installation. Report any discrepancies to general contractor. Commencement of work indicates acceptance of concrete slab condition.

3.2 Installation

A. Underlayment – Rubber underlayment shall be unrolled and allowed to relax. All butt joints shall be properly trimmed, fitted, and seamed together with an approved all-purpose tape.

B. Floor shall be installed to pre-approved layout.

C. Minimum clearance at all vertical obstructions of 3/4 inch (19mm) is required.

D. Floor surface shall be clean and dust free.

E. Game Lines
1. Use only high quality masking tape approved by Sport Court.
2. Lines shall be primed and painted using Sport Court proprietary adhesion promoter and recommended aliphatic polyurethane paint.
3. Provide game lines as indicated on drawings.
4. Room temperature shall be >55° F (13°C) and rising during paint installation.

F. Wall Base - Install cove base anchored to walls with base cement

G. Remove all excess and waste materials from the area of work. Dispose of empty containers in accordance with federal and local statutes.

3.3 Maintenance

A. Extra Materials: Deliver extra material to Owner. Furnish extra material described below that match products installed packaged with protective covering for storage and identified with appropriate labels.
   1. 5% of main court color.
   2. 3% of all other colors.

END OF SECTION

SECTION 09648 – GYMNASIUM WOOD FLOORING SYSTEM

1.0 - GENERAL

1.1 Description

A. Furnish and Install complete wood athletic flooring system and related work as necessary.

B. Related work specified under other sections.

1. Concrete and Concrete Finishing - Section 03300
   a. Concrete Slab Depression: **1-3/4"**(44mm) using 25/32" (20mm) flooring.
   b. Surface Finish: steel troweled and finished smooth.
   c. Concrete Tolerance: 1/8" (3mm) in radius of 10' (3m).
   d. Compressive Strength: **Concrete shall be a minimum of 3,000 psi (21 MPa) and a maximum of 4000 psi (28MPa) compressive strength after 28 days. Concrete shall be free of washed river gravel, pea gravel, flint or hardener additives. No lightweight concrete.**
   e. Floor Flatness and Floor Levelness (FF and FL) numbers are not recognized.
2. Membrane Waterproofing and Dampproofing -Section 07180
   a. Concrete subfloors on or below grade shall be adequately waterproofed beneath the slab and at the perimeter walls and on the earth side of below grade walls by general contractor using suitable type membrane.
   b. Sand-Poly-Sand slab construction **is not** an acceptable construction.
3. Thresholds -Section 08710
4. Game Standard Inserts - Section 11480

1.2 References

A. MFMA- Maple Flooring Manufacturers Association
B. FSC- Forest Stewardship Council

1.3 Quality Assurance

A. Floor System Manufacturer Qualifications
   1. Manufacturer shall be an established firm experienced in field and have been in business or a minimum of ten (10) years; Robbins, Inc. or an approved equal.
   2. Manufacturer will be a member in good standing of the Maple Flooring Manufacturers Association (MFMA).

B. Floor Contractor/Installer Qualifications and Certifications
   1. Flooring contractor shall be a firm experienced in flooring field and approved by manufacturer.
   2. Submit a list of at least three completed projects of similar magnitude and complexity.

C. Surface Appearance
   1. Expansion spaces will not exceed 1/64" (0.4mm) at time of installation and will be spread evenly across the floor with each row of flooring.
   2. Expansion spacing will be installed to allow for normal expected increases in Equilibrium Wood Moisture Content (EMC).

1.4 Submittals

A. Specification and Drawings
   1. Submit wood gym floor specification sheet
   2. Submit gym floor drawings as required.

B. Concrete Guidelines
   1. Submit MFMA Recommendations for correct preparation, finishing and testing of concrete subfloor surfaces to receive wood flooring.

C. Sample
   1. Submit one (1) sample of flooring, if requested by architect. Sample to be made by the manufacturer and so indicated.

D. Maintenance Guidelines
   1. Submit 2 copies of Maintenance Instructions with Closeout documents.

1.5 Delivery, Storage and Handling

A. Delivery of Materials
   1. Materials shall not be delivered, stored or installed until all masonry, painting, plastering tilework, marble and terrazzo work is complete, and all overhead mechanical work, lighting, backstops, scoreboards are installed. **Room temperature of 55-80 degrees Fahrenheit (13 to 27 degrees Celsius) and relative humidity of 35-50 % are to be maintained**. Ideal installation/storage conditions are the same as those that will prevail when building is occupied
   2. Materials shall not be stored at the installation location if the moisture level for the concrete slab exceeds 4% or vapor transmission exceeds 4.5 pounds per 1,000 square feet. Use ASTM F 2170 In-Slab Relative Humidity test.

1.6 Job Conditions-Sequence

A. Do not install floor system until concrete has been cured 60 days and the requirements above obtained.

B. General Contractor is responsible to ensure slab is clean and free of all dirt and debris prior to floor installation beginning.

C. Commencement of installation indicates that the installer has accepted the floor conditions and confirms that the surface is acceptable to receive the flooring.

D. Permanent heat, light and ventilation shall be installed and operating during and after installation. Maintain a temperature range of 55 to 80 degrees Fahrenheit (13 to 27 degrees Celsius) and a relative humidity range of 35 to 50%. Consult MFMA guidelines for further information.

E. After floors are finished, area to be kept locked by general contractor to allow curing time for the finish. If after required curing time general contractor or owner requires use of gym, he shall protect the floor by covering with non-fibered kraft paper or red rosin paper with taped joints, until acceptance by owner (or owner's agent) of complete gymnasium floor.

1.7 Warranty

A. Guarantee shall not cover damage caused in whole or in part by casualty, ordinary wear and tear, abuse, use for which material is not designed, faulty construction of the building, settlement of the building walls, failure of the other contractors to adhere to specifications, separation of the concrete slab and

excessive dryness or excessive moisture from humidity, spillage, migration through the slab or wall, or any other source.

B. Manufacturer shall warrant the material to be free from manufacturing defects for a period of 1 year. In the event of breach of any warranty, the manufacturer shall repair or replace material and system components supplied by them and proven to be defective in manufacture.

2.0 - PRODUCTS

2.1 Material

A. Vapor Barrier
6-mil polyethylene or Moisture Suppression System for projects with high concrete moisture.

B. Subfloor
1. Robbins Lineal Zero/G
2. Bio-Channel SB subfloor panels
   a. 23/32" factory engineered panels, on-site lamination shall not be permitted
   b. Pre-determined, factory routed locations to accept resilient Zero/G pad
   c. Pre-determined, factory routed locations to accept linear anchor channel.
3. 16 gauge Anchor Channels.

C. Maple Flooring
1. 25/32" (20mm) thick x 2-¼" (57mm) width, 2nd grade and better, Random Length (RL) - Unfinished TGEM, KD Northern Hard Maple, Flooring as manufactured by Robbins (Basis of Design) and graded in accordance with MFMA-FJ rules.

D. Fasteners
1. Flooring – 1-¾" (45mm) cleats or staples.
2. Subfloor – Channel anchors, Powers SPIKE® anchors

D. Finish Materials
Robbins Miracle or approved equal oil-modified polyurethane sealer and finish.

E. Gamelines
Gameline paint(s) shall be recommended by the finishing materials manufacturer, and must be compatible with the finish.

F. Perimeter Base - Robbins 3" x 4" ventilating type.

3.0 - EXECUTION

3.1 Inspection

A. Inspect concrete slab for proper tolerance and dryness, and report any discrepancies to the general contractor and architect in writing. Slab will be level to within 1/8" (3mm) in a 10' (3m). Moisture content of the concrete slab shall not exceed 85% RH as tested using ASTM F 2170 In-Slab Relative Humidity test.

B. All work required to put the concrete subfloors in acceptable condition shall be the responsibility of the general contractor.

C. Subfloor shall be broom cleaned by general contractor.

D. Installer shall document all working conditions provided in General Specifications prior to commencement of installation.

3.2 Installation

A. Vapor Barrier
Install poly-film with joints lapped a minimum of 6" (150mm) and turned up 4" (100mm) at the walls.

B. Subfloor
1. Place Bio-Channel SB subfloor panels diagonally to strip flooring, in an end-to-end manner, staggering end joints in adjacent rows. Allowing a ¼" (6mm) gap between panels. Provide 1-½" to 2" (38mm to 50mm) expansion void at the perimeter and all vertical obstructions.
2. Install solid stop blocking as needed.

C. Anchoring
1. Place anchor channel and anchor at each anchoring location. These anchor locations shall be perpendicular to the finished floor to allow for lateral movement. Anchors shall be driven tight to the concrete to insure proper placement, anchors that need to be shimmed are not allowed.

D. Maple Flooring
1. Machine nail maple flooring per manufacturer's instructions. Provide spacing for humidity conditions in specific regions. Provide 2" (50mm) expansion voids at perimeter and all vertical obstructions.

3.3 Finishing

A. Sanding
1. Sand per manufacturer's recommendations.
2. After sanding, buff entire floor using 100 grit screen or equal grit sandpaper, with a heavy-duty buffing machine.
3. Inspect entire area of floor to insure the floor presents a smooth surface without drum stop marks, gouges, streaks or shiners.
4. Vacuum and/or tack floor before first coat of seal.
5. Floor should be clean and completely free of dirt and sanding dust.

B. Sealing and Gameline Paint
1. Apply specified combination of seal, gameline paint, and finish in accordance with manufacturer's instructions.
2. Buff and vacuum and/or tack between each coat after it dries.
3. Apply game lines accurately after the buffing and vacuuming the coated surfaces. Game lines shall be painted between seal coats and finish coats. Layout in accordance with drawings. For game lines, use current rules of association having jurisdiction. Lines shall be straight with sharp edges in colors selected by architect.
4. Apply finish coats per manufacturer's recommendations.

3.4 Wall Base Installation

1. Install Robbins vent cove base anchored to walls with base cement or screws and anchors. Use pre-molded outside corners and neatly mitered inside corner.

3.5 Cleaning

Clean up all unused materials and debris and remove it from the premises.

END OF SECTION

1.0 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. The Construction Waste Management plan prepared by the Construction Manager for coordination of waste material recycling is hereby incorporated by the reference as requirement of this section. Work under this section shall conform to the provisions outlined in the Plan and shall conform with the local recycling Standards to provide a coordinated effort to maximize reuse of waste materials.

1.2 Submittals

A. Submit for the approval of the Architect samples of each color and type of material. Mark each sample with the manufacturer's name, type material, pattern, color, catalog number, thickness, name of contractor, and name of project.

1.3 Delivery and Storage

A. Deliver materials to site in manufacturer's original, unopened containers clearly marked with manufacturer's brand name, color, and pattern numbers, and production run color code. Care shall be taken to prevent damage and freezing during delivery, handling, and storage.

B. Store materials at site for at least 24 hours before installation.

C. Maintain temperature of spaces where materials are stored and are to be installed at not less than 60° for at least 24 hours before installation. Thereafter, maintain a minimum temperature of 60°F.

2.0 - PRODUCTS

2.1 General

A. Materials shall be uniform in thickness and size with accurately cut edges. No seconds, off-goods, or remnants will be allowed.

B. Colors shall be uniform throughout.

C. Materials within each area shall be from one production run as indicated by cartons bearing the same manufacturer's color code.

D. Interior finish materials shall comply with flame spread limitations and smoke production limitations as follows. Tests shall be performed by an independent testing laboratory.

Walls and Ceilings	Flame Spread	25 or less ASTM E-84.
	Smoke Production	350 or less ASTM E-84.
Floors	Flame Spread	75 or less ASTM E-84.
	Smoke Production	350 or less ASTM E-84.

2.2 Manufacturers

A. Rubber Base Manufacturers
   1. Tarkett (Basis of Design)
   2. Roppe

3. Flexco
4. Mannington

B. Transition Material Manufacturers:
1. Tarkett
2. Roppe
3. Flexco
4. Mannington

C. Requests for substitution shall be considered in accordance with provision of Section 01360 and received by Architect at least 10 days prior to bid.

2.3 Wall Base Materials

A. Rubber Base shall be 4" high x running length. Rubber base shall be Johnsonite, Roppe or approved equal. Base type and color as specified on Finish Legend.

B. Provide 1/8" ga., 4 " high Tarkett/Johnsonite Baseworks Thermoset Rubber wall base standard profile conforming to ASTM F1861.
1. Color to be selected by Architect from manufacturer's full range of colors.
2. Refer to manufacturer's written installation instructions for complete installation details.

C. Refer to Section 09560 for Flexco Base Specialty.

D. Adhesives, including primer, shall be as manufactured or recommended by the manufacturer of the materials used.

E. Outside corners are to be mitered. V-cut back of base strip to two thirds of its thickness and fold. Use Tool # 532 cove base groover gunlach or equal. Inside corners are to be mitered.

4' lengths or less and pre-mitered corners are not acceptable

F. Provide caulk to fill in at bullnose corners.

2.4 Floor Transition Materials

A. Provide transition strips tapered to meet abutting materials on drawings.

2.5 Adhesives:

A. Wall Base Adhesives shall be as manufactured or recommended by the manufacturer of the materials used. Provide epoxy at "wet areas".
1. Wall Base Adhesives
a. Tarkett/Johnsonite 960 Wall Base Adhesive for porous surfaces
b. Tarkett/Johnsonite 946 Premium Contact Adhesive for non-porous surfaces
c. Tarkett/Johnsonite 965 Flooring and Tread Adhesive
d. Tarkett/Johnsonite 996 Two-Part Epoxy Adhesive
e. Tarkett/Johnsonite 975 Two-Part Urethane Adhesive
2. Caulk: Color Rite Inc.

B. Floor Transitions: Adhesives shall be as manufactured or recommended by the manufacturer of the materials used.

3.0 - EXECUTION

3.1 Inspection

Surfaces to receive rubber base shall meet the minimum requirements established by the rubber base manufacturer. Examine surfaces and correct defects before starting applications.

3.2 Precautions During Installations

A. Spaces in which rubber base material is being set shall be closed to traffic and to other work until the base is firmly set.

B. Where solvent-based adhesive is used, safety sparkproof fans shall be provided and operated when natural ventilation is inadequate. Smoking shall be prohibited.

3.3 Installation

A. Install rubber base materials only after all finishing operations have been completed. Moisture content of concrete slabs, building air temperature and relative humidity must be within limits recommended by rubber base manufacturer.

B. Mix and apply adhesive in accordance with the manufacturer's instructions. Cover the area evenly and only to the extent which can be covered with rubber base material in the recommended working time of the adhesive.

C. Base shall be applied in such a manner that the entire under- surface shall be securely bonded in place. Base shall be laid tightly so that each piece is in contact with the adjoining pieces and all joints are in true alignment.

D. Apply resilient base to permanent walls, cabinets, and fixtures in rooms or areas as specified. Install base in as long lengths as practicable. Press down so that bottom cove edge follows floor. Scribe accurately to abutting materials.

3.4 Adjustments

Inspect and make necessary adjustments after heat is applied continuously in finished areas. Any portion of the rubber base which has not seated in a level plane with surrounding base and all damaged, imperfect, or improperly installed base shall be warmed, carefully removed, and new base of the same color and thickness substituted.

3.5 Cleaning and Waxing

Remove stains from base and clean as required and recommended by manufacturer.

3.6 Surplus Materials

Unused runs and one full carton of materials shall be left at the job and turned over to the Owners.

END OF SECTION

1.0 - GENERAL

1.1 Summary

A. Section Includes: Luxury Vinyl tile floor coverings.

B. Cement Based Finishing Underlayment

C. Related Sections:
   1. Division 5 Section: Miscellaneous Metals

1.2 References

A. ASTM International:
   1. ASTM E648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
   2. ASTM E662 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
   3. ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
   4. ASTM F970 Standard Test Method for Static Load Limit.
   5. ASTM F1700 Standard Specification for Solid Vinyl Floor Tile.

B. National Fire Protection Association (NFPA):
   1. NFPA 253 Standard Method of Test for Critical Radiant Flux for Floor Covering Systems Using a Radiant Energy Source.
   2. NFPA 258 Research Test Method for Determining Smoke Generation of Solid Materials.

1.3 System Description

A. Performance Requirements:
   1. Fire Performance:
      a. Critical Radiant Flux (NFPA 253 or ASTM E648): Class 1 (0.45 watts per square centimeter or greater).
      b. Smoke Density (NFPA 258 or ASTM E662): 450 or less.

1.4 Submittals

A. General: Submit listed submittals in accordance with Conditions of the Contract and Section 01360 - Submittals

B. Product Data: Submit product data for specified products.

C. Samples: Submit selection and verification samples of finishes, colors and textures.

1.5 Quality Assurance

A. Installer Qualifications: Firm with minimum five years successful experience completing resilient tile installation similar to that required.

B. Provide types of flooring and accessories supplied by one manufacturer, including leveling and patching compounds, and adhesives.

C. Materials within each area shall be from one production run as indicated by cartons bearing the same manufacturer's color code.

D. Materials shall be uniform in thickness and size with accurately cut edges. No seconds, off-goods, or remnants will be allowed.

E. Provide flooring material to meet the following fire test performance criteria as tested by a recognized independent testing laboratory:

1. ASTM E 648 Critical Radiant Flux of 0.45 watts per sq. cm. or greater, Class I.
2. ASTM E 662 (Smoke Generation) Maximum Specific Optical Density of 450 or less.

F. Pre-Installation Conference: Conduct meeting at site prior to commencing work related to resilient tile installation.

1. Require attendance of parties directly affecting resilient tile installation.
2. Review site conditions, procedures, and coordination required with related work.

1.6 Delivery, Storage & Handling

A. General: Comply with Division 1 Product Requirements Section.

B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

2.0 - PRODUCTS

2.1 Cement Based Finish Underlayment

A. Ardex Feather Finish as approved by Ardex Engineered Cements
1. Self-Drying
2. Waterbased

2.2 Vinyl Tile Floor Covering

A. Manufacturer: Interface

B. Other manufacturers seeking approval must submit product information and comply with Section 01360 - Product Substitution. Information must be received by Architect at least 10 days prior to bid date.

2.3 Materials

A. Level Set Collection LVT: Natural Woodgrains
1. Product No. A002
2. Product Construction: High performance luxury vinyl tile
3. Classification: ASTM F1700, Class III, printed vinyl plank.
4. Wear Layer Thickness: 22 mil
5. Total thickness: 4.5mm

6. Backing Class: Commercial Grade.
7. Finish: Ceramor Coating.
8. Installation Recommendation: Floating Floor with tactiles glue free installation system.
9. Nominal dimensions: 25cm x 1m (9.845in x 39.38in)
10. Installation Methods: Ashlar or Herringbone

2.4 Waterjet Floor Graphic

A. Provide waterjet cut floor design. Size and location located on Architectural drawings. Graphic to be provided by Architect. Waterjet company to provide a dimensioned color rendering for approval prior to production.

B. Cutting of LVT

1. All cutting is to be done with waterjet technology.
2. Orifice size not to exceed 0.005"
3. Waterjet cutting company is to be supplied an electronic file of the design. CAD file is preferred
4. Includes cutting and assembly of the designs, and the field that surrounds.

C. Preparation for Shipping of LVT Tiles

1. Entire project to be checked for accuracy prior to boxing which Includes verifying that each assembled piece fits correctly. Depending on the size of the design ours are laid out and photographed prior to packaging.
2. Tiles to be packaged in the same boxes that they were received in.
3. Each box to always have labels indicating contents of box.
4. First box to be opened will be clearly marked. This would depend on the design and how the installer wishes to proceed; we usually try to determine this prior to cutting.
5. Boxes to be palletized, shrink wrapped and banded to the pallet
6. Waterjet cutting company will be available in case of emergency.
7. Installer to be notified in writing of the importance of having a smooth flat surface.
8. Shipment to be insured by shipper. Shipping and insurance to be provided at customer's expense

D. Installation

1. Installer to dry lay all waterjet designs prior to final installation.
2. Installer to notify waterjet company of any concerns prior to final installation.

3.0 - EXECUTION

3.1 Manufacturer's Instructions

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.

3.2 Finishing Underlayment

A. Clean and prepare the full extent of the existing concrete floor scheduled to receive flooring under this section.

B. Provide new Ardex feather finish underlayment as recommended by the manufacturer to achieve a uniform, level substrate surface throughout the entire area to receive flooring products specified under this section.

3.3 Examination

A. Site Verification of Conditions: Verify that substrate conditions, which have been previously installed under this section, are acceptable for product installation in accordance with manufacturer's instructions.

3.4 Preparation

A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.5 Protection

A. Protect installed products until completion of project.

B. Repair or replace damaged products prior to Substantial Completion.

END OF SECTION

1.0 – GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 Summary

A. This section includes the following:

1. Resinous flooring system as shown on the drawings and in schedules.

B. Related sections include the following:

1. Cast-in-Place Concrete, Section 03300

1.3 System Description

A. The work shall consist of preparation of the substrate, the furnishing and application of a seamless flooring system with decorative flake broadcast and chemical resistant topcoat.

B. The system shall have the color and texture as specified by the Owner with a nominal thickness of 60 Mils. It shall be applied to the prepared area(s) as defined in the plans strictly in accordance with the Manufacturer's recommendations.

C. 4 inch Cove base to be applied where noted on plans and per manufacturers standard details unless otherwise noted

1.4 Submittals

A. Product Data: Latest edition of Manufacturer's literature including performance data and installation procedures.

B. Samples: A 6 x 6 inch square sample of the proposed system. Color, texture, and thickness shall be representative of overall appearance of finished system subject to normal tolerances.

1.5 Quality Assurance

A. The Manufacturer shall have a minimum of 10 years' experience in the production, sales, and technical support of epoxy and urethane industrial flooring and related materials.

B. The Applicator shall have experience in installation of the flooring system as confirmed by the manufacturer in writing in all phases of surface preparation and application of the product specified. Qualifications of applicator must be submitted to Architect by the General Contractor for approval within 24 hours after acceptance of bid. Architect reserves the right to reject applicator if they do not meet the specified qualifications and/or cannot provide documentation from manufacturer.

C. No requests for substitutions shall be considered that would change the generic type of the specified System.

D. System shall be in compliance with requirements of United States Department of Agriculture (USDA), Food, Drug Administration (FDA), and local Health Department.

E. A pre-installation conference shall be held between Applicator, General Contractor, manufacturer and the Owner for review and clarification of this specification, application procedure, quality control, inspection and acceptance criteria and production schedule.

1.6 Product Delivery, Storage, And Handling

A. Packing and Shipping
All components of the system shall be delivered to the site in the Manufacturer's packaging, clearly identified with the product type and batch number.

B. Storage and Protection

1. The Applicator shall be provided with a dry storage area for all components. The area shall be between 60 F and 85 F, dry, out of direct sunlight and in accordance with the Manufacturer's recommendations and relevant health and safety regulations.
2. Copies of Material Safety Data Sheets (MSDS) for all components shall be kept on site for review by the Architect or other personnel.

C. Waste Disposal

1. The Applicator shall be provided with adequate disposal facilities for non-hazardous waste generated during installation of the system.

1.7 Project Conditions

A. Site Requirements

1. Application may proceed while air, material and substrate temperatures are between 60 F and 85 F providing the substrate temperature is above the dew point. Outside of this range, the Manufacturer shall be consulted.
2. The relative humidity in the specific location of the application shall be less than 85 % and the surface temperature shall be at least 5 F above the dew point.
3. The Applicator shall be supplied with adequate lighting equal to the final lighting level during the preparation and installation of the system.

B. Conditions of new concrete to be coated with specified flooring material.

1. Concrete shall be moisture cured for a minimum of 7 days and have fully cured for 28 days in accordance with ACI-308 prior to the application of the coating system pending moisture tests. Outside of these parameters manufacturer shall be consulted.
2. Concrete shall have a light steel trowel finish (a hard steel trowel finish is neither necessary or desirable).
3. Sealers and curing agents should not be used.

4. Concrete surfaces on grade shall have been constructed with a vapor barrier to protect against the effects of vapor transmission and possible delamination of the system.

C. Safety Requirements

1. Other trades shall be removed during the application of the product and 72 hours after completion

2.0 – PRODUCTS

2.1 Manufacturers

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following.

1. Basis-of-Design Product: Subject to compliance with requirements, provide BPI Spartacote Chip Pure Seamless Floor System. Not all manufacturers produce all categories and types of resinous flooring systems.
   a. Also pre-approved are:
      Sherwin Williams – Aqua Armor Decorative Mosaic Flooring
      Stonhard – Stontec ERF

2. Other Products must be approved prior to Bid and must be submitted in compliance with Section 01360 - Product Substitution.

2.2 Flooring

A. Spartacote Chip Pure Seamless Floor System (60 mil floor system),
   1. System Materials:
      a. Primer: Primer/Scratch Coat 160 sq. ft/gal
      b. Base resin: Pigmented Body Coat 65 sq. ft/gal
      c. Broadcast Aggregate: Broadcast Chips
         (size and quantity determined by selection of architect)
      d. Grout Coat: MVT Tolerant UV Stable Glaze 160 sq. ft/gal
      e. Top Coat: Surface Build Top Coat UV- Finish to be selected by Architect
      f. Color: See Finish Legend

   2. Cove base (4 inch high with 2 inch diameter radius, smooth texture)
      a. Cove resin; Cove Gel, Spartacote Broadcast quartz mixed with resin and troweled in place
      b. Overlay Spartacote Chip Pure Floor System to match floor
      c. Cove termination strip: clear plastic with 1/8" lip

2.3 Product Requirements

Material: Spartacote Resin	2-component epoxy
Density	12.70 lbs./gallon
VOC Content, Mixed	
Volume Solids	59%
Flash Point: Part A Part B	>212°F 170 °F
Mixing Ratio	1:4 by Vol.
Pot Life, Approximate	60 minutes @ 75°F
Open to Foot Traffic	After 16 hrs. at 73°F
Curing Temperature	Minimum 50°F
Full Cure & Max. Resistance	7 days
Hardness, Shore D ASTM-D-2240	70-75
Compressive Strength ASTM-C- 579	6500 psi
Flexural Strength ASTM-C-580	2100 psi
Adhesion To: -New concrete (5 days) -Moist concrete (28 days) -Dry concrete (28 days)	110 psi 550 psi 580 psi

3.0 – EXECUTION

3.1 Examination

A. Examine substrates, areas and conditions, with Applicator present, for compliance with requirements for maximum moisture content, installation tolerances and other conditions affecting flooring performance.

B. Verify that substrates and conditions are satisfactory for flooring installation and comply with requirements specified.

3.2 Preparation

A. General

1. Existing concrete surfaces shall be free of oil, grease, curing compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, and bituminous products
2. Mechanical surface preparation
   a. Shot blast all surfaces to receive flooring system with a mobile steel shot, dust recycling machine (Blastrac or equal). All surface and embedded accumulations of paint, toppings hardened concrete layers, laitance, power trowel finishes and other similar surface characteristics shall be completely removed leaving a bare concrete surface having a minimum profile of CSP 3-5 as described by the International Concrete Repair Institute.

b. Floor areas inaccessible to the mobile blast machines shall be mechanically abraded to the same degree of cleanliness, soundness and profile using diamond grinders, needle guns, bush hammers, or other suitable equipment.

c. Wherever a free edge will occur, including doorways, wall perimeters, expansion joints, columns, doorways, drains and equipment pads, a ¼ inch deep by 3/16 inch wide keyways shall be cut in.

d. Cracks and joints (non-moving) greater than 1/4 inch wide are to be chiseled or chipped-out and repaired per manufacturer's recommendations.

3. At spalled or worn areas, mechanically remove loose or delaminated concrete to a sound concrete and patch per manufactures recommendations.

3.3 Application

A. General

1. The system shall be applied in six distinct steps as listed below:
   a. Substrate preparation
   b. Cove application
   c. Primer Application
   d. Topping/overlay application with flake aggregate broadcast.
   e. Grout coat application
   f. Topcoat application to thickness to reach even texture matching accepted sample
2. Immediately prior to the application of any component of the system, the surface shall be dry and any remaining dust or loose particles shall be removed using a vacuum or clean, dry, oil-free compressed air.
3. The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results in accordance with the Manufacturer's recommendations.
4. The system shall follow the contour of the substrate unless pitching or other leveling work has been specified by the Architect.
5. A neat finish with well-defined boundaries and straight edges shall be provided by the Applicator.

B. Cove

1. Cove will be placed with the broadcast flake to match selected color and size at 4 inches in height unless otherwise noted on drawing with a 1 inch radius
2. The cove will be smooth with no texture above mid-radius

C. Topping

1. The topping shall be applied as a self-leveling system as specified. The primer must be applied and will not be a lift coat. The topping shall be applied in one to two lifts with a minimum thickness of 60 mils.
2. The topping shall be comprised of three components, a resin, hardener and filler as supplied by the Manufacturer.
3. The hardener shall be added to the resin and thoroughly dispersed by suitably approved mechanical means.
4. The topping shall be applied over horizontal surfaces using a pin rake, trowels or other systems approved by the Manufacturer.
5. Flake shall be broadcast into the wet material to excess.
6. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose aggregate.

D. Grout coat and Topcoat

1. The grout coat shall be mixed and applied per manufacturer recommended procedure.
2. The grout coat shall be comprised of two components, a resin, hardener.
3. The grout coat will be applied at the rate of 160 sf per gallon.
4. The top coat shall be mixed and applied per manufacturer recommended procedure.
5. The top coat shall be comprised of two components, a resin, hardener.
6. The top coat will be applied at a rate to achieve selected texture.
7. The finish floor will have a uniform texture free of dry or smooth areas that do not match the selected texture. The finished thickness shall be 60 mils.

3.4 Field Quality Control

A. Tests, Inspection

The following tests shall be conducted by the Applicator:

1. Temperature
   Air, substrate temperatures, relative humidity, and, if applicable, dew point.
2. Perform moisture tests on concrete as follows:
   a. Perform calcium chloride moisture tests in accordance with ASTM D1869 a minimum of twice for the first 1000 sq. ft and once for each additional 1000 sq. ft of area to be coated. Provide a written report of these test results including a letter of acceptance from the manufacturer.
   b. Perform PH tests alongside each calcium chloride moisture tests. Provide a written report of these test results including a letter of acceptance from the manufacturer.

B. Coverage Rates
Rates for all layers shall be monitored by checking quantity of material used against the area covered.

C. Provide daily reports including detailed days activities, materials used with batch numbers and environmental conditions

3.5 Cleaning And Protection

A. Cure flooring material in compliance with manufacturer's directions, taking care to prevent their contamination during stages of application and prior to completion of the curing process.

B. Remove masking. Perform detail cleaning at floor termination, to leave cleanable surface for subsequent work of other sections.

END OF SECTION

SECTION 09800 - ACOUSTICAL PANEL TREATMENT

1.0 GENERAL

1.1 Section Includes

A. Acoustical wall panels.

1.2 Related Sections

A. Section 09260 - Gypsum Board Assemblies.

B. Section 09510 - Suspended Acoustical Ceilings: Conventional grid-supported acoustic ceilings.

C. Section 09910 - Paints and Coatings.

1.3 References

A. ASTM C 423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2000.

B. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2000a.

1.4 Performance Requirements

A. Acoustical Absorption: Perform testing in accordance with ASTM C 423, Type A mounting method unless otherwise specified.

B. Flame Spread Rating: Provide all components with Class A flame spread rating when tested in accordance with ASTM E 84, unless otherwise specified.

1.5 Submittals

A. Submit under provisions of Section 01350.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Independent testing agency test reports.

C. Selection Samples: For each product specified, two complete sets of color samples representing manufacturer's full range of available colors and patterns.

D. Verification Samples: For each product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

1.6 Quality Assurance

A. Manufacturer Qualifications: Minimum 10 years of experience in producing acoustical products of the types specified herein.

B. Installer Qualifications: Acceptable to the manufacturer of the acoustical products being installed.

C. Mock-Up: Provide a mock-up for evaluation of installed appearance.
   1. Install acoustical products in areas designated by Architect.
   2. Do not proceed with remaining work until Architect approves workmanship and appearance.
   3. Approved mock-up may remain as part of the work.

1.7 Delivery, Storage, And Handling

A. Protect acoustical products from moisture during shipment, storage, and handling.

B. Store products in manufacturer's unopened packaging until ready for installation.
   1. Store materials flat, in dry, well-ventilated space.
   2. Do not stand panels on end.
   3. Protect edges from damage.

C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.8 Project Conditions

A. Do not begin installation of acoustical products until building has been enclosed and environmental conditions approximate those that will prevail when building is occupied.

B. Environmental Requirements: Do not install panels until wet work, such as concrete and plastering, is complete; the building is enclosed; and the temperature and relative humidity are stabilized at 60 – 80 degrees F (16 – 27 degrees C) and 40% to 50%, respectively.

1.9 Extra Materials

A. Provide 5 percent, but not less than 1 of each type of acoustical unit actually installed, for Owner's use in maintenance.

2.0 PRODUCTS

2.1 Manufacturers

A. Basis of Design - Manufacturer: G&S Acoustics

B. Requests for substitutions will be considered in accordance with provisions of Section 01360. Submit for pre-approval at least 10 days prior to bid.

C. Provide all acoustical products specified herein by a single manufacturer.

2.2 Acoustical Wall Panels

A. Wrapped Fiberglass Panels: Acousti-Panels AP; fiberglass core of 6 to 7 pcf (96 to 112 kg/cu m) with chemically hardened edges, seamless finish material wrapped and bonded to back side of panels.
   1. Thickness: 2 inch (51 mm); NRC 1.05.

2. Size: As indicated.
3. Finish Material: Custom fabric provided by Owner.
   a. Manufacturer – Maharam
   b. 54" width of fabric
   c. Contents: 66% Cotton 34% polyester
   d. Style No. Messenger 458640
4. Color: As selected from manufacturer's standards.
   APF 1 – Color to be determined
   APF -2 – Color to be determined
5. Edges: Square.
6. Mounting: Mechanical clips.
7. Fabric to be supplied by the installation dealer

2.3 Accessories

A. Mounting Adhesive: Water-based, heavy-bodied adhesive as recommended by manufacturer of acoustical panels.

B. Impaling Clips. Manufacturer's standard 3 by 4 inches (75 by 100 mm) galvanized mounting clips designed for impaling back side of fiberglass units.

C. Two-Part Z-Clips: Manufacturer's standard mounting bar and matching clips for mounting on rear of acoustical panels.

3.0 EXECUTION

3.1 Examination

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 Preparation

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 Installation

A. Install acoustical units in accordance with manufacturer's instructions.

B. Adhesive Mounting: Size back of panels at 18 inch (450 mm) on center in both directions with thin coating of adhesive in 4 inch (100 mm) squares. Center adhesive dabs the size of a large egg on each sized area, and press panel firmly against substrate, flattening adhesive. Block panel for not less than 24 hours until adhesive has set.

C. Impaling Clips: Fasten clips to wall at 48 inches (1220 mm) on center, with points facing upward. Attach panels by pressing downward and toward the wall, so points of clips are embedded firmly in back of panel.

D. Two-Part Clips: Fasten bars to wall at 48 inches (1220 mm) on center in both directions. Impale matching mechanical clips into back of panels in matching pattern and drop panel into position so clips fully engage into wall-mounted bars.

3.4 Protection

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

1.0 – GENERAL

1.1 Scope

A. The work under this section consists of all painting, finishing work and related items.

B. Paint or Painting shall include sealers, primers, stains, and oil, alkyd, latex and enamel paints and the application of these materials on surfaces prepared to produce a complete job whether or not every item is specifically mentioned. Where items are not mentioned they shall be furnished as specified for similar work. **Only work specifically noted as being excluded shall be left unfinished.**

C. This specification includes field painting of all exposed piping, metal, ductwork, conduit, hangers, mechanical and electrical equipment in finished spaces. A finished space is one listed in the Finish Schedule as having finish materials on walls and/or ceiling.

1.2 List of Proposed Materials

The contractor shall either verify in writing that he intends to apply the products listed in the Paint Schedule, or shall submit for approval a list of comparable materials of another listed approved manufacturer. This submittal shall include full identifying product names and catalog numbers.

1.3 Submittals

A. As soon as practicable after contract is let, submit for approval a detailed schedule of the paint proposed, listing the name of each product, and the surface to which it will be applied. Omission of any item from the approved schedule shall not relieve Contractor of his obligation.

B. Product Data: For each paint system indicated. Include block fillers and primers.

1) Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
2) Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.
3) Coating Maintenance Manual: Upon conclusion of the project, the Contractor or paint manufacturer / supplier shall furnish a coating maintenance manual, such as Sherwin-Williams "Custodian Project Color and Product Information" report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product / color / finish was used, product data pages, Material Safety Data Sheet (MSDS), care and cleaning instructions, Touch-up procedures.

1.4 Storage of Materials

A. Deliver all painting materials to job site at least three (3) days before beginning painting in original unbroken containers showing manufacturers name and type of paint, subject to Architect's inspection and approval.

B. All materials used on the job shall be stored in a single place. Such storage place shall be kept neat and clean, and all damage thereto or its surroundings shall be made good. Any soiled or used rags, waste, and trash must be removed from the building every night, and every precaution taken to avoid the danger of fire.

1.5 Protection of Other Work

The painting contractor shall furnish and lay drop cloths in all areas where painting is being done to protect floors and other work from damage. He shall be responsible for any damage to other work and shall replace any materials which have been damaged to such an extent that they cannot be restored to their original condition. All damage must be repaired to the satisfaction of the Architect.

1.6 Job, Weather, and Temperature Conditions

A. Maintain temperature in building at constant 65° F. or above and provide adequate ventilation for escape of moisture from the building in order to prevent condensation mildew, damage to other work, and improper drying.

B. Exterior painting shall not be done when the temperature is below 50° F., while the surface is damp, or during cold, rainy, or frosty weather, or when the temperature is likely to drop to freezing within 24 hours. Avoid painting surfaces while they are exposed to hot sun.

C. Before painting is started in any area, the area shall be broom cleaned and excessive dust shall be removed from all areas to be painted. After painting operations begin in a given area, clean only with commercial vacuum cleaning equipment.

D. Adequate illumination shall be provided in all areas where painting operations are in progress.

1.7 Inspection of Surfaces

A. Before starting any work, surfaces to receive paint finishes shall be examined carefully for defects which cannot be corrected by the procedures specified under paint manufacturers recommended "Preparation of Surfaces" and which might prevent satisfactory painting results. Work shall not proceed until such damages are correct.

B. At areas of existing previously painted surface, the painting contractor shall field verify to assure compatibility between existing paint / coating material and the proposed new paint / coating material prior to procuring such new materials or products. Should a material or product compatibility conflict be discovered, the Contractor shall immediately notify the Architect for direction prior to proceeding with procuring such materials or products.

C. The beginning of work in a specific area shall be construed as acceptance of the surfaces and the Contractor shall be fully responsible for satisfactory work.

1.8 Quality Assurance

A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

B. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats. An inspection is required by manufacture in between prime coat and finish. Per the request of the Architect.

C. Coordination of Work: Review other Sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings systems for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats are used.

D. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample for each type of coating and substrate required. Comply with procedures specified in PDCA P5. Duplicate finish of approved sample Submittals.

1.9 Cooperation With Other Trades

A. This work shall be scheduled and coordinated with other trades and shall not proceed until other work and/or job conditions are as required to produce satisfactory results.

B. The contractor shall examine the specifications for the various trades and shall thoroughly familiarize himself with all provisions regarding painting. **All surfaces that are left unfinished by the requirements of other sections shall be painted or finished as part of the work covered by this section.**

1.10 Maintenance Material

The contractor shall turn over to the Owner at the final inspection one gallon of each type and final color of the paint used on the project.

2.0 – PRODUCTS

2.1 Materials

A. Except where otherwise specifically stated hereinafter, painting materials shall be products of one of the following manufacturers without substitution of "Equal", and shall be in that manufacturer's top grade of the respective type: Benjamin Moore, PPG, or Sherwin-Williams (Basis of Design). The term "top grade" refers to the manufacturers advertised line of best quality and not to "Professional" or "maintenance" lines. Any deviations from the requirements of this article shall only be by written change order with contract price adjusted accordingly.

B. If job-mixed paints are used, submit proposed formulas for approval before proceeding with work. Thinning and tinting materials shall be as recommended by the manufacturer of the material used.

C. Paints and finishing materials shall be free from skins, lumps, or any foreign matter when used, and pigments, fillers, etc., shall be kept well stirred while being applied.

D. Interior finish materials shall comply with flame spread limitations and smoke production limitations as follows:

Walls and Ceilings - Flame Spread - 25 or less ASTM E-84.
Smoke Production - 350 or less ASTM E-84.

2.2 Colors

A. Not limited to "stock" ready-mixed colors. Bring to directed shades or tones by mixing.

B. In two-coat or three-coat work use slightly different colors for different coats to avoid skipping.

C. Accent or feature areas when indicated shall be colors as selected. Color spacing and pattern shall be as indicated and/or directed. Maximum three (3) colors per area.

D. Complete color scheme shall be as indicated on Finish Legend and Schedule.

2.3 Accessory Materials

Provide all required ladders, scaffolding, drop cloths, maskings, scrapers, tools, sandpaper, dusters, cleaning solvents, and waste as required to perform the work and achieve the results specified herein.

3.0 – EXECUTION

3.1 Workmanship

A. Surfaces shall be clean, dry, and free of oil, grease, dirt, mildew, loose or peeling paint, loose wood particles, and in proper condition for painting. All work shall be carefully done by skilled mechanics. Finished surfaces shall be uniform in coverage, gloss, finish and color, and free from brush marks. All coats shall be thoroughly dry before applying succeeding coats.

B. Do all work in strict accordance with manufacturer's label directions.

C. Hand sand woodwork until smooth and free from raised grain and other surface imperfections. First coat shall be applied before erection, to all surfaces, front and back. After woodwork is primed, fill nail holes, cracks, etc., full and smooth with putty. Lightly sand between coats where necessary in accord with good practice. Fully finish the top and bottom edges of doors and other woodwork edges not normally visible. Shellac knots and pitch streaks before painting.

D. On concrete or masonry, do no painting until the surface has dried to the equivalent of eight days drying time under well ventilated conditions in good drying weather.

E. Vertical surfaces to Interface with suspended acoustical panel ceiling shall be primed/filled to a minimum of 8" about finish ceiling elevation prior to the installation of the acoustical panel ceiling perimeter wall edge molding/trim.

F. Wash metal surfaces with mineral spirits to remove any dirt, grease, before applying materials. Where rust or scale is present, use wire brush, or sandpaper clean before painting. Clean shop coats of paint that become marred and touch up with specified primer.

G. Treat galvanized metal surfaces chemically with compound designed for this purpose, apply as per manufacturer's directions before applying first paint coat.

H. Remove and protect hardware panels, accessories, device plates, lighting fixtures, factory finished work, and similar items; or provide ample in-place protection. Upon completion of each space, carefully replace all removed items.

I. Exterior doors shall have tops, bottoms, and side edges finished the same as the exterior faces of these doors. Interior door shall have vision windows, louvers, grilles, etc. Finished to match door frame.

J. All closets and the interior of all cabinets shall be finished the same as adjoining room paint or stain unless otherwise scheduled. All other surfaces shall be finished the same as nearest or adjoining surfaces unless otherwise scheduled or directed.

3.2 Schedule

A. Exterior Metals

1. Galvanized metal shall be solvent clean with VM&P Naphtha.
   Primer: S-W: Pro Industrial Pro-Cryl Primer, B66W01310
   Finish: Apply two coats
   S-W: Industrial Enamel, B54W00101
   Option: S-W: Pro Industrial Urethane Alkyd Enamel, B54W00151 Series (Urethane Alkyds provide enhanced color and gloss over the standard alkyd enamels)

2. Non-primed metal shall be cleaned and etched with approved acid and washed with water.
   Primer: Pro Industrial Pro-Cryl Primer, B66W01310
   Finish: Apply two coats
   S-W: Industrial Enamel, B54W00101
   Option: S-W: Pro Industrial Urethane Alkyd Enamel, B54W00151 Series (Urethane Alkyds provide enhanced color and gloss over the standard alkyd enamels)

3. Primed metals shall be inspected, scuffs, and abrasions sanded free of rust and receive full coat of primer. Concealed metal surfaces shall be spot primed.

   Primer: Pro Industrial Pro-Cryl Primer, B66W01310
   Finish: Apply two coats
   S-W: Industrial Enamel, B54W00101
   Option: S-W: Pro Industrial Urethane Alkyd Enamel, B54W00151 Series (Urethane Alkyds provide enhanced color and gloss over the standard alkyd enamels)

B. Interior Metals

1. Non-primed metal shall be primed under this section.
   Primer: Pro Industrial Pro-Cryl Primer, B66W01310
   Finish: Apply two coats
   S-W: Industrial Enamel, B54W00101
   Option: S-W: Pro Industrial Urethane Alkyd Enamel, B54W00151 Series (Urethane Alkyds provide enhanced color and gloss over the standard alkyd enamels)

2. Primed metal shall have scratches and abrasions sanded free of rust and receive one full coat of primer.
   Primer: Pro Industrial Pro-Cryl Primer, B66W01310
   Finish: Apply two coats
   S-W: Industrial Enamel, B54W00101

Option: S-W: Pro Industrial Urethane Alkyd Enamel, B54W00151 Series (Urethane Alkyds provide enhanced color and gloss over the standard alkyd enamels)

C. Exterior Wood

Exposed wood of every description.

Primer: S-W: Exterior Latex Wood Primer, B42W8041
Finish: Apply Two Coats:
S-W: A-100 Exterior Latex Satin, A82 Series

D. Interior Gypsum Board and Plaster

1. Latex Finish system:
Primer: S-W: ProMar 200 Zero VOC Interior Latex Primer, B28W2600
Finish Apply Two Coats:
S-W: ProMar 200 Zero VOC Interior Latex Wall Paint
(Flat, B30W12651 / EgShel, B20W12651 / SG, B31W02651)

2. High Touch areas - Microbicidal Latex Finish System – passive system for controlling / killing E-COLI, STAPH and MRSA Infections. With topcoat EPA registered No. 64695-1.
Prime Coat: Primer, latex, interior: S-W ProMar 200 Zero VOC Latex Primer, B28W2600, at 4.0 mils (0.102 mm) wet, 1.0 mils (0.025 mm) dry.
a. First Coat: Microbicidal Latex, interior, matching topcoat.
b. Topcoat: Microbicidal Latex, interior, eggshell:
S-W Paint Shield Interior Latex Eg-Shel Microbicidal Paint, D12W51, at 4.0 mils (0.102 mm) wet, 1.8 mils (0.046 mm) dry, per coat. Brush and roll application only.

3. Ceiling Application:
**Note: Provide flat finish for gypsum board in ceiling applications.
S-W: Pro-Mar Ceiling Paint, A27W05050

4. High Performance System: (All areas not ceiling) ***
Primer: S-W: ProMar 200 Zero VOC Interior Latex Primer, B28-2600
Finish Apply Two Coats:
S-W: Pro Industrial Pre-Catalyzed Waterbased Epoxy
(K45W1151 Egshel, K46W1151 S/G)

Provide at all wet areas
S-W: Pro Industrial Waterbased Catalyzed Epoxy, B73 Series
(EgShel, B73-360 / Gloss, B73-600)

E. Exterior Exposed Concrete and/or Clay Brick Masonry
Primer: Loxon Exterior / Interior Concrete & Masonry Primer / Sealer, LX02W0050
Block Filler:S-W: Pro Industrial Heavy Duty Acrylic Block filler, B42W00150
Finish:
S-W: A-100 Exterior Latex

Sheen indicated on Finish Schedule

F. Interior Concrete and Concrete Masonry
1. Concrete Masonry Surfaces shall be filled unless noted otherwise.
Prime: Pro Industrial Heavy Duty Acrylic Block Filler, B42W00150

Finish Apply Two Coats:
S-W: Pro Industrial Pre-Catalyzed Waterbased Epoxy
(K45W1151 Egshel, K46W1151 S/G)

Provide at all wet areas
S-W: Pro Industrial Waterbased Catalyzed Epoxy, B73 Series
(EgShel, B73-360 / Gloss, B73-300)

a. Note: Block Filler should achieve a smooth pinhole free appearance.
b. This is necessary for proper protection before top coat is applied.
c. Apply at recommended film thickness and spread rate as indicated by manufacturer.
d. Architect requires manufacturer' inspection between block filler and top coat.

2. Concrete (Cast in Place or Precast)
Primer: Loxon Exterior / Interior Concrete & Masonry Primer / Sealer
LX02W0050
Finish Apply Two Coats:
S-W: Pro Industrial Pre-Catalyzed Waterbased Epoxy
(K45W1151 Egshel, K46W1151 S/G)

3. **Concrete Sealer:** Concrete MUST be etched, with H&C® Concrete Etcher or muriatic acid, following label directions.

Reducer/Cleaner --- Aromatic 100, R2K5, or R7K65
Brush – Use natural bristle brushes
Roller – Use a ¼" – 3/8" nap woven or other solvent-resistant cover
Freshly stained or painted surfaces will require cure time before any application of this H&C® High Performance Industrial Clear. Follow manufacturer's instructions and recommendations.

G. Interior Wood Doors and Natural Finish Wood
One (1) coat - Stain, of selected color,
S-W: MinWax Performance Interior Wood Stain
Or One (1) coat – S-W: Minwax Performance Polyurethane Varnish

H. Stenciled Wall Identification
Provide one coat red color stencil identification on walls above ceilings of corridor, Smokestop, Horizontal Exit, enclosures and Firewalls. Wording shall be:
1. Wording for fire walls shall indicate the rating and:
Fire Barrier - Protect All Openings
Both sides of wall are to be stenciled above the ceiling with one stencil sign to be placed above ceilings on all separate areas and maximum of 20'-0 o.c.
2. Wording for smoke barriers:
Smoke Barrier - Protect All Openings
Both sides of wall are to be stenciled above the ceiling with one stencil sign to be placed above ceilings on all separate areas and maximum of 20'-0 o.c.

I. Exterior Ground Mount and Roof Top Mechanical Units, Equipment and Accessories. Painting contractor shall examine the site and all drawings and provide one (1) heavy coat of paint for each unit. Provide also one (1) coat primer for galvanized and/or rust areas.

K45-151 Series	350-400	4.0	1.5

J. Exposed Ceiling Painting (Dryfall)
Primer: Pro Industrial Pro-Cryl Primer (1 coat)
Finish: Waterborne Acrylic Dry Fall Flat (1-2 coats)
B42W00001

3.3 Material Application

A. All materials shall be applied in complete accordance with manufacturer's printed instructions.

B. All coats shall be thoroughly dry before the succeeding coat is applied.

END OF SECTION

1.0 - GENERAL

1.1 Scope

The work required under this section consists of room & wall signage.

1.2 Existing Conditions

A. It is the general contractor's responsibility to field verify existing signage before a bid and provide signage that shall match all existing signage types and styles currently installed to provide a continuity of design to the owner as required.

1.3 Submittals

A. Submit a sample of signs, including size, lettering style, materials, and finish.

B. Provide mounting templates.

C. Signs shall conform to requirements as set forth by the AMERICANS WITH DISABILITIES ACT Accessibility Guidelines.

D. Submit the schedule indicating each room name and number indicated on Architectural Drawings with a corresponding space for the Owner's markup for the actual room name and number per school system of each room name and number along with sign type to the Architect for review.

2.0 – PRODUCTS

2.1 Manufacturers

Subject to compliance requirements. Provide products by the following.

1. Leeds Architectural Letters, Inc. (Basis Of Design)
2. Devaney Sign Service, LLC
3. Bellco Sign & Engraving Specialists

2.2 Room and Wall Signs Standards

A. Provide photopolymer signs with Grade II Braille 3/4" numerals and 5/8" Letters to comply with ADA (American Disability Act). Signs shall be color selected from the manufacturer's full line of colors.

B. Room signs with message insert to have 1/16" front plate, minimum 1/32" solid spacer (no tape spacer), and 1/8" back plate.

C. Room Signs (no message slot)- minimum 1/8" thick with 1/32" raised letters.

D. Elevator and Stair Signs to be 6 x 6 and 1/8" thick with 1/32" raised letters.

E. Exterior Signs - Exterior Aluminum .040 thick, factory painted, and text to be silkscreened or inkjet print.

F. Edge Condition - Square Cut.

G. Corners - Round.

H. Mounting:
   1. Sheet Rock – double-sided tape
   2. Block or Brick – double-sided tape and silicone
   3. Signs to be mounted with screws and anchors if specified.
   4. Signs mounted on the wall adjacent to the latch side of the door 60" from floor to centerline of signs and 2" from the edge of the door frame to edge of the sign.

2.3 Typical Signage Schedule (refer to Architectural Signage Plan in construction documents)

A. All Offices, Classrooms, and Instructional Areas shall be 6" x 8" with a 2-1/2" x 8" changeable clear message insert unless otherwise indicated. **Refer to Item 1.2, Item A for existing signage conditions**

B. All other interior door signs except corridor and vestibule doors shall be a 6" x 6" with no message strip.

C. All restrooms shall have a minimum 6" x 8" sign with pictogram area with an additional area for raised copy and Braille.

D. 6" x 6" signs at all elevators on all floors. (Use Stairs in Case of Fire...etc.) if applicable.

E. 6" x 6" Stair Sign at every stair on all floors with pictogram if applicable.

F. 3" x 7" area of refuge sign with raised copy and Braille as indicated on the Life Safety Plans

G. Provide Framed Signage with Clear View Window. Frame to Match Interior Signage Cover) to accommodate an 8.5 x 11 Landscape Floor Plan. Provide two (2) per Classroom and Assembly Area.

H. 6" x 6" tactile exit sign at all interior exit doors leading directly to the exterior with raised copy and Braille. (Identified as **EXIT** on signage plan)

I. Occupant Load Sign to be provided at every Auditorium, Gymnasium, and Cafeteria (**Assembly Areas**) as required by IBC Section 1004.3

J. Storm Shelter Signage (**See Life Safety Plan if applicable**)

   1. Provide the following Storm Shelter Signage as required by ICC 500-2014 and as indicated on the storm shelter plan located within architectural drawings.
      a. Provide a 12" x 16" storm shelter plaque which shall be located within each storm shelter, as indicated.
      b. Provide 8" x 8" storm shelter sign, location as indicated.
      c. Provide 4" x 7" storm shelter instruction signs on each face of all storm doors as indicated.
      d. Provide an 8"x8" sign adjacent to all doors leading to electrical equipment rooms containing stationary battery systems indicating "APPLY NO WATER," along with the type of battery system and current maintenance contact information

2.4 Pictorial Signs

A. Provide 12" x 18" baked enamel on metal sign with International Symbol for Accessibility Wheelchair and lettering "Physically Handicapped Parking Only." Each sign shall have a "Van Accessible" sign mounted to the post.

B. Provide Traffic Control signs as indicated on drawings and in accordance with the State of Alabama Highway Department Manual on Uniform Traffic Control Devices.

2.5 Project Sign - Specification requirements are listed in Section 01030.

3.0 - EXECUTION

3.1 Installation of Signs
Install signs on surfaces and at heights as directed.

3.2 Install "Physically Handicapped Parking Only" sign at Handicapped Parking Spaces as indicated.

3.3 Install Traffic Control Signs in accordance with State of Alabama Highway Department Manual on Uniform Traffic Control Devices.

END OF SECTION

PART 1 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, shall apply to work specified in this section.

1.2 General Description of Work

A. Work in this section shall include design, fabrication and installation of a complete rod supported extruded aluminum canopy system in accordance with the drawings and this specification.

1.3 References

A. Aluminum Design Manual 2000, Specifications & Guidelines for Aluminum Structures.

B. ASCE 7, Minimum Design Loads for Buildings and Other Structures.

C. American Architectural Manufacturers Association (AAMA)

D. American Society for Testing and Materials (ASTM)

1.4 Related Sections

A. Concrete Work - Section 03300

B. Masonry Work - Section 04200

C. Miscellaneous Metals - Section 05500

D. Flashing and Sheet Metal - Section 07600

E. Sealants - Section 07900

1.5 Submittals

A. Product Data: Submit manufacturer's product information, specifications and installation instructions for components and accessories.

B. Shop Drawings: Submit complete erection drawings showing attachment system, column and gutter beam framing, transverse cross sections, covering and trim details, and optional installation details to clearly indicate proper assembly of components, sealed by a State Registered Structural Engineer registered in the state in which the work is being performed.

C. Calculations: Submit complete structural design calculation sealed by State Registered Structural Engineer registered in the state in which the work is being performed.

D. Design and engineering of attachment surfaces are not covered in this specification and scope of work.

1.6 Quality Assurance

A. Codes and standards: Comply with provisions of the following except as otherwise indicated: 2021 International Building Code, latest addition with amendments, if any. AWS (American Welding Society) standards for structural aluminum welding.

B. Manufacturer: Obtain aluminum covered walkway system from only one (1) manufacturer, although several may be indicated as offering products complying with requirements.

C. Installer Qualifications: Firm with not less than three (3) years experience in installation of aluminum walkway covers of type, quantity and installation methods similar to work of this section.

D. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to insure proper fitting of work.

E. Coordination: Coordinate work of this section with work of other sections which interface with covered walkway system (sidewalk, curbs, building fascias, etc.).

1.7 Warranty

A. Provide manufactures standard one-year warranty that shall include, but not limited to, coverage for structural, water tightness and finish beginning the day of Substantial Completion of Installation.

PART 2 - PRODUCT

2.1 Manufacturers

Canopy shall be Tennessee Valley Metals, Peachtree Protective Covers, Inc., Superior Metals, Mitchell Metals or approved equal as long as they meet or exceed Specifications and adhere to drawing details.

2.2 Materials

A. Aluminum Extrusions: All sections shall be extruded aluminum 6063 alloy, heat treated to T-6 temper.

B. Finishes: For factory baked enamel finish, specify AAMA 603.8 standard or custom color.

For fluoropolymer (Kynar) finish, AAMA 605.2, two or three coats.

For satin anodized finish, specify 204.R1 meeting Aluminum Association specification AA-M-10C- 22A21.

2.3 Components

A. Support rods: Rods shall be 2" tubular shapes as per manufacturer's standard. (Rod and clevis is available as an option.)

B. Deck: Deck shall be extruded self-flashing sections interlocking into a composite unit.

C. Fascia: Fascia shall be manufacturer's standard shape. Size as indicated on drawings.

D. Flashing: Flashing shall be .032" aluminum (min.). All thru-wall flashing is completed by others.

E. Scuppers: Scupper plates shall be used to drain water from the canopy fascia. (Downspouts are available as an option).

F. Fasteners: All exposed fasteners shall be stainless steel.

2.4 Fabrication

A. Drainage: Water shall drain directly from the fascia and be diverted by a scupper plate (or into downspout and discharged at ground level).

B. Deck Construction: Deck shall be manufactured of extruded modules that interlock in a self- flashing manner.

PART 3 - EXECUTION

3.1 Preparation

A. Erection shall be performed after all concrete, masonry, and roofing work in the vicinity is complete and cleaned.

3.2 Installation

Protective cover shall be erected true to line with adequate slope for drainage. Adequate framing members and/or blocking shall be provided in the wall structure (by others) to safely support the canopy.

3.3 Cleaning

A. All protective cover components shall be cleaned promptly after installation.

3.4 Protection

A. Extreme care shall be taken to protect materials during and after installation

END OF SECTION

1.0 - GENERAL

1.1 Scope
The work under this section consists of all toilet accessories.

1.2 Samples
Returnable samples to be furnished upon request.

1.3 Manufacturer
Catalog numbers indicated in the schedule are from Bobrick Company catalog unless indicated otherwise. Equivalent products as manufactured by American Specialties, Inc., or Bradley, will be acceptable.

2.0 - PRODUCTS

2.1 List of Fixtures

A. The following list of accessories is essentially complete; however, the contractor shall examine the drawings carefully and shall supply such items not specifically called for to provide a complete installation.

B. Fixtures shall be supplied as follows:

1. Feminine Napkin Disposal - Model B-270, surface mounted, stainless steel finish. One per toilet compartment. (Female Only. Mount on opposite wall of toilet paper dispenser.) Provide at all Unisex Toilet locations.

2. Framed Mirror - Model B-165-1830, surface mounted, stainless steel finish. One per lavatory where noted. Custom mirrors are specified under Section 08810 - Glass and Glazing.

3. Grab Bars - Model B6806 (or 6861 at Shower Stall as indicated), 1-1/2" diameter, surface mounted with B-2571 anchors at masonry walls, stainless steel finish. Provide per ADA requirements at Handicapped Toilet Compartment and Shower Stall.

4. Mop and Broom Holder - Model B-223 x 36" surface mount, stainless steel, Type 302 (18-8) satin finish. Holders spring loaded, rubber cam with plated steel retainer. Mounting height 6'-0" floor to top. One per service and/or mop sinks.

5. Coat hook with bumper - Model B-212, surface mount aluminum casting with satin finish to match stainless steel. Bumper is hard rubber secured with drive screw. Note: provide one (1) in toilet rooms without stalls.

6. **Baby** Changing Station **(TODDLER)** – Model KB200-01 Koala Kare Products; Wall Mounted Horizontally per manufacturer's recommended mounting height and per ADA requirements.

2.2 Finishes

A. All fixtures specified or cataloged to be stainless steel shall be type 302 (18-8) with satin finish.

B. All fixtures specified or cataloged to be chrome finish shall be triple plated with heavy chrome over nickel and copper.

C. Mirrors shall be 1/4" electro-copper backed plate glass.

3.0 - EXECUTION

3.1 Attachment

A. All fixtures shall be secured to walls or partitions in the most secure method possible. Fixtures mounted singly against concrete block shall be secured with toggle bolts.

B. The proper mounting accessories shall be furnished with each item.

C. Contractor shall verify with Architect, the mounting locations and heights before installing accessories.

END OF SECTION

A. 1.0 - GENERAL

1.1 Summary

A. The Work required under this Section consists of providing gymnasium equipment complete with, accessories and necessary mounting, and installation hardware.

B. Related Work Specified Elsewhere

1. Division 3, Concrete; set the volleyball sleeves.
2. Division 5, Metals Sections: Structural steel and steel joints
3. Division 7, Waterproofing
4. Division 9, Finishes; install volleyball sleeve cover plates.
5. Division 16, Electrical; coordinate all electrical.

1.2 Submittals

A. Comply with Section 01350 – Submittal Procedures.
B. Product Data: Submit manufacturer's product data, including materials, components, fabrication, finish, and installation instructions.
C. Shop Drawings:
   1. Submit manufacturer's shop drawings, including plans, elevations, sections, and details, indicating locations, quantities, dimensions, tolerances, materials, fabrication, connections, hardware, fasteners, finish, electrical wiring diagrams, options, and accessories.
   2. Show location and detail of attachment to building structure.
D. Samples: Submit manufacturer's color samples
E. Design Data:
   1. Basketball Backstops:
      a. Submit manufacturer's design data, indicating static loads and point reactions.
      b. Submit calculations complete, showing hanger and hoist pulley points.
      c. General load charts or generic product laboratory test data will not be considered sufficient data.
F. Test Reports: Submit manufacturer's certified test reports from testing performed by accredited independent testing laboratory, indicating compliance of materials with requirements as specified.
G. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
H. Manufacturer's Project References: Submit manufacturer's list of recently completed projects, including project name and location, name of architect, and type and quantity of gymnasium and play field equipment installed.
J. Warranty: Submit manufacturer's standard, lifetime, and additional warranties.

1.3 Project Conditions

A. Loose items of equipment shall be turned over to the Owner after un-packaging or uncrating, and checking for proper type, material, size and fit of each accessory. Obtain receipt from Owner for items turned over. No claim may be made for items turned over to the Owner without obtaining a receipt.

1.4 Coordination

A. Coordinate with Divisions 15 and 16 contractors for installation of the gymnasium equipment. Also coordinate with the Architect for exact locations.

B. Field Verify existing conditions and coordinate the work of the section accordingly.

1.5 Warranty

A. Provide 1-year warranty against defects in materials and workmanship, unless otherwise specified.

1.6 Quality Assurance

A. Single Source Responsibility: Provide gymnasium and play field equipment from single manufacturer.
B. Manufacturer's Qualifications: Minimum of 5 consecutive years' experience manufacturing gymnasium and play field equipment similar to that specified.
C. Installer's Qualifications: Trained and approved by manufacturer.
D. Regulatory Requirements: Gymnasium and play field equipment shall conform to latest rules and regulations.
   1. Federation Internationale de Football Association (FIFA).
   2. International Basketball Federation / Federation International de Basketball (FIBA).
   3. National Association for Girls and Women in Sport (NAGWS).
   4. National Basketball Association (NBA).
   5. National Collegiate Athletic Association (NCAA).
   6. National Federation of State High School Associations (NFHS).
   7. USA Volleyball (USAV).

2.0 - PRODUCTS

2.1 Materials

A. Products of the following manufacturers are acceptable, providing their products equal or exceed the quality specified. Minor differences in construction and products are recognized to exist and may be acceptable. These variations must be submitted to the architect at least 10 days prior to bid date. Acceptance will be established by addendum.
   1. Basis of Design: Porter Athletic, Champaign, Illinois
   2. Other Acceptable Manufacturers – Draper and JayPro.

2.2 General

A. Equipment shall be provided complete as per manufacturer's standard catalog description and specifications for the numbers indicated in the schedule. Equipment to be permanently installed shall be complete and ready for use.
B. Materials and finishes shall be non-corrosive in type and quality of finish noted or as a part of the manufacturer's printed description or specifications.

2.3 Forward Fold Front Braced Bent Mast overhead-supported basketball backstop

A. Model No. 950W 32'-40' Attachment Height

1. Frame: Vertical Front Frame Assembly: Main center mast of 6-5/8-inch O.D. heavy-wall structural steel tube with diagonal side-sway braces of 2-3/8-inch O.D. structural pipe
2. Structure: Supported from 3-1/2-inch O.D. pipe or tube anchored to overhead framing members with heavy formed-steel support fittings. Fittings must be capable of supporting load exceeding 10,000 pounds with sufficient attachment points and meeting safety factor of 60 to 1. Furnish certified test results with submittals.
3. Goals: Mount directly through backboard and into heavy structural steel weldment Center-Strut, clamped to vertical 6-5/8-inch O.D. center support to eliminate strain on backboard, should player hang on front-mounted goal and to be in compliance with NCAA and NFSHSA requirements.
4. Pipe Ends: Cap when exposed.
5. Finish: Metal Parts, Pipes, and Fittings shall be powder coated, color specified at later time
6. Attachments: Clamping devices used in attaching backboards and other components shall be of saddle clamp design providing uniform clamping force around mast, Clamps that provide non-uniform clamping will not be considered equal.
7. Safety Indicator Clamp Required: Mast Attachment Indicator must be capable of supporting backboard and all weight attached to the mast with a minimum safety factor of 4, with visible indication if indicator clamp is supporting weight or if any attachments have moved.
8. Frame Hangers: Tested to 20,000 pounds maximum breaking point to achieve safety factor of 50 to 1. Furnish certified test results with submittals. Minimum of 2-inches of adjustability for precise plumbing of backstop.
9. Brace: Operate with 2-3/8-inch O.D. brace with folding mechanism that locks backboard in playing position with internal torsion spring that must be mechanically disengaged by the hoist cable.
10. Warranty: 25 Year limited warranty on backstop structure

2.4 Rectangular Glass Backboards

A. Basketball Backboards: Model No. 208 rectangular backboard by Porter Athletic, Champaign, Illinois
   1. Provide for each Model #: 950W backstop.
   2. Backboards: 2-5/16-inch thick frame, 72 inches by 42 inches, 1/2-inch tempered plate glass cushioned in unitized steel-tubing frame.
   3. Perimeter: Glare-free aluminum.
   4. Standard White Borders and Target Area: Fired into glass permanently.
   5. Warranty: limited lifetime warranty against breakage.

B. Basketball Backboard Padding: Model No. 326 Pro Pad bolt-on positive-attachment backboard pad.
   1. Provide for each rectangular glass backboard, along bottom of backboard and up 15 inches on each side, meeting NCAA and NFSHSA rules.
   2. Pads: 2-inch thick, molded from 9-pound density polyurethane foam with integral skin.
   3. Color: To be selected by Architect from Porter Athletic's standard color offerings
   4. Warranty: 8 years.

2.5 Basketball Goals

A. Basketball Goals: Model No. 00256-500 Torq-Flex adjustable goal as manufactured by Porter Athletic, Champaign, Illinois
   1. Provide for each Model No. 950W backboard.
   2. Compliance: Meets NCAA and FIBA recommendations for rebound performance.
   3. Steel Torsion-Rod Pivot/Tension Mechanism: Ensure goal maintains original elasticity and rebound characteristics for minimum of 5 years. Provides maintenance-free goal.
   4. Net Attachment: Tube-tie net attachment on rim to eliminate conventional wire-formed net locks. Prevents players from injuring fingers during play.
   5. Mounting Goal: Goal mounted to backboard with concealed hardware.
   6. Net: Anti-whip, white net.
   7. Finish: Official orange powder coated.
   8. Warranty: limited 5 year warranty

2.6 Electric Winch

A. Basketball Backstop Winches, General:
   1. Hoist Cable: Of sufficient length to each backstop. 1/4-inch diameter galvanized aircraft-type cable, minimum of 7,000 pounds ultimate.
   2. Swivel Pulleys: 4-inch diameter cast ductile iron pulley sheave with maintenance-free, oil-impregnated bearing for proper hoist cable routing to winch.
   3. Pulley Assembly and Attachment to 3-1/2-Inch O.D. Support Structure: Rated at minimum 9,000-pound load rating. Furnish certified test results with submittals.

B. Heavy-Duty Electric Winches:
   1. For each Model No. 950W backstop.
   2. Hold units at any position when raising or lowering.
   3. Electric Motor: Individually operate units by 3/4-hp, 13-amp, capacitor-type, 60-cycle, 115-V AC, single-phase, electric motor with automatic thermal-overload protection, manufactured to NEMA specifications.
   4. Fully Enclosed Gear Set: Set in oil bath and factory sealed to eliminate need for lubrication.
   5. Cable Drum: Grooved to provide neat and consistent cable tracking.
   6. Gear Shaft: Connect directly to drum hoist without use of chain.
   7. Warranty: limited 5 year warranty

2.7 Touch-Pad Master Control System: Powr-Touch Control System

A. Touch-Pad Master Control System: Model No. 12555100 Powr-Touch 2.5 simultaneous operation gymnasium control center.
   1. Operation: Push-button control system capable of operating a maximum of 128 basketball backstops or other gymnasium equipment and a maximum of 32 units of auxiliary gymnasium electrical equipment.
   2 Operation Safety: For safety of operation, touch pad requires constant pressure on pad button to control gymnasium equipment.
   3. Control of Auxiliary Equipment: Single touch of appropriate button.
   4. Basketball backstops or height adjusters shall be operated individually or simultaneously by pressing single button.

5. Each Relay: Programmed to accept 8 memory address assignments for a maximum of 8 different operation combinations for each basketball backstop, height adjuster, or curtain. Operate 1, 2, 3, and up to 8 units individually or simultaneously, curtain simultaneous maximum is 4 units.
6. Desired Operation Mode: Selected at touch pad by entering assigned backstop, height adjuster, or curtain number or combination backstops or height adjusters number.
7. Security Code: Four-digit reprogrammable security code to prevent unauthorized use.
8. Time Delay: Touch pad shall automatically revert back to secure mode if no button is used within 30 seconds.
9. Multiple Locations: Maximum of 7 touch pads may be used when operation from various locations is desirable.
10. Mounting: Flush mounted in standard 2-gang electrical box, 4 inches by 4 inches by 2-1/2 inches, with 12-volt control circuit to relay panels located on walls or roof framing structure.
11. Relay Panels: Minimum of 1 dual-powered relay panel, with a maximum of 16 relay panels per network. Each relay panel shall contain 2 banks of eight 30-amp relays for operating 8 momentary-controlled type (up and down), 120-volt or low-voltage pieces of equipment. Each bank of relays shall be independently powered by 120-volt line power, with 2 dedicated circuit breakers per relay panel. Each relay panel shall include 2 maintained 30-amp relays.
12. Relay Panel Enclosure: 4-3/8 inches by 14 inches by 17 inches.
13. Touch Pad LEDs: Tri-color LED at touch pad for positive user feedback. Illuminates when proper security code is entered (green), when confirming touch pad button is fully depressed (amber), and while operating equipment up or down (red). Additional LEDs at touch pad and relay panel circuit boards to ensure system is receiving power, wired correctly, and relays are functioning properly.
14. Touch Pad Wiring: Fuse protected for additional circuit protection.
15. Warranty: limited 5 year warranty

B. Wiring: Install electric power and hook-up of electric controllers.
1. Materials: Conduit, wire, and boxes for power and control of key switches, touch pad, and motors to be furnished and installed as specified in Division 16 (Division 26) electrical section.
2. Hook-Ups: Complete and final hook-up of motors and electrical devises as specified in Division 16 (Division 26) electrical section.

2.8 Backstop Auto Lock Safety Strap

A. Safety Locks: Model No. 797 Saf-Strap safety lock.
1. For each Model No. 950W backstop.
2. Lock: Inertia sensitive to automatically lock basketball backstop in position at any time in storage or during raising or lowering cycle, due to sudden surge of speed created by possible malfunction of hoisting apparatus.
3. Reset: Fully automatic reset requiring no poles, ropes, levers, or buttons.

2.9 Electric Basketball Backstop Height Adjuster

A. Height Adjustment Units:

1. For each Model No. 950W court backstop, height adjustment unit for adjusting goal height to any position between 8'-0" and 10'-0" above floor, with Center-Strut direct-goal attachment to eliminate strain on backboard.
2. Height Scale: Located on side of slide tube to visually determine height settings.
3. Guide Tubes: Fabricated with dual, 2-3/16-inch square, heavy-wall, zinc-plated, guide tubes. Tubes to be welded to upper and lower clamps that attach securely to 6-5/8-inch diameter backstop mast. Tubes shall support heavy steel center weldment, which shall support backboard and be factory drilled for direct goal attachment.
4. Warranty: limited lifetime warranty against breakage for backboards mounted on height adjustment unit.

B. Provide height adjustment with compact, 115-volt, 60-Hz, electric gear motor linear actuator, providing 600-pound thrust capacity to raise and lower unit.
1. Integral Limit Switches: Automatically shut off when goal height reaches 8'-0" and 10'-0".
2. Motor: Controlled by Sportsonic radio-controlled system.
3. Transmitter: Provide 1 Sportsonic portable hand-held transmitter for each project site. Capable of operating basketball backstop and/or gymnasium divider curtains.
4. Receiver: Provide for each height adjuster, Sportsonic commercial-type receiver coded to operate with transmitter. Factory wired and installed in standard 9-1/2-inch by 6-inch by 3-1/2-inch metal enclosure with 54-inch long flex conduit with twist-lock grounded plug attached.

2.10 Volleyball Floor Plate/Sleeves

A. Floor Sleeves and Cover Plates: Model No. 00870200 floor sleeve.
1. Floor Sleeve: 3-3/4-inch O.D. heavy-wall steel tubing, extending 9 inches into grout footing.
2. Cover Plate: Brass plated. 5-inch O.D. by 1/2-inch thick recessed collar, cork gasket, and cover.
3. Swivel Retainer Pin in Collar: Prevent theft.
4. Cover removal key.

2.11 Volleyball Standards

A. Volleyball Systems: Model No. 01971-000 Powr-Rib II volleyball system.
1. Standards: 3-1/2-inch O.D., high-strength, lightweight, aluminum Alloy 6063-T6, with 2 internal reinforcing ribs for maximum rigidity and minimum deflection. Include height-marking labels.
2. Volleyball Upright: Equipped with sliding-collar devices with spring-loaded pin to guide height setting collar up and down standard without rotating. Height settings secured with pressure-locking T-handle assembly.
3. Collar: Allow volleyball standard to be infinitely height adjustable for instant net height setting for volleyball, badminton, and tennis. Lock in place with pressure-locking T-handle.
4. Each System: 1 winch post and 1 end post.
5. Winch Post: Equipped with heavy-duty power winch.
6. End Post: Collar assembly for net tie-off.
7. Power Winch: Heavy-duty, self-locking ratchet with disc-brake release mechanism for safest tensioning system. 1-3/4-inch wide, high-tensile,

nylon strap and durable snap hook. Removable handle to prevent unauthorized use.

8. Cap: Molded cap on top and bottom to protect against gymnasium floor damage.
9. Finish of Post: Clear anodized.
10. Warranty: limited 5 year warranty

2.12 Protective Padding

A. Model No. 00839-000 protective padding
   1. Compliance: Meet current competition requirements as prescribed by USAV, NFHS, and NCAA for player protection and safety.
   2. Padding: Extend to height of 6'-0".
   3. Construction: Firm, 1-1/4-inch thick, closed-cell protective filler. Covered in durable, vinyl-reinforced fabric. Velcro closure.
   4. Each Pad: Tailored with 4 vertical, miter cuts to fold around upright and store compactly.
   5. Pads Installed on Uprights: Narrow profile of 7-1/2 inches by 11-1/4 inches, to provide for maximum visibility for judges and spectators.
   6. Color: To be selected by Architect from Porter Athletic's standard color offerings
   7. Net Attachment: One side of pad has cut-out to accommodate net attachment.

2.13 Volleyball Nets

A. Model No. 02295-xxx volleyball net.
   1. Compliance: Meet requirements of USAV, NCAA, NFHS, and NAGWS.
   2. Nets: 32 feet by 39 inches with 42'-6", 1/8-inch diameter galvanized cable along top.
   3. End Hems: 4-inch width with 1/2-inch diameter fiberglass dowel to provide rigidity and tailored square hanging net.
   4. Each End Hem: Equipped with three 1-inch wide polypropylene web-tension straps and quick-adjust tension clips.
   5. Netting: 4-inch square, heavy-duty, #24 black nylon mesh with 2-inch wide, vinyl-coated, polyester hem double-stitched across top of net.

2.14 Net Antenna / Boundary Markers

A. Model No. 02296-100 Powr-Line net antenna with clamp.
   1. Antenna Clamps: Included with net antenna. As 1 complete unit, clamps shall snap easily and securely into place.
   2. Antenna Size: 3/8-inch diameter by 6-foot long fiberglass dowels.
   3. Antenna Markings: Alternately marked red and white.

B. Boundary Markers: Model No. 02297 boundary markers.
   1. 2-inch wide, durable, white, polyester-reinforced vinyl material with white Velcro attachment strips sewn in place for securing to competition volleyball net.

2.15 Volleyball System Storage

A. Volleyball Storage and Transport Carts: Model No. 00956-100 volleyball storage/transport system.
   1. Capacity: Store and transport 6 sleeve-type volleyball standards, 1 judge's stand with pads, 3 nets including antennae, and 3 sets of upright pads.

2. Overall Size: 4'-3/8" in length, 3'-2-1/4" in height, and 2'-6-1/4" in width, to allow transporter to pass through typical 3-foot wide doorway.
3. Frame: Heavy-duty steel transport frame. Heavy-wall, 2-1/2-inch by 1-1/2-inch rectangular steel tubing.
4. Hooks: Heavy-formed steel hooks. Provided on side diagonal frame members for storage of standards. Covered in vinyl material to protect finish on upright posts.
5. Storage Pouch: Large vinyl nylon net storage pouch. Provided with tunnel loops and Velcro flaps for attaching to transport frame.
6. Casters: Bottom of transport on four, 3-1/2-inch diameter, heavy-duty, swivel casters.

2.16 Protective Wall Padding

A. Non-fire Retardant Wall Padding: Model No. 00560-0XX HiNRG SAFPAD.
1. Shock Absorption: ASTM F 2440, meet minimum standard.
   a. Maximum Drop Height: 5 feet.
   b. gmax: 166.5.
   c. HIC: 656.5.
2. Cover Material: Designated as flame resistant in accordance with NFPA 701 and State of California, Registered Fabric No. F-140.
3. Wall Pad Dimensions: 2'-0" wide by 6'-0" high.
4. Nailing Margin: 1-inch nailing margin top and bottom for securing panels to wall.
5. Foam: 2-inch thick, rebonded foam.
6. Interior Foam: Bonded to 7/16-inch OSB to minimize warping.
7. Entire Face of Panel, Including Nailing Margins: Upholstered in 14-ounce, fire-retardant, high-tensile, vinyl-coated polyester fabric material with leather-like embossed finish.
8. Cover Material Tear Strength: 100 psi.
9. Cover Material Properties: Mildew resistant, rot resistant, with infection-combating fungicide.
10. Fold and securely staple cover to backside of OSB.
11. Color: To be selected by Architect from Porter Athletic's standard color offerings

3.0 - EXECUTION

3.1 Preparation

A. Make such arrangements as necessary to provide scaffolding to perform Work under this Section. Damage to floors, walls, equipment and the like shall be corrected at the expense of Contractor under this Section.

3.2 Installation, General

A. Install equipment in accordance with manufacturer's printed instructions, drawings, specifications and approved shop drawings. Complete equipment field assembly, where required.

B. Unless otherwise indicated, install gymnasium equipment after other finishing operations, including painting, have been completed.

C. Permanent Gymnasium Equipment: Rigid, level, plumb, square and true; anchored securely to supporting structure; positioned at locations and elevations indicated on Shop Drawings; in proper relation to adjacent construction; and aligned with court layout.

1. Floor Insert Location: Coordinate location with application of game lines and markers.
2. Floor Insert Elevation: Coordinate installed heights of floor insert with installation and field finishing of finish flooring and type of floor plate.

D. Floor Insert Setting: Grout sleeve for post standards in oversized, waterproofed recessed voids in concrete slabs. Clean holes of debris. Position sleeve and fill void around sleeves with grout, mixed and placed to comply with grout manufacturer's written instructions. Verify that sleeves are set plumb, aligned and at correct height and spacing and held in position during placement and finishing operations until grout is cured. Set insert so top of unit is flush with finished flooring surface.

E. Portable Gymnasium Equipment: Assemble in place to verify equipment and components are complete and in proper working order. Disassemble portable gymnasium equipment after assembled configuration has been approved by Architect and store units in location indicated on Drawings.

3.3 Demonstration

A. Work under this Section shall include demonstrating the proper use and operation of equipment to the Owner as required. Instruct Owner's designated authorized personnel in properly handling, assembling, adjusting, disassembling, transporting, storing and maintaining units.

END OF SECTION 11480

1.0 - GENERAL

1.1 Summary

A. The Work required under this Section consists of providing Gymnasium Divider Curtain System with accessories, hardware mounting and installation.

B. Related Work Specified Elsewhere:

1. Section 09510 - Acoustical Ceilings
2. Division 15 - Mechanical
3. Division 16 - Electrical

1.2 Submittals

A. Submit in accordance with Division 1 requirements.

B. Shop drawings shall indicate the model, type of material, finishes, attachments and details of construction. Provide layout of gymnasium showing location dimensions.

C. Submit color samples and warranties as specified.

1.3 Coordination

Coordinate with contractors providing adjoining and adjacent work.

1.4 Warranty

Provide manufacturer's standard One Year Warranty effective from the date of Substantial Completion.

2.0 - PRODUCT

2.1 Materials

A. Products of the following manufacturers are acceptable, providing their products are equal to or exceed the quality specified herein. Minor differences in construction and products are recognized to exist and may be acceptable. These variations must be submitted to the Architect at least 10 days prior to bid due date. Acceptance will be established by addendum.

1. Basis of Design: Jaypro Sports, LLC, Waterford, Connecticut.
2. Porter Athletic Equipment Company, Broadview, Illinois.

2.2 General

A. Equipment shall be provided complete as per manufacturer's standard catalog description and specifications for the numbers indicated in the schedule. Equipment that is to be permanently installed shall be complete and ready for use.

B. Materials and finishes shall be non-corrosive in the type and quality of finish noted or as a part of the manufacturer's printed description or specifications.

2.3 Walk-Draw Divider Curtain

A. Lower section of curtain shall be solid vinyl coated polyester (18 oz.). Flammability rated as self extinguishing by the California State Fire Code. All seams to be welded with a full 1" contact weld. Outer edge hems shall be triple turned with double welds. A pocket shall be formed along the bottom edge of the curtain to accommodate a No. 2/0 coil proof chain.

B. Upper section of curtain shall be average 9 oz. per square yard vinyl coated polyester (VCP) mesh. Flammability rated as self extinguishing by the California State Fire Code. Color shall be as specified by the Owner. Vinyl fabric, double thickness, 3" wide with double welds shall form the top edge of the curtain. Grommets located 12" on center for attachment to carriers shall be rolled rim spur type.

C. Track to be heavy duty, double rib aluminum 4" x 1-1/4". Track suspension spacing with beam clamps and hanger brackets shall not exceed 8'-0" on center.

D. Carriers shall be 1-1/8" diameter ball bearing wheels. Spacing shall be 12" centers. Carriers shall be attached to a trim chain that is fastened to the grommets in the top of the curtain. Stack space for curtain shall not exceed 1-1/8" per carrier.

E. Walk draw double bi-parting curtains shall overlap 3'-0" where they come together in the opening. The curtain system shall involve four sections and three overlaps as required to allow passage at side court aisles and at the center.

F. Provide strap system to hold drawn curtain securely in place against the side walls.

3.0 - EXECUTION

3.1 Preparation

Make such arrangements as are necessary to provide installation in sequence with General Contractor’s construction schedule. Provide scaffolding and protection to in-place construction as required to perform Work under this Section. Damage to floors, walls, equipment, and the like shall be corrected at the expense of the Contractor under this Section.

3.2 Installation

A. Install equipment in accordance with the manufacturer’s printed instructions, drawings and specifications, and approved shop drawings.

B. Loose equipment shall be removed from packaging or crating, cleaned and tested for proper operations before turning over to Owner through the General Contractor. Removable items shall be set in the various required positions to be checked for proper fit.

END OF SECTION

1.0 - GENERAL

1.1 Scope
The work of this section consists of furnishing and installing complete, all miscellaneous furnishings, fixtures, and signage items as indicated.

1.2 Existing Conditions
A. It is the general contractor's responsibility to field verify existing signage before a bid and provide signage that shall match all existing signage types and styles currently installed to provide a continuity of design to the owner as required.

1.3 Submittals
Shop drawings shall be submitted.

2.0 - PRODUCTS

2.1 Building Letters
Cast aluminum letters, equal to Leeds Architectural Letters, Inc., Select from all available fonts Size: As indicated on drawings, lay-out as indicated. Colors as selected by Architect. Provide flush concealed stud mounting.

2.2 Building Plaque
A. Dedication plaque shall be of cast aluminum. Furnish and install a 24" x 42" plaque with approximately 500 raised letters and raised border. Field shall have stipple finish. Face of letters and borders shall have ground satin finish surface.

B. Plaque layout and designation shall be furnished by the Architect.

2.3 KnoxBox
Provide one Standard Capacity Model 3274 KnoxBox 3200 - Location as directed by the Architect
Color: (Bronze)
Mount Type: (Recessed Mount)
Tamper Switch Type: (Fire Alarm/Panel)

2.4 Project Sign - Specification requirements are listed in Section 01030.

3.0 - EXECUTION

3.1 Installation
Installation of all items shall be in full conformity with manufacturer's specifications, recommendations, and approved details.

3.2 Installation of Building Letters
Install building letters on surfaces and at heights as directed. Install in accordance with manufacturer's recommendations.

3.3 Installation of Plaque(s)
Install plaque(s) where directed.

3.4 Installation of Appliances
Install appliances as directed. Install in accordance with manufacturer's recommendations.

END OF SECTION

1.0 – GENERAL

1.1 Section Includes

A. Fixed modular laminate clad casework and components.

B. Countertops.

C. Mobile storage units, tables and components.

1.2 Related Sections

A. Blocking within walls where indicated: Division 6.

B. Millwork, trim, and custom cabinetry: Division 6 and 12.

C. Glass: Division 8.

D. Base molding: Division 9.

E. Sinks and service fixtures, service waste lines, connections, and vents: Division 15.

F. Electrical service fixtures: Division 16.

1.3 Quality Assurance

A. Manufacturer: Minimum of 5 years' experience in providing manufactured casework systems for similar types of projects, produce evidence of financial stability, bonding capacity, and adequate facilities and personnel required to perform on this project.

B. Manufacturer: Provide products certified as meeting or exceeding ANSI-A 161.1-2000 testing standards.

C. All manufactured casework systems, countertops and related items herein specified shall be furnished by one contractor to insure single source responsibility, and integration with other building trades.

1.4 Submittals

A. Comply with Section 01350, unless otherwise indicated.

B. Product Data: Manufacturer's catalog with specifications and construction details.

C. Shop Drawings: Indicate dimensions, description of materials and finishes, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures, plus the following specific requirements.

1. Include production drawings for all casework systems and section drawings of all casework, work surfaces and accessories.

2. Indicate locations of plumbing and electrical service field connection by others.

3. Include layout with units in relation to surrounding walls, doors, windows, and other building components.

4. Coordinate production drawings with other work involved.

D. Casework Samples:
1. Component samples: Two sets of samples for each of the following: Decorative laminate color charts / PVC and ABS edgings.

1.5 Product Handling

A. Deliver completed laminate clad casework, countertops, and related products only after wet operations in building are completed, store in ventilated place, protected from the weather, with relative humidity range of 25 percent to 55 percent.

B. Protect finished surfaces from soiling and damage during handling and installation with a protective covering.

C. General Contractor shall be responsible for protection of all casework and tops after installation is complete.

1.6 Job Conditions

A. Environmental Requirements: Do not install casework until permanent HVAC systems are operating and temperature and humidity have been stabilized for at least 1 week.
1. Manufacturer/Supplier shall advise Contractor of temperature and humidity requirements for architectural casework installation areas.

2. After installation, control temperature and humidity to maintain relative humidity between 25 percent and 55 percent.

B. Conditions: Do not install casework until interior concrete work, masonry, plastering and other wet operations are complete.
1. Flooring required to be placed under casework and equipment must be installed prior to installation.

2. Wood or metal blocking (wall grounds) shall be installed within partitions prior to delivery of casework and furnishings to allow for immediate installation on delivery.

3. Walls and openings shall be plumb, straight and square. Concrete floors shall be level within acceptable trade tolerances. Specifically the floor must be within 1/8" of level per 10 foot run, non-accumulative, when tested with a straight edge in any one direction.

4. All overhead mechanical, electrical or plumbing rough-in work shall be complete

5. Ceiling grids (with or without ceiling tiles), overhead soffits, duct work and lighting shall be installed.

6. Painting shall be complete.

7. General Contractor shall provide a secure storage area within the building that is clean, dry, well ventilated, protected from direct sunlight and broom clean.

1.7 Warranty

All materials and workmanship covered by this section will carry a five (5) year warranty from date of acceptance.

2.0 – PRODUCTS

2.1 Manufacturers:

A. Manufacturer:
Casework shall be Stevens, Advanced Cabinet Systems or pre-approved equal. Each manufacturer must be able to provide casework (including selected plastic laminate colors) as specified and detailed in drawings and specifications.

B. Substitutions:

1. Casework of other manufacturers will be considered for pre-approval, providing written request is received and approved at least ten (10) days prior to announced bid date and approved by Addendum. Bidder shall state in writing any deviations from requirements and specifications. The casework shall conform to the configuration, arrangement, design, material quality, joinery, panel thickness, and surfacing of that specified and shown on drawings.

2. Manufacturer must be Architectural Woodwork Institute (AWI) Premium Certified.

3. Requests for product substitutions must comply with Section 01360 – Product Substitution Procedures.

2.2 Materials

A. Core Materials:

1. Particleboard up to 7/8 inch thick: Industrial Grade average 47-pound density particleboard, ANSI A 208.1-1999, M-3.

2. Particleboard 1 inch thick and thicker: Industrial Grade average 45-pound density particle-board, ANSI A 208.1-1999, M-2.

3. Medium Density Fiberboard 1/4 inch thick: Average 54-pound density grade, ANSI A208.2.

4. MR Moisture Resistant Particleboard: Average 47-pound density particleboard, ANSI A208.1 1-1999, M-3.

B. Decorative Laminates: GREENGAURD Indoor Air Quality Certified

1. High-pressure decorative laminate VGS (.028), NEMA Test LD 3-2005.

2. High-pressure decorative laminate HGS (.048), NEMA Test LD 3-2005.

3. High-pressure decorative laminate HGP (.039), NEMA Test LD 3-2005.

4. High-pressure cabinet liner CLS (.020), NEMA Test LD 3-2005.

5. High-pressure backer BKH (.048), (.039), (.028), NEMA Test LD3-2005.

6. Thermally fused melamine laminate, NEMA Test LD 3-2005, color to be selected by architect.

C. Laminate Color Selection: Nevamar, Wilson Art, Formica, Laminart, Arbonite, and Pionite are approved manufacturers. Manufacturer, colors, and pattern shall be selected from premium grade laminate and indicated on finish legend and schedule.

D. Edging Materials:
1. 1mm PVC banding, machine applied; match laminate as schedule
2. 3mm PVC banding, machine applied and machine profiled to 1/8 inch radius; match laminate as scheduled

E. Glass:
1. Wall unit full sliding glass doors: 1/4 inch thick laminated safety glass.

2. Glass insert doors, hinged or sliding wall cabinets: 1/4 inch thick laminated safety glass.

3. Glass insert doors, hinged or sliding tall or base cabinets. 1/4 inch thick laminate safety glass.

4. Sliding doors mounted in aluminum track.

5. Trim glass inserts: Extruded rigid PVC channel and self-locking insert retainer strip.

2.3 Specialty Items
A. Support Members:
1. Countertop support brackets: Epoxy powder coated, 11 gauge steel with integral cleat mount opening and wire management opening.

2. Undercounter support frames: Epoxy powder coated.

3. Legs: Epoxy powder coated.

4. Brackets must support minimum of 600 lbs. without use of cross brace.

2.4 Cabinet Hardware
A. Hinges:
1. 120 degree concealed hinge.
a. Doors 48 inches and over in height have 3 hinges per door.
b. Magnetic door catch with maximum 5 pound pull provided, attached with screws and slotted for adjustment.
c. Finish to be selected by Architect.
d. location for installation shall be noted on schedules on the drawings.

2. 270 degree five knuckle - epoxy powder coated, institutional grade, 2-3/4 inch overlay type with hospital tip. 0.095 inch thick. ANSI-BHMA standard A156.9, Grade 1..
a. Doors 48 inches and over in height have 3 hinges per door.
b. Magnetic door catch with maximum 5 pound pull provided, attached with screws and slotted for adjustment.
c. Finish to be selected by Architect.
d. location for installation shall be noted on schedules on the drawings.

B. Pulls:
One pull shall be: located at the centerline of the drawer, regardless of width, to ensure ease of operation and maximize drawer slide life. Pull design shall comply with the Americans with Disability Act (ADA). Finish to be selected by Architect.
a. Anodized aluminum wire pull, 8mm diameter with 96mm O.C. mounting holes

C. Drawer Slides:

1. Regular, knee space and pencil: 100-pound load rated epoxy coated steel, bottom corner mounted with smooth and quiet nylon rollers. Positive stop both directions with self-closing feature. Paper storage, 150-pound load rated epoxy coated steel slides.

2. File: Full extension, 150-pound load rated epoxy coated steel, bottom corner mounted with smooth and quiet nylon rollers. Positive stop both directions with self-closing feature.

D. Adjustable Shelf Supports:

1. Injection molded transparent polycarbonate friction fit into cabinet end panels and vertical dividers, adjustable on 32mm centers. Each shelf support has 2 integral support pins, 5mm diameter, to interface pre-drilled holes, and to prevent accidental rotation of support. The support automatically adapts to 3/4 inch or 1 inch thick shelving and provides non-tip feature for shelving. Supports may be field fixed if desired. Structural load to 1200 pounds (300 pounds per support) without failure.

E. Locks:

1. Removable core, disc tumbler, cam style lock with strike. Lock for sliding 3/4 inch thick doors is a disc type plunger lock, sliding door type with strike. Lock for sliding glass/acrylic doors is a ratchet type sliding showcase lock.

2. Keying:

For Specifier only: Choose ONE of the following for each lock as shown on drawings. (Verbiage will disappear on final spec)

a. Alike Per Room & Master (100 maximum combinations)

Provide 2 Master keys to owner.

3. Elbow catch or chain bolt used to secure inactive door on all locked cabinets.

F. Sliding Door Track: Anodized aluminum double channel.

G. Coat Rods: 1 inch diameter, 14-gauge chrome plated steel installed in captive mounting hardware.

H. File Suspension System: Extruded molding integral with top of drawer box sides to accept standard hanging file folders.

I. Mirrors: 1/4 inch thick polished mirror plate.

2.5 Fabrication:

A. Fabricate casework, countertops and related products to dimensions, profiles, and details shown. Tall Cabinets: All wardrobe cabinets are to be to be 29" deep unless noted otherwise on architectural drawings

B. All casework panel components must go through a supplemental sizing process after cutting, producing a panel precisely finished in size and squared to within 0.010 inches, ensuring strict dimensional quality and structural integrity in the final fabricated product.

C. Cabinet Body Construction:

1. All cabinet body construction shall be secured utilizing concealed interlocking mechanical fasteners. Construction must meet requirements in the AWS Manual, Edition 2, including errata through 2016 and appendix section.

    a. Tops, bottoms and sides of all cabinets are particleboard core.

    b. Tops, bottoms and sides of sink base units are moisture resistant particleboard core.

    c. Sink Base Countertop substrate shall be 3/4" MR particleboard. Which shall run entire length of sink base unit. Joints or breaks at sink opening shall not be accepted. If necessary breaks shall only be allowed 4' to the right or left of the centerline of the drain.

2. Cabinet backs: Minimum 1/4 inch thick particle board core (maximum of 1/2 inch thick particle board)

    a. Exposed back on fixed: 3/4 inch thick particleboard with the exterior surface finished in VGS laminate as selected.

    b. Exposed back on fixed: 3/4 inch thick moisture resistant particleboard with the exterior surface finished in VGS laminate as selected.

3. Cabinet base and tall units shall have a site-built toe base, constructed of 3/4-inch (minimum) lumber unless otherwise shown on the drawings. Base is 96mm (nominal 4 inch) high unless otherwise indicated on the drawings.

4. Base units, except sink base units: Full sub-top. Sink base units are constructed of 3/4 inch moisture resistant particleboard and the base shelf shall be laminated both sides with cabinet liner.

5. Side panels and vertical dividers shall receive adjustable shelf hardware at 32mm line boring centers. Mount door hinges, drawer slides and pull-out shelves in the line boring for consistent alignment.

6. Exposed and semi exposed edges.
Edging: 1mm PVC.

7. Adjustable shelf core: 3/4 inch thick particleboard up to 36 inches wide, 1 inch thick particleboard over 36 inches wide.
Front edge: 1mm PVC.

8. Interior finish, units with open Interiors: (exposed areas)

    a. Top, bottom, back, sides, horizontal and vertical members, and adjustable shelving faces that are exposed to receive thermally fused melamine to match exterior laminate.

    b. Laminate color to be selected by architect.

9. Interior finish, units with closed Interiors:

    a. Top, bottom, back, sides, horizontal and vertical members, and adjustable shelving faces with thermally fused melamine to match other laminate.

b. Laminate color to be selected by architect.

10. Exposed ends:
Faced with VGS high-pressure decorative laminate.

11. Wall unit bottom:
Faced with thermally fused melamine laminate. (non-exposed areas only)

12. Balanced construction of all laminated panels is mandatory. Unfinished core stock surfaces, even on concealed surfaces (excluding edges), are not permitted.

13. All wardrobe cabinets are to be 29" deep unless noted otherwise on architectural drawings

D. Drawers:

1. Sides, back and sub front: Minimum 1/2 inch thick particleboard, laminated with thermally fused melamine doweled and glued into sides. Top edge banded with 3mm PVC.

2. Drawer bottom: Minimum 1/2 inch thick particleboard laminated with thermally fused melamine, screwed directly to the bottom edges of drawer box.

3. Paper storage drawers: Minimum 3/4 inch thick particleboard sides, back, and sub front laminated with thermally fused melamine. Minimum 1/2 inch thick particleboard drawer bottoms screwed directly to the bottom edges of the drawer box. Provide PVC angle retaining bar at the rear of the drawer.

E. Door/Drawer Fronts:

1. Core: 3/4 inch thick moisture resistant particleboard at sink units.

2. Provide double doors in opening in excess of 24 inches wide.

3. Faces:
   a. Exterior: VGS High-pressure decorative laminate.

   b. Interior: High-pressure cabinet liner CLS.

   c. All exposed areas to receive matching laminate color as face.

4. Door/drawer edges: 3mm PVC, external edges and outside corners machine profiled to 1/8 inch radius.

F. Miscellaneous Shelving:

1. Core material: 3/4 inch or 1 inch thick particleboard.

2. Exterior: VGS High-pressure decorative laminate.

3. Edges: 3mm PVC (at open storage shelving on metal standards), external edges and outside corners machine profiled to 1/8 inch radius.

2.6 Decorative Laminate Countertops:

A. All laminate clad countertops shown on drawings for fixed casework shall be constructed with minimum 1-1/6"" solid particleboard, except at sink and wet areas.
Furnish plywood core tops and splashes, two and a half feet each side of center line of all sinks. All tops shall be laminated on the top face with GP50 (.050) high pressure decorative laminate and shall also have BK20 backer sheet creating balanced construction. The plastic laminate tops required for the rail mounted casework shall be constructed the same as the fixed laminate tops in the lengths indicated on the drawings. The rail mounted tops mounted over brackets shall be 1-1/4 inches from the wall to create a continuous grommet behind the back of the top. The rail mounted tops shall be supplied with 3mm PVC on all four edges. Provide tight joint fasteners where needed. All exposed edges, including edges of backsplash where used, shall have 3mm PVC banding, machine applied with waterproof hot melt adhesive. Exposed edges and corners shall be machine profiled to 1/8" radius for safety. Edging shall be available in colors as listed in Specification. Furnish 4" high backsplashes behind all sinks and as indicated on architectural drawings.

3.0 - EXECUTION

3.1 Inspection

The casework contractor must examine the job site and the conditions under which the work under this section is to be performed, and notify the building owner in writing of unsatisfactory conditions. Do not proceed with work under this Section until satisfactory conditions have been corrected in a manner acceptable to the installer.

3.2 Preparation

Condition casework to average prevailing humidity conditions in installation areas prior to installing.

3.3 Installation

A. Erect casework, plumb, level, true and straight with no distortions. Shim as required. Where laminate clad casework abuts other finished work, scribe and cut to accurate fit.

B. Adjust casework and hardware so that doors and drawers operate smoothly without warp or bind.

C. Repair minor damage per plastic laminate manufacturer's recommendations.

3.4 Cleaning

A. Remove and dispose of all packing materials and related construction debris.

B. Clean cabinets inside and out. Wipe off fingerprints, pencil marks, and surface soil etc., in preparation for final cleaning by the building owner.

3.5 Color Selection:

Laminate Color Selection: See Finish Legend and Schedule for color selections.

END OF SECTION

1.0 - GENERAL

1.1 Summary

A. Section Includes: Telescoping Gym Seating includes manually operated systems of multiple-tiered seating rows comprising of seat, deck components, understructure that permits closing without requiring dismantling, into a nested configuration for storing or for moving purposes.

1. Typical applications include the following:
   a. Wall Attached Telescoping Gym Seats.
2. Special applications include the following:
   a. Extended Custom Engineered Rear Column Cutouts & Filler

B. Related Sections:

1. Division 9 finishes sections for adequate floor & wall construction for operation of Telescoping Gym Seats. Flooring shall be level and rear wall plumb within 1/8" in 8'-0. Maximum bleacher force on the floor, of a 25'-6" section, shall be a static point load of less than 300 psi.
2. Division 16 Electrical sections for electrical wiring and connections for electrically operated Telescoping Gym Seats.

C. Qualifications:

1. Bidders are required to be an authorized dealer or manufacturer for equipment proposed which on a day-to-day basis regularly provide the equipment offered. Bidders are further advised only standard production models or standard options will be acceptable for award. Equipment offered shall be currently manufactured on an active assembly line. The approved equipment shall be provided, installed, and serviced by Authorized Dealers capable of providing references.

2. Installer Qualifications:
Bleacher installer shall be Factory Certified by the Manufacturer. Proof of Factory Certified Installation Certificate must be provided upon request. Failure to provide this information may result in rejection of bid.

3. Service Capability:
The Bleacher Contractor must be able to show proof of full time service capability by factory certified technicians directly employed by the Bleacher Contractor. Sub-Contractors of the Bleacher Contractor or Factory Technicians located outside of the State do not qualify under this service response requirement. Adequate and satisfactory availability of repair and supplies, and ability to meet warranty and service requirements are a requirement of this Bid. The Owner reserves the right to satisfy itself by inquiry or otherwise as to bidder's capabilities in this regard. All Full Time Service Personnel shall be Factory Authorized and Trained. Proof of Service Capability shall be provided upon request. Failure to provide this information may result in rejection of bid.

1.2 References

A. National Fire Protection Association (NFPA)
   1. NFPA 102 Standard for Assembly Seating, Tents and Membrane Structures.
B. American Welding society (AWS):
   1. AWS D1.1 Structural Welding Code - Steel.
   2. AWS D1.3 Structural Welding Code - Sheet Steel.
C. American Institute of Steel Construction (AISC):
   1. AISC - Design of Hot Rolled Steel Structural Members.
D. American National Standards Institute (ANSI).
E. American Iron & Steel Institute (AISI):
   1. AISI - Design Cold Formed Steel Structural Members.
F. Aluminum Association (AA):
   1. AA - Aluminum Structures, Construction Manual Series.
G. American Society for Testing Materials (ASTM):
   1. ASTM - Standard Specification for Properties of Materials.
H. National Forest Products Association (NFoPA):
   1. NFoPA - National Design Specification for Wood Construction.
I. Southern Pine Inspection Bureau (SPIB):
   1. SPIB - Standard Grading Rules for Southern Pine.
J. National Bureau of Standards/Products Standard (NBS/PS):
   1. PS1 - Construction and Industrial Plywood.
K. Americans with Disability Act (ADA)
   1. ADA - Standards for Accessible Design.

1.3 Manufacturer's System Engineering Description

A. Structural Performance: Engineer, fabricate and install telescopic gym seating systems to the following structural loads without exceeding allowable design working stresses of materials involved, including anchors and connections. Apply each load to produce maximum stress in each respective component of each gym seat unit.
   1. Design Loads: Comply with NFPA 102, 1992 Edition, Chapter 5 for design loads.
B. Manufacturer's System Design Criteria:
   1. Gymnasium seat assembly; Design to support and resist, in addition to it's own weight, the following forces:
      a. Live load of 120 lbs per linear foot on seats and decking
      b. Uniformly distributed live load of not less than 100 lbs per sq. ft. of gross horizontal projection.
      c. Parallel sway load of 24 lbs. per linear foot of row combined with (b.) above
      d. Perpendicular sway load of 10 lbs. per linear foot of row combined with (b.) above
   2. Hand Railings, Posts and Supports: Engineered to withstand the following forces applied separately:
      a. Concentrated load of 200 lbs. applied at any point and in any direction.
      b. Uniform load of 50 lbs. per foot applied in any direction.
   3. Guard Railings, Post and Supports: Engineered to withstand the following forces applied separately:
      a. Concentrated load of 200 lbs. applied at any point and in any direction along top rail.
      b. Uniform load of 50 lbs. per foot applied horizontally at top rail and a simultaneous uniform load of 100 lbs. per foot applied vertically downward.

4. Member Sizes and Connections: Design criteria (current edition) of the following shall be the basis for calculation of member sizes and connections:
   a. AISC: Manual of Steel Construction
   b. AISI: Specification for Design of Cold Formed Steel Structural Members
   c. AA: Specification for Aluminum Structures
   d. NFOPA: National Design Guide For Wood Construction.

1.4 Submittals

A. Section Cross-Reference: Required submittals in accordance with "Conditions of the Contract" and Division 1 General Requirements sections of this "Project Manual."
B. Project Data: Manufacturer's product data for each system. Include the following:
   1. Project list: Ten (10) seating projects of similar size, complexity and in service for at least five (5) years.
   2. Deviations: List of all deviations from these project specifications.
C. Shop Drawings: Indicate Telescoping Gym Seat assembly layout. Show seat heights, row spacing and rise, aisle widths and locations, assembly dimensions, anchorage to supporting structure, material types and finishes.
   1. Wiring Diagrams: Indicate electrical wiring and connections.
   2. Graphics Layout Drawings: Indicate pattern and seat colors
D. Samples: Seat materials and color finish as selected by Architect from manufacturers offered color finishes. Including Standard Colors and Select Colors if applicable.
E. Manufacturer Qualifications: Certification of insurance coverage and manufacturing experience of manufacturer, and copy of a telescopic load test to all loads described in 1.03 above, observed by a qualified independent testing laboratory, and certified by a registered professional structural engineer verifying the integrity of the manufacturer's geometry design and base structural assumptions.
F. Installer Qualifications: Installer qualifications indicating capability, experience, and official Certification Card issued by manufacturer of telescopic seating.
G. Engineer Qualifications: Certification by a professional engineer registered in the state of manufacturer that the equipment to be supplied meets or exceeds the design criteria of this specification.
H. Operating/Maintenance Manuals: Provide to Owner maintenance manuals. Demonstrate operating procedures, recommended maintenance and inspection program.
I. Warranty: Manufacturers FIVE year warranty documents.

1.5 Quality Assurance

A. Seating Layout: Comply with current NFPA 102 Standard for Assembly seating, Tents, and Membrane Structures, and specifically with Folding and Telescopic Seating, except where additional requirements are indicated or imposed by authorities having jurisdiction.
B. Welding Standards & Qualification: Comply with AWS D1.1 Structural Welding Code - Steel and AWS D1.3 Structural Welding Code - Sheet Steel.
C. Manufacturer Qualifications: Manufacturer who has a minimum of 15 years of experience manufacturing telescoping gym seats and can demonstrate continual design enhancement and 15-year minimum product life-cycle support of telescopic seating.
D. Installer Qualifications: Engage experienced Installer who has specialized in installation of telescoping gym seat types similar to types required for this project and who carries an official Certification Card issued by telescoping gym seat manufacturer.
E. Engineer Qualifications: Engage licensed professional engineer experienced in providing engineering services of the kind indicated that have resulted in the

successful installation of telescoping bleachers similar in material, design, fabrication, and extent to those types indicated for this project.

1.6 Delivery, Storage and Handling

A. Deliver telescopic gym seats in manufacturers packaging clearly labeled with manufacturer name and content.
B. Handle seating equipment in a manner to prevent damage.
C. Deliver the seating at a scheduled time for installation that will not interfere with other trades operating in the building.

1.7 Project Conditions

A. Field Measurements: Coordinate actual dimensions of construction affecting telescoping bleachers installation by accurate field measurements before fabrication. Show recorded measurements on final shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid delay of Work.

1.8 Warranty

A. Manufacturer's Product Warranty: Submit manufacturer's FIVE YEAR warranty form for telescoping bleachers. This warranty is in addition to, and not a limitation of other rights Owner may have under Contract Documents.
   1. Warranty Period: Five years from Date of Acceptance.
   2. Beneficiary: Issue warranty in legal name of project Owner.
   3. Warranty Acceptance: Owner is sole authority who will determine acceptance of warranty documents.

1.9 Maintenance and Operation

A. Instructions: Both operation and maintenance shall be transmitted to the Owner by the manufacturer of the seating or their representative.
B. Service: Maintenance and operation of the seating system shall be the responsibility of the Owner or his duly authorized representative, and shall include the following:
   1. Operation of the Seating System shall be supervised by responsible personnel who will assure that the operation is in accordance with the manufacturer's instructions.
   2. Only attachments specifically approved by the manufacturer for the specific installation shall be attached to the seating.
   3. An annual inspection and required maintenance of each seating system shall be performed to assure safe conditions. The inspection should be performed by a professional engineer or factory qualified personnel.

2.0 - PRODUCTS

2.1 Manufacturers

A. Basis-of-Design: Hussey Seating Company, U.S.A.
   1. Product: MAXAM Telescopic Gym Seat System by Hussey Seating Company
B. Model: MAXAM26 Series Telescopic Gym Seats, adjustable row spacing in two-inch increments from 22 inches to 26 inches
C. MAXAM26 Series Telescopic Gym Seats Row Rise Spacing: 9 5/8"
D. Aisle Type: foot level aisles, front steps, and intermediate aisle steps.
E. Seat Type: 10" Courtside Collection
F. Seat color finish: 15 standard colors for Courtside Collection

G. Seat design logos: Custom color graphic logo design application for end cap insert and Up to 5 color combinations for seating design graphics and/ or school logos.
H. Rail Type: Self-storing end rail and store-in-place aisle hand rails
I. Rail color finish: Standard black
J. Operation: Manual

K. Product Description/Criteria:

Bank Length:	83' – 3"
Aisle Widths:	4' – 6"
Number of Tiers:	3
Row Spacing(s):	26"
Row Rise:	9 5/8"
Open Dimension:	8' – 0"
Closed Dimension:	5' – 3"
Overall Unit Height:	3' – 1"
Net Capacity:	No Less than 300 Seats (18" per seat)

L. Miscellaneous Product Accessories: end curtains and custom color graphic logo design application for end cap insert.
M. Handicap Seating Provisions: Provide first tier modular recoverable Flex-rows per requirements of The American with Disabilities Act and as Indicated.
N. Special Seating Graphics: Provide up to five different color seat modules to create a graphic pattern as indicated or approved. Provide a custom graphic logo on each seating module located beginning and end of each seating row.

2.2 Approval Consideration:

Manufacturers wishing to bid this project are required to have written approval from the Architect. Requests for approval must be submitted to the architect at least Ten (10) days prior to bid date. Manufacturers will be considered if in strict compliance with these specifications. Proof of compliance and all deviations must be submitted with approval request in compliance with Section 01360.

2.3 Materials

A. Lumber: ANSI/Voluntary Product 20, B & B Southern Pine
B. Plywood: ANSI/Voluntary Product PS1, APA A-C Exterior Grade.
C. Structural Steel Shapes, Plates and Bars: ASTM A 36.
D. Uncoated Steel Strip (Non-Structural Components): ASTM A569, Commercial Quality, Hot-Rolled Strip.
E. Uncoated Steel Strip (Structural Components): ASTM A570 Grade 33, 40, 45, or 50, Structural Quality, Hot-Rolled Strip.
F. Uncoated Steel Strip (Structural Components): ASTM A607 Grade 45 or 50, High-Strength, Low Alloy, Hot-Rolled Strip.
G. Galvanized Steel Strip: ASTM A653 Grade 40, zinc coated by the hot-dip process, structural quality.
H. Structural Tubing: ASTM A500 Grade B, cold-formed.
I. Polyethylene Plastic: ASTM D 1248, Type III, Class B; molded, color-pigmented, textured, impact-resistant, structural formulation; in color selected by Architect from manufacturer's standard colors.
J. Fasteners: Vibration-proof, of size and material standard with manufacturer.

2.4 Understructure Fabrication

A. Frame System:
1. Wheels: Not less than 5" diameter by 1 1/4" with non-marring soft rubber face to protect wood and synthetic floor surfaces, with molded-in sintered iron oil-impregnated bushings to fit 3/8" diameter axles secured with E-type snap rings.
2. Lower Track: Continuous Positive Interglide System interlocks each adjacent CPI unit using an integral, continuous, anti-drift feature and

through-bolted guide at front to prevent separation and misalignment. CPI units at end sections of powered banks and manual sections shall contain a Low Profile Posi-Lock LX to lock each row in open position and allow unlocking automatically. Provide adjustable stops to allow field adjustment of row spacings.

3. Slant Columns: High tensile steel, tubular shape.
4. Sway Bracing: High tensile steel members through-bolted to columns.
5. Deck Stabilizer: High tensile steel member through-bolted to nose and riser at three locations per section. Interlocks with adjacent stabilizer on upper tier using low-friction nylon roller to prevent separation and misalignment. Incorporates multiple stops to allow field adjustment of row spacing.
6. Deck Support: Securely captures front and rear edge of decking at rear edge of nose beam and lower edge of riser beam for entire length of section.

B. Deck System:
1. Section Lengths: Each bank shall contain sections not to exceed 25'-6" in length with a minimum of two supporting frames per row, each section.
2. Nose beam and Rear Riser beam: Nose beam shall be continuously roll-formed closed tubular shape of ASTM A653 grade 40, Riser beam shall be continuously roll-formed of ASTM A653 grade 40. Nose and Riser beam shall be designed with no steel edges exposed to spectator after product assembly.
3. Attachment: Through-Bolted fore/aft to deck stabilizers and frame cantilevers.
4. Decking: 5/8" , AC grade clear-top-coated tongue and groove Southern Yellow Pine of interior type with exterior glue, 5-ply, all plies with plugged crossbands, produced in accordance with National Bureau of Standards PS-1-97. Plywood shall be cut and installed with top, center and bottom ply grain-oriented from front of deck to rear of deck (nose beam to riser beam). Adjacent pieces shall be locked together with tongue and groove joint from front to rear of deck. Longest unsupported span: MAXAM 26, 21 ½" [546].
5. Deck End Overhang: Not to exceed frame support by more than 5'-7".

2.5 Seating Fabrication

A. Plastic Seat System – Courtside Collection XC10 (10" seat):
Hussey Courtside Collection Series embodies the latest leading edge innovations in linear telescopic seating modules. Courtside seats utilize a harmonious blend of advanced ergonomic principals, architecturally appealing design, safety, value and performance.
1. Seat Modules: 18" long assembled, gas assisted injection-molded, high density, 100% recyclable HDPE (high density polyethylene) modules in monochromatic colors providing, dual textured scuff resistant 10" or 12" wide seat surface with 1/2" minimum interlock on seat and face. Unit structural tested to 600 lbs occupant load.

B. 10" wide continuous comfort curve style bench seat
C. Ergonomically contoured forward "waterfall" edge for enhanced spectator comfort and minimization of sensitive pressure point area, regardless of leg positioning.
D. Fore & Aft contoured seat surface for uniform support and minimize high pressure points under the buttocks.
E. Seat height ranges from deck to t/o seat range from 16-1/8" to 18-1/8"
F. 21-1/2" clear foot space area, regardless of leg positioning.
1. Integrally molded end caps at aisle end locations for clean finished appearance.
2. Integrally molded recess pockets to accept seat number and row letters.
3. Integrally molded rear closure panel at back of seat to allow for "continuous clean sweep" of debris at deck level and minimized visibility of structural ribbing.

G. Seat Attachment: Each plastic seat module shall be securely anchored by a 12 ga steel clamp bracket that provides a steel-to-steel, through bolted attachment to the front nose beam of the bleacher. Attachment eliminates fore / aft movement of the seat module on the nose beam.

H. Custom Signature Logo
   1. Factory or Dealer designed logo that incorporates school letters or graphical representation of school logo across the front of the bleachers.
   2. Logo is visible when the bleachers are in the stored position.
   3. Select up to five colors for maximum color contrast and creativity.

I. Custom color graphic logo design application for end cap insert. See Product Accessories for details.

2.6 Shop Finishes

A. Understructure: For rust resistance, steel understructure shall be finished on all surfaces with black "Dura-Coat" enamel. Understructure finish shall contain a silicone additive to improve scratch resistance of finish.

B. Wear Surfaces: Surface subject to normal wear by spectators shall have a finish that does not wear to show different color underneath:
   1. Steel nosing and rear risers shall be pre-galvanized with a minimum spangle of G-60 zinc plating.
   2. Decking shall have use-surfaces to receive both a sealer coat and wear-resistant high gloss clear urethane finish.

C. Railings: Steel railings shall be finished with powder-coated semi - gloss black.

2.7 Fastenings:

A. Welds: Must be performed by welders certified by AWS standards for the process employed.

B. Structural Connections: Secured by structural bolts with prevailing torque lock nuts, free-spinning nuts in combination with lock washers, or Riv-nuts in combination with lock washers.

2.8 Accessories

A. Flex-Row: Provide first row modular recoverable seating units to be utilized by persons in wheelchairs and able-bodied persons. Each Flex-Row unit shall have an unlock handle for easy deployment if wheelchair or team seating access is needed. Unlock handle shall lock the bleacher seats into position when fully opened.

   1. Provide a black full-surround steel skirting with no more than ¾" floor clearance for safety and improved aesthetics.
   2. Provide a black injection molded end cap for the nose beam for safety and improved aesthetics.
   3. Provide a mechanical positive lock when the Flex-Row system is in the open and used position.

B. Front Aisle Steps: Provide at each vertical aisle location front aisle step. Front steps shall engage with front row to prevent accidental separation or movement. Steps shall be fitted with four non-skid rubber feet each 1/2" [13] in diameter. Blow molded end caps shall have full radius on all four edges. Quantity and location as indicated.

C. Non-Slip Tread: Provide at front edge of each aisle location an adhesive-backed abrasive non-slip tread surface.

D. Foot Level Aisles: Provide deck level full width vertical aisles located as indicated.

E. Intermediate Aisle Steps: Intermediate aisle steps shall be of boxed fully enclosed type construction. Blow molded end caps shall have full radius on all four edges. Step shall have adhesive-backed abrasive non-slip tread surface. Quantity and location as indicated.

F. Self Storing Aisle Handrails: Provide single pedestal mount handrails 34" high with terminating mid rail. Handrails shall be attached to the understructure. Aisle Hand Rails requiring any human interaction to open or close the bleacher system are unacceptable.

G. Self Storing End Rails: Provide steel self-storing 42" high above seat, end rail with tubular supports and intermediate members designed with 4" sphere passage requirements.

H. Scorer's Table: Provide one 8' x 15" scorer's table. Table top shall be tan high pressure laminate on 5/8" balance veneer core with edge molding. Integral perimeter frame to include tubular folding steel legs permanently attached to top with screws.

I. Full Bleed Graphic Vinyl End Closure Curtain:
1. Provide closure curtains fabricated of vinyl-coated 14oz Polyester fabric on open ends of telescopic seating. Curtains to be permanently attached to wall or rear closure panel and secured to individual rows of seating. Curtain to open with seating unit into taught secure configuration and fold automatically as seating unit closes.
2. Curtain to have high resolution "full bleed" graphic logo or photograph located across entire visible surface area of the end curtain.

J. Safety Accessories: Provide the following safety features:
1. Coin Round or Roll all edges of exposed metal on top and underneath Bleacher to eliminate sharp edges. Provide safety ease edges, coined edges, or rounded edges for the bleacher understructure components as follows. Diagonal or X braces and deck support or deck stabilizers. Systems provided with sharp edges or corners, to be rounded off in the field and field painted.
2. Provide plastic end cap on nose metal at Bank ends to close off edges to prevent spectator injury.
3. Provide plastic end cap on back of deck supports on 1st 7 Rows to prevent spectator injury.
4. On 1st Row, provide front and side skirt boards any where there is an exposed end to prevent players/balls from sliding underneath the 1st Row.
5. Provide metal cover over motor chains and wheels to protect chains from debris and provide a safety switch that if cover is taken off the power system will not work.
6. Provide metal end deck cover on each row to cover exposed edge of plywood at the ends of the bleachers.
7. Powered frames systems without a metal protective housing, covering drive chain and drive wheels are not permitted under this specification

K. Courtside Graphic Logo
1. Decorative graphic logo that is applied to the integrally molded end cap recess area of the CourtSide 10" seat module.
2. Logo is approximately 4.7" (h) x 3.5" (w) w/full color CMYK vector art output on FujiFlex crystal archive printing material.
3. Color logo is laminated with a 5-mil Hard Guard Matte laminate.
4. Laminated logo is bonded to a Flex-Con L – 606 laminating adhesive layer
5. Logo is trimmed to a precise custom cut shape with two mounting holes

6. A Graphic Logo Should be placed on each Seating Modules with an exposed end. This includes all seat modules located on an aisle and seat modules located at the end of bank of bleachers with end rails.

L. Extended Rear Deck Filler: Provide at rear deck level and extended rear deck filler mounted between rear wall building columns. Rear Deck Filler per Contract Drawings to meet site conditions.

M. Rear Wall Column Cutouts: Provide custom bleacher cutouts at rear wall building columns. Top row(s) to be cutout and scribe fitted to meet wall column conditions.

3.0 - EXECUTION

3.1 Examination

A. Verification of Conditions: Verify area to receive telescoping gym seats are free of impediments interfering with installation and condition of installation substrates are acceptable to receive telescoping gym seats in accordance with telescoping gym seats manufacturer's recommendations. Do not commence installation until conditions are satisfactory.

3.2 Installation

A. Manufacturer's Recommendations: Comply with telescoping gym seats manufacturer's recommendations for product installation requirements.

B. General: Manufacturer's Certified Installers to install telescoping gym seats in accordance with manufacturer's installation instructions and final shop drawings. Provide accessories, anchors, fasteners, inserts and other items for installation of telescoping gym seats and for permanent attachment to adjoining construction. Cost of storage shall be borne by the General Contractor if the facility is not in satisfactory order when bleachers arrive.

3.3 Adjustment and Cleaning

A. Adjustment: After installation completion, test and adjust each telescoping gym seats assembly to operate in compliance with manufacturer's operations manual.

B. Cleaning: Clean installed telescoping gym seats on both exposed and semi-exposed surfaces. Touch-up finishes to restore damage or soiled surfaces.

3.4 Protection

A. General: Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer to ensure telescoping gym seats are without damage or deterioration at time of substantial completion.

END OF SECTION