REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF EDUCATION
EDUCATION FACILITIES DIVISION
DepEd Complex, Meralco Avenue
Pasig City, Philippines

ANNEX E

TECHNICAL SPECIFICATION FOR ARCHITECTURAL AND FINISHING WORKS

Project : **Repair, Rehabilitation and Retrofitting of various DepEd Central Office Buildings**
Lot 1 – Rizal & Alonzo Building
Lot 2 – Bonifacio Building

Location : DepEd Complex, Meralco Avenue, Pasig City

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Repair, Rehabilitation and Retrofitting of various DepEd Central Office Buildings
Lot 1 – Rizal & Alonzo Building
Lot 2 – Bonifacio Building

GENERAL CONDITIONS

A. LICENSE AND PERMITS

The Contractor shall secure from the government agencies all necessary licenses and permits needed to proceed with the construction of the Project.

B. TEMPORARY SIGN

The Contractor shall provide suitable sign acceptable to the Owner advertising the work and indicating thereon the names of the Project, the Contractor and the Architect. The sign layout and the text and location of such sign will be approved by the Owner. No other sign or advertising will be permitted.

C. TEMPORARY STRUCTURES AND SERVICES

Temporary Building and Facilities

- Temporary Buildings shall be of a design and materials acceptable to the Owner.

Contractor's Office

- The Contractor shall provide on or near the premises, temporary building for his own use, equipped among other items with at least one telephone.

Field Office

- The Contractor shall provide temporary office building at least 12' 0" wide by 30' 0" long for the use of the field representatives, Architects, at an approved location on or adjacent site. The field office shall be complete with electrical light, power outlets, drinking water, two (2) desks, two chairs, a plan table, a plan rack, filing cabinet, private local telephone line and daily janitorial service, including periodic washing of windows. The Contractor shall pay for all of the above services and facilities except long distance telephone calls.

Toilets

- The Contractor shall provide suitable toilet facilities at approved location (2) with proper enclosures for the use of workmen, and shall maintain some in sanitary operable conditions, all in conformity with the local regulations.

Other Temporary Buildings

- The Contractor shall provide such other temporary building as maybe required for use of his workmen and safe storage of tools and materials. Such structures shall be located only where previously approved.

Temporary Electric Power

- The Contractor shall provide and pay for all light and Owner required for the construction work including all wiring, connections and accessories an all power consumed.

Temporary Water Supply

- The Contractor shall make all necessary arrangements for and provision of water including temporary piping and house extensions required for the construction purposes. He shall obtain and pay for necessary permits and for all water used.

Temporary Parking Facilities

- The Contractor shall provide and maintain in a safe and satisfactory condition temporary facilities for use by workmen employed on the job and for the Owner, the Project Manager and the Architect's use.

Temporary Scaffolding, Hoist, etc.

- The Contractor shall install and operate an adequate number of temporary hoists and shall also furnish and maintain temporary scaffolds, runways, ladders, and the like as required for the proper execution of the work. As soon as the progress of the work will permit, the Contractor shall erect the permanent stair platforms, ramps, catwalks, etc., safeguard and shall provide these and all other permanent parts from damage or defacement during the work.

Removal of Temporary Services and Facilities

- All temporary services and facilities installed by the Contractor shall be removed by the Contractor on completion of this Contract or as directed by the Project Manager. The Contractor shall make any repairs or alterations necessitated by such removal.

D. PROTECTION OF WORK, PROPERTY, AND PERSONS

- The Contractor shall protect the work of employees, equipment at the Owner's property and adjacent property from damage for any cause whatsoever, and shall be responsible for any damage or injury (including death) due to his act or neglect. These provisions are solely for the benefit of third persons.

- The Contractor as, part of the contract shall provide watchmen and erect all planking bridges, bracings, shorings, sheet piling, lights and warning signs necessary for the public. The Contractor shall provide scaffolds, tarpaulins, and similar items as directed by the Project Manager to protect Owners, equipment and employees and shall, if necessary, seal off his work so as not to interfere with Owner's business operation.

Watchmen Service

- The Contractor shall provide reputable watchmen service or in lieu thereof, any approved protective service to guard the construction area against vandalism, theft, and mischief. Such service should be in operation at all hours that the Contractor's supervisory staff is not in attendance at the site, 24 hours per day and 7 days per week from the date of Contractor starts work until the date of final acceptance of the work under this Contract.

- Watchmen or approved protective service shall continue uninterrupted during delays in the work such as inclement weather, delays in delivery, and the like. In the event of any official work stoppage of the Project, make immediate arrangements with the Owner regarding watchmen service continuation and cost thereof during the time the work will be stopped. If such official stoppage is found to be due to fault, neglect or improper work performance of the Contractor, or his sub-contractors, the extra cost for watchmen service shall be borne by the Contractor.

The Contractor shall be responsible for any injury loss or damage to any presently existing improvements on the premises caused by him or his employees, agents or any sub-contractors, and in the event of such injury, loss or damage shall promptly make such repairs or replacement as required by the Owner without additional cost to the Owner.

During the progress of the work, the Contractor shall protect all finished work as soon as it is erected and shall maintain such protection until such time they are no longer required.

E. INSPECTION AND TEST

- The Contractor shall permit and facilitate inspection of the work by the Owner, its representatives, the Project Manager, or his authorized representative, and the public authorities having jurisdiction at all times during the progress of the work.

- The Contractor will be responsible for all test and engineering services required by the Specifications. The cost for inspection or tests not required by the specification but which the Owner requires, will be borne by the Owner.

- All tests shall be performed by the testing agency approved by the Owner and shall be in accordance with the current standards of the American Society for Testing and Materials unless otherwise specified by the Owner. The Contractor shall furnish the Owner with 2 copies of the test procedures used.

- Failures of the Owner, the Project Manager or the Architect during the progress work or work not in accordance with the Drawings and Specifications shall not be deemed an acceptance thereof nor waiver of the Owner's right to a proper execution of the Contract work or any part of it. No partial payment of entire occupancy of the premises by the Owner shall be construed to be an acceptance of work or materials which are not strictly in accordance with the Contract Documents, nor a waiver of the Owner's right.

F. CONTRACTOR'S ROAD AND TRAFFIC LIMITATIONS

- Contractor shall make himself fully aware of any restrictive traffic limitations and/or shall comply with request of local authorities in this construction plan and equipment, to and from the site, as routes, entry and exit on site, times of delays, etc.

- Prior to moving equipment or materials to the site, the Contractor shall secure the Project Manager's approval of the specific roadway route on or adjacent to the site to be used. He shall thereafter be limited to the use of said roadways or route unless the Project Manager first approves the use of alternate roadway or routes.

G. SECURITY OF EQUIPMENT AND OPERABLE MACHINERY

- Site-parked mobile equipment and operable machinery, and hazardous parts of the new construction subject to mischief shall be kept locked or otherwise made inoperable whenever left unattended.

H. AIR POLLUTION

- Contractor shall comply with the requirements of "The Clean Air Act of 1999" and of local authorities regarding air pollution control: As a general rule, shall be no burning of trash at the site.

I. CLEANING

- The Contractor shall at all times keep the premises from accumulation of waste materials or rubbish caused by his employees, sub-contractors, or the work. At completion of the work, he shall remove from the building and site all rubbish, scaffolding and surplus materials and shall leave

the work broom clean, unless otherwise specified. If the Contractor fails to keep the premises clean, the Project Manager may remove the waste materials and rubbish; charge the expense of such removal to the Contractor.

- The Contractor shall thoroughly wash and clean all glass, clean hardware, remove stains, spots, smears, marks and dirt from all surfaces; clean fixtures, wash terrazzo, tile floors and all exposed concrete so as to present clean work to the Owner for acceptance.

J. FINAL COMPLETION

- The term final completion, means the completion of all work called for under the Contract to include but not limited to satisfactory operation of all equipment, by means of acceptance tests, correction of all punch list items to the satisfaction of the Owner, the Project manager and/or the Architect, settlement of all claims, if any payment and release of all record of all mechanics materials, men and like lines, delivery of all guarantees, Equipment Operation and Maintenance Manuals; as built drawings, Building certificates prior to occupancy; Electrical permits; all other required approvals and acceptance by the City/Municipality or other authority having jurisdiction and removal of all rubbish, tolls scaffoldings and surplus materials and equipment from the job site.

K. PUNCH LIST

- The list prepared by the Project manager and the Architect of the Contractor's uncompleted defective or uncorrected work.

L. AS BUILT DRAWINGS

- The drawings to be submitted by the Contractor to the Owner, illustrating how the various elements of the work were actually installed during the progress of the construction. As built Drawings shall be approved by the Architect and the Project Manager.

- The Contractor shall keep "as-built" drawings up to date concurrently as the work progresses and not wait until the end of the job to do so.

M. CONNECTING THE WORK

- The Contractor shall do all the cutting, fitting and pitching that may be required to make several parts of the work come together properly and to fit his work to receive or be received by the work of other contractor shown upon, or reasonable implied by the Drawings and Specification. After the other contractor has finished, he shall properly complete and finish his work, as the Project Manager shall direct.

N. SAFETY AND ACCIDENT REPORTS

- The Contractor shall take necessary precautions for the safety of all employees; Owner's Representatives, Project Manager and the Architect. The Contractor shall comply with all instructions and Government Safety laws and Building Codes to prevent accident or injury to persons on about or adjacent to the premises as well as for the protection of adjacent property where work is performed. The Contractor shall not excessively load.

SOIL POISONING

A. SCOPE OF WORK

- Furnish all labor materials, equipment, plant and other facilities and perform all operations necessary to complete the Soil Poisoning requirement hereinafter specified.

- All work under this Division shall be subject to the General Conditions accompanying these Specifications. The Contractor and the Sub-Contractor for this portion of the work is required to refer especially thereto.

B. APPLICATION

- Thoroughly drench and saturate every lineal meter of excavation for footings and other foundation work with soil poison working solution (F-3, or F-35 by MAPECON or approved equivalent) before pouring of concrete. Soil poisons shall not be applied when soil is excessively wet.

- After grading and leveling the soil and laying of the gravel base for floor slab, flood or soak every square meter of floor area with soil poison working solution before pouring of concrete.

- Prior to landscaping of the lawn, saturate every linear meter of perimeter of the building about three (3) meters wide with soil poison working solutions.

- The application of the chemical solution shall be performed by a competent Pest Controller following the Thropallaxis Method or approved equivalent.

C. WOOD PROTECTION

- Paris Green Solution. Apply one (1) coat solution of 100 grams green powder mixed with 4.40 liters diesel all wood members with minor "Banakal".

- Spar Varnish. All exposed surfaces of doors, windows, and exterior roof fascia boards shall be painted with a base coat or linseed oil before application of spar vanishes.

PREPARATION OF SITE

A. SCOPE OF WORK

- Furnish all labor materials, equipment, plant and other facilities and perform all operations necessary to complete the preparation of site shown and hereinafter specified.

- All work under this division shall be subject to the General Condition, accompanying these Specifications. The Contractor and sub-contractor for this portion of work are required to refer especially thereto.

B. SURVEY

- The Contractor shall stake out the building accurately and shall establish grades and after the approval by the Project Manager and Architects shall be secured before further work is commenced.

- Basic batter boards and basic reference marks as directed by the Project Managers shall be erected at such places where they will not be disturbed during construction.

- Materials shall be stored and work shall be conducted in such manner as to preserve all references approved the Project Manager and the Architect. Reestablishment of lines and grades where necessitated due to negligence of part the contractor shall be done at the expense of the Contractor.

- The Contractor shall construct two (2) permanent benchmarks near the site of construction for the purpose of determining any settlement that may occur during the progress of construction.

- The Contractor shall provide all necessary instruments.

UTILITIES EXCAVATION

A. SCOPE OF WORK

- Furnish all materials, equipment, labor, plant and other facilities to complete all utilities excavating work shown on the drawings and hereinafter specified.

- All Work included under this division shall be subject to the General Conditions accompanying these specifications. The Contractor and sub-contractor are required to refer especially thereto.

B. MATERIAL

- Provide all materials, equipment, labor, plant and other fine granular materials as approved. Soil removed in the excavation process maybe used for back fill if meeting the above qualifications approved by the Project Manager.

- Make widths of trenches at bottom and above sufficient for working conditions, including bracing, sheeting and shoring if any should be necessary to adequately protect men at work.

- For pipe, make trench with at bottom between 30 and 40 cm greater than outside diameter of pipe measured at widest point of pipe.

- Make centerline of trench and centerline of pipe and structures coincide.

- Accurately grade bottom of trench to provide uniform bearings; support pipe on undisturbed soil for each length of pipe.

- After grading trench bottom, dig bell holes for bell point pipe. Make bell holes of sufficient size as a minimum to permit accurate caulking work.

- Sheet and shore as necessary. Refer to and conform to specifications for such work required in operations for which this section serves as a reference.

- Take precautions to prevent over-excavation of earth in trench. For rock abode and like solid materials excavate to a minimum over depth of 10cm below required for outside of pipe.

- Correct over depth excavation due to negligence or faulty work of Contractor or for removal of undesired materials as noticed in paragraph H above by back filling with compacted fine granular materials. Stack excavated materials in orderly manner adjacent to work except in street. Stack in manner to divert surface water from running into trench. Remove accumulations of water from trenches by pumping or other approved method.

C. SHEETING AND SHORING

- Provide sheeting and shoring as required to protect trench excavations and provide safe working conditions. This requirement shall be at the sole decision and responsibility of the Contractor including the remedy and satisfactory of all damages and liabilities occasioned by the entire operation.

- Where damage is likely to result from withdrawing sheeting, the sheeting will be ordered to be left in place by the Project Engineer.

D. BACKFILLING

- Do not backfill until underground piping and conduit have been tested and approved by proper authorities or until Project manager authorize back filling.
- Remove bracing, sheeting and shoring before back filling, except such sheeting as Project Manager may require in order to be left in place. Cut off sheeting ordered to be left in place at level of top of pipe.

- Backfill entire depth of trench with damp, compacted sand at following locations.

- Trenches within limits of building and 91 cm outside foundations.
- Trenches under footing, pavements, concrete slabs, sidewalks, utility pipes and other load bearing items and 91 cm beyond.

- Spread sand by hand shoveling in layers not more than 15 cm thick and compact to degree or compaction satisfactory to the Project Manager or his representative but not greater than for fills specified under division SEB, except in streets compact per City Regulations. Carry out spreading and tamping simultaneously in layers.

- Backfill all other trenches with ample sand to top of pipe. Earth, sand, clay and gravel, all constitute approved excavated material. Deposit by hand shoveling in 15 cm thick layers until pipe or conduit has a cover of not less than 30 cm., with earth moving equipment. Make ample allowances for settlement.

- Use water, but not excessive quantities for setting earth or sand backfill.

- Fill settled areas before final inspection and acceptance.

STRUCTURAL EXCAVATION AND BACKFILL

A. SCOPE OF WORK

- Furnish all materials, equipment, labor, plant and other facilities to complete the structural excavation and backfill as shown and hereinafter specified.

- All work included under this division shall be subject to the General Conditions accompanying these Specifications. The Contractor and Sub-Contractor are required to refer especially thereto.

- Examine the list of record of existing utilities and construction, record of the test borings and sub-surface exploration reports and soil samples to determine the conditions under which work will be performed. The record of test borings is not guaranteed to represent all conditions that will be encountered.

B. APPLICABLE CODES AND STANDARDS

- The Standards and Codes applicable to only a portion of the work specified in this section are referenced in the relevant parts and clauses. Standards and codes, which are generally applicable to the work of this section, are listed hereinafter.

- 2.2 AASHTO - American Association of States Highways and Transportation Officials.

- T88 - Mechanical Analysis of Soils

- T90 - Determining the Plastic Limit and Plasticity Index of Soils

- 2.3 ASTM - American Society for Testing and Material

- C33 - Concrete Aggregates

- D1556 - Density of Soil – in – Place by the Sand – Cone Method

- D1557 - Moisture Dust Density relations of soils, using ten-pound rammer and eighteen-dust inch crop.

C. SUBMITTALS

- Samples of any materials or product to be used in the works. They shall be properly marked and accompanied by a letter of transmittal clearly listing the samples, their intended use and locations in the works.

- Test Reports Shop test shall show the results of required shop tests of materials, equipment or system certified in writing by the manufacturer or its authorized representative.

D. TRANSPORTATION, HANDLING, STORAGE AND PROTECTION

- Pumping and Drainage

  Excavate areas so as to afford adequate drainage. Control grading to prevent water running into the excavated areas until the work is complete. Remove water that may interfere with the proper performance of the work or cause ponding.

E. QUALITY CONTROL

- The testing laboratory shall perform all tests and submit reports specified in this section. The testing laboratory shall be responsible for conducting and interpreting the tests; shall state in each report whether

or not the test specimens comply with all the requirements of the Contract Documents and specify note the deviation therefrom.

- Testing Materials

  The testing laboratory shall perform all tests herein specified and additional tests as may be required.

  Optimum moisture-maximum density curve for each type of soil encountered in subgrades and fills under pave areas and bulking slabs. Determine maximum densities in accordance with ASTM D1157. Each type of borrow materials shall receive the following:

  a. Material Analysis : AASHT T88

  b. Plasticity index determination : AASHTO T90

  c. Moisture-density curve determination : ASTM D1557

- Testing and Subgrade and Fill Layers

  Subgrade and fill layers shall be approved before construction of any further works thereon. Test of sub-grades and fill layers shall be taken as follows:

  1. Footing subgrades: The design bearing capacities shall be verified by testing each strata of soil on which footings will be placed. The following tests shall be performed as required by the Construction Manager.

     Cohesionless soil, plates bearing test and filled density test.
     For cohesive soil, unconfirmed compression test.

- Paved area and Building Slab Subgrades: The top 12-inch of subgrade resulting from excavation shall have the maximum density of optimum moisture as specified. In fill area, each layer of fill shall meet the required density test of the subgrade for every 3000 ft. square of paved area or building slab but in no case less than three tests shall be made. In each compacted fill layer. Make one field density test for every overlaying 3000-ft. square of building slab or paved area, but in no case less than three tests. Field density tests shall be performed in accordance with ASTM D1556 at ASTM D2167.

- Foundation Wall Backfill at least three field density tests ASTM D1556 or ASTM D2167 shall be taken at locations and elevations as directed.

F. PREPARATION

- Clear and grub shrubs, roots, brush, vegetation, rubbish and debris within the construction limit lines, except as otherwise designated to remain or to be relocated.

G. EXCAVATION

- General

  Excavation to the lines and elevations are required. Excavation shall comprise and includes the satisfactory removal and disposal of all materials encountered regardless of the nature of the materials. Make excavations sufficiently large to permit placing and removal of forms, installation of weatherproofing, damp proofing and utilities and to permit inspection.

- Excavation for Footings

  Footing subgrades shall be approved before proceeding with construction of piers and footings shall be found on rock or firm understructure at elevations indicated or as shown. Refer to construction notes for required preparations. Subgrades of footings shall be level and free of loose rock, dirt, debris, and standing water prior to acceptance for placing concrete.

- Excavation for Paved Areas, Building Slabs and Structural Members in Cut Areas

  1. Structural Members: Structural members shall include frame slabs, grade beams utility tunnels.

  2. Subgrades: Subgrades shall be approved before proceeding with construction of structural members.

     The top 12 inch of subgrade resulting from excavation shall be free from unsuitable material and have a minimum moisture when cohesive soil is tested in accordance with ASTM D2049.

     If the subgrade thus meets the above requirements, compact the subgrade by rolling with suitable compaction equipment to obtain the density specified.

- Excavation for General Grading

  Excavations made below the elevations shown or specified shall be filled and compacted as hereinafter specified for filing and compacting.

- Excavation for Paved Areas, Building Slabs and Structural Members in fill Areas

  Subsection c applies except that no subgrade recompaction will be required.

H. FILLING AND COMPACTION

- Fill Materials

Materials for fill and backfill shall be in general fill as herein before specified, obtained from the required excavation on site, if acceptable, or from burrow sources.

- Utilization or Excavated Materials

  Suitable excavated materials for fill and backfill as defined in clause 1 and 2 MATERIALS shall be approved. Materials which is suitable for use as fill under exterior slabs and paving and backfill shall be separated form material which is only suitable for general grading.

- Burrow

  Provide additional materials, if required, at no additional cost. Acceptable burrow shall consist of suitable materials.

- Placing

  Place fill materials in horizontal loose layers in such manner as to produce a uniform thickness of materials. Placement shall start in the deepest area and progress approximately parallel to the finished grade. Thickness of layers before compaction shall not exceed 8 inches for cohesive soils. No fill material shall be placed on areas where free water is standing, or on surfaces which have not been approved.

- Compaction

  Compact each layer of fill with equipment to achieve 95 percent of maximum density at optimum moisture when cohesive soils are tested in accordance with ASTM D1557 or 75 percent of relative density when cohesionless soils are tested in accordance with ASTM D2040.

  In case of cohesive soil, do not compact materials when the moisture content varies more than 3 percent from the optimum moisture content. Maintain moisture content by wetting and drying manipulation. Suspend compaction operation because of rain and other unsatisfactory conditions.

- Gravel fill for Building Slabs

Provide completion of foundation walls and removal of forms. Clean the excavation of all trash and debris before application of damp proofing or waterproofing and placement of backfill as hereinafter specified for fill operations. Maintain symmetrical backfill loading and compact each layer by hand tampers or other unsatisfactory conditions.

- Do not backfill against foundation or basement walls until compaction or supporting floor construction to top of backfill or to first level above top of backfill. In placing backfill, take special care to prevent wedge action, eccentric or overloading of structure by equipment used in compacting

backfill material, and to prevent damage to waterproofing or damp proofing on walls.

- Where subsoil drainage system is installed, place backfill so as to prevent any drainage to the system.

- Place drainage fill top of felt above footing subsoil drains to within 18 inches of finished grade, except as otherwise shown. Place and compaction as necessary to obtain the required densities under paved areas of general as specified herein.

CAST-IN-PLACE CONCRETE

A. SCOPE OF WORK

- Furnish all labor, materials, equipment, plant and other facilities the cast-in-place concrete as shown and hereinafter specified.

- All work under this division shall be subject to the General Conditions accompanying these specifications. The Contractor and Sub-Contractor for this portion of the work required are especially referred thereto.

B. APPLICABLE CODES AND STANDARDS

- The Standards and codes applicable to only a portion of the work specified in the section are referenced in the relevant parts of the clauses. Standards and codes, which are generally applicable to the work of this section, are listed hereinafter.

- American Concrete Institute

  Recommended Practice for Selecting Proportions for Normal Weight Concrete
  Recommended Practice for Evaluation of Compression Test Results of Field

  Specifications for Structural Concrete for Building

  Recommended Practice for Measuring and Placing Concrete

  Recommended Practice for Curing Concrete

  Recommended Practice for Consolidation of Concrete

  Building Code Requirements for Reinforcing Concrete.

- American Society for Testing and Materials

  Making and Curing Concrete Test Specimen in the Field

  Compressive Strength of Cylindrical Concrete Specimens

Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.

Ready Mixed Concrete

Slump of Portland Cement Concrete

Sheet Materials for Curing Concrete

Fresh Concrete Sampling

Liquid Membrane – Forming Compounds for Curing Concrete

Chemical Admixtures for Concrete

Concrete Made by Volumetric Batching and Continuous Mixing

Sampling Aggregates

Reporting Results of Analysis of Water

Performed Expansion Joint Fillers for Concrete Paving and Structural Construction

Wire – Cloth Sleeves for Testing Purposes

- Federal Specifications

  Concrete Patching and Leveling Compound

- C – E Corps of Engineers

  Requirements for water for use in Mixing or Curing Concrete

  Rubber Waterstops

  Polyvinylchloride Waterstops

  Expansive Grout

C. SUBMITTALS

- Layout of Proposed Placement
- Placement Schedule Proposed Construction Joint Layout and Sequence of Placement
- Proposed Curing Concrete
- Quality Assurance

Proof of quality of manufacturer and reliability in field operations. Such proof shall normally constitute evidence that the product/equipment has been manufactured by them over a period of time and has established field service record. It shall include installation locations, dates and years of operating services. If there is no experience for an identical unit it may release to a similar unit by the same manufacturer.

- Samples

  Samples of any materials or product to be used in the works. They shall be properly marked and accompanied by a letter of transmittal clearly listing the samples, their intended use and locations in the work.

- Certificate of Compliance

  Certificate of Compliance shall include materials or Product manufacturer's Statement that the supplied items or systems to the specifications.

- Test Reports

  Shop test shall show the results of required shop test of materials, equipment or system certified in writing by the manufacturer or its representative.

  Field test reports shall show the results of required field test and compliance with approved procedures, certified by the Contractor.

D. TRANSPORTATION, HANDLING, STORAGE AND PROTECTION

- Cement and Admixtures

  Upon the delivery at site of work, cement and admixtures shall be stored separately in dry, weather tight, properly ventilated structure with adequate provision for prevention of absorption of moisture.

- Temperature Control

  The Contractor shall provide facilities and procedures to control or reduce the temperature of all materials used for concrete during hot weather; to such degree of temperature shall not exceed 90 degrees Fahrenheit.

  Concrete Removed from the Structure

  When the results of the strength test of the specimen indicate deficiency in specification requirements or where there is other evidence that the quality of the concrete is below specification requirements, core-boring tests shall be made in conformance with ASTM C42. If deficiency id discovered, the Contractor maybe allowed to make load test at his

expense, and results shall be evaluated in conformance with ACI 318, Chapter 2.

Slump

Slump test shall be performed in the field under the supervision of the Construction Manager. Slump test shall conform to ASTM C143.

- Sample Concrete Panel

Sample concrete panel for exposed or painted concrete shall be constructed and submitted for approval by the Construction Manager. The panel shall be not less than 6 ft. by 4 ft. in size. Sample panel shall be protected until acceptance of the complete concrete work. The approved sample shall be representative of the smooth texture concrete finish required in the work.

E. MATERIALS

- Portland Cement

Only one brand of any type of cement shall be used for exposed concrete surfaces of any individual structure.

- Concrete Patching Compound

PS SS – 1302, type 11, that can be painted without evidence of bleeding and that after final set will be unaffected by high humidity and moisture.

- Aggregates

Grading requirements shall conform to ASTM C33. Coarse aggregates shall be well graded from fine to coarse within the prescribed limits of the Contract Documents.

Fine Aggregates

Fine aggregates shall consist of natural sand, manufactured sand or combination of the two and shall compose of clean, hard and durable spherical or curvical particles.

F. QUALITY CONTROL

- Samples and Testing

Samples from stock on the site shall be taken by the Contractor in the presence of the construction Manager

Cement

The testing laboratory shall test sampled cement. Certify copies of laboratory of cement and shall include all test dates, and testing procedures are in conformance with stored more than four months after being tested shall be tested before use. Cement found unsatisfactory under test shall be immediately removed from the construction site.

Aggregates

Aggregates sampling shall conform to ASTM D75. Aggregates shall be sampled and submitted to the Construction manager for testing. No aggregate shall be used until test results are satisfactory to the construction Manager.

Water

Water analysis shall be performed in accordance with ASTM D596.

Admixtures

Sampling and testing of all admixtures used in concrete mix shall be in accordance with the standard procedure recommended by the testing laboratory. No admixtures shall be used if the test results are unsatisfactory.

- Concrete

During Place Concrete

The Contractor shall provide for test purposes three sets of the test specimens taken under the supervision of the Construction Manager from each 50-cu. m or fraction thereof for each class of concrete placed. At least one set of the test specimens for each class of the concrete shall be provided in each eight-hour shift. Samples shall be secured in accordance with ASTM 172. Test specimens shall be made and cured in accordance with ASTM C39 or ACI 214. Test specimen shall be evaluated for each class of concrete specified in conformance with ACI 318, Chapter 4 Concrete Quality. Specimen may be tested 7 days to 28 days strength of the concrete is established.

Coarse Aggregates

Coarse Aggregates shall consist of crushed or uncrushed gravel, crushed stone, or a combination thereof and shall be clean, hard, and compacted particles of maximum nominal size ¾ inch. However, coarse aggregate of greater maximum size may be used provide the requirements of ACI 318, Sec. 3.3.3 are met.

- Water

Water for washing aggregated and for mixing and curing concrete shall be fresh and free from injurious amounts of oil, acid, slate, alkali, organic matter, or other deleterious substances as determined by CDCRD – C400. Chlorides and hardeners shall not exceed specified limits of ASTM D512.

- Admixtures

  Admixtures containing chloride ions or other ions producing deleterious effect shall not be used.

- Vapor Barrier

  Polyethylene sheeting conforming to ASTM E154 and mils thick minimum. Other similar materials having a vapor permanence rating not exceeding 0.5 per as determined by ASTM E96, procedure will be considered.

- Grout

  Damp pack bedding grout mix of one part of Portland cement type 1 and ½ parts of the fine aggregates proportioned by weight and more than 4 – ½ gal. Of water per bag, 94 lb. Of cement.

  Premixed, non – Shrink Metallic Grout
  "Masterflow" 713 manufactured by Master Builders, Euco – N.S. manufactured by Euclid Chemical Company or an approved equal.

  Premixed Non – Shrink Metallic Grout
  "Embecco 36" manufactured by Master Builders. Premixed manufactured by the Euclid Chemical Company or an approved equal.

  Expansive Grout

  CE CRD – C588, Type A or M, as required.

- Curing Materials

  Impervious Sheeting

  ASTM C171 type optional except that polyethylene sheeting shall be 4 minimum winds the imperious sheeting shall not be used.

  Burlap

  Cloth made of jute or kenaf shall conform to AASHTO M182 and shall weigh a minimum 0.06 Lb. Square foot.

  Membrane Forming Compound

ASTM C309, Type 1. When non- pigmented compound is used, each shall contain a fugitive dye.

- Hardener

  Floor hardener shall be a colorless aqueous solution containing not less than 20 lb. /gal. of zinc and or magnesium fluosilicate or sodium silicate solution having a specific gravity of 16.7 degrees Baume, "hornoligh" manufactured by A.C. Horn W.R. Grace "Saniseal 50" manufactured by Master Builders, Lapidolite manufactured by Sonneborne Contech, or an approved equal.

- Joint Fillers

  ASTM D1751 performed resilient bituminous type or ASTM D1752, performed sponge rubber.

- Joint Sealant

  ASTM D1190, hot – pour type

- Water Stops

  Metallic

  Copper conforming to ASTM B370, 20-ounce weight or stainless steel conforming to ASTM 167, 0.037-inch nominal thickness and 6 inch wide.

  Non-Metallic

  CEO CRD –513 and CRD – 572, ¼ inches minimum thickness and 6 inches wide. Installation Joints – Shown and detailed on the plans

- Expansion Joints – As Shown and Detailed on the Plans

G. CLASSES, USAGE AND PROPORTIONING

- Concrete of the various classes indicated and as required under other section for different usage shall be proportioned and mixed by volumetric batching and continuous mixing in accordance with ASTM C685.

- Retarder Agents

  Water reducing admixtures (plastic and retarder) maybe used subject to the approval of the Construction Manager.

- Trial Designed batches

  Trial designed batches for various classes required shall be the responsibility of the Contractor. Trial mixture having a proportion, consistencies and air contents suitable for the work shall be made based

on ACI 211.1, using at least 3 different water cement rations which will produce a range of strength encompassing those required for the work. Trial mixtures shall be designed for maximum permitted slump and air content. The temperature of concrete in each content. The temperature of concrete in each trial batch shall be reported. For each water-cemented ratio at least three strengths shall be determined by ACI 301, Chapter 3, and Paragraph 3.8 method 1 or 2.

- Slump

  Slump for vibrated concrete shall be minimum of 2 inches to a maximum of 4 inch as determined by ASTM C143.

H. BATCHING, MIXING, and TRANSPORTING CONCRETE

- Batch Plant

  The plant shall be semi-automatic type and of sufficient capacity not to impair the construction time schedule. The semi-automatic plant is a system where batching weights are set manually and materials are batched automatically.

  Site – Mixed Concrete

  Measuring tolerances, mixing capacity, and time shall be in accordance with ACI 301, Chapter 7, and paragraph 7.2.

- Truck Mixers

  When a truck is used to complete mixing of central plant batch of materials, all water shall be added at mixing speed before completing of mixing. Retempering of concrete will not be permitted. Each truck shall carry a ticket stamped by item clock to show date and time of the loading of each truck was completed.

I. PLACING CONCRETE

- Sequence of Concrete Placement

  To control shrinkage defects placement of concrete for floors shall follow a checker board pattern. Joints line shall cross within middle third of beams, girders, and short spans of slabs, unless otherwise allowed by Construction Manager. Contractor shall submit a construction joint layout and sequence of concrete placement for approval of Construction Manager.

- Preparation of Placing

  Excavation of forms shall be clean, free of debris of foreign materials. Reinforcement and embedded items shall be secured in position and shall be inspected and approved before placing concrete. Runways shall

be provided for wheeled concrete handling equipment. Such equipment shall not be wheeled over reinforcement nor shall runways be supported on reinforcement.

- Placing Procedures

  Concrete shall be delivered from central plant of final deposit in a continuous manner in the time interval specified and without segregation or loss of ingredients. Placing shall be suspended when the sun, heat, wind, or limitation of facilities furnished by Contractor prevents proper finishing and curing of concrete. Concrete shall be placed in forms or excavations as close as possible in final position, in uniform approximately horizontal layers not over 12 inch deep unless otherwise directed. Concrete shall not be allowed to drop freely more than 5 feet in unexposed work nor 3 feet in exposed work. For greater drop trunks or other approved means shall be employed. Conduits and pipes shall not be embedded in concrete unless specifically indicated or specified.

- Transformation Time Interval

  Concrete mixed in central plant and transported by non-agitating equipment shall be placed and transported in the forms in 60 minutes.

- Placing in Hot Weather

  Hot weather placing shall be in accordance with recommended practice of ACI 305, except that air temperature, reinforcement and form temperature exceeding 35 degrees C concreting shall be controlled as follows:

  1. Concrete temperature during mix, transporting and placing shall not exceed 32 degrees C otherwise approved by the Construction Manager.

  2. Reinforcing Steel and Forms shall be protected from direct sunrays and shall be cooled with water immediately before concrete placing so that concrete temperature specified can be maintained.

  3. When cold joints tend to form or where surface set and dry too rapidly or plastic shrinkage cracks tend to appear, concrete shall be kept moist by sprays applied shortly after placement and before finishing.

- Conveying Concrete

  Concrete may be conveyed by chute, conveyor, or pump if so approved by the Construction Manager. Aluminum chutes or pipelines shall not be used in conveying concrete. Approval will not be given for chutes or conveyors requiring changes in the concrete design mixed for desired operation.

Chutes and Conveyors

Chutes shall be steel or steel lined wood, rounded in cross section, rigid in construction protected from overflow and slopes not exceeding one vertical to three horizontals. Conveyors shall be designed to operate assuring uniform flow of concrete without segregation of ingredients, loss of mortar or change in slump.

Pumps

Placing concrete by pumping method shall confirm with ACI 304. Pumps shall be operated and maintained so that a continuous stream of concrete is delivered in the forms without air pockets, segregation or change in slump exceeding two inches.

- Placing Through Reinforcement

Where congestion of steel or other condition make placing of concrete difficult, a trim pipe shall be used. Recommended placing and consolidation practices shall conform to that outline ACI 304 and ACI 309.

J. COMPACTION

- Immediately after placing each layer of concrete shall be compacted by internal concrete vibration supplemented by hand spanding, rodding and tamping or other external vibration of forms will not be permitted. Internal vibrators submerged in concrete shall maintain a minimum frequency of not less than 8000 vibration per minute. The vibrating equipment shall be adequate in quantity and capacity required and shall conform to the requirement of ACI 309.

K. BONDING

- Before depositing new concrete on or against concrete that has set, the surface of the set concrete shall be thoroughly cleaned so as to expose the coarse aggregate. Form shall retighten and all surface moisture.

L. SLABS ON GRADE

- Subgrade under slabs within the building shall be covered with vapor barrier. Edge shall be lapped by not less than 6 inches and seal a pressure sensitive tape not less than 2 inches wide, compatible with the membrane. Concrete shall be placed continuously so that each unit of operation will be monolithic in construction. Concrete shall be placed in alternate checkerboard pattern terminating at crack control joints or maybe limited by expansion and construction joints. Cracks control joints shall be expansion control, or construction joints.

- Control Joints

Control Joints shall be performed by an insertion of hard-pressed fiber guard strips inserted in plastic concrete. The joints shall be 1/8 inch wide and depth equal approximately ¼" of the slab thickness, unless otherwise indicated on the drawings.

- Sealing

  Concrete joints shall be filled with joint sealant except where floor covering is required.

M. SETTING OF BASE PLATE

- After being plumbed and properly positioned, base plates shall be provided with full bearing weight non-shrink grout except where expansive grout is indicated. The grout shall be packed by tamping or ramming with a bar or rod until voids are completely filled. For clearances of two inches or more than expansive grout shall be provided. Mixing and placing shall be in accordance with manufacturer's instructions. Grout shall not be retempered or subject to vibration. Temperature of the grout and the surface receiving the grout shall not exceed 32 degrees C.

N. CONCRETE FINISHES

- Floor and Roof Slabs

  Finish floors and roof slabs surfaces shall be through plane surface without deviation in excess of 8 inches when tested with a 10-foot straight edge. Surface shall be pitched as shown.

- Other Than Floor and Roof Slabs

  Within 12 hours after forms are removed, surface defects shall be prepared as specified hereinafter or as directed by the Construction Manager. Temperature of the concrete ambient air and mortar during repair work including curing shall not exceed 32 degrees C. Fine and loose materials shall be removed. Honeycombed, aggregate pockets, voids over ½ inch diameter and holes left by the reamed wetted, brush coated with neat cement grout and filled with mortar. Holes shall be packed full and all patchwork shall be damped cured for 7-day minimum.
  For surface, which is not to receive architectural finish; the following additional measures shall be taken.

  The concrete shall receive smooth finish by brush coating surface with cement grout composed by volume of one part Portland cement and not more than two parts fine aggregates passing number 30 mesh sieves and mixed with water to consistency of thick paint. Excess grout shall be scraped off with a trowel any visible grout film. The grout shall be kept damp by means of fog spray during setting period.

- Non-Slip Finish

  The concrete shall be screened and flatted to the required finish level with coarse aggregate visible. Abrasive aggregate shall be uniformly sprinkled over flattened surface at a rate recommended by the manufacturer. The surface then shall be steel trowelled to a smooth, even finish that is uniform in texture and appearance. Immediately after curing, cement coating or laitance covering the abrasive aggregate shall be removed by steel be removed by steel brushing, rubbing or light sand blasting to expose abrasive particles.

- Hardener

  Hardener shall be applied to expose interior concrete floor were indicated on the drawing and in accordance with the manufacturer's written installation.

- Curing

  Concrete shall be protected against moisture loss, rapid temperature changes, mechanical injury and injury from wind or flowing water for a period of time corresponding to cementing material used as follows:

  Portland Cement Type I 7days

  1. Monolithic finish

     Slabs shall be screened and flattened with straight edge to bring the surface to the required finish level with coarse aggregates visible. The concrete while still green but sufficiently harder to bear a man's weight without deep imprint shall be wood trowelled to a smooth even dense finish free from blemishes including trowel marks. Rough surface shall be provided for resilient flooring thin – set ceramic tile carpeting where no other finish is specified.

  2. Power machine Finish (option)

     In lieu of hand finishing, an approved power-finishing machine may be used. The preparation of surface by machine shall be in general herein before specified for hand finish. Finish surface shall be free of machine marks, ridges or other blemishes.
  3. Rough Slab Finish

     Tamp the concrete to force the aggregate away from the surface, then screen with a straight edge to produce a uniform surface. Rough slab finish surface shall be provided for ceramic tile, floor toppings, and insulation built-up roofing of terrazzo.

  4. Broom Finish

     The concrete shall be screened and flatted to required finish level with coarse aggregate visible. While concrete is still green, steel or wood trowel

to uneven smooth finish and then broom with fiber bristle brush in a direction transverse to that of the maintained traffic broom finish surface shall provide for drive – ways and ramps.

5. Wood Float

The preparation of surface shall be in general herein force specified for monolithic finish. While surface is still green, wood float to an even textured surface. Curing procedure shall conform to ACI 308 and ACI 305. During the specified curing period, the concrete shall be maintained in the moist condition and temperature not over 90 degrees F.

CONCRETE REINFORCEMENT

A. SCOPE OF WORK

- Furnish all equipment, labor, plant and other facilities to complete the concrete reinforcement as shown on the drawings and herein specified.

- All work included under this division shall be subject to the General Conditions accompanying these specifications. The Contractor and Sub-Contractor are required to refer especially thereto.

B. APPLICABLE CODES AND STANDARDS

- The Standards and codes applicable to only a portion of the work specified in this section are reference in the relevant parts of clauses. Standards and codes, which are generally applicable to the work of this section, are listed hereinafter.

- ACI American Concrete Institute

  Manual of Standard Practice for Detailing Reinforced Concrete Structures
  Building Code Requirements for Reinforced Concrete

- ASTM – American Society for Testing and Materials

  A185 Welded Steel Wire

  Fabric for Concrete Reinforcement

  A615 Deformed and Plain Billet – Steel Bars for Concrete Reinforcement

- CRSI – Concrete Reinforcing Steel Institute Manual of Standard Practice Placing Reinforcing Bars.

- AWS – American Welding Society Reinforcing Steel Welding Code

C. SUBMITTALS

- Details, Drawings and/or Shop Drawings

  Fabrication installation and assembly drawings for all parts of the work in sufficient detail to enable to check conformity with Contract requirements. Drawings shall show details and dimensions of all component parts including plan and elevation views, cross sections and details.

- Test Reports

  Shop test shall show the results of required test of materials, equipment or systems certified in writing by the manufacturer or its authorized representative.

  Field Test Reports shall show the results of required field test and compliance with the approved procedures, certified by the Contractor.

D. MATERIALS

- Bars: ASTM A615 Grade 60 and Grade 40, 40.

- Bar Mats: ASTM A184, of mesh and bar size indicated on the drawings

- Welded Fabric Wire: ASTM A4976, or mesh and bar size indicated on the drawings.

- Drawn Wire: ASTM A82

- Bar Supports: Comply with CRS – WCRSI "Manual of Standard Practice"

  Interior concealed areas: Class A "Bright Basic"
  Interior exposed Areas: Class C "Plastic Protected.
  Exposed painted or concealed: Class D "Stainless Steel Protected"
  Exterior unpainted or exposed: Class E "Special Stainless Protected"

E. DETAILING AND FABRICATION

- Reinforcement

  Provide concrete reinforcement, which is made from new billet steel and free from rust, dirt, oil and grease and any other foreign substances detrimental to bonding with concrete. Accurately bend or from fabricated bars to the shapes and dimensions shown using methods that will not damage materials. Do not weld unless specially shown or approved by the Construction Manager.

- Identification

  Bundle and tag reinforcement with suitable identification to facilitate sorting transportation to, or storage and placing at the job site.

F. PLACING REINFORCEMENT

- Reinforcement shall be installed as shown.

- Tolerances

  Maintain surfaces clearances dimensions shown, plus or minus ¼ inch. Secure reinforcement with accessories and tie wire to prevent displacement before and during concreting. Do not place concrete if bars are not properly placed with adequate support.

- Dowels

  Secure in position prior to placing concrete

G. SPLICES

- Lap-splices all bars up to 36 mm in accordance with ACI 318, unless otherwise shown. Follow AWS D12.1 recommendations for welded splices where shown.

H. REPAIR

- Remove and replace damaged bars as directed.

CONCRETE FRAMEWORK

A. SCOPE OF WORK

- Furnish all labor, materials, equipment, plant and other facilities to complete the concrete form work as shown and hereinafter specified.

- All work under this division shall be subject to general construction accompanying this specification. The Contractor and Sub-contractor for this portion of the work as required referring specifically thereto.

B. APPLICABLE CODES AND STANDARDS

- The standards and codes applicable to only portion of the work specified in this section are referenced in the relevant parts of clauses. Standards and codes, which are generally applicable to the work of this section, are listed hereinafter.

- ACI – American Concrete Institute

  301 Specifications for Structural Concrete for Buildings

  318 Building Code Requirements for Reinforced Concrete

  347 Recommend Practice for Concrete Formworks (ANSI A 145.1)

- ANSI – American National Standards Institute, Inc.

  A199.1 Construction and Industrial Plywood

- Timber Design Standard – Philippine Association of Civil Engineers (PACE) CP 202, 1965.

C. SUBMITTALS

- Detail Drawings and Shop Drawings for all parts of the work in sufficient detail to enable the Construction Manager to Check conformity with the contract requirements. Drawings shall show the details.

D. QUALITY CONTROL

- Construction

  Construction formworks so that concretes surface comply with ACI 347, Chapter 2 and 3.

- Hydraulic Pressure

  The maximum allowable deflection of forming surface from concrete pressure is length/360 between supports.

E. MATERIALS

- Formworks Materials

  Unless otherwise shown form materials shall be one of the following:

  Plywood; ANSI A199.1 minimum—" in thickness

  Form Lumber

  Fiberglass reinforced plastic

  Steel

- Blockouts and keyways

  Wood or extended expanded polystyrene

- Ties

  Bolt or standard snap ties for snap off 1 inch from surface with minimum working capacity of 3,000 lbs. Maximum size cones shall be —" in diameter.

- Chamfer Strips

Wood, polyvinyl chloride or neoprene

- Dovetail Anchor Slots

  Standard size, 20-gauge galvanized steel with removable filler installed for abutting masonry and at 24-inch o. c. for facing masonry where shown.

- Flashing Reglets

  26 gauged galvanized sheets, with removable filler and beveled edges.

- Anchoring Inserts

  Approved propriety type inserts for the load capacity and use shown.

- Fabricated Embedments

  Install only as shown and as specified.

- Form Release

  Non-staining, non-reactive rust preventive guaranteed not to affect bond of surface application to concrete.

F. FABRICATION AND ERECTION

- Forms
  Design, construct, erect, support, brace, maintain and remove forms in conformance with the requirements of ACI318 part 1, 2 and 3 exclusive and ACI347 for loads lateral pressure and allowable stresses; in addition to other design parameters such as wind loads.

- Shores

  Shores shall be adjustable by screw jacks or wedges.
- Preparation of Forms

  Clean forms before each use. All steel forms shall be free of rust and scale.

- Form Re-use: The Number of reuses is dependent on the resulting finish quality and is subject to approval.

- Form Joints; Forms shall be butted types.

- External Corner: Chamfered unless noted.

- Cleanouts: Where required provide temporary openings panels in the forms to facilitate cleaning, placing and inspection.

- Cambers: Where specified camber is noted position the forms to maintain hardened concrete lines with specified tolerances measured for camber lines. Camber is to maintain as noted plus or minus 3mm (1/8 inch) until shoring is removed.

- Form Release: Coat removable forms with forms release agent before reinforcing is placed and in accordance with manufacturer's instruction. Remove release agents from reinforcing steel embedments solvents recommended by the manufacturer.

G. STRIPPING AND RESHORING

- General: Do not remove forms or shoring until the concrete members have acquired sufficient strength to support their weight and subsequent construction loads without defection. Forms shall be moved in a manner to assure safety of the structure.

- Time: Form and supports shall remain in place until the concrete has attained sufficient strength to support the loads to be applied but in no case shall they be stripped in less than the following minimum periods.

Columns	-	2 days
Walls	-	2 days
Sides of Beams and Girders	-	2 days
Floor Slabs	-	14 days
Shoring for Beams and Girders	-	14 days
Beam and Girders	-	14days

- Reshore: Reshore immediately after stripping slab, beams and girders that support subsequent formwork. Retain reshore for as many levels as required to combine the liveload capacities of cured floors to support the loads of the subsequent fresh construction loads. Reshore at minimum of two consecutive levels.

MASONRY WORK

A. SCOPE OF WORK

- Furnish all labor, materials, equipment, plant and other facilities and perform all operations on necessary to complete the Masonry Work requirements hereinafter specified.

- All work under this Division shall be subject to the General Conditions accompanying these specifications. The Contractor and Sub-Contractor for this portion of the work are required to refer specifically thereto.

B. MATERIALS

- Concrete Hollow Blocks: Shall be Machine Bilt, Non-Load Bearing (NLB) or approved equivalent. Minimum face shell thickness shall be 1" Nominal face 7" x 17" normal thickness shown. Hold all units in storage

for a period of not less than 28 days (including curing period) and do not deliver prior to that time unless strength and other test indicate compliance with this specification.

- Mortar Aggregate: Natural river sand, clean free from soluble salts and organic matter, grades from fine to coarse, compatible with the thickness of joints in which used.

- Cement: Shall be Portland cement/Union Premium or approved equal.

- Mortar:

  General: Mix mortar from 3 to 5 minutes in such quantities as are needed for immediate use. No retempering will be permitted on mortar stiffness because of premature setting. Discard such materials, as well as those that have not been used within one hour after mixing.

  Proportioning: Cement mortar shall be one (1) part Portland Cement and two (2) parts sand by volume but not more than one (1) Portland cement and three (3) parts sand by volume.

C. HANDLING AND STRUCTURE

- Take care in handling masonry units to avoid chipping and breakage. Locate storage piles and stacks so as to avoid being disturbed. Barricade to protect from damage by construction operation. Stack masonry units, reinforcement and other materials on wood blocking above ground.

D. SCAFFOLDING

- Provide all scaffolding required for masonry work, including cleaning down on completion, remove.

E. SAMPLES AND TESTING

- Sample blocks shall be taken at random from every one thousand (1000) blocks delivered. Average strength of concrete hollow blocks shall not be less than 500 lbs. per square inch. Test shall be at the expense of the Contractor.

F. CUTTING AND PATCHING

- Consulting other trades in advance of masonry work and make provision for installation of their work to avoid unnecessary cutting and patching. Experienced masons shall do all cutting and patching.

G. HOLLOW METAL FRAMES

- Fill jamb of all pressed steel hollow frames occurring in masonry walls with mortar and carefully point all joints between metal frames and adjacent masonry and other construction.

H. WALL FLASHING

- Build in wall flashing at base of cavity wall formed to exclude water, bended in and covered with mortar. Keep joints to a minimum but where necessary, lap 6' and seal with plastic cement.

I. LAYING CONCRETE BLOCKS

- Lay units in common bond with uniform coursing and jointing. All concrete block joints shall be uniform thickness, approximately 3/8 tooled concave where exposed and flush cut where concealed, making 16' x 8' course. Butter vertical and horizontal joints full with mortar.

  Bond courses at corners and intersection and tie to abutting walls as per TRU-LOK Specifications.

  Reinforce concrete block walls continuously in two 2) consecutive courses below openings; using TRU-LOK shall be provided at every 16" of vertical wall height for load bearing walls. Lay units' full thickness of partition from floor slabs to height shown, and where necessary cut.

GLASS AND GLAZING

A. SCOPE OF WORK

- Furnish all labor equipment, plant and other facilities required to complete all glazing work as shown in the drains and schedule and hereinafter specified.

- All work included under this division shall be subject to the General Conditions accompanying these specifications. The Contractor and the Sub-Contractor for this portion of the work is required to refer especially thereto.

B. GENERAL

- The type and the location of the glass are indicated. Determine the actual size by measuring the opening to be glazed, each piece of glass shall bear the Manufacturer's label giving his name and the quality, type and thickness of the glass. Do not remove label until final cleaning.

C. MATERIALS

- All glass for the aluminum storefront and drops shall be…" thick tinted polish plate glass as indicated in the schedule of windows and shall be those manufactured by the Republic Glass or approved equal.

- Size shall be those shown on the drawings.

D. SHOP DRAWINGS

- The Contractor shall furnish copies of the drawings showing dimensions and details and indicating all necessary items to the Architect for approval.

- Any correction required by the Architect shall be done immediately by the Contractor and corrected copies of drawings affected shall be returned to the Architect. The examination and approval of show drawings by the Architect shall not relieved the Contractor from any obligation to perform the work strictly in accordance with plans and specifications. The responsibility for errors in shop drawings shall remain with the Contractor.

E. INSTALLATION OF GLASS

- General: Employ only skilled labor. Set glass without springing, accurately fitted and carefully set using setting and spacer blocks in accordance with the recommendation of the glass manufacturer. Set all glass before final painting. Take every precaution to insure first-glass free from edge chips cracks or other defects and all glazing materials properly installed to meet approval.

- Examination of Surfaces: Before commencing the setting examines surfaces and report to the Architect in writing any defect in it. Commencement of work shall indicate the acceptance of the surface as satisfactory.

- Breakage: The Contractor shall be responsible for all glass broken because of faulty setting and shall be replaced at his expense.

- Expansion: Allow for expansion of glass as per manufacturer's recommendation.

F. GUARANTEE

- Furnish guarantee to Owner as per requirements of the General Conditions for the period of one year after date of final acceptance of building.

WATERPROOFING

1. SCOPE OF WORK

- Furnish all materials, equipment, labor, plant and other facilities to complete all waterproofing works as shown on the plans and hereinafter specified.

- All work included under this division shall be subject to the General Conditions accompanying these specifications. The Contractor and Sub-Contractor are required to refer especially thereto.

2. WATERPROOFING OF PARAPET AND ROOFDECK

- Materials

- Materials shall be Cold Applied Waterproofing or approved equivalent.

- Applications

  The concrete surface shall be wood troweled smooth, firm, dry, clean and free of loose or foreign materials and without any projects, indention and other imperfections. Cabinets shall be installed in the angle formed by the floor and adjoining vertical wall. All drainage connection shall be set to permit free flow of water.

  On this concrete surface, apply 2 coats of Cold Applied Waterproofing to a roofdeck and vertical wall to a height of 10" (250mm) unless otherwise shown on the drawings surrounding the area to be waterproofed.

  Sprinkler fine sand topping

  Apply 2 base coats of Cold Applied Waterproofing and apply 2 topcoats of 2mm thick of Polyethylene sheet.

  The installation of the waterproofing shall be done by an approved roofing contractor by the manufacturer.

  No substitution of materials shall be made unless authorized in writing by the Architect prior to starting the work of waterproofing.

  All materials composing the waterproofing underlayment shall be delivered into the job in unopened bags, pails and packages clearly labeled by the manufacturer's name.

- All the request of the Architect, the Contractor shall deliver to the Architect the following:

  Samples of the materials proposed for use as waterproof underlayment, clearly labeled as to brand name manufacturer's name.

  The manufacturer's complete printed specifications for the application of the materials.

C. FLOOR HARDENER

(For Transformer vaults room. Emergency Genset, Electrical Room, Pump Room and elevator machine room.)

- The concrete floor shall be monolithically finished with "Koradur" non-ferrous colored floor hardener in accordance with manufacturer's specifications for heavy-duty floor of 1.00 lbs. of "Korudur" per square foot of floor area. Colors to be approved by the Architect.

D. WATERPROOFING OF ALL EXTERIOR WALLS

- Materials

  Class B concrete
  Thoro-Seal White

- Application

  Pour all holes of exterior concrete hollow blocks with class B concrete (coarse, aggregates shall be of such size so that no voids are formed) with Thoro-Seal White of the type recommend by the manufacturer.

E. GUARANTEE

- The Contractor shall guarantee that work specified in this division shall be free from defects of materials and workmanship for period of five (5) years from the date of acceptance.

- The Contractor shall make good all damages or failures resulting from the use of defective materials and poor workmanship.

- The following failures will be considered as defective work.

  Leakage
  Peeling of waterproofing materials
  Delaminating of plies
  Air bubbles

- Approved Equal Brand
  Other approved equal brands shall be those that are representative by well-established firms to insure the period of guarantee.

HARDWARE

A. SCOPE OF WORK

- Furnish all labor equipment, and other facilities required to complete the installation of hardware as shown on the drawings and hereinafter specified.

- All work included under this division shall be subject to the General Conditions Accompanying these specifications. The Contractor and Sub-Contractor for this portion of the work are required to refer specifically thereto.

- The intent of the specifications is to cover the complete hardware requirements for this building, and any hardware called for in the specifications not shown on the drawings or vice versa shall be furnished the same as if it were shown on the drawings and called for in the

specifications. Also, any hardware which has been omitted from both drawings and specifications but is evidently necessary for complete building shall be finished the same as if it were shown on the drawings and called for in the specification.

B. GENERAL

- Determine the quality of hardware to be furnished from the drawings and schedules. Provide all complete finish hardware for doors and other movable parts of the building with exception of items specified elsewhere or not included.

- The hardware herein specified are given as a means of describing the type, materials, strength, design, quality, weight, mechanical constructions, operation and requirements to which such hardware shall conform.

- It is the responsibility of the contractor to thoroughly check the drawings and specifications and to furnish all required materials whether specifically mentioned or not.

C. FINISHING

- Hardware finishes specified are in accordance with U.S. Standard finishes flush bolts, push plates, pulls, and knobs and other finishing hardware shall be polished chromium plated over nickel or brass (US 26/625).

D. PROTECTION

- After hardware has been properly fitted exposed items such as door knobs, escutcheons, plates, locks, etc. shall be removed after final coat has been applied. All hardware unless to be painted over, that are not removed after painting shall be properly masked.

E. HARDWARE LOCATION

- Unless otherwise specified locate hardware as follows;

  Doorknobs shall be 39” from finished floor level to center knob.

  Push plates shall be 50” from finish floor level to center of push plate.

  Door pulls shall be 40” from finish floor level to grip center.

  Cylinder dead lock shall be 55” from finish floor level to center of lock.

- Butt Hinges: the number of butt hinges to be furnished for each door shall be determined as follows:

  For door 5’-0” high less, provide two (2) butts.

For door 5'-0" high less than 7'-0" high provide three (3) butts.

For doors over 7'-0" high unless otherwise required, provide additional one (1) butt for every 2'-0" or fraction thereof.

For metal doors, provide four (4) heavy duty hinges per cash. Butt hinges shall be 8" from top and bottom of door to center of hinges and the rest equally spaced.

F. HARDWARE SCHEDULE

- Refer to schedule on drawings

G. GUARANTEE

- Furnish guarantee to the owner as per requirements of the General Conditions for one year after date of final acceptance of building.

ROOFING WORKS

SCOPE OF WORK

- The work under this division shall include all labor equipment; plant and other facilities and the satisfactory performance of all work necessary to complete all the roofing works as shown on the drawings and hereinafter specified.

- All work included under this division shall include all labor equipment, plant and other facilities and the satisfactory performance of all work necessary to complete all the roofing works as shown on the drawings and hereinafter specified.

- All work included under this division shall be subject to the General Conditions accompanying these specifications. The Contractor and Sub-Contractor for this portion of the work are required to refer especially thereto.

B. ROOFING MATERIALS

- All roofing materials including accessories will be supplied by the Contractor.

C. INSTALLATION

- Lay roofing sheets as per manufacturer's recommendations with overlaps oriented following storm wind direction. Manufacturer's installation details.

- All roofing works shall be done by experienced tinsmiths known to the Contractor.

- Rat proofing works shall be in accordance with ordinances of the National Building Code and its Implementing Rules.

- All welded and solded connection in the roofing shall be painted by red lead paint then painted to match color of roofing sheets.

D. GUARANTEE

- Furnish guarantee to the owner as per requirements of the general conditions for period of one year after date of final acceptance.

PAINTING

A. SCOPE OF WORK

- Furnish all labor materials, equipment, plans and facilities to complete all painting and varnishing as shown and hereinafter specified.

- The Contractor shall examine the specification for the various other trades and shall thoroughly familiarize himself with the items and surfaces of work to be included.

- All work included under this division shall be subject to the General Conditions accompanying these specifications. The Contractor and Sub-Contractor for this portion of work are required to refer especially thereto.

B. GENERAL

- This work includes interior and exterior painting and finishing of all items as required to produce a finished painting job throughout all of the areas affected by work under this contract, except items which are specifically excluded.

- Complete color scheme for the painting of the building (exterior and interior) shall be furnished by the Architect to the Contractor. Color schemes samples required by these specifications and/or by the Architect shall be submitted by the Contractor for approval at his expense.

- All exposed work shall be protected while the building is being painted. The floor steps and all other surfaces not to be painted shall be well protected during painting by sufficient covers. Any stains, dirt, smear, etc. shall be removed by the Contractor to the satisfaction of the Architect.

C. SURFACES NOT TO BE PAINTED NOR VARNISHED

- Neither paint nor varnish shall be applied on finish like glazed tiles, glass, plastic, brass, bronze, aluminum and other corrosive metal finishes.

D. MATERIALS

- Make and Certificate of Origin and Quality

- All paint materials shall meet the requirements of the Standard Specifications of the Standardization Committee on Suppliers and shall be delivered on the site in the original containers, with label intact and seal unbroken.

- The manufacturer's certificate of origin and quality shall be submitted to the Architect for inspection and approval before using any of the paint materials herein specified.

- Use materials only as specified by manufacturer's direction on label of container unless otherwise specified herein.

- Paint materials only as specified by manufacturer's direction on label of container unless specified herein.

- Paint materials such as linseed oil, shellac, turpentine etc., shall be pure, higher quality and should bear identifying label on container.

- The use of white zinc (lithopone) shall not be allowed.

- Pigment for Tinting

- Tinting color for oil paint shall be color -in-oil, ground in pure linseed oil, and of the highest grade obtainable.

- Colors shall be non-fading.

- Color pigments shall be used to produce the exact shades of paint, which shall conform to the approved color scheme of the finish coat. The first coat shall be white.

E. INSPECTION OF SURFACES

- The Contractor shall inspect all surfaces to be painted and all defects shall be remedied before starting work. Commencing of work by the Contractor indicates his acceptance of the surface.

- No work shall be started unless the Contractor shall have made certain as to the dryness of surfaces. Tests shall be made, in the presence of the Architect or his representative, to verify dryness of surfaces to be painted.

F. PREPARATION OF SURFACE

- All concrete shall be allowed to weather for two months before painting.

- Clean all surfaces to be painted and varnished off loose dirt and dust before painting is started. Do the customary amount of sanding in the Architect's opinion to produce a surface suitable to receive paint or varnish.

- Inspect all surfaces with regards to their suitability to receive a finishing. In the event that imperfection due to materials of workmanship appear on any surfaces after the application of the paint the cost of any correction shall be borne by the Contractor. Damages to any painted or varnished finish due to carelessness or negligence of others shall be corrected.

- Touch all knots, pitch streaks and soppy spots with shellac or other approved sealer. Putty nail holes cracks, etc. after the first coat with non-shrinking putty of a color to match that of the finish.

- Wash all metal surfaces with benzene, mineral spirits, or detergent to remove any dirt or grease before applying materials. Where rust or scale is present, wire brush or sandpaper cleans before painting. Where shop coats of paint have become marred clean, and touch up with a compound designed for this purpose, or approved acid solution before applying the first coat of paint.

- Prepare masonry surfaces to be painted by removing all dirt, dust, oil and grease stain sand efflorescence. The method of surface preparation shall be left to the discretion of the Contractor provided that the result is satisfactory to the Architect. Masonry surfaces to be painted shall be free from alkali and thoroughly dry before paint is applied.

- Before applying succeeding coats, primers, and undercoats shall be completely integral and performing the function for which they are specified. Properly prepare and touch up all scratches, abrasions, or any other disfigurement and remove any foreign matter before proceeding with the following coat.

- Do not apply final coat on interior work until after others are finished with their work in any given area in normal sequence and all materials and debris removed, and the premises left in satisfactory broom clean condition as approved.

- Remove or protect hardware, hardware accessory plates, lighting, fixtures and similar items placed prior to paintings or remove protection upon completion of each space. Disconnect equipment adjacent to walls where necessary move to permit painting of all wall surfaces, and following completion of painting, replace and reconnect.

- Paint the backsides of access panels, removable or hinged covers and the like.

- All wood shall be sanded lightly with #00 Sandpaper between coats. Paint coats shall be thoroughly dry before sanding.

G. WORKMANSHIP

- All painting and varnish work shall be done in workmanlike manner by skilled house painter and varnisher only.

- All materials shall be evenly applied, so as to form a film of uniform thickness, free from sags, runs, crawls, or other defects. The use of heavy brush (nylon brushes for oil paints) is required. Light brushes shall not be permitted. Paint shall be thoroughly stirred so as to have the pigment evenly in suspension while paint is being applied.

- In general, or unless otherwise specified, and/ or instructed by the Architect due to actual conditions on the job, no less than 48 hours time shall elapse between application of succeeding coats. Each of paint shall be allowed to dry thoroughly and inspected for approval before the succeeding coat is applied.

- No oil painting shall be done in damp weather.

- Except where otherwise noted or specified all paints shall be applied in three coats (priming body and finish coats). Each coat shall be roller applied (except as otherwise noted) spread evenly and in full covering body.

- No work shall be done in conditions unsuitable for the production of good results. No painting or varnishing on woodwork shall be done while plastering is in processor is drying.

- Surfaces which cannot be satisfactorily finished on the number of coats specified shall have additional coats or such preparation coats and subsequent coated as many as may required to produced satisfactory finished work without additional cost to the Owner.

- Spray gun application shall be used where indicated in the color schedule.

- All parts of molding and ornaments shall be left clean and true to details.

- All finishes shall be uniform as to sheen color and texture, except when glazing is required.

- The Painting Contractor since he is the last tradesman on the project shall include in his work all final clean up and washing of glass, spots on floors, hardware fixtures, etc.

H. PAINTING SCHEDULE

- The type of paint specified are intended to illustrate the quality and are taken from paint catalogue equivalent materials from manufacturers listed herein, which the Contractor desires to use other than those specified should accompany proposal with such request in writing for approval by the Architect. Give manufacturers name, specific name of each product offered as a substitute. After the award, no substitution of materials for those mentioned in the accepted proposal will be permitted. Other brands of paint and primer are the following: Dutch Boy; Sinclair; Sherwin Williams; Boysen; General Paint and Finch.

  Exterior Concrete Walls

  Cement Plaster over Concrete give:

  - 1 Coat Concrete Primer
  - 1 Coat Concrete Sealer
  - 1 Coat Latex Flat Paint (Primer)
  - 1 Coat Latex Flat Paint (Finishing)

  Exterior and Interior Work

  Metal steel doors, frames, railings, balusters, and grating give:

  Coat Primer Paint
  Coats Quick Drying Enamel

  Apply one generous coat of "Raincheck "water repellant by spraying on all exposed non-painted concrete finish.

  Interior work

- Plywood walls (painted) give: (Roller Painted)

  1 Coat flat wall enamel washable paint after which putty all over and sand smooth
  1 Coat interior Primer Sealer
  1 Coat paint (Flat Enamel Paint)
- Plywood ceiling give: (Roller Painted)

  1 Coat Flat Enamel Paint
  1 Coat Sealer
  1 Semigloss Enamel Paint

- Cement plaster and sunblasted finish over concrete and hollow concrete blocks, give:

  1 coat interior primer sealer
  coats Flat Wall enamel washable paints:

I. GUARANTEE

- The Contractor shall guarantee his work for a period of one (1) year from date of the acceptance. Under such guarantee, the Contractor shall make good any defect due to faulty materials or workmanship caused by him by without any additional cost to the Owner for the period specified.

WOOD AND PLASTICS

A. SCOPE OF WORK

- Furnish all materials and equipment and perform labor required to complete wooden framing and related rough carpentry work as indicated in the drawings and/or specified herein.

- Include in the works, nailing strips, scaffoldings, plates, straps, joists, hangers, rods, dowels, rough hardware, fasteners, and other miscellaneous iron and steel items pertinent to rough carpentry work.

B. STORAGE AND PROTECTION

- Stack framing lumber to insure against deformation and maintain proper ventilation.

- Protect Lumber from elements.

- Lumber in contact with concrete masonry shall be coated with two (2) coats of asphalt, applied hot.

- Temporary Protection

  Provide and maintain temporary protection of the work as required to safeguard completed or partially completed work during the progress.

  Provide all the necessary rough stairs, ladders, runways, for convenient access to all parts of the building until other permanent facilities are in place.

C. SCOPE OF WORK

- Lumber

  Moisture content – not to exceed 18 percent

  Grade and Trade Mark – required on each piece of lumber. All lumber including scaffoldings, conforming to 63 % stress grade lumber in accordance to the requirements of the National Structural Code of the Philippines, Volume 1, latest edition.

  Refer to summary of Materials and Finishes

  Substitution of Lumber

Any lumber equally good for the purpose intended may be substituted for kinds specified, provided however, that the substitution be authorized in writing by the Architect.

D. ROUGH HARDWARE AND METAL FASTENERS

- Plates, straps, nails, spikes, bolts, joists, hangers, rods, dowels, fasteners, and miscellaneous iron steel items shall be of sizes and types to rigidly secure member in place.

- Execution

  Fit carefully mortise and tenon joists of all framing including tongues and grooves of sheathing. Anchor all frames coming in contact with concrete, unless otherwise specified, by means of 20 D nails, spaced not more than 0.20 m (8") apart all around the contact surfaces. Plane and dress side of frames that will receive the wallboards or sidings.

  Wood nailers shall be in accordance with detail drawings or mentioned herein, nailing strips shall be 1" x 2" at 16 inches on centers both ways. Fasten securely by expansion bolts or other approved device at every (2) feet on center.

  Make all exposed nails countersunk. Do scrubbing, metering and joining accurately and neatly to conform to data

MILLWORK

A. SCOPE OF WORK

- Furnish materials and equipment and perform labor required to complete wooden jambs and doors and ceiling panels and related rough carpentry work indicated in the drawings and/or specified herein. Coordinate work with all other trades.

B. STORAGE AND PROTECTION

- Protect millwork against dampness during and after delivery.

- Do not bring in interior finish, including doors into building until plaster thoroughly dry.

C. PRODUCTS

- Lumber

  Kiln dried, selected, quarter sawn containing not more than 12 % moisture, free from imperfections impairing its strength, function and appearance with the same shade, color, grain configuration.

  Trademark is required in each piece of lumber.

- Plywood

  For interior plywood, use class B plywood whose species and thickness conform to schedule and drawings.

- Finish Hardware

D. EXECUTION

- Workmanship

  Make all wood finish and millwork true to details clean and sharply defined.

  Set panels to allow free movement in case of swelling shrinkage.

  Conceal means of fastening various parts together.

E. FINISH

- Mill fabricates and erects interior finish as indicated on the drawings. Machine sand at the mill and hand smooth at the job.

- Separate with ¼ inch stone-cut joints all interior trims set against concrete masonry or wood.

- Make joints tight and in a manner to conceal shrinkage. Secure trim with fine finishing nails, screws, or glue where required.

- Set nails for putty stopping.

- Make window and door trim single length.

- Meter molding at corner, cope at angles.

F. WOOD JAMBS

- Set doorframes plumb and level and brace until built-in.

- Anchor wood frames to masonry with approved metal anchors on each side of jamb. Place top and bottom anchors 8 inches from head to floor.

G. WOOD SHELVING

- Each shelf shall be supported on a continuous wood cleat at walls.

- Secure cleats to masonry walls be expansion bolt or approved fastening device.

H. HARDWARE

- Accurately fit and install all required finish hardware items.

- If surface-applied hardware is fitted and applied before painting, remove all such items, except butts, and reinstall after painting work is completed.

WOOD DOORS

A. SCOPE OF WORK

- Furnish all materials and equipment and perform labor required to complete flush doors / panel doors.

B. SAMPLES

- Submit sample corner sections of wood doors and jamb for approval of the Architect.

C. PROTECTION

- Protect door adequately from scratches, and other stains with heavy building appear

D. PRODUCTS

- Fabricates

  Assemble joints and doors with water resistant glue. Keep door under pressure until glue has thoroughly set.

  Sand smooth finish doors. Provide with joints and clean cured molding.

  Keep faces free from defects or machine marks that will show through the finish.

  Flush doors Hollow Core

  Provide doors with cross bending/solid section and edging. Make face veneer first quality-selected plywood or lawanit as indicated in the drawings or as specified herein.

E. EXECUTION

- Installation

  Cut, trim and fit each door to each frame and hardware accurately.

  Give allowance for painter's finish and possible swelling or shrinkage.

Provide not more than 1/8-inch clearance at lock end hanging styles and not more than ¼ inch at bottom.

Round all corners to 1/16-inch radius. Level slight lock and rail edge.

All doors shall operate freely and all hardware shall be properly adjusted and functioning.

GLASS JALOUSIE / STEEL WINDOWS AND FRAMES

A. SCOPE OF WORK

- Unless otherwise specified, the Contractor or his Sub-Contractor shall furnish all materials, tools, equipment apparatus, transportation, labor, supervision, management, and incidentals necessary and required for the completion and satisfactory performance of work in strict accordance with this section of the specification and the applicable drawings, subject to the terms and conditions of the Contractor.

B. SHOP DRAWINGS AND SAMPLES

- The Contractor shall before proceed with the manufacture/assembly glass jalousie/steel windows prepare and submit complete manufacturing and installation drawings in full size and in triplicate, together with samples of member, section and hardware to be used for the approval of the Architect. Windows to be manufactured shall conform to the approved drawings and samples.

- Submit shop drawings of metal windows for approval. The drawings shall show complete details of construction, anchorage and samples.

- Guarantee

  All steel works shall be guaranteed for one year from final acceptance of the Owner and the Architect.

C. PRODUCTS

- All members shall be hot-rolled new billet steel with frame and ventilator section not less than 25mm deep from front to back. Frame members to be of equally designed section only at points were called for by the detail drawings and continuous angle pins, as indicated on drawings shall be furnished. For frame at sills, zee type section of special design. With offset permitting downtrend left of the vent member to set flush when vent is in a fully closed position shall be used. Ventilator member shall have integral weathering baffles providing double flat weathering contacts of not less than 6mm width on all four sides of the vent. Muntin shall be 22mm x 25mm rolled to a section.

D. EXECUTION

- Construction

- Corners of vent shall be metered, electrically butt-welded and ground smooth. Corners of frame and all other window, joints and intersection of muntin with frame and vent members shall be coped and electrically welded. Muntin bars except where ventilators are to be continuous from head to sill and from jamb to jamb. Muntin cross joints shall be rigidly and neatly interlocked with faces flushed. Frame section and vent sills shall have weep-holes to provide drainage. Continuous weather drips shall be provided where required at the heads for side hinges ventilators or door. Windows and doors shall be designed for glazing from the outside with wire glazing clips and steel casement putty. All units shall be prepared for and supplied with necessary standard hardware, and for screen plans or drawings.
- Mullions

  Rolled-steel T–bars, pipes, plate or other formed section or a combination of the as shown on drawings shall be furnished where two or more window units are installed in the same opening.

- Installation

  No window unit shall be allowed, in any case, to be installed in place in the formwork previous to pouring concrete. Instead, grooves for grouting shall be caused to be formed along the side and heads of wall openings as indicated on detail.

  Windows shall be erected and prepared openings by experienced window erection men. They be set plumb and true securely wedged and anchored as shown on detailed drawings and held in alignment during construction. All contacts between window and door wall units and adjacent steel including mullions shall be tightly sealed or bedded in mastic or approved sealing compound applied by the Contractor Ventilators shall be carefully adjusted before glazing.

  Standard anchors, clips, and mullions, bolts or screws shall be provided by the window manufacturer provided suitable sinkages and frames for all mortised or counter-sunk hardware and insert steel reinforcement drilled and tapped for attaching all hardware. Frames in masonry shall have steel adjustable anchors for each jamb, spaced approximately 0.60m on center. Provide special anchors for securing to concrete as detailed.

  Steel Doorframes or jambs formed to details shown with rebates to receive the doors. Make allowance of not more than 3mm clearance for doors. Neatly form all returns and edge. Frames shall be smooth and free from warp and buckle, the finish work shall be strong and rigid, neat in appearance and free from corners, and shall be reinforced and may be metered, their full-length welded length and dressed of flush on the exposed surface. Meters shall be well formed and in true alignment. Set frames properly and braced against displacement during construction

operation. During masonry work, grout the jambs solidly with masonry mortar. Protect all metal frames during construction.

- Field Painting

  Prior to or immediately after steel windows has been erected and before glazing, one coat of oil-based metal protective paint shall applied. A second coat shall be applied after putty has dried and set, not sooner than 3 weeks after glazing.

- Glass and Glazing

  Windows shall be glazed from the outside, using steel grade sash compound. Glass panels shall be bed-putted secured in place by copper-covered spring wire glazing clips furnished by the door manufacturer, and then face-puttees to a neat trim line. Glass shall be 6mm thick, clear, American or European made, unless other thickness is indicated on the drawings or as specified in the Schedule of Windows.

CEMENT FINISHES

A. SCOPE OF WORK

- Furnish materials and equipment and perform labor required to complete all plain cement, plaster finish.

- Samples

  Submit test panels for Architect's approval before execution of the work.

B. EXECUTION

- Plain cement plaster finish

  Provide all walls indicated with three coats of cement plasters (scratch coat, brown coat, finish coat). Mix each coat in the proportion of 1 part Portland Cement to Three parts sand by volume.

  Apply the scratch coat with sufficient materials and pressure to insure a good bond and then scratch to a rough surface. Provide a thickness of 3/8-inch scratch coat.

  Apply brown coat one day after applying scratch coat, with a thickness of 3/8 inch and level to a flat even surface. When stiff enough, trowel with a wooden float and cross hatch or broom lightly and evenly to secure a good mechanical bond for the finish coat. Wet the surface and keep from drying out for at least three days.

  Apply finish coat seven days after the application of brown coat. Provide thickness of 1/8 inch. Keep the finish coat damp but not saturated for a period of seven days.

CERAMIC TILEWORK

A. SCOPE OF WORK

- Furnish materials equipment and perform labor required to complete all types of tiles works.

- Samples

- Submit samples of floor and wall tiles including all required beads and moldings.

B. EXECUTION

- Application of scratch coat.

  Thoroughly dampen but not saturated, surfaces of masonry or concrete walls before applying the scratch coat. Make surface areas appear slightly damp. Allow no free water on the surface.

  On masonry, first apply a thin coat with pressure, then bring it out sufficient to compensate for the major irregularities on the masonry surfaces to a thickness of not less than ¼ inch at any point.

  Evenly rake scratch coats, but not dash coats, to provide good mechanical key for subsequent coats before the mortar applied by dashing until it has hardened.

  On surfaces not sufficiently rough to provide good mechanical key, dash on the first coat with whisk brown or otherwise disturb mortar applied by dashing until it has hardened.

- Floor Tile Installation on Mortar Bed

  Before spreading the setting bed, establish lines of borders and center the field work in the both directions to permit the pattern to be laid with a minimum of cut tiles.

  Clean concrete sub-floor then moistens but not soaked. Afterwards, sprinkle dry cement over the surface and spread the mortar on the setting bed.

  Mix mortar and one part Portland Cement to three parts sand. Tamp to assure good cover the entire area and screened to provide a smooth and level bed at proper height and slope.

  Pitch floor to drains as required.

  After setting bed has set sufficiently to be worked over, sprinkle dry cement over the surface and lay tile.

Keep tile joints parallel and straight over the entire area by using straight edge.

Tamp the tiles solidly onto the bed using wood blocks of size to ensure solid bedding free from depressions.

Lay tiles from centerlines outward and make adjustment at walls.

- Wall the installation on mortar bed.

  Before application of mortar bed, dampen the surface of the scratch coat evenly to obtain uniform suction.

  Use temporary or spot grounds to control the thickness of the mortar bed. Fill out the mortar bed even with grounds and rod it to a true plane.

  Apply the mortar bed over an area no greater than can be covered with tile while the coat is still plastic.

  Allow no single application of mortar to be ¼ inch thick.

  Completely immerse wall tiles in clean water and soak of at least ½ hour. After removal, stack tiles on edge long enough to drain off excess water. Re-soak and drain individual tiles that dry along edges.

  Apply a bond coat 1/32 – 1/16 inches which to the plastic setting bed or to the back of each sheet or tile.

  Press tiles firmly into the bed and beat into place within one hour.

  Lay tile fields in rectangular block areas not exceeding 25 by 25 inches.

- Grouting

  After tile has sufficiently set, force a maximum of grout into joints by trowel, brush or finger application
  .
  Before grout sets, strike or tool the joints of cushion-edgetile to the depth of the cushion

  Fill all joints of square-edged tile flush with the surface of the tile. Fill all gaps and slips.

  During grouting, clean all excess grout off with clean burdock, cloth or sponge.

- Cleaning

  Sponge and wash tile thoroughly with clean water after the grout had stiffened. Then clean by rubbing with damp cloth or sponge and polish

Clean with dry cloth.

RESILIENT TILE FLOORING

A. SCOPE OF WORK

- Summary

  The General Conditions apply to all work under this section of the specification.

- Unless otherwise specified, the Contractor shall furnish all materials, tool, equipment, apparatus, appliances, transportation, labor, supervision, management and incidentals necessary and required for the completion and satisfactory performance of work in strict accordance with this section of the Specifications and the applicable drawings, subject to terms and conditions of the Contractor.

B. PRODUCTS

- Vinyl Tiles

  Details and color schemes to be determined by Architect.

- Tile Adhesive

  As manufacturer's specifications.

- Floor Divider Strips

  Heavy top strips, brass ¼ inch top thickness with an offset or projection below the top of the strip and extending it from one side.

C. EXECUTION

- Preparation of surface

  Clean the floor thoroughly of all dirt, grease, paint drops, etc. leaving a surface suitable for the installation of the vinyl tile the resulting concrete surface therefore, shall be smooth, even thoroughly dry and clean, before a layer of the manufacturer's adhesive is laid to receive the tile in accordance with the manufacturer's primer.

  If the Engineer so requires, because of the concrete surface conditions, the manufacturer's primer shall prime the concrete surface.

- Laying Vinyl Tile Workmanship

  The Vinyl Tiles shall be laid according to details and color scheme approved by the consulting Architect and shall be carefully matched and

the seams cut. All seams and edges shall be cemented carefully smug fit with the manufacturer's adhesive for the purpose. The surface of the finish floor shall be left smooth, clean and in first class condition.

Only experienced men shall be employed in this work.

All borders shall follow the line of the permanent fixtures and the width of the border may vary to allow for variations in the dimensions of rooms, size of tiles and design selected. The tiles shall but against the base floor level. Approved metal moldings shall be provided at door openings and such points where so required.
Do not begin work until work of other trades including painting has been completed.

- Floor divider metal

  Floor divider strips (heavy top strip), ¼ inch thickness with an offset or projection below the top of the strip and extending from it on one side, shall be laid straight and true between Vinyl Tile flooring and other floor finishes like cement, terrazzo, granolithic, tile, etc. This projection provides a bearing surface for a vinyl tile and brass strips to the flush. Where jointing occurs at door openings, strips shall be set directly under center of doors.

- Cleaning, Waxing, and Polishing

  At completion of the work, the Contractor shall clean all Vinyl Tile works, remove all cement dirt or other foreign substances.

  Apply two coats of water emulsion wax and polish each coat to produce a well-polished finish.

  Do not permit traffic on finished floors unless they are protected with heavy papers.

- Adjustments

  The installation shall be thoroughly inspected and all necessary adjustment shall be made within one-month time.

  Tiles that have not "seated" in level glance with surrounding tiles shall have heat applied locally or quickly rolled to surrounding floor tile level. Repair tile showing minor fracture, shall have heat locally applied and then quickly rolled.

  Tiles showing broken corners or fracture line entirely across their surface shall be warmed and then removed. Substitute new tile of same color and thickness.

WROUGHT IRON GRILLES

A. SCOPE OF WORK

- Furnish all labor materials, equipment, plant and other facilities necessary for fabrication, delivery and installation of all security grill work shown on drawings and as herein specified.

- All work under this division shall be subject to the General Conditions accompanying these specifications. The Contractor and the Sub-Contractor for this portion of the work is required to refer thereto.

B. GENERAL

- The Contractor shall furnish and installs all wrought iron grillwork indicated on the drawings or specified herein.

C. FABRICATION

- All work is to be first quality, by experienced craftsman and fabricated in a shop capable of producing the higher grade of metal work and whose principal business is the manufacturer of architectural metals.

- All joints and splices shall be electrically welded and ground smooth.

- Before delivery to the job site, all wrought iron grille work shall be shop painted with a coat of rust inhibitive primer such as red lead.

- All seams shall be ground smooth.

D. INSTALLATION

- All work shall rigidly install in a first-class manner done by experienced mechanics.

E. GUARANTEE

- Furnish guarantee to Owner per requirements of the General Conditions for period of one year after date of final acceptance of building.