



PROJECT TITLE : FIRE PROTECTION SYSTEM OF GUSALING ANDRES BONIFACIO
Gusaling Andres Bonifacio, College of Arts & Sciences
University of the Philippines Manila

SUBJECT : SCOPE OF WORK AND TECHNICAL SPECIFICATIONS

DIVISION 1 - GENERAL

01000 General Requirements

1. The Contractor shall furnish all materials, equipment, tools, apparatus, appliances, accessories, transportation, labor and supervision required for the complete construction of the subject project, as shown on the drawings and called for in these specifications, ready for use.
2. All Contractors submitting proposal for this project shall first examine the site. All proposals shall take into consideration all such conditions that may affect the work under this contract. The specifications and plans shall form part as one. Anything mentioned on plans and not mentioned on the scope of work and specifications and vice versa shall be properly consulted to the CPDMO Project Architect/Engineer for clarification. Any work or materials not in accordance with the drawings or specifications shall be replaced with new at the Contractor's expense.
3. The Contractor shall coordinate his work with all parties to ensure proper phasing or comply with the approved schedule of works. The Contractor shall engage under him, a registered Engineer or Architect to supervise his work. He shall remain at all times in the construction site.
4. A logbook shall be available at the site. It shall contain the daily activities in the site, including but not limited to weather condition, delivery, manpower and other matter pertaining to the condition of the project. It will also serve as data for Contractor and the Project Inspector and shall be surrendered to the CPDMO at the end of the project.
5. Identification Card of construction workers and engineer/representative shall be supplied by CPDMO with corresponding fees; it should be worn at all times while inside the building/campus premises. Those without IDs shall not be allowed to enter the premises for security purposes.
6. No alteration or additional work that will result in an additive or deductive cost change from the Contract shall be allowed without the approval of the chancellor.
7. The contractor shall submit at least three (3) options per item for approval. Complete specifications with product sample shall be submitted by the contractor to CPDMO and end-user for evaluation. Inspection of the Project Architect/Engineer in-charge shall be required prior to installation of any item/material on the construction.

8. Regular coordination meeting shall be conducted with CPDMO, Contractor and End-user for proper project monitoring.
9. Existing condition of the work site shall be documented by the contractor and photos shall be taken before commencement of work to ensure such status. Any damage on the areas due to the contractor's on-going work shall be refurbished at his expense.
10. The Contractor shall provide a complete copy of "As built plans" of the project/unit concerned which shall include all the civil, architectural, plumbing, electrical and other related layouts in 20" x 30" original sheets. It should be properly drawn indicating all the specifications, layouts, tables and necessary data. An initial layout should be submitted in a A3 sheet for checking and approval of Project Architect/Engineer. Final "As built plans" shall be submitted in 20" x 30" tracing sheets, 3 blue prints with signature of project engineer, and an electronic Autocad drawing file. A copy of the technical documents and warranties of the items shall also be submitted in soft and hard copies.
11. The Contractor shall promptly remove from the premises all rubbish, trash, debris, and all superfluous building materials weekly. After the completion of all works, restore all areas that were damaged as affected by the construction works and leave the site clean to the satisfaction of the Project Inspector or his representative and End-user.
12. All materials removed from the unit shall be properly documented prior to turn-over to the End-user for proper safe keeping. The turn-over document shall be attached to the contractor's final billing.

01300 Submittals

Shop Drawings, Product Data and Samples

- Submit to the CPDMO of shop drawings, product data and /or samples of all materials for review. Submit at least three (3) options per material for approval.
- The CPDMO's review shall be limited to quality and design intent. It shall be the Contractor's responsibility to verify quantities and sizes, and make corrections observed and noted by CPDMO on any returned submissions.
- No work requiring submissions or samples shall be commenced until submission has been reviewed by the End User and or CPDMO.
- Final Acceptance of colors and finishes will be made from samples applied on the job based on the signed and approved sample materials.
- All submittals shall be channeled from General Contractor to CPDMO, Planning and Development Department, and back to the General Contractor. This procedure applies to original submittals as well as required resubmittals. Each organization shall keep its required number of copies and/or make necessary copies. The Contractor will make all corrections noted on check sets, if necessary, and return for review as required by CPDMO.
- No submittal shall be received by the CPDMO without transmittal letter.
- Samples must have Manufacturer's Data Sheet/Specification and must come together with a transmittal sheet with a section for approval/disapproval and recommendation of CPDMO and/or END USER.

01500 Temporary Facilities

- Provide Temporary GI sheets or Board enclosures on all areas for building protection. Such coverings shall be adequate enough to cover all the building facilities throughout the span of the project.
- Charges for restoration or replacement of any damaged facility, equipment, material and the like shall be made on the contractor due to his negligence in providing suitable temporary covering.
- Provide the appropriate scaffoldings, board ups, safety nets and related items to ensure proper installation of all framing systems and protection of the area, at the expense of the contractor as its basic equipment.

DIVISION 2 – SITE CONSTRUCTION

02200 Site Preparation

Mobilization / Demobilization

- This work includes mobilization process, provision for warning signs, including barricades, temporary facilities, temporary fences, warning lights and similar safeguards shall be provided by the Contractor as they are required for protection of his manpower and others during the construction life of this project.
- Demobilization procedure shall include clearing of the affected areas from all rubbish, trash, debris, and all superfluous building materials and restore all areas that were damaged as affected by the works and leave the site clean to the satisfaction of the Project Inspector or his representative and End-user.

02230 Site Clearing

- Clear the area from all obstructions or as affected by the construction works, except those structures indicated on the drawings or designated by the Project Architect/Engineer to be left standing. It shall be properly protected from incidental damage due to construction works by the erection of suitable barriers upon approval of the Project Architect/Engineer.

02290 Site Monitoring

- Site monitoring shall be a must to the contractor for the effective implementation of the project. Any discrepancies on plans and actual site conditions shall be properly coordinated with the Project Architect/Engineer concerned for verification.
- Regular coordination meeting shall be done between the contractor or its representative and the Project Architect/Engineer concerned at CPDMO.

02300 Earthwork

- The contractor shall supply all labor, plant, materials, equipment and other facilities required to complete all earthworks in an acceptable manner as shown in the drawings and as specified herein. This work shall include, clearing, staking, excavation, sub base preparation, backfilling, compaction and trimming for final grades. It also includes site drainage, utility service connection for sewer, water supply, power and all appurtenant works in accordance with the contract and as may be directed by the Resident Architect/Engineer.

Material Requirements

- All filling materials, whether native to the site or imported, shall be free of debris, roots, vegetation or other deleterious materials. All earth fill materials, sand and gravel shall be free of any clods or stones larger than 50mm in their largest dimension except as otherwise shown or specified.
- Excavated materials that can be compacted to the required density and which are otherwise judged by the Resident Engineer (RE) to be acceptable maybe used for backfill material as directed.
- Bedding materials shall be used as shown in the drawings and as directed by the Resident Engineer (RE). The material shall be hard, durable stone, and if in direct contact with a fabric cloth shall be free of sharp edges. The stone shall be 19mm (3/4 in.) maximum size graded by weight as follows:

Sieve Size (Square Openings)	Percent by Weight
19mm (3/4 inch)	90 - 100
12mm (1/2 inch)	10 - 50
9.5mm (3/8 inch)	0 - 20
4.75mm (No. 4)	0 - 5

Scope of Work:

- The area shall be cleared of rubbish, loams, refuse, grass, roots and other perishable or objectionable matter to a suitable sub-grade.
- All unsuitable materials that lie within the operational area shall be removed and disposed from the site, to a dump designated by the Resident Engineer or Administrator or spread in locations in a manner approved by the Resident Engineer. Clearing may be undertaken by any method which is not detrimental to the work, or waste of earth materials.
- The building shall be staked out and all lines and grades as shown on the plans shall be established accurately before the start of excavation. Basic batter boards and reference marks shall be erected at such places where they will not be disturbed during the construction of the foundation.
- Trenching for water, sewer and storm drainage pipelines shall be done according to line and depths as shown in the drawings. Trench shall be of sufficient width to accommodate the proper laying, installations and jointing of pipes. Lines and depths not indicated on the drawings shall be determined by the Resident Engineer before laying of pipelines is done. All trenches shall be fully backfilled at the end of each day or in lieu thereof, when approved by the Resident Engineer.
- Where trenches for water, sewer and storm drainage pipelines requires the dismantling of road pavements, the contractor shall undertake trenching after obtaining written permit. The contractor shall restore such pavements to their original and better condition immediately after backfilling of pipes without any additional cost.
- The excavation lines shown on the drawings are solely for the purpose of computing quantities for payment purposes. The owner specifically does not warrant that actual sides can be made to the excavation lines shown.
- The Contractor shall design, furnish, put in place, and maintain such sheeting and bracing as may be required to support the sides of excavations. Care shall be taken to prevent voids outside the sheeting, but if voids are formed, they shall be immediately filled and rammed. Prior to installation of any sheeting and bracing, the Contractor shall

submit in writing for review by the Resident Engineer (RE) the type of sheeting and bracing to be used and his intended method of placing and maintaining it as required.

- All sheeting and bracing not left in place shall be carefully removed without endangering the new installations and other existing utilities of any adjoining property.
- All voids caused by withdrawal of sheeting shall be immediately refilled with sand and compacted by ramming with suitable tools, by watering, or as otherwise directed.
- Wood sheeting shall not be withdrawn if driven below the bottom of any drain, and under no circumstances shall any wood sheeting be cut off at a level lower than 0.30m above the top of the drain.
- The Contractor shall leave in place to be embedded in the backfill, all sheeting, bracing, etc. which the Resident Engineer may direct him in writing to leave in place at any time during the progress of the work for the purpose of preventing injury to structures, utilities or property, whether public or private.
- Generally, limits the depth of excavation for building and pipelines shall be in accordance with details shown on the drawings.
- Excavations shall include the removal of all materials of whatever nature encountered including all obstructions of any nature that would interfere with the proper execution and completion of the work. The removal of these materials shall conform to the lines and grades shown or ordered. The Contractor shall supply, place and maintain all supports and shoring that may be required for the sides of the excavation and all pumping, ditching or other approved measures for the removal or exclusion of water including taking care of storm water and waste reaching the site of the work from any source so as to prevent damage to the work or adjoining property. The walls and faces of all excavations in which workers are exposed to danger from unstable ground shall be guarded against by a shoring system, sloping of the excavation, or some other acceptable method. The Contractor shall supply, install and maintain such sheeting; bracing, etc. as may be necessary to protect the workers and to prevent any movement of earth which could cause injury, delay of work, or endanger adjacent structures.
- Excavation to depth greater than that shown on the drawings may be required, without any additional cost. The depth and extent of over excavation shall be approved by the Resident Engineer. If necessary, the Resident Engineer will include an estimated allowance for loss of material into soft sub grade. This allowance will be separately determined by the Resident Engineer for each individually measured section of work. The Contractor is required to draw the attention of the Resident Engineer in each instance and obtain the Resident Engineer's determination of the allowance to be used.
- The excavation shall be then be refilled to the grade of the bottom of the bedding layer with either imported ordinary material, gravel, or other materials that is acceptable. The material to be used shall be placed in layers, brought to optimum moisture content and compacted to ninety (90%) percent of the modified AASHO standard.
- Bedding material shall be sand or crushed rock as previously specified. Bedding material shall be placed to a minimum depth of 100mm and compacted to 95% of modified AASHO compaction elsewhere.
- Launching an initial backfill to a depth of 150mm above the pipe shall be carried out using coarse sand as previously specified. The backfill shall be carried out in layers not exceeding 150 mm compacted thicknesses and to 95% of modified AASHO compaction under road ways and to 90% elsewhere.
- The remainder of the backfill shall be Select Native Material subject to the Resident Engineer's approval except under roadways where sand or crushed rock compacted to 95% of modified AASHO compaction shall be used.

- Filling shall be carried up in layers not exceeding 150 mm compacted thicknesses. Compaction shall be carried out using vibrating rollers or as directed by the Resident Engineer.
- The Contractor shall give special attention to the effect of his operations. He shall take special care to maintain, trim, and level the grade surrounding the area around the building.

02500 Utility Services

- Provision of electric and water meter shall be included in the quotation to be charged to the contractor's overhead. All utility consumption shall be provided with meters to limit the usage of such during working period. Payments of bills shall be made thru the Cashiers Office after the renovation period presenting the statement of account issued by Accounting upon recommendation of the Chief of CPDMO.

DIVISION 3 – CONCRETE

Section 03050 Basic Materials & Methods

- The work to which this refers includes all operations necessary for the supply and delivery of all materials, labor, equipment and all associated activities. This shall conform in the recommendations of the "National Structural Code for Buildings" published by the Association of the Structural Engineers of the Philippines, together with the latest editions including all revisions of the following standards:
 - ASTM C-31 Method of making and Curing Concrete Compression and Flexure Test Specimen in the Field.
 - ASTM C-33 Concrete Aggregate
 - ASTM C- 39 Method of the test for Compressive Strength of Molded Concrete Cylinders.
 - ASTM C- 94 Ready Mixed Concrete
 - ASTM C-143 Test of Slump for Portland cement Concrete.
 - ASTM C-140 Portland cement
 - ASTM A-615 Deformed and Plain Steel Bars for Concrete Reinforcement.

Material Requirements:

- Cement to be used shall be Type I conforming the ASTM C-150.
- Fine and coarse aggregates shall be obtained from the approved source as determined by DPWH and shall conform to ASTM C-33.
- Water shall be potable and free from deleterious amounts of acids, alkalis, oils or organic matters.
- Admixtures shall only be used with the prior written consent to the Resident Engineer. Admixtures shall not contain calcium chloride. The amount of admixture shall not change the required quantities of cement specified and quantity of admixture used and method of mixing shall be in accordance with the manufacturer's instruction as the case may be.
- Reinforcement steel shall be deformed steel bars conforming to Structural Grade (Grade 33) and High Strength (Grade 60) as specified on the structural plans and as specified in Section 5.07 of the National Structural Code for Buildings. Shapes and dimensions shall be in accordance to the above-mentioned standards.

Quality of Concrete:

- The quality of concrete shall comply with Section 5.04 of the National Structural Code of the Buildings and with the specific requirements outlined in the various sections of these specifications
 - Testing of samples from concrete pours shall be as required by Section 5.05 of the National Structural Code of Buildings
 - Test of specimen shall be deemed acceptable provided they meet the requirements of Section 5.04 clauses (e) of the National Structural Code of Buildings
 - Should further testing of the finished concrete be necessary due to non-compliance of test specimens, as required by the Resident Engineer, it shall be carried out in accordance with the approved procedures laid down in National Structural Code of Buildings. Section 5.04 clause (e)
 - Hardened concrete that is deemed not to comply with the specifications above, but which the Resident Engineer permits to be further tested, shall be tested for compressive strength
 - Any concrete will be rejected under the specifications above if the results fail to meet the requirements Section 5.03 of National Structural Code of Buildings.
 - Hardened concrete may also be rejected for any one of the following conditions:
 - a. It is porous, segregated or honeycombed.
 - b. Its placing has been so interrupted that there is a construction or similar joint not in accordance with Section 5.03, clause (d) of the National Structural Code of Buildings.
 - c. The reinforcing steel it incorporates has been displaced.
 - d. Construction tolerances have not been met.
 - e. The required surface finish has not been met.
 - f. The concrete can be shown to be otherwise defective.
- When the above things happened, the Resident Engineer has the option to let the Contractor to demolish the rejected portion.

Scope of Works / Method of Activities

- Concrete shall not be placed until all formworks, installation of reinforcement, embedded parts and the preparation of surfaces have been approved. Prior to concreting, the contractor shall submit a proposed pouring schedule for the various stages of the work. No concrete shall be poured prior to the approval. Subsequently, the contractor shall give the RE twenty-four (24) hour notice of his intention to proceed with the stage of the work.
- All batches of mortar or concrete shall be adjusted as to within the capacity of the mixer. When cement is delivered in bags, the batch shall be so proportioned as to use of only full bag batches.
- Hand mixing will not be permitted except by written permission from Resident Engineer and only in such manner as he may direct.
- All mortar and concrete shall be used while fresh and before there is evidence of initial set. No re-tempering of mortar or concrete shall be undertaken.
- Ready mixed concrete (i.e., off-site transit mixed concrete) shall comply with ASTM C-94 and the requirements herein.
- Batch deliveries shall not exceed the rated capacity specified for the mixer by its manufacturer. The Contractor shall submit affidavits for the approval of the Resident Engineer from the ready-mix concrete suppliers, certifying that the proposed mix to be supplied shall satisfy the requirements of this specification.
- All concrete shall be ready mixed unless approved otherwise by the Resident Engineer in writing. Concrete not ready mixed shall comply with the National Structural Code for Buildings.

- The surfaces of measuring, mixing, and transporting equipment that will be in contact with concrete shall be clean at the commencement of the mixing operation.
- The accuracy of weighing equipment and the accuracy of batching shall comply with the applicable requirements of ASTM C-94 and its reference standards. The materials shall be as measured as to give the required mixed proportions.
- Cements and aggregates shall be measured by weighing or any method approved by the Resident Engineer.
- The device employed to measure and discharge the amount of water for the mixture shall be capable of adjustment and checking.
- Water carried by aggregate, in excess of those giving saturated surface-dry conditions shall be considered as part of the required mixing water.
- Mixing shall be done in mixer of approved type.
- Concrete shall be mixed until the material are uniformly distributed and shall be discharged completely before the mixer is recharged.
- The time of mixing shall not be less than one and one half (1 ½) minutes after all ingredients are in the mixer, unless it is shown that the uniformity requirements of the appropriate reference standards are met by an alternative time that shall be agreed to by the Resident Engineer and confirmed in writing.
- No concrete shall be placed until the depth and character of the foundation materials, the forms and false work and the placement of the steel reinforcement had been inspected and approved by the Resident Engineer. Before depositing concrete, all debris, foreign matter, dirt and water shall be removed from the forms, and the surface of any concrete previously placed shall be cleaned and brushed with cement paste.
- No concrete shall be placed on filled ground until the Resident Engineer has approved the standard of compaction of the sub-grade.
- All concrete shall be placed in daylight or under such lighting condition that may be approved by the Resident Engineer.
- The method and manner of placing concrete shall be such as to avoid the possibility to segregation of the concrete materials or the displacements of the reinforcement. Where troughs or chutes are used in placing concretes, their angle of inclination with respect to the horizontal shall not exceed thirty (30) degrees. When a pipe is used, it shall be kept full of concrete with its discharged and submerged.
- Concrete shall not be allowed to drop into place from a height exceeding one (1) meter.
- The placing of concrete shall be evenly regulated to avoid the depositing of a large quantity at any one point. Concrete in horizontal layers shall be deposited as near practicable to its final position in the forms.
- Concrete shall be deposited in a continuous operation as far as it is practicable to do so and shall avoid initial set starting in any part of the work before fresh concrete can be placed against it.
- Compaction of concrete shall be by approved immersion type vibrators. Vibration shall be limited to the time necessary to produce thorough compaction of the concrete without segregation. Under no circumstances shall vibrators be used to move concrete laterally, nor shall it be allowed to penetrate concrete in the prior lift.
- During placing and until curing as specified is completed all new concrete shall be protected against the harmful effects of exposure to the elements and to running water either as specified or as directed by the Resident Engineer.
- When concrete hardens sufficiently it shall be covered with damp, close-woven burlap or similar material, or clean sand, which shall be kept thoroughly saturated over a period of ten to fourteen days. Where wood forms are used, they shall be kept wet for the same period to prevent openings at the joints and drying out of the concrete.

- Precautions shall be taken to avoid premature stiffening of the fresh mix and to reduce water absorption and evaporation losses.
- If the temperature of the surrounding air is higher than 32 C, the following shall be applied unless otherwise documented by the Resident Engineer.
- The formwork shall be continually sprayed with cold water in advance of the concreting and excess water shall be removed from the inside of the forms immediately prior to the placement of concrete.
- The reinforcement and the formwork if metal forms are used shall be protected from the effects of hot winds and direct sunlight.
- Suitable barriers shall be provided to protect the freshly placed concrete from wind, until the concrete is hardened sufficiently to allow it to be covered,
- The concrete shall be held to a temperature of 32 C when being poured.
- The concrete shall be mixed, transported, placed and compacted as rapidly as possible and shall be then covered with an impervious membrane and shall kept wet for curing.

Finishing in Concrete

- Allowable deviations from plumb or level and from the alignment, profile grades and dimensions shown on the drawings are defined as "tolerances" and are to be distinguished from irregularities in finish. Surface irregularities are classified as abrupt or gradual. Off-sets caused by displaced or misplaced from sheeting, from lining, form section, loose knots or otherwise defective form timber will be considered as abrupt irregularities and will be tested either by a straight edge or its equivalent for curved surfaces.
- Immediately after removal of forms all pins and loose materials shall be removed. "Honey-combing" aggregate pockets, voids and holes shall be cut back to solid concrete. All repair of imperfection in concrete shall be completed within twenty-four (24) hours after removal of forms.
- Dry pack concrete shall be used for filling holes having at least one surface dimension, little if any, greater than the hole depth and for narrow slots out for repair or cracks.
- Mortar filling shall be used for repairing defects which are too wide for dry pack filling, too shallow for concrete filling and too deeper than the far side of the reinforcement that is nearest to the surface.
- Concrete filling shall be used for holes extending entirely through concrete sections for holes that are greater in area than 0.1 square meters and deeper than 100 mm and for holes in reinforced concrete which are greater in area than 0.1 square meter and which extend beyond the reinforcement.
- Surfaces of work carried out in accordance with this specification above shall be prepared by thoroughly roughening and cleaning so that all loose or soft material, free water, foreign matter and laitance are removed. At the time of placement of the fresh concrete, the joint surfaces of the hardened concrete shall be damped but there shall be no water.

Section 03100 Concrete Forms and Accessories

- The Contractor shall be responsible for the design, erection and adjustment of all formwork and false work in accordance with Section 5.06, "National Structural Code for Buildings".
- All materials used in construction and support of formwork shall be of timber. Alternative materials shall only be used with the Resident Engineer's approval.
- It shall be the Contractor's responsibility to ensure that the forms are placed to the shape, lines and dimensions as indicated on the drawings, and they shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete. The

Contractor shall ensure that the forms are maintained rigidly in position and be sufficiently tight to prevent excessive leakage of mortar.

- All debris particularly chipping, shavings and sawdust, shall be removed from the interior of the forms before the concrete is placed. All form surfaces shall be cleaned and thoroughly wetted before pouring of concrete.
- Before the placement of any concrete, the Resident Engineer shall inspect the formwork and may, at his discretion, reject any materials or forms that do not conform to this specification.
- The deflection of forms between joints and/or studs shall not exceed one five-hundredth (1/500) of the joints or stud spacing.
- The recommended minimum stripping for horizontal slabs shall be twenty-four (24) hours after the approval of the Resident Engineer prior to the removal of any forms.

Section 03200 Concrete Reinforcement

- All steel bars to be used during construction should be in accordance with the guidelines of National Structural Code for Buildings.
- The support and tolerance in placing of reinforcement shall comply with section 5.07 of National Structural Code of Buildings.
- Lap splicing and or welding of reinforcement shall comply with section 5.07 "National Structural Code of Buildings".
- Welding of reinforcement shall not be carried out unless shown on the drawings, specified, or otherwise approved by the Resident Engineer.
- Welding if approved shall not be carried out within 75mm of a bend having internal diameters, or any part of a bar that has been bent in reverse direction or straighten.
- All reinforcing bars shall be high tensile strength (Grade 60) except and ground floor slab rebars which shall be structural grade (grade 33).
- Prior to installation of ground floor rebars, 0.3mm thick polyethylene plastic shall be laid above gravel base after application of soil poisoning.

DIVISION 4 – MASONRY

Scope of Work

- The work covered by this Item shall consist of furnishing all masonry work requirements in accordance with Plan and/or standard detail and as herein specified.

Material Requirements

- Use Portland cement which conforms to the requirements of ASTM C-150 Type for normal Portland cement.
- Use fine aggregates which shall be free from injurious amount of clay loam and deleterious materials and shall conform to ASTM C-33 or C-330.
- Concrete hollow blocks, 4" and 6", shall be standard manufacture, machine vibrated, and shall have fine and even texture, and well-defined edges. Mortar, filler and plastering shall be Class "A" mixture.
- Deformed steel bars shall conform to ASTM A-305. It shall be clean and free from loose, rust, scales and any coatings that will reduce bond.
- #16 tie wire shall be used for reinforcing bars connections.

Construction Requirements

- Provide CHB wall with 10 mm dia. deformed round bars at 0.60 m on centers both ways. Verify actual location.
- All cells shall be solidly filled with grout.
- Concrete mixture shall be class "A".
- Provide the plastering at 16 mm thick using class "A" mixture.
- Follow plan for details.

DIVISION 8- DOORS & WINDOWS**08100 Doors****Scope of Work**

The work covered by this item shall consists of furnishing all fabricated doors and jambs, equipped with fixing accessories and locking devices in accordance with plan and/or shop drawings and as herein specified.

Material Requirements

D-1 Double Panel Steel Louver Door

Galvanize sheet GA# 18 thick

GA# 16 thick powder coated finish jamb

Complete with lockset, knob, hinges and other accessories

Dimensions: 2.10m x 1.70m

Submit shop drawing and layout of doors for approval of CPDMO Project Architect/Engineer and End-users.

08500 Windows**Scope of Work**

- The work covered by this item shall consists of furnishing all fabricated windows and jambs, equipped with fixing accessories and locking devices in accordance with plan and/or shop drawings and as herein specified.

Material Requirements

W-1 Metal Louver Window

Metal louver fixed window in powder coated finish

Dimensions: 1.50m x 1.20m

W-2 Metal Louver Window

Metal louver fixed window in powder coated finish

Dimensions: 0.50m x 3.80m

Submit shop drawing and layout of doors for approval of CPDMO Project Architect/Engineer and End-users.

Division 9- Finishes

09910 Paints and Coatings

Surface Preparation

- No painting works shall be done under conditions that may jeopardize the quality or appearance of the painting or finishing.
- All surface to receive paint should be cleaned and in proper condition. Wood works shall be sandpapered and dusted clean

Material Requirement

- Elastomeric Paint (topcoat) semi-gloss
- Submit color scheme to the Project Engineer / Architect in-charge for approval.

Application

- All new areas shall be properly primed, existing areas shall be repainted in two coats providing all the necessary patching up of uneven areas.
- Top coat shall be of the approved color by CPDMO and End-users. Painting system may vary from two to three coats.
- Paints when applied by brush shall be non-fluid, thick enough to lay down an adequate film of wet paint. Brush marks shall flow out after the application of paint.
- Paints prepared for application by roller must be similar to brushing paint. It must be non-sticky when thinned to spraying viscosity to break up easily into droplets.
- Adequate workmanship shall be done on this part of the finishing works. Additional coatings shall be applied by the Contractor at his expense if the painted areas will not be satisfactory to the Project Architect/Engineer and End-users.

Restrictions

- Color schemes and other paint material sample required by these specifications and/or by the Project Architect / Engineer and End-users shall be submitted subject for approval at the expense of the Contractor.
- After all work have been done, restore and repaint all affected areas due to the installation works or related works to the same color scheme of the building.

09999 Paints Restoration

- Provide all the restoration works and rehabilitation on all affected areas to follow existing features and assembly.

DIVISION 15 – MECHANICAL

Section 03100 Fire Protection

Scope of Works

- A. Furnishing of all materials, labor, tools, equipment and accessories for the complete installation, testing and adjustment ready for use of the proposed Automatic Fire Suppression System (AFSS). The work essentially shall include but shall not necessarily be limited to the following items:
 - a. Sprinkler system for the floors as shown on plans.

- b. Fire department connections, fire hose valves, roof manifold and dry standpipe system.
- c. Material and accessories:
 - 1. Automatic fire sprinkler system, risers, piping, hangers and supports, supervisory flow switches, sway braces including installation of sprinkler system and accessories.
 - 2. Supply and installation of the wet standpipe system consisting of Fire Department inlets and fire hose cabinets.
 - 3. Supply and installation of dry standpipe system consisting of Fire Department inlets, fire hose valves and testing hose valve headers.
 - 4. Miscellaneous metal works, hangers, braces, signs, supports and miscellaneous materials.
 - 5. Supply and installation of alarm check valve assembly with retarding chambers, motor gong, alarm bell complete with trims and accessories including connection to the building central Fire Alarm and Detection System (FDAS).
- d. Supply and installation of fire and jockey pumps with controllers and accessories to include vibration isolators.
- e. Installation and supply of floor control valves and water flow switches.
- f. All openings through which fire may spread from one floor to the other such as holes through floors made for the passage of sprinkler pipes, plumbing pipes and electrical conduits shall be sealed with fire resistant materials.
- g. Supply of tools and stock of spare sprinkler heads.
- h. Furnishing and installation of instruction boards, charts, signs and markers.
- i. Priming and finish painting of all exposed piping and all equipment except for the sprinkler heads.
- j. Securing and payment of permits and licenses for construction purposes including approval from the Bureau of Fire Protection (BFP).
- k. Complete testing of all Fire Protection System in accordance with NFPA 13.
- l. One (1) year warranty of trouble free operation, testing and maintenance of the complete work
- m. Water supply for fire protection use shall be separate from the domestic supply and shall have a minimum capacity of not less than 21,000 gallons (80 cu.m).
- n. Submission of as-built drawings in white print and electronic file to the owner/s.

APPLICABLE CODES, ORDINANCES, PERMITS AND FEES

- A. The work covered in this contract is to be installed according to the following:
 - 1. Fire Code of the Philippines 2019 edition.
 - 2. NFPA codes.
 - 3. International Fire Code.
 - 4. Fire Department ordinances of concerned city and municipality.
- B. All construction permits and fees required for the works shall be obtained by and at the expense of the Contactor. The Contractor shall furnish the Architect, the Engineer and the Owner certificates of inspection and approval from the proper government authorities after completion of work.
- C. The Contractor shall obtain all necessary allowances, pay royalties, etc. in connection with the use of any patented device or system and shall save the Owner harmless from any claim or lawsuit arising from such use.

SHOP DRAWINGS, SAMPLES AND OTHER SUBMITTALS

- A. The Contractor shall prepare and submit for approval the following:
 - 1. Dimensional layout of all pumping system, fire hose cabinet connections, etc.
 - 2. Manufacturer's catalogue, sheets, marked as necessary to indicate materials or equipment being furnished for the following items:
 - a. Fire and Jockey pump.
 - b. Pump controllers.
 - c. Valves.
 - d. Mechanical grooved coupling and flexible connectors.
 - e. Fire department connections, hose valves, fire hose cabinets.
 - f. Sprinkler heads.
 - g. Hangers and supports.
 - 3. List of miscellaneous materials proposed including pipes, fittings, valves, etc. identifying manufacturer and type.
 - 4. Field test reports.
 - 5. Such other similar information the Engineer may require.

ACCEPTANCE OF TESTS

- A. Acceptance of work shall be conditioned on successful tests of the entire system.
- B. Test requirement laid out in the NFPA 13 standards for the installation of sprinkler system shall be performed prior to the approval of the work.
- C. Isolated leak tests or partial tests of areas may be performed prior to installation of ceiling materials in the area to preclude any damage there at during total system final tests.
- D. The Contractor shall furnish the Owner a written statement to the effect that the work covered by the Contract has been completed and tested before requesting for final approval of the installation by the Bureau of Fire Protection.

WORKMANSHIP AND COORDINATION OF WORK WITH OTHERS

- A. The Contractor shall be held fully responsible for the work of any manufacturer or subcontractor supplying the materials to or performing work as it is intended that the entire fire protection system shall be ready in every respect for satisfactory and efficient operation when finally delivered to the Owner/s.
- B. The Contractor shall assume full responsibility and shall provide the services of a qualified Engineer to supervise the complete installation of equipment and to conduct final acceptance tests.
- C. The work throughout shall be executed in the most thorough and satisfactory manner in accordance with the best practices of the trade.

SPRINKLER HEADS

- A. Type: Automatic standard 15 mm Ø orifice, solder fillet type, upright, pendent or sidewall heads.

Pendent heads shall be provided with aluminum escutcheon or approved equivalent to fit into ceiling boards or ceiling runners. Flush or concealed type pendent units shall be accepted as substitute. Heads shall be UL approved of one brand all throughout.

B. Head rating:

Public areas; lobby	135°F
Residential units; corridor	135°F
Hallways; bedroom and toilet	135°F
Storage and other similar areas	135°F
Kitchen	212°F

C. Pipe thread and valve seat: 15 mm Ø nominal

D. Furnish spare heads as required in the code and maintenance services parts list for a period of at least one (1) year reckoned from the date after termination of warranty.

FIREHOSE CABINETS

A. Hose: 40 mm Ø; 30 m long single jacketed; rubber lined

B. Nozzle: combination fog and solid stream; 40 mm Ø; chrome plated

C. Rack: semi-automatic; chrome plated

D. Pressure Restricting Valve (PRV): angle type combination type 40 mm Ø; chrome plated polished trim. For exceeding 100 psi water pressure, provide with nipple and union patente set at 70 psi water pressure.

E. Hose nipple: shall be chrome plated for components. Provide two (2) universal spanned wrenches.

F. Cabinet: full flush mounting door with anodized colored aluminum for all glass plate; frame and box

Shall be no. 14-gauge steel with white interior and red exterior baked enamel finish over primer. Cabinet size shall contain the above components.

FIRE DEPARTMENT CONNECTION (INLET)

Shall be two-way sidewalk inlet connections. Vertical cast brass with plug spring check snouts complete with plugs and chain and brass escutcheon lettered "Dry Standpipe" and/or "Wet Standpipe". Threads to suit Bureau of Fire Protection specifications.

WALL HYDRANTS (FIRE HOSE VALVES)

A. Thread and type of connection.

B. Type: single outlet as shown on the plan; wall mounted.

C. Finish: polished brass.

D. Outlet shall have chain connected caps or plugs.

ROOF MANIFOLDS (OUTLET)

A. Type: Twin angle valve outlet connection with chain secured plugs. Size indicated in plans.

B. Threads and type of connection.

C. Finish: polished brass.

D. Outlet shall have chain connected caps or plugs.

PORTABLE FIRE EXTINGUISHER

Furnish and install as indicated on the drawings. Ten (10) pounds dry chemical type capable for type ABC fire unless otherwise specified. Mounting shall be inside fire hose cabinets and as shown on drawings.

PIPING – GENERAL

- A. Where American Standards are specified, other approved national or local standards may be acceptable provided copies of these standard specifications are forwarded to the Engineer for his written approval.
- B. Black iron schedule 40 pipes: ASTM A-53 for risers only (wet and dry); ASTM A-120 for inside building installation (feed mains, cross mains and branch lines). Contractor is permitted to use Chlorinated Polyvinyl Chloride (CPVC) pipes or Polypropylene Random Copolymer (PPR) pipes and fittings listed for light hazard occupancy and shall be used only in the branch line system and if approved by the BFP. No additional and/or variation cost shall be charged due to the change in pipe specification/s.
- C. All inside piping shall be installed by means of screwed or flanged fittings. Flanged joints shall be used at all sprinkler risers and provided with 1.60 mm thick fiber asbestos; cross laminated gasket "cranite".
- D. Torch cutting shall not be permitted as means of modifying or repairing sprinkler system.
- E. All welding shall be "shop welding" only and shall be done by electric arc welding process.

FITTINGS – GENERAL

- A. Sprinkler system fittings shall be extra heavy pattern. Whenever a change in pipe size is made, one piece of reducing fitting shall be used. Provide mechanical grooved coupling at each main feed line of every floor just after the riser and along the ceiling line.
- B. All fittings shall be of malleable iron fittings.
- C. Steel pipe flanges mating with steel equipment flanges shall have the same facing as mating flange.
- D. Screwed union shall not be used on pipes larger than 50 mm (2 inches). Couplings and unions of pipes other than screwed type shall be of types approved specifically for sprinkler used.

VALVES – GENERAL

- A. All valves shall be of the same manufacturer for each class of piping and as much as possible, for the entire project. Valves shall have permanent bear affixed stamp or tag indicating manufacturer, catalogue number, pressure and temperature ratings of gate valve, angle valves, check valves, pressure relief with all cast iron body with bronze trim.
- B. Furnish valves and accessories necessary for piping not shown on drawings as follows:
 - 1. Vents and drains for equipment to which piping connections are made.
 - 2. Connections to metering instruments and controls including pressure gauges, thermometer, controllers, traps and appurtenances for proper functioning on instrument controls.
 - 3. Temporary valves and accessories required for placing equipment to initial service.
 - 4. Piping 50 mm (2 inches) and smaller required for proper operation of piping system and equipment including drain valves required to drain all low points in piping.
- C. Valve seats shall be renewable except for forged steel and high pressure cast steel valves where manufacturer's standard is integral seats.
- D. All valves shall be approved by Factory Mutual (FM) and Underwriters Laboratories Inc (UL listed).
- E. Where required and not noted, provide chain-wheel operations for chain operated valves.

- F. Provide floor stand with flanged faces for bolting to floor or platforms and other special devices where specified or noted on drawings.
- G. Provide extension stem, universal joints stem guide bearings and other accessories required to locate floor stands in convenient location with interference with other equipment, piping or building parts.
- H. Floor control valves within the building shall be approved indicating wedge gate with electrical contacts and which will open when valve is partially or totally put in close position.
- I. Foot valve shall be of the full flow globe style designed to provide silent operation, positive seating, and full flow area and shall be flanged connection. The valve body shall be constructed of cast iron and stainless steel for the basket screen.

SWAY BRACES, HANGERS AND SUPPORTS

- A. Sway bracing: Steel flat bars; structural grade 7 mm minimum thickness with corrosion protection;
Shape/type as shown on plans.
- B. Pipe hangers: Steel flat bars; structural grade 7 mm minimum thickness with corrosion protection;
Shape/type as shown on plans. 13 mmØ bars with corrosion protection as shown on plans.
- C. Sway bracing installation
 - 1. Adequate sway bracing shall be provided to oppose longitudinal or transverse pipe movements.
 - 2. Lateral bracing shall withstand a force equal to 50% of the weight of the water contained in piping, valves and fittings.
 - 3. When pipes 100 mmØ (4 inches) and larger are supported in the vertical position, the support shall be at a minimum spacing of 3.0 m (10 ft) on center. Holes in concrete for expansion shields shall be made of the proper size and depth as specified for the type of shield used. Provide a uniform contact with the shield over its entire length and circumference.
 - 4. Maximum distance between hangers shall be 3.65 m (12 ft) for size 25 mm (1 inch). Provide at least one hanger for each length of branch line, one between each two crossmain branches, one hanger for each 4.75 m (15 ft) length of feed mains. The distance between the hanger and the centerline of upright sprinklers shall not be less than 75 mm (3 inches).
- D. Support on risers
Risers shall be adequately supported either by attachment directly to the riser or by hangers located on the horizontal connections close to the risers. Support shall be provided at the ground level and at each third level at the topmost level of the riser.

PIPE SLEEVES

- A. Materials:
 - 1. Through fittings - cast iron
 - 2. Below grade - cast iron or standard weight iron pipe
 - 3. Above grade- steel pipe

B. Installation:

1. Minimum clearance between the pipe and sleeve shall not be less than 25 mm (1 inch) for pipes 25 mm (1 inch) to 75 mm (3 inch) and 50 mm (2 inch) clearance for pipes 100 mm (4 inches) and larger. The clearance between pipes and sleeves shall be filled with non-combustible flexible materials such as asbestos rope and furnished with semi-hardening mastic flush.
2. Floor sleeves shall extend at least 75 mm (3 inches) above the top of the wearing surface.
3. Drains, fire department connections, test manifolds and other auxiliary piping connected to risers shall not be cemented into walls or floors.

PIPE PAINTING

- A. Sprinkler heads, valve stems and the like shall not be painted.
- B. After installation and tests and before the installation of ceiling fixtures or boards, all piping shall be prime painted and coated with two (2) coats of gloss quick drying enamel.

ALARM CHECK VALVES

- A. The alarm assemblies shall be so constructed and installed that any flow of water from the sprinkler system equal to or greater than from a single automatic sprinkler head will result in an audible and visual alarm. Alarm bells whether water or electrically actuated shall be capable of being actuated both automatically and manually.
- B. The water actuated alarm check valve assembly shall be complete with all the necessary attachments required to give an alarm and ease in maintenance.
- C. The gong shall be installed as indicated in the plans. The alarm check valve shall consist of but not limited to the following:
 1. Retard chamber
 2. Water motor
 3. Weatherproof gong; 300 mmØ
 4. Strainer
 5. Pressure gauges
 6. Drain and attachments
 7. Control valves
 8. Pressure switches

FLOOR CONTROL VALVES & WATER FLOW SWITCH DETECTORS

- A. Flow alarm valves with sizes indicated on the plans shall be provided with two (2) N.O electrical contacts that will close instantaneously with steady flow of water in the pipe and shall be complete with tamper proof terminal chamber with minimum of 12.50 mm (1/2 inch) diameter knock-out. False alarm shall be prevented by an adjustable pneumatic device to retard the flow switch operation due to water surges. The switches shall be actuated only by a unidirectional flow of water. Conduit connections, conduit box, riser etc. shall be under Fire Protection Contractor's scope of works.
- B. The alarm apparatus shall be substantially supported, located and installed so that all parts shall be readily accessible for inspection, removal and repair.
- C. An actual water flow through the use of the test connection shall be employed to test the operation of the sprinkler alarm units in each floor or as a whole.

SPRINKLER FIRE ALARM AND SUPERVISORY SYSTEM

The supervisory and sprinkler fire alarm system shall be integrated with the building Fire Alarm System at the at the ground floor. The Sprinkler Fire Alarm System annunciators shall indicate the supervisory switches of the system.

MARKERS, INSTRUCTION AND IDENTIFICATION SIGNBOARD

These signboards shall be made of gauge no. 14 black iron sheet with baked enamel finish and letter of instruction as shown in the plans. Additional signboards shall be mounted unobstructed for easy identification reading. Paints shall be basically gloss red and white.

PUMPS

A. General

1. Manufacturer's installation drawings shall be submitted together with the proposal. After installation is completed, "as installed" drawings showing all the field revisions and exact locations/dimensions on reproducible form plus two (2) white print copies shall be submitted to the Owner at the Contractor's expense.
2. Pump performance curves shall be submitted together with the proposal. The pump efficiencies at the various workloads shall be indicated thereon and properly marked.
3. Test run shall be performed by the supplier after the installation is completed to demonstrate conformity to the manufacturer's specifications. A successful test shall be a condition to the Owner's acceptance of the installed equipment to final payment.
4. A direct statement on the availability of spare parts and maintenance service from pump supplier for a period of at least three (3) years reckoned from the date of acceptance test shall be submitted.

B. Fire Pumps

1. There shall be one (1) unit of Fire Pump for the system. The pumps, electric motor drive, control and necessary attachments specified herein shall be UL listed and FM approved and shall be furnished under this contract. The pump shall be capable of delivering not less than 150% of rated capacity at not less than 65% of total head. The shut-off head shall not exceed 120% of the rated heads. The fire pump shall be horizontal end suction, direct coupled mounted electric motor drive. Fire pump to be supplied with accessories to include controllers, circuit breakers, starters and contactors. Pump unit major accessories are as follows:
 - a. Circulating relief valve
 - b. Hose valve manifold; 150 mmØ hose valve
 - c. Flow measuring device
 - d. Relief valve and discharge cone
 - e. Suction strainer
 - f. Primary connection
 - g. Capacity plate
 - h. Automatic air release valve fittings
 - i. Water level testing device and piping
 - j. Pressure gauge 75 mmØ (3 inches)
 - k. Pressure switches

2. Capacity and Electric Motor Drive:
 - a. Fire Pump (Horizontal End Suction)
 - HP 40 (Approx.)
 - Capacity 350 GPM @ 119 psi TDH
 - Voltage 380
 - Phase 3
 - Frequency 60
 - Temperature rise 40°C
 - Service factor 1.15 min.
 - b. Jockey Pump (Horizontal End Suction)
 - HP 5.0 (Approx.)
 - Capacity 35 GPM @ 119 psi TDH
 - Voltage 380
 - Phase 3
 - Frequency 60
 - Temperature rise 40°C
 - Service factor 1.15 min.
3. Pump Controller (Electric Motor Driven)
 - a. Main combined manual and automatic controller for squirrel cage induction motor driven fire pump, full voltage, auto-transformer, closed transition or soft start/stop. Starting, accommodated in drip-proof enclosure, completely wired and tested by manufacturer before shipment from factory. For pumps over 25 HP use reduced voltage or soft start/stop.
 - b. Rating: Horsepower as indicated 380V/3ph/60Hz
 - c. Controller microprocessor based capable of being energized automatically through pressure switch or manually by externally operable handle. Pressure switch set to cut in and out as determined on site.
 - d. Pilot lamp to indicate circuit breaker closed and power available.
 - e. Digital display and annunciator.
 - f. Mark "FIRE PUMP CONTROLLER".
4. Flow Measuring Device: Venturi flow meter system; FM approved, meter reading in GPM, flow sensor and all required accessories.
5. Installation Drawings
Manufacturer's installation drawings shall be submitted as part of shop drawings.
6. Performance Curves
Performance curves shall be submitted. Pump efficiencies at various workloads shall be indicated thereon and properly marked.

C. Motors

1. General Requirements:
 - a. Motor type required for project. Refer to other parts of specifications.
 - b. Motor shall be furnished with driven equipment to assure proper coordination of motor and control characteristics with requirements of driven equipment. Contractor is responsible for proper correlation of horsepower, starting torque

and other characteristics of electrical equipment with requirements of driven equipment.

- c. Horsepower nameplate rating shall be at least as great as the brake horsepower required to drive the equipment under the maximum specified conditions without consideration of service factor.
 - d. Conform to NEMA Standard MG 1 "Motors and Generators" except where specifically noted otherwise.
 - e. Conform to ANSI Standard No. C520, 2-1955 "Alternating Current Induction Motors Induction Machines in General and Universal Motors".
 - f. Torque and speed characteristics suited to requirements of driven equipment including gear reducers if specified.
 - g. Maximum speed: 1750 rpm unless specified otherwise
 - h. Horsepower:
 - Motor HP rating specified shall be nameplate rating without consideration of motor service factor
 - Nameplate HP not less than HP required by driven equipment operated at maximum conditions specified
 - Duty: continuous
 - Service factor : as specified herein unless specifically stipulated otherwise in detailed equipment specifications
 - Bearings: ball, unless otherwise specified; provide for in-service lubrication of enclosed motors unless specifically noted otherwise
 - Base: i. Provide cast iron or steel motor base with provision for motor alignment on direct coupled drives.
ii. Provide sliding or hinge motor base with screw type automatic gravity type or other manufacturer's standard means of adjustment for belt or chain drives.
 - Accessories: lifting lugs as required
2. Enclosure and Insulation
 - a. Suitable for 40°C ambient duty with standard service factor unless otherwise specified.
 - b. Drip-proof encapsulated moisture sealed insulation system with weather resistant conduit box. Bearings shielded against entrance of moisture and dirt and anti-corrosion treatment of exposed metal parts; 40 °C ambient continuous duty with 1.15 (min) service factor.
 - c. Totally enclosed non-ventilated fan-cooled; 40 °C ambient continuous duty with 1.15 (min) service factor.
 - d. If other types of insulation are proposed, operating temperature must be guaranteed satisfactory for proposed installation.
 3. Types: Three (3) phase induction method of starting suited to driven load requirement; constant or
Multi-speed and method of starting as specified.

ACCEPTANCE TESTS

- A. The Contractor shall conduct test in the presence of inspector or Authority Having Jurisdiction (AHJ).
- B. To remove foreign materials which may have entered the piping during installation of same. Flushing or underground connection is required before sprinkler piping is connected.
- C. Hydrostatic Tests:
 - 1. Test pressure not less than 200 psi for two (2) hours.
 - 2. No visible leakage for inside sprinkler piping will be allowed. For underground mains and lead-ins, exceeding the permissible leakage or joints necessary repair shall be made.
 - 3. All control valve must pass water pressure to insure proper operating tests. Use clean non-corrosive water.
 - 4. Fire connection shall be tested.
- D. Testing of drainage facilities shall be made by opening the main drain valve while the control valve is wide open.
- E. Test certificates shall be filled out and signed by the Owner's and Contractor's representatives.
- F. System operations and maintenance charts shall be submitted to the Owner upon completion of the Contract. This shall include among others, the locations of the control valves and care of the new equipment.

MINOR MODIFICATIONS AND TIME COMPLETION

- A. The plans as drawn shall be accurate as it is possible to indicate the minimum scale. The plans are diagrammatical and do not necessarily show all fittings, etc. necessary to fit building conditions. The location of valves, fittings and fixtures shown on the plans are approximate. The contractor shall be responsible for the proper location in order to make them fit with architectural details and instructions.
- B. The Contractor shall complete the work herein described in accordance with the specific schedules set by the Owner in accordance with General Contractor's schedule of work.

GUARANTEE

The contractor shall guarantee that the installed sprinkler system complies with the requirements of the authorities and free from all defective workmanship and materials and will remain so for a period of one (1) year from the date to final inspection and acceptance of the work. Any defect appearing within one (1) year shall be corrected by the Contractor at no additional cost to the Owner.

CONTRACTOR'S RESPONSIBILITY

- A. The contractor shall provide temporary fire protection system during the construction period. This shall be of sufficient capacity to put any fire that may break out at any floors due to construction operations. This is in addition to temporary fire extinguishers required.
- B. The Contractor shall identify and save the Owner, Architect and Consulting Engineer harmless from and against all liabilities for damage to property occasioned by any or omission of this Contractor or any of his subcontractors, including any and all expenses,

legal or otherwise which may be insured by the Owner, Architect or Consulting Engineer in the defense of any claims, action or suits.

DIVISION 16 - ELECTRICAL

Workmanship and Materials

- All works shall be done in accordance with the requirements of the latest edition of the Philippine Electrical Code and National Safety Code. Nothing contained in these specifications or shown on the plan shall conflict with the requirements of these Codes, any discrepancies should be consulted to the Project Inspector / Electrical Engineer.
- All materials and equipment to be used and installed hereunder shall be of the approved type bearing the stamp or approval of the proper authorities concerned. Locally made or constructed materials shall first be approved before installation.
- All works shall be done in workmanlike manner and should present a neat and mechanical appearance when completed.

Plans

- The accompanying drawings shall indicate the general arrangement of the equipment, outlets and other works. When it is necessary to deviate from the arrangement indicated on plans in order to meet the structural conditions, such deviation shall be made at the expense of the Contractor and upon approval from the Project Inspector / Electrical Engineer.
- The outlets and circuit breakers shown on the plan are diagrammatic and approximately correct as to location. Minor changes shall be made through the Contractor at his own expense. The exact location of all outlets and switches shall be determined by the Project Inspector/Electrical Engineer and the same shall be located accordingly. The Contractor shall be responsible for the accurate location of all outlets with respect to doors, partitions, water pipes, cabinets and other facilities.

16050 Basic Electrical Materials and Methods

Conduit System

- IMC & PVC is primarily required for this work. Conduit runs shall be well supported especially on ceiling and slab, concrete encased on soil. All conduits placed on walls and partition shall be embedded, exposed layout will not be allowed. Conduit ends shall be provided with an end bell or adapter with locknut and bushing. Conduit shall enter knockouts squarely. Locknuts and bushing shall be used at termination of conduits in outlets, pull or junction boxes, panels and cabinets. Locknuts shall be screwed tight. Bends and offsets shall be avoided if possible, but when necessary it shall be made with an approved Field bend or pipe / conduit bending machine. The use of pipe tee or vice bending conduits will not be permitted.

Restrictions

- Supply and installation of all material not shown in the drawing nor mentioned in this specification but necessary for the completion of the construction works shall be included. Coordination with CPDMO and Project Inspector should be done for proper installation of all wiring systems.

16070 Hangers and Supports

- All electrical pipes and accessories shall be using appropriate hangers and support follow existing features, **GI Wires as support is not allowed**. Exposed layout on walls and partition inside offices shall not be allowed. Chipping works required.

16080 Testing

- Complete testing of the system involved in operation and provision of all system apparatus for making test and guarantee for a period of one (1) year after acceptance of the project and shall agree to repair and make good at no additional cost to the end user.

16120 Conductors and Cables

- Wires and cable for lights and power shall be type THHN/THW 600 volts insulation approved type building wire. No. 3.5 mm THHN shall be used from the panel board to the last outlet, and shall be the smallest wire that should be used, unless otherwise No. 8.0mm wires THNN and larger shall be stranded and be connected to the panel boards and equipment by solder less connectors sufficiently large to enclose all strands of the conductor and be securely fastened. They shall not get loose under vibration and normal strain. Wire splices shall be mechanically and electrically secured and soldered. Joints taps and splices in wires larger than No. 10 AWG shall be made with the use of solder less connectors. They shall be tapped with electrical tape to the thickness of the wire insulation.
- Wires and cables shall be continued from outlet, or outlet to pull boxes without splices. Conductors shall not be drawn in conduits until plaster is dry and the conduits are cleaned and free of moisture. Conductors of other systems shall not occupy the same conduit and boxes used for light and power.

Scope of Works

- Complete supply and installation of wires and cable shall be included in this scope of works.
- Tagging of all switches corresponding to the branch circuit number as indicated on the respective panel boards directory using tagging machine.
- Provide Directory in all Electrical Panels
- Balancing of loads
- Wires must be color coded using the standard color coding
- Lightings and outlet will be tapped to nearest power available (verify on site)
- Feeder line shall be hang at the rear side of gab bldg. provide bracket for the hanger & supports

16130 Raceway and Boxes

Boxes and Pull boxes

- All conduit boxes and fittings shall be standard manufactured by reputable electrical manufacturers. All conduit boxes not over 100 cubic inches in size, if constructed of sheet metal, the metal shall not be less than No.14 US gauge and shall be set flush with the surface of the structure in which they are installed and where conduit runs are concealed. Care shall be exercised to line up all outlet boxes, 4" octagon type and 1-1/2" depth. When more than two conduits enter the outlet box, the 2-1/8" depth type box

shall be removed. All outlet boxes indicated to be used for lighting fixtures shall be provided with standard flat metal covers.

- Horizontal or vertical gang boxes shall be installed as indicated or when required. All conduit boxes, junction boxes, and blank outlet boxes shall be fitted with standard flat metal conduit box covers.

16140 Wiring Devices

Wiring Devices

- All wiring devices to be used hereunder shall be new and of approved type. All wall switches shall be top-action quiet-matic type, wide series, bases to be fire-resistant and non-absorptive material. When more than one switches is indicated in the same location, they shall be mounted in gang under a common plate.
- Convenience outlet shall be duplex-type, universal & flush-type with fire-resistant non-absorptive bases, minimum rating of 16 amperes at 250 volts wide series.
- Suitable single pole and heavy-duty switches shall be installed where indicated on the plans. Sample of wiring devices shall be presented for approval. Minor relocations and re-circuiting shall be the liability of the Contractor.
- Following features shall be followed: one gang, one way switch, 2 gang, one way switch, 3 gang, one way switch, one gang three way switch, two gang three way switch, three gang three way switch, duplex flush type convenience outlet universal grounding type.
- All the exhaust ventilation switch location shall be coordinate to the CPDMO.

16580 Lighting Fixtures (Submit sample materials for approval)

- 40W, SURFACE MOUNTED LED PANEL LIGHT 600X600mm
- EMERGENCY LIGHT 2-1.5WATTS LED (22HRS)
- SINGLE LIGHTING SWITCH W/ PLATE COVER 16A WIDE SERIES

16410 Panel Boards, Enclosed switches and Circuit Breakers

Supply & Installation of the following item:

- PP-FP Main @ 100AT, 3 pole, 380V, 22KAIC with 3 branch circuits @ 1-20AT 2 pole, & 1-30AT 2 pole bolt-on type.
- 100AT, 3 pole, 230V ECB in NEMA 1
- 75KVA Dry Type Transformer, 3Ø, 60Hz, Primary Voltage: 230V Secondary Voltage: 380V with Brought-Out Neutral, Delta-Wye Connection, Class H Insulation, High Grade Silicon Core, Temperature Rise °C in Nema 1(Indoor/IP10) Enclosure.
- Feeder line will be tapped to the line side of existing lvsg
- The enclosure shall be galvanized steel of code thickness, powdered coated enamel finish and shall be installed plumb and symmetrical with the surrounding devices.
- 20mmØPVC, 40mmØPVC, & 50mmØIMC with fittings and complete accessories
- 2" x 4", 4" x 4" PVC utility and junction boxes Pull box with cover enamel coated finished with ½ and ¾ knock outs.
- Electrical tapes, rubber tapes, pull wires, mica tubes and assorted screws.

NOTE

The foregoing list of items of works does not in anyway limit the responsibility of the Contractor to perform all other works necessary for the completion of the project, **FIRE PROTECTION SYSTEM OF GUSALING ANDRES BONIFACIO**.


GUARANTEE

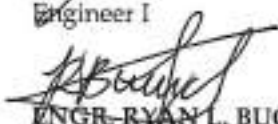
The Contractor shall guarantee all works under this contract to be free from any technical, material, workmanship and/or factory defects and shall replace and repair to the satisfaction of the Project Architect / Engineer and/or to the Chief of CPDMO on any part or portion of the work which may fail within a period of one (1) year after the final acceptance of the system.

COMPLETION PERIOD

The Contractor is given **One Hundred Twenty (120) calendar days** to execute the renovation works including the installation all system requirements. The Contractor shall coordinate to the CPDMO Inspector and End-users for the schedule of testing of systems and other related job.

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