UNIVERSITY OF THE PHILIPPINES MANILA
Campus Planning, Development and Maintenance Office
Padre Faura St. Ermita, Manila 1000, Philippines
Tel: (632) 525 2233 • (632) 526 8420 • (632) 814 1258 • (632) 814 1257

CPDMO
U.P. MANILA

PROJECT TITLE : **INCREASE IN THE CARRYING CAPACITY OF THE SCHOOL OF HEALTH SCIENCES**
School of Health and Sciences Palo, Leyte
University of the Philippines Manila

SUBJECT : **SCOPE OF WORK AND TECHNICAL SPECIFICATIONS**

DIVISION 1 - GENERAL

01 00 00 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 commence 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.

13. The Contractor shall submit monthly progress report with attached plan highlighted all the completed works to the CPDMO which will evaluate by project architect/engineer and will be the basis of progress billing.

01 30 00 Administrative Requirements

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.

01 40 00 **Quality Requirements**

- Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality. Perform quality control procedures and inspections during installation.
- Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate. Comply with manufacturers' tolerances.
- For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

01 50 00 **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.
- 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.
- Submit request for tapping of utilities. Tapping for utility sources shall be coordinated and approved by the CPDMO.

DIVISION 2 – EXISTING CONDITION

02 41 19 **Selective Demolition**

Selective Building Demolition

- Selective demolition of interior partitions, systems, and building components designated to be removed.
- Selective demolition of exterior facade, structures, and components designated to be removed.
- Protection of portions of building adjacent to or affected by selective demolition.
- Removal of abandoned utilities and wiring systems.
- Notification to Owner of schedule of shut-off of utilities which serve occupied spaces.
- Pollution control during selective demolition, including noise control.
- Removal and legal disposal of materials.
- Removal and legal disposal of materials.
- Salvage of designated items.
- Interruption, capping or removal of utilities as applicable.

Execution

- Demolition Operations: Do not damage building elements and improvements indicated to remain. Items of salvage value, not included on schedule of salvage items to be returned to Owner, shall be removed from structure. Storage or sale of items at project site is prohibited
- Utilities: Locate, identify, disconnect, and seal or cap off utilities in buildings to be demolished.
- Shoring and Bracing: Provide and maintain interior and exterior shoring and bracing.
- Occupied Spaces: Do not close or obstruct streets, walks, drives or other occupied or used spaces or facilities without the written permission of the Owner and the authorities having jurisdiction. Do not interrupt utilities serving occupied or used facilities without the written permission of the Owner and authorities having jurisdiction. If necessary, provide temporary utilities.
- Operations: Cease operations if public safety or remaining structures are endangered. Perform temporary corrective measures until operations can be continued properly
- Security: Provide adequate protection against accidental trespassing. Secure project after work hours.
- Restoration: Restore finishes of patched areas.

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" 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 5 - METALS

05 10 00 Structural Metal Framing

Scope of Work

- This item shall consist of fabrication/installation of columns and roofing for covered walkway including labor, tools, equipment, and the satisfactory performance in undertaking the proper installation of the system as shown on the Plans and in accordance with this Specifications.

Submittals

- Shop Drawings: Submit shop and erection drawings clearly showing each piece required for fabrication and erection. Drawings shall include material grade, camber, holes and other pertinent data, indicate welds by standard AWS symbols showing size, length, and type of each weld.
- Coordination drawings and templates: Provide anchor setting drawings clearly showing location of all anchor bolts and embedded plates to be anchored in concrete and masonry construction. Provide templates for anchor bolts.

Quality Assurance

Welding

- Performed by certified welders in compliance with Welder's Qualification Test Certificate, AWS D1.1 and or ASME IX.
- Welders shall be duly qualified (test passed in the preceding 12 months) in the position in which they are to weld and the qualifications and specifications for workmanship shall comply with the AWS requirements "AWS Structural Welding Code - Steel".

Delivery and Storage

- Exercise Care during unloading, storage, and erection to avoid damage, dumping on the ground is not permitted.
- Support material stored at the site completely free of the ground and cover to avoid damage from the elements.

Materials

- General: Materials shall be new, of uniform quality, suitable and without defects affecting the strength or service of the structure.

Execution

Examination:

- Verify anchor bolt locations, grouting, and elevation of base and setting plates and other material set by other trades before commencing work.

Erection:

- Erect work to the proper lines and levels, plumb and true, and in correct relation to other work and maintain this condition to completion.

Connections

Welding:

- Weld by shielding arc method as per AWS standard code for arc and gas welding in building construction.
- Submit certification that welders have passed Welder's qualification test.
- Certification must be dated no earlier than 3 months prior to beginning of project.
- Close joints exposed to weathering with continuous 1/8" weather welds.
- Grind smooth exposed welds, but grinding shall not reduce weld strength or required cross section.
- Connect members temporarily and align completely before making permanent connections.
- Temporary connections shall consist of bolts on no less than 1/3 of the holes and in no case less than 3 bolts in any single connections.
- Surfaces in contact shall be thoroughly clean when assembled.
- Provide necessary temporary bracing and guying to align the structure properly for permanent connections, and to safety resist erection dead load and wind stress.
- Take particular care to have the work plumb and level (maximum tolerance 1- 500 for interior members, 0- 1000 for exterior members) before making permanent connections
- Remove bracing and guys only after permanent alignment and assembly and structure area capable of completely sustaining design and temporary construction loads.

Cleaning:

- During the course of the work and on completion of the work, remove excess materials equipment and debris and dispose of away from premises in a legal manner.

DIVISION 8 - OPENINGS

08 10 00 Door and Frames

Scope of Work

- The work covered by this Item shall consists of supply and installation of all fabricated door and jambs, equipped with fixing accessories and locking devices including restoration of opening for fitting in accordance with Bill of Quantity, Plan and/or shop drawings and as herein specified.

Material Requirement

- (D-1) Metal Flush Door w/ view panel
  6mm thick tempered clear glass view panel, galvanized sheet GA#18, jamb GA#16 in power coated finish complete w/:
  -lever type door handle and one side deadbolt lock cylinder,
  -heavy duty ball bearing butterfly door hinges
  -automatic door closer
  Dimension: 0.80m x 2.10m

- (D-2) Flush Door w/ louver
  Fabricated fiber cement board door panel, wood door jamb, painted finish complete w/ lever type door handle lockset
  Dimension: 0.70m x 2.10m

- (D-3) Flush Door w/ louver
  Fabricated fiber cement board door panel, wood door jamb, painted finish complete w/ lever type door handle lockset
  Dimension: 0.70m x 2.10m

08 51 13 **Aluminum Windows**

Scope of Work

- The work covered by this Item shall consists of supply and installation of all fabricated windows, including materials, labor, tools, restoration of openings for fitting and equipment required in undertaking the proper installation as shown on the Plans and in accordance with this Specifications.

Material Requirement

(W-1) Casement Window
6mm thick tempered clear glass on aluminum powder coated frame complete w/ heavy duty lock handles
Dimension: 0.80m x 1.20m

(W-2) Casement Window
6mm thick tempered clear glass on aluminum powder coated frame complete w/ heavy duty lock handles
Dimension: 0.80m x 1.20m

DIVISION 9 – FINISHES

09 30 00 **Tile**

Scope of Work

- This item shall consist of furnishing all floor tiles, including all labor, tools, equipment and the satisfactory performance in undertaking the proper installation of tile as shown on the plans and in accordance with these specifications.

Material Requirement

- 600mm x 600mm Porcelain Tiles, matte or rustic surface including sand, cement, tile grout, adhesive and other accessories (tile trim, expansion joints, transition strips, etc.)
- Wall Tiles including sand, cement, tile grout, adhesive and other accessories (tile trim, expansion joints, transition strips, etc.)
- Submit sample and layout of tiles for approval of CPDMO Project Architect/Engineer and End-users.

Application

- Existing floor shall be prepared to level the floor finish with the hallway flooring.
- Tile gap must be uniform.
- Provide tiles on the specified areas as per design of CPDMO and End-users.
- Confer to Project Architect all the floor layouts and features of tiles.
- Layout tiles after the surfaces have been prepared for the work. Tiles shall be free from lamination, serrated edges, chipped off corners, and other imperfections affecting their quality appearance and strength.

- Samples of all tiles shall be submitted to the project Architect/Engineer and End-users for approval as to color, texture quality.

09 50 00 Ceiling Finishes

Scope of Work

- The work covered by this Item shall consists of furnishing all ceiling finishes, equipped with fixing accessories in accordance with Plan and/or shop drawings and as herein specified.

Material Requirements

- (CF-1) Moisture Resistant Acoustic Board on T-runners suspended ceiling system complete with hanger and support.
- (CF-2) Painted fiber cement board on metal furring complete with hanger and support
- Submit sample for approval of CPDMO Project Architect/Engineer and End-users.

Construction Requirements

- Provide all the necessary preparation of ceiling.
- Hanger rod with adjustable clip shall be at 0.60 m maximum interval both ways but provide additional hanger and support on critical areas.
- Provide all the necessary accessories and framing for proper installation.
- Ensure adequate hanger and support to all the utilities on the area.
- Restore all affected areas.

09 60 00 Flooring

Scope of Work

- The work covered by this Item shall consists of furnishing all floor finishes, including all necessary surface preparations, floor leveling, materials, labor, tools equipment and in accordance with Plan and/or shop drawings and as herein specified.

Material Requirement

- (FF-01) 2mm thick Homogeneous vinyl tiles complete with transition trims/strips
- (FF-03) Smooth cement floor in Chlorinated Rubberized Paint finish 2 top coats including prep work

Construction Requirements

- Surface must be leveled evenly and free from any foreign objects.
- Samples of all floor finish shall be submitted to the project Architect/Engineer and End-users for approval as to color, texture quality.
- Provide all the necessary accessories for proper installation.

09 91 00 Paints and Coatings

Scope of Works

- This Item shall consist of furnishing all paints, enamels, varnishes and other products to be used including labor, tools and equipment required as shown on the Plans and in accordance with this Specification.

Materials Requirements

- Semi-gloss anti-bacterial paint puttied and sanded
- Roof Paint – Insulating Roof Paint
- Specified item and/or its components shall be handled in such manner as to prevent damage. The same shall be properly protected from harmful elements or damage by other work prior to its incorporation into the Project.
- Store materials in a well-ventilated space designated for the storage and mixing of paint. Materials delivered to the site shall be properly stored as to minimize exposure to extremes of temperature.

Quality Assurance

- The University reserves the right to subject material samples to test at his expenses. If such material tests do not meet the specified standards, the cost will be charged to the Contractor.
- Number of coats, where specified, is minimum. Contractor shall apply as many as required to meet specifications for solid, uniform appearance. Where film thickness in mils is specified, spot checks will be made to determine compliance with specified thickness.
- Specified item and/or its components shall be handled in such manner as to prevent damage. The same shall be properly protected from harmful elements or damage by other work prior to its incorporation into the Project.
- Store materials in a well-ventilated space designated for the storage and mixing of paint. Materials delivered to the site shall be properly stored as to minimize exposure to extremes of temperature.

Submittals

- Submit 2 samples of each and every color or finish (including all coats). Where the same color or finish is to be applied over different materials, samples of each shall be submitted on different materials, where practical.
- Sample size shall be a minimum of 150 mm x 150 mm (6" x 6")

Protection

- Paint materials shall be properly protected from damage, providing for adequate storage space. Take all necessary precautions to prevent fire, such as keeping oily rags in U. L. approved metal containers or removing from building at the end of each day's work.
- All work fittings, furniture, etc., are to be suitably protected during execution of the work. Splashes on floors, walls, etc. are to be removed during progress of work and on the whole, left clean and perfect upon completion.
- No exterior or exposed painting shall be carried out under adverse weather conditions, such as extremes of temperature, during rain, fog, etc., or if there is excessive dust in the air.

Lead Content and Warning Labels

- The material manufacturer shall state the lead content on the label of any paint product container based on metal percentage of total solids.
- The label of any paint product exceeding 0.5% lead content shall include the following statement: "This paint contains more than 0.55 lead content and shall not be used on surfaces accessible to children."

Repair of Defective Work

- All defective or damaged work shall be restored to initial condition.

- All voids, cracks, nicks, etc., will be repaired with proper patching material and finished flush with surrounding surfaces.
- Marred or damaged shop coats on metal shall be spot-primed with appropriate metal primer.
- Defective or damaged items and/or components, which cannot be repaired or restored to initial conditions, shall be removed and replaced to the satisfaction of the Architect at no additional cost to the Owner.

Cleaning

- Upon completion of the building, the Painting Contractor shall remove all paint spots from all finished work, remove all empty cans and leave the entire premises free from rubbish or other debris caused by his work. He shall remove his equipment from the premises. He shall clean off all glass free from paint spots and smears and shall present the work clean and free from all types of blemishes.

Products

General:

- Materials are specified to establish the standards of grade and quality desired for the work, principal pigments and vehicle types and minimum percentage of solids content by volume.
- The products of Manufacturers not named may be submitted for use provided they are equal in quality and grade to the primers and finishes specified as approved by the Architect. If substitute paint products are desired, a statement shall be submitted to the Architect giving the Manufacturers name, proposed primer and finish for each paint system, analysis for each type of paint, and the use or uses intended. Failure to submit such statements will be cause for rejection.
- In cases where the name of a brand or supplier is mentioned under a particular specification, only paint or primer of that manufacturer is acceptable and no substitution shall be permitted on the grounds that the brand specified is not available in the local market. Materials of one manufacturer shall not be applied over that of another, except in the case of shop primer coat.

Color, Gloss and Texture:

- Refer to Finish Schedule. All work is to be completed without deviation from these unless written approval is received from the Architect. No extra cost shall be allowed because of the color variety scheduled.

Execution

General:

- Work-in-place, on which specified work is to be applied, shall be examined to ensure that conditions are satisfactory for application of specified materials. Any defect, which may influence satisfactory completion of specified work, shall be report, in writing, to the Architect. Absence of such notification will be construed as acceptance of work-in-place.
- Do not apply exterior paint in damp or rainy weather or until surfaces have thoroughly dried from the effects of such weather.
- Before start of painting, remove finish hardware, accessories, plates, lighting fixtures, and similar Items, as approved by the Architect, except UL. Labels on Fire Door and

Frames, which must not be removed. Use only workmen skilled in the applicable building trade for removal and reinstallation of finished item in-place.

- The following items shall be masked or protected with suitable covering:
  - Sealing, caulking and glazing compounds (unless otherwise directed by the Architect)
  - Glass.
  - Gauges, thermometers and other recording devices.
  - Moving parts of machinery and other mechanical equipment - such as: shafts, couplings, valve stems, and the like.
  - Coated decorative sheet metal work.
  - Sprinkler heads and the like.
  - U.L. Labels

Surface Preparation as Applied to Various Substrate

a. Wood

New Surface:

- Surface to be painted should be clean and dry, free from oil, grease, dust, dirt, contaminants and all loose girt or mortar; sand rough edges remaining, countersink nail heads for putty applications.
- Dust off surfaces completely then wipe with a clean rag.

b. Metal

New Surface:

- Surface to be painted should be clean and dry, free from oil, grease, dust, dirt, wax, solder flux, and other contaminants by wiping with mineral spirits or paint thinner.
- Remove rust by wire brushing, sanding or scraping.
- Where maximum performance of protective coatings is necessary (e.g. Industrial Plants), prepare surface by blast cleaning.

c. Concrete:

New Surface:

- Surface to be painted should be clean and dry, free from oil, grease, dust, dirt, contaminants and all loose girt or mortar.
- Treat with masonry neutralizer. Mix (1) liter of B-44 with (16) liters of water. Apply liberally by brush and let dry overnight.
- Rinse with water to remove white crystals that form on the surface. Let dry.

Paint Application

General

- Specified work shall be done by skilled painters in a workmanlike manner. All spaces shall be broom-cleaned before painting is started. Surface to be painted shall be clean, dry, smooth and adequately protected from dampness. Each coat of paint shall be allowed to dry at least twenty-four (24) hours before succeeding coat is applied. Finish work shall be uniform, of approved color, smooth and free from runs, sags, defective coverage, clogging or excessive flooding. If surfaces are not adequately covered, as determined by the CPDMO Architect/Engineers/Inspectors, further coat shall be applied to the satisfaction of the CPDMO Technical Group. Edges of paint adjoining other materials or colors shall be sharp and clean without overlapping.

Paint Mixing:

- Paint mixing and thinning shall be done only in accordance with directions of Manufacturer. Paint must be strained free from all skin and extraneous substances and shall be thoroughly mixed in a clean container during use.

Methods of Application:

- Exterior first coats and Interior first coats shall be applied by brush, except on shop-primed surfaces, which shall be applied by brush or roller. All primer shall be applied by brush. Succeeding coats over field-primed surfaces and all coats over shop-primed surfaces may be applied by brush roller or spray. Distemper brushes are to be of approved type and less than 15 cm In width. Rollers for applying enamel shall have a short nap. Spray equipment shall be as recommended by the manufacturer of the paint used. Areas inaccessible to spray painting shall be coated by brushing or suitable method.

Coating:

- Consecutive coats of paints are to be slightly differing tints except in the case white. Each coat shall be allowed to harden before the next Is applied. Rubbing down between coats is to be done with fine abrasive paper.

Wood Finishing

- Wood to have natural satin varnish finish shall be stained as required and sealed as soon as such Items are delivered to the job site. Seal all ends to exclude moisture. Knotting shall be carried out by using shellac dissolved in spirit or approved ready mixed compound.

Woodwork and Metal Work:

- Primed or undercoated woodwork and metalwork shall not be left in an exposed or unsuitable situation for an undue period before completing the painting process. Stopping and filling shall be deemed to be included for all metal works, plaster works, and wood work specified to be used to produce a surface ready for priming and painting.

Final Touch-Up:

- Upon completion, finish work shall be touched-up and restored where damaged and left in good condition.

DIVISION 10 – SPECIALTIES

Section 10 21 00 Toilet Partitions

Scope of Work

- This item shall consist of furnishing toilet partitions including all necessary item for the installation as shown on the plans and in accordance with these specifications.

Material Requirement

- Solid Phenolic Panels
- PVC accessories

Quality Assurance

- Manufacturer Qualifications: A company regularly engaged in manufacture of products specified in this section, and whose products have been in satisfactory use under similar service conditions for not less than 5 years.
- Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
    1. Finish areas designated by Architect.
    2. Do not proceed with remaining work until workmanship is approved by Architect.
    3. Rebuild mock-up area as required to produce acceptable work.

- Cleaning and Protection:
    1. Remove packaging and construction debris and legally dispose of offsite.
    2. Clean partition and screen surfaces with materials and cleansers in accordance with manufacturer's recommendations.
    3. Touch-up, repair or replace damaged products before Substantial Completion.

DIVISION 22 – PLUMBING

22 10 00 Plumbing Piping

Scope of Work

This item shall consist of supply of all plumbing piping system with accessories including labor, tools, equipment, testing, commissioning, and the satisfactory performance in undertaking the proper installation of the system as shown on the Plans and in accordance with this Specifications.

Material Requirements:

- Use PPR pipes and fittings for waterline, in conformity with the existing lines.
- Use PVC combination pipes and fittings for sanitary lines, in conformity with the existing lines.
- Provide proper hanger and supports.

Application:

- Make the necessary preparation works for the installation of sanitary and sewerage system on the specified area.
- Ensure proper installation of the system, tap to the nearest sewer area.
- Testing and commissioning shall be done in the presence of the Engineer and End-User or his representative.

22 40 00 Plumbing Fixtures

Scope of Work

This item shall consist of supply of all plumbing fixtures with accessories including labor, tools, equipment, testing, commissioning, and the satisfactory performance in undertaking the proper installation of the system as shown on the Plans and in accordance with this Specifications.

DIVISION 23 – HEATING, VENTILATING AND AIR-CONDITIONING (HVAC)

General Conditions and Provisions

- The work throughout shall be executed in the best and most thorough manner, under the direction of, and to the satisfaction of the Owner or the Owner's duly authorized representative and based on strict conformance with the contract plans and documents.
- The Contractor shall be responsible for his work until its completion and final acceptance and shall replace any of the same which may be damaged lost or stolen without additional cost to the Owner. He shall guard the building and its contents against damage by him, his employees or sub- contractors and shall make repair for any damage free of charge. This Contractor shall indemnify and save harmless the Owner, Architect and Engineering Consultant from and against all liabilities for damages arising from injuries or disabilities to persons or damage to property occasioned by any act or omission of this Contractor or any of his subcontractors, including any and all expenses, legal or otherwise, which may be incurred by the legal or otherwise, which may be incurred by the Owner, the Architect, or the Consulting Engineer in the defense of any claim, action or suit.
- The Contractor shall put his work in place as fast as reasonably possible. He shall at all times keep a competent Engineer in charge of the work, and shall facilitate its inspection by the Owner, Architect and Engineer Consultant. He shall also remove any rubbish caused by his work as expeditiously as possible.
- A fixed sequence of operations is required to properly install the complete system. It shall be the responsibility of the Contractor to closely schedule his work in such a way that it shall be installed at the proper time and without delaying the completion of the entire project. The Contractor shall carefully check space requirement with other subcontractors to ensure that his equipment and pipes can be installed in the space allotted for them. The Contractor, before commencing work, shall examine all adjoining work on which the work in any way dependent for perfect workmanship according to the intent of this specification, and shall report to the Project Manager or Owner's representatives, any conditions which prevent the Contractor from performing first-class work, no "waiver of responsibility" for defective adjoining work will be considered unless notice has been filed before the Contractor submits his proposal. The Contractor shall thoroughly acquaint himself with the work involved, and verify at the building all measurement necessary for the proper installation of his work, obtaining the same, when necessary, from the General Contractor or other Sub-Contractors. He shall also be prepared to promptly furnish to these Contractors any information relating to his own work necessary for the proper installation of their contracts and shall cooperate with them to secure the best progress of, and harmony between the work of the different trades, in the interest of the building as a whole. This Contractor shall confer with other Contractors of other trades for finish adjacent to his own work (such as grilles, escutcheons, etc.) fit in and harmonize with the finish, in a manner satisfactory to the Owner.
- It is specifically intended that all materials and labor which are necessary for the proper completion and best operation of the system shall be furnished as part of this contract without additional cost – whether or not shown in details on the drawings or described in detail in the Specifications. The provision is in consideration of the fact that, in many cases, the use of apparatus of different makes may be considered, which differ in detail from that described, although intended to fulfill the same functions.
- Equipment and piping arrangements shall provide adequate and acceptable clearances for entry, servicing, filter replacement and maintenance. Access panels shall be provided in the housings of air conditioning equipment and shall be the type that will permit

servicing or replacement of the components of the units as installed.

- The contractor shall guarantee all work performed and materials installed by him to be free from inherent defects, and shall keep same in repair and replace any defective materials or workmanship, free of cost to the Owner, for a period of one (1) year, from date of acceptance upon notice from the Architect or the Owner's representative.
- The Contractor shall guarantee that the equipment, materials, accessories, methods of installation and workmanship supplied under this Specification will be of the best class, that it will be erected in a practical and first-class manner, that it will be complete in operation, nothing omitted in the way of labor and shown or mentioned herein, and that it will be delivered in good working order, complete and perfect in every aspect.
- The Contactor shall supervise the installation of this apparatus and equipment, test or adjust them in repair for a stated period or render other similar services. The Contractor will be held responsible for the performance of the specified services under the actual conditions of installation. The same shall apply to cases where special adjustment or other services are necessary to insure the proper and efficient functioning of apparatus even though not specifically hereinafter called for. It is intended that the entire plant, when finally delivered, shall be ready in every respect for satisfactory and efficient operation and the Contractor is hereby made responsible for the result.

Codes, Rules, Permits & Fees

- The Contractor shall give all necessary notices, obtain all permits and pay all government sales taxes, fees and other costs, including utility connections or extensions, in connection with his work; file all necessary plans, prepare all documents and obtain all necessary approvals of all governmental departments having jurisdiction; obtain required certificates of inspection for his work and deliver same to the Owner before request for acceptance and final payment for the work.
- The Contractor shall include in the work, without extra cost to the Owner, any labor, materials, services, apparatus, drawings in order to comply with all applicable laws, ordinances, rules and regulations, whether or not shown on drawings and/ or specified.
- The installations provided for and specified herein shall comply with the laws, ordinances and regulations of the Municipality where the jobsite is located, and the Bureau of Industrial Safety.
- The acceptability of all furnished equipment, materials, accessories, methods of installation and workmanship shall be based on complete adherence with applicable standards established by the following:
    1. PD 1096 National Building Code of the Philippines 2005 ed.
    2. RA 9514 Fire Code of the Philippines 2019 ed.
    3. Philippine Mechanical Code 2012 ed.
    4. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)
    5. International Mechanical Code (IMC) 2018 ed.
    6. Philippine Green Building Code (PGBC) 2015 ed.
    7. Philippine Society of Ventilating, Air Conditioning and Refrigerating Engineers (PSVARE)

Intent

- It is the intention of this Specification and Drawing to call for finished work, tested and ready for operation. Wherever the word "provide" is used, it shall mean "furnish and install complete and ready for use".
- Minor details not usually shown or specified, but necessary for the proper installation and operation, shall be included in the work, the same as herein specified or shown.

- It shall be understood that this Specification is written with certain items, equipment and materials specified by manufacturer's name, brand, number or trade name, as a means of establishing a standard of quality and performance. The use of these names to establish quality does not however prohibit use of other make of items, equipment or materials which may be considered to be equally efficient in both performance and quality of materials.

Surveys and Measurements

- The Contractor shall base all measurements, both horizontal and vertical from established bench marks. All work shall agree with these established lines and levels. Verify all measurements at site and check the correctness of same as related to the work
- The Contractor shall examine all drawings relating to his work and verify all governing conditions at the site and shall become fully informed as to the extent and character of the work required its relation to the other work in the area. No consideration will be granted for any alleged misunderstanding of the materials to be furnished or work to be done, it being understood that submission of a proposal is an agreement to all items and conditions referred to herein or indicated on the accompanying drawings. Any exceptions, omission or substitution shall be presented in writing with the contractor's bid.
- Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the drawings and specifications, he shall notify the Project Manager and the Owner, and shall not proceed with his work until he has received instruction from the Owner/Project Manager.

Drawings

- Drawings are diagrammatic and indicate the general arrangement of systems and work included in the contract. Drawings are not to be scaled. The architectural drawings and details shall be examined for exact location of fixtures and equipment. Where they are not definitely located, this information shall be obtained from the Architect, or Owner/Project Manager.
- The Contractor shall follow drawings in laying out work and check drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points, where headroom or space conditions appear inadequate, Project Manager or Owner shall be notified before proceeding with installation.
- Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the drawings and specifications, he shall notify the Project Manager and the Owner, and shall not proceed with his work until he has received instruction from the Owner/Project Manager.
- Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the drawings and specifications, he shall notify the Project Manager and the Owner, and shall not proceed with his work until he has received instruction from the Owner/Project Manager.

Equipment Deviations (Where Applicable)

- Where the Contractor proposes to use an item of equipment other than that specified or detailed on the drawings, which requires any redesign of the partition, structure, foundations, piping, wiring or any other part of the mechanical, electrical or architectural layout, all such redesign and all new drawings and detailing required therefore, shall be prepared by the Contractor at his own expenses and approved by the Project Manager/Owner.

Scaffolding, Rigging, Hoisting

- This contractor shall furnish all scaffolding, rigging, hoisting, and services necessary for erection and delivery into the premises of any equipment and apparatus furnished. Remove same from premises when no longer required.

Material and Workmanship

- All materials and apparatus required for the work, except as specifically specified otherwise, shall be new, of first-class quality, and shall be furnished, delivered, erected, connected and finished in every detail, and shall be selected and arranged as to fit properly into the building spaces. Where no specific kind or quality of materials is given, a first-class standard article as approved by the Owner or his designated representative.
- The contractor shall furnish the services of an experienced superintendent who shall be constantly in charge of the installation of the work, together with all skilled workmen, fitters, metal works, welders, helpers and labor required to unload, transfer, erect, connect-up, adjust, start, operate, and test each system.
- Unless otherwise specifically indicated on the plans or specifications, all equipment and materials shall be installed with the approval Owner in accordance with the recommendations of the manufacturer. This includes the performance of such tests as the manufacturers recommends.

Electrical Connections (Where Applicable)

- The Electrical Contractor shall furnish and install all wiring except; 1) temperature control wiring; 2) equipment control wiring and 3) interlock wiring. The Electrical contractor shall furnish and install power wiring complete from power source to the individual machine room, terminating in a circuit breaker or junction box.
- The mechanical contractor shall, regardless of voltage, furnish and install all temperature wiring, and all interlock wiring and equipment control wiring for the equipment that the owner furnishes. The mechanical contractor shall furnish the electrical power wiring from the circuit breakers or junction box installed by the Electrical Contractor, to all motor including the furnishing of all starters or combination starters not factory mounted on equipment. The mechanical contractor shall provide and be responsible for the heater in all starters that the Mechanical Contractor furnishes.
- After all circuits are energized and completed, the Electrical Contractor shall be responsible for all power wiring, while all control wiring shall be the responsibility of the mechanical contractor. Motors and equipment shall be provided for current characteristics as shown on the drawings.
- All cost of electricity due to testing and startup operation shall be for the contractor's account, (see applicable sections.)

Accessibility

- The contractor shall be responsible for the sufficiency of the size of shafts and chases, the adequate clearance in double partitions and hung ceiling for the proper installation of his work. He shall cooperate with the General Contractor and all other contractors whose work is in the same and shall advise the Owner Representatives of his requirements. Such spaces and clearances shall however, be kept to the minimum size required.
- The Contractor shall locate all equipment which must be serviced, operated, or maintained in fully accessible positions. Equipment shall include but not be limited to valves, traps, cleanouts, motors, controllers, switchgear, and drain points. If required for better accessibility, furnish access doors for this purpose. Minor deviations from

drawings may be made to allow for better accessibility and any change shall be presented for approval prior to implementation.

Foundations, Supports, Piers & Attachments

- The Mechanical Contractor shall furnish approved shop drawings showing concrete bases required and shall provide the necessary foundation bolts for anchoring the machines, which shall be as shown on the drawings or as directed.
- The Mechanical Contractor shall provide approved anchor bolts with plates, sleeves, washers and double nuts for all apparatus set on concrete foundations. Also provide billets or plat, grouting, etc., as directed to properly distribute the weight of apparatus on foundations and set equipment perfectly level.
- The Mechanical Contractor shall furnish and install as shown or directed, all necessary supports for equipment furnished under this section of the Specifications. To meet varying conditions in each case, saddles, brackets, etc. as shown or directed. All such supports shall have substantial flanges bolted to floor construction. Hangers shall be supported from the structure as previously specified. Supports shall be properly located with reference to any supporting pads, legs, etc of the equipment carried and must be of such number and distributed so as not to throw any undue strains on shells or casing.

Cutting and Patching

- The Mechanical Contractor shall provide all cutting and patching necessary to install the work specified in this section. Patching shall match adjacent surfaces.
- No structural members shall be cut without the approval of the Owner Representatives, Architect and all such cutting shall be done in a manner directed by him.

Sleeves and Plates

- This Contractor shall provide and locate all sleeves and inserts required before the floors and walls are built, or shall be responsible for the cost of cutting and patching required for pipes where sleeves and inserts were not installed, or where incorrectly located. Each Contractor shall do all drilling required for the installation of his hangers.
- Sleeves shall be provided for all mechanical piping passing thru concrete floor slabs and concrete, masonry, tile and gypsum wall construction. Sleeves shall not be provided for piping running imbedded in concrete or insulating concrete slabs on grade.
- Where sleeves are place in exterior walls below grade, the space between pipes or conduit and the sleeves shall be packed with oakum and lead and made completely watertight.
- Sleeves shall be constructed of 24 gage galvanized sheet with lock seam joints for all sleeves set in concrete floor slabs terminating flush with the floor. All other sleeves shall be constructed of galvanized steel pipe unless otherwise indicated on the drawings.
- Fasten sleeves securely in the floors, walls, so that they will not become displaced when concrete is poured or when other construction is built around them. Take precautions to prevent concrete, platters, or other materials being forced into the space between pipe and sleeve during construction

Waterproofing

- Where any work pierces waterproofing including waterproof concrete, the method of installation shall be approved by the Owner's Representative or Architect before work is done. Contractor shall furnish all necessary sleeves, caulking and flashing required to make openings absolutely watertight.

Mechanical Maintenance

- Operation – The Mechanical Contractor shall receive calls for any and all problems experienced in the operation of the equipment provided under this Specification and shall take steps to immediately correct any deficiencies that may exist.

Air-Conditioning

Variable Refrigerant Volume/Flow System (VRV/VRF)

- General – Unit/s shall be air-cooled or water-cooled as specified or indicated in drawings, split type multi system air conditioner consisting of one outdoor unit and multiple indoor units, each having capability to cool independently room requirements. Different types and cooling capacity of indoor units can be connected to one refrigerant circuit and controlled individually. Compressor/s shall be equipped with inverter controller and capable of changing the rotating speed to satisfy variations in cooling load. The refrigerant to be utilized shall be environmentally friendly with zero ODP such as R410A or R407C.

- Outdoor Unit/s – Shall be a factory assembled unit housed in a sturdy weatherproof casing constructed from rust-proofed mild steel panels coated with a baked enamel finish. All outdoor units shall have multiple steps of capacity control to meet cooling variations.
    1) The outdoor unit of 8 and 10 HP shall have two scroll compressors and be able to operate even in case that one inverter compressor is out of order. The outdoor unit of 5 HP shall have one scroll compressor.
    2) The connectable range of indoor units shall be from 0.80 to 10 HP
    3) The compressor shall be of highly efficient scroll type and equipped with inverter control capable of changing the speed in accordance to the cooling load requirement.

- Indoor Unit/s – Shall be of the following models: ceiling cassette, ceiling suspended, wall mounted, ceiling concealed ducted and floor standing.
    1) The heat exchanger shall be constructed with copper tubes mechanically bonded to aluminum fins to form a cross fin coil and shall be covered by anti-corrosion resin film. It shall have electronic control valve which control refrigerant flow rate in respond to load variations of the room.
    2) The fan shall be statically and dynamically balanced to ensure low noise and vibration free operation.
    3) The address of the indoor unit shall be set automatically in case of individual and group control.
    4) In case of centralized control, it shall be set by liquid crystal remote controller.

- Control – Computerized PID control shall be used to maintain a correct room temperature. Unit/s shall be equipped with a self-diagnosis for easy and quick maintenance and service. The LCD (Liquid Crystal Display) remote controller shall memorize the latest malfunction code for easy maintenance.
    1) Local Remote Controller
    2) Central Remote Group Controller

- Refrigerant Circuit – Shall include liquid and gas shut-off valves, solenoid valves and

accumulator as the system demands.

- Safety Devices – All necessary safety devices shall be provided to ensure safe operation of the system. The following safety devices shall be part of the outdoor unit: high pressure switch, fan drive overload protector/ fan motor safety thermostat, fusible plug, overload relay, etc.
- The unit/s shall deliver the design cooling capacity at the external ambient specified. The units are rated at 35°C and shall be suitable for continuous operation with reduced capacity at an external ambient temperature of 40°C.
- Provide supports and mounts in accordance with manufacturer's recommendations or as indicated on drawings.
- Condensate removal shall be by means of gravity drainage and/or condensate pump as necessary.
- Unit electrical power shall be 230V/1phase/60Hz or as indicated on the drawings.
- Evaporator and condenser coils shall be of copper tube construction with aluminum fins and additional anti-corrosion coating suitable for salty spray atmosphere.
- Filters shall be washable type, easily accessible, and shall cover the full unit area of re-circulated air.
- Refrigerant Piping and Fittings – Copper refrigerant tube, ASTM B280, cleaned, dehydrated and sealed, marked ACR on hard temper straight lengths.
- Refrigerant Insulation – Flexible closed cell elastomeric rubber insulation; ASTM C534, k = 0.033 W/m- °C, flame spread not over 25, smoke developed not over 50 for temperatures from -4°C (40°F) to 93°C (200°F). No jacket required except specified.

Ventilation

Statement of Work

- Intent – It is the intent of these specifications to furnish ventilation systems complete, fully adjusted and ready for use.
- Equipment – Equipment has been carefully selected for this project and the Contractor is expected to provide all items as closely as possible to the specifications and as called for on the drawings. Equipment specifications as per owner choice.
- Job Coordination – The Contractor for Ventilating and Air Conditioning shall plan his work in advance and shall coordinate all space requirements with other trades involved. Where conflicts occur, the Contractor shall request clarification thru the General Contractor.
- Workmanship – It is the intent of these specifications to provide the best workmanship available.
- Cleaning – It is the intent of these specifications that all work, including the inside of equipment be left in a clean condition. All construction dirt shall be removed from material and equipment.

Equipment

- Ceiling Cassette Fan – exhaust fan shall be of the centrifugal direct drive type. The fan housing shall be constructed of heavy-gauge galvanized steel. The housing interior shall be lined with acoustical insulation. The outlet duct collar shall include a plastic backdraft damper. Outlet shall be adaptable for horizontal or vertical discharge. The access for wiring shall be external. The motor disconnect shall be internal and of the plug-in type. The motor shall be mounted on vibration isolators. The fan wheel shall be of the forward-curved centrifugal type and dynamically balanced.
- Air Curtain - wireless remote control with 2-speed options

- uses centrifugal air flow technology
- centrifugal turbine produces high volume of air stream that provides Strong air barrier against infiltration of dust, insects and unconditioned air
- high performance with low noise steady motor

Ductworks

- PVC Exhaust Duct
  - Material – Shall be PVC schedule 40 as follows:

3.1	Pipe	- ASTM D2729
3,2	Fittings	- ASTM D2729
3.3	Solvent cement	- ASTM D2564
3.4	Primer	- ASTM F656

- Round Vent Caps
  - Description – Round type vent cap complete with screen to keep out ingress of small particles.
    - a.1 High strength stainless steel adopted.
    - a.2 Coated with metallic silver paint to prevent oxidation of material.
    - a.3 Three (3) pieces of spring clip to allow easy connection to pipe duct.

DIVISION 26 - ELECTRICAL

26 05 00 Common Work Result for 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 & Drawings

- 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.

Basic Electrical Materials and Methods

Conduit System

- 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.

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.
- Hanger and support outside the building will be used and subject for painting and restoration (refer to plans)

Testing of system

- 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.

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

Raceway and 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 1-½" 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.

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 are 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, simplex flush type convenience outlet universal grounding type and duplex flush type convenience outlet universal grounding type.
- Supply and installation of Duplex Universal Grounding type, Weatherproof

26 20 00 Low-Voltage Electrical Distribution

Panel Boards, Enclosed switches and Circuit Breakers

- DP-AL Main @ 175AT, 3 pole, 25KAIC with 4 branch circuits @ 1-70AT 3 pole, 1-40AT 3 pole bolt-on type with grounding bus and 2 Space, 3 pole.
- LPP2F Main @ 70AT, 3 pole, 18KAIC with 20 branch circuits @ 20-20AT 2 pole bolt-on type with grounding bus.
- The enclosure shall be galvanized steel of code thickness, powdered coated enamel finish and shall be installed plumb and symmetrical with the surrounding devices.
- 9-20AT 2 pole, MCCB bolt-on type circuit breakers.
- Enclosed Circuit Breaker 1-100AT, 3-pole, Nema 3R.
- Enclosed Circuit Breaker 2-30AT, 2-pole, Nema 3R.
- Enclosed Circuit Breaker 2-20AT, 2-pole, Nema 3R.
- 20mmØPVC, & 50mmØPVC 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.
- Confer to Project Engineer the brand and approved equivalent.
- Provide sample material for approval.

26 50 00 **Lighting**

Material Requirement

- Supply and installation of 1x28watts; 1200mm x 300mm Surface Mounted in Louver Housing (contractor to verify the exact location of the lighting unit/s before installation)
- Supply and installation of 2x28watts; 1200mm x 300mm Recessed Mounted in Louver Housing (contractor to verify the exact location of the lighting unit/s before installation)
- Recessed type LED Panel Daylight, 300x1200mm, 40W, 230V
- Emergency light 2-1.5W LED (22hrs)
- Recessed type LED daylight round pin light 200mm dia., 12W, 230V
- Surface Mounted 12W LED downlight
- Surface Mounted 12W LED downlight with photosensor
- Single lighting switch with plate cover 16A wide series
- 2gang lighting switch with plate cover 16A wide series
- 3gang lighting switch with plate cover 16A wide series
- Confer to Project Engineer the brand and approved equivalent.
- Provide sample material for approval.

Miscellaneous Equipment

Supply and Installation of the following units for Solar Panel Electrical System:

- 360W Monocrystalline Solar Panel
- Solar Charge Controller 12/24V battery regulator
- Solar Battery bank 12/24V
- Solar Inverter AC to DC
- Solar Panel Miscellaneous (Cable, conduit, hanger & support and etc.)
- Electrical tapes, rubber tapes, pull wires, mica tubes and assorted screws.
- Confer to Project Engineer the brand and approved equivalent.
- Provide sample material for approval.

DIVISION 27 – COMMUNICATIONS

27 10 00 **Structured Cabling**

- Category6 UTP, 4 pairs, unshielded twisted pairs, polyethylene insulated hyper grade non-plenum LAN cable is the general requirements for this structured cabling system, The height of the data outlets is 90cm above finish floor line for all the area that has furniture table and 30cm the rest of areas does not have table furniture (refer to plans)
- Supply and installation of complete wiring devices, 3 meters patch cords information data outlet 8pin CAT6, RJ45 snap in jacks and other accessories ready for use.
- Supply and installation of Intermediate Data Frame Cabinet:
  Wall Mounted IDF Cabinet/Server Data rack (L530mmxW400mmxH300mm) with exhaust fan and power outlet including patch panel, wire manager, termination and commissioning is included in this scope of work.
- Supply and installation of 16 ports smart switch hub

- Supply and installation of HPE Networking BTO Ap-225 Wireless Access Point
- Supply and installation of access point:
  -Access Point/Wireless Wi-fi Router
  Standards:
  IEEE 802.11ax/ac/n/a 5 GHz
  IEEE 802.11ax/n/b/g 2.4 GHz
  Wi-fi Speeds:
  5 GHz: 4804 Mbps (802.11ax, HE160)
  2.4 GHz: 574 Mbps (802.11ax)
- Complete termination and testing of cables, tagging (using tagging machine), labeling of each terminal for easy identification. Submission of test results shall be required.
- Provide 1 run of cat6 cable per devices from LAN outlet to IDF as indicated on the Plans.
- Intermediate Distribution Frame (IDF) up link shall be coordinated w/ CPDMO to Communicate with IMS team.

Conduit Pipes and Accessories

- 25mm dia. PVC pipes, couplings, PVC elbows, male adapter, coupling, locknut and
- bushing.
- 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 Pull wires, mica tubes and assorted screws
- Provide Hanger and Supports
  -All conduit pipes and accessories shall be using appropriate hangers and support follow existing features. Exposed layout on walls and partition inside offices shall not be allowed. Chipping works required.

Additional Notes:

1. Contractor to verify the exact location of the lighting unit/s before installation
2. Confer to Project Engineer the brand and approved equivalent.
3. Provide sample material for approval.

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

28 46 00 Fire Detection and Alarm System (FDAS)

- Supply and Installation of brand-new Intelligent Photo electronic Smoke Detector, Intelligent Optical Detector with emote indicator output (Certified by LPCB) without base.
- Supply and Installation of brand-new Common Detector Base for Addressable Detector and for conventional detector using EOLR (refer to detailed drawings)

Technical Specifications of Smoke Detector:

- Operating Voltage
  -Loop 24V (16V ~ 28V)
  -Standby Current: <0.8mA
  -Alarm Current: <1.8mA (without remote indicator)
  <3.8mA (with remote indicator)
  -Code Range: 1 ~ 242
- Dimensions
  -Diameter: 100mm

-Height: 54.5mm (with base)

- Supply and Installation of brand-new Digital manual Call point flush mount resettable (non-breaking glass), Supplied with surface mount back box and special reset key.

Technical Specifications of Digital Manual Call Point:

- Operating Voltage
  -Loop 24V (16V – 28V)
  -Standby Current: <0.6mA
  -Alarm Current: <1.8mA (without remote indicator)
  -Address Range: One address within 1 – 242

- Dimensions (LxWxH):
  -87.1mm x 87.1mm x 58.5mm (with back box)
  -87.1mm x 87.1mm x 23.5mm (without back box)

- Supply and Installation of brand new Addressable Combined Sounder and strobe 24VDC required.

Technical Specifications of Addressable Sounder Beacon:

- Sound Level Output: 84dBA at 3 meters
- Beacon frequency: 20 – 180 times
- Operating Current:
  -Loop: Standby – 0.8mA; Alarm-6mA
  -PSU: Standby – 10mA; Alarm-160mA
- Operating Voltage:
  -Loop 24V (16V – 28V)
  -PSU: 24VDC (20VDC – 28VDC)

- Dimensions:
  -144mm x 90mm x 57mm

- Supply and Installation of brand new #18AWG TF wire, 1/2Ø EMT conduit pipes, flexible metallic conduit and consumables
- Programming, Testing and commissioning

Testing of system

- 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.

Hangers and Support

- All conduit pipes and accessories shall be using appropriate hangers and support follow existing features. Exposed layout on walls and partition inside offices shall not be allowed. Chipping works required.

Additional Notes:

1. Contractor to verify the exact location of the lighting unit/s before installation
2. Confer to Project Engineer the brand and approved equivalent.
3. Provide sample material for approval.

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, **INCREASE IN THE CARRYING CAPACITY OF THE SCHOOL OF HEALTH SCIENCE**.

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 Eighty (180) 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.

Prepared by:

TRISTAN A. MENDOZA
Engineer I, Civil

ENGR. MARL DARWYN E. RODRIGUEZ
Engineer II (Electrical)

RICARDO ALVARAN
Administrative Assistant III, Plumber

ENGR. ABEL L. LOPEZ
Engineer III, Mechanical

ENGR. EDINEL V. TADEO
Structural Consultant

AR. MARK ANTHONY C. QUINICIO
Draftsman III (AoR)

Certified Correct:

ENGR. RENATO B. REMORQUE
Engineer III, Electrical

AR. ROSALIE G. FLORES-BERNARDO
Chief, CPDMO

Recommending Approval:

FILEDITO D. TANDINCO MD, MSC, DPPS
Dean, School of Health and Science

MICHAEL L. TEE, MD, MHPEd, MBA
Vice Chancellor for Planning and Development

18 JAN 2023

Approved:

ARLENE A. SAMANIEGO, MD
Vice Chancellor for Administration

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