Project Title: Renovation and construction of additional 1-unit classroom for the Tirador Building
Owner: WVSU-Janiuay Campus
Location: Janiuay, Iloilo

ARCHITECTURAL SPECIFICATIONS
GENERAL PROVISIONS

I. EARTHWORKS

1. MOBILIZATION/DEMOBOLIZATION

DESCRIPTION

The intent of this item is to provide for the Contractor's contingent or incidental expense in setting up field offices, mobilization and demobilization of equipment, setting up plants, providing sanitary facilities, providing any watchman service required, and providing other services called for in the Technical Specifications or indicated on the Construction Plans and for which no direct payment is allowed. The units stated hereinafter shall be included for payment under this item, but a unit not specifically included herein and required elsewhere in the Construction Plans and Technical Specifications shall not be cause for additional compensation.

SCOPE OF WORK

a) Sanitary Facilities - The Contractor shall provide and maintain in a neat and sanitary condition, a temporary convenience or enclosure for the exclusive use of the Contractor's employees on the construction site. Such Facility shall comply with the State Department of Environmental Protection, County Health Department, and/or federal, state and/or local ordinance as required.
b) Contractor shall be solely responsible for maintaining safe vehicular and pedestrian access and passage, and emergency vehicle access and passage on the site at all times.
c) It is the responsibility of the Contractor to replace and/or restore all materials stored on the site subject to demolition and/or theft, and shall provide and pay for such watchman's service during the construction period as may be required.

II. DEMOLITION WORKS

1.1 DESCRIPTION:

This section specifies demolition and removal of buildings, portions of buildings, utilities, other structures and debris from trash dumps shown.

1.2 PROTECTION:

a) Perform demolition in such manner as to eliminate hazards to persons and property; to minimize interference with use of adjacent areas, utilities and structures or interruption of use of such utilities; and to provide free passage to and from such adjacent areas of structures.
b) Provide safeguards, including warning signs, barricades, temporary fences, warning lights, and other similar items that are required for protection of all personnel during demolition and removal operations.
c) Maintain fences, barricades, lights, and other similar items around exposed excavations until such excavations have been completely filled.

d) Provide enclosed dust chutes with control gates from each floor to carry debris to truck beds and govern flow of material into truck. Provide overhead bridges of tight board or prefabricated metal construction at dust chutes to protect persons and property from falling debris.
e) Prevent spread of flying particles and dust. Sprinkle rubbish and debris with water to keep dust to a minimum. Do not use water if it results in hazardous or objectionable condition such as, but not limited to; ice, flooding, or pollution. Vacuum and dust the work area daily.
f) In addition to previously listed fire and safety rules to be observed in performance of work, include following:
    i. No wall or part of wall shall be permitted to fall outwardly from structures.
    ii. Maintain at least one stairway in each structure in usable condition to highest remaining floor. Keep stairway free of obstructions and debris until that level of structure has been removed.
    iii. Wherever a cutting torch or other equipment that might cause a fire is used, provide and maintain fire extinguishers nearby ready for immediate use. Instruct all possible users in use of fire extinguishers.
    iv. Keep hydrants clear and accessible at all times. Prohibit debris from accumulating within a radius of 4500 mm (15 feet) of fire hydrants.
g) Before beginning any demolition work, the Contractor shall survey the site and examine the drawings and specifications to determine the extent of the work. The contractor shall take necessary precautions to avoid damages to existing items to remain in place, to be reused, or to remain the property of the // Medical Center // Cemetery Property //; any damaged items shall be repaired or replaced as approved by the Resident Engineer. The Contractor shall coordinate the work of this section with all other work and shall construct and maintain shoring, bracing, and supports as required. The Contractor shall ensure that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract. Do not overload structural elements. Provide new supports and reinforcement for existing construction weakened by demolition or removal works. Repairs, reinforcement, or structural replacement must have Resident Engineer’s approval.
h) Demolish and remove outside utility service lines shown to be removed.
i) Remove abandoned outside utility lines that would interfere with installation of new utility lines and new construction.

1.3 DEMOLITION:

a) Completely demolish and remove buildings and structures, including all appurtenances related or connected thereto, as noted below:
    i. As required for installation of new utility service lines.
    ii. To full depth within an area defined by hypothetical lines located 1500 mm (5 feet) outside building lines of new structures.
b) Debris, including brick, concrete, stone, metals and similar materials shall become property of Contractor and shall be disposed of by him daily, off the // Medical Center // Cemetery Property // to avoid accumulation at the demolition site. Materials that cannot be removed daily shall be stored in areas specified by the Resident Engineer. Break up concrete slabs below grade that do not require removal from present location into pieces not exceeding 600 mm (24 inches) square to permit drainage. Contractor shall dispose debris in compliance with applicable federal, state or local permits, rules and/or regulations.

c) In removing buildings and structures of more than two stories, demolish work story by story starting at highest level and progressing down to third floor level. Demolition of first and second stories may proceed simultaneously.
d) Remove and legally dispose of all materials, other than earth to remain as part of project work, from any trash dumps shown. Materials removed shall // become property of contractor and shall be disposed of in compliance with applicable federal, state or local permits, rules and/or regulations // be hauled to VA specified disposal site //. All materials in the indicated trash dump areas, including above surrounding grade and extending to a depth of 1500mm (5feet) below surrounding grade, shall be included as part of the lump sum compensation for the work of this section. Materials that are located beneath the surface of the surrounding ground more than 1500 mm (5 feet), or materials that are discovered to be hazardous, shall be handled as unforeseen. The removal of hazardous material shall be referred to Hazardous Materials specifications.
e) Remove existing utilities as indicated or uncovered by work and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the Resident Engineer. When Utility lines are encountered that are not indicated on the drawings, the Resident Engineer shall be notified prior to further work in that area.

1.4 CLEAN-UP:

On completion of work of this section and after removal of all debris, leave site in clean condition satisfactory to the Physical Plant Supervisor. Clean-up shall include the disposal of all items and materials not required to remain property of the Government as well as all debris and rubbish resulting from demolition operations.

III. EXCAVATION AND BACKFILLING

1. Scope of Work

The Contractor shall furnish all labor, materials, equipment, plant and other facilities and perform all work necessary to complete the preparation of site, excavation, filling and grading in strict compliance with the applicable drawings and as specified herein.

2. Stake and Batter Boards

The Contractor shall stake out the buildings accurately and establish grades, after which the approval of the Owner shall be secured before any excavation work is started.

Basic batter boards and basic reference marks shall be erected at the expense of the Contractor, at such places where they will not be disturbed during construction. Materials shall be stored and work shall be conducted in such manner as to preserve all reference marks set.

The Contractor shall construct two (2) permanent benchmarks of previously known elevations near or within the site of construction for determining any settlement that may occur during the progress of construction.

Elevation reading shall be taken on at least four (4) points in the buildings and other related structures. A permanent record of the weekly reading shall be kept at construction site and monthly report thereof shall be submitted to the Owner unless some unusual reading is observed in which case report shall be made

immediately.

A. Excavation

Excavation work shall commence after the fill has thoroughly compacted and attained the required elevation.

The Contractor shall make all necessary excavation for foundations to grade indicated on the Drawings. All trenches shall be excavated at a neat size, leveled to a line at the bottom, which is ready to receive the foundation. The Contractor shall not excavate to a depth below elevations shown on the Drawings. Work that is excavated to a greater depth than required by the drawings and this specification shall be filled with lean concrete (fc' = 13.8 Mpa) at the expense of the Contractor.

No footings shall rest on fill. If the excavations for foundation reveal that footing will rest on fill, excavations shall be carried until the desired stratum is reached for safe bearing. All excavations shall be made with proper allowance made for floor slabs and forms. Bottom of footing and foundations shall be approximately level, clean and clear of loose materials with the lower section true to size.

All excavation for drainage, sewer and water services, and other underground utilities, which are within the property line or scope of work indicated on the Plans, are included.

Sheathing shall be driven below the bottom of excavation deep enough. Where walls or footings are to be poured without forms, trench sides shall be sharp and true.

The Contractor, at all times protects the excavation and trenches from damage due to water. He shall provide pumps and equipment, build enclosures and shall construct and maintain temporary drainage and do all pumping necessary to keep the excavation free of water. Sheet pilling if needed shall be provided and tightly driven, shored and braced to maintain its position until removed.

B. Utilities

When encountered in work or as indicated, protect the existing active sewer, water, gas, electric, other utility services, and structures, when required for proper execution of work, relocate them as directed. If encountered, requiring protection or relocation, request in writing for decision of the Owner. Do not proceed until written instructions are obtained.

C. Backfilling, Grading and Compaction

After forms have been removed from footings, beams, foundations, walls, etc., and when the concrete work has attained full designed strength, backfill shall be placed free from waste and objectionable matters. After the backfill has settled, the Contractor shall fill all shallow places to bring the backfill area to grade. The Contractor shall grade the site within the area indicated in the scope of work.

All filling materials shall be placed in layers not exceeding 150 mm in thickness, each layer being thoroughly wetted and compacted by rolling or tamping. All fills shall have 95% compaction.

The types of filling materials for buildings shall be selected earth fill and the source shall be approved by the Engineer.

IV. REINFORCED CONCRETE WORKS

1. Scope of Work

The work shall include all labor, materials, equipment, plant and other facilities for the satisfactory performance of all work necessary to complete all concrete and reinforced concrete work shown on the Drawing and specified herein.

2. Concrete and Reinforced Concrete

All concrete and reinforced concrete work shall be done in accordance with the *DPWH Standard Specifications for Highways, Bridges and Airports revised 2012 Edition and the current American Concrete Institute "BUILDING CODE REQUIREMENTS FOR THE REINFORCED CONCRETE (ACI 318 – 76)".*

3. Concrete Materials

Portland Cement shall be Type I and shall conform to "Specification for Portland cement (ASTM – C – 150-76a)".
Concrete aggregates shall be well-graded particles of gravel or crushed rock conforming to the *"Specification for Concrete Aggregates (ASTM C33 – 74a)".*

The maximum size of the aggregates shall not be larger than 1/5 of the narrowest dimension between forms nor larger than 3/4 of the minimum clear spacing between reinforcing bars nor larger than 25 mm in diameter.

Larger diameters of aggregates may be allowed in massive concreting with written permissions from the Owner.

Water used in mixing concrete shall be clean and free from injurious amount of oil, acid, alkali, salt, organic matter or other deleterious substances.

All reinforcing bars used shall be deformed and shall be free from rust, oil, defects, grease or kinks.

All reinforcing steel bars shall conform to the *PHILIPPINE STANDARD GRADE DSB 275.*

4. Forms

The Contractor shall provide forms that will produce correctly aligned concrete. Plastering in general shall not be allowed so that extra care shall be exercised by the Contractor in choice of fitting, and rigid supporting of the forms. Plywood, metal or surfaced lumber forms shall be used for all exposed concrete works.

Column forms shall be checked for plumpness before concrete is poured. Handholds shall be provided in column forms at lowest points of per lifts to render this space accessible for cleaning.

Forms and shoring shall not be removed until the concrete is adequately set and strong enough to withstand anticipated loading, and in no case less than seven (7) days after pouring.

All girders, beams, centering shall be crowned at least 25 mm in all direction from every eight (8) meters span. However, chambers for all cantilevers shall be as indicated in Plans or obtained from the Owner.

5. Storage of Materials

Cement shall be stored immediately upon arrival at the site in substantial, weatherproof bodegas, with a floor raised from the ground sufficiently high to be free from dampness.

Aggregates shall be stored in such a manner as to avoid the inclusion of other/foreign materials.

Reinforcing bars shall be placed in racks raised above the ground and protected from moisture and vegetation.

6. Samples and Testing

Testing except as otherwise specified herein shall be performed by an approved testing agency as proposed by the Contractor and approved by the Owner at no additional cost to the Owner.

Cement: Sampled either at the mill or at the site of the work and tested by an approved independent commercial or national testing laboratory at no additional cost to the Owner. Certified copies of laboratory test reports shall be furnished for each lot of cement and shall include all test data results and certificates that the sampling and testing cement shall be used until notice has been given by the Owner that the test results are satisfactory. Cement that has been stored, other than in bins at the mills, for more than four (4) months after delivery to the site shall be retest before use. Cement delivered at the site and later found under the test to be unsuitable shall not be incorporated into the permanent works.

Aggregates: Tested as prescribed in ASTM C 33.

Reinforcement: Certified copies of mill certificates of tests shall accompany deliveries of steel bar reinforcement. If requested by the Owner, additional testing of the materials shall be made at the Contractor expense.

Concrete Test: Provide for test purposes three sets of test specimens taken under the instructions of the Owner from each 50 cu. m. or fraction thereof of each class of concrete placed. At least one set of test specimens shall be provided for each Class of concrete placed in each 8-hour shift. Each shall consist of two specimens, and shall be made from separate batch. *Samples shall be secured in conformity with ASTM C172. Test specimens shall be made, cured and packed for shipment in accordance with ASTM C 31.* Cylinders will be tested by and at the expense of the Contractor in accordance with the ASTM C 39. The Owner for meeting strength level requirements for each cylinder with CONCRETE QUALITY of ACI 318 will evaluate test specimens separately. The standard age of test shall be 28 days, however 7 days tests may be allowed, with the permission of the Owner provided that the relation between the 7day and the 28 day strengths on the concrete is established by tests for the materials and proportions used. When samples fail to conform to the requirements for strength, the Owner shall have the right to order a change in the proportions of the concrete mix for the remaining portions of the work at no additional cost to the Owner.

7. Proportioning of Concrete Work

Trial design batches and testing to meet requirements of the classes of concrete specified shall be the responsibility of the Contractor. The design mix shall be of consistencies specified herein after in ***REINFORCEDCONCRETE WORKS***. Test for slump, unit weight, and air content shall be performed in the field under the presence of the Owner.

Concrete Proportioning: Samples of approved aggregate shall be obtained in accordance with the requirements of ASTM D 75. Samples of materials other than aggregate shall be representative of those proposed for the project and shall be accompanied by the manufacturer's test reports indicating compliance with applicable specified requirements. Trial mixes shall have proportions, consistencies, and air content suitable for the work. Trial mix shall be designed for maximum permitted slump and air content. The temperature of concrete in each trial batch shall be reported. For concrete in each water-cement ratio, at least three test cylinders for each test age shall be made and cured in accordance with ASTM C 39. From these test results, a curve shall be plotted showing the relationship between water-cement.

8. Strength Requirement

All concrete, unless otherwise indicated, shall develop a minimum 28 - day cylinder strength of 20.70 MPa.
The Contractor shall submit mix design obtained from at least three standard cylinder samples made in accordance with Section 5.4 of the NSCB, 1991, for the strength required stating the proposed slump and the proportional weights of cement, aggregates and water. The mixes shall be approved by preliminary tests fourteen (14) days before concreting and shall show the required strength. No substitutions shall be made in the materials or mix without additional tests to show that the quality for concrete is satisfactory.

Slump: Tests shall be made in conformity with ASTM C 143, and unless otherwise specified by the Owner slump shall be within the following limits:

Structural Element	*Slump of Vibrated Concrete*	
	Minimum	*Maximum*
Concrete Wall, Column and girder, beam, 25 cm maximum thickness	50 mm	70 mm
	50 mm	70 mm
All other concrete	50 mm	100 mm

9. Joints

No reinforcement, corner protection angles or other fixed metal items shall be run continuous through joints containing expansion – joint filler, through crack - control joints in slabs on grade and vertical surfaces.

Pre – molded Expansion Joint Filler

Joints with Joint Sealant: At expansion joints in concrete slabs to be exposed, and at the other joints indicated to receive joint sealant, pre–molded expansion joint filler strips shall be installed at the proper level below the elevation with a slightly tapered, dressed and wood strip temporarily secured to the top thereof to form a groove, when surface dry, shall be cleaned of foreign matter, loosed particles, and concrete protrusions, there filled approximately flush with joint sealant so as to be slightly concave after drying.

Finish of Concrete at Joints: Edges of exposed concrete slabs along expansion joints shall be nearly finished with slightly rounded edging tools.

Construction Joints: Unless otherwise specified herein, all construction joints

shall be subject for approval of the Owner. Concrete shall be placed continuously to form a monolithic construction. Fresh concrete may be placed against adjoining units, provided the set concrete is sufficiently hard not to be injured thereby. Joints not indicated shall be made and located in a manner not to impair strength and appearance of the structure.

Placement of concrete shall be at such rate that surfaces of concrete not carried to joint levels will not have attained initial set before additional concrete is placed thereon. Lifts shall terminate at such levels as indicated or as to conform to structural requirements as directed. If horizontal construction joints are required, a strip of 25 mm square – edge lumber, leveled to facilitate removal shall be taken to the inside the forms at the construction joint. Concrete shall be placed to a point 25 mm above the underside of the strip. The strip shall be removed (1) one hour after the concrete has been placed, any irregularities in the joint lines shall be leveled off with a wood float, and all laitance removed.

Prior to placing additional concrete, horizontal constructed joints shall be prepared as specified in *BONDING*.

Crack control joints in slabs on grade are specified in – *REINFORCED CONCRETE WORKS/SLABS ON GRADE.*

10. Placing Concrete

Concrete shall be transport from mixer to the place of final deposit in a continuous manner, as rapidly as practicable without segregation or loss of ingredient until the approved unit of work is completed. Placing will not be permitted when the sun, heat, wind or limitations of facilities furnished by the Contractor, prevent proper finishing and curing of the concrete. Concrete shall be placed in the forms, as closed as possible in the final position, in uniform approximately horizontal layers not over 300 mm deep. Forms splashed with concrete of form coating shall be cleaned in advance of placing subsequent lifts. Concrete shall not be allowed to drop freely more than 10 m in unexposed work not more than 1.0 m in exposed work; where greater drops are required, tremie or other approved means shall be employed. The discharge of the tremies shall be controlled so that the concrete may be effectively compacted into horizontal layers no more than 300 mm thick, and spacing o the tremies shall be such that segregation does not occur. Concrete to receive other construction shall be screeded to the proper level to avoid excessive skimming or grouting. Conduits and pipes shall not be embedded in concrete unless specifically indicated or as directed by the Owner.

Time Interval Between Mixing and Placing: Concrete mixed in stationary mixers and transported by non-agitating equipment shall be placed in the forms within 45 minutes from the time ingredients are charge into the mixing drum. Concrete transported in truck mixers or truck agitator shall be delivered to the site of work discharge in the forms within 45 minutes from the time that the ingredients are discharge into the mixing drum. Concrete shall be placed in the forms within 45 minutes after discharge from the mixer at the jobsite. ***Earth – foundation Placement:*** Leveling concrete for concrete foundations, exterior slabs and exterior foundations receiving equipment or machinery shall be placed upon undisturbed surfaces conforming to ***– EXCAVATION AND BACKFILLING SECTION***. The surfaces shall be clean, free from mud and water. The concrete foundations maybe placed over the leveling concrete surfaces.

Conveying Concrete by Chute, Conveyor or Pump: Concrete may be conveyed by chute, conveyor, or pump if approved in writing. In requesting approval, the Contractor shall submit his entire plan of operation for time of discharge of concrete from the mixer to final placement in the forms, and the steps to be taken to prevent the formation of cold joints, in case the transporting of concrete by chute, conveyor or pump is disrupted. Conveyor and pump shall be capable of

expeditiously placing concrete at the rate most advantageous to good workmanship. Approval will not be given for chutes or conveyors requiring changes in the concrete materials or design mix for efficient operation.

a. **Chutes and Conveyors:** Chutes shall be of steel or steel line wood, rounded in cross section rigid in construction, and protected from over flow. Conveyors shall be designed and operated and chute section shall be set, to assure a uniform flow of concrete from mixer to final place of deposit without segregation of ingredients, loss of mortar, or change in slump. The discharge portion of each chute or conveyor shall be provided with a device to prevent segregation. The chute and conveyor shall be thoroughly cleaned before and after each run. Waste material and flushing water shall be discharge outside the forms. When using tilted chutes, the inclination should not be flatter than one (1) vertical and two (2) horizontal. From the outlet/mouth of the chute to the concrete surface, the maximum allowable height shall be 1.50 m.
b. Pumps shall be operated and maintained so that a continuous stream of concrete is delivered into the forms without air pocket, segregation of change in slump. When pumping is completed, concrete remaining in the pipeline shall be ejected, wasted without contamination of concrete already.
c. After each operation, equipment shall be thoroughly cleaned and the flushing water shall be splashed outside the forms.
d. ***Placing Concrete Reinforcement:*** Where congestion of the steel or other conditions will make placing or compaction of concrete difficult, a layer of mortar shall be first deposited in forms to a depth of approximately 25 cm. Mortar proportions shall be the same as the concrete minus the coarse aggregate.

11. Compaction

Immediately after placing, each layer of concrete shall be compacted by internal concrete vibrators supplemented by hand spading, rodding and tamping. Tapping or other external vibration of forms will not be permitted unless specifically approved by the Owner. Vibrators shall not be used to transport concrete inside forms. Internals vibrators submerged in concrete shall maintain a speed of not less than 7,000 impulses per minute. The vibrating equipment at all times shall be adequate in number of units and power to properly consolidate all concrete.

Spare units shall be on hand as necessary to insure such adequacy. Duration of vibrating equipment shall be limited to time necessary to produce satisfactory consolidation without causing objectionable segregation. The vibrators shall not be inserted into lower courses that have begun to set. Vibrators shall be applied at uniformity spaced points not further apart that the visible effectiveness of the machine.

12. Bonding

Bonding/depositing new concrete on or against concrete that has set; The surfaces of the set concrete shall be thoroughly cleaned so as to expose the coarse aggregate and be free of laitance, coatings, foreign matter and loose particles. Forms shall be retightened. The cleaned surfaces shall be moistened, but shall be without free flowing water when concrete is placed.

13. Slabs on Grade

Capillary water barrier or surged shall conform to ***PART I.C – EXCAVATION AND BACKFILLING FOR BUILDINGS.***

Concrete shall be compacted, screeded to grade, and prepared for the specified finish. Concrete shall be placed continuously so that each unit of operation will be monolithic in construction. Concrete shall be placed in alternate check board

pattern terminating at crack-control joints or construction joints or may be placed in alternative paving lanes as limited by expansion, and contraction joints. Crack-control joints shall be expansion, contraction, or construction joints. Joints not shown shall be lifted at column centerlines and at intermediate intervals so that such panel is shall not be more than 55 sq.m. Panels shall be approximately square with dimensioning of one side not more than 7.5 m. Forms shall remain in place for at least 12 hours after complete placement.

Construction joints may be formed by the insertion of hard pressed fiberboard strips inserted in the plastic concrete or may be cut with an approved concrete sawing machine, after the concrete has set. Unless otherwise indicated or directed the joints shall be 3 mm wide and depth equal to approximately 1/4 of the slab thickness of the maximum size of the coarse aggregate whichever is greater.

14. Finishes of Concrete

Within 12 hours after forms are removed, surface defects shall be remedied as specified herein. Fine and loose material shall be removed. Honeycomb, aggregate pockets, voids over 13 mm in diameter, and holes left by the rods or bolts shall be cut out to solid concrete, reamed, thoroughly wetted, brush-coated with neat cement rout, and filled with mortar. Mortar shall be a stiff mix of 1 part Portland cement to not more than 2 parts fine aggregates passing the no. 16 mesh sieve, and minimum amount of water. The color of the mortar shall match the adjoining concrete color. Mortar shall be thoroughly compacted in place.

Holes passing through walls shall be completely filled from the inside face by forcing mortar through to the outside face. Holes, which do not pass entirely through wall, shall be packed full.

Patchwork shall be finished to match adjoining surfaces in texture and color. Patchworks shall be damping cured for 72 hours. Ambient temperature shall not be less than 10 degrees C. Dusting of finish surfaces with dry material or adding water to concrete surfaces will not be permitted.

15. Concrete Finished for Slabs

Slab Receiving Concrete Paving: After concrete is placed and consolidated, slab shall be screed or struck off and no further finish is required.

Smooth Finish: Required only when specified; screed concrete and floats to required level with no coarse aggregate visible. After surface moisture has disappeared and laitance has been removed the surface shall be finished by float and steel trowel.

Broom Finish: Required for paving, stairs and landings; the concrete shall be screed and floated to required finish level with no coarse aggregate visible. After the surface moisture has disappeared and laitance ahs been removed, surface shall be float finished to an even, smooth finish. The floated surfaces shall be broom with a fiber bristle brush in a direction transverse to the direction of the main traffic.

Tolerance: Smooth and broom finished surfaces shall be true to plane with no deviation in excess of 3 mm in any direction when tested with a 3.0 m. straight edge.

16. Curing

Concrete shall be protected against moisture loss, rapid temperature change, mechanical injury from rain or flowing water, for a minimum period of 7 days.

Concrete shall be maintained in a moist condition at temperature above 10° C throughout the specified curing period and until remedied work started under ***Part II.D – CONCRETE WORKS/FINISHES OF CONCRETE***. Curing activities shall be started as soon as free water has disappeared from the surface of the concrete after placing and finishing. Form under surfaces shall be moist cured with forms in place for the full curing period or, if other removes forms prior to the end of the curing period by any approved means. Curing shall be accomplished by any of the following methods of combination thereof, as approved.

Water: Water used in curing shall be reasonably cleaned and free of oil, salt, acid, alkali, or other substances injurious to the concrete. Drinking water may be used for curing test.

Moist Curing: Uniformed surfaces shall be covered with burlap or mats, wetted before placing and over-lap at least 150 mm. Burlap or mats shall be kept continually wet and in intimate contract with the surface. If the forms are removed before the end of the curing period, curing shall be continued on uniformed surfaces, using suitable materials.

V. WELDING, METAL WORKS AND ROOFING WORKS

1. Scope of Work

This section covers the furnishing of all work, equipment, materials, labor and supervision required to complete the items in full compliance with the Drawing and this Specifications.

2. Material Provisions

All welding shall conform to the "AWS CODE FOR ARC AND GAS WELDING IN BUILDING" and as herein specified or any other welding standards approved by the Owner's Engineer.

All metal works shall be done in accordance with all related publications of American Institute of Steel Construction (AISC), American Society of Testing Materials (ASTM) and American Welding Society (AWS).

Use only welding equipment, electrodes, welding wire and fluxes capable of producing satisfactory results when used in a qualified welding procedure.

The Contractor shall be responsible for all errors of detailing for correct fitting of the structural members.

3. Storage of Materials

The materials shall be stored out of contact with the ground and in a manner and location that will minimize contamination and deterioration.

4. Material Requirement

All materials shall be new stock, free from surface imperfection and shall conform to the applicable ASTM Specifications and equivalent standards.

The 50 mm diameter handrail for Administration Building shall be made of stainless steel pipe Sch. 40, Grade 416.

Comfort Room for person with disability shall be provided with 500 mm diameter, Sch. 40 stainless steel grab bar.

5. Shop Connections

As detailed in the drawing or as approved by the owner's representative.

6. Field Connections

Provide welded connections as shown in the drawing or as approved by the Owner's Engineer.

7. Roofing works

a. All roofing materials should be of standard quality and as specified in the detailed drawings and plans.
b. All materials should be approved by the owner before installation.
c. All accessories should conform to the existing standards and are subject to approval by the owner.

VI. MASONRY WORKS

1. FINISHES

All mortar to be used for cement plaster shall be mixed as specified in sec. III-3 masonry finishing as indicated on the drawings shall be done to give the best quality of work. Before application of material to be used under this section, it must have the approval of the Architect.

2. CHB WALL

All CHB walls as shown on the drawings shall have 10mm ø horizontal a n d vertical reinforcement bars, spaced at 24" 0r .60 m. O.C. Concrete mixture to be used shall be class B. Provide stiffener column @ every 6 meter clear span & lintel beam @ every 3 meter clear height. All pouring shall be cast-in-place.

VII. CEMENT BOARD CEILING

1. Ceiling Support System:

a. Main Runners: Steel channels with rust inhibitive coating (Galvanized), hot or cold-rolled, minimum nominal thickness 0.6 mm with 40 mm flanges and channel web of suitable size.
b. Hanger Wire: Conform to ASTM A 641, soft, Class 1, galvanized.
c. Hanger Rods and Flats: Mild steel with zinc or equally rust.

2. Cement Board: Calcium silicate boards, reinforced with selected fibers and fillers and asbestos free, 6 mm thick unless otherwise indicated on Drawings. Boards shall be moisture-resistant, undamaged by water; fire performance shall be as follows:

a. Boards shall be unaffected by brine and chlorine, resistant to low concentrations of most acids, alkalis and bleaching agents as well as attack of insects or vermin. Inhibitive coating for rods and zinc or rust-inhibitive paint finish for flats.
b. Furring Members: Conform to ASTM C 645, not less than 0.6 mm thick, hat-shaped with 19 mm flanges.

3. Fasteners:

a. Screws: Self-drilling, self-tapping bugle head for use with powder-driven tool and of the type recommended by board manufacturer for the intended application.
b. Fasteners for furring members: Type and size shall be as recommended by furring manufacturer for the substrate and intended application.

4. Joint Treatment Materials:

a. Joint reinforcing tape: Perforated type, width range between 45 mm and 60 mm, and 0.3 mm thick.
b. Joint compound: As recommended by the board manufacturer for the intended application and in accordance with ASTM C 475.

c. Concealed Sealants: Mastic type, non-shrink, non-drying, non-migrating, and non-staining sealant.
d. Exposed Sealant: Acrylic-latex type, permanently elastic and paintable.

VIII. PAINTING

A. Painting materials complete with primers, sealers, stains applied for exterior and interior areas as indicated on Drawings and as specified in this section.
B. Product Data: Submit manufacturers technical information including instructions for thinning, mixing, curing and touch-up.
   1. Manufacturer's standard color charts.
   2. Test Reports and certificates of compliance.
   3. Samples: Prior to beginning work, furnish color chips for surfaces to be painted. Submit samples for the Engineer's review of color and texture only. Provide a listing of material and application for each coat of each finish sample.
      a. 300 mm x 300 mm hardboard, provide 2 samples of each color and material, with texture to simulate actual conditions. Re-submit samples as requested by the Engineer until acceptable sheen, color and texture is achieved.
      b. Wood surfaces, provide 2 samples 100 x 200 mm of natural and stained wood finish on actual wood types. Label and identify each as to location and application.
      c. Concrete masonry, provide two 100 mm square samples of masonry for each type of finish and color, defining filler, prime and finish coat.
      d. Actual wall surfaces and other exterior and interior building components, duplicate painted finishes of prepared samples. Provide full-coat finish samples on at least 9 m^2 of surface, as direct, until required sheen, color and texture is obtained; simulate finished lighting conditions for review of in- place work.
      e. Final acceptance of colors will be from samples applied on the job.
C. Material Quality: The quality of paints to be used shall be Boysen, Davies or its equivalent. Paints, coatings, and primers shall be ready-mixed at the manufacturer's plant and shall be delivered in sealed containers, labelled and identified. Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Paints and finishes shall have Class A rating. Materials without manufacturer's identification as a standard, best-grade product will not be acceptable. Use products of same manufacturer for succeeding coats.
D. Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.
E. Color and Texture:
   a. Exterior Painting: Color and texture of the exterior paint shall be as indicated on Drawings and as approved by the Architect.
   b. Interior Painting: Colors, textures, and degree of luster will be as indicated on Interior Design Drawings and Interior Design Specifications. Color selection will include safety colors for hazards in accordance with ANSI Z53.1 Safety Color Code for Marking Physical Hazards. Tint prime and undercoats approximately to the shade of the final coat but with sufficient variation to distinguish them from the preceding coat.

F. Mildewcide: Paints shall contain a mildewcide as recommended by the manufacturer.
G. Solvents and Thinners: As recommended by the paint manufacturer.

IX. PARTITION WALLS

1. Partition Support System:

   a. Metal tracks and studs: Steel channels with rust inhibitive coating (Galvanized), hot or cold-rolled, minimum nominal thickness 0.6 mm with 50 mm flanges and channel web of suitable size.

2. Cement Board:

   a. Calcium silicate boards, reinforced with selected fibers and fillers and asbestos free, 6 mm thick unless otherwise indicated on Drawings. Boards shall be moisture-resistant, undamaged by water.
   b. Boards shall be unaffected by brine and chlorine, resistant to low concentrations of most acids, alkalis and bleaching agents as well as attack of insects or vermin. Inhibitive coating for rods and zinc or rust-inhibitive paint finish for flats.

3. Fasteners:

   c. Screws: Self-drilling, self-tapping bugle head for use with powder-driven tool and of the type recommended by board manufacturer for the intended application.
   d. Fasteners for furring members: Type and size shall be as recommended by furring manufacturer for the substrate and intended application.

4. Joint Treatment Materials:

   e. Joint reinforcing tape: Perforated type, width range between 45 mm and 60 mm, and 0.3 mm thick.
   f. Joint compound: As recommended by the board manufacturer for the intended application and in accordance with ASTM C 475.
   g. Concealed Sealants: Mastic type, non-shrink, non-drying, non-migrating, and non-staining sealant.
   h. Exposed Sealant: Acrylic-latex type, permanently elastic and paintable.

X. WINDOWS

X.1 ALUMINUM WINDOWS

A. General: Fabricate aluminum window units to comply with indicated standards. Include a complete system for assembly of components and anchorage of window units.
   1. Provide units that are realizable without dismantling sash or ventilator framing.
   2. Prepare window sash or ventilators for glazing, except where preglazing at the factory is indicated.

B. Thermally Improved Construction: Fabricate window units with an integral, concealed, low-conductance, thermal barrier, located between exterior materials and window members exposed on interior, in a manner that eliminates direct metal-to-metal contact.
   1. Provide thermal-break construction that has been in use for not less than 3 years, has been tested to demonstrate resistance to thermal conductance and condensation, and has been tested to show adequate strength and security of glass retention. .
   2. Provide hardware with low conductivity or nonmetallic material for hardware bridging thermal breaks at frame or vent sash.
   3. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.

4. Provide water-shed members above side-hinged ventilators and similar lines of natural water penetration.
5. Subframes: Provide subframes with anchors for window units as shown, of profile and dimensions indicated but not less than 1.6-mm- thick extruded aluminum. Miter or cope corners, and weld and dress smooth with concealed mechanical joint fasteners. Finish to match window units.
6. Mullions: Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units.
7. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, as indicated.
8. Glazing Stops: Provide screw-applied or snap-on glazing stops, coordinated with glass selection and glazing system indicated. Finish to match window units.

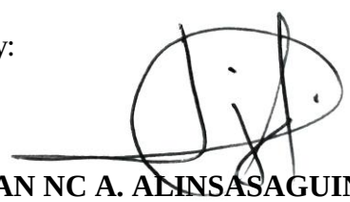
X. HARDWARES

A. HINGES, LOCKSETS AND ACCESSORIES
Unless otherwise specified, all fixtures and fitting for doors and windows shall be equal to the best grade of work produce by “Corbines”, “Yales”, “Schalage”, and “Stanley”, Russwin, kwikset. All hinged doors shall be placed with 3-1/2” x 3-1/2” L.P. Butt Hinges or Olive Knuckle hinges.

B. WROUGHT IRON AND STEEL WORK
Steel grilles and railing works shall conform to the detailed drawings as shown on the plans.

C. HARDWARE
The contractor shall provide and fit in place hardware not herein specified but necessary to leave the work complete. All such hardware shall there any, shall conform in every respect to the balance of the hardware herein specified.

Prepared by:



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