UNIVERSITY OF THE PHILIPPINES
PHILIPPINE GENERAL HOSPITAL
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SCOPE OF WORK and TECHNICAL SPECIFICATIONS

Project Title: PROPOSED PSYCHITARIC WARD RESTROOMS RENOVATION

Location: WARD 7, PGH COMPOUND, TAFT AVENUE, MANILA

Date: September 10, 2019

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DIVISION 1 GENERAL REQUIREMENTS

1.01 GENERAL SCOPE OF WORK

The work contemplated under this Contract shall consist of the furnishing of all materials, labor, tools and equipment, and the satisfactory performance of all work necessary to complete the construction of the **PROPOSED PSYCHITARIC WARD RESTROOMS RENOVATION** ready for use, the strict conformity with the Plans, the Specifications and other related Contract Documents. The principal items of work are enumerated below:

I.	**GENERAL REQUIREMENTS**
	(Mobilization and demobilization, staging of temporary facilities, utilities, protective covers/ fencing, billboard/signage, bonds, insurances, fees etc.)
II.	**DEMOLITION WORKS**
1	Removal of floor tiles
2	Chipping of floor slab (at entrance to ward restrooms)
3	Removal of wall tiles
4	Stripping of paint on walls, exposed beams, and exposed slab soffits
5	Dismantling of existing restroom entrance doors
6	Dismantling of existing aluminum doors
7	Dismantling of existing doorway frames (for refurbishment)
8	Adjustment/enlargement of door openings (chipping of CHB walls)
9	Demolition of CHB partition
10	Dismantling of fixed window pane (for replacement with awning)
11	Dismantling of existing restroom fixtures
12	Dismantling of lighting fixtures
13	Removal of ceiling boards
14	Dismantling of granite counter tops
III.	**ARCHITECTURAL WORKS**
	FLOORS
1	Dampproofing of restroom floors
2	Water proofing of mezzanine restroom floors
3	Construction of concrete slope from ward hallway to ward restroom entrance (20mm elevation change)
a	Supply and installation of vinyl roll to match existing, with coved corners and edge beading, sealed
	WALLS / PARTITIONS
4	Construction of new CHB partitions
5	Construction of fiber cement drywall on metal furrings
a	Waterproofing, both sides
6	Supply and installation of solid core phenolic board partitions with stainless steel brackets

	CEILINGS
7	Construction of (6mm thk) fiber cement board ceiling on metal furrings
8	Construction of (6mm thk) fiber cement board ceiling on sturdy wooden framing
	DOORS
9	Refurbishment of existing flush doors - installation of wood laminate, attachment of accessories, and re-installation
a	D1 - 670W x 2100H mm
b	D2 - 690W x 2100H mm
c	D3 - 750W x 1950H mm
d	Stainless steel push plate and bar handle (at pull side)
e	Privacy bolt lock with indicator, stainless steel
f	Automatic door closer
10	Supply and installation of new flush door with wood laminate finish, complete with fittings and accessories
a	D4 - 750W x 2100H mm
b	D5 - 920W x 2100H mm
c	Stainless steel push plate and bar handle (at pull side)
d	Privacy bolt lock with indicator, stainless steel
e	Automatic door closer
f	For D-5 only: lockset, wall-mounted at entrance (to keep door open)
11	Supply and installation of solid core phenolic doors, complete with fittings and accessories
a	D6 - 900W x 1790H mm
b	D7 - 720W x 1790H mm
c	D8 - 720W x 1700H mm
d	Stainless steel cylinder knobs
e	Privacy bolt lock with indicator, stainless steel
	WINDOWS
13	W1 - Supply and installation of tempered glass awning window panel (replacement for existing fixed panel), 520W x 440H mm
14	Cleaning and repainting of all existing windows and window screens, including rag rack at Restroom 2-101, with proper rust removal, treatment and prevention
	FINISHES
15	Supply and installation of 300x600mm non-skid floor tiles (samples for approval by end-users and architect consultant prior to purchase)
a	TF-1
b	TF-2 - For male restroom
c	TF-3 - For female restroom

16	Supply and installation of 300x600mm wall tiles (samples for approval by end-users and architect consultant prior to purchase)
a	TW-1
b	TW-2 - Male restroom base tile
c	TW-3
d	TW-4 - Female restroom base tile
e	TW-5
17	Re-painting of restroom walls above tiles and exposed beams, with plaster and three (3) coats semi-gloss latex paint (colors for approval by end-users and architect consultant)
a	PT-1 - For offices and Call Room/Odor-less, anti-bacterial latex paint, (color for approval by end-users and architect consultant)
b	PT-2 - For Male Restroom Odor-less, anti-bacterial latex paint, (color for approval by end-users and architect consultant)
c	PT-3 - For Female Restroom Odor-less, anti-bacterial latex paint
d	PT-4 - For wooden transom over ward restroom doorways: Odor-less, anti-bacterial latex paint
e	PT-5 For ficem ceilings: Odor-less, anti-bacterial latex paint
	SPECIALTIES
18	Construction of 120mm thick RC counter with acrylic solid surface countertop at Male Restroom
19	Construction of 120mm thick RC counter with acrylic solid surface countertop at Female Restroom
20	Supply and installation of stainless steel bag hooks at office restrooms
21	Supply and installation of stainless steel vertical grab bar, 500mm length
22	Supply and installation of bevel-edged mirrors on MR plywood backing
a	At office restrooms, 450W x 900H mm
b	Supply and installation of bevel-edged mirror on MR plywood backing, 800W x 1500H mm
c	Supply and installation of bevel-edged mirror on MR plywood backing, 1650W x 800H mm
d	Supply and installation of bevel-edged mirror on MR plywood backing, 1750W x 800H mm
23	Supply and installation of security film for all mirrors
24	Supply and installation of restroom signage (Male / Female)

IV.	PLUMBING WORKS
1	Supply and installation of new water supply lines and accessories, including tapping to existing lines
a	32 mm dia. PPR Pipe x 3m
b	25 mm dia. PPR Pipe x 3m
c	20 mm dia. PPR Pipe x 3m
d	25 mm Gate Valve
e	25 mm Check Valve
f	Fittings and accessories
g	Other Consumables
2	Supply and installation of new sanitary lines and accessories, including tapping to existing lines
a	100 mm dia. uPVC SOIL PIPE x 3m
b	50 mm dia. uPVC WASTE PIPE x 3m
c	50 mm dia. uPVC VENT PIPE x 3m
d	Floor drain (Stainless Steel 100mmx100mm) with strainer
e	Fittings and accessories
f	Other Consumables
	Fixtures - Lavatories, Faucets, Showers and Hand Sprays
3	Pedestal lavatory
4	Rectangular under counter lavatory w/ EV pop-up, p-trap and bracket (540L x 365W x 200H mm)
5	Stainless steel single-lever lavatory faucet
6	Lavatory faucet with self-powered controller, sensor at tip of spout (flow rate: 2L/min)
7	Wall-mounted mop faucet
8	Shower head, mixer and faucet
9	Hand bidet/spray
	Fixtures - Water Closets and Urinals
11	Elongated, close coupled water closet with soft-closing seat and cover w/ metal hinges and slip-in conector; minimum water pressure: 0.05 Mpa-0.75Mpa; Rough-in 305mm
12	Wall-hung urinal with back inlet, complete with fittings and accessories (365L x 444H x 200D mm)
13	Concealed urinal sensor (flush volume: 2.5-5L), battery operated (through back inlet) complete with fittings and accessories
14	Water heater, instantaneous single-point
V.	**ELECTRICAL & AUXILIARY WORKS (as per OETS plans and estimates)**

1	5 Watts, 220 volts ceiling mounted LED light in square white frame finnish
2	12 Watts, 220 volts, ceiling mounted LED light in square white frame finish
3	12 Watts, 220 volts wall mounted LED light fixture metal base with secure acrylic diffuser
4	One way lighting switch per OETS approved sample with plate cover
5	Two-One way lighting switch per OETS approved sample with plate cover
6	Three-One way lighting switch per OETS approved sample with plate cover
7	Utility box, PVC
8	Junction box with cover, PVC
9	No. 35 mm square THHN insulated stranded wires
10	15 mm square diameter PVC conduit pipe including fittings
11	Consumables (electrical tapes, screws, clamps, etc.)
12	Labor cost
VI.	**CONSTRUCTION SAFETY AND HEALTH PROGRAM**

1.02 VERIFICATION OF EXISTING CONDITIONS

All Contractors submitting proposal for this project shall **first examine the site, verify and investigate the existing conditions** affecting the Work and submit proposed solutions of anticipated problems to the Architect for approval at least one week ahead of the construction schedule.

No claim for extra compensation by the Contractor shall be entertained by the Owner for negligence or inadvertence on the Contractor's part in obtaining all necessary and pertinent data from the site or from the Architect to supplement those on the Drawings.

1.03 INTENT OF THE CONTRACT DOCUMENTS

The Contract Documents are complementary and what is called for by one shall be as binding as if called for by all. The intent of the Plans and Specifications is to prescribe a complete work which the Contractor undertakes to do in full compliance with the Contract Documents. The Contractor shall perform all items of work covered and stipulated in the Proposal, Specifications and on the Plan and do such special, additional, extra and incidental work as may be considered necessary without additional cost. He shall furnish all equipment, labor, machinery, materials, tools, supplies, transportation and incidental expenses necessary to prosecute the work to completion, ready for use by the End-User.

It is not intended that the drawings shall show every detail. All such items, whether mentioned or not in the Specifications, or shown or not in the Plan, shall be furnished and installed if necessary, to complete the system, without extra cost to the End-User, in accordance with the best practice of the trade and especially **AS PER MANUFACTURER'S INSTRUCTIONS AND SPECIFICATIONS FOR INSTALLATION.**

Materials deemed necessary to complete the works but not specifically mentioned in the Plans, Specifications or other Contract Documents shall be supplied and installed by the Contractor without extra cost to the Owner. Such materials shall be of the highest quality available and installed or applied in a workmanlike manner at prescribed or appropriate locations.

1.04 REQUIREMENTS OF REGULATORY AGENCIES

A. Codes, Inspections, Permits and Fees

Install the work under this contract according to the requirements of the latest Philippine Electrical Code, Plumbing Code, National Structural Code of the Philippines and the National Building Code. Nothing contained in these specifications or shown in the drawings shall be construed as to conflict with the national and local ordinances or laws governing the Installation of the Work. All such laws and ordinances are hereby made part of these Specifications. The Contractor is required to meet the requirements thereof.

1.5 DEMOLISHED/ REMOVED MATERIALS

All demolished/removed materials that are still usable shall be properly stocked, inventoried and turned over in writing to the End-User/Property Office.

1.6 PROTECTION OF EXISTING CONDITIONS

Due care shall be taken during demolition and/or construction of new structure to ensure minimal damage to existing parts of the building. Any damage done by the Contractor to existing structure, in part or whole thereof, shall be repaired and restored at the expense of the Contractor.

1.7 SAFETY MEASURES

It is the Contractor's responsibility to take extra precautions in the process of implementing construction projects. As a matter of policy, the Contractor is required to install warning signs and barricades for the safety of the general public. All construction workers shall wear the necessary safety devices (e.g. safety helmets, safety shoes, etc.) to ensure safety during construction. Concerned Contractor will be held personally liable for accidents that may occur during the execution of the project. Health program shall be provided to all workers.

1.8 PROJECT COORDINATION AND SUPERVISION

The Contractor is responsible in coordinating the various parts and trades of the work including sub-contract work. Contractor must employ competent and efficient Architects, Engineers or Superintendents to oversee construction work.

1.9 I.D. REQUIREMENT FOR ALL CONSTRUCTION WORKERS

Any COMPANY involved in any construction project inside the U.P. PGH premises is required to comply with the following requirements:

a. Coordinate with the Office of Engineering and Technical Services (OETS) regarding any and all technical and permitting requirements.

b. Submission of a complete list of names of all workers to be employed for the duration of the construction project.

c. All listed company workers and employees that will work inside the University shall secure an NBI clearance. The Construction company shall provide the University a copy of the said clearance. Sub-contractors and its workers shall also submit same requirement prior to the start of sub-contracted work.

d. All workers are required to wear the company uniform. Said uniform shall bear the company

name and logo.

e. The company identification cards should be worn at all times when inside the campus premises.

f. Should any worker be found without their identification cards, the Contractor shall be warned to comply with the requirements.

g. It is emphasized that no minors/child workers who are under the age of 15 should be hired to do construction work.

Prevention of any criminal violations committed within the construction premises shall be the main responsibility of the Contractor. For obvious security reasons, it shall be the prime responsibility of the Contractor to screen beforehand all workers to be assigned to their respective projects.

1.10 SUBMITTALS

Within seven (7) days after award of contract, submit for Architect's approval a listing of manufacturer's names of all materials he proposes to use. The Contractor shall furnish for approval, with such promptness as to cause no delay in work, samples as specified or required. Work shall be in accordance with approved samples.

1.11 TRADE NAMES MATERIALS AND SUBSTITUTES

Whenever an item or class of material is specified exclusively by trade name, by manufacturer's name, or by catalogue reference, only such items shall be used. No substitutions shall be made for any material, article or process required under the Contract unless approved in writing by the Architect. Materials and articles installed or used without such approval shall be at the risk of subsequent rejections.

1.12 QUALITY OF MATERIALS

Unless otherwise specified, all materials shall be new and of the best grade. Apparent silence in the Specifications, as to any detail or description concerning any point shall be regarded as meaning that only the best general practice is to prevail and that only materials and workmanship of first class quality are to be used.

1.13 DEFECTIVE MATERIALS/ WORKMANSHIP

All materials not conforming to the requirements of these Specifications shall be considered as defective. Defective materials shall be removed and replaced by the Contractor. Upon failure of the Contractor to comply with the order of the Architect, the Architect shall have the authority to remove and replace defective materials and to deduct the cost of removal and replacement from any money due or to become due the Contractor.

Failure or neglect on the part of the Architect or any of his agents to condemn or reject bad or inferior materials shall not be construed to imply an acceptance of the materials and workmanship if said bad or inferior materials and/or workmanship are discovered at any time prior to the final acceptance of the work by the End-User and the release of payment to the Contractor.

1.14 GUARANTEE

The Contractor shall guarantee all works installed under this contract to be free from defects and shall replace and repair to the satisfaction of the Architect or Engineer any part or portion of the work which may fail within a period of one (1) year after the final acceptance of the system, provided such failure is due to defects in the materials or workmanship.

1.15 REQUIREMENTS FOR BILLING

The following documents must be submitted to the Project Inspector before processing of payments to the Contractor:

A. Progress Billing
1. Request for payment by the Contractor
2. Pictures/photographs of original site condition (for first billing only)
3. Pictures/photographs of work accomplished
4. Payment of utilities
5. Contractor's Affidavit (if accomplishment is more than 60%)

B. Final Billing
1. Request for full payment by the Contractor
2. Pictures/photographs of work accomplished
3. As-built drawings (if necessary)
4. Logbook
5. Payment of utilities (water & power consumption)
6. Contractor's Affidavit
7. Certification from GSAD and BCO
8. Report of Scrap Construction Materials
9. Acceptance from End-User
10. Surety Bond from accepted/accredited banks/agencies

PART 2 - WORKMANSHIP

Perform all labor according to first-class standards as done by specialist highly skilled in their respective trades, in accordance with the national and local ordinances or laws, in accordance with the intent of the architectural and engineering plans and to the satisfaction of the Architect and Engineers.

2.1 CLEANING

The Contractor shall at all times keep the premises free from the accumulation of waste materials or rubbish caused by his employees or work and, upon completion of the work, shall remove all rubbish from and about the building and all his tools, scaffoldings and surplus materials and shall leave his work "broom cleaned" or its equivalent.

2.2 START-UP OF PROJECT BEFORE THE PERFECTION OF CONTRACT

The Contractor may start the project at his own risk provided he notifies the Architect Consultant in writing and approved by the architect and End-User.

2.3 CONTRACT CLOSE-OUT

The Contractor is required to submit to the Architect and the Owner the following prior to final acceptance of the work.

A. As-built drawings – in reproducible originals for all phases of the work.
B. Guarantees and Bonds – for all materials and appliances.

~ END OF SECTION ~

~ END OF DIVISION ~

DIVISION 2 EXISTING CONDITIONS

SECTION 2.41.19.16 SELECTIVE INTERIOR DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Selective Building Demolition:
   a. Selective demolition of interior partitions, systems, and building components designated to be removed.
   b. Protection of portions of building adjacent to or affected by selective demolition.
   c. Removal of abandoned utilities and wiring systems.
   d. Notification to End-user of schedule of shut-off of utilities which serve occupied spaces.
   e. Pollution control during selective demolition, including noise control.
   f. Removal and legal disposal of materials.
   g. Salvage of designated items.
   h. Interruption, capping or removal of utilities as applicable.

1.2 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
B. Schedule: Submit for approval selective demolition schedule, including schedule and methods for capping utilities to be abandoned and maintaining existing utility service.

1.3 QUALITY ASSURANCE

A. Codes and Regulations: Comply with governing codes and regulations. Use experienced workers.

1.4 PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to starting work of this section.

1.5 SEQUENCING

A. Immediate areas of work will not be occupied during selective demolition. The public, including children, may occupy adjacent areas.
B. No responsibility for buildings and structures to be demolished will be assumed by the End-user.
C. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

PART 2 PRODUCTS - Not applicable to this Section.

PART 3 EXECUTION

3.1 SELECTIVE DEMOLITION

A. 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 End-user, shall be removed from structure. Storage or sale of items at project site is prohibited.
B. Utilities: Locate, identify, disconnect, and seal or cap off utilities in buildings to be demolished.
C. Shoring and Bracing: Provide and maintain interior and exterior shoring and bracing.
D. Occupied Spaces: Do not close or obstruct streets, walks, drives or other occupied or used spaces or facilities without the written permission of the End-user and the authorities having

jurisdiction. Do not interrupt utilities serving occupied or used facilities without the written permission of the End-user and authorities having jurisdiction. If necessary, provide temporary utilities.

E. Operations: Cease operations if public safety or remaining structures are endangered. Perform temporary corrective measures until operations can be continued properly.

F. Security: Provide adequate protection against accidental trespassing. Secure project after work hours.

G. Restoration: Restore finishes of patched areas.

3.2 SCHEDULE

A. Items for Protection During Demolition and Construction:
   a. Terrazzo floor finish (Ground and second floor)
   b. Glass panels
   c. Bathroom tiles
   d. All other areas and items not included in the scope of work

B. Items to be Salvaged for Reinstallation:
   a. Light fixtures
   b. Air-conditioning Units

C. Utilities Requiring Interruption, Capping, or Removal:
   a. Electric
   b. Water
   c. Sewerage

~ END OF SECTION ~

~ END OF DIVISION ~

DIVISION 3 CONCRETE

SECTION 03.11.16 CAST-IN-PLACE CONCRETE

1.0 **Scope.** This section includes cast-in-place concrete, complete, for restoration and repairs of affected areas.

2.0 **Delivery and storage.**

2.1 **Cement.** Cement shall be stored immediately upon receipt at the site of the work. Cement in bags shall be stored in a suitable weatherproof structure, which shall be as airtight as practicable. Floors shall be elevated above the ground, a distance sufficient to prevent the absorption of moisture. Bags shall be stacked close together to reduce circulation of air but shall not be stacked against outside walls. The manner of storage shall permit easy access for inspection and identification of each shipment. Bulk cement shall be transferred to elevated airtight and weatherproof bins. At the time of use, all cement shall be free flowing, and free of lumps. Cement that has been in storage longer than 6 months will be tested by standard mortar tests or other test as deemed necessary by the Construction Architect/Engineer to determine its suitability for use.

2.2 **Aggregates.** Aggregates shall be stored on areas covered with tightly laid wood planks, sheet metal or other hard and clean surface, and in a manner that will preclude the inclusion of foreign materials. Aggregates of different sizes shall be stored in separate piles.

2.3 **Reinforcement.** Reinforcement shall be stored in a manner that will avoid excessive rusting or coating with grease, oil, dirt, and other objectionable materials. Storage shall be in separate piles or racks to avoid confusion and losses of identification after bundles are broken.

3.0 **Materials.**

3.1 **Cement.** Portland cement shall conform to PNS 07, type 1. Cement for exposed concrete surfaces shall be from the same mill.

3.2 **Reinforcement.** All reinforcing steel bars, except No. 2, shall be deformed conforming to PNS grade 230, 275, and 415 (ASTM A615, grade 40, and 60 respectively).

3.3 **Fine aggregates** shall be clean, hard natural sand or manufactured sand, or combinations of both, and conforming to PNS 18, type 1.

3.4 **Coarse aggregate** shall be hard, durable, uncoated gravel, crushed gravel, or a combination thereof conforming to PNS 18, type 2.

3.5 **Water.** Mixing water for concrete shall be fresh, clean, and potable.

3.6 **Form coating** shall be non-staining type mineral oil.

4.0 **Forms**

4.1 **General requirements.** Forms shall be provided for all concrete not indicated or specified otherwise. Forms shall be set true to line and grade and maintained so as to ensure completed work within the allowable tolerance specified and shall be mortar-tight. The contractor shall be

responsible for the adequacy of forms and form support. Wire ties shall not be used where the concrete surface will be exposed to weathering and where discoloration will be exposed. All formwork shall be provided with adequate clean-out openings to permit inspection and easy cleaning after all reinforcement has been placed. Where forms for continuous surfaces are placed in successive units, these shall be fitted over the completed surface to obtain accurate alignment of the surface and to prevent leakage of mortar. Panel forms shall be constructed to provide tight joints between panels. All forms shall be constructed so that they can be removed without damaging the concrete.

4.2 **Materials for forms.** Forms shall be of wood, plywood, steel, or other suitable materials. Wood forms for surfaces exposed to view in the finished structure and requiring a standard finish, shall be plywood. For unexposed surface, undressed square-edged lumber may be used. Surfaces of steel forms shall be free from irregularities, dents, and sags.

4.3 **Coating.** Before placing the concrete, the contact surfaces of forms shall be coated with non-staining mineral oil or suitable non-staining form coating compound, or shall be given two coats of nitrocellulose lacquer, except as specified otherwise. Mineral oil shall be used on forms for surfaces, which are to be painted. For surfaces not exposed to view in the finished structure and when temperature is above 4 degrees C, sheeting may be wetted thoroughly with clean water. All excess coating shall be removed by wiping with cloths. Re-used forms shall have the contact surfaces cleaned thoroughly. Those, which have been coated, shall be given an additional application of the coating.

4.4 **Tolerance and variations.** The Contractor shall set and maintain concrete forms to ensure that after removal of the forms and prior to patching and finishing, no portion of the concrete work will exceed any of the tolerances specified. Variation in floor levels shall be measured before removal of supporting shore. The Contractor shall be responsible for variations due to deflection. The specified variation for one element of the structure will not be applicable when it will permit another element of the structure to exceed its allowable variations. Except as otherwise specified hereinafter, tolerances shall conform to ACI-347.

5.0 Classes of concrete and usage:

5.1 **Strength requirements.** Concrete of the various classes, if not indicated in the drawings and as specified under other sections, shall be proportioned and mixed for the following strengths:

Class	Specified compressive strength in 28 days		
	psi	mpa	
AA	4,000		27.57
A	3,000	20.68	
B	2,500		17.23
C		2,000	13.78

Concrete made with high early-strength cement shall have a 7-day strength equal to the specified 28-day strength for concrete of the class specified made with type 1 or II Portland cement.

5.2 **Usage**. Concrete of the various classes shall be used as follows:

5.2.1 **Class A concrete.** For pre-cast concrete items, slabs, beams, and walls above grade, columns, stairs, lintels, and for all reinforced work not otherwise indicated or specified.

5.2.3 **Class B concrete.** For slabs and grade, grade and tie beams, footings, and for such concrete work as indicated or specified.

5.2.4 **Class C concrete.** For all concrete not reinforced except as otherwise indicated or specified.

6.0 **Proportioning, measurement and mixing.**

6.1 **Concrete designs mix.** Concrete mixes, except otherwise indicated, shall be designed by the contractor. The proportions shall be changed whenever necessary to maintain the workability, strength, and standard of quality for the concrete covered by these specifications, and to meet the varying conditions encountered during construction. Test for slump and unit weight shall be performed under the supervision of the Construction Architect/Engineer.

6.2 **Proportioning of materials** shall be accomplished by weighing, except as otherwise provided herein. In urgent situation, volumetric proportioning may be used temporarily, if permitted by the Construction Architect/Engineer who will stipulate the length of the period during which volumetric proportioning may be used. The contractor shall furnish the necessary equipment and shall establish accurate procedures, subject to the approval of the Construction Architect/Engineer for determining the quantities of free moisture in the aggregates, the true volume of the fine aggregate if volumetric proportioning is used, and the air content of the freshly mixed concrete if air-entrained concrete is used. Moisture, volumetric and air determinations shall be made at intervals as directed by the Construction Architect/ Engineer as specified hereinafter under field testing requirements. Allowable tolerances for measuring cement and water shall be one (1%) percent; for aggregates, two (2%) percent; and three (3%) percent for mixtures.

6.2.1 **Weight measurement.** The fine aggregate and each size of coarse aggregate shall be weighed separately. Cement in standard packages (bags) need not be weighed, but bulk cement or fractional packages shall be weighed on a scale separate from that used for weighing other materials.

6.2.2 **Volumetric measurement.** The weight proportions shall be transposed into equivalent volumetric proportions by weighing representative samples of the aggregates in the conditions in which they will be measured and in accordance with ASTM C29. In determining the true volume of the fine aggregate, allowance shall be made for the bulking effect from the moisture contained therein. Suitable allowances shall also be made for variations in the moisture conditions of the aggregates.

6.3 **Mixing.** All concrete shall be machine-mixed. In emergencies, the mixing may be done by hand if so authorized by the Construction Architect/ Engineer. Mixing shall begin within 30 minutes after the cement has been added to the aggregates. The time of mixing after all cement and aggregates are in the mixer drum shall be not less than one minute for mixers having a capacity of one cubic yard or less; for mixers of larger capacities, the minimum time shall be increased 15 second for each additional cubic yard or fraction thereof of additional capacity for continuous mixers conforming to ASTM C685 as prescribed by the equipment manufacturer. A reduction in the aforementioned mixing time shall be permitted in accordance with ASTM C94 if mixer performance tests made at the contractor's option and at his expense, indicate adequate mixing with the reduced time. All mixing water shall be introduced in the drum before one-fourth of the mixing time has elapsed. The entire content of the mixer drum shall be discharged before recharging. The time elapsing between the introduction of the mixing water to the cement and aggregates or the cement to the aggregates and placing of the concrete in final position in the forms shall not exceed 60 minutes, if the air temperature is less than 85 degrees F. and 45 minutes,

if the air temperature is equal or greater than 85 degrees F. The re-tampering of concrete, i.e., re-mixing with or without additional cement, aggregate or water, will not be permitted.

7.0 **Placing reinforcement and miscellaneous materials.**

7.1 **General requirements.** All reinforcement bars, stirrups, hanger bars, wire fabric, spiral, and other reinforcing materials shall be provided as indicated on the drawing or required by this specification, together with all necessary wire ties, chairs, spacers, supports and other devices necessary to install and secure the reinforcement properly. All reinforcement, when placed, shall be free from rust, scales, oil, grease, clay, and other coatings, and foreign substances that would reduce or destroy the bond. Rusting of reinforcement shall not be a basis of rejection, provided that the rusting has not reduced the effective cross sectional area of the reinforcement to the extent that the strength is reduced beyond specified value. Heavy, thick rust or loose, flaky rust shall be removed by rubbing with burlap or other approved method, prior to placing. Reinforcement, which has bends not shown on the project drawings, approved shop drawings, or is reduced in section by rusting such that its weight is not within permissible ASTM tolerances, shall not be used. All reinforcement shall be supported and wired together to prevent displacement by construction loads or by the placing of concrete. Unless directed otherwise by the Construction Architect/Engineer, reinforcement shall not be bent after being partially embedded in hardened concrete. Detailing of reinforcing shall conform to ACI315. Where cover over reinforcing steel is not specified, it shall be in accordance with ACI 318.

7.2 **Placing.** Reinforcement shall be placed accurately and secured. It shall be supported by suitable chairs or spacers or by metal hangers. On the ground, and where otherwise subject to corrosion, concrete or other suitable non-corrodible material shall be used for supporting reinforcement. Where the concrete surface will be exposed to the weather in the finished structure or where rust would impair the appearance or finish of the structure, all reinforcement supports, within specified concrete cover, shall be galvanized or made of a suitable non-corrodible material.

7.3 **Splicing of reinforcement.** Splicing of reinforcement shall be in accordance with ACI 318, except as indicated otherwise or modified herein. Where splices in addition to those indicated on the drawings are necessary, they shall be approved by the Construction Architect/Engineer prior to their use. Splices shall not be used in grade beams and slabs at points of maximum stress. Except as indicated or specified otherwise herein, in lieu of lapping, splicing of reinforcement may be permitted provided the splicing material, equal or greater in cross sectional area to the spliced steel, shall possess a minimum of 125 percent of the yield strength or 90 percent of the ultimate strength of the reinforcing steel, whichever is the greater. Splicing shall preferably use overlapping for bar sizes no. 11 and above.

7.4 **Moving reinforcing steel.** All placement or movement of reinforcing steel after placement to positions other than that indicated or specified shall be subject to the approval of the Construction Architect/Engineer.

8.0 **Conveying and placing concrete.**

8.1 **Conveying.** Concrete shall be conveyed from the mixer to the forms as rapidly as practicable by proper methods, which will not cause segregation or loss of ingredients. It shall be deposited as nearly as practicable in its final positions in the forms. At any point in the conveying, the free vertical drop of the concrete shall not exceed 91 cm. Chuting will be permitted only where the concrete is deposited into a hopper before it is placed in the forms. Conveying equipment shall be cleaned thoroughly before each run. All concrete shall be deposited as soon as practicable after the forms and reinforcements have been inspected and approved by the Construction Architect/Engineer. Concrete

which has been segregated in conveying shall be removed and disposed of as directed by the Construction Architect/Engineer.

8.2 **Placing concrete.** No concrete shall be placed after there is evidence of initial set. All concrete placing equipment and methods shall be subject to approval of the Construction Architect/Engineer. Concrete placement will not be permitted when weather conditions prevent proper placement and consolidation. Before placing concrete on porous sub-grades, they shall be dampened as directed by the Construction Architect/ Engineer. Forms shall be clean and free from dirt, construction debris and water. Concrete shall be deposited in horizontal layers approximately 31 to 51 cm deep in a manner to preclude the formation of cold joints between successive layers. The method of depositing concrete shall be such as to avoid displacing the reinforcement and segregating the aggregate. Concrete shall be worked about the reinforcement and embedded fixtures and avoid overworking which may result in segregation. On the bottom of slabs, the girders where the congestion of steel near the forms makes placing difficult, a layer of mortar equal to the approved slump shall be deposited to cover the surface to a depth of approximately 25 mm before placing the concrete. Water which accumulates on the surface of the concrete during placing shall be removed by absorption with porous materials in a manner that prevents removal of cement. Pumping of concrete through aluminum pipe shall not be permitted.

8.3 **Embedded items.** All sleeves, inserts, anchors, and embedded items required for adjoining work or for its support shall be placed prior to concreting. All ferrous metal sleeves, inserts, anchors and other embedded ferrous items exposed to the weather or where rust would impair the appearance of finish or the structure shall be galvanized.

8.4 **Placing embedded items.** Embedded items shall be positioned accurately and supported against displacement. Voids in sleeves, inserts and anchors in slab shall be filled temporarily with readily removable material to prevent the entry of concrete into the voids.

9.0 **Surface finish (except floor finish).**

9.1 **General requirement.** All formed surfaces shall be repaired by patching minor honeycombed or otherwise defective areas and tie holes with cement mortar. Cement mortar for patching shall be the same composition as that used in the concrete. Patching shall be done as soon as the forms are removed. Area of surfaces which are to be cured with a curing compound shall be covered during its application. All areas to be patched shall be cleaned thoroughly. Minor honeycomb or otherwise defective areas shall be cut out to solid concrete to a depth of not less than 25 mm. The edges of the cut shall be perpendicular to the surface of the concrete. The area to be patched and at least 150 mm adjacent hereto shall be saturated with water before placing the mortar. The mortar shall be mixed approximately one hour before placing and shall be re-mixed occasionally during this period with a trowel without the addition of water. A grout of cement and water mixed to a consistency of paint shall then be brushed on to the surfaces to which the mortar is to be bonded. The mortar shall be compacted into place and screeded slightly higher than the surrounding surface. Patches on exposed surface shall be finished to match the adjoining surfaces, after they have set for an hour or more. Patches shall be cured as specified for the concrete. Holes extending through the concrete shall be filled by means of a plunger type gun or other suitable device from the unexposed patch. The excess mortar shall be wiped off the exposed face with a cloth. Finished surfaces shall be protected from stains and abrasions. Standard finish against steel, plywood and wood forms shall be equal in workmanship, texture and general appearance to that of approved sample panels. Concrete with excessive honeycombing, which exposes the reinforcing steel or other defects which affect the structural strength of the member will be rejected and the defects shall be corrected as directed by the Construction Architect/Engineer, and at the expense of the Contractor.

9.2 **Rubbed-finish.** Rubbed-finish shall be provided for all exposed concrete beams and ceiling. The surface of the concrete shall not vary more than 16 mm when measured from a 1-1/2 meter template. Exposed surfaces shall be rubbed with carborundum or other abrasives to a smooth even finish or uniform appearance. Upon completion of the rubbing, the surface shall be washed thoroughly with clean water.

10.0 **Curing.**

10.1 **General requirements.** Curing for all concrete shall be accomplished by preventing loss of moisture, rapid temperature change, mechanical injury, or injury from rain or flowing water for a period of 7 days when normal Portland cement has been used. Curing shall be started as soon after placing and finishing, and after free water has disappeared from the surface of the concrete. Curing may be accomplished by any of the following methods or combination thereof, as approved.

10.2 **Moist curing.** Unformed surfaces shall be covered with burlap or other approved fabric-type mats and shall be kept continually wet. Forms shall be kept continually wet. If forms are removed before the end of the curing period, curing shall be continued on unformed surfaces that will be exposed in the finished work.

10.3 **Curing periods.** When 7-day compression test cylinders, representative of parts of a structure already placed, indicate that the 28-day strengths may be less than 90% of the design strengths, those parts of the structure shall be given additional curing, as directed by the Construction Architect/Engineer. Curing shall be as follows:

Time (minimum)	Concrete Element
7 days	All concrete not specified otherwise.
10 days	Pavement not undercover.

10.4 **Removal of forms and protection.** Forms shall be removed in a manner which will prevent damage to the concrete. Forms shall not be removed without approval of the Construction Architect/Engineer.

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~ END OF DIVISION ~

DIVISION 4 MASONRY

SECTION 04.22.00 CONCRETE MASONRY UNIT WORK

1.0 **Scope.** This section includes concrete masonry unit work, complete.

2.0 **Materials.** Cement and other cementitious materials shall be delivered to the site and stored in unbroken bags, barrels, or other approved containers, plainly marked and labeled with the manufacturer's name and brand. Mortar materials shall be stored in dry, weather tight sheds or enclosures, and shall be stored and handled in a manner which will prevent the inclusion of foreign material and damage by water or dampness. Concrete masonry units shall be handled with care to avoid chipping and breakage, and shall be stored as directed. Materials stored in newly constructed floors shall be stacked in such manner that the uniformly distributed loading does not exceed 50 psi. Concrete masonry materials shall be protected from contact with the earth and exposure to the weather, and shall be kept dry until used.

2.1 **Concrete masonry units** shall be 2 or 3-core steam-cured modular blocks. Exterior and interior masonry units shall be load bearing and non-load-bearing units with compressive strength of 800 psi and 400 psi respectively. However, load-bearing units may be provided in lieu of non-load-bearing units. Surfaces of units that are to be plastered shall be sufficiently rough to provide a suitable bond. Concrete masonry units shall be as manufactured by **"Jackbilt Concrete Blocks Co., Inc.**

2.2 **Portland cement** shall be type 1 conforming to PNS 07.

2.3 **Sand** shall conform to PNS 18 type 1.

2.4 **Water** for mixing shall be potable.

2.5 **Reinforcing steel bars** shall be corrugated structural grade.

3.0 **Erection.**

3.1 **Workmanship** Concrete masonry walls shall be carried up level and plumb all around. One section of the walls shall not be carried up in advance of the others unless specifically approved. Unfinished work shall be stepped back for joining with new work. Heights of masonry shall be checked with an instrument at each floor, and at sills and heads of opening to maintain the level of the walls. Door and window frames, louvered openings, anchors, pipes, ducts and conduits shall be built-in carefully and in a neat manner as the masonry work progresses. Spaces around metal doorframes shall be filled solidly with mortar. Concrete masonry units shall be handled with care to avoid chipping, backing, and spilling of faces and edges. Structural steel work, bolts, anchors, inserts, plugs, ties, lintels, and miscellaneous metal work specified elsewhere shall be placed in position as the work progresses. Unless indicated otherwise, partitions shall extend from the floor to the bottom of the floor or roof construction above. Non-load-bearing partitions and interior walls shall be securely anchored to the construction above in a manner that provides lateral stability while permitting unrestricted deflection of construction above, scaffolding well-braced and securely tied in position. Overloading of scaffolding will not be permitted.

4.0 **Mortar mixing.** Mortar materials shall be measured by volumetric proportioning in approved containers that will insure that the specified proportions of materials will be controlled and accurately maintained during the progress of the work. Measuring materials with shovels will not be permitted. Unless specified otherwise, mortar shall be mixed in such a manner that the materials will be distributed uniformly throughout the mass. A sufficient amount of water shall be added gradually and the mass further mixed not less that 3 minutes until a mortar of the plasticity necessary for the purposes intended is obtained. Mortar boxes, pans and/or mixer drums shall be kept clean and free of debris of dried mortar. The mortar shall be used before the initial setting of the cement has taken place; re-tempering of mortar in which cement has started to set will not be permitted. Mortar shall be mixed in the proportions of one part Portland cement and 3 parts sand.

5.0 **Grout** shall consist of a mixture of cementitious materials aggregate as specified hereinafter; water shall be added in sufficient quantity to produce a fluid mixture. Fine grout shall be provided in grout spaces less than 50 mm in any horizontal dimension or in which clearance between reinforcing and masonry is less than 20 mm. Coarse grout shall be provided in-group spaces 50 mm or greater in all horizontal dimensions and clearance between reinforcement and masonry is not less than 20 mm.

5.1 **Fine grout** shall be mixed in proportions of one part Portland cement and 3 parts sand.

5.2 **Coarse grout** shall be mixed in proportions of one part Portland cement, 3 parts sand and 3 parts pea gravel passing a 10 mm sieve.

6.0 **Mortar joints** shall be uniform in thickness, and the average thickness of any three consecutive joints shall be 10 mm to 12 mm. Changes in coursing or bonding after the work is started will not be permitted. Exposed joints shall be rolled slightly concave with a round or other approved jointer when the mortar is thumbprint hard. The jointer shall be slightly larger than the width of the joint so that complete contact is made along the edges of the units, compressing and sealing the surface of the joint. Joints in masonry that will not be exposed shall be struck-flush. Horizontal joints shall be struck-flush. Horizontal joints shall be rolled first. Joints shall be brushed to remove all loose and excess mortar. All horizontal joints shall be level; vertical joints shall be plumb and in alignment from top to bottom of wall, within a tolerance of plus or minus 12 mm.

7.0 **Concrete masonry unit work.** The first course of concrete masonry units shall be laid in a full bed of mortar for the full width of the unit; the succeeding courses shall be laid with broken joints. The bed-joints of concrete masonry unit shall be formed by applying the mortar to the entire top surfaces of the inner and outer face shell, and the head joints shall be formed by applying the mortar for a width of about 25 mm to the ends of the adjoining units laid previously. The mortar for joints shall be smooth, not furrowed, and shall be of such thickness that it will be forced out of the joints as the units are being placed in positions. Where anchors, bolts, and ties occur within the cells of the units, such cells shall be filled with mortar or grout as the work progresses. Concrete masonry units shall not be damped before or during laying.

8.0 **Reinforcing** shall be positioned accurately as indicated. As masonry work progresses, vertical reinforcing shall be rigidly secured in place at vertical intervals as

indicated. Reinforcing shall be embedded in grout as grouting proceeds. The minimum clear distance between masonry and vertical reinforcement shall be not less than 12 mm. Unless indicated or specified otherwise, splices shall be formed by lapping bars not less than 20 bar diameters and wire tying them together.

9.0 **Bonding and anchoring.** Masonry walls and partitions shall be accurately anchored or bonded at points where they intersect, and where they abut or adjoin the concrete frame of a building. All anchors shall be completely embedded in mortar.

10.0 Grout placement. Grouting shall be performed from interior side of walls, except as approved otherwise. Sills, ledges, offsets and other surfaces to be left exposed shall be protected from grout droppings; grout falling on such surfaces shall be removed immediately. Grout shall be stirred before placing to avoid segregation of the aggregate and shall be sufficiently fluid to flow into joints and around reinforcing without leaving voids. Grout shall be placed by pumping or pouring from buckets equipped with spouts, not exceeding 1.22 m; pours shall be kept at 38 mm below the top of masonry units in top course. Grout shall be puddled or agitated thoroughly to eliminate voids without displacing masonry from its original position. Masonry displaced by grouting operation shall be removed and laid in re-alignment with fresh mortar.

~ END OF SECTION ~

~ END OF DIVISION ~

DIVISION 6 WOOD AND PLASTIC

SECTION 06.20.00 FINISH CARPENTRY

1.0 **Scope.** This section includes carpentry work, complete.

2.0 **General.** Lumber and woodwork shall be covered and protected from the elements until used. Building shall be thoroughly dry before the finish is placed in them. As far as practicable, nailing shall be done in concealed places, and all nails in exposed work shall be set. Exterior and interior finish shall be dressed and smooth. Finishing woodwork shall be hand-smoothed and sanded at the site as necessary to produce the proper finish. When practicable, millwork shall be fabricated in the shop, doweled, mortised and tensioned together, backed up and glued, machine and hand-sanded to a smooth surface, and delivered to the site, ready to be secured in place. All lumber shall be surfaced four sides. All cutting, framing and fitting necessary for the accommodation of other work shall be provided. All nails, spikes, screws, bolts, clips, anchors, shapes, and any other rough hardware necessary for the completion of the work shall be provided. All lumber surfaces in contact with concrete and masonry shall receive one brush of bituminous paint.

3.0 **Moisture content.** Except where otherwise specified, lumber shall be sun-dried or kiln dried. At time of installation, the maximum moisture content, expressed as a percentage of the weight of the over-dry wood, shall be as follows:

3.1 **Rough carpentry and framing:**

Framing lumber 50 mm and less in thickness		19%
Framing lumber over 50 mm thick		25%
Boards	19%	

3.2 **Interior millwork,** siding and trim. 17%

3.3 **Exterior millwork,** finish and trim 17%

4.0 **Delivery and storage.** Lumber delivered to the site shall be carefully piled off the ground and stacked in such a manner as to ensure proper drainage, ventilation, and protection from the weather. It shall be stored in a well-ventilated building and shall not be exposed to extreme changes in temperature or humidity.

5.0 **Materials.**

5.1 **Expansion shields** shall be of the type, class and style best suited for the intended use or as indicated. Shield shall be accurately recessed and unless otherwise indicated, shall be not less than 64 mm into concrete or masonry.

5.2 **Wood screws** shall be steel, type and size best suited for the purpose. Nails may be of the annular ring or the screw type with mechanically deformed shanks.

5.3 **Lumber.**

5.3.1 **Lumber for wood jambs, and all lumber** in contact with concrete shall be