Project Manual and Technical Specification

for

Completion of the UP Baguio Balay Internasyonal Phase 4

University of the Philippines-Baguio,
Government Center Road, Baguio City

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01 00 00GENERAL REQUIREMENTS

01000 Equipment and Tools

ESTIMATING

Includes moving costs, rentals, small tool purchases, vehicle expenses, fuel, oil and maintenance cost.

01000 Safety Provision

ESTIMATING

Includes systems, equipment and manpower gears to ensure the health and safety in construction procedures.

01020 SUMMARY OF MATERIALS AND FINISHES

01000 GENERAL REQUIREMENTS

1.03 SPECIFICS

Materials specifically mentioned in this Summary shall be installed following efficient and sound engineering and construction practice, and especially as per manufacturer's application for installation specifications which shall govern all works alluded to in these Specifications.

1.04 ON-SITE ITEMS

Materials and finishes for onsite improvements and facilities as listed below are part of the scope of work and shall be supplied and installed by the Contractor without extra cost to the Owner.

A. Installation of engineered and drainage fills for building and landscaped areas where specified.

B. Construction of:

1. Concrete driveways, walks, ramps, steps, posts, and miscellaneous slabs;
2. Concrete splash slabs, steel or hard plastic gratings;
3. Below grade utility structures such as septic vaults, cisterns, handholes, and manholes;
4. Above-grade utility structures such as electrical poles, concrete pedestals, and the like; Exterior utility lines, raceway system, fixtures, breakers, switches, buzzers, controls including fittings and accessories as required by the specialty trades under plumbing, electrical and communication works. Pumps, tanks and other necessary equipment and facilities.

1.05 OFF-SITE ITEMS

Off Site improvements shall generally be under the responsibility of the Owner and not included in the Contract, with the exception of the following which shall be part of the Contractor's Work:

A. Concreting of entry slabs. This work shall neatly make connections to the existing roads or curbs, if any, and shall incorporate necessary utility ways under such as required. Access road drainage system and other existing utility lines must be kept in working condition.

B. Installation of concrete drainage pipes to neatly receive connections from the storm drainage system of the site to access road and/or to existing drainage system.

02200: EARTHWORK

A. FILL MATERIALS

1. General Fill for structures and under spread footings, pavers, or concrete slabs on grade shall conform to the general requirement for soil materials above and shall be classified as GW, GM, GP, SW, SM by the ASTM 2487 and conform to the following.

a) Liquid Limit – shall not exceed 25% when tested in accordance with ASTM 423.

b) Plasticity Index – shall not exceed 12 % when tested in accordance with ASTM 424.

c) Under Buildings, no more than 25% by weight shall be finer than No. 200 sieve when tested in accordance with ASTM D 1140.

Granular Fill shall conform to the general requirements for soil material above and shall be clean, crushed stone or gravel conforming to ASTM C 33, size 67 and with a sand equivalent of not less than 50% when tested in accordance with ASTM D 2419. Backfill material behind walls shall consist of free-draining granular fills, sized in particular to provide a filter media around subsoil drainage system.

Drainage Fill: Fill material shall clean, well graded, free draining sand conforming to ASTM C 33 for Fine Aggregate.

02700: SITE DRAINAGE

A. DRAINAGE PIPE:

1. Plain concrete drain pipes and fittings: 250 mm (10") and below in diameter: T & G conforming to ASTM C1459.

2.Reinforced concrete pipes fittings: 300 mm (12”) and bigger: Centrifugally cast or vibrated T & G conforming to ASTM C7659 T.

B. JOINING MATERIAL: One part cement to two parts sand.

C. BUILDING STORM DRAIN CONNECTION TO MAIN: Concrete wye branch and clean out, T & G or use junction boxes.

D. AREA DRAIN CATCH BASIN: Loadbearing 4.8 Mpa (700 PSI) concrete hollow blocks (CHB) or reinforced concrete with cover as shown on the drawings.

E.CATCH BASINS OF JUNCTION BOXES: Loadbearing 4.8 Mpa (700 PSI) concrete hollow blocks (CHB) or reinforced concrete as indicated in the drawings, with solid reinforced concrete cover.

04 00 00 MASONRY

04000 MASONRY

04100: MORTAR

A. PORTLAND CEMENT: Use only one brand of cement throughout. Portland cement shall conform to the Standard Specifications for Portland Cement (ASTM Designation C-150 latest revision) for type 1 Portland Cement.

SAND: ASTM C 35 – 67, clean, washed river sand, strong, free from organic and other deleterious materials. Sand from salt water or lahar is not allowed.

WATER: Fit for drinking, free from injurious amounts of oil, acids, alkali, organic materials and other deleterious substances.

CONCRETE MORTAR COMPRESSIVE STRENGTH: (f'c) = 13.8 Mpa (2000 psi).

ADHESIVE MORTAR: Use adhesive mortar for laying vitrified ceramic tiles, with dispersion compound as an additive to adhesive mortar.

GROUT: Use grout premixed drywall filler for floor and wall tile joints either glazed or semi-glazed tiles. Masonry concrete grout compressive strength (fc’) = 13.8 Mpa (2000 psi). For tile works.

PLASTER BOND: 25mm smooth sand cement plaster finish on both sides for S2 & S3 Exterior Walls.

MORTAR TOPPING & PLASTER REINFORCING FIBER: For plaster works thicker than 25mm (1”) and for mortar topping over membrane waterproofing for roof decks and balconies.

3-5mm Thk high-Performance Acrylic Render (Konstrukt Permaplast K 222 Render or equivalent) for all exposed beams and columns.

04200: UNIT MASONRY

CONCRETE HOLLOW BLOCKS (CHB):

1. Use 150 mm x 200 mm x 400 mm (6" x 8" x 16") and 100 mm x 200 mm x 400 mm (4” x 8” x 16”) Non-Load Bearing Concrete Hollow Block Units of standard manufacture, machine vibrated with even texture and well defined edges, steam-cured, conforming to PNS16 Type 1, Class A, with a minimum compressive strength of 2.5 MPa (350 psi) for building exterior and interior walls and septic tank retaining wall around open court and wherever else specified. Note: For interior walls, use 4” CHB from floor to bottom of slab or bottom of beam, with 10mm dia. reinforcing bars at 600 mm o.c. bothways. Anchor to floor by embedding vertical bars 75mm deep into the floor slab. Anchor to slab or beam by providing 10mm dia. dowels. Provide stiffener columns and beams as required in the general notes.

REINFORCING BARS: Masonry reinforcing steel yield strength (fy) =228 Mpa (33,000 psi), Grade 33 bars, conforming to ASTM Specifications A615 / PNS 49 of sizes shown in Plans. Use standard sizes; upgrade to next bigger size if specified standard sizes are unavailable.

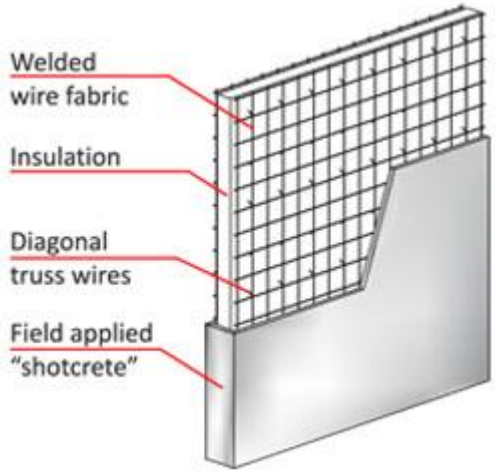
TIE WIRES: Gauge 16 Galvanized Iron (G.I.) tie wires.

150x200x400mm CMU Assembly -including Sand-Cement render, Mortar fill and Reinforcement 10mm Rebar G33; fy 275, 600 O.C. both ways

100x200x400mm CMU Assembly -3 Core including including Sand-Cement render, Mortar fill and Reinforcement 10mm Rebar G33; fy 275, 600 O.C. both ways

100x200x400mm CMU Assembly -3 Core including including Sand-Cement render, Mortar fill and Reinforcement 10mm Rebar G33; fy 275, 600 O.C. both ways

Sandwich Type Structural Panel 50mm Expanded Polystyrene Panel with Welded High Tensile Wires, 18mm Sand Cement Render on both sides, Paper Finish [SRC Panel or equivalent]



05 00 00METALS

05000 METALS

05100: STRUCTURAL STEEL

Owner/Architect – approved manufacturer/sub–contractor. Conform all materials and workmanship to the requirements of the American Institute of Steel Construction "Specifications for Design, Fabrication and Erection of Structural Steel for Buildings" as amended to date or as may be specifically modified by the drawings or by these Specifications.

PLATES, SHEETS AND CONNECTORS: Conform to ASTM Designation A36 with specified yield point of 248 MPa (36,000 psi). From mild steel sheets or plates with standard thickness, size, shape and design as indicated in the plans. For miscellaneous stiffener, bearing anchorage and connector plates or straps. Upgrade to next higher / bigger size and thickness if specified sizes & thicknesses are unavailable.

A. Weathering steel roof and wall -

1. 4'X8'X 3mm Atmospheric Corrosion Resistant Plates (COR-TEN steel) for Wall type EPW-06 & EPW-07
2. 4'X8'X 6mm Atmospheric Corrosion Resistant Plates (COR-TEN steel) for Wall type EPW-05
3. 4'X8'X 12mm Atmospheric Corrosion Resistant Plates (COR-TEN steel) for Planter Boxes @ Multi Purpose Roof Top

B. Hollow Steel Section (HSS) - Galvanized Gauge 40

STANDARD SOLID SECTION: Conform to ASTM A36 with specified yield point of 248 MPA (36000 psi). Mild steel angles, flat bars, square bars, channels, U and other sections. For structural steel trusses, purlins, building eaves framing, overhead anchorage of roll-up doors, grillworks, miscellaneous fabricated mounting brackets, straps, dowels, frames and connectors. Upgrade to next higher/bigger size and thickness if specified sizes and thickness are unavailable.

HIGH STRENGTH BOLTS, NUTS AND WASHERS: Conform bolts to the Specification for High Strength Bolts ASTM A 325, Type 1. See structural connection details for location of bearing-type and friction-type bolts.

ANCHOR BOLTS:

1. 12 Ø 150mm Length Anchor Bolt ASTM A325N Bolts with Nut and washer
2. 16Ø x 100mm Wedge Expansion Bolt
3. 10mmØ x 3" High Tensile Hex Machine Bolt, w/ Nut and Washer

WELDING ELECTRODES: Conform welding electrodes to AWS D1.1:2000 Structural Welding Code – Steel, E-60XX for structural welding.

GROUT: Conform non-shrink grout to ASTM C827. Grout shall be non-metallic. Use Non-shrink flowable cementitious grout. Apply using manufacturer's standards strictly.

G. STRUCTURAL STEEL PRIMER PAINT: Epoxy zinc chromate primer except as otherwise recommended by the manufacturer of the coating for all structural steel surfaces.

H. FIRE COVER: Cementitious Fireproofing System. Refer to Section 07251 Sprayed-On Fireproofing, whenever necessary.

05200: MISCELLANEOUS METALS

A. STANDARD SOLID SECTION: Conform to ASTM 611 with specified yield point of 228 Mpa (33,000 psi). Mild steel flat bars, square bars, overhead anchorage of roll-up doors, grill work, miscellaneous fabricated mounting brackets, straps, dowels, frames and connectors. Upgrade to next higher / bigger size and thickness if specified sizes & thickness are unavailable.

B. BRACING RODS: Standard structural grade steel rods with turnbuckles whenever required ex. for roof framing.

C. PAINTING: Epoxy Resin Bonding Agent, Solvent-Free,Thixotopic, 2-component structural epoxy resin adhesive[Sikadur 752,5kg/set or equivalent] for all architectural steel components only. For field painting, use only approved epoxy paint.

I. STRUCTURAL METAL FRAMING :

1. L2"X2"X6m Steel Angle Bar @6m and Double Steel Angle Bar L2"X2"X6mm on 16mm MS Plate Anchor Plates on Upper,Mid, Lower Stair Truss and 4.5mm MS Plate Gusset Plates [include preparation, epoxy primer coating and 2 coat acrylic top coat finish] M12x150mm Dynabolts and M16x150mm Dynabolt on Concrete
2. 1200mm High Truss Railing- 3"Ø Sch80 HSS Pipe Top and Bottom Chords with 2"Ø Sch80 Diagonal Members spaced at 1200mm OC [include cutting of existing floor tiles, dowel attachment, epoxy primer and acrylic top coat finish]
3. 460mm wide x 3500mm L2"X2"X6m Steel Angle Bar on 1-1/2" Ladder Rung spaced at 300mm, include base plates and wall attachments [include preparation, 2 coats epoxy primer and 2 coat epoxy finish]
4. 3"x3"6mm @ 6m Angle Bar and Eye bolt welded to angle bar spaced at 100mm [include 2 coat primer+2 coat finish epoxy matte black acrylic spray applied]
5. W8X31x 12m Wide Flange Structural Metal Framing [include surface preparation,include 1 coat epoxy primer+2 coats epoxy top coat,spray applied]

6. 2"x2"6mm @ 6m Angle Bar [include 2 coat primer+2 coat finish epoxy matte black acrylic spray applied]

06 00 00WOOD AND PLASTICS

06100: ROUGH CARPENTRY

Note: For K.D. Tanguile, plywood inner sides and for cut ends of Apitong joints, nailers, and framings, supplever called for, with size, shape and type to ensure a rigid connection for laminated items and at cabinet framing joints.

06200: FINISH CARPENTRY (See 9.02 and 9.03 for all DRYWALL and CEILING Finishes)

Lumber:

GUIJO: quarter-sawn, sound and free from imperfections impairing its strength and finish. Kiln-dried (max. moisture content: 12%), with the same shade and color for assemblies or sets of assemblies, warp-free, treated, S4S and fine sanded lumber. For louver slats of doors and edgings, when required.

MEDIUM DENSITY FIBERBOARD (MDF): 19mm (3/4"). For free span shelves, and for miscellaneous components of cabinets, overhead cabinets and closet housing; for all doors and exposed and unexposed sides of closets and kitchen cabinets/overhead cabinets.

FIBER CEMENT BOARD: Use 6mm thick for ceiling boards and backing of mirrors; 9mm thick for wall boards; 1200 mm x 2400 mm. Install as per manufacturer's instructions.

FIBER CEMENT SOFFIT: Wood-grain, 300mm wide x indicated length. Install and paint per manufacturer's instructions. Fixings shall be rust-proof screws or nails. For all roof eaves or any approved soffit material by architect

HARDWARE AND FASTENERS: Use metal nails, screws, plates, straps, miscellaneous fasteners or anchorage; concealed or countersunk whenever called for, with size, shape and type to ensure a rigid connection for laminated items.

ASSEMBLY MATERIALS: Approved water-resistant glue, and nails, screws and bolts of appropriate type, shape and size for all types of joints.

TRADEMARK: Each separate lumber piece or assembly is required to bear an official mark of the millworks supplier.

06220.B1 PRESSURE TREATED TIMBER SLATS

The treated timber should be sourced from a FSC certified or equivalent certification that ensures the sustainability of the forest the timber is sourced from.

PRODUCT:

Wood Handrail
48mmx48mmx2400mm Wood Solid Rail [Include wall railing attachments spaced at 1200mm]
Dorm Unit Kitchen Counter
K-2 600x1850 + 600x1100 L-Shaped Kitchen Assembly: Countertop w/ Cabinet (16mm Moisture Resistant Melamine Board Carcass; 16mm Waterproof Cintra Board Sink Cabinet: 18mm Moisture Resistant Melamine Board Doors; C-Type Handle; Soft closing Hinges[Blum or equivalent]; Soft Close Ball Bearing Drawer Guides and Synthetic Granite Cabinet); include: **Double Bowl Sink, Faucet, Built-in Electric Hotplat**e[Vitroceramic Hob Glem P3802 or equivalent] & **600mm Stainless Steel 430 Range Hood**[Whirlpool AKR 621 IX or equivalent] LABOR INCLUDED

Reception Counter
2"x6" KD S4S Timber Sawn to varying length(Ecofor of equivalent) [include wood glue, finishing nails, sanding, and polyurethane coating and attachments] see plan
Atrium
2x2" S4S Pine Lumber[Ecofor or equivalent] include stainless steel #8x3" winged self-drilling screw and Oil Wood Preserver[Sadolin or equivalent]
18mm Birch Plywood (Finnwood or Equivalent) stainless steel #8x3" winged self-drilling screw
Congregation Space (Level 1)
2x2" S4S Pine Lumber[Ecofor or equivalent] include stainless steel #8x3" winged self-drilling screw and Oil Wood Preserver[Sadolin or equivalent]
18mm Birch Plywood (Finnwood or Equivalent) stainless steel #8x3" winged self-drilling screw
Congregation Space (Level 0)
2x2" S4S Pine Lumber[Ecofor or equivalent] include stainless steel #8x3" winged self-drilling screw and Oil Wood Preserver[Sadolin or equivalent]
18mm Birch Plywood (Finnwood or Equivalent) stainless steel #8x3" winged self-drilling screw
Congregation Space (Level -1)
2x2" S4S Pine Lumber[Ecofor or equivalent] include stainless steel #8x3" winged self-drilling screw and Oil Wood Preserver[Sadolin or equivalent]
18mm Birch Plywood (Finnwood or Equivalent) stainless steel #8x3" winged self-drilling screw
Balcony Railing
1900mm x 1500mm High Timber Slat Railing: 48mm x 48mm Pressure Treated Smooth Planks[Finnwood PT PAR or equivalent] on 2"x3"x1.2mm Stainless Tubular Steel SS304[include wall attachments and #8x3" winged self-drilling screw and oil wood preserver, Sadolin or equivalent]
3300mm x 4400mm Timber Slat Wall: 38mm x 65mm Lumber(Ecofor or equivalent] spaced at 100mm OC on 38mm x 65mm top and bottom plate [include sanding, finishing nails and matt sanding sealer]
Level 0.5 Shed
48mm x 150mm 3600mm Pressure Treated Smooth Planks[include wall attachments and #8x3" winged self-drilling screw and oil wood preserver, Sadolin or equivalent]
12mm Tempered Safety Glass[include sealant, attachments to timber roof beams]
Exterior Benches at Entrance Walkways and Ramps
21mm x 95mm Pressure Treated Smooth Planks [Finnwood or equivalent] with 10mm gap on 28x45mm PT Timber Battens spaced @ 400 O.C., include stainless steel #8x3" winged self-drilling screw,attachment and asphalt sheet spacer to concrete and Oil Wood Preserver[Sadolin or equivalent]

08 00 00 DOORS AND WINDOWS

08100: METAL DOORS AND WINDOWS

08110 STEEL DOORS AND FRAMES, STEEL DOOR HEAD AND JAMBS:

STEEL JAMBS AND HEADER: 1.4mm (gauge 16) thick x 50mm x 100mm single rabbet and 1.4 mm (gauge 16) thick x 50mm x 150mm double rabbet; fabricated cold-rolled steel; epoxy paint finish.

STEEL DOOR TYPES: Use manufacturer's standard details.

Plain, full flush design, Positive/Negative Pressure; 45mm panel thickness, lightweight, minimum 1.0 mm (gauge 20) thick galvanized aluminum - high carbon steel sheet faces with honeycomb chemically treated core, lockformed edge; conforming to NAAMM/HMMA 861-06 and ANSI/SDI A250.8-2003 (LEC Steel Doors or Equivalent). Complete with stainless steel flag-type hinges and locksets. Provide optional accessories when required.

For steel doors with glass: use 6mm thick wired glass on aluminum snap on frame and as shown in the plans.

ALUMINUM CASEMENT WINDOW - Use high quality aluminums on 100mm Frame (Lixil Tostem P7 series or approved equal)

Skylight - 12mm Laminated Safety Glass with Tubular aluminum : Frameless Fixed Window gap - 20mm clear tempered glass on aluminum 25mm U channel at top and bottom

STORM RESISTANT FIXED STEEL LOUVER: For louvers under skylights, use 1.4 mm (gauge 16) thick G.I. jamb, header and mid frames and 1.2mm (gauge 18) thick G.I. louver blades as per manufacturer's standards and details; powder coated finish (2.4 Mw).

08800: GLAZING

CLEAR FLOAT GLASS: 6 mm (1/4inch) thick. Heat-Treated Float Glass: ASTM C 1048, Kind FT (fully tempered), Type 1 (transparent). Provide products of thickness indicated that have been tested for surface and edge compression according to ASTM C 1048 and for impact strength according to CPSC 16 CFR, Part 1201 for Category II materials. Complete with all components and hardware. For all exterior Aluminum Windows; must be able to withstand a Design Wind Velocity of 250 km/h at project site.

CLEAR FLOAT GLASS: 6 mm (1/4 inch) thick Heat-Treated Float Glass. For all interior aluminum fixed windows and aluminum doors.

C. CLEAR FLOAT GLASS: 3 mm (1/8 inch) thick. For all fire extinguisher cabinets.

D. TEMPERED GLASS SMOKED used in Canopies , use 8'mm Thick Glass

D. MIRRORS: 6 mm (1/4") thick plate glass mirror, distortion-free with felt paper on 4.5 mm (1/2") thick FCB backing installed on satin-finish anodized aluminum frame. For all toilets.

E. BULK COMPOUND FOR GLASS INSTALLATIONS:

Mastics – Elastic compounds and non-skinning compound.

Putties – Wood sash putty, metal sash putty.

Sealants – one component, two components.

F. PREFORMED SEALANTS:

Synthetic Polymer – base sealants – resilient or non-resilient type.

Pre-formed gaskets – compression type, structural type.

G. CAULKING: Silicone Building Sealant or approved equal. For all joint gaps between aluminum frames and concrete.

H. GLASS TO TIMBER ADHESIVE - 12mm (w) 3M™ VHB™ Structural Glazing Tape (or equivalent) on 32mm x1.5mm aluminium flat bar screwed to timber every 125mm with 6x32mm

Metal Doors and Frames

D4-1730mm x 2100mm Double Swing Steel Fire Door with Fiber glass infill; include: 110mmx50mm Single Rabbet Galvanized Door Frame (ANSI/SDI A250 B-2003 compliant(LEC Steel Doors or equivalent)),4-1/2"x4"x3.4mm Butt Hinge, Painted,with 2 Ball Bearing(Toyo or equivalent) 2 pcs Door Stop, **Door Coordinator** (UL listed (Thase or Equivalent), **2 pcs Door Closer**, include **Lockset** [Heavy Duty, Satin Nickel Finish, Lever Type]
D5 - 800mm x 2100mm Steel 45mm Thk door, Galvanized Panel with honeycomb Insulation, with Galvanized **50mmx100mm Door Frame** - Single Rabbet(LEC Steel Doors or equivalent);4-1/2"x4"x3.4mm Butt Hinge, Painted,with 2 Ball Bearing(Toyo or equivalent), include: Door Stop, 300mm x 400mm Louver, **Door Closer** [surface Mounted, 40 kg. max. door weight, satin chrome finish (Yale or equivalent)], **Entrance Lockset** [Heavy Duty, Satin Nickel Finish, Lever Type]
D8-700mm x 2100mm 45mm Thk Steel door w/ Louver, Galvanized Panel with honeycomb Insulation, with G**alvanized 50mmx100mm Door Frame** - Single Rabbet(LEC Steel Doors or equivalent), **Entrance Lockset** [Heavy Duty, Satin Nickel Finish, Lever Type]

Power Substation
2650mm x 1000mm Louvered Steel Door Gauge 18 Z-bars on 2"x2" Steel Angle Bar Framing [include top and bottom attachments and 2 coat epoxy primer]
Entrances, Storefronts and Curtain Walls
Entrances and Storefronts
D11- 1200mm x 12mm x 2100mm Frameless Tempered Glass Storefront Double Swing Door include frameless floor hinges (ie Dorma or equivalent)
Curtain Wall and Glazed Assemblies
10mm Tempered Glass on 50x100mm Powder Coated Aluminum Mullion Framing spaced at 500mmV and 1500mmH with 500mmx1500mm Awning Windows [see elevations]
10mm Tempered Glass on 50x100mm Powder Coated Aluminum Mullion Framing spaced at 500mmV and 1500mmH with 500mmx1500mm Awning Windows [see elevations]
10mm Tempered Glass on 50x100mm Powder Coated Aluminum Mullion Framing spaced at 500mmV and 1500mmH with 500mmx1500mm Awning Windows [see elevations]
Windows
500mmx500mm AwningHigh Quality Heavy Section Aluminium on 100mmX50MM Frame, include locksets (Lixil Tostem P7 Series or equivalent)
500mmx1900mm Awning-Fixed High Quality Heavy Section Aluminium on 100mm Frame, include locksets (Lixil Tostem P7 Series or equivalent)

09 00 00FINISHES

The wall contractor is aware that the space beneath the access floor will be used as an air delivery plenum and as such will take the necessary precautions when installing their work so as not to impact the integrity of the plenum space specific to air leakage and cleanliness. Any penetrations or holes in the underfloor plenum created for or resulting from the work performed by the division 9 wall contractors are required to be properly sealed to prevent air leakage.

09200: PLASTER

PLAIN CEMENT PLASTER FINISH: Consisting of the scratch and finish coats, both consisting of one (1) part Portland cement and two (2) parts of clean, washed sand, measured by volume. For all interior and exterior wall surfaces where plastering is essential to complete the work.

WOOD TROWEL FINISH: Provide score joints whenever required. For exterior and interior surfaces to be painted.

STEEL TROWEL FINISH: Provide score joints whenever required. For curbs, catch basins, septic tank.

BURLAP FINISH: Achieve consistent texture pattern through proper selection of burlap material and application of consistent pressure on surface. Provide 50mm plain concrete borders at all edges and at approximately every 1.00 m on center, for all exterior corridors, ramps, steps, and sidewalks.

PLASTERING GUIDE SYSTEM: Use for interior and exterior grooves, drip moulds, construction joints and surface wall plastering.

LIGHT METAL FRAMES FOR WALL ASSEMBLIES: For all Drywalls. Use 35mm x 102 mm x .4mm thick metal studs at 0.40 M on center and 35mm x 102mm x .4mm thick Metal tracks and noggings, knurling stiffeners, side assemblies, bullnoses, corner beads, utility holes and others to complete. Submit mock-up on site before installation.

CEILING BOARDS

METAL CEILING ASSEMBLY: Use 19mm x 50mm x 0.5 mm thick G.I. furring channel and 0.6 mm thick J-type-wall angle with 12mm x 38mm x 1.0 mm thick G.I. carrying channel, 6 mm diameter hanger rod, suspension clips, rod joiners, steel angles, furring clips, fastening devices and others to complete. Submit mock-up on site, with ceiling boards, before installation. For main ground floor common areas.

METAL SUSPENSION SYSTEMS
A. Components: Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees are double-web steel construction with exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.

a. Structural Classification: ASTM C 635 normal duty
b. Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.
c. Acceptable Product: Prelude Plus XL FireGuard 15/16" Exposed Tee as manufactured by Armstrong World Industries

B. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.
C. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft annealed, with a yield stress load of at least time three design load, but not less than 12 gauge.
D. Edge Moldings and Trim:
780036 - 12ft Hemmed Angle Molding
E. Accessories

FIBER CEMENT BOARD

PRODUCT: Decorative Fibercement Wall Panel

Ceiling
Support for Plaster and Gypsum Board
6mm Ficem Board on Ceiling Suspension Metal Joist 0.5mm 41mm 600mm OC both ways with hangers to concrete above (include .6mm carrying channel 1200 OC include, Corner Angles, hanger rods, expansion bolts)

FLOOR TILES

Finish shall be clean, plumb and true to line. Avoid odd-size tiles. Serojos should be more than half the tile size. Provide one (1) box containing 20 pcs. of each tile type for Owner's stock upon Final Acceptance.

IMAGE REFERENCE:

Tiling
600mmx300mmx10mm Non-slip Homogeneous Porcelain Floor Tile [include sand-cement dry pack, tile adhesive, grout and expansion gap sealant] [
600mmx300mmx10mm Non-slip Homogeneous Porcelain Floor Tile [include sand-cement dry pack, tile adhesive, grout and expansion gap sealant] [
600mmx600mmx10mm Non-slip Homogeneous Porcelain Floor Tile [include sand-cement dry pack, tile adhesive, grout and expansion gap sealant](Tile Center Deni Crema or Equivalent)
300mmx300mmx10mm Non-slip Homogeneous Floor Tile [include sand-cement dry pack, tile adhesive, grout and expansion gap sealant][Tenzen Tiles 3100 or equivalent]
600mmx600mmx10mm R12 Non-slip Homogeneous Porcelain Floor Tile [include sand-cement dry pack, tile adhesive, grout and expansion gap sealant] [

PAINTING

Use one brand all throughout. All exposed finish hardware, lighting fixtures and accessories, plumbing fixtures and accessories, glass surfaces and the like shall be adequately protected against stains from paint and other painting materials prior to painting works. All other surfaces which would be endangered by stains or paint marks should be taped and covered with craft paper or equal.

A. EXTERIOR:

1. ACRYTEX PLAIN FINISH; for all concrete/masonry surfaces, fascias and all exterior FCB fascias; for all front sides of concrete parapets, concrete ledges and projections.

After waterproofing:

Surface Preparation: Masonry Neutralizer #44; Putty surface imperfections with Acrytex Cast # 1711; or approved equal

1st Coat: Acrytex Primer or approved equal

2nd and 3rd Coats: Acrytex Topcoat Semi-gloss Finish or approved equal.

2. SEMI-GLOSS LATEX, or approved equal; for underside of concrete ledges, exposed sides of retaining walls, concrete railing of ramps, stepped platform at front and all other minor surfaces unless otherwise specified.

Surface Preparation: Masonry Neutralizer #44 or approved equal;

1st Coat: Concrete Sealer #705 White or Latex #701 White or approved equal
Putty minor cracks and surface imperfections with Patching Compound or approved equal.

2nd and 3rd Coats: Semi-gloss Latex#715 or approved equal. Tint to get the required color with Latex Colors

B. INTERIOR:

1. ACRYTEX PLAIN FINISH or approved equal; for all interior concrete, masonry and FCB wall and column surfaces, from floor line to 2.40m height, of Lobbies and Corridors.

Surface Preparation: Masonry Neutralizer #44 or approved equal; Putty surface imperfections with Acrytex Cast # 1711 or approved equal

1st Coat: Acrytex Primer or approved equal

2nd and 3rd Coats: Acrytex Topcoat Semi-gloss Finish or approved equal

2. SEMI-GLOSS LATEX #715 or approved equal. For all interior concrete, masonry and FCB upper wall and column surfaces above 2.40m in height up to bottom of slab, of Lobbies and Corridors. For wall areas of all other rooms; for walls above toilet tiles; for beams, girders, all ceilings including bottom of slabs and gypsum boards; for exposed walls at upper part of atrium; for maintenance offices, deck roofs and all other miscellaneous concrete areas unless otherwise specified.

Surface Preparation: Masonry Neutralizer #44 or approved equal

1st Coat: Concrete Sealer #705 White or Latex #701 White or approved equal. Putty minor cracks and surface imperfections with Patching Compound or approved equal.

2nd and 3rd Coats: Semi-gloss Latex#715 or approved equal. Tint to get the required color with Latex Colors

Note: Provide painted baseboards, latex or acrytex as required, 100mm wide, for all interior walls and stair walls without PVC baseboards, even if not indicated in the elevations/sections.

AUTOMOTIVE LACQUER #1300, or approved equal; for Steel Doors and Frames, and Steel Plate Supports. These shall be shop-applied.

Surface Preparation: Lacquer Spot Putty # 306 or approved equal
1st Coat: Lacquer Primer-Surfacer # 305 or approved equal
2nd Coat: Lacquer Spot Putty # 306 or approved equal as required
3rd Coat: Lacquer Primer-Surfacer # 305 or approved equal on puttied areas.
Top Coat: Automotive Lacquer # 1300 or approved equal in required Coats

CLEAR DEAD FLAT LACQUER #1253, or approved equal; for all exposed interior wood surfaces and wood doors and jambs and where applicable:

Surface Preparation: Wood Paste Filler #60 or
Lacquer Wood Tite #61 or approved equal
1st Coat: Lacquer Sanding Sealer #1254 or equal
Oil Wood Stain Series #2700 or equal
2nd & 3rd Coats: Clear Dead Flat Lacquer #1253 or equal
Solvent/Cleaner: Lacquer Thinner or equal

FLATWALL ENAMEL #800 or approved equal; for minor unexposed wood surfaces, where applicable.

1st Coat: #300 White Interior Primer & Sealer of Flatwall Enamel #800 or equal #311 White Glazing Putty or equal
2nd & 3rd Coats: Flatwall Enamel #800 or equal
Thinner: Paint Thinner or equal

C. METAL SURFACES:

1. EPOXY ENAMEL, or approved equal; for ferrous surfaces such as all structural steel surfaces, steel grille, steel louvers, steel and roof framing and other exposed steel surfaces unless otherwise specified.

Surface Preparation: Masonry Neutralizer #44 or equal
1st Coat: Epoxy Red Lead Primer #2270 or
Zinc Chromate Primer #2260 or equal
2nd and 3rd Coats: Epoxy Enamel or equal. Tint to get the required color.
Thinner: Epoxy Reducer or equal

Painting Works
Semi-Gloss Latex Paint Finish on Ficem Board Exterior Walls (Includes surface preparation, Flat White Primer and Top Coat, PU Sealant on all expansion gaps)
Semi-Gloss Latex Paint Finish on Finished Concrete(Includes surface preparation, Flat White Primer and Top Coat)
Steel Section Repainting [Include cleaning,degreasing and preparation-rust converter on rusted areas, 1 coat epoxy primer and 2 coat topcoat]
Semi-Gloss Latex Paint Finish on Ficem Board Ceiling (Includes surface preparation, 1 Coat Flat Primer, 2 Coats Finish)
Semi-Gloss Latex Paint Finish on SRC Walls(Includes surface preparation, 1 Coat Flat Primer, 2 Coats Finish)

10 00 00 SPECIALTIES

10400: IDENTIFYING DEVICES

ROOM NUMBERS: Acrylic letters with borders and background. Fabricated from plastic materials with standard size and dimensions. Colors, design and size to be approved by the Architect.

FIRE EXIT SIGNS: White acrylic letters and green acrylic background; 2 Hours duration; complete with 1 X 8 W Fluorescent lamp and Sealed Maintenance-Free Nickel Cadmium Battery. For all fire exit doors.

Signages/ Wayfinding
300mm x 150mm Acrylic Signage (include attachments)
300mm x 150mm Acrylic Signage (include attachments)
300mm x 150mm Acrylic Signage (include attachments)
1000mm x 2000mm Sticker Decal on Drywall
1200mm x 600mm Plasma Cut Lobby Signage on 3mm Corten Steel [include wall attachment]

Shower Enclosures
2100mm x 900mmx900mm 8mm Tempered Glass Enclosure sliding door, corner entry(include Stainless Steel mounting accessories)
2100mmH x 1100mmL at 2-550mm sliding panels 8mm Tempered Glass Partition(include Stainless Steel mounting accessories)
2100mmH x 1500mmL at 2-750mm sliding panels 8mm Tempered Glass Partition(include Stainless Steel mounting accessories)
2100mmH x 2000mmL at 2-1000mm sliding panels 8mm Tempered Glass Partition(include Stainless Steel mounting accessories)
2100mmH x 900mmL at 2-450mm sliding panels and 300mm Fixed Panel, 8mm Tempered Glass Partition(include Stainless Steel mounting accessories)
2100mmH x 1400mmL at 2-700mm sliding panels 8mm Tempered Glass Partition(include Stainless Steel mounting accessories)
Glass Railing
12mm Safety Tempered Glass Railing at 1000mm-1400mm on 100mmx50mm Black Powder Coated Aluminum Bottom Track[Include glass mount bracket for 38mm Timber Round Railing]
10mm Tempered Glass Railing at 1000mm-1400mm on 100mmx50mm Black Powder Coated Aluminum Bottom Track[Include glass mount bracket for 38mm Timber Round Railing]
38mm Timber Railing at 900mm Mounting Height included coating-marine spar varnish [To be mounted on Glass mount railing]
Timber Slat Railing
38mm Timber Railing at 900mm Mounting Height included coating-marine spar varnish [To be mounted on Glass mount railing]

Compartments and Cubicles
Toilet Partition Assembly 0720 x 16500mm (Phenolic black-core compact board or equivalent)with Stainless Steel Railing and U-Bar,Stainless Steel Accessories Includes Hinges, Indicator, Door Knob, Brackets, Adjustable Foot, Top Rail, Coat Hook, Handle LABOR INCLUDED
Toilet Partition Assembly 1500mm with Door (Phenolic black-core compact board or equivalent)with Stainless Steel Railing and U-Bar,Stainless Steel Accessories Includes Hinges, Indicator, Door Knob, Brackets, Adjustable Foot, Top Rail, Coat Hook, Handle LABOR INCLUDED
Urinal Screen 0400 x 900mm (Phenolic black-core compact board or equivalent) Stainless Steel Accessories Included
6mm Glass Mirror FEP (1600m x 1100mm) glued on 4.5 marine plywood screwed to wall tile with #8x1-1/2" Stainless Steel Screw
6mm Glass Mirror FEP (600mm x 1100mm) glued on 4.5 marine plywood screwed to wall tile with #8x1-1/2" Stainless Steel Screw

14 00 00 CONVEYING EQUIPMENT

14200 ELEVATORS

Elevators
800kg Rated Capacity,Machine Room Less Elevator with Automatic Voltage Regulator- One/Simplex Grouping Control, 800kg, 5.9kW, 1.0m/s, 5 stops, 5 door openings, 14.00m Travel, Flat Belt Traction Media, 400 Power Supply (Main), 20kVA AVR Rating, Stainless Steel AISI 304, 50x40 Door Frames Landing Position Indicator: Combined with LOP Landing Operating Panel: Touch Sensitive LOP Version: Surface Mounted Shaft: 1900mmx1700mmx1100mmx4200mm (Width, Depth, Pit, Headroom) Floor Designations: G,2,3,4,5 Car: 2100x800mm Door, Center-Opening, 1400x1350mm (Car Width, Depth) Side Walls, Rear Wall, Car Door & Front Finish: Full Height Glass Car Operating Panel Buttons: Touch Sensitive COP Version: Surface Mounted Ceiling: Stainless Steel [Schindler S3300 AP or equivalent] LABOR, IMPORTATION INCLUDED

22 00 00 PLUMBING

01500 _ MECHANICAL / SANITARY

15400: PLUMBING SYSTEMS

SEWER AND WASTE PIPES:

a) Main Lines and Stacks: POLYVINYL CHLORIDE PIPES AND FITTINGS Equivalent to Series 1000, Class 35.
b) Branches Only: POLYVINYL CHLORIDE PIPES AND FITTINGS Equivalent to ASTM D2729. Rigid (uPVC) pipe and drainage pattern fittings or approved equal conforming to ASTM D2564.
c) Vent Pipes: POLYVINYL CHLORIDE PIPES AND FITTINGS Equivalent to Series 1000, Class 35.

STORM DRAINAGE SYSTEMS:
a) Downspouts: POLYVINYL CHLORIDE PIPES AND FITTINGS Equivalent to Series 1000, Class 35.
b) Storm Drainage: CONCRETE PIPES: Sizes as required, conforming to Class IV.1, reinforced for 300 mm Φ and larger.
AIR-CON DRAIN: POLYVINYL CHLORIDE PIPES AND FITTINGS, Equivalent to Series 1000, Class 35, with Elastomeric Closed Cell Insulation.

PIPE AND FITTINGS: All PVC sewer pipe and fittings shall be manufactured in accordance with one of the following Standard Specifications:
a. ASTM D3034, “Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings”
b. ASTM F679, “Standard Specification for Poly (Vinyl Chloride) (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings”
c. ASTM F794, “Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter”
d. ASTM F949, “Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings”
e. ASTM F1336, “Standard Specification for Poly(Vinyl Chloride) (PVC) Gasketed Sewer Fittings”
f. ASTM F1760, “Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content”
g. ASTM F1803, “Standard Specification for Poly (Vinyl Chloride) (PVC) Closed Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter” All fittings shall be compatible with the pipe to which they are attached.
JOINTS: All PVC pipe joints shall be gasketed, bell-and-spigot, push-on type conforming to ASTM D3212, “Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.” Since each pipe manufacturer has a different design for push-on joints, gaskets shall be part of a complete pipe section and purchased as such. Gaskets may be factory installed or field installed as recommended by the pipe manufacturer. Lubricant shall be as recommended by the pipe manufacturer.
PIPE STIFFNESS: All PVC sewer pipes shall have a minimum pipe stiffness that equals or exceeds 46 lbs / in-in.
INSTALLATION: Pipe and fittings should be installed in accordance with ASTM D2321, “Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.”
EMBEDMENT REQUIREMENTS: The method for calculating loads and determining embedment requirements for PVC sewer pipe shall be in accordance with the latest published edition of one of the following:
a. ASCE Manual No. 60 / WPCF Manual FD-5, “Gravity Sanitary Sewer Pipe Design and Construction.” b. The Handbook of PVC Pipe, Design and Installation available from the Uni-Bell PVC Pipe Association.

c. UNI-TR-1, “Deflection: The Pipe/Soil Mechanism” available from the Uni-Bell PVC Pipe Association.

Shower Heater Single Point, Open Outlet Type, 3.5kW, 370mmH x 190mm x 93mm, 1.6kg, Water Flow Sensor, Manual Reset Thermostat, Auto Thermal Cut-off, Water Pressure: 1.4psi-55psi [Panasonic DH-3JL2P or equivalent]
Tapping of Soil Stack to Septic Tanks (100mmØ-150Ømm PVC Pipes and Fittings)
Tapping of Rainwater to Cistern Tank

	Type		Instant Water Heater (Open Outlet Type)
	Power Supply		AC 230v / 60HZ
	Power Consumption		3.5kW
	Water Stop System		One Turn System
	Water Pressure	Min	0.1 kgf/cm2 (1.4 psi)
		Max	3.87 kgf/cm2 (55 psi)
	Power Control		Stepless Electronic Power Control
	Water Temperature Control		Inlet Water Temperature to Max Power
	Body Dimension	H x W x D mm	370 x 190 x 93
	Weight	kg	1.6 kg
Features		Safety Device	9 Safety Points
		Shower Head	1-way
		Semi-Pause	-
		Other	Hanger A Assembly Filter

FIRE SUPPRESSION

A. DRY FIRE SPRINKLER SYSTEM

Black Iron Pipe,150PSI hydrostatic tested

B. WET FIRE SPRINKLER SYSTEM

Chlorinated Polyvinyl Chloride(cPVC) see data below

Steel pipe schedule 40 for sleeves in concrete beams or concrete fireproofing.

Galvanized steel pipe schedule 40 for sleeves through floors.

Steel pipe sleeves in footings shall be not less than four inches larger in diameter than the pipe to be installed.

Direct-driven Fire Pump(with auxillary pump)

25 in 1 Integrated Direct Driven Horizontal Fire Pump

ATLANTA TS 25 (or equivalent) in 1 Integrated Direct Driven Horizontal Fire Pump, 50HP, 3550 rpm, 230 Volts, 60Hertz, 4" water outlet, complete with 5HP Jockey Pump, Electric Motor, Pressure Tank, Water Filling Tank, Control Panel, Base Stand, Water Flow Testing Pipe, Flow Meter, Drain Valve, Pump Water Filling Pipe, Temperature Guard System, Water Filling Inlet, Overflow Drain Outlet, Water Level Detector, Pressure Exhaust Valve, Pressure Check Valve, Pressure Gauge, Pressure Tank Pipe, Expansion Joint, Outlet Control Valve, Outlet Check Valve, Pump Exhaust Valve, Drain Valve, Differential Pressure Gauge, Coupling, and Bearing Frame

C. Intelligent Photoelectronic Smoke Detector

I-9102

Description:

Intelligent Photoelectronic Smoke Detector

Key Features

- Aesthetically pleasing low profile design
- 8 Bit intelligent processor with A/D converter
- Built in algorithm maps for false alarm rejection
- Electronically addressed
- Twin LED for 360o vision
- With Remote Indicator output

- Operating Voltage: 24VDC
- Operating Current:
  - Standby Current: 0.8mA
  - Alarm Current: 5.0mA
- Operating Environment:
  - Temperature: -10℃ ～+50℃
  - Relative Humidity: 95%
- Dimensions: Diameter 100mm, Height 56mm

16000 _ ELECTRICAL

16100: BASIC ELECTRICAL MATERIALS AND METHODS:

A. WIRES AND CABLES: No conductor shall be less than 3.5 mm2 in size unless otherwise specified.

B. CONDUITS: As indicated in the Electrical (E) Plans.

1. Non-Metallic Conduit (PVC): smooth wall non-metallic conduit conforming to Philippine National Standards No. 14 for PVC Pipes. Conduit shall be in standard length of 3.05 meters including coupling

C. OUTLET BOXES AND FITTINGS:

1. Convenience Outlets: White color, Wide-Series, Universal outlet, 220V, with amperage as required. For general building interior use.
2. Weatherproof Outlets: Double device plate with cover receptacle, heavy duty. For outlets inside pump room and other exterior-located outlets, as indicated in the plans.
3. Boxes: Metal utility boxes Ga. 16, sizes and shapes as required.

D. INDIVIDUAL ELECTRIC METERS: Provide Owner-approved individual electric meter for each studio unit. Locate at designated utility cabinet or at meter center per floor.

E. SWITCHES, PANELBOARDS AND CIRCUIT BREAKERS:

1. Switches: With amperage as required. Suited to location and intended purpose. Approved type by architect.

a. For 3-Gang with 3-Way Switch consider using model BTICINO-SA32301TBA Single Pole Switch with 16A 250V or equivalent

SAE2301TBA

b. For 1-Gang with 1-Way Switch consider using model BTICINO-SAE2001TBA Single Pole Switch with 16A 250V or equivalent

SAE2001TBA

c. For 2-Gang with 1-Way Switch consider using model BTICINO-SA2001TB15A Single Pole Switch with 16A 250V or equivalent

SAE2001TB15A
SAE2003TB15A

d. For 3-Gang with 1-Way Switch consider using model BTICINO-SA32301TBA Single Pole Switch with 16A 250V or equivalent

SAE2301TBA

2. Circuit Breakers: GA 16 bolt-on type, pre-painted, surface mounted, with latch lock.
   a. Terasaki Circuit Breakers or equivalent
3. Magnetic Starter: With casing, surface mounted with latch lock.
4. Metal Enclosures and Cabinets: FUJI-HAYA, ALLIED, MACROPOWER or approved equal.
5. Emergency: ATS – 1200A, 3P, Breaker Type, 240V, High Interrupting; EMDP – Main 1200AT – use Fixed Type.
6. Distribution Panels

   a. Powerbox - Panel Board or equivalent

*All materials galvanized,
* guarantee a minimum of 5 years.
* State of the art 3D modeling Software, to produced precised & accurate design.
* Fully-bolted construction (MODULAR TYPE), CNC TRUMPH MACHINE Fabricated .
* Phospetised metal parts, Powder Painted w/ Epoxy Polyester a minimum thickness of 80 microns.
* EPOXY FULL POLYESTER FOR OUTDOOR PANEL/ENCLOSURE Guaranteed not to fade & not to pulvurized.
* TIN PLATED Copper busbars.
* Copper busbars are of oxygen-free high conductivity. ETP Grade - C103.
* Quality/manufacturing procedures as per ISO Standards.
* Non-tracking, busbar insulators.
* Complete w/ mechanical terminal lugs at line side main & load side branches .
* Engraved nameplate, black background, white letters.
* Claw-type, screw type side and rear covers (For free standing panels only)
* PANELBOARD design screw type or hinged type deadfront.

* Detachable top & bottom plate for panelboard

F. HANGERS AND SUPPORTS:

1. For all suspended conduits: Angle bars with 12mm dia. hangers at 1-m intervals. Prime and finish-painted.. Joints of conduits on a staggered position. Submit shop drawings for approval.

16410: ELECTRICAL SERVICE SYSTEM

a. Transformers, Transformer cables and posts:

Provide as needed and/or as recommended by the local electrical cooperative. All components shall be provided by the local electrical cooperative upon representation and full payment by the Contractor.

16500: LIGHTING

A. Lighting Fixtures and Accessories: Samples of lighting fixtures, complete with lamps and accessories, shall be submitted for approval by the Architect and University prior to fabrication and purchase.

16510: INTERIOR LUMINAIRES

16520: EXTERIOR LUMINAIRES

GROUND LIGHTS

1620.A. Description

:• Recessed luminaire for outdoor installation in wall, ceiling or floor.
• Configuration: die-cast aluminium structure EN AB-47100 (low copper content) available in round and square version.
• Double layer coating for high resistance to corrosion: chemical conversion coating on the aluminium surface followed by a first layer of epoxy powder and a second finishing layer of polyester powder.
• The luminaire is composed of a wiring unit connected to an emitting unit with different designs: onlyglass-round and square; anodized aluminium frame-only round. The glass is fixed to the aluminium structure through a robotic gluing system.
• Tempered transparent or sandblasted glass.
• Protection rating: IP67.
• In compliance with EN 60598-1 standards.
• Class of insulation: III.

• Warning! Use IP68 connectors to avoid water ingress from the cable.

END OF SECTION 01020

01250 SUBSTITUTIONS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Requirements for requesting approval of proposed substitutions.
B. The requirements of this section govern the use of "Substitution Request Form - Section 01251".

1.02 LIMITATIONS ON SUBSTITUTIONS

A. Substitutions will not be considered unless the "Substitution Request Form - Section 01 25 10" attached in this Project Manual is used and the requirements of this section and Section 01 25 10 are fully complied with. Other types of forms are not acceptable.
B. Substitutions will not be considered when indicated on shop drawings or product data submittals without separate formal request complying with "submittal procedures" specified in this section.
C. Substitutions will not be considered unless submitted through the Contractor.
D. Additional studies, investigations, submittals, redesign and/or analysis by the Architect caused by the requested substitutions shall be paid by the Contractor at no expense to the Owner.
E. Substitute products shall not be ordered or installed without written acceptance.
F. Only one request for substitution for each product will be considered. When substitution is not accepted by the Architect, provide the specified product.
G. Architect will determine the acceptability of all substitutions.

1.03 REQUESTS FOR SUBSTITUTIONS

A. Contractor's Representation
1. Request for substitution constitutes a representation that the Contractor has investigated the proposed product and has determined that it is equal to or superior in all respects to the specified product.
2. Request for substitution constitutes a representation that the Contractor will provide same type of warranty for substitution as for specified product. Contractor's warranty shall be in writing guaranteeing all substituted products have same or superior performance as the product specified.
3. Request for substitution constitutes a representation that the Contractor will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.
4. Request for substitution constitutes a representation that the Contractor waives all claims for additional costs related to substitutions which consequently become apparent.
5. Request for substitution constitutes a representation that the cost data is complete and includes all related cost under his Contract, but excludes any approved Architect's design fees required by substitution.
6. Request for substitution constitutes a representation that the Contractor has thoroughly investigated the proposed substitute to determine if license fees and royalties are pending on the proposed substitute, for compliance with General Conditions of the Contract/AIA 201.
B. Requests for substitutions shall be submitted on "Substitution Request Form - Section 0125 1" attached in this Project Manual. Legible copies of this form shall be complete with data substantiating compliance of proposed substitution with requirements of Contract Documents including the following information:
1. Project title and Architect's project number.
2. Identification of product specified including Specifications Section and Paragraph Number.
3. Identification of proposed substitute complete with manufacturer's name and address, trade name of product, and model or catalog number. Attach product data as specified in Section 01330.
4. List of fabricator and supplier (with address and phone number) for proposed substitute.
5. The effect of substitution on dimensions, material thicknesses, wiring, piping, duct work, etc. indicated in Contract Documents.
6. The effect of substitution on other trades.
7. The effect of substitution on construction schedule.
8. Differences in quality and performance between specified product and proposed substitute.

9. Comparison of manufacturer's guarantees of specified product and proposed substitute.
10. Availability of maintenance services and replacement materials for proposed substitute.
11. Cost data comparing proposed substitute with specified product, and amount of net change to Contract Sum.

END OF SECTION

001311 PROJECT COORDINATION

PART 1 - GENERAL

1.01 SCOPE:

A. Minimum administrative and supervisory requirements necessary for coordination of Work on the Project include, but not limited to:

1. Coordination and meetings.
2. Administrative and supervisory personnel.
3. Surveys and records or reports.
4. Limitations for use of site.
5. Special reports.
6. General installation provisions.
7. Cleaning and protection.
8. Conservation and salvage.
9. Work of other contractors outside the scope of this Contract but working in the immediate vicinity of this Site.

1.02 COORDINATION AND MEETINGS:

A. Prepare a written memorandum on required coordination activities. Include such items as required notices, reports and attendance at meetings. Distribute this memorandum to each entity performing work at the Project site. Prepare similar memorandum for separate contractors where interfacing of their work is required.
B. Coordination drawings: Prepare coordination drawings where work by separate entities requires fabrication off site of products and shall indicate how work shown by separate shop drawings will interface, and shall indicate sequence for installation. Comply with all requirements of the "Submittals" section.
C. Monthly coordination meetings: Hold monthly general Project coordination meetings at regularly scheduled times convenient for all parties involved. These meetings are in addition to specific meetings held for other purposes, such as regular Project meetings and special pre-installation meetings. Request representation at each meeting by every party currently involved in coordination or planning for the Work of the entire Project. Conduct meetings in a manner which will resolve coordination problems. Record results of the meeting and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1. At Contractor's option, monthly coordination meetings can be held integrally with monthly progress meetings as specified in other sections of this specification.

1.03 LIMITATIONS ON USE OF THE SITE:

A. Limitations on site usage as well as specific requirements that impact site utilization are indicated on the Drawings and by other Contract Documents. In addition to these limitations and requirements administer allocation of available space equitable among entities needing both access and space so as to produce the best overall efficiency in performance of the total work of the Project. Schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on site.

1.04 SPECIAL REPORTS:

A. Submit special report directly to the Owner within one day of an occurrence. Submit a copy of the report to the Architect and other entities that are affected by the occurrence.
B. Reporting unusual events: When an event of an unusual and significant nature occurs at the site, prepare and submit a special report. List chain of events, persons participating, response by the Contractor's personnel, an evaluation of the results or effects and similar pertinent information. Advise the Owner in advance when such events are known or predictable.
C. Reporting accidents: Prepare and submit reports of significant accidents, at site and anywhere else work is in progress. Record and document data and actions. For this purpose, a significant accident is defined to include events where personal injury is sustained, or property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury.

3.01 GENERAL INSTALLATION PROVISIONS:

A. Pre-installation conferences: In addition to other pre-installation requirements indicated throughout the Contract Documents, hold a pre-installation meeting at the Project site well before installation of each unit of work which requires coordination with other work. Installer and representatives of the manufacturers and fabricators who are involved in or affected by that unit or work, and with its coordination or integration with other work that has preceded or will follow shall attend this meeting. Advise the Architect of scheduled meeting dates.

1. At each meeting review progress of other work and preparations for the particular work under consideration including specific requirements for the following:
   a. Contract Documents.
   b. Options.
   c. Related change orders.
   d. Purchases.
   e. Deliveries.
   f. Shop drawings, project data and quality control samples.
   g. Possible conflicts and compatibility problems.
   h. Time schedules.
   i. Weather limitations.
   j. Manufacturer's recommendations.
   k. Compatibility of materials.
   l. Acceptability of substrates.
   m. Temporary facilities.
   n. Space and access limitations.
   o. Governing regulations.
   p. Safety.
   q. Inspection and testing requirements.
   r. Required performance results.
   s. Recording requirements.
   t. Protection.
   u. Other contractors performing work outside of the scope of this Contract.
2. Record significant discussions of each conference, and record agreements and disagreements, along with the final plan of action. Distribute the record of meeting promptly to everyone concerned, including the Owner and Architect.
3. Do not proceed with the Work if the pre-installation conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene pre-installation conference at the earliest feasible date.

B. Installer's inspection of conditions: Require the installer of each major unit of work to inspect the substrate to receive work and conditions under which the work is to be performed. The installer shall report all unsatisfactory conditions in writing to the Contractor. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

C. Manufacturer's instructions: Where installations include manufactured products, comply with the manufacturer's applicable instructions and recommendations for installation, to the extent that these instructions and recommendations are more explicit or more stringent than requirements indicated in the Contract Documents.

D. Inspect each item of materials or equipment immediately prior to installation. Reject damaged and defective items.

E. Provide attachment and connection devices and methods for securing work. Secure work true to line and level, and within recognized industry tolerances. Allow expansion and building movement. Provide uniform joint width in exposed work. Arrange joints in exposed work to obtain the best visual effect. Refer questionable visual-effect choices to the Architect for final decision.

F. Recheck measurements and dimensions of the work, as an integral step of starting each installation.

G. Install each unit-or-work during weather conditions and Project status which will ensure the best possible

results in coordination with the entire Work. Isolate each unit of work from incompatible work as necessary to prevent deterioration.

H. Coordinate enclosure of the Work with required inspections and tests, so as to minimize the necessity of uncovering work for that purpose.

I. Mounting heights: Where mounting heights are not indicated, mount individual units of work at industry recognized standard mounting heights for the particular application indicated. Refer questionable mounting height choices to the Architect for final decision.

3.02 CLEANING AND PROTECTION:

A. During handling and installation of Work at the Project site, clean and protect Work in progress and adjoining work on the basis of continuous maintenance. Apply protective covering on installed work where it is required to ensure freedom from damage or deterioration at time of substantial completion.

1. Clean and perform maintenance on installed work as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
2. Coordinate with the requirements of Section 01740.

B. Limiting exposures of Work: To the extent possible through reasonable control and protection methods, supervise performance of the Work in such a manner and by such means which will ensure that none of the Work, whether completed or in progress, will be subjected to harmful, dangerous, damaging or otherwise deleterious exposure during the progress of the Work. Such exposures include, where applicable, but not by way of limitation the following:

1. Excessive static or dynamic loading.
2. Excessive internal or external pressures.
3. Excessively high or low temperatures.
4. Thermal shock.
5. Excessively high or low humidity.
6. Air contamination or pollution.
7. Water or ice.
8. Solvents.
9. Chemicals.
10. Light.
11. Puncture.
12. Abrasion.
13. Heavy traffic.
14. Soiling.
15. Insect infestation.
16. Combustion.
17. Electrical current.
18. High speed operation, improper lubrication, unusual wear or other misuse.
19. Incompatible interface.
20. Destructive testing.
21. Misalignment.
22. Excessive weathering.
23. Unprotected storage.
24. Improper shipping or handling.
25. Theft.
26. Vandalism.

3.03 CONSERVATION AND SALVAGE:

A. It is a requirement for supervision and administration of the Work that construction operations be carried out with the maximum possible consideration given to conservation of energy, water and materials. In addition maximum consideration shall be given to salvaging materials and equipment involved in performance of the work but not incorporated therein. Refer to other sections for required disposition of salvage materials which are the Owner's property.

- END OF SECTION -

01321.6 CONSTRUCTION SCHEDULES

PART 1 - GENERAL

1.01 SUMMARY

A. Procedures for preparation, submission and review of Construction Schedules for entire work and periodic updating.

B. By submitting a proposal the Contractor agrees that his work, or various activities of this work, will be completed within the overall requirements of the Project Construction Schedule.

1.02 SUBMITTALS

A. Submit within 20 days after award of Contract a network analysis diagram of the Work using the Critical Path Method (CPM) or PERT method of scheduling.

B. The Contractor's schedule shall be considered a supplement to the Project Construction Schedule for the benefit of the Contractor and the Project and not one instead of the Project Construction Schedule.

1.03 CONTENTS OF SCHEDULE

A. Show pertinent activities with durations along with:

1. Early start date.
2. Late start date.
3. Early finish date.
4. Late finish date.

B. Show the Work by a sequence of activities with the relationship and dependency of each activity properly indicated.

C. Show submittal times for shop drawings, product data and samples, including those provided by the Owner and those under allowances. Show approval times as allowed by the Contract Documents and delivery times of material and equipment.

D. The critical activities and the critical path are to be clearly identified an the network diagram.

E. In preparing his schedule, the Contractor must take into consideration the work of other contractors and the dependency each has on the other for the proper and efficient execution of all work on the Project.

F. Schedules which do not meet the requirements stated herein will not be considered as acceptable.

1.04 ARCHITECT'S ACTIONS

A. The schedule provided by the Contractor will be reviewed with respect to the Project Construction Schedule and the Contractor will be advised that:

1. His schedule is acceptable and meets the overall objectives of the Project Construction Schedule.
2. His schedule does not meet the overall objectives of the Project Construction Schedule, but will be reconsidered if certain revisions are made.
3. His schedule does not meet the requirements of the Contract documents and is rejected.

B. If the Architect rejects the Contractor's schedule the Contractor shall, within 15 days after notification that the schedule is rejected, resubmit his schedule to meet the requirements of the Contract Documents.

END OF SECTION

01330 SHOP DRAWINGS, PRODUCT DATA, SAMPLES

PART 1 - GENERAL

1.01 SUMMARY

A. Procedures for processing:

1. Shop Drawings
2. Product Data
3. Office Samples
4. Mock-up Samples
5. Certificate of Compliance

1.02 GENERAL PROCEDURES

A. The approval of submittals does not constitute a Change Order.

B. All items shall be submitted under Contractor's transmittal letter, and shall include the following information:

1. Project by title and Architect's project number.
2. Contractor's contract number.
3. Work and products by Specifications Section and Article number.

C. The Contractor shall transmit to the Architect a completed "Submittal Information and Schedules" form.

D. Resubmittals: When Architect requires that a submittal be "resubmitted", comply with requirements of this section.

1. Identify changes made since the previous submittal.

E. Notify the Architect in writing at time of submittal, of any deviations from the requirements of Contract Documents.

F. Make all submittals far enough in advance of scheduled dates for installation to provide sufficient time for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery.

1. Review Time: In scheduling, allow at least 10 working days for Architect's review.
2. Delays caused by the tardiness of the Contractor in preparing and forwarding of submittals will not be an acceptable basis for extension of the Contract completion date or for consideration of alternate products which do not meet the specified requirements of this Project Manual.
3. The Architect will review submittals with reasonable promptness so as to cause no delay. The Architect's review and/or corrections refer only to the general arrangement and conformance of the subject of the submittals with the design concept of the project and with the information given in the contract documents. Under no conditions should the Contractor consider the review to include the dimensions, quantities, and details of the items nor the approval of an assembly in which the item functions. The Architect review of shop drawings shall not relieve the Contractor of responsibility for any deviation from the requirements of the contract documents unless the Contractor has informed the Architect in writing of such deviation at the time of submission and the Architect has given written approval to the specific deviation; nor shall the Architect's review relieve the Contractor from responsibility for errors from the shop drawings.

G. Fabricating products before receiving Architect approval and before submittals are returned to Contractor, shall be at Contractor's risk.

H. Starting work which requires submittals to be approved by Architect before Architect approves and submittals are returned Contractor shall be at Contractor's risk.

I. Where used in the Contract Documents, the words "or equal" shall be defined as "refer to substitution requirements"

1.03 SHOP DRAWINGS

A. Reproduction of any portion of the Architect's Construction Documents for use as submittals for shop drawings is not acceptable, such submittals will be returned unreviewed.

B. Submit shop drawings in a clear and thorough manner.

1. Title each drawing with Project name and Architect's project number.
2. Identify each element of drawings by reference to sheet number and detail, schedule, or room number of

Contract Documents.

C. Identify the following:

1. Requirements of the individual section of Project Manual.
2. Field measurements.
3. Field construction criteria.
4. Relation to adjacent or critical features of the Work or products.
5. Conformance of submittal with requirements of Contract Documents.

D. Each sheet of shop drawings shall be stamped and signed by Contractor before submitting to Architect. Review for compliance with requirements of Contract Documents.

E. Fabricating products or beginning the work before shop drawings are approved by Architect and returned to Contractor shall be at Contractor's risk.

F. Required Printing: One set of sepia prints and 3 sets of blueline prints, for all architectural submittals and 4 sets of blue line prints for structural, mechanical and electrical submittals.

G. A copy of the marked, Structural Shop Drawings with the Structural Engineer's review stamp is to be maintained at the job site.

1.04 PRODUCT DATA

A. Submit only pages which are pertinent.

1. Mark each copy of standard printed data to identify pertinent products, referenced to Specification Section and Article number.
2. Show reference standards, performance characteristics, and capacities; wiring and piping diagrams and controls; component parts; finishes; dimensions; and required clearances.

B. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the Work. Delete information not applicable.

C. Each set of manufacturer's product data shall be stamped and signed by Contractor before submitted to Architect to certify compliance with requirements of Contract Documents.

D. Number of Copies Required: See paragraph 1.03, F.

1.05 OFFICE SAMPLES

A. Submit full range of manufacturer's standard finishes except when more restrictive requirements are specified, indicating colors, textures, and patterns, for Architect's selection.

B. Submit samples to illustrate functional characteristics of products, including parts and attachments.

C. Approved samples which may be used in the Work are indicated in the Specification section.

D. Label each sample with identification required for transmittal letter.

E. Number Required: As specified in individual specifications section.

1.06 MOCK-UP SAMPLES

A. Where mock-up samples and similar samples are indicated in the individual specifications sections, comply with requirements for "Office Samples", and process transmittal forms for mock-ups to provide a record of activity.

1.07 CERTIFICATES OF COMPLIANCE

A. Contractor submit "Certificates of Compliance" certifying that all materials used in the Work comply with all specified provisions thereof.

1. Submit in the form of a letter or company standard forms.

2. If test reports are submitted with "Certificates of Compliance", test reports shall include data or dates of testing and results of testing.

1.08 TEST REPORTS

A. Test reports certified by an independent testing laboratory must be made available upon request by Architect.

1.08 ITEMS FOR SUBMISSION BY THE CONTRACTOR FOR THE ARCHITECT'S APPROVAL PRIOR TO ORDER, PURCHASE, WORK OR MANUFACTURE

The following section is a listing of materials and construction documents for the Architect's appreciation to ensure that design objectives for the intended class of construction are met. It is designed to avoid waste such as when the Contractor installs specific materials or systems which are not acceptable for the project.

SAMPLES

04000 MASONRY

○ All specified sizes and types of unit masonry	1 piece each
○ Others (if required by Architect / Owner)	1 unit each

05000 METALS

○ All specified sizes of structural steel sections	1000 mm length
○ All specified sizes of steel reinforcements per bulk delivery	1000 mm length
○ All aluminum & stainless steel sections	150 mm length
○ Brass nosing section	150 mm length
○ Others (if required by Architect / Owner)	1 unit each

06000 WOOD AND PLASTICS

○ Wood Section Samples	300 mm length
○ Hardware and Fasteners	1 piece each
○ Others (if required by Architect / Owner)	1 unit each

07000 THERMAL AND MOISTURE PROTECTION

○ All waterproofing & damp proofing products	300 mm x 300 mm swatch
○ Roofing sheets and accessories	1 piece each
○ Joint sealants	1 tube each
○ All insulation products	300 mm x 300mm swatch
○ Others (if required by Architect / Owner)	1 unit each

08000 DOORS & WINDOWS

○ All corner sections of metal doors, jambs and hardware	1 unit each
○ All aluminum door and window panels complete with operating mechanisms, locksets and all other hardware	1 panel each
○ All glass panes & glazing compounds	1 panel each
○ Aluminum and Steel Storm Resistant Fixed Louver	1 panel each
○ All finishing hardware: locksets, hinges, door stopper/holder, closer, chain lock, eye, deadlock, cabinet & drawer pulls, locks, butt hinges and aluminum door hardware	1 piece each
○ Others (if required by Architect / Owner)	1 unit each

09000 FINISHES

○ All plaster types	1 panel mock-up
○ PalmEco board or other equivalent	1 panel each
○ Homogenous Tiles	1 piecel each
○ All specified sizes and types of stones	1 piece each
○ All colors of vitrified tiles	1 piece each
○ All paints and lacquers	Sample swatches for all types and colors (300 mm x 300 mm)
○ Others (if required by Architect / Owner)	1 unit each

010000 SPECIALTIES

○ Identifying Device Letter Size	1 piece each
○ All toilet accessories	1 piece each
○ Others (if required by Architect / Owner)	1 unit each

015000 MECHANICAL / SANITARY

- All plumbing pipes, fittings, meters and accessories 1 of each type
- All fire alarm system components and accessories 1 of each type
- All exhaust fans 1 unit each
- All valves 1 unit each
- Others (if required by Architect / Owner) 1 unit each

016000 ELECTRICAL

- All conduits, fittings, wires, cables, meters and accessories 1 of each type
- All junction box, pull box and accessories 1 of each type
- All LED lighting fixtures, switches and convenience outlets 1 complete set each
- All fire alarm wiring devices 1 of each type
- Others (if required by Architect / Owner) 1 unit each

MOCK-UPS

NOTE: All mock-ups are for Architect's approval before final installation.

1. Stone pavers on sand bed
2. Stainless steel railing assembly
3. Aluminum horizontal devices assembly
4. All waterproofing materials in place
5. All types of wall board assemblies
6. All types of ceiling board assemblies
7. All types of wall and floor tile and stone finish
8. All paint finishes
9. All types of cabinetries and closets
10. Model of complete studio unit including toilet
11. Cement and Natural Stone Paving showing setting bed, joint sizes, laying patterns, colors, textures, one unit area per plan
12. Natural Stone Wall Finish showing waterproofing, joint sizes, laying patterns, colors, textures, 0.50 x 1.00m area
13. Others (if required by Architect / Owner)

TECHNICAL CATALOGUES AND BROCHURES

1. Roofing System
2. Fire alarm system
3. Fire Extinguisher
4. All Pumps
5. Electrical panel distribution
6. Exhaust & Ventilating fans
7. Others (if required by the Architect / Owner)

DETAILED SHOP DRAWINGS

1. All structural steel framing joints and steel decking
2. Roofing Installation
3. Structural steel trusses, frames, its connection system and sequence of erection
4. Fireproofing
5. All architectural pre-cast units
6. All door, window panels including all operating devices, locksets and other hardware
7. Aluminum and Stainless Steel Sections, Framing, and Cladding
8. Waterproofing and Insulation installation methods
9. Installation method and details of building I.D. letters
10. Complete Natural Stone Finish installation method with waterproofing and stainless metal anchors
11. Others (if required by the Architect / Owner)

LABORATORY TEST CERTIFICATES

1. Structural Steel strength
2. Reinforcing Steel strength
3. Welding tests
4. Concrete (bases on batch mix for specified phases of pouring works)

a. Concrete mix design
b. Concrete test results

5. Compaction tests on fill materials
6. Fireproofing tests
7. Waterproofing tests
8. Leak test for all plumbing and water pipes
9. Analysis of imported topsoil
10. Others (if required by the Architect / Owner)

GUARANTEES / WARRANTIES

Submittals for Environmental Performance

1. Termite Poisoning
2. Wood treatment
3. All Waterproofing Materials
4. Roofing System
5. Aluminum Doors and Windows
6. Pumps
7. Fire alarm systems and fire extinguishers
8. Fire doors
9. All trees, palms, shrubs, ground covers, lawns (when needed)
10. Others (if required by Architect / Owner)

END OF SECTION

01400 Quality Requirements

RESPONSIBILITIES

A. Contractor Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, Contractor shall provide inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction.

Costs for these services are included in the Contract Sum.

1. **Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Contractor's responsibility, the Contractor shall employ and pay a qualified independent testing agency to perform quality-control services. Costs for these services are included in the Contract Sum.**

2. **Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Owner's responsibility, the Owner will employ and pay a qualified independent testing agency to perform those services.**
   a. Where the Owner has engaged a testing agency for testing and inspecting part of the Work, and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Owner, unless agreed to in writing by the Owner.

B. Retesting: The Contractor is responsible for retesting where results of inspections, tests, or other quality-control services prove unsatisfactory and indicate noncompliance with Contract Document requirements, regardless of whether the original test was Contractor's responsibility.

1. **The cost of retesting construction, revised or replaced by the Contractor, is the Contractor's responsibility where required tests performed on original construction indicated noncompliance with Contract Document requirements.**

C. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:

1. **Provide access to the Work.**
2. **Furnish incidental labor and facilities necessary to facilitate inspections and tests.**
3. **Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.**
4. **Provide facilities for storage and curing of test samples.**
5. **Deliver samples to testing laboratories.**
6. **Provide the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.**
7. **Provide security and protection of samples and test equipment at the Project Site.**

D. Duties of the Testing Agency: The independent agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual Sections shall cooperate with the Architect and the Contractor in performance of the agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.

1. **The agency shall notify the Architect and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.**
2. **The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.**
3. **The agency shall not perform any duties of the Contractor.**

E. Coordination: Coordinate the sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

1. **The Contractor is responsible for scheduling times for inspections, tests, taking samples, and**

similar activities.

SUBMITTALS

A. The testing agency shall submit a plan, in writing, from the testing agency, stating how they intend to perform these services of special inspections stated above and submit to the Building Inspectors office as required by Chapter 17 of the 2002 K.B.C. The testing agency shall submit reports to the Architect for review, and record.

B. Unless the Contractor is responsible for this service, the independent testing agency shall submit a certified written report, in duplicate, of each inspection, test, or similar service to the Architect. If the Contractor is responsible for the service, submit a certified written report, in duplicate, of each inspection, test, or similar service through the Contractor.

1. **Submit additional copies of each written report directly to the governing authority, when the authority so directs.**
2. **Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:**
   a. Date of issue.
   b. Project title and number.
   c. Name, address, and telephone number of testing agency.
   d. Dates and locations of samples and tests or inspections.
   e. Names of individuals making the inspection or test.
   f. Designation of the Work and test method.
   g. Identification of product and Specification Section.
   h. Complete inspection or test data.
   i. Test results and an interpretation of test results.
   j. Ambient conditions at the time of sample taking and testing.
   k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
   l. Name and signature of laboratory inspector.
   m. Recommendations on retesting.

REPAIR AND PROTECTION

A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes.

B. Protect construction exposed by or for quality-control service activities, and protect repaired construction.

C. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

END OF SECTION

01520 TEMPORARY FACILITIES

PART 1 - GENERAL

1.01 SUMMARY

A. The Contractor shall pay all energy costs for the temporary electricity, heat and ventilation used for the Work of the Project. This shall include the costs of installation and maintenance of temporary equipment, which costs shall be the responsibility of the Contractor. The Contractor shall remove all temporary equipment at the end of each work phase.
B. Use of alternate temporary facilities is Contractor's option, subject to the Architect's acceptance.
C. Comply with Federal, State and local codes/regulations.

1.02 TEMPORARY ELECTRICITY AND LIGHTING

A. Temporary lighting and power shall be of adequate size to properly service the requirements of the Work, including adequate feeder sizes to prevent excessive voltage drop. Temporary work to be installed in a neat and safe manner in accordance with the National Electrical Code, Article 305, and as required by OSHA or applicable local safety codes. Panelboard shall be equipped with ground fault and be tested daily to ensure proper function of ground fault.
B. Provide approved construction type power cords or approved wiring as necessary for the performance of this work. Power cords or wiring that does not comply with codes/regulations will not be allowed under any circumstances.
C. If higher voltages are required, make arrangements with local electric power company, make connections to primary source, and pay installation fees and meter charges.
D. The Contractor will see to the provisions of temporary lighting for construction operations.
E. Permanent lighting may be used during construction.

1.04 TEMPORARY TELEPHONE/COMMUNICATION SERVICE

A. The Contractor shall provide telephone/communication service for his and the Architect's use.

1.05 TEMPORARY WATER

A. The Contractor shall make provisions for temporary water service required for construction operations.
B. Provide branch piping, hoses for their own use.
C. Be responsible for providing drinking water in approved sanitary containers and disposable cups for their workers.

1.06 SANITARY FACILITIES

A. Make provisions for temporary toilet facilities for the use of all contractors.

1.07 CONSTRUCTION AIDS

A. Provide hoisting equipment, scaffolding, etc. as needed to properly perform his work.

1.08 PUMPING AND DEWATERING

A. Provide and operate drainage and pumping equipment as may be necessary for the proper performance of this work. In doing so he must maintain the site, the construction work area and adjacent areas free from water resulting from their operation.

1.09 BARRICADES

A. Make provisions for barricades to surround the areas of work. Maintain these barricades when the operations are adjacent to and confined within these barricades. Should the Contractor find it necessary to remove a portion of the barricades in the performance of his operations, then the Contractor shall provide all necessary warnings, temporary guard rails and other safety measures required, and shall place the temporary barricade back to its proper conditions as soon as practical, but in any case at the end of each work day. Should the Contractor fail to replace the barricade as required, then the Architect, if he deems it necessary, may do so without notice to the Contractor, and charge the Contractor the full cost thereof.
B. Provide barricades and warning lights at locations where their operations present a hazard to the Owner.

1.10 PROJECT IDENTIFICATION

A. Provide a project identification sign designed by the Architect. See Drawings for size and requirements.

B. Other signs will not be permitted.

1.11 FIELD OFFICE AND SHEDS

A. Provide a temporary field office for Contractor's, the Owner and the Architect's use.
B. In accordance with his needs to properly perform work, provide a temporary field office for this own work.
C. Provide a weather tight structure, with heat and ventilation for products requiring controlled conditions, with adequate space for organized storage and access, and lighting for inspection of stored materials.
D. The location, appearance and type of temporary field office and storage facilities must be approved by the Architect prior to its use.

1.13 SITE SECURITY

A. In addition to placing the permanent fire protection facilities in operating condition at the earliest feasible date, provide fire extinguishers of types and sizes recommended by NFPA No. 10 for the general construction areas. The extinguishers will be located on each story of construction, near each entrance and stairway.
B. Provide similar fire extinguishers for specific areas of work.
C. Smoking will not be allowed except in marked, non-hazardous areas.
D. Employ and pay for watchman services as he deems appropriate and necessary.

1.14 PROTECTION OF FINISHED WORK

A. Be wholly responsible for the protection of the finished Work, except to the extent covered by Property Insurance to be maintained by Owner.
B. Upon completion of the Work and before acceptance, the Contractor shall, without extra compensation, repair an/or refinish his work that may have been damaged.

1.15 REMOVAL

A. Be responsible for the removal of temporary materials, equipment, services, and construction at such time as to allow the work on the Project to proceed according to the established Construction Schedule.
B. Repair damage caused by installation and use of temporary facilities.
C. Restore existing facilities used during construction to specified or to original condition.

1.16 ESTIMATING

Includes field office for Contractor and Owner's Representative, material storage, barracks, security, temporary fences, barricades, first aid, fire extinguishers, toilets, project signage.

END OF SECTION

01660 TRANSPORTATION AND HANDLING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section specifies requirements for transportation and handling of packaged and unpackaged products, equipment and components.

1.02 PACKAGING AND TRANSPORTATION

A. Require supplier to package products in boxes or crates for protection during shipment, handling and storage. Protect sensitive products against exposure to elements and moisture.
B. Protect sensitive equipment and finishes against impact, abrasion and other damage.

1.03 DELIVERY

A. Arrange deliveries of products in accordance with construction schedules and in ample time to facilitate inspection prior to installation.
B. Coordinate to avoid conflict with work and conditions at the site. Specifically coordinate to determine:
1. Work of the Owner.

2. Work of other contractors.
3. Availability of equipment and personnel for handling products.
4. Owner's use of premises.

C. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.

D. Clearly mark partial deliveries of component parts of equipment to permit easy accumulation of parts and to facilitate assembly.

E. Immediately on delivery, inspect shipments to assure:

1. Compliance with requirements of Contract Documents and approved submittals.
2. Quantities are correct.
3. Containers and packages are intact and that labels are legible.
4. Products are properly protected and undamaged.

1.04 PRODUCT HANDLING

A. Provide equipment and personnel to handle products, including those provided by the Owner, by methods to prevent soiling or damage to products or packaging.

B. Provide additional protection during handling as necessary to prevent scraping, marring, or otherwise damaging products or surrounding spaces.

C. Handle products by using methods that will prevent bending or over stressing.

D. Lift heavy components only at designated lifting points.

END OF SECTION

017400 CLEANING

PART 1 - GENERAL

1.01 SUMMARY

A. In addition to the General Conditions regarding Cleaning up, this Section specifies general requirements for cleaning of premises during construction and for final cleaning.

1.02 CLEANUP - GENERAL

A. Maintain premises and public properties free from accumulation of waste, debris, and rubbish caused by operations.

B. Keep streets clean from mud, dirt, debris and other materials. Promptly remove from streets, mud and dirt tracked by vehicles.

C. At completion of Work, Phase or Critical Area, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials. Clean all sight-exposed surfaces. Leave work clean and ready for construction work to follow or for final cleaning as applicable.

D. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

1. Do not burn or bury rubbish and waste materials on project site.
2. Do not dispose of volatile waste in storm drains or sanitary sewers.

E. Comply with rules/regulations regarding hazardous materials and:

1. Store volatile wastes in covered metal containers and remove from premises daily.
2. Prevent accumulation of waste which might cause hazardous conditions.
3. Provide adequate ventilation during use of volatile and noxious substances.

1.03 DURING CONSTRUCTION

A. Keep building, grounds, and public properties free from accumulation of waste materials and rubbish.

B. Wet down dry materials and rubbish as necessary to prevent dust. Schedule cleaning operation so that dust and debris resulting from the cleaning process does not damage other work.

C. Do not drop or throw materials from heights.

D. Unless otherwise stated, provide on site containers for collection of waste materials, debris, and rubbish. Containers must have adequate capacity to accommodate Contractors needs. Provide for removal of

containers at appropriate intervals so that containers do not overflow.
E. Provide containers at workers break and lunch area. Police area daily.

1.04 FINAL CLEANING THE WORK, PHASE OR CRITICAL AREA
A. Final cleaning prior to Architect's final inspection will be the responsibility of the Contractor.
B. In addition to cleanup requirements stated elsewhere shall:
1. Perform cleaning operations as may be specifically required by the Specifications.
2. Remove temporary protection and labels not required to remain.
3. Remove debris, rubbish, dirt, etc., resulting from the Contractors work from all areas including concealed spaces, chases, and above ceilings.
4. Remove debris, rubbish, etc. resulting from the Contractors work, from roofs and drainage systems.

PART 2 - PRODUCTS

2.01 MATERIALS
A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
B. Use cleaning materials only on surfaces by cleaning material manufacturer.

END OF SECTION

01741.9 CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY
A. This Section includes administrative and procedural requirements for the following:
1. Salvaging non-hazardous demolition and construction waste.
2. Recycling non-hazardous demolition and construction waste.
3. Disposing of non-hazardous demolition and construction waste.
4. Related Sections include the following:
B. Division 1 Sections “LEED Requirements” and “LEED Checklist” for construction waste management and other U.S. Green Building Council's (USGBC) LEED prerequisites and credits needed for the Project to obtain LEED certification.
1. Division 1 Section "Temporary Facilities and Controls" for environmental-protection measures during construction.
2. Division 2 Section "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.
3. Division 4 Section "Unit Masonry Assemblies" for disposal requirements for masonry waste.
4. Division 4 Section "Stone Veneer Assemblies" for disposal requirements for excess stone and stone waste.

1.03 DEFINITIONS
A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.04 PERFORMANCE GOALS

A. Salvage/Recycle Goals: Develop a Construction Waste Management Plan to divert 75% of construction waste from landfills through recycling and salvage; Owner's goal is to salvage and recycle as much non-hazardous demolition and construction waste as possible including the following materials:

1. Demolition Waste:

a. Asphaltic concrete paving.
b. Concrete.
c. Concrete reinforcing steel.
d. Brick.
e. Concrete masonry units.
f. Wood studs.
g. Wood joists.
h. Plywood and oriented strand board.
i. Wood paneling.
j. Wood trim.
k. Structural and miscellaneous steel.
l. Rough hardware.
m. Roofing.
n. Insulation.
o. Doors and frames.
p. Door hardware.
q. Windows.
r. Glazing.
s. Metal studs.
t. Gypsum board.
u. Acoustical tile and panels.
v. Carpet.
w. Carpet pad.
x. Demountable partitions.
y. Equipment.
z. Cabinets.
aa. Plumbing fixtures.
bb. Piping.
cc. Supports and hangers.
dd. Valves.
ee. Sprinklers.
ff. Mechanical equipment.
gg. Refrigerants.
hh. Electrical conduit.
ii. Copper wiring.
jj. Lighting fixtures.
ll. Lamps.
mm. Ballasts.
nn. Electrical devices.
oo. Switchgear and panelboards.
pp. Transformers.

2. Construction Waste:

a. Site-clearing waste.
b. Masonry and CMU.

c. Metals.
d. Gypsum board.
e. Piping.
f. Electrical conduit.
g. Packaging: Regardless of salvage/recycle goal indicated above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
(1) Paper.
(2) Cardboard.
(3) Boxes.
(4) Plastic sheet and film.
(5) Polystyrene packaging.
(6) Wood crates.
(7) Plastic pails.

1.05 SUBMITTALS

A. Waste Management Plan: **Submit 3 copies of plan within 30 days of date established for the Notice to Proceed**.

B. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit three copies of report. Include the following information:

1. Material category.
2. Generation point of waste.
3. Total quantity of waste in .
4. Quantity of waste salvaged, both estimated and actual in .
5. Quantity of waste recycled, both estimated and actual in .
6. Total quantity of waste recovered (salvaged plus recycled) in .
7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

C. Waste Reduction Calculations: Before request for Substantial Completion, submit three copies of calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.

1.06 QUALITY ASSURANCE

A. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review waste management requirements for each trade.

1.07 WASTE MANAGEMENT PLAN

A. General: Develop plan consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Include separate sections in plan for demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.

3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include the following:

1. Total quantity of waste.
2. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers for each type of waste.
3. Total cost of disposal (with no waste management).
4. Revenue from salvaged materials.
5. Revenue from recycled materials.
6. Savings in hauling and tipping fees by donating materials.
7. Savings in hauling and tipping fees that are avoided.
8. Handling and transportation costs. Include cost of collection containers for each type of waste.
9. Net additional cost or net savings from waste management plan.

A. General: Implement waste management plan as approved by Architect. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

1. Comply with Division 1 Section "Temporary Facilities and Controls" for operation, termination, and removal requirements.

B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.

1. Distribute waste management plan to everyone concerned within three days of submittal return.

2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.

2. Comply with Division 1 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.02 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until installation.
4. Protect items from damage during transport and storage.
5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

B. Salvaged Items for Sale and Donation: Not permitted on Project site.

C. Salvaged Items for Owner's Use:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area off-site.
5. Protect items from damage during transport and storage.

D. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.

3.03 RECYCLING OF DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall be shared equally by Owner and Contractor.

C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.

1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste off Owner's property and transport to recycling receiver or processor.

3.04 RECYCLING DEMOLITION WASTE

A. Asphaltic Concrete Paving: Grind asphalt to maximum size.

1. Crush asphaltic concrete paving and screen to comply with requirements in Division 2 Section "Earthwork" for use as general fill.

B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.

1. Crush concrete and screen to comply with requirements in Division 2 Section "Earthwork" for use as satisfactory soil for fill or subbase.

C. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.

1. Crush masonry and screen to comply with requirements in Division 2 Section "Earthwork" for use as general fill.
2. Clean and stack undamaged, whole masonry units on wood pallets.

D. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

E. Metals: Separate metals by type.

1. Structural Steel: Stack members according to size, type of member, and length.
2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

F. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.

G. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.

H. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.

1. Separate suspension system, trim, and other metals from panels and tile and sort with other metals.

I. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.

J. Plumbing Fixtures: Separate by type and size.

K. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.

L. Lighting Fixtures: Separate lamps by type and protect from breakage.

M. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

N. Conduit: Reduce conduit to straight lengths and store by type and size.

3.05 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Site-Clearing Wastes: Chip brush, branches, and trees on-site.

C. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

3.06 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: **Do not burn waste materials.**

C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

- END OF SECTION -

01770 CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 SUMMARY

A. This Section specifies administrative and procedural requirements for project closeout.

1.02 SUBSTANTIAL COMPLETION

A. When each individual Phase, Critical Area, and the Work as a whole is considered to be substantially complete, the Contractor shall submit the following:

1. Written notice that the Phase, Critical Area, or Work, or designated portion, is substantially complete.
2. List of items to be completed or corrected.

B. Within a reasonable time, Architect will inspect to determine status of completion, and compile a punch list of items to be completed and corrected. If Architect determines that the Project is not substantially complete, the Contractor will be notified in writing. Architect will generally point out his reasons, but he will not be obligated to give an exhaustive list of discrepancies.

C. Contractor's Duties: Remedy deficiencies and send another written Notice of Substantial Completion.

1.03 OWNER OCCUPANCY

A. Owner's Action: Occupy the Project, or designated portion of the Project, in accordance with provisions of the Certificate of Substantial Completion.

B. Contractor's Duties:

1. Obtain Certificate of Occupancy (if required by local building codes authority).
2. Obtain consent of insurance company or companies to keep insurance in force during partial occupancy by Owner.
3. See that corrections listed on punch list attached to Certificate of Substantial Completion are made by Contractor.
4. Perform final clean-up.

1.04 FINAL COMPLETION

A. When the Work or any of the Phases or Critical Areas are considered to be complete, Contractor shall submit certification indicating the following:

1. Contract Documents have been reviewed and Work has been inspected for compliance with those Documents.
2. Work has been completed in accordance with Contract Documents.
3. All punch list items have been corrected.
4. Equipment and systems have been tested in presence of Owner's Representative and are operational.
5. Work is complete and ready for final inspection.

B. Architect's Actions During Final Inspection:

1. Inspect to verify the status of completion with reasonable promptness.
2. If he considers the Project incomplete or defective, the Contractor will be notified in writing, with deficiencies listed.

C. Contractor's Duties: Take immediate action to correct deficiencies, and send certification to Architect's that work is complete.

D. When Architect determines that the work is acceptable, the Contractor will be requested to make closeout submittals.

1.05 REINSPECTION FEES

A. Should status of completion of work (in whole or in part) require reinspection by Architect due to failure of work to comply with Contractor's claims on initial inspection, Architect will deduct the amount of his compensation for reinspection services from final payment to Contractor.

1.10 POST-CONSTRUCTION INSPECTION

A. Prior to expiration of one year from the Date of Substantial Completion, the Architect will make a visual inspection of the Project to determine whether correction of Work is required, in accordance with the Conditions of the Contract.

B. The Architect will promptly notify the Contractor, in writing, of any observed deficiencies. Contractor shall then correct deficiencies.

END OF SECTION

01783.9 PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Procedural requirements for maintaining documents and samples at the site as required in the General Conditions.

B. The General Conditions require the Contractor to maintain a record copy of the following for Architect's review:

1. Drawings.
2. Specifications and Schedules (Project Manual).
3. Addenda.
4. Change Orders and other documents which modify original document.
5. Approved shop drawings, product data and samples.
6. Records of all changes made during construction.

C. In addition to the above, Contractor shall maintain at the Contractor’s office a record copy of the following:

1. Field test records.
2. Manufacturer's certificates.
3. Fixed equipment manuals.
4. Inspection certificates.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store Record Documents and samples in a file in the Field Office, apart from the documents used for construction.

1. Provide files, racks and secure storage for Record Documents and samples.

B. Label and file Record Documents in sequence with section number listings in Table of Contents of this Project Manual.

1. Label each document "PROJECT RECORD" in the lower right hand corner in neat, large printed letters.

C. Maintain Record Documents in clean, dry, legible condition.

1. Do not use Record Documents for construction purposes.

D. Keep Record Documents and samples available for inspection by Architect.

1.03 RECORDING

A. Record information concurrently with construction progress.

1. Do not conceal work until required information has been recorded.

B. Contract Drawings and Shop Drawings: Legibly mark each item to record actual construction, including the following:

1. Depth of footings in relation to finish first floor level.
2. Measured horizontal and vertical locations of underground utilities, valves, etc. referenced to building exterior lines. Show direction of flow of pipe and depth of piping underground.
3. Field changes of dimensions and details.
4. Changes made by Contract Modifications.
5. Details not on original Contract Drawings.

C. Project Manual: Legibly mark to record actual construction, including the following:

1. On appropriate pages, record changes made by Addenda, Change Orders and other modifications.
2. On appropriate pages, enter trade name, manufacturer, catalog number, and name of supplier of each product and item actually installed, if different from that specified.
3. Other items installed but not originally specified.

1.04 RECORD DRAWINGS

A. Record Drawings which are required for Owner's records, shall be recorded on reproducibles by the Contractor. These reproducibles shall be transmitted to the Contractor prior to the start of Construction.

1. Do not use Record Drawings for construction purposes.

B. Contractor shall transfer all changes recorded on construction drawings on the Record Drawings.

1. All information shall be recorded neatly and legibly.
2. Use separate colors for recording information about each major system.
3. Establish a code to denote the color for each trade and indicate by a schedule placed on the front sheet of the Record Drawings.

1.05 SUBMITTALS

A. At Contract Closeout, deliver Record Documents and samples, including Record Drawings, to Architect.

B. Submit Record Documents under cover of a transmittal letter containing:

1. Date.
2. Project title and number.
3. Contractor's and subcontractor's names and addresses.
4. Title and number of each Record Document.
5. Certification that each document submitted is complete and accurate.
6. Signature of Contractor or his authorized representative.

END OF SECTION

04100 MORTAR

1.00 GENERAL

1.01 SCOPE

A. Furnish all materials, labor, equipment, plant, tools, required to complete plaster masonry work and patching mortar as shown in the drawings and specified in the Summary of Materials and Finishes herewith.

B. Unless otherwise indicated on drawings or specified herein, all materials or work under the division shall be subject to the provisions under Division 3 CONCRETE

2.00 PRODUCTS

2.10 MATERIALS

Refer to Section 01020 Summary of Materials and Finishes.

2.02 MIXES

Cement Mortar:
1 part Portland Cement
2 parts sand, but not more than 1 part Portland Cement, 3 parts sand.
For plaster works thicker than 25 mm (1”), use plaster mix with FIBRIN – 23 or equivalent as per manufacturer’s specifications.

3.00 EXECUTION

3.01 INSTALLATION

A. Application of Cement Plaster

1. Scratch Coat: Apply with sufficient force and material to form full keys or bond. Cross scratch as soon as scratch coat has attained initial set and apply brown coat as soon as practicable.

2. Brown Coat: Scratch or broom for bond of finish coat and allow to set hard. Keep brown coat moist until finish coat is applied.

3. Finish Coat: Bring to true, even surfaces with rods and trowel smooth, leaving finished surface free from tool marks and blemishes. Keep cement plaster moist for at least 3 days and protect against rapid drying until cured.

B. Application of masonry mortar

Lay all concrete hollow blocks with 10 mm (3/8") horizontal and vertical mortar joints.

C. Application of patching mortar

1. Provide the same mixture of gray and white cement for patching mortar and used to fill holes and imperfections, but should be richer mixture and the cement and sand proportions should be the same as those used in the concrete.

2. Never steel trowel patches, but finish with wood or cork floats.

3. Allowing the mixed patching mortar to stand for an hour or two before using it, reduces the amount of shrinkage, but never add water in remixing it.

No cement dusting is allowed to hasten any phase of surface for floors and wall finishing.

END OF SECTION 04100

04200 UNIT MASONRY

1.00 GENERAL

1.01 SCOPE

Furnish all materials, labor, equipment, plant, tools, required to complete: concrete unit masonry

1.02 HANDLING AND STORAGE

A. Handle in a manner to prevent undue chipping and breakage
B. Protect storage piles, stacks and bins from heavy traffic.
C. Provide platforms to protect bottom piles from contact with soil.

1.03 VISUAL INSPECTION

A. All units shall be sound and free from cracks or other defects that would interfere with the proper placing of the unit or impair the strength or permanence of the construction.
B. Units that are intended to serve as a base for plaster shall have sufficiently rough surface to afford good bond.

2.00 PRODUCTS

Refer to Section 01020 Summary of Materials and Finishes.

3.00 EXECUTION

3.01 CONCRETE UNIT MASONRY

A. Lay all masonry unit, plumb, true to line, level and with accurately spaced course.
B. Let the Architect approve sample of special stone arrangement where required.
C. Keep bond plumb throughout. Keep corners and reveals plumb and true.
D. Build in anchors, wall plugs and accessories to masonry as erection progresses.
E. Bed solidly each course in Portland Cement mortar. Keep all units damp when laid.
F. Wedge units terminating against beam or slab soffits tightly with mortar and reinforcement properly secured to dowels.
G. Consult drawings as to the schedule of reinforcements.
H. Masonry joints
    1. Unless otherwise specified or detailed on plans, make horizontal and vertical mortar joints 10 mm (3/8") with full mortar coverage on the face shells and on the webs. Fill surrounding cells.
    2. Fill all joints solidly.
    3. Do not permit furrowing of the mortar.
I. Tooled joints
    1. Use concave joints where tooled mortar joints are called for in the drawings.
    2. Joints must be neat and clean, plumb and true to line.

3.02 UNFINISHED WORK

A. Step back unfinished work for joining with new work.

B. Before new work is started, remove all loose mortar and wet the exposed joint thoroughly not less than one hour before laying new work.

3.03 CLEANING

Wash finished surface in a manner most appropriate and satisfactory to the Architect. No cement dusting is permitted for any cement finish.

END OF SECTION 04200

A. Furnish all materials, labor, equipment, plant, tools, required to complete fabrication and erection of all structural steel and miscellaneous steel items complete, as shown and/or as specified including:

a. Furnishing of anchor bolts for structural steel columns and responsibility for their correct locations; provide templates;
b. Brackets and miscellaneous iron connections, shop-connected to structural members;
c. Beam Penetrations as indicated in the drawings;
d. Installing and removing temporary guys, shores, scaffolding and bracing required for steel erection.

B. Where so indicated on the plans, structural members shall be joined by welding. The welds shall be of size and type indicated and shall be made by competent operators.

1.02 RESPONSIBILITY

A. Contractor shall be responsible for the accurate location of all steel work including all items used to attach materials to other parts of the work.
B. Contractor shall see to it that any and all items of work which are to be built into the works of other trades are installed at the proper time.
C. Contractor shall notify the Architect / Engineer if the steel work shall be fabricated in a shop other than the site, so that arrangements can be made together with the Project Representative in the inspection of the delivered materials and in the fabrication of the steel work.
D. Where specified steel sizes and thicknesses are found unavailable in market, all affected items shall be upgraded to next higher level of size and thickness.

2.00 PRODUCTS

A. MATERIALS: Refer to Section 01020 Summary and Finishes.

B. FABRICATION:

1. Fabricate structural steel within tolerances specified under Codes and Standards referenced in paragraph 1.03.
2. Fabricate and assemble structural steel in the shop to the greatest extent possible. Do shearing carefully and accurately using machine equipment where possible.
3. Connections shall be welded or bolted as indicated. Shop connections not otherwise shown shall be welded. Eccentric connections are not permitted unless shown in detail on shop drawings.
4. Surfaces required to be milled or planned are indicated on the drawings.
5. Provide bearing plates for members bearing on footings, piers and walls.
6. Drift pins may be used for assembling parts provided metal is not distorted or holes enlarged. Holes requiring enlargement to admit bolts shall be reamed. Misaligned holes will subject members to rejection.
7. Shop Cleaning:

a) Cleaning: Thoroughly clean loose mill scale, rust, dirt, grease and other foreign matter from structural steel shapes.

8. Shop Painting: Shop paint structural steel work which will be exposed in the finish work and other fabrications exposed to weather. Coordinate the use of primer paint on the steel with architectural drawings and fire ratings.

a) Surface Preparation: After inspection and before shipping, clean steel work to be painted. Remove loose rust, loose mill scale, and spatter slag or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC) SP-2, SP-3, or SP-7. Remove oil and grease deposits by solvent.

b) Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide uniform dry film thickness on 1.5 mils. Use painting methods which will result in full coverage of joints, corners, edges, and exposed surfaces.

3.00 EXECUTION

3.01 CONDITION OF SURFACES

A. Before starting work, verify locations and elevations of bearings and anchor bolts. Immediately report inaccuracies. Work under this Section shall include responsibility for accurate bearing of steel and correct location of anchorage.

3.02 ERECTION

A. General - The Contractor shall use special care in unloading, handling and erecting the steel to avoid bending, twisting or otherwise distorting the steel members. The erector shall handle the materials in such a way as to minimize the damage to the shop coat of paint. The Contractor shall plan and execute the erection in such a way so that the close fit and neat appearance of the joints and the structure, as a whole will not be impaired. If temporary braces or erection slips are employed, care shall be taken to avoid any unsightliness upon removal. Tack welds shall be ground smooth and holes shall be filled with weld metal or body solder and smoothed by grinding or filing. The Contractor shall submit to the Architect or Engineer the sequence of erection for approval.

B. Erect items of structural steel in accord with applicable provisions of Reference Standard 1.03.

C. Erection Tolerances:

1. Structural Steel work erection tolerances shall be in accord with “AISC Specification for the Design, Fabrication and Erection of Structural Steel for Buildings” and “AISC Code of Standard Practice for Steel Buildings and Bridges”.
2. Let all structural members of single rolled shape and builtup members fabricated by riveting or welding, unless otherwise specified, be straight within the tolerances allowed by ASTM Specification.
3. Never let compression members deviate from straightness by more than 1/100 of the axial length between points which are to be laterally supported.
4. Let completed members be free from twists, bends and open joints. Sharp kinks or bends shall be the cause of rejection of materials.

D. Field connections shall be welded or bolted as indicated.

E. Temporary Bracing: Introduce wherever necessary to provide for loads to which structure is subjected including erection equipment and its operation. Leave in place until no longer required for safety. Make proper provisions for construction loads, piles of materials, equipment, etc., carried by structural frame during erection.

F. Alignment: No riveting, permanent bolting or permanent welding shall be done until the structure has stiffened with the resulting stresses and properly aligned.

3.03 WELDING TECHNIQUE

A. Perform welding in accord with appropriate Section of Reference Standards.

B. Conform the technique of welding employed, the appearance and quality of welds made, the methods used in correcting defective work to the requirements of the Standard Code for Welding in Building Construction of the American Welding Society.

C. Make surfaces to be welded free from loose scale, slag, rust grease, paint and any other foregoing material except that mill scale which withstands vigorous wire brushing remain. Any shop paint on surface adjacent to joints to be field welded shall be wire brushed, to reduce the paint film to a minimum.

D. Prepare edges by gas cutting, whenever practicable, cut by a mechanically guided torch.

E. Let gas cut edges which will be subjected to substantial stress or which are to have weld

metal deposited on them be free from gouges. Remove by grinding any gouges that remain from cutting.

F. Shape all reentrant corners notch free to a radius of at least 12 mm (1/2").

G. Bring the fit of joints at contact surfaces which are not completely sealed by welds, close enough to exclude water after painting.

H. Align all abutting parts to be welded carefully. Correct misalignments greater than 3 mm (1/8") and in making the correction, never draw parts into a slope sharper than two (2) degrees (7/16 inch in 12 inches).

I. Position the work for flat welding whenever practicable.

J. In assembling and joining parts of structure or of built up members, avoid needless distortion and minimize shrinkage stresses. Where it is impossible to avoid high residual stresses in the closing welds of a rigid assembly, make closing welds in compression elements.

K. In the fabrication of cover plated beams and built up members, make all shop splices in each component part before such component part is welded to other parts of the member.

L. Backing strips may be removed by gouging or gas cutting after welding is completed, provided no injury is done to the base metal and weld metal. Weld metal surface is left flush or slightly convex with full throat thickness.

M. Terminate butt welds at the ends of a joint in a manner that will ensure soundness. Where possible, do by the use of extension bars or runoff plates. Remove extension bars or runoff plates upon completion of the weld. Make the ends of the weld smooth and flushed with abutting parts.

N. Undercut and overcut should be avoided.

3.04 BOLTING

A. As erection progresses, bolt up work to take care of dead loads, construction live loads, lateral forces and erection stresses. Tighten all bolts to a bolt tension not less than the proof load given in the applicable ASTM Specification for the type of the bolt used.

B. Unless other wise noted, erection bolts used in welded construction may be either tightened securely and left in place or removed and the holes filled with plug welds.

C. Make high strength bolted connections in accord with Reference Standard for “high-type” connections with threads excluded from shear plane for bearing-type connections.

D. Contact surface with “slip critical (friction) type” connections shall be free of oil, paint, lacquer, or other coatings.

E. Tighten nuts using Direct Tension Indicators. Minimum bolt tension as per Reference Standard for each bolt type and size used. Use beveled washers to compensate for parallelism when outer face of bolted parts has a slope greater than 1:20 with respect to a plane normal to the bolt axis.

F. Let completed member be free from twist, bends and open joints. Sharp or bends shall be the cause of rejection of materials.

G. When bolts have been completely tightened, mark with identifying symbol.

3.05 FIELD PAINTING

A. For convenience, all steel works shall receive final painting on the ground before erection on a higher level. Connections made on the field by bolting or welding shall receive another coat of epoxy paint.

All steel work connections shall be free from loose mill scale, rust, weld slag and other foreign matter.

After erection, all unpainted areas including any marred or damaged surfaces shall receive one coat of same rust inhibitive paint as used in the shop painting.

05510 METAL STAIRS

PART 1 - GENERAL

1.01 SCOPE:

A. Provide all of the labor, materials, equipment, and services required to furnish and install the steel stairs.

1.02 QUALITY ASSURANCE:

A. Manufacturer: Shall have not less than 10 continuous years of successful production/installation of this product.

B. All components shall meet or exceed ADA, OSHA and appropriate building code requirements.

C. Comply with the following:
1. ASTM A36 - Standard Specification for Carbon Structural Steel.
2. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-dipped, Zinc-Coated, Welded and Seamless.
3. ASTM A366 - Standard Specification for Commercial Steel (CS) Sheet, Carbon (0.15 maximum Percent) Cold-Rolled.
4. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
5. ASTM A513 - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
6. ASTM A570 - Standard Specification for Steel, Sheet and Strip, Carbon, Hot-Rolled.
7. ASTM A569 - Standard Specification for Commercial Steel (CS), Sheet and Strip, Carbon (0.16 Maximum to 0.25 Maximum to 0.25 Maximum Percent), Hot-Rolled.
8. AWS D1.1 - Structural Welding Code - Steel.
9. AWS D1.3 - Structural Welding Code - Sheet Steel.

1.03 STRUCTURAL REQUIREMENTS:

A. Steel stairs: Engineer, fabricate, and install steel stairs to withstand the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections. Apply each load to produce the maximum stress in each component of steel stairs.

1. Treads: Capable of withstanding a uniform load of 100 lbf per square foot or a concentrated load of 300 lbf on an area of 4 square inches located in the center of the tread, whichever produces the greater stress.

2. Platforms: Capable of withstanding a uniform load of 100 lbf per square foot.

3. Framing: Capable of withstanding stresses resulting from loads specified above as well as stresses resulting from railing system loads.

4. Limit deflection of treads, platforms and framing members to L/240 or 1/4", whichever is less.

C. Handrails and railings systems: See Section 05 52 13.

1.04 SUBMITTALS:

A. Prior to fabrication, submit to the Architect for review the following:

1. Manufacturer's product data indicating materials.
2. Shop drawings indicating profiles, sizes, connection attachments, reinforcing, anchorage, openings, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable. Indicate welded connections using standard AWS welding symbols. Indicate net weld lengths.
3. Certification by an engineer, registered in the state where project is located, stating that stairs meet specified structural loading requirements.
4. Certification that primer finishes/coats are compatible with specified finished painting.

B. Submit all project required LEED documentation including, but not limited to, 500 mile radius data for local manufacturing/harvesting and recycled material content information.

1.05 DELIVERY, STORAGE, AND HANDLING:

A. Store components in a dry, clean location and cover to protect.

B. Rusted, bent, warped or otherwise damaged units will not be accepted.

PART 2 - PRODUCTS

2.01 TREADS, RISERS AND LANDINGS:

A. Type:

1. Closed risers with pans for poured-in-place concrete treads and landings.

B. Materials:

1. Steel: ASTM A-36.

2. Bolts, nuts and washers: ASTM A-325 bolts of sizes recommended by the stair manufacturer for the application.

3. Welding materials: AWS D1.1, type required for materials being welded.

C. Assembly:

1. Stringers: Minimum thickness or gauge as determined by structural design calculations, structural grade steel plate and/or channel.
2. Risers: Closed riser, minimum 14 gauge hot-rolled mild steel sheet, sloped maximum 1-1/2"
3. Treads: Manufactures standard concrete pan system (field poured) tread pans to be a minimum of 14 gauge, or as determined by design calculations. Pan depth 1-1/2". Exposed welds from the bottom side of flight assemblies will not be allowed. All welds to be from topside of tread pans as recommended by manufacturer.
4. Mid landings: Minimum of 11 gauge hot-rolled mild steel sheets, formed for a minimum 3" concrete fill, with 12 gauge channel supports and bracing welded to perimeter frame at 12" o.c.
5. Fasteners and supports: Sized by the manufacturer to meet the structural design criteria.

D. Fabrication:

1. Verify dimensions on site prior to shop fabrication.
2. Provide support beams appropriate for the application as recommended by the stair manufacturer.
3. Grind exposed welds flush and smooth with adjacent finished surfaces. Ease exposed edges to small uniform radius.
4. Priming: Clean surfaces of rust, scale, grease, and foreign matter prior to finishing. Do not prime surfaces in direct contact bond with concrete or where field welding is required. Apply one coat of primer.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. Inspect areas where stairs are to be installed for defects which would affect the proper installation of stairs. If any defects are found, do not commence stair erection until the defects are corrected.

B. Erect stair units plumb, square and in proper alignment, and securely anchor as indicated on the Drawings.

C. Do not field cut or alter members.

D. Field bolt and weld to match standard of shop bolting and welding. Hide bolts and screws where possible. Where not hidden, use flush counter-sunk fastenings.

E. Mechanically fasten joints butted tight, flush, and hairline.

F. Welding:

1. Welds shall be ground smooth.

2. Field welding and joining shall conform to AWS D1.1 and AWS D1.3 requirements.

3.02 TOUCH-UPS:

A. Clean and smooth all welds. Check welds for integrity before permitting any use of the stairs.

B. Check the complete installation for sharp edges and grind smooth any sharp edges found.

C. Clean surfaces of foreign matter, oil, and grease.

D. Touch-up any areas where shop coat has been disturbed to as closely as possible match the existing shop coat.

- END OF SECTION -

06000 WOOD AND PLASTICS

06200 FINISH CARPENTRY

1.00 GENERAL

1.01 SCOPE

A. Furnish all materials, labor, equipment, plant, tools, required to complete Wood framing, trims and mouldings Wood panel boards and related finish carpentry work as indicated on the drawings and/or specified herein.

B. Coordinate work with all other related trades.

1.02 HANDLING, STORAGE AND PROTECTION

A. Millwork

1. Protect millwork against dampness during and after delivery.
2. Do not bring interior finish, including doors, inside building until plaster is thoroughly dry.
3. Protect all finished woodwork from injury after it has been set in place until the completion and final acceptance of the work.

B. Medium Density Fiberboard, Gypsum Board and Fiber Cement Board.

Stack boards flat on a smooth level surface. Timber blocks may be used as support if it ensures optimum performance. Store sheets under cover and keep dry prior to fixing. If sheets should become wet, allow to dry thoroughly before fixing is commenced.

2.00 PRODUCTS

Refer to Section 01020 Summary of Materials and Finishes.

3.00 EXECUTION

3.01 WORKMANSHIP

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

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

C. Conceal means of fastening various parts together.

3.02 FINISH

A. Mill, fabricate and erect interior finish as indicated on the drawings. Machine sand at the mill and manual smooth at the job.

B. Separate with 6 mm (1/4”) stone-cut joints all interior trim set against with fine finishing nails, screws or glue where required.

C. Make mill mouldings perfectly smooth on exposed surfaces and true to profile.

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

E. Set nails for putty stopping.

F. Make window and door trim simple length.

G. Miter mouldings at corner, cope and angles.

3.03 WOOD SHELVING

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

B. Secure cleats to masonry walls by expansion bolt or approved fastening device.

3.04 CABINETS AND LOCKERS

A. Fabricate cabinets and closets in accordance with details.

B. Use sound kiln-dried lumber or medium density fiberboard.

C. Erect cabinets straight, level and plumb and securely anchor in place.

3.05 ASSEMBLY MATERIALS

A. WELDWOOD or approved water-resistant wood glue

B. SELLEY LIQUID NAILS or approved equal.

C. Nails, screws and bolts of appropriate type, shape and size for all types of joints.

3.06 FASTENERS FOR ECOBOARD

A. Fasteners: Use galvanized wire nails 32 mm (1 1/4") long for fixing to timber frames. Deutsher "Teks" screws may also be used with self-embedded head, No. 8 * 32 mm (1 1/4").

3.07 HARDWARE

A. Accurately fit and install all required finish hardware items.

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

Finish Hardware: See Summary of Materials and Finishes.

END OF SECTION 06200

08000 DOORS AND WINDOWS

08100 METAL DOORS AND WINDOWS

1.00 GENERAL

1.01 SCOPE

A. Furnish all materials, labor, equipment, plant, tools, required to complete:

Metal Doors and Windows

Metal Jambs and Frames

Operable Wall Partition

B. See drawings and schedules for size, details and location of required work.

1.02 SHOP DRAWINGS AND SAMPLES

A. Submit shop drawings and secure Architect's approval prior to placement of order.

B. Submit sample corner sections, hinges, tracks, handles and all other accessories.

C. Submit sample of one full size unit, complete assembly, with all accessories, prior to fabrication of steel windows.

2.00 _PRODUCTS

Refer to Section 01020 Summary of Materials and Finishes.

3.00 _ EXECUTION

3.01 METAL DOORS

A. Fabrication

a. Factory prefabricate all frames in accordance to the designs and dimensions indicated in the drawings.
b. Flush type doors shall be 45 mm (1-3/4") thick. Reinforced doors form steel sections extending full height of doors and spaced not over 200 mm (8") o.c. vertically.
c. Tops and bottoms of doors shall have continuous stiffener channels welded to side plates.
d. Insulate hollow flush doors with fiberboard or cork to deaden metallic sound. Edges at top sides shall be reinforced and finished flush.

B. Installation

1. Set and anchor frames as shown in details and in approved shop drawings.
2. Set frames plumb and square and brace where necessary to prevent distortion.
3. Provide continuous vinyl weatherstrip, vertically at meeting stiles on pairs and concealed top and bottom rails for all exterior doors. Entrances shall be constructed so that gaps will not occur between pivot stiles and door jambs when doors are locked or operational to prevent heat and air transmission and entrance of water and insects.
4. Protective Coating: Clean all surfaces and apply a protective coating of clear, waterwhite methacrylate type lacquer, resistant to alkaline mortar and plaster immediately after fabrication and may not be removed even after completion of installation.

5. Wedge clear of masonry all frames set in prepared openings 3/16 to 1/4 inch to allow for caulking.

Install hardware to fit details as shown in the drawings and as per manufacturer's specifications. Supply all necessary templates and instructions required.

C. Adjustments

1. Adjust all frames and attach all hardware before glazing.

2. Secure all windows and doors to be watertight and all hardware operating free and easy.

08441.3 ALUMINUM CURTAIN WALL

PART 1 - GENERAL

1.01 SCOPE:

A. Provide all of the labor, materials, equipment, and services required to furnish and install the aluminum curtain wall system and doors.

1.02 QUALITY ASSURANCE:

A. Qualifications:

1. Installer shall be experienced to perform work of this section who has specialized in the installation of work similar to that required for this project. If requested by Architect, submit reference list of completed projects.

2. Manufacturer shall be capable of providing field service representation during construction, approving acceptable installer and approving application method.

B. Mock-ups (field constructed):

1. Install at project site a job mock-up using acceptable products and manufacturer approved installation methods. Obtain Architect's acceptance of finish color, and workmanship standards.

a. Maintenance: maintain mock-up during construction for workmanship comparison; remove and legal dispose of mock-up when no longer required.

b. Mock-up may be incorporated into final construction upon Architect's approval.

C. Single-source responsibility: Provide curtain wall from one source and produced by a single manufacturer.

D. Pre-installation meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

E. Air leakage and U-factor:

1. Provide a permanent name-plate, installed by the manufacturer, listing the U-factor, SHGC and air leakage rate.

2. U-factor and the air leakage rate for all doors installed between conditioned space, semiheated space, unconditioned space, and exterior space shall be identified on a permanent name-plate installed on the product by the manufacturer.

1.03 SUBMITTALS:

A. Prior to fabrication, submit to the Architect for review the following.

1. Shop drawings showing the following:
   a. A description of all materials, sizes, dimensions, and gauges.
   b. Size of openings.
   c. Method of fabrication and assembly.
   d. Method of joining.
   e. Any concealed stiffening and reinforcement.
   f. Type of spacing of fasteners.
   g. Method of providing for expansion and contraction.
   h. Method of attachment to adjacent construction.
   I. Method of glazing.
   j. Location of sealant.

2. Physical Sample: An aluminum corner section of system in the color and finish proposed to be provided. Sample shall show complete range of light and dark of color anodized finish.

B. Submit all project required LEED documentation including, but not limited to, 500 mile radius data for local manufacturing/harvesting and recycled material content information.

1.04 PROJECT CONDITIONS:

A. Field measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

1.05 WARRANTY:

A. Manufacturer's warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under the Contract Documents.

1. Beneficiary: Issue warranty in the name of the project Owner.

2. Warranty period:

a. Windows: 2 years commencing from the Date of Substantial Completion.

b. Installation: Warranted against defects for 1 year from the Date of Substantial Completion.

PART 2 - PRODUCTS

2.01 CURTAIN WALL SYSTEM:

Description:
1. Thermally improved.
2. Horizontal and vertical framing member face dimension: 2-1/2". Depth as indicated on Drawings.
3. Flush glazing on all sides. No protruding stops.
4. Extrusion: ASTM B-221, 6063-T5 Aluminum.
5. Finish: AAMA 611-98, Class 1 - 7 mils minimum coating thickness, Powder Coated
C. Glazing: See Section 08800.

2.02 DOORS:

A. See Section 08411.3.

PART 3 - EXECUTION

3.01 GENERAL:

A. Installation shall be in accordance with the Contract Documents, the approved submittals, and the manufacturer's instructions.

3.02 FABRICATION:
A. Shop prefabricate all doors and frames into complete units, verifying all measurements at the job site prior to fabrication.
B. Fabricate in strict accordance with the approved submittals and the manufacturer's published recommendations.
C. Accurately miter and fit all members to hairline joints.
D. Weld or mechanically fasten along entire line of contact on the unexposed side.
E. No discoloration on the face after anodizing will be acceptable.

3.03 ERECTION:

A. Install all members with adequate provision for setting, expanding, and contracting to occur without breaking glass.

B. Firmly anchor all members, using all anchoring devices required to ensure positive attachment of the members for long life under hard use.

C. All items shall be set in their correct locations and shall be level, square, plumb, and at proper elevations and in alignment with other work.

D. All joints between interior metal and masonry and between interior glass framing and mullion members shall be tightly caulked in order to secure a watertight job.

E. All metal shall be screwed in place, using backing, masonry plugs, or anchor straps as required.

F. Where moldings are joined, they shall be accurately cut and fitted to result in a tightly closed joint.

G. Protection:

1. Wherever aluminum is in contact with steel, concrete, or other material potentially creative of electrolytic action, provide all required permanent isolation of the aluminum by backpainting with first quality bituminous paint or by such other isolation as is approved in advance by the Architect.

2. Protect all finished surfaces as necessary to prevent damage during progress of the Work.

3.04 CLEANING UP:

A. Immediately prior to acceptance of the work, remove all protective materials from the storefront system and clean all exposed members.

B. Do not use abrasives or harmful cleaning agents.

- END OF SECTION -

3.00 _EXECUTION

3.01 INSPECTION

A. Inspect openings before installation. Verify that rough or masonry opening is correct and sill plate is level. Masonry surfaces shall be visibly dry and free of excess mortar, sand, and other construction debris.

3.02 INSTALLATION

A. Comply with manufacturer's specifications and recommendations for installing window units, hardware, operators, and other components of the Work.

B. Set window units plumb, level, and true to line, without warp or rack of frames or sash. Provide proper support and anchor securely in place.

1. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with requirements specified under "Dissimilar Materials" Paragraph in appendix to AAMA 101.

C. Set sill members and other members in a bed of sealant or with joint fillers or gaskets, as shown on Shop Drawings, to provide weathertight construction. Refer to Division 7 Section "Joint Sealants" for compounds, fillers, and gaskets to be installed concurrently with window units. Coordinate installation with wall flashings and other components of the Work.

3.03 FIELD QUALITY CONTROL

A. Conduct on-site tests for air and water infiltration with window manufacturer's representative present. The Architect will select units to be tested. Tests not meeting specified requirements and units having similar deficiencies shall be corrected at no cost to the Owner. Testing shall be performed by a qualified independent testing agency selected by the Architect.

1. Air-Infiltration Tests: Conduct tests according to requirements of ASTM E 783. Allowable infiltration shall not exceed 1.5 times the amount indicated.
2. Water-Resistance Tests: Conduct tests according to requirements of ASTM E 1105. No water leakage is permitted.

3.04 ADJUSTING

A. Adjust operating sash and hardware to provide a tight fit at contact points and at weather-stripping for smooth operation and a weathertight closure.

3.05 CLEANING

A. Clean aluminum surfaces promptly after installing windows. Exercise care to avoid damage to protective coatings and finishes. Remove excess glazing and sealant compounds, dirt, and other substances. Lubricate hardware and other moving parts.

3.06 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to aluminum window manufacturer, that ensure window units are without damage or deterioration at the time of Substantial Completion.

END OF SECTION

08800 GLAZING

1.00 GENERAL

1.01 SCOPE

Furnish all materials, labor, equipment, plant, tools required to complete all glass and glazing works free from imperfection, water marks.

B. See drawings for size, location and details.

1.02 SUBMITTALS

A. Submit samples of glass panels with factory labels for Architect's approval.

B. Submit samples of glazing compound.

1.03 LABELS

Label each glass panel and do not remove from glass panel until final cleaning and after inspection and approval.

1.04 DELIVERY AND STORAGE

Deliver only as required and store in a safe location as directed. Unpack only when ready for use.

1.05 PROTECTION

A. Protect all glass from damage, breakage, staining, etching, differential ageing, abrasion, scratches, impact during construction and until final acceptance of the contract work. Replace unless satisfactory corrective measures can be made at the job without removing the damaged glass, as directed by the Architect.

B. Glazed openings shall be identified with a colorful flag, festoon, or tape suspended near, but not in contact with the glass. Tapes or banners may be attached to the sash at head, jambs or site with a non-staining adhesive or by any convenient, mechanical means. Do not mark or coat glass partially or completely with "X", "S" or other symbols with soap, wax cleaning powders or other materials.

C. Lost and damaged materials shall be replaced by the Contractor at his own expense.

2.00 _ PRODUCTS

Refer to Section 01020 Summary of Materials and Finishes.

3.00_EXECUTION

3.01 GLAZING

A. Prevent glass from all contact with metal or any hard or sharp materials by use of resilient shims placed at quarter points.

B. Use resilient sealants.

C. Use stops in sizes permitting a "good grip" on the glass.

D. Install glass only in openings that are rigid, plumb and square.

E. Allow sufficient clearance at edges of glass to compensate for its expansion or for some settlement of the building. Clearance should be 6 mm (1/4") from edge to frame and 3 mm (1/8") for face.

Removal of putty or glazing compound smears from glass shall be performed by the glazing contractor during the materials normal work life. Failure to do so may result in damage to the glass.

END OF SECTION 08800

09000 FINISHES

09200 PLASTER

1.00 GENERAL

1.01 SCOPE

A. Furnish all materials, labor, equipment, plant, tools, required to complete all plain cement plaster finish.

B. See drawings for details and location of work required.

1.02 RELATED DOCUMENTS

A. See Division 4 Section “Mortar” for description of Materials.

2.00 _PRODUCT

Refer to Section 01020 Summary of Materials and Finishes.

3.00 _ EXECUTION

3.01 PLAIN CEMENT PLASTER

A. Provide all walls indicated with three coats of cement plaster (scratch coat, brown coat and finish coat). Mix each coat in the proportion of one part Portland cement to three parts and by volume.

B. Apply the scratch coat with sufficient material and pressure to ensure a good bond and then scratch to a rough surface. Provide a thickness of 6 mm (3/8") for the scratch coat. Dampen with water before applying brown coat.

C. Apply brown coat one day after applying scratch coat with a thickness of 6 mm (3/8") and level to a flat even surface. When stiff enough, trowel with a wooden float and cross hatch or broom lightly and evenly to secure a good mechanical bond for the finish coat. Wet the surface and keep from drying out for at least three (3) days.

D. Apply finish coat using Duraplas cementitious plaster or equivalent seven (7) days after the application of the brown coat. Provide thickness of 2 mm .

DURA-PLAS Application:

1. MIXING: Mix approximately ratio off 0.4 part of clean water to 1 part of Dura-plas Maxi powder in a suitable container. Stir to achieve a lump free, tacky smooth paste. Add water when needed and then allow standing for 3 to 5 minutes. For best results: Re-stir, prior to application. (Mix only what can be used at that time. Do not attempt to extend the pot life by adding water. Do not mix directly on the floor, use plastic bucket for mixing).

Refrain from adding more water to a mixture which has already begun to set. Adding more water might weaken the properties of the product.

2. APPLICATION: Apply Dura-plas Maxi using finishing cement trowel, decorative rubber roller or mortar gun is recommended. Use cement trowel by force in pressing down to fill the dip or crack. Cover thin layer as topping directly to the rough surface of the prepared plastered wall. Allow to set and fill up to level and let dry. Applied area may be sanded 24 hours after application to attain flat, even surface (avoid continuous heavy sanding). Wash down with water make sure dirt and dust are removed and let it stand for a few days for hydration, prior to application of topcoat paint. END OF SECTION 09200

09300 CERAMIC TILE

1.00 _GENERAL

1.01 SCOPE:

A. Provide all of the labor, materials, equipment and services to furnish and install the ceramic tile and accessories as indicated on the Drawings and as specified herein.

1.02 SUBMITTALS:

A. Prior to installation, submit to the Architect for review the following:

1. Physical samples:

a. Tile and tile accessory pieces: Architect shall select from manufacturer’s full range of colors and prices.

b. Grout for selection of color.

2. Master Grade Certificate, signed by an officer of the firm manufacturing the tile used, and issued when the shipment is made, stating the grade, kind of tile, identification marks for tile containers, and the name and location of the Project.

B. Maintenance and operation manual: Submit tile manufacturer's maintenance guides for Owner's use in maintaining all tile herein specified.

C. Certification that all standards and requirements have been met. These shall include, but not be limited to:
1. Delivery.
2. Storage.
3. Conditions under which the materials were installed.

1.03 QUALITY ASSURANCE:

1. ANSI Specifications: American National Standard Specification for Installation of Ceramic Tile - A108.1-1976; A108.4-1976; A108.5-1976; A108.6-1976; A108.7-1967 (R1976); A118.1-1976; A118.2-1967 (R1976); A136.1-1967 (R1972).

1.04 DELIVERY, STORAGE, AND HANDLING:

A. Deliver all materials of this Section to the job site in their original unopened containers with all labels intact and legible at time of use.

B. Prevent damage or contamination to materials by water, freezing, foreign matter and other causes.

1.05 PROJECT CONDITIONS:

A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.

2.00 _PRODUCTS

Refer to Section 01020 Summary of Materials and Finishes.

3.00 _ EXECUTION

3.01 TCA INSTALLATION METHODS:

A. Tile shall be installed in accordance with the following TCA Installation Methods:

1. Thin-set floors: F-113.
2. Tile set with waterproof membrane: F-122.
3. Thin-set over gypsum board walls: W-243.

3.02 LAYOUT:

A. Determine location of all movement joints prior to beginning work.
B. Layout all tile work so as to avoid cuts of less than one-half tile size.

C. Locate cuts in both so as to be the least conspicuous.
D. Align all wall joints to give straight uniform grout lines, plumb and level.
E. Align floor tile joints square with walls, and make them uniform in width.
F. Caulk expansion joints wherever tile butts a perpendicular surface.

3.03 CLEAN-UP:

A. Remove debris daily while work is in progress. At completion of this work, leave the entire work area neat and work like conditions satisfactory for receipt of other related items of work which are to be installed as part of other sections.
B. Remove all grout haze, observing tile manufacturer's recommendations as to use of mild solution of muriatic acid and chemical cleaners. Rinse tile work thoroughly with water before and after using chemical cleaners.

ADHESIVE, GROUT AND SEALANT:

Grout and Sealant color coordinated as required. Include Colored Silicone Sealant as expansion joint every 4500 m x 4500m of Tiled Area and all tile to wall edges to thickness of tile.

TILE ADHESIVE

MIXING:

Into a plastic pail containing clean tap water, pour a sufficient quantity of TILE ADHESIVE that may be used within the pot life of 3-4 hrs. 5 kg of TILE ADHESIVE needs approx. 1.5 L of water and 25 kg needs approx. 8 L of water. Stir with a mixing device or by hand. Wait 15 min. and mix again briefly. TILE ADHESIVE is now ready to use. This mix will be usable within 1-2 hrs.

CAUTION: Use only plastic pail or galvanized iron sheet as mixing base. Never use absorbent material such as plywood, wooden box, gypsum board, etc.

APPLICATION:

1) Wet the substrate lightly before applying tile adhesive especially during hot and windy conditions.

2) Spread the adhesive mortar over 1m2 area at a time using a notched trowel.

3) Fix tiles immediately within the adhesive's open time of 15 min. Adjust and align accordingly. Carry out random checks every 5 m2 to determine whether the back of the tiles are fully covered with tile TILE ADHESIVE. Also check if the tile adhesive mortar still adheres to your fingers. If not, remove the adhesive layer and throw away. Do not mix with a newly prepared batch of tile adhesive mortar.

SPECIAL APPLICATION: For tile installations over non-concrete surfaces, such as existing ceramic tiles, moisture resistant gypsum boards, fiber cement boards, granolithic floors, marble, granite or wood, use TILE ADHESIVE in combination with REDIFIX or TILE ADHESIVE HEAVY-DUTY. Consult your representative or dealer for more information.

INSTALLATION:Fix tiles immediately within the open time of 20 minutes. Carry out random checks to determine whether the back of the site is fully covered with adhesive.

OPEN TIME: Open time is the period when the mortar's adhesive strength is most effective. Adjust and align accordingly within the adhesive's open time only.

FINGER CHECK:

To ensure that open time has not lapsed, check if the tile adhesive mortar still adheres to your finger in order to avoid bonding failure. Open time has lapsed, remove the applied adhesive layer and throw away. CAUTION: Do not add a newly prepared batch of tile adhesive to a previously mixed batch.

CLEANING:

Remove excess mortar on the tile face and on tools using clean water.

COVERAGE:

Dependent on substrate conditions 25 kg of TILE ADHESIVE shall cover approx. 5-7 m2.

END OF SECTION 09300

SECTION 09900 PAINTING

1.00 _ GENERAL

1.01 SCOPE

Furnish all materials, labor, equipment, plant, tools required to complete: all painting and varnishing works See drawings for location, quantity and extent of surfaces to receive paint and varnish.

1.02 WORK IN OTHER SECTIONS

The Painting Contractor shall examine the drawings and specifications for the section being painted and for painting work in other sections for possible conflict in work.

The Painting Contractor shall also examine all the surfaces to be finished under the contract and see that the work of other trades has been left or installed in satisfactory condition to receive the paint, stain, or specified finish.

1.03 PROTECTION OF WORK

The Painting Contractor shall protect his work and the work of other contractors against damage or injury caused by paint application.

1.04 WORKMANSHIP

A. The paint shall be applied only by skilled painters to the method specified so as to form a film of uniform thickness, free from sags, runs, crawls, or other defects.

B. For painted work, each succeeding coat shall differ slightly in color or tint from that of the preceding coat.

C. The Painting Contractor shall include in his work all final clean-up of paint spots on the floor, glass and finish hardware.

1.05 MATERIALS STORAGE

A. All materials shall be provided to the job site in clean, sealed, original containers with all labels and other markings intact. Materials will be stored in the area designated and all storage areas will be kept neat, clean and locked.

B. A room or rooms in the premises shall be assigned for the storage of painting tools and materials. Protect the floor with drop cloths or building paper. Place cloth and cotton waste in covered metal containers, or destroy them at the end of each work day.

C. All painting materials shall be received and mixed in an assigned room to avoid pilferage and maintain quality control. All necessary precautions shall be taken to prevent fire by complying with all applicable local Fire Prevention and Safety Ordinances.

1.06 COLORS

A. All colors are to be selected or approved by the Architect or his authorized representative and actual color chips shall be supplied to the Contractor for matching.

B. All undercoats shall be tinted to approximate the finish coat color.

1.07 SUBMITTALS

TEST PANELS: Prepare sample panels of selected color or shade on 300 mm by 300 mm (12” by 12”) plywood panels for approval by the Architect. Colors may not be the manufacturer's standard color. Special color shall be provided as required.

1.08 FIRE PREVENTION

Every precaution will be taken by the Contractor to prevent fires. At the end of each day's work, all oily rags, empty containers and combustible material will be removed from the premises. Seal all paint and varnish containers with remaining content and store outside the construction site.

2.00 _PRODUCT

2.01 MATERIALS

Refer to the Summary of Materials and Finishes.

Use materials in accordance with the manufacturer's directions printed on the labels unless otherwise, approved by the Architect.

2.02 SURFACE PREPARATION

A. Masonry (new surface)

1) All areas to be painted must be dry and free of dirt, grease, oil, dust, loose grit or mortar and other contaminants.

2) Treat with Concrete Neutralizer at least a week prior to painting. Apply sufficient coats, let dry, then brush off white crystals that form on the surface.

3) Apply one coat Concrete Primer & Sealer.

Fill up all hairline cracks and crevices with Concrete Putty. Allow to dry, sand smooth, dust off, then spot prime before applying finish coats.

B. Masonry (old surface)

Remove scaling, flaking, blistering and peeling off paint either with the use of paint remover, wire brushing, or scraping.

For chalking old paint, use Masonry Surface Conditioner as primer.

In case of mildew infestation, treat with Fungicidal Wash Solution by scrubbing or brushing. To ensure adequate treatment, allow to remain on the surface for twenty four (24) hours. Brush off and rinse with water. Let dry.

C. Wood (new surface)

1) All areas to be painted must be dry and free of dirt, dust, grease, oil and other foreign matter.

2) Sand surface until wood is smooth to touch and no slivers or rough edges remain.

3) Dust off completely, then wipe with clean rag.

4) Apply one coat of Interior Primer & Sealer or Exterior Wood Primer.

5) Fill nail holes, cracks, dents and damaged areas with Plastic Wood Dough or Glazing Putty.

D. Metal (new surface)

1) Remove dust, dirt, grease, oil, wax, loose scales and other contaminants by wiping with rag soaked in lacquer thinner or naphtha.

2) Sand, wire brush or scrape all rusty metal exposed to the weather for some time.

3) Treat surface with Rust Converter. Let stand overnight, then wipe off white residue with clean rag soaked in lacquer thinner of naphtha.

4) Apply one coat Red oxide or Red Lead or Zinc Chromate Primer. Let dry overnight before finishing with one or two coats of recommended topcoat.

3.00 _EXECUTION

3.01 APPLICATION

A. Employ only experienced, skilled craftsmen and apply as per manufacturer's written specifications.

B. Paint shall be applied by a brush, roller or spray in accordance with the manufacturer's directions. All materials when brushed, shall be evenly flowed on with brush best suited for the type of material being applied. When using roller, the covers shall be carpet, velvet back or high pile sheep wool best suited for materials and texture specified by the Architect. Sprayed paint shall be uniformly applied with suitable equipment.

C. Exposed surfaces shall mean all areas visible when all permanent or built in fixtures, etc., are in place in all areas specified or scheduled to be painted. Painted surfaces in back of movable equipment and furniture. Paint all inside metal and plastered surfaces visible through the above specified equipment covers.

D. Access panels, electrical panels, louvers, exposed conduits, primed outlet covers, primed wall and ceiling plates and other primed items they occur unless otherwise specified in Painting Schedule. Paint the back sides of access panels, removable or hinged covers and the like.

E. Do not apply exterior paint in damp, rainy weather. Do not apply interior paint when in the Architect's opinion, satisfactory results cannot be obtained due to high humidity and excessive temperature. However, failures of the Architect to notify the Contractor shall not relieve the Contractor of responsibility to produce satisfactory results.

3.02 PROTECTION

A. Protect or remove all exposed finished hardwares, lighting fixtures and accessories, plumbing fixtures and accessories, glasses and the like so that these are not stained during painting operations. Reinstall them after completion of works.

B. Tape and cover with craft paper or equal all other surfaces which would be endangered by stains or paint marks.

C. Repair any damage done. Refinish any work made necessary by defective workmanship for material or carelessness of other crafts.

3.03 WORKMANSHIP IN GENERAL

A. Mix paint with proper consistency. Apply paints evenly and brush efficiently to minimize brush marks.

B. Stir paint thoroughly to keep pigment in even suspension when paint is being applied.

C. Except as otherwise directed by the Architect, apply paints in three coats (priming, body and finish). Allow each coat to dry thoroughly before the succeeding coat is applied. In general, unless otherwise instructed by the Architect, provide not less than 48 hours as the time between the application of succeeding coats. Let the Architect or his representative inspect and approve each coat before the succeeding coat is applied.

D. If surfaces are not fully covered or cannot be satisfactorily finished in the number of coats specified, apply subsequent coats to attain the desired evenness of paint without extra cost to the Owner.

E. Touch up knots, pitch steaks, sappy spots, etc. where finish calls for interior paints or enamel. For exteriors, use any approved sealer.

F. Sand smooth woodwork to be finished with enamel or varnish. Use fine sand paper between coats of enamel or vanish applied to wood or metal to produce an even smooth surface.

G. Do not paint exterior while surface is damp or during rainy or damp weather.

H. Do necessary puttying of nail holes, cracks, etc. after the prime had been applied. Bring putty flush with adjoining surface in a neat, workmanlike manner.

I. Tint undercoats of paint or enamel to same or approximate shade of final coat.

J. Protect to remove hardwares, hardware accessories, plates, lighting fixtures and other similar items during the painting operation and reinstall them after completion of work.

3.04 VARNISHING

A. Sand thoroughly all woodwork surfaces to be varnished. Fill carefully all cracks, nail holes and other defects with first quality colored or white putty tinted to match the desired finish.

B. For open grain woods like Tanguile etc., reduce the prominence of the course grain by applying first quality paste wood filler with consistency reduced for brush application and tinted to match the desired finish. Allow this filler to set sell and remove excess by wiping across grain. Allow overnight drying or as per required by manufacturer. Remove all remaining surplus by wiping the wood.

C. Allow stains and varnishes to dry for 48 hours between coats and sand lightly between coats with no. 00 sand paper or finer. Clean and dust before applying the next coat.

3.03 CLEANING

Protect the work and adjacent work and materials at all times by a suitable covering or by other methods. Upon completion of the work, remove paint and varnish spots from the floor, glass and finish hardware. Remove all surplus materials, scaffoldings, etc. so as to leave the premises in perfect condition, acceptable to the Owner.

END OF SECTION 09900

10000 SPECIALTIES

15000 Mechanical

16000 Electrical

16100 BASIC ELECTRICAL MATERIALS AND METHODS

GENERAL

GENERAL DESCRIPTION

All electrical works for this project shall be governed by the provisions of the latest edition of the Philippine Electrical Code, rules and regulations of Local Authorities that have jurisdiction over the project and policies of electric and communication utility companies in the locality.

The plans and specifications are complementary, and what is called for in one shall be taken as called for in both.

The General Conditions and Provisions of the Civil Works Contract not in conflict with the plans and specifications form part of this section of the specifications.

SITE VISIT

The Contractor is advised to visit the site to ascertain for himself the prevailing local conditions there at and to check the existing line facilities of local power and communication companies. Also, to investigate other pertinent things that may affect his work. It shall be presumed that he had done this before preparing his proposal and no subsequent claim on the ground of inadequate or inaccurate information will be entertained.

SCOPE OF WORK OF THE CONTRACTOR

The work of the Contractor includes supervision, labor, equipment and materials, and to perform all electrical operations in connection with the electrical system shown on the plans, and their tests and inspection complete and in accordance with these specifications and plans and subject to the terms and conditions of the contract. Any equipment, materials, or works not shown on the plans but mentioned in the specifications, or vice-versa, shall be furnished and installed by the Contractor.

The following are the scope of work of the Contractor:

A. Install Owner-supplied transformers at locations indicated in the plans. Provide concrete base mounting pads.

B. Furnish and install Generator Sets. Provide resilient mounting pads on concrete base.

C. Furnish and install power service entrance including related concreting and civil works, such as excavation / backfilling and concrete encasement.

D. Furnish and install a complete roughing-in and wiring systems for lighting and power including feeders, branch circuits and taps.

E. Furnish and install all lighting fixtures, wiring devices and necessary wiring gutters and boxes.

F. Furnish and install motor wiring inclusive from overcurrent device to motor terminals except those specified to be done by other trades.

G. Furnish and install wiring and conduits for pump and electronic control motors of mini-irrigation system inclusive from overcurrent device to motor terminals except those specified to be done by other trades.

H. Furnish and install service entrance PVC conduit for incoming telephone service including related concreting and civil works.

I. Furnish and install complete telephone and public address/paging systems, wiring, outlets, telephone terminal cabinets, terminal blocks, wiring accessories, devices and all terminations.

J. Furnish and install a complete fire alarm system including wiring, control panel, alarm stations, bell stations, smoke detectors and heat detectors.

K. Furnish and install panelboards and enclosed circuit breakers as required.

L. Complete testing of all electrical and auxiliary systems.

M. Painting of all panelboards and enclosures.

N. Application of electric power service and telephone service connections including preparation of all necessary plans, forms and related documents, payment of government fees and charges and coordination with power and telephone companies and other authorities or persons involved in the procedures.

O. Preparation of as-built plans and drawings.

P. Furnish and install a complete grounding system.

Q. If anything has been omitted of any item of work or materials, usually furnished, which are necessary for the completion of the electrical works as outlined herein before, then such items shall be and are hereby included in this division of the work.

WORK NOT INCLUDED

A. Furnishing and installation of the kilo-watt hour meter which is to be supplied by others.

B. Furnishing of transformer which are to be supplied by Owner.

EXCAVATION AND BACKFILL

The Contractor shall be responsible for excavation to layout his electrical conduit. Excavation shall be such as to provide a uniform bearing for the conduit and shall be filled with gravel to grade.

CUTTING AND PATCHING

The Contractor shall furnish sketches to the General Contractor showing the location and sizes of all openings, chases, sleeves and inserts. He shall be responsible for the cost of cutting and patching where any electrical items were not installed, incorrectly sized or located. No structural members shall be cut without the consent and proper direction from the Architect. All patching shall be performed in a neat and workmanlike manner acceptable to the Architect.

SUBCONTRACTING

Whole or any part of the work without the written consent of the Owner. The Contractor shall be responsible for any work carried out by any subcontractor as if he himself were undertaking the job.

WORKMANSHIP

The Contractor shall execute all works in a neat and workmanlike manner and shall do all necessary works whether or not it is clearly specified in the plans and specifications. All work shall be done in accordance with the best practices employed in modern electrical installations.

The Contractor shall employ only competent and efficient workmen and shall, upon written request of the Architect, discharge or otherwise remove from work any employee who, in the opinion of the Architect, is careless, incompetent, an obstruction to the progress of the work, acts contrary to instructions or conducts himself improperly.

STANDARD OF MATERIALS

All materials shall be new and must conform with the technical specifications. They shall be standard products of reputable manufacturers and shall bear its name.

All materials shall be subject to the approval of the Architect. This approval shall not relieve the Contractor of the responsibility of inspecting such materials for defects and non-conformance with the specifications.

Where the technical specifications or the drawings give the name of the manufacturer and/or catalog number of a material, it is given as a guide as to the size, strength, quality or class of the material desired and shall be interpreted to mean that the item or another fully equal is suitable for the service intended. Substitution shall be subject to prior written approval of the Architect.

The apparent silence of the specifications and drawings as to any detail or apparent omission from them of a detailed description concerning any material shall be regarded to mean that only materials of first class quality shall be used.

REMOVAL OF DEFECTIVE OR UNAUTHORIZED WORK

Any defective work due to poor workmanship, defective materials, damaged through carelessness or any other cause, found to exist prior to acceptance of or final payment for the work shall be removed immediately and replaced by work and material which shall conform to these specifications or, otherwise, remedied in an acceptable manner. This clause shall have effect regardless of the fact that the work may have been done within the full knowledge of the Architect.

All materials not conforming to the requirements of the technical specifications shall be considered as

defective.

No defective materials, the defect of which has been subsequently corrected, shall be used unless approval has been given by the Architect.

CONFORMITY WITH PLANS AND ALLOWABLE DEVIATIONS

These specifications and drawings indicate the general layout of the system and the Contractor shall be responsible for the proper installation of the system without substantial alterations or modifications. Whenever departures from the specifications and the drawings become inevitable due to field condition of exigencies of construction, details of proposed departures shall be submitted without delay to the Architect for approval.

COORDINATION WITH OTHER CONTRACTORS

The Contractor shall familiarize himself with the specifications and drawings of the Civil Works and those works of the specialty trades to avoid conflict with their work. Whenever conflict with the works of other trades are identified or pinpointed, this should be brought to the attention of the Architect immediately for proper disposition and coordination to arrive at the best solution.

INJURY TO PERSONS OR DAMAGE TO PROPERTY

The Contractor shall be responsible for all injuries to persons and damage to property caused by his work or by his workmen and shall be liable for any claim against the Owner on account of such injury and/or damage. Likewise, he shall be liable to damages and loss of Owner's property caused by inclement weather or theft due to his defective work, negligence or carelessness of his men. Should the Contractor cause damage to the works of any other contractor, he should settle the matter between them and free the Owner from any claim on account of such damage.

SUSPENSION OR DELAYS

The Contractor shall not suspend or fail to make progress in his work without justifiable cause. In the event of continuous delay or suspension of the work still persists despite a written complaint, at the Owner shall have the right to take over the work and all materials in the site and take the necessary steps to have the work completed by others.

INSPECTION AND TEST

The Architect, or his representative, shall be allowed access to all parts of the work at all times and shall be furnished information and assistance by the Contractor to conduct a detailed inspection test. The cost of such inspection and test shall be borne by the Contractor.

The Contractor shall conduct the following tests, where applicable, on all electrical conductors and equipment installed in the presence of the Owner or his duly authorized representative.

A. ground resistance test
B. insulation resistance test
C. continuity test
D. voltage level test
E. phase relationship

The Contractor shall also check circuit connection at panelboards, and see to it that all single phase circuits are connected at panelboards, and see to it that all single phase circuits are connected to phase as shown in the load schedule.

All reports must be formal, typewritten and signed with the signatory properly identified.

All defects found during the tests shall be repaired immediately by the Contractor.

All tools, equipment and instruments needed to conduct the tests shall be on the account of the Contractor.

CLEANING UP

During the progress of the entire work, the Contractor shall keep clean the premises at all times by removing all dirt, debris, rubbish and waste materials caused by him in the performance of his work. He shall remove all tools, scaffolding and surplus materials after completion and acceptance of the work.

LEAVING THE SITE

The Contractor shall not withdraw from the site until the whole electrical system is complete and in operating condition and ready for use by the Owner.

GUARANTEE

The Contractor shall leave the entire electrical work in proper working condition. He shall replace any defective work or materials furnished and installed by him without charge for labor and materials except those caused by ordinary wear and tear within one year from the date of acceptance of the project by the Owner or Architect.

PERMITS AND DUES
The Contractor shall secure all necessary permits at his own expense and pay all corresponding government fees and taxes.

The Contractor shall include in his work, without extra cost to the Owner or Architect, drawings (in addition to contract drawings and documents) and associated paperwork as required by the electric and telephone companies and government authorities.

SHOP DRAWINGS
The Contractor shall submit five (5) copies of shop drawings to the Architect for approval within thirty (30) days after the award of the contract.

Shop drawings or brochures for all major electrical equipment, including service entrance equipment, lighting fixtures, panelboards, switches, wiring devices and plates and equipment of auxiliary systems shall be submitted for approval. All equipment shall be a standard product of an established manufacturer whether the manufacturer's name is specified or not.

The Contractor shall be able to submit sample fixtures when requested by the Owner or Architect. All materials and equipment installed without prior approval of the Architect shall be at the risk of subsequent rejection.

AS-BUILT DRAWINGS
The Contractor shall record all deviations made from approved construction plans during the progress of electrical construction and shall reflect the actual layout in the as-built plans. Upon completion of the project, the Contractor shall submit to the Architect two (2) complete sets of as-built plans signed and sealed by the Contractor's Professional Electrical Engineer. One (1) set of original tracing reproducible copy shall be submitted to the Owner.

INSPECTION AND CERTIFICATES
Upon completion of the entire installation, the approval of the Architect and Owner shall be secured. The Contractor shall obtain, at his own expense, a Certificate of Electrical Inspection from the government authorities having jurisdiction over the project and submit same to the Architect prior to final payment.

EQUIVALENTS
When materials or equipment are mentioned by name, they shall form the basis of the contract. If the name is not mentioned, the Contractor may, through written request, recommend an equivalent subject to the approval of the Architect. Substitution of specified materials, if allowed or approved by the Architect, will credit the Owner of any savings so obtained from the difference in cost.

DETAILED BREAKDOWN OF ESTIMATE
The Contractor shall submit a detailed estimate on each listed electrical system along with the bid proposal.

PRODUCTS

GENERAL
Where specifications of any type of material or equipment are in question, such materials shall conform to the standard specifications set by the following:

A. U.S. UNDERWRITERS LABORATORIES
B. U.S. NATIONAL BOARD OF FIRE UNDERWRITERS
C. NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
D. INSULATED POWER CABLE
E. AMERICAN STANDARDS ASSOCIATION
F. BUREAU OF STANDARDS, DEPARTMENT OF TRADE
G. PHILIPPINE NATIONAL STANDARDS

CONDUITS

A. Rigid steel conduits (RSC): shall be hot dipped galvanized, standard weight pipes made of mild steel smooth circular bore. It shall be in standard length of 3.05 meters including coupling, reamed and threaded on each end.

B. Intermediate Metallic Conduit (IMC).

C. Non-metallic conduit (PVC): CS40 smooth wall non-metallic conduit conforming to Philippine National Standards No. 14 for PVC Pipes. Conduit shall be in standard length of 3.05 meters including coupling.

SWITCHES, PANELBOARDS AND CIRCUIT BREAKERS

A. Circuit Breakers

Molded case circuit breakers shall be Japan-made. No bracing on handles of single pole breakers shall be allowed in lieu of two- or three-pole types.

B. Metal Enclosures and Cabinets

Panelboard enclosures, telephone cabinets, bus bar gutters, pull boxes, and wire gutters for feeders shall be locally fabricated by reputable manufacturers.

C. Safety Switches:

1. All safety switches shall be rated as shown in the plans and shall be fusible type unless noted otherwise.
2. All safety switches rated at 60A and above shall be spring assisted.

WIRES AND CABLES

Wires and cables shall be insulated for 600 volts. Feeders, sub-feeders and branch circuit wires and cables shall be soft drawn copper, annealed and of 98% conductivity, type THWN.

All joints or splices for No. 8 or larger shall be made with a double indent mechanical compression connector. Branch circuit splices shall be soldered. A soldered joint shall be carefully soldered without use of acid. After the conductors have been made mechanically and electrically secure, the entire joint shall be covered with rubber and plastic tapes to make the insulation of the joint or splice equal to the original insulation of the conductor.

LIGHTING FIXTURES

For lighting fixtures, lamps and accessories, refer to Electrical (E) Plans.

WIRING DEVICES

The following wiring devices are for small appliances, receptacles and switches to control lights only. For other specific loads they shall be described accordingly.

A. Duplex convenience outlet, grounding type, 10A, 250V.
B. Single-pole switch with mounting strap and device plate cover, 15A, 300V.
C. Two single-pole switch with mounting strap and device plate cover, 15A, 300V.
D. Three single-pole switch with mounting strap and device plate cover, 15A, 300V.
E. Three-way switch with mounting strap and device plate cover, 15A, 300V.
F. Special purpose outlet shall be as specified in the plans

AUXILIARY SYSTEMS

All systems shall be as per plans.

A. Fire systems shall be as per plans.

OTHERS

All other materials not mentioned herewith shall be one approved for the location and intended use and the best of its kind.

OPERATION AND MAINTENANCE

1. The Contractor shall furnish operation and maintenance manuals for each electrical and auxiliary systems and for each piece of equipment. Four (4) copies of the complete manual bound in hardback binders or an approved equivalent shall be provided to the Owner. One copy shall be provided to the Architect's office for future reference. The following identification shall be inscribed on the cover: the words "OPERATING AND MAINTENANCE MANUAL", the name and location of the project and the name of the Contractor. The manual shall include the name, address and the telephone numbers of each subcontractor supplying the equipment and systems, and of their local representatives. The manual shall have a table of contents with the tab sheets placed before instructions covering the subject. The instruction sheets shall be legible with large sheets of drawings folded in.
2. The manual shall include, but not limited to the following; a system layout showing circuits, devices and controls; wiring and control diagrams with data to explain detailed description of the function of each principal component of the system, the procedure for operating; shutdown instructions; installation instructions; maintenance instructions; test procedures; performance data; and parts list.
3. The parts list for equipment shall indicate the sources of supply, recommended spare parts, and life service

organization which is reasonably convenient to the building site. The manual shall be complete in all respects for all equipment, controls and accessories provided.

EXECUTION

SERVICES

Power and telephone service entrances shall be in PVC pipes installed underground, in concrete encasement, from their designated tapping points to the building being served. Specifications for this type of installation as indicated in the site development plans shall be applied.

A. Secondary service voltage from transformer shall be : 220 volts, 3-phase, 3-wire, 60 Hz.

WIRING METHODS

A. Conduit runs for lighting, power and auxiliary branch layouts shall be in PVC pipes.

B. Exposed conduit runs which are subject to physical injury shall be in RSC pipes.

C. Underground conduit runs shall be in PVC pipes encased in concrete.

GROUNDING

The following shall be grounded in accordance with the drawings and the requirements of the Philippine Electrical Code.

A. Metal enclosures of panelboards and circuit breakers, wire gutters, pull boxes, junction boxes and utility boxes.

B. Non-current carrying metal parts of lighting fixtures, devices and motors.

C. Provide a continuous and effective equipment grounding system.

DISTRIBUTION FEEDERS

Feeder conductors and raceways shall be installed as shown on the plans and no changes in size shall be made without written consent from the Architect and Engineer. Feeder conductors shall be continuous without splices to its destination panelboards, circuit breakers and wire gutters.

BRANCH CIRCUITS

The plans indicate the general installation of all circuit wiring and outlets. Branch circuit raceways shall follow the line of shortest distance between connection points as practicable and in so far as the building condition would allow. However, exposed feeders and circuit raceways shall be installed following the building line. No wires of different circuits shall be inserted in one conduit. Where homerun for light and branch circuits exceeds thirty (30) meters, the next larger conductor size shall be used.

PANELBOARDS

Panelboards shall be fabricated from gauge no. 16 black iron (B.I.) sheet with epoxy primer and baked enamel paint finish. Doors shall be hinged with allen screw lock from the top to bottom. Front covers shall have a stainless push-to-open lock. Dead front covers shall only be removed after the front cover has been detached.

WIRE GUTTERS AND PULLBOXES

Common pullboxes and wire gutters shall be fabricated from gauge no. 16 B.I. sheet with epoxy primer and baked enamel paint finish. Cover shall have twist lock on corners and centers of edge.

OUTLET, SWITCH AND SPLICE BOXES

Power, lighting and auxiliary outlet boxes shall be fabricated from gauge no. 16 standard pressed steel or cast metal coated with red lead primer before installation.

RACEWAY SYSTEM

1. Conduit raceways and tubing shall not have more than four quarter bends in any continuous run. Where more than four (4) 90-degree bends become necessary, a pull box shall be installed to reduce the four (4) quarter bends into halves. Exposed conduits shall be run parallel with or perpendicular to the building line. Exposed conduits shall be secured in place by means of approved supports, hangers or fastenings. Conduit supports shall be fastened to walls by means of bolts with expansion sleeves. The use of wood or lead plugs is not permitted. All conduit ends shall be firmly attached to cabinets or boxes by means of locknuts and bushings. Field bends shall not be allowed for rigid steel conduits larger than 20mm diameter. Threadless couplings and connectors used with the tubing shall be of concrete-tight type. No

tubing smaller than 15mm diameter shall be used.

Exposed conduits shall be treated with red lead primer and finished with gray color paint. All field cut threads shall be painted with white lead.

16420 ELECTRICAL DISTRIBUTION SYSTEM

GENERAL REQUIREMENTS

SCOPE OF WORK

Furnish materials and equipment and perform labor required to complete the following:

- Power distribution system
- Lighting system
- Lightning Protection System

Refer to drawings for extent and magnitude of work.

PRODUCTS

refer to Electrical (E) Plans

EXECUTION

POWER SYSTEM

A. Unless otherwise indicated on drawings, do all wiring for power, connections of motors and line switches, motor starters, speed regulators, circuit breakers, compensators or any other appliance or electrical component that may need motors and specific power requirement. Present a representative when the motors are first started by the supplier for testing.

B. Wire control may be 3.5 mm^2, 5.5 mm^2 and 8.0 mm^2 Type "THWN" and color-coded for easy identification. Use PHELPS DODGE, or approved equal.

LIGHTING SYSTEM

A. Install all wiring in rigid conduit and, in general, conceal them in the structure, except connections to luminous recessed fluorescent troughs, which shall be in flexible steel conduit or ACT cable.

B. Balance lighting conduits at the panels on the 1-phase, 3-wire systems.

COMMUNICATION SYSTEM

Telephone and Intercom Systems:

A. Furnish and install conduits, cables, telephone & intercom cabinets, terminal blocks, pull boxes, telephone & intercom outlets, and telephone/intercom lines as per plans, and other outlets and/or lines the Architect may consider necessary. Provide telephone backing.

B. Furnish and install conduits, cables for public address and sound system.

C. Install all wiring in rigid conduit.

WIFI SYSTEM

Wifi System:

A. Furnish and install conduits, cables, hubs and routers for each floor to service all levels. Connect to UP when possible.

B. Install all wiring in rigid conduit.

FIRE ALARM AND SIGNALLING BELL SYSTEM

A. Install all wiring in rigid conduit and, in general, conceal them in the structure.

B. Install components at terminals as the general location indicated in the plans, and in conformity with the respective specifications for the systems. Confirm the exact placement of components with the Architect prior to implementation and installation.

LIGHTNING ARRESTER

A. Use bare copper wire, 22mm^2 for line inside, and grounding rod 20 mm diameter x 3.00 meters solid copper embedded in the ground. Install where indicated by Electrical Engineer.

B. Fix the cable securely to the base of the finial and to the solid rod at its base. Drop the cable at the center of the spire avoiding contact with any of the steel reinforcement.

SECTION 16721 FIRE PROTECTION

GENERAL

SCOPE

The work includes the furnishing, installation, commissioning and putting into operation and ready for use a non-coded Class A automatically activated pre-signal, general alarm, pre-signal, 2-wire supervised detection system. The fire alarm system shall consist of the main control panel, manual stations with key switch, manual stations with key switch and vibrating bells. The main control panel shall include alarm silencing switches, system test switches, battery check switch, visual indicator for power, fault and alarm condition; and a trouble sound alarm for system fault indication. The fire alarm system shall be provided with nickel-cadmium batteries for reliable backup operation.

SYSTEM OPERATION

The fire detection main control panel shall have a capacity of at least 8 zones (expandable) in which alarm horns shall be used as the sounding device.

The activation of a manual station shall initially activate a buzzer presignal alarm at the main control of the panel. The corresponding that zone shall be lighted forewarning key personnel to investigate and evaluate the danger at the indicated area. If conditions warrant, the alarm mode can be initiated manually either by inserting a key at any manual station or at the main control panel. The system shall automatically trigger a general alarm should the presignal not be canceled at the preset time. System restart shall be effected at the main control panel.

SHOP DRAWINGS AND TECHNICAL CATALOGUES

The Contractor shall provide together with his proposal technical catalogues (3 sets) and shop drawings indicating the number of wires and sizes or conduits required for his equipment to properly function as required for approval by the Engineer prior to installation.

TESTING AND GUARANTEE

After completion of the system installation and at such time the Engineer may direct, the Contractor shall conduct system and equipment operational tests and make all adjustments required to fully and completely demonstrate that the system has been installed and will operate in accordance with the specifications, drawings, codes and free from any ground, shorts or defects. Copies of test results shall be provided to the Engineer and the Owner's representatives.

The Contractor shall guarantee his work, equipment for a period of not less than one (1) year from the date of final acceptance. Any part of the work or equipment that becomes defective or that will show evidence of defect or neglect during the said period shall be replaced or remedied at the expense of the Contractor without any contest.

PRODUCTS

A. Fire Alarm Devices and Detectors:

B. Fire Alarm Control Panel: Shall be expandable, with supervice bell circuits and supervice detector circuits, with capacity to support 12-volts, 2.6 AH rechargeable sealed battery, plug-in terminal block zone wiring, bell-ring and external trouble input, individual LED indicator for individual zone alarm and fault, AC-AC fault.

EXECUTION

INSTALLATION

Install fire alarm system as per manufacturer's instructions

16200 Electrical Power

WIRES AND CABLES:

No conductor shall be less than 3.5 mm^2 in size unless otherwise specified.

CONDUITS:

As indicated in the Electrical (E) Plans.

Non-Metallic Conduit (PVC): smooth wall non-metallic conduit conforming to Philippine National Standards No. 14 for PVC Pipes. Conduit shall be in standard length of 3.05 meters including coupling

OUTLET BOXES AND FITTINGS:

Convenience Outlets: White color, Wide-Series, Universal outlet, 220V, with amperage as required. For general building interior use.

Weatherproof Outlets: Double device plate with cover receptacle, heavy duty. For outlets inside pump room and other exterior-located outlets, as indicated in the plans.

Boxes: Metal utility boxes Ga. 16, sizes and shapes as required.

SWITCHES, PANEL BOARDS AND CIRCUIT BREAKERS:

ESTIMATING

Includes circuit breakers, panel boards, starters, grounding, and accessories.

Switches: With amperage as required. Suited to location and intended purpose. Approved type by architect.

Circuit Breakers: GA 16 bolt-on type, pre-painted, surface mounted, with latch lock.

Magnetic Starter: With casing, surface mounted with latch lock.

Metal Enclosures and Cabinets: FUJI-HAYA, ALLIED, MACROPOWER or approved equal.

includes pull-boxes, junction boxes, convenience and weatherproof outlets, switches, cover plates, other wiring devices and accessories.

16500 Lighting

ESTIMATING

All lighting includes luminaires - color temperature to be determined upon approval of products

END OF DOCUMENT