



TECHNICAL SPECIFICATION
FOR
ARCHITECTURAL WORKS

MULTI-PURPOSE CENTER

BORONGAN CITY, EASTERN SAMAR

24 SEPTEMBER 2015



IOM • OIM

INTERNATIONAL ORGANIZATION FOR MIGRATION (IOM)

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ARCHITECTURAL WORKS TECHNICAL SPECIFICATION TO BE READ IN CONJUNCTION WITH ARCHITECTURAL DRAWINGS



SECTION 01 PRELIMINARIES

PERMITS, REGULATIONS AND AUTHORITIES

A Generally: The Works shall comply with the National Building Code of the Philippines, the rules and regulations of the Municipality, and the requirements and regulations of relevant authorities. The expression relevant authority means any statutory or other organisation, and its employees and agents, having jurisdiction over the Works, and includes the Relevant Building Surveyor and the authorities which supply services, including electricity, water, sewerage, drainage and the like, where applicable.

The Contractor shall make all required applications and pay all fees to relevant authorities. The Contractor shall prepare and submit applications including those, which are required to be signed by the Owner. However, the Contractor shall submit progressively evidence of applications made and fees paid, and submit copies of permits received by it from the issuing authorities.

The Owner reserves the right to direct the Contractor to make applications to relevant authorities and pay the related fees and charges otherwise indicated as carried out and paid for by the Owner.

The Contractor will make all necessary applications and pay all fees for hoardings, building over roadways, issue and obtain all relevant works protection notices and any other statutory or required permit required for the Contractor to construct the Work. All these applications fees etc will be at the Contractors expense.

B Planning and Building Permit: The Contractor will arrange and pay for and obtain the Planning and Building Permits and arrange and pay for the services of the Relevant Building Surveyor, and lodge plans.

SCOPE OF WORKS

The works for this building contract will in the main comprise:

Clearing of site, and required site works, including coordination with local authorities to connect to electricity, water, sewerage, drainage and the like, where applicable.

Construction of one (1) new building:

- Multi-Purpose Center (also referred to as *Borongan Community Evacuation Center*)

STAGING OF THE WORKS

The project is to be undertaken as single stage exercise.

GENERAL

A Usual, incidental and necessary work: Where an item or process is usual, incidental or necessary, or is reasonably and properly to be inferred from the Contract Documents, and minor items not expressly indicated but necessary for the completion of the Works, shall be deemed to be included, whether described or indicated in the Contract Documents, or not. Include all work required by the condition of existing buildings, whether indicated in the Contract Documents, or not.

B Existing dimensions: Existing dimensions shall be considered when setting out the Works. Verify dimensions and levels before commencing work on site or shop



drawings. Notify any discrepancies to the Architect for clarification and directions before commencing work.

- C On-site drawings:** Prepare one complete set of Contract Documents with durable water-proof covers, and keep on site for the duration of the Works for inspection by the Architect. Covers may include sleeves, plastic lamination or plastic sheet securely sealed to plywood backing. Keep on site a complete set of the approved shop drawings, with current amendments if any and signed Building Permit Documents.

AS-BUILT DRAWINGS

During construction, the Contractor shall keep accurate as-built records of sizes, locations and depths of footings, service pipes and ducts, including junctions, changes in direction, fittings, access points and sumps.

Before Final Acceptance of Completed Works, the Contractor shall mark-up drawings with the as-built information, and submit the marked up as-built drawings, in good condition.

SURVEY AND SETTING OUT

The Contractor will engage and pay for a licensed surveyor to set out the Works, including fences and site works, and shall maintain site boundary pegs and temporary bench marks in good condition and correct positions until the set-out is certified correct. Any peg or bench mark accidentally or purposely removed before this time shall be re-established by the original surveyor at the Contractor's cost.

CONSTRUCTION SCHEDULE OF WORKS

Within the timeframe specified in the NoA and no later than the date of signature of the Contract the contractor shall submit a construction schedule of works showing the following:

- Sequence of work.
- Critical paths of activities related to the work.
- Allowance for holidays.
- Activity inter-relationships.
- External dependencies including permit approvals and work by others.
- Estimate manpower and equipment.
- Submittals (materials tests, shop drawings, and samples).
- Periods within which various stages or parts of the work are to be executed.
- Revisions: Revise the construction program as required by the progress of the work. Submit revisions with each progress claim. Identify changes since the previous version, and show the estimated percentage of completion for each item of work.

Display in the contractor's site office an up-to-date construction schedule of works.

SITE MEETINGS

Attend site meetings with the Architect to review progress, co-ordination and other matters. Site meetings shall be held at a regular time and place each fortnight, or at regular intervals determined by the Architect. Arrange the attendance of relevant site personnel, and other parties, if directed.

SITE PERSONNEL AND RECORDS



- A Site personnel:** Retain a full-time, experienced construction manager on site for the duration of the Works. The construction manager shall be authorised to receive directions from the Architect. Provide the afterhours contact telephone numbers of the construction manager for use in emergencies.
- B Records:** Maintain a daily site diary which shall record general progress and any significant events, the number of personnel and list of onsite subcontractors, temperature and weather conditions, meetings, visits and inspections, delays, unusual events and accidents. The original site diary shall be available for inspection and copying by the Architect at any time without notice.

PROJECT SIGN BOARDS

The Contractor may erect a sign or signs to identify itself and its subcontractors and suppliers. Such signs may be free-standing or attached to hoardings, fences or structures. All such signs shall be subject to the Architect's approval. Remove any unauthorised advertisements or signs immediately discovered or if directed. Remove all signs before Final Acceptance of Completed Works. The Owner reserves the right to display any sign on hoardings or elsewhere.

TEMPORARY HOARDINGS AND SAFETY FENCES

It remains the Contractors responsibility to prepare applications and obtain all relevant authority permits required for hoardings and safety fences and to maintain such safety hoardings to the satisfaction of the relevant authority for the duration of the Project..

Enclose the Works with suitable temporary barriers and protection, prevent the entry of unauthorised persons onto the site, and prevent injury, damage, vandalism and theft. Supervise openings and access points to the Works during working hours and lock up the Works during nonworking hours.

Allow for removal and relocation of hoardings and safety barriers during the course of the project to allow access to buildings.

HOURS OF WORK

Do not carry out on-site work outside working hours notified or approved by the relevant authority. The Architect reserves the right to direct that working hours be further modified or restricted.

PROTECTION OF ADJACENT LAND AND BUILDINGS

- A Generally:** Protect adjacent land and buildings from interference or damage attributable to the Works. Ensure that the Works does not adversely affect the rights and interests of occupants of adjacent and surrounding buildings and properties.

Co-ordinate the construction of any required temporary and permanent support and protection for structures and ground-works on adjoining areas.

Obtain agreements with the Owner regarding the construction procedures, timing and required access onto adjacent buildings and areas before commencing any such work.

- B Protection:** Provide appropriate support and protection not less than that provided by existing ground-works, structures and fences before excavation or demolition. Maintain support and protection in good condition, alter as necessary, and remove



before Final Acceptance of Completed Works, or if directed. Support and protection may include under-pinning, shoring, strutting, retaining walls, fencing and the like. Submit computations for the proposed support and protection. Do not commence relevant work until the Architect and/or Engineer have approved the proposed support and protection methods.

Where permanent supports for adjacent structures are required and are not indicated, notify the Architect and obtain instructions. The Architect reserves the right to arrange for the rectification of damage or defects to adjacent buildings and areas attributed to the Works and deduct the cost of such rectification from the Contract Sum.

- C Adjacent roads, paths and land:** Provide and maintain continuous access to adjacent buildings and areas for pedestrians and vehicles. Do not close or obstruct any road or path unless required by the Contract Documents and carried out in accordance with the requirements of the Owner. Make arrangements with the Owner for access to and from the site for personnel, goods and materials, and constructional plant and equipment. Provide required temporary roads, crossings over existing roads and paths, in accordance with the requirements of the relevant authorities and Owner and remove when no longer required. Provide traffic control equipment such as vehicle barricades, signs, traffic lights and the like, as required from time to time. .
- D Making Good:** The Contractor is to make good all roads, crossovers, kerbs, channels, pits, footpaths etc damaged or worked on, as a requirement or consequence of the works, to the satisfaction of the Architect and relevant authorities, without additional cost to the Owner.

EXCAVATIONS

Protect excavations, ground-works and exposed slopes to ensure the safety of site personnel, adjacent property, and the general public at all times. Provide temporary supports, bracing, shoring, planking and strutting as required. Provide covers over holes. The Architect reserves the right to require additional temporary supports at no additional cost to the Owner. No direction by the Architect shall relieve or modify the complete responsibility of the Contractor.

EXISTING SERVICES

- A Generally:** Before commencing work, locate and identify existing services whether active or not and similar concealed items on or adjacent to the site which might be affected by the Works. Coordinate with relevant services authorities and the Owner and notify the Owner before commencing any work, which may affect the services. . Carry out all required work on services in accordance with the requirements of the relevant authority. Record the location of all services discovered during the Works, including inactive or abandoned services on as-built drawings. Maintain services to adjacent buildings to ensure the proper operation and continuous supply of such services during the construction period.
- B Active, inactive and abandoned services:** Protect and maintain existing active services at all times. Relocate services if required. Where relocation is for the convenience of the Contractor, pay the costs of such relocation. Establish procedures required in the event of damage or interruption to active services on or adjacent to the site during construction. Immediately notify the relevant services authority in the event of damage or interruption, comply with all instructions by the



authority, and pay for the repair or replacement of damaged services as directed by the authority. Inactive services discovered during construction shall be progressively removed or sealed, and made safe. Do not excavate by machine within 300 mm of existing underground services.

TEMPORARY SERVICES

- A Generally:** Provide all required temporary services required for the Works, including electricity, water, sewerage, storm water disposal, telephone and the like, regardless whether permanent services are available or not. Negotiate with the Owner to pay all connection and consumption charges, comply with conditions, provide connections, equipment and reticulation, and remove entire installation and make good when no longer required or at Final Acceptance of Completed Works.
- B Power, lighting and ventilation:** Reticulate temporary power to required work areas. Comply with all safety requirements and notify all site personnel of safety procedures. Provide general and access lighting to circulation and common areas. Provide task lighting of adequate brightness and quality to carry out installation and inspection of the work of each Trade Section.
- C Ventilation:** Provide adequate ventilation to work areas when volatile coatings, solvents and adhesives are being used, and provide suitable warning notices. Provide mechanical air extraction equipment if required.

NUISANCE, WATER AND EROSION

A Noise and Dust

Minimise nuisance to the adjoining building occupants, the public and tenant and occupants of adjacent properties, from noise and dust from the Works. If directed, submit proposed procedures to minimise and control such nuisance and carry out approved procedures. Re-submit progressively any proposed changes to the approved procedures. Limit noise-producing activities to normal working hours unless otherwise approved by the Architect. All constructional plant and equipment shall be fitted with noise suppressers, acoustic linings or screens. Sirens and loud hailers shall not be used except in an emergency. Use suitable equipment and procedures, screens and water spraying to reduce dust nuisance. Spray dust-producing materials before loading in trucks or open containers. Use trucks with suitable covers for transporting dust-producing materials or materials that could be dislodged by wind.

B Water and moisture:

Control moisture and dampness which may cause damage to the Works. Provide flashings, seal around penetrations, properly fix roofing and cladding and carry out all required work to ensure the exclusion of water and weather. Control surface water, and prevent flooding, ponding, seepage and erosion generally which may cause damage or delay to the Works. No claim for additional cost or extension of time will be approved for remedial work due to failure to prevent entry of moisture or to remove water. Keep excavations and ground-works free of surface water. Prevent surface water flowing over freshly constructed work. Prevent surface water collecting on or near exposed slopes and excavations. Remove surface water immediately before back-filling or placing new work and services in excavations.

C Construction drainage:



Provide and maintain temporary drains, graded surfaces, embankments and the like to control the flow and collection of surface water. Keep drains clear at all times to enable unrestricted flow. Prevent erosion of the site and contamination of adjacent areas. Remove and make good as soon as temporary drains are no longer required. Prevent water run-off from site, and sediment and debris carried by such run-off, over Adjacent Properties.

D Pumping:

Where required, provide maintain and continuously supervise suitable pumping equipment to remove water from the Works and the site. Discharge water into approved storm water drains at locations and conditions approved by the relevant services authority. Do not discharge water over adjacent ground or near exposed slopes and excavations. Provide effective settling pits or other methods to prevent discharge of silt or other solids into storm water drains, and dispose of silt to a legal disposal location

FIRE SAFETY

Comply with the fire safety requirements of the Relevant Authorities, Building Code and relevant Standards, and Fire Engineering Reports, if applicable. Provide and maintain all required temporary fire protection equipment. Coordinate and comply with Owner's existing fire safety procedures, if any. Store inflammable materials safely in accordance with relevant Standards and accepted industry practice. Remove inflammable debris at the end of each day, including debris subject to spontaneous combustion. Do not light fires on or adjacent to the site.

ASBESTOS AND HAZARDOUS MATERIALS

- A Generally:** Do not bring to the site or incorporate in the Works any material, which contains toxic or dangerous substances, including asbestos or any material containing asbestos or mineral fibres.
- B Existing and found asbestos and/or hazardous materials:** Immediately notify the Architect of any asbestos or toxic material discovered on the site and arrange for removal and decontamination by a qualified specialist in accordance with an approved program of work.
- C Disposal:** Properly dispose of all toxic and dangerous materials to a legal disposal location, and comply with the requirements of the relevant authority.

SEPARATE CONTRACTORS

The Owner retains the right to have specialist work carried out by Separate Contractors during the construction period. Where the Owner has engaged such Separate Contractors, the Owner Contractor will: Provide attendance, coordinate and cooperate with Separate Contractors. Integrate such specialist works into the overall construction program to ensure proper completion of all work before the Date for Final Acceptance of Completed Works. Distribute copies of the adjusted construction program to relevant parties. Give Separate Contractors notice in writing of required commencement and completion dates not less than three weeks in advance. Provide adequate space for unloading and storage of goods and materials. Provide temporary services. Provide access to site amenities. Ensure that the site or relevant work areas are in a suitable condition for commencement of such specialist works. Protect and secure the work of Separate Contractors from damage and make good any such damage. Co-ordinate hoisting requirements and provide same.



PENETRATIONS AND CHASING

Construct all required openings, penetrations, plinths, up-stands, set-downs and chasing to the Works for services and built-in items. Coordinate with relevant subcontractors and obtain correct and accurate locations, sizes, tolerances, details, making good and statutory requirements of all such penetrations. Jointly investigate with relevant subcontractors the optimum location of services and built-in items in relation to structural members, clearances, other services, and openings which may affect installation and proper functioning of such services and built-in items.

CONSTRUCTIONAL PLANT AND EQUIPMENT

Provide and maintain all required constructional plant and equipment. Constructional plant and equipment shall include site sheds and facilities, storage compounds, hoisting and crainage, scaffolding, platforms, ladders, handrails, power tools, hand tools, safety equipment, and the like. Constructional plant and equipment shall comply with the requirements of all relevant authorities. Obtain required permits, pay applicable fees and comply with all conditions and instructions. Remove all constructional plant and equipment when no longer required.

ACCESS AND LOADING

- A Parking:** Make arrangements for car parking in legal designated areas which do not cause nuisance or obstruction to adjacent properties.
- B Loading:** Set aside and clearly indicate on site loading and unloading areas where practicable. Coordinate location of loading areas on the grounds of occupied premises with the Architect and Owner Where loading cannot take place on site, designate areas of adjacent roads and paths approved by the Architect and relevant authorities. Comply with all imposed conditions for such use. Do not store goods and materials on adjacent roads and paths unless approved in writing by the Architect and relevant authorities. Keep loading areas in a clean and safe condition at all times.

SITE ACCOMMODATION

- A Generally:** Provide temporary site sheds and accommodation for administration, storage and site amenities. Site sheds shall be properly constructed, in good condition, weather tight, with natural light and ventilation, power and lighting, and freshly painted. Site sheds shall be properly secured to a base or foundation, and connected to suitable drainage and sewerage in accordance with the requirements of the relevant services authorities. Locate site sheds in on properly constructed gantries designed and approved by Structural Engineers and by the Architect and, if required, the Local Government Unit.

Keep site sheds tidy, clean, and in sanitary condition. Remove site sheds before Final Acceptance of Completed Works. Make good after removal adjacent areas.

If the Contractor deems it necessary to relocate site accommodation, all costs associated with the relocation and consequential reconnection of temporary services is at the Contractor's cost.

- B Amenities:** Provide site amenities in accordance with the requirements of the relevant authorities, industrial agreements and awards, and occupational health and safety practice. Obtain all required permits, pay all applicable fees and comply with



all conditions and instructions. Site amenities shall include lunch rooms, change rooms, ablutions and first aid rooms, including washing and screened toilet accommodation for male and female personnel.

OCCUPATIONAL HEALTH AND SAFETY

Take responsibility and ensure the health and safety of all employees. Be aware of and comply with the statutory occupational health and safety obligations and relevant acts and ordinances. Notify details of all accidents to the Architect, and provide monthly reports stating total hours worked, number of accidents and time lost, rehabilitation reports and other relevant information. Remove from site of any person not wearing or using required safety clothing and equipment, or any person who refuses to carry out occupational health and safety related instructions.

PROPRIETARY BRANDS

Where the Specification refers to one or more proprietary brand names, the Contract Sum shall be deemed to include the cost of such products and the Contractor shall use one of such products in the Works. The Contractor may offer alternative products with similar characteristics, quality, appearance, finish, method of construction or performance after the Notice of Award (NoA) has been issued. Such proposals shall include appropriate technical details and supporting documents. The written indication by the Architect that there is no objection to their use shall be the only authority for use of alternative products.

REQUIRED INSPECTIONS

The Contractor shall give not less than five days notice to the Architect in writing and make arrangements for review of significant stages of work indicated. Do not commence subsequent stages of work until the Architect has reviewed the following stages of work where appropriate:

- Site Works: Set out and Excavation.
- Concrete Works: Reinforcement and Formworks, before pouring concrete.
- Masonry Works: Set-out of walls.
- Roof Structure: Truss Framing, before loading of roof.
- Finishes: Substrate preparation, before painting.
- Electrical / Plumbing Works: Installation, before covering over.
- Any review and comment by the Architect shall not reduce or modify the complete responsibility of the Contractor for the finished work.

CLEANING

- A Progressively:** Keep the Works, adjacent common areas and adjacent properties affected by the Works, clean and tidy at all times. Clear and remove dirt and debris from the site progressively. Provide sufficient personnel and equipment for cleaning operations. Provide and regularly empty disposal containers for demolished materials, debris, discarded and surplus goods and materials generated by the Works. Locate containers as close as practicable to the relevant work area. Containers shall not be located on public roads or paths unless approved by the relevant authority and all required permits have been obtained and fees paid. The Architect may require any area to be immediately cleaned during the construction period at no additional cost to the Owner.
- B Dirt and debris outside site:** Remove all dirt and debris attributable to the Works from adjacent roads, paths and properties in accordance with the requirements of the



relevant authorities. Use trucks that will not spill or deposit dirt or debris on adjacent public roads, paths or properties. Clean the tyres and underside of trucks before leaving the site.

COMPLETION

Clean gutters of all debris and foreign matter. Clean walls, floors and windows and leave clear of dirt, grease, fingermarks etc. Clean all fixtures and fittings, light fittings, air exhaust outlets etc

Before arranging handover inspections, finish, clean, and make good the Works including:

- Clear and remove surplus materials, dirt, litter debris and the like.
- Repair damage and defects to adjacent properties resulting from the Works.
- Repair damage, stains and blemishes, or replace work where required.
- Clean all surfaces, and polish glass, tile and metal finishes.
- Ease all doors, windows, drawers.
- Commission, lubricate and adjust locks and closers.
- Commission, test and ensure services and equipment are connected and operating properly.
- Hand over keys and all maintenance manuals

WARRANTIES AND GUARANTEES

Provide a warranty of approved wording for the work of every Trade Section unless indicated as not required. Refer to the relevant Trade Section for the requirement and warranty period. The provision of a warranty shall not relieve the Contractor of responsibility to comply with the Contract Documents. The use of a proprietary or an approved system shall not relieve the Contractor of responsibility to provide a warranty. The provision of a warranty shall not relieve the manufacturer or supplier of goods and materials of responsibility for the safety and fitness for purpose of such goods and materials. The warranty shall include all manufacturer's product warranties. Warranties shall include an undertaking that all work will remain fit for the intended purpose, in good appearance, free of defects and comply with statutory requirements for the warranty period.

Excepting fair wear and tear, warranties shall include the cost of: Rectification of other work to be removed and replaced to provide access for rectification of warranted work. Rectification of other work which has been damaged as a result of failure of the warranted work. The liability for and cost of any damage, including consequential damage, to persons or property arising from the failure of any part of the warranted work. The costs of removal and replacement of any defective or related work shall be without regard for whether the Owner or the occupant has benefited from use of such work during the warranty period.

Rectification procedures shall be carried out with minimum inconvenience to the Owner and the occupants of occupied premises. Where required, rectification procedures shall be carried out at particular times to suit the requirements of the Owner or occupants.

Where a manufacturer's or supplier's warranty for any item is usual but is not supplied with the item, provide a written guarantee for that item. Unless otherwise directed, warranties shall name the Owner and its assigns and successors as the warrantee.

All warranties shall be guaranteed by the Contractor. Except for work completed and accepted after Final Acceptance of Completed Works, all warranties shall commence at Date of Final Acceptance of Completed Works. The Contractor or other approved warrantors are to provide written warranties where so specified elsewhere in this specification. Each



warranty is to be in approved form and will specifically include the provisions required in writing.

SECTION	WARRANTY (NO. OF YEARS)
CONCRETE	Statement guaranteeing mix attaining spec strength in 28 days
METAL FINISHES, SHOP-APPLIED	7 YEARS
WATERPROOFING AND TANKING	20 year on external application 10 years on internal applications
METAL ROOFING, SIDING AND PLUMBING	15 YEARS
DOORS AND DOOR FRAMES	5 YEARS
METAL WINDOWS	9 YEARS
DOOR / WINDOW HARDWARE	5 YEARS
RENDER	15 YEARS
CERAMIC TILE	5 YEARS
PLUMBING FIXTURES	2 YEARS
ELECTRICAL INSTALLATIONS	10 YEARS

The Contract shall furnish Guarantee to the Owner per requirement of the Contract for a period of one (1) year after date of Final Acceptance of Completed Work.

HANDOVER

The handover process shall include preliminary inspections, by the Contractor and Architect, all making good, rectification and finishing by the Contractor, and a final inspection by the Relevant Building Surveyor, Contractor and Architect. The Works shall be substantially completed and cleaned before the preliminary inspection. All handover inspections shall be carried out jointly.

Notify Architect regarding arrangements for the testing and servicing of emergency services for the duration of the Defect Liability Period, as required and provide evidence that 12 months maintenance for essential services is in place

Handover shall be effective when the Architect has acknowledged in writing that all relevant items and remedial works have been completed and the Contractor has provided to the Architect all relevant keys. Handover shall be a requirement of Final Acceptance of Completed Works

Before arranging inspections, make reasonable efforts to ensure the completion, cleaning and correction of defects. If it becomes apparent to the Architect during inspections, that the Contractor has not made such reasonable efforts, the Architect may terminate the inspection at its discretion. Contractor to retain sufficient personnel and equipment on the site until



handover to complete the required making good, rectification and finishing. All making good, rectification and finishing shall be completed within seven days of the preliminary inspection.

The Architect retains the right to make arrangements for work not completed by the Contractor after seven days to be completed by others, and the cost deducted from the Contract Sum. .

CONSTRUCTION DRAWINGS

It remains the Contractors responsibility to ensure that discrepancies found in Construction Drawings shall be brought to the attention of the Architect for direction and clarification prior to commencing that component of the work.

CONTRACTOR'S EXPERTISE

Whilst every attempt is made to document and provide information on dimensions, materials, all critical details, connections, fixtures, finishes and the like, it will remain the Contractors responsibility to ensure that the entire building is assembled in accordance with good building practice, whether detailed, specified or not.

The Contractor shall provide all necessary fixings, sealants, adhesives, flashings, cappings etc., whether drawn, specified or implied, and install all materials and to make provision for movement, shrinkage or expansion in materials to ensure the building is left permanently water- and weather-tight.

ELECTRONIC DOCUMENT COMMUNICATIONS

- A. Generally:** All written communications and document transfers between the Contractor and the Architect will be sent via email. Facimilie, SMS and MMS communications will not be recognised or acknowledge except in an emergency.
- B. The Contractor's email system:** The Contractor shall establish a suitable high speed email system on site for receiving and sending emails with large attachments.
- The Contractor's on-site email system shall have sufficient post box capacity to send and receive all drawings in one ZIP file, but not less than 100 Mb capacity.
- The Contractor's on-site email system shall be fully operational, and all relevant parties notified of correct email addresses and procedures not more than one week the Date of Commencement.
- C. Issue of documents by the Architect:** In addition to the Contract Documents issued at the Commencement Date, the Architect may issue all subsequent drawings as electronic documents only. The Architect will issue electronic documents by direct email as attachments.

END OF SECTION



SECTION 02 SITE PREPARATION

SCOPE OF WORK

Perform work described here and shown on drawings including but not limited to: prepare site, excavate for roads, paving, drains, pits, foundations, slabs. Remove trees and other vegetation, including roots, where they prevent building work, paving, civil works, trenches etc.

Work under this section generally comprises:

- Site clearing
- Excavation and earthworks to form platforms and levels for construction of new concrete slabs
- Works necessary to form levels and grades for vehicle parking areas, pathways, etc
- Cutting and filling the site in preparation for site development works

Refer to **Structural Engineers General Notes, ST1 and ST2** for specific requirements.

OTHER TRADES

Co-operate with these other trades to resolve possible problems before starting work: water distribution, sanitary sewerage, storm drainage, utilities connection, deep well, concrete.

PERFORMANCE

- A Protection:** Protect the public and property which is to remain on or adjacent to the site from interference or damage. Make good any such damage to match existing. Take responsibility for any damage, inconvenience or annoyance to any third party and for the settlement of any disputes arising without cost to the Owner. Keep dust and noise to a minimum.
- B Water:** Keep excavations and groundwork free of surface water.
- C Shoring:** Construct shoring, planking and strutting required to retain the sides of the excavations and /or the battered slopes. Ensure safe working. Include safety covers over holes. Obtain Architect's approval for shoring method for excavations deeper than 1.7 metres

EXCAVATION

- A Generally:** Excavate to the correct design levels and profiles for footings, ground slabs, pads, service trenches, pits, paving, filling, landscaping and the like, to the required sizes and depths. Make provision for compaction and settlement. Contractor to allow for on-site coordination with Owner and/or Architect to in regards to removal / relocation of surplus excavated soil.
- B Public roads and paths:** Obtain approval of relevant authority before excavating any public road or path. Arrange the work so that at least half the width of thoroughfare is kept open for use.
- C Over-excavation:** Re-instate over-excavation to the correct depth, level and bearing value with back-filling compacted to match adjacent undisturbed ground, or with additional concrete, at no additional cost to the Owner. Refer to CONCRETE Section.
- D Grading generally:** Grade finished ground surfaces to falls indicated. Where not indicated, grade 1500 mm adjacent to buildings to 3% minimum fall away, to prevent



ponding in re-entrant corners and against buildings, and to ensure natural surface drainage to pits and surface drains.

- E Levels at gates:** Excavation for paths shall enable opening of gates fully without use of offset hinges unless otherwise indicated. Bottom of gates shall be not more than 75 mm above finished paving level, with provision for 25 mm gate sag.
- F Footings and ground slabs:** Battered slopes shall not be steeper than indicated slopes, except for excavation in stiff natural ground. Bottoms of footing trenches shall be level.
- G Excavation for service trenches:** Refer to relevant Engineering Drawings and Technical Specifications. Make services trenches straight between access pits, inspection points, junctions and the like, with vertical sides and uniform grades. Locate trenches clear from buildings and paths. Excavate service trenches with the minimum delay before installation of services, and back-fill as soon as practicable after installation and testing of services. The depth of cover provided to all services installed underground including pipework and valves shall be in accordance with the requirements of the relevant authorities, Standards or Codes except that a minimum cover of 450 mm shall be provided. Refer to **Plumbing Engineers Drawing, P04**.
- H Site Investigation:** A site investigation was made and a copy of the report is included in the contract documents. The site investigation information given in the report, or shown on the drawings, or both, is information on the nature of the ground at each tested part. It is not a complete description of conditions existing below the surface. The accuracy of the information is not guaranteed and will not be a basis for cost variation. If unnatural or unhealthy material (potentially destructive) is found, notify the Architect immediately and arrange for an inspection by a specialist.
- I Provisional Depths:** The footing or strip depths shown on the drawings are provisional. Approval of the Architect or Engineer is required for actual depths on the site. If there have been variations to the contract levels or dimensions of excavations, do not commence back-filling or place permanent work in excavations until the Architect or Engineer has made measurements and approved them.

MATERIALS TO BE USED

ITEM	DESCRIPTION
Backfill	Backfill shall be placed in 150mm layers and each layer shall be compacted to a minimum of 95% maximum density, shall be free from detrimental amounts of organic material and no rock or similar irreducible material with a maximum dimension greater than 300mm be buried or placed in fills; field density testing required in accordance with AASHTO T191
Vapour Barrier	1mm thick (over 100mm thick gravel bed) – refer to Structural Engineers Drawings, Detail 06 / ST10

PREPARATION

Inspect conditions at site before starting work. Clear site to areas of proposed building, paving, civil works and landscape as shown on drawings.

Stock pile top soil and excavated material at a location, as directed, for consideration for redistribution as part of the landscaping works.



ON-SITE ACTIONS

Start of work means total acceptance of conditions.

BACK-FILLING

A Generally: Back-filling material under slab-on-ground floors, paving etc. shall be compacted material of suitable type, as scheduled above

Back-filling under slab-on-ground floors in excess of 75 mm over the whole area or 230 mm in any part shall be approved before commencing. All filling material shall be of one classification.

B Contamination: Back-filling material shall not contain debris, building materials, crushed or broken bricks and concrete, organic matter, scoria, rock, silt, clay or expansive soil, material from site clearing or excavation, top-soil, organic material or material which will decay.

C Back-filling for service trenches: Back-filling for services trenches shall be generally as for slab-on-ground construction, but shall not exceed 20 mm evenly graded material. Do not back-fill until required inspections and making good, if any, have been carried out.

COMPLETION

Complete work in accordance with Architect Instructions and written variation orders.

WARRANTY

Provide to Owner a Warranty covering satisfactory performance of the complete installation. Carry out site clearing, excavation, back-filling, grading and associated groundwork in a safe and orderly manner, remove debris and clean-up progressively, as required.

END OF SECTION



SECTION 03 CONCRETE

SCOPE OF WORK

Perform work described here and shown on drawings including but not limited to: supply and install concrete, reinforcing steel, formwork, for strip footings, floor slabs, paving, pits, etc.

Refer Structural Engineering Drawings and Specifications for Project specific requirements

OTHER TRADES

Co-operate with these other trades to resolve possible problems before starting work: excavation and fill, storm drainage, sanitary sewerage, pavements, concrete screeds, blockwork, wet area membrane, sanitary / plumbing, electrical.

Allow for all necessary set downs to wet areas (toilets, shower) - refer to **Structural Engineers Drawing, ST4.**

QUALITY ASSURANCE

All materials to comply with the following minimum standards:

Reinforced Concrete	National Building Code of the Philippines requirements for reinforced concrete; ASTM C-39
Portland Cement	ASTM C-150; Type III for high early strength Portland Cement
Fine Aggregates	ASTM C-33 or C-330
Gravel	Foundations, Footings: uniform size of 25mm (1") Slabs, Beams, Columns: uniform size of 19mm (3/4")
Reinforcements	ASTM A-615 (Grade 60)
Admixture	Air entraining admixtures – ASTM C-260 Water reducing admixtures – ASTM C-494 Must be free from chlorides conforming to ASTM C-494-651 and to be used as per manufacturer recommendation
Water	ASTM C1602; clean water, must be free from salt and grit

Contractor must submit materials test certificates to the Architect, sufficiently in advance of field requirements to allow ample time for review and approval. Materials will also be subject to routine inspection and random testing on site, by the Architect at any time without notice.

PREPARATION

Inspect conditions at site before starting work. Prepare surfaces to receive concrete smooth, clean and stable under concrete load.

CONCRETE CLASS

Concrete class and strength to be in accordance with **Structural Engineers General Notes, ST1 and ST2.**

FORMWORK

Formwork to be in accordance with **Structural Engineers General Notes, ST1 and ST2.**

- A Generally:** Design and construct formwork to ensure the dimensions, profiles, locations and surface finishes of finished concrete indicated on the Drawings. Formwork shall be watertight and of sufficient strength to prevent excessive deflection under loads during placement and compaction of fresh concrete. Inspect formwork immediately before placing concrete and remove all dirt and other debris. Formwork ties shall be of suitable type and shall be removed carefully. Make good any visible damage to the concrete. Formwork release agents shall be non-staining. Apply to clean formwork before placement of reinforcement.
- B Formed surface finish:** Surface finish shall be smooth. Set out the formwork to give a regular and tidy arrangement of panels, joints, bolt holes and visible elements in the formed surface.
- C Pour to finish:** Use Phenolic Plywood to ensure satisfactory pour to finish.

REINFORCEMENT

Reinforcement to be in accordance with **Structural Engineers General Notes, ST1 and ST2.**

- A Generally:** Reinforcement shall be free from loose rust, mill scale, dirt or other substances which might prevent proper bonding with the concrete. Reinforcement shall be free from kinks and bends not indicated, and any defect that may affect strength, durability or appearance of the finished work. Where embedments and built-in items require cutting of reinforcement, notify Architect and obtain approval before commencing. Include additional reinforcement where directed. If additional splices are required, submit details to the Architect for approval. Support reinforcement on bar chairs, support and spacer bars to ensure correct and secure position.

CONCRETE PLACING AND COMPACTION

Do not place concrete when ambient temperature is above 32 C-degree or below 4 C-degree. Do not commence placing concrete when rain is falling, or if there is risk of rain damage. Do not discharge concrete from a height more than 1.2 metres. Maintain discharge at a steady rate with minimum practicable breaks between deliveries.

If excessive delay occurs or initial set takes place, immediately notify the Architect for approval to continue or make a construction joint. Where concrete is moved more than 50 metres by wheel-barrow, thoroughly re-mix by hand shovelling before final placing.

Thoroughly compact concrete during placing with suitable mechanical vibrators. Work concrete under and around reinforcement and ensure uniform density, free from voids, segregation and honeycombing. Avoid over vibration that may cause segregation, and do not hold the vibrator against formwork or reinforcement. Concrete slabs more than 100 mm thick shall be compacted with a suitable vibrating screed.

PROTECTION AND CURING

Protect finished surfaces from rain damage until hardened. Prevent rapid evaporation by sun or wind before application of the curing method. Implement a suitable curing system within two hours of finishing the concrete, including:

- Ponding or continuous sprinkling of water.
- Cover with impervious sheet or membrane, such as polythene sheet.
- Cover with absorptive material such as 25 mm of sand, kept continuously wet.



- Proprietary liquid applied curing compound.

If used, polythene sheeting shall be taped to prevent moisture loss and weighed down to prevent lifting. When ambient temperature is above 30 C-degrees, the keep sheeting continuously wet.

Take responsibility for any damage resulting from commencing work on concrete before full 28 days strength has developed. Curing period before commencing such work shall be not less than:

- Footings: Seven days.
- Slab on ground: Ten days.

AS LAID AND MONOLITHIC FINISH

A Generally: Finish as laid concrete as follows:

- Concrete floor slabs: Machine floated
- Concrete landings and ramps: Broom (non-skid finish)
- Concrete steps / stair: Steel trowel
- Concrete columns / beams / walls: pour to finish – using Phenolic Plywood

Normal tolerance of applied finish shall be +/- 6 mm over 3 metres, unless noted otherwise.

B Machine floated finish: Finish with suitable mechanical equipment to a uniform smooth texture. Steel trowel by hand in locations inaccessible to the machine float.

C Steel trowelled finish: Finish by hand with a steel trowel, to produce uniform texture and appearance, free of trowel marks.

D Broom finish: Finish with broom, to produce non-skid finish

E Clear seal finish: Finish internal areas with clear penetrative sealer

FOOTINGS

Footings to be in accordance with **Structural Engineers General Notes, ST1 and ST2**

GROUND SLABS

Slabs to be in accordance with **Structural Engineers General Notes, ST1 and ST2**

A Generally: Place concrete carefully. Do not puncture vapour barrier. Do not disturb reinforcement and formwork. Support pump hoses and wheel-barrow access above reinforcement and finished surface. Exposed concrete edges to be free from all imperfections, membrane ripples, air pockets, honeycombing etc.

Before placing concrete, ensure that all services have been installed and tested where necessary, the ground has been properly prepared, and vapour barrier is in place.

B Finish: Surfaces shall be finished within +/- 6 mm over 3 metres, unless otherwise indicated. After stripping formwork, rub down exposed slab edges to remove loose material and expose any holes. Fill holes with mortar mix of 1:3 parts cement to sand, and finish flush. If directed, apply slurry of neat cement and water to the whole surface and finish smooth with a steel trowel.



- C Shower recesses:** Where required for showers and falls in toilet, construct set-downs in concrete floor slabs to 50 mm nominal depth.
- D Miscellaneous slabs:** Construct concrete slabs for site development works, landscaping, areas below concrete pavers and the like, not less than 75 mm thick. Build-in holding down bolts where required. Construct upper surfaces to falls and finish top and edges with a steel trowel.

ON-SITE ACTIONS

Start of work means total acceptance of conditions.

COMPLETION

Complete work in accordance with Architect Instructions and written variation orders.

WARRANTY

Provide to Owner a Warranty covering satisfactory performance of the complete installation, and required strength at 28 days.

END OF SECTION



SECTION 04 BLOCKWORK

SCOPE OF WORK

Perform work described here and shown on drawings including but not limited to: supply labour and install materials. Build in miscellaneous materials (flashing, wall ties, damp proof course, anchors etc.) Include staging, scaffolding and cleaning.

OTHER TRADES

Co-operate with these other trades to resolve possible problems before starting work: concrete, rendering, painting, metal framing, doors and door frames, metal windows, balustrades and railings, specialities (site built), wet area membrane, ceramic tile, toilet and shower accessories, toilet and shower fixtures, sanitary / plumbing, electrical.

QUALITY ASSURANCE

All materials to comply with the following minimum standards:

Concrete Hollow Blocks

- shall have minimum strength of 350 PSI (100mm and 150mm thickness)
- shall conform to standard block size L400mm x H200mm x thickness varies
- product to be certified by the Department of Trade and Industry (DTI) and/or the Department of Public Works and Highways (DPWH)
- all load-bearing walls to be constructed with Type1 Class A, conforming to ASTM C-140. Provide stiffener columns provided at every three (3) metres on centre with 2-16Ø vertical bar with 10 Ø ties at 200mm on centre – in accordance with **Structural Engineers General Notes and Drawings**
- all load-bearing walls shall be laid to 1200mm high in one (1) day
- all-load-bearing walls shall be backfilled with grout – in accordance with **Structural Engineers General Notes and Drawings**

Mortar and Grout Type 1 Portland Cement conforming to ASTM C-1019

Sand for mortar setting beds, grouting and pointing; ASTM C-144

Water ASTM C-1602; clean water, must be free from salt and grit

Contractor must submit materials test certificates to the Architect, sufficiently in advance of field requirements to allow ample time for review and approval. Materials will also be subject to routine inspection and random testing on site, by the Architect at any time without notice.

PREPARATION

Inspect conditions at site before starting work. Review work with other trades, piping, ducts etc. Clean base before laying blockwork. Set doors and windows plumb and brace.

ON-SITE ACTIONS

Start of work means total acceptance of conditions.

INSTALLATION

- A Generally:** Protect adjacent work against damage during blockwork construction. Clean blockwork progressively. Clean face work to remove mortar smears, stains, discoloration and the like.



- B Laying:** Lay blocks on a full bed of mortar. Fill joints completely with mortar. Keep perpend true, angles plumb and courses horizontal. Properly bond all bricks. All face blockwork shall be in stretcher bond unless otherwise indicated. Use a masonry saw for all face brick cutting.
- C Completion:** Make good after other trades and after removal of scaffolding and finish to match surrounding work. Replace defective blocks, and point up faulty joints, holes and chases. Remove surplus mortar. . Walls to be rendered shall have smears, splashes and lumps removed and holes filled before painting. Wire brush and wash down in clean water only.

Blockwork to be in accordance with **Structural Engineers General Notes and Drawings.**

COMPLETION

Complete work in accordance with Architect Instructions and written variation orders.

WARRANTY

Provide to Owner a Warranty covering satisfactory performance of the complete installation.

END OF SECTION



SECTION 05 STEEL FRAMING (LOAD BEARING)

SCOPE OF WORK

Perform work described here and shown on drawings including but not limited to: design, engineer, supply and install metal framing: load bearing roof framing (truss), secondary framing components and bracing, anchor bolts and other attachments, field welding and application of surface treatment.

OTHER TRADES

Co-operate with these other trades to resolve possible problems before starting work: concrete, blockwork, metal windows, balustrades and railings, specialties (site built), painting, toilet and shower accessories.

PREPARATION

Inspect conditions at site before starting work. Prepare surfaces to receive framing. Prepare surfaces affected by the installation in accordance with material manufacturer's instructions. Install inert isolating material such as from a roll of black flashing strip to isolate metal from mortar, concrete, plaster, masonry or other metals.

Contractor must submit shop drawings to the Architect, sufficiently in advance of field requirements to allow ample time for review and approval.

ON-SITE ACTIONS

Start of work means total acceptance of conditions.

DESIGN PROVISIONS

- A. General:** the Architect's drawings are to be considered essentially schematic except for profiles of exposed surfaces and panel arrangement where indicated. If, in the opinion of the Contractor a change of profile is required in order to meet the specification, arrange through the Architect for a review of the condition. Design the assembly, reinforcing and anchorage to suit each specified condition in an acceptable manner complying with the requirements specified herein.
- B. Tolerances:** design frames to accommodate building tolerances, and when completed, within the following tolerances:
 1. Deviation from plumb, level or dimensioned angle within 3mm per 3.5m of length of member, or 6mm in total run in line.
 2. Deviation from theoretical position on plan or elevation, including deviation from plumb, level or dimensioned angle not to exceed 9mm total at location.
 3. Change in deviation not to exceed 3mm for 3.5m run in direction.
- C. Structure:** in accordance with **Structural Engineers General Notes and Drawings.**
- D. Additional:** the Contractor shall allow for additional framing components, bracing and anchors, for example extra purlins at roof edges, to ensure roof remains secure in wind speeds up to 300km/hour.



FABRICATION

Form junctions so that no fixings, such as pins, screws, pressure indentations and the like are visible on exposed faces. Cut edges, drill holes, rivet joints and clean flat sheets, neat, free from burrs and indentations. Remove sharp edges without excessive deformation. Fit mitred joints accurately to a fine hairline. Pre-assemble and match mark before delivery.

CONNECTIONS

- A. Generally** supply end cleats, brackets and other connections, not specifically detailed on the drawings, to suit the location and forces shown thereon with gauge and edge distances in accordance with relevant standards.
- B. Bolting General Supply** bolts in bearing of such lengths that no threaded portion crosses the interface of the parts joined. Place at least one washer under the bolt head or nut, whichever is to be rotated. Provide taper washers where the part under the bolt head or nut is not perpendicular to the centre-line of the bolt.

SURFACE TREATMENT OF STEEL

Clean steelwork free from loose rust, loose mill scale, dirt, oil and grease or by sand-blasting.

INSTALLATION

A. Examination

Inspect site conditions both before fabrication and delivery of steel. Ensure that conditions are satisfactory for installation, so that on delivery, materials can be directly installed. Perform rectification required before delivery of materials Report discrepancies immediately they are found and instruction obtained before continuing with the affected portion of the work.

B Erection

Adopt an erection procedure such that members can be placed and fixed in position without distortion. Make safe, during erection, against wind and erection stresses and loading conditions, including those due to erection equipment. Allow for the cost of temporary erection bracing required and of the Structural Engineer's requirements in connection with such bracing.

C Frame

Anchorage Fabricator is required to supply the anchorage devices to the Contractor for building in by others and check that devices are located as required to suit the requirements of the fabrication for positive and permanent fixing. Insulation: isolate dissimilar metals at interfaces with bitumen based or nylon shim materials to prevent galvanic action. Make good concrete or masonry damaged during the installation of masonry anchors at no cost to the Owner.

D Inspection on Site

Advise Architect and/or Engineer when erected steel is ready for inspection.



E Adjustments

Following erection, adjust the installation as required by Engineer. Touch up abraded or missing paint areas.

F Cleaning

Clean the installed steelwork and touch up with rust-inhibitive primer paint of matching colour. Ensure that the touch up paint is compatible with the factory applied material.

MATERIALS TO BE USED

Design, engineer and fabricate by an approved fabricator in the workshop before delivery to the site. Commission supplier to design the framing member sizes, schedule and supply frame. Form junctions so that no fixing, such as pins, screws, pressure indentations and the like are visible on exposed faces not to be covered. Show on shop drawings fixings which will be exposed. Cut edges, drill holes, rivet joints and clean flat sheets, neat, free from burrs and indentations. Remove sharp edges without excessive deformation. Fit mitred joints accurately to a fine hairline. Preassemble and match mark before delivery.

DELIVERY, HANDLING AND STORAGE

Handle materials with care. Do not store on site. Install directly in place as instructed by manufacturer. Where possible, deliver pre-assembled panels of framing, roof trusses etc., ready for immediate placement and connection.

COMPLETION

Complete work in accordance with Architect Instructions and written variation orders.

WARRANTY

Provide to Owner a Warranty covering satisfactory performance of the complete installation.

END OF SECTION



SECTION 06 CARPENTRY

SCOPE OF WORK

Perform work described here and shown on drawings including but not limited to: supply and erect framing both structural and sub-structural, include miscellaneous framing for specialties (site built).

OTHER TRADES

Co-operate with these other trades to resolve possible problems before starting work: concrete, blockwork, wall lining, sanitary / plumbing, electrical, rendering, painting, specialties (site built), doors and door frames, door and window hardware.

PERFORMANCE

- A Envelope protection:** Install flashings, seals, sealants and all other items to ensure that external elements remain weather- and water-tight and exclude moisture from building envelope.
- B Durability:** Timber shall have natural durability appropriate to the location or shall be preservative treated in accordance with the relevant Standards to ensure long term durability. External timber shall be preservative coated and decorative coating where visible.

TIMBER MATERIALS

Timber with any active termite infestation or other imperfections shall not be used, and immediately removed from site and replaced with suitable materials.

PRESERVATIVE TREATMENT

Carry out pressure treatment to timber with a suitable waterborne preservative appropriate to exposure and use in accordance with the relevant standards. Submit evidence of treatment.

FIXINGS

Fixings shall be appropriate to the purpose, sufficient to transmit the loads and stresses imposed and ensure rigidity of assembly in accordance with the relevant standards.

Masonry anchors shall be proprietary expansion types. Plugs shall be proprietary plastic types. Explosive driven fasteners shall not be used unless approved by the Architect for a particular purpose. Fix timber framing to blockwork using slotted holes, masonry anchor bolts and suitable washers. Adjust nuts to enable settlement movement. Brackets and blades to support timber posts off the ground shall be hot dip galvanized steel, set accurately into the concrete base neatly fitted to the post at least 25 mm above the base, and fixed to the post with at least one 12 mm galvanized bolt.

EXECUTION

- A Generally:** The whole of the carpentry shall be carried out in the best and most workmanlike manner. Carry out all required grooving, mitering, rebating, framing, housing, furring and the like. Include all required slips, fillets, wedges, casings, blocks, and the like.
- B Trimming:** Trim for flues, vents, pipes, exhaust fans, light-fittings, hand rails, sanitary fittings and attached metalwork as required.



TIMBER WALL FRAMING

A Generally: Timber framing generally for specialties (site built) as indicated on Architectural Drawings.

B Fixings:

Bottom plates shall be fixed to concrete floor slabs with 10 mm diameter galvanized bolts at no more than 1000 mm centres, and not less than 50 mm from slab edges.
Top plates shall be halved at joints, or connected with suitable gang nailed plates.

C Miscellaneous Items: Fit noggins and trimmers for fixing of fixtures and fittings as indicated on Drawings.

COMPLETION

Complete work in accordance with Architect Instructions and written variation orders.

WARRANTY

Provide to Owner a Warranty covering satisfactory performance of the complete installation.

END OF SECTION



SECTION 07 SPECIALTIES (SITE BUILT)

SCOPE OF WORK

Perform work described here and shown on drawings including but not limited to: supply and installation of site built specialties items.

OTHER TRADES

Co-operate with these other trades to resolve possible problems before starting work: concrete, blockwork, carpentry, metal framing, metal windows, doors and door frames, wet area membrane, sanitary / plumbing, electrical, toilet and shower accessories, toilet and shower fixtures.

SUBMISSIONS

Submit shop drawings to Architect for review and approval prior to commencement of work on site.

PREPARATION

Inspect conditions at site before starting work.

ON-SITE ACTIONS

Start of work means total acceptance of conditions. Provide necessary anchoring devices. Use concealed shims to install work plumb, level, straight and distortion free within the following tolerances: – 1mm in 800mm for plumb and level. – 0.5mm maximum offsets in flush adjoining surfaces. – 0.2mm maximum offsets in revealed adjoining surfaces. Scribe and cut to fit adjoining work; refinish cut surfaces or repair damaged finishes at cuts.

Secure specialties with anchors or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required to complete the installation. Except where prefinished matching fastener heads are required, use fine finishing nails, countersunk and filled flush. Use a matching filler where a transparent finish is required. Install without distortion.

COMPLETION

Complete work in accordance with Architect Instructions and written variation orders.

WARRANTY

Provide to Owner a Warranty covering satisfactory performance of the complete installation.

END OF SECTION



SECTION 08 WET AREA MEMBRANE

SCOPE OF WORK

Perform work described here and shown on drawings including but not limited to: generally to wet areas, including toilet and shower rooms. Typically to floors and walls of wet areas and to walls areas immediately adjacent and behind a shower, lavatory or similar fixture.

OTHER TRADES

Co-operate with these other trades to resolve possible problems before starting work: concrete, blockwork, rendering, painting, ceramic tile, sanitary / plumbing, toilet and shower accessories, toilet and shower fixtures.

PREPARATION

Inspect conditions at site before starting work.

- **Curing:** Allow concrete to cure for a minimum of 28 days prior to the application of the membrane.
- **Cleaning:** Clean down the substrate surface to remove all curing agents, wax, grease, oil, dirt, dust and other foreign material and leave it clean, dry, dust free, smooth and free of undulations.
- **Vooids:** Patch with a non shrinking quick setting grout and allow to cure for a minimum of 7 days prior to applying the membrane.

ON-SITE ACTIONS

Start of work means total acceptance of conditions. Install water proofing membrane, to create a complete waterproof envelope to the floor area of the space being treated, in accordance with the manufacturer's recommendations, as shown on the drawings and as follows:

- Turn the membrane down into the puddle flange of outlets.
- Turn the membrane up at and seal to all penetrations, pipes, waste outlets, etc.
- Turn the membrane up for 200mm at all walls, plinths, and other upstands.
- Dress the membrane over the horizontal leg of angle tile trims at doorways and turn up the vertical face of the angle to terminate level with the bottom of the floor tiles.
- Similarly dress the membrane up the face of door jambs to terminate at the underside of the floor tiles.
- Membrane curing: Allow 72 hrs for the membrane to cure prior to carrying out water tests or applying finishes, toppings etc.
- Shower recess: minimum H 2000mm and extending 300mm beyond the horizontal extent of the designated tiled wall area.
- Lavatory: minimum H 450mm to all wall areas immediately adjacent and behind

COMPLETION

Complete work in accordance with Architect Instructions and written variation orders.

WARRANTY

Provide a Warranty for materials and application of the membrane for a period of 10 years from the date of Final Acceptance of Completed Works.

END OF SECTION



SECTION 09 ROOFING, SIDING & ROOF PLUMBING

SCOPE OF WORK

Perform work described here and shown on drawings including but not limited to: metal roofing and sarking, downpipes, gutters,

OTHER TRADES

Co-operate with these other trades to resolve possible problems before starting work: metal framing, stormwater drainage, concrete, blockwork, rendering, painting, wet area membrane, sanitary / plumbing, electrical.

SUBMISSIONS

Submit shop drawings to Architect for review and approval prior to commencement of work on site.

MATERIALS

- Roof Sheeting** refer to **Architectural Materials / Finishes Schedule, A001**
- Woven Wire Mesh** proprietary Woven Wire Mesh, 3mm gauge to wire and sized at 2" weave, to be installed to underside of roof sheeting (between truss and purlins) to provide reinforcing and protection from flying debris
- Flashings** construct flashings, cappings, gutters, outlets, down-pipes and the like to complete the roof system in accordance with the relevant standards and in accordance with **Sanitary / Plumbing Engineers Drawings**

PREPARATION

Inspect conditions at site before starting work. Ensure framing is in place and secure.

ON-SITE ACTIONS

Start of work means total acceptance of conditions. Install each item in accordance with manufacturer's current written instructions. Form penetration flashings neatly with material matching roofing material. Provide flashings at all upstands lapped 150mm at junctions. Step flashings evenly. Finish top corners to a line parallel to the roof slope. Close and seal ends of cut ribs. Form back gutters not less than 100mm wide with falls towards the sides of the penetration collars. Seal joints with compatible sealant. Secure downpipes through cladding to structure. Seal at stormwater pipe upstands. Remove debris from gutters and downpipes. Test on completion.

COMPLETION

Complete work in accordance with Architect Instructions and written Instruction.

WARRANTY

Provide to the Owner a Warranty covering penetrations through the roof and the satisfactory performance of the complete installation.

END OF SECTION



SECTION 10 DOORS & DOOR FRAMES

SCOPE OF WORK

Perform work described here and shown on drawings including but not limited to: manufacture, supply and install door frames and doors for external and internal door openings.

OTHER TRADES

Co-operate with these other trades to resolve possible problems before starting work: concrete, carpentry, blockwork, rendering, painting, ceramic tile, door hardware, toilet and shower accessories, toilet and shower fixtures.

SUBMISSIONS

Submit shop drawings to the Architect for review and approval prior to the commencement of work on site. Construct a sample installation of door and door frame. Stop. When approved by Architect, complete remaining work.

DELIVERY, HANDLING AND STORAGE

Deliver specified items shortly before installation is due to occur. Prevent damage and deterioration during transport and handling. Store carefully at site in a secure area. Prevent twisting and warping of doors.

MATERIALS TO BE USED

Refer to **Architectural Drawing, A801** for Door Schedule.

ITEM	DESCRIPTION
Door Frame:	Kiln Dried Hardwood (KDHW)
Door Panel: Flush Hollow Core	Thickness: 40mm Core: paper, honeycomb, metal. Face: 4.5mm hardboard veneer. Edge strips: to 4 sides of door, 10mm thick hardwood For external doors and doors to wet areas, face of doors shall have waterproof plywood veneer.

PREPARATION

Inspect conditions on site before starting work. Ensure conditions are satisfactory for installation. Prepare openings in walls or other structures before installation. Install fixing grounds and inserts as required to secure frames.

ON-SITE ACTIONS

Start of work means total acceptance of conditions.

INSTALLATION

Condition doors to average humidity in area prior to hanging. Align doors to frame for proper fit and uniform clearance at edge and machine for hardware. Seal cut surfaces after machining. Provide clearance of 3mm at jambs and heads; 3mm at meeting stiles at pairs of door; minimum 12mm from bottom of door to top of floor finishing, unless noted otherwise. At



thresholds provide 6mm clearance. Adjust each door in its frame and ensure silent operation. Oil locks and hinges. Clean all surfaces marked during the installation of door frames, doors and hardware.

COMPLETION

Complete work in accordance with Architect Instructions and written variation orders.

WARRANTY

Provide to the Owner the Warranty covering satisfactory performance of the complete installation, covering faulty materials, and installation, warping of materials and other faults which may occur within 5 years of Final Acceptance of Completed Works

END OF SECTION



SECTION 11 DOOR AND WINDOW HARDWARE

SCOPE OF WORK

Perform work described here and shown on drawings including but not limited to: supply and install door hardware listed in the Schedule for doors.

OTHER TRADES

Co-operate with these other trades to resolve possible problems before starting work: doors and door frames, metal windows, blockwork, concrete, rendering, painting.

SUBMISSIONS

Submit a sample of each item to the Architect for review and approval prior to commencement of work on site. Install a complete set of hardware as scheduled. Install samples of each type. Stop. When approved by Architect, continue.

PREPARATION

Inspect conditions at site before starting work. Ensure doors and door framing and windows are in place and secure.

ON-SITE ACTIONS

Start of work means total acceptance of conditions. Install with accordance with written instructions of each manufacturer. Check deliveries on arrival. Lock away until needed and assume responsibility for hardware. Fit accurately at correct heights and protect until completion of project. Lubricate hinges and locks and provide two keys to each lock.

Refer to **Architectural Drawing, A801** for Door Schedule.

Refer to **Architectural Drawing, A802** for Window Schedule.

INSTALLATION

Check deliveries on arrival. Keep items locked until needed. Assume responsibility for delivered items. Fit accurately and at correct heights, protect with heavy cloth until completion of project. Label keys, and hand over to contractor.

Master key locks as instructed. All doors with security lock to be keyed alike.

COMPLETION

Complete work in accordance with Architect Instructions and written variation orders.

WARRANTY

Provide to Owner a Warranty covering satisfactory performance of the complete installation.

END OF SECTION



SECTION 12 METAL WINDOWS

SCOPE OF WORK

Perform work described here and shown on drawings including but not limited to: supply and install metal windows: includes the supply, fabrication and erection metal windows and all associated steel framing, steel roller shutters, trim, beads, lugs, sills, flashings, hardware and seals as required to satisfactorily complete the installations.

OTHER TRADES

Co-operate with these other trades to resolve possible problems before starting work: concrete, carpentry, blockwork, rendering, painting, window hardware.

SUBMISSIONS

Submit shop drawings to Architect for review and approval prior to commencement of work on site.

PREPARATION

Inspect conditions at site before starting work field measurements: Do not delay job progress. Allow for adjustments and fitting of the work in the field where taking of measurements might cause delay. Provide smooth finishes to exposed surfaces with sharp well-defined lines and arrises. Mill to a close fit machined joints. Design necessary lugs, brackets and similar items so that work can be assembled and installed in a neat, substantial manner. Provide holes and connections as required to accommodate the work of other trades and for site assembly of metalwork. Drill or punch and ream in the shop. Fasteners : Provide required bolts, screws, inserts, fasteners, templates and other accessories required for a complete installation. Co-ordinate with other trades as to the proper fastening systems suitable for the substrates to which the item is to be secured. Refer to Architect if in doubt. Fasten galvanised items with galvanised fasteners.

ON-SITE ACTIONS

Start of work means total acceptance of conditions. Inspect fabrication on arrival at site. Do not repair on site. Replace damage items. Install each item by bolting or screwing to structural elements of building. Locate anchorages accurately and ensure secure installation. Do not cut metal on site. Remove weld spatter and touch up with rust-inhibitive paint immediately. Protect work until project completion. Install window catches, dropbolts, locks etc.

MATERIALS TO BE USED

Refer to **Architectural Drawing, A802** for Window Schedule.

Design and install work as required to meet the architectural provisions shown on the drawings and these performance requirements. Frame sections and general arrangements shown on drawings shall be considered schematic, except for module break-up and finished profiles of final visible surfaces.

All materials shall be chemically and electrolytically compatible with each other, with the substrates, with adjacent materials and shall be non-staining and non-bleeding.



INSTALLATION

- A** **Generally:** Pre-manufacture, pre-finish and pre-assemble all aluminium work in the shop to maximise quality and limit work at project site. During assembly and erection, do not strain, twist or bend such items to bring them to their true position.

All surfaces shall be smooth, clean and straight with sharply defined lines and arrises, unless otherwise indicated on the drawings. Machined joints shall be milled to a close fit. Mitre corner joints. Use concealed fasteners where possible. Provide all necessary lugs, brackets and similar items so that work can be assembled and installed in a neat, substantial manner.

Provide holes and connections as required to accommodate the work of other trades and for site assembly of metal work. Holes shall be drilled or punched and reamed at right angles to the surface of the metal.

- B** **Fixing to Substrate** All fixings, fastenings, anchors, lugs and the like shall be of approved type to transmit loads and stresses imposed. Ensure the rigidity of the assembly is designed to allow for adequate on-site adjustment

Before commencing installation, inspect all substrates and determine that they are in proper condition to receive the work in accordance with the drawings.

Commencement of installation of any window or screen assembly attached to structural components will be deemed to mean that the Contractor has verified the correctness and the condition of the structural frame and the correct positioning of cast in items, and any defects resulting from such accepted substrates have been corrected.

- C** **Damage** Minor damage may be repaired, provided finished items are equal in all respects to new work. Otherwise remove and replace all damaged items.

- D** **Workmanship** Junctions shall be made so that no fixings, such as pins, screws, pressure indentations and the like shall be visible on exposed faces. Cut edges, drilled holes, riveted joints and flat sheets shall be clean, neat, free from burrs and indentations. Remove sharp edges without excessive radiusing. Fix mitred joints accurately to a fine hairline. Treat exposed and cut or drilled raw material so that salt or other contamination shall not occur.

All parts shall be secured by concealed means, wherever possible, and where exposed to view, screw positions shall be indicated on the Shop Drawings. Exposed screws shall be of the countersunk type, aluminium or non-magnetic stainless steel, and shall be evenly and neatly located in an approved manner. Exposed fasteners shall be finished to match aluminium component.

All exposed work shall be carefully matched to produce continuity of line, design and finish. Joints in exposed work, unless otherwise shown or required for thermal movement, shall be accurately fitted, rigidly secured with hairline contacts and sealed watertight and protected against salt action.

Where two or more sections of metal are used in building up members, the surfaces in contact shall be brought to a smooth, true and even surface and secured together so that the joints are absolutely tight without the use of pointing material. Exposed sealants, except where shown, will not be permitted. Extrusions shall be toleranced to eliminate any edge protection or misalignment at joints.



COMPLETION

Complete work in accordance with Architect Instructions and written variation orders.

WARRANTY

Provide to Owner a Warranty covering satisfactory performance of the complete installation.

END OF SECTION



SECTION 13 RENDER TO BLOCKWORK

SCOPE OF WORK

Perform work described here and shown on drawings including but not limited to: preparation of substrate, application of proprietary render coating to blockwork.

OTHER TRADES

Co-operate with these other trades to resolve possible problems before starting work: concrete, blockwork, painting, doors and door frames, metal windows, balustrades and railings, sanitary / plumbing, electrical, painting, toilet and shower accessories, toilet and shower fixtures, ceramic tile.

QUALITY ASSURANCE

All materials to comply with the following minimum standards:

Mortar and Grout Type 1 Portland Cement conforming to ASTM C-150

Water ASTM C-1602; clean water, must be free from salt and grit

Contractor must submit materials test certificates to the Architect, sufficiently in advance of field requirements to allow ample time for review and approval.

SUBMISSIONS

Install sample area of 3 square metres. Stop. When approved by Architect, continue.

PREPARATION

Inspect conditions at site before starting work. Blockwork to be rendered shall be carefully constructed with joints struck flush so as to provide a satisfactory substrate for the coating system to coating applicators approval. In addition to the nominal patching, carry out and be responsible for all the costs associated with any further work or treatment of the wall surface to provide a suitable substrate. Joint and bond pattern must not be visible through the finished coating system. Ensure dirt, grease, and other material which could reduce bonding of render to the surface, are removed. Make good any imperfections in surface with patching compound and allow to dry. Apply a skim coat where required to completely conceal joint pattern.

ON-SITE ACTIONS

Start of work means total acceptance of conditions.

INSTALLATION

In accordance with **Structural Engineers General Notes and Drawings** and Wall Types as indicated on **Architectural Drawings, A001**

COMPLETION

Complete work in accordance with Architect Instructions and written variation orders.

WARRANTY

Provide to Owner a Warranty covering satisfactory performance of the complete installation.

END OF SECTION



SECTION 14 CERAMIC TILE

SCOPE OF WORK

Perform work described here and shown on drawings including but not limited to: prepare surfaces to be tiled, supply and install bedding as required. Work includes the supply and furnishing of materials and performing labor necessary for the complete installation of all ceramic tiles (wall and floor) as indicated in drawings and as specified herein, and cleaning of finished work.

OTHER TRADES

Co-operate with these other trades to resolve possible problems before starting work: concrete, carpentry, blockwork, wet area membrane, specialties (site built), rendering, painting, sanitary / plumbing, electrical, toilet and shower accessories, toilet and shower fixtures.

MATERIALS TO BE USED

Refer to **Architectural Materials / Finishes Schedule, A001**

Tiles shall be manufactured by MARIWASA MANUFACTURING INC. and or approved equal. All materials shall be of the best of their respective kinds, as indicated on the drawings or otherwise specified herein or as will be approved by the Architect upon submission of samples. All tiles shall be delivered to the jobsite in unopened grade-sealed containers.

Trim Units: Provide matching trim units with tile work. Provide where indicated and where necessary for a complete and neatly finished installation. Provide bull-nose units for wainscot, except where wainscot is flush with abutting wall surface. Provide up and down corners for wainscot bull-nose units where there is a break in wainscot height, or where the wainscot does not terminate against projecting construction. Provide covered base units for wainscots, and 106 mm cover base units for tile floors where wainscots are not provided. Internal and external covers shall be rounded using appropriate matching trim units.

Tile	Fully Vitrified Porcelain, non-skid finish, water absorption rate of <0.5%
Hydrated Lime	ASTM C-206, Type S; or ASTM C-207, Type S.
Sand	ASTM C-144, for mortar setting beds, grouting and pointing.
Mortar and Grout	Type 1 Portland Cement conforming to ASTM C-150
Water	ASTM C-1602; clean water, must be free from salt and grit

SUBMISSIONS

Submit samples of each type of floor and wall tile including all required beads, moulding, and trim units to the Architect for review and approval before placing orders.

DELIVERY AND STORAGE

Deliver materials (except bulk materials) in manufacturer's unopened containers fully identified with manufacturer's name, trade name, type, class, grade, size and color. Store materials in unopened containers off ground and under cover, protected from damage. Supply on extra two percent of each type of tile used in clean, marked cartons for maintenance use.



INSTALLATION

Do not start tile work until roughing in for plumbing and electrical work has been completed and tested. All surfaces to receive tile-work shall be cleaned of loose materials and given proper surface preparation prior to ceramic tile-work. Prepare and install in accordance with ANSI A108.1 and ANSI A108.5.

Application of Scratch Coat

Thoroughly dampen, but not saturate, surfaces of masonry or concrete walls before applying the scratch coat. Make surface areas appear slightly damp. Allow no free water on the surface.

On masonry, first apply a thin coat with great pressure, then bring it out sufficiently to compensate for the major irregularities on the masonry surfaces to a thickness of not less than 6 mm at any point.

Evenly rake scratch coats, but not dash coats, to provide good mechanical key for subsequent coarse before the mortar has fully hardened.

On surfaces not sufficiently rough to provide good mechanical key, dash on the first coat with a whisk by broom or fiber brush using a strong whipping motion. Do not travel or otherwise disturb mortar applied by dashing until it is hardened.

Floor Tile Installation on Mortar Bed

Before spreading the setting bed, establish lines of borders and center the fieldwork in both directions to permit the pattern to be laid with a minimum of cut tiles.

Clean concrete sub-floor then moisture but not soak. Afterwards sprinkle dry cement over the surface and spread the mortar on the setting bed.

Mix mortar 1 part Portland cement to 2 parts sand. Tamp to assure good bond over the entire area and screed to provide a smooth and level bed at proper height and slope.

Pitch floor to drains as required.

After setting bed has set sufficiently to be worked over sprinkle dry cement over surface and lay tile.

Keep the joints parallel and straight over the entire area by using straight edges.

Tamp the tile solidly onto the bed, using wood blocks of size to ensure solid bedding free from depressions.

Lay tiles from center outward and make adjustments at walls.

Wall Tile Installation on Mortar Bed

Before application of mortar bed, dampen the surface of the scratch coat evenly to obtain uniform section.

Use temporary or spot grounds to control the thickness of the mortar bed. Fill out the mortar bed even with the grounds and rod it to a true plane.

Apply the mortar bed over an area no greater than can be covered with tile while the coat is still plastic.



Allow no single applications of mortar to 19 mm thick.

Completely immerse wall tile in clean water and soak it at least ½ hour. After removal, stack tile on edge long enough to drain off excess water. Re-soak and drain individual tiles then dry along edges. Allow no moisture to remain on the back of tile during setting.

Apply a bond coat 0.8 mm thick to the plastic setting bed or to the back of each sheet or tile.

Press tile firmly into the bed and beat into place within 1 hour.

Lay tile field in rectangular block areas not exceeding 600 mm x 600 mm. Cut the setting bed through its entire depth along the edges of each block area after placement and before subsequent blocks are installed.

Within 1 hour after installation of tile, remove strings from string-set tile and wet the faces of face-mounted tile and remove the paper and glue. Avoid using excess water. Adjust any tile that is out of alignment.

Grouting

- After tile has sufficiently set, force a maximum of grout into joints by trowel, brush or finger application.
- Before grout sets, strike or tool the joints of cushion-edge tile to the depth of the cushion.
- Fill all joints of square-edged tile flush with the surface of the tile. Fill all gaps or sips.
- During grouting clean all excess grout off with clean burlap, other cloth or sponges.

CLEANING

Sponge and wash tile thoroughly with clean water after the grout has stiffened. Then clean by rubbing with damp cloth or sponges and polish clean with dry cloth.

PROTECTION

Cover finished tile floors with clean 13.6 kg. natural kraft paper before permitting foot traffic. Place board walkways on floors that are to be continuously used as passageways by workers. Protect tiled corners external angles, with board corner strips in areas used as passageways by workers.

COMPLETION

Complete work in accordance with Architect Instructions and written variation orders.

WARRANTY

Provide to Owner a Warranty covering satisfactory performance of the complete installation.

END OF SECTION



SECTION 15 PAINTING

SCOPE OF WORK

Perform work described here and shown on drawings including but not limited to: supply labour and materials, services and equipment necessary for the preparation, application and finishing of painting and staining as indicated on drawings, schedules and as specified herein, to internal and external surfaces of building, as follows - refer to **Architectural Material / Finishes Schedule, A001** for paint types.

OTHER TRADES

Co-operate with these other trades to resolve possible problems before starting work: concrete, doors and door panels, metal windows, blockwork, rendering, balustrades and railings, sanitary / plumbing, electrical.

QUALITY ASSURANCE

Determine that the materials specified in the Schedule are compatible with shop coats. Failure to do so will be construed as accepting the paints specified. Contractor is to correct, at his own expense, defects in his work resulting from the use of such materials.

SUBMISSIONS

Submit one (1) sample no less than A4 size to the Architect for review and approval before placing orders.

ON SITE ACTIONS

1. Prepare test samples for painting types and typical locations, where determined by the Architect. Do not commence painting of the substrate type until the sample is approved by the Architect. Apply samples in conditions approximating as closely as possible the lighting conditions of the finished work.
2. Test samples include the suitable preparation of substrates.
3. After approval, test samples are to be the standard for quality control of the completion of work of same type.

DELIVERY, HANDLING AND STORAGE

Store materials in designated spaces in a secure manner which meets the requirements of applicable codes and fire regulations. When not in use, keep such spaces locked and inaccessible to those not employed under this section. Bring materials to the building and store in manufacturer's original sealed containers, bearing the manufacturer's standard label, indicating type and colour. Deliver materials in sufficient quantities in advance of the time needed in order that work will not be delayed in any way.

COMPLETION

Complete work in accordance with Architect Instructions and written variation orders.

WARRANTY

Provide to Owner a Warranty covering satisfactory performance of the complete installation.

END OF SECTION



SECTION 16 BALUSTRADES AND RAILINGS

SCOPE

Perform work described here and shown on drawings including but not limited to: the furnishing of materials and labor including equipment necessary to complete the installation of balustrades and railings as shown in the drawings and as specified herein.

OTHER TRADES

Co-operate with these other trades to resolve possible problems before starting work: concrete, blockwork, rendering, painting, doors and door panels, metal windows.

SUBMISSIONS

- A Shop Drawings:** Show details of fabrication and installation for each type and material of handrail and railing system required including plans, elevations, sections, profiles of rails, fittings, connections, and anchors.
- B Samples:**
Prepare samples of each type of metal balustrade and railing. Where finish involves normal color and texture variations, include sample sets composed of two or more units showing limits of such variations expected in completed works.
Include:
- 150mm long samples of each distinctly different railing member including handrails, top rails, posts, balusters, and typical welded connection. Include samples of fittings and brackets if requested by Architect for review and approval prior to commencement of work on site.

QUALITY ASSURANCE

Single Source Responsibility: Obtain handrails and railing systems of each type and material from a single manufacturer.

MATERIALS TO BE USED

Metals

- A Generally:** comply with standards indicated for forms and types of metals indicated or required for handrail and railing system components.
- B Stainless Steel:** Provide austenitic stainless steel in form indicated complying with the following requirements:
1. Tubing: ASTM 312, Grade TP 304.
 2. Pipe: ASTM A 167, Type 304.
- C Hot Dip Galvanised:**

Miscellaneous Materials

- A Non-shrink Nonmetallic Epoxy Grout:** Pre-mixed, factory-packaged, non-staining, non-corrosive, nongaseous grout complying with CE CRD C621 . Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.
- B Welding Electrodes** as recommended by producer of metal to be welded, complying with applicable AWS Specifications, and as required for color match, strength, and compatibility in fabricated items.



- C** Fasteners: Use fasteners of same basic metal as the fastened metal, unless otherwise indicated. Do not use metals that are corrosive or incompatible with materials joined. Provide concealed fasteners for interconnection of handrail and railing components and for their attachment to other work, except where otherwise indicated. Provide Philips flat head machine screws for exposed fasteners, unless otherwise indicated.

FABRICATION

- A** **Generally:** Fabricate handrails and railing systems to design, dimensions and details shown. Provide handrail and railing members in sizes and profiles indicated, with supporting posts and brackets or size and spacing shown, but not less than required to comply with requirements indicated for structural performance.
- B** **Shop Assembly:** Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- C** **Welded Connections:** Fabricate handrails and railing systems of materials indicated below for interconnections of members of welding. Use welding method, which is appropriate for metal and finish, indicated and develops strength required to comply with structural performance criteria. Finish exposed welds and surfaces smooth, flush, and blended to match adjoining surfaces. Form changes in direction of railing members by bending members by metering, or as indicated on the drawing, as approved by the Architect. Furnish inserts and other anchorage devices for connecting handrails and railing systems to concrete or masonry work. Fabricate anchorage devices, which are capable of withstanding loading imposed by handrails and railing systems. Coordinate anchorage devices with supporting structure. For railing posts set in concrete provide pre-chiseled openings and insert posts as indicated on drawings. Fill opening with non-shrink, non-metallic grout.

METAL FINISHES

Comply with NAAMM "Metal Finishes Manual" for recommendations and designations of finishes, except as otherwise indicated.

PREPARATION

Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as sleeves, concrete inserts, anchor bolts, and miscellaneous items having integral anchors, which are to be embedded in concrete as masonry construction. Coordinate delivery of such items to project site.

Field Measurements: Take field measurements prior to fabrication.

STORAGE

Store handrails and railing systems in clean, dry location, away from uncured concrete and masonry, protected against damage of any kind. Cover with waterproof paper, tarpaulin, or polyethylene sheeting; allow for air circulation inside the covering.

INSTALLATION

Fit exposed connections accurately together to form tight, hairline joints.

Perform cutting, drilling, and fitting required for installation of handrails and railing systems. Set work accurately in location, alignment, and elevation, plumb, level, true, and free of rack, measured from established lines and levels.



Field Welding: Comply with applicable AWS specification for procedures of manual shielded metal-arc welding, for appearance and quality of welds made, and for methods used in correcting welding work. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed welded joints smooth and restore finish to match finish of adjacent rail surfaces.

Prior to anchoring, adjust handrails and railing systems to ensure matching alignment at abutting joints. Space posts at interval indicated but not less than that required by design loading.

Anchoring Posts

Concrete-Anchored Posts: Provide chiseled opening on concrete base as indicated on the drawings to receive railing posts and required anchoring system. Clean holes of all loose material, insert posts, and fill annular space between post and concrete with non-shrink, non-metallic epoxy grout, mixed and placed to comply with grout manufacturer's directions.

Railing Connections

Welded Connections: Use fully welded joints for permanently connecting railing components by welding. Cope or butt components to provide 100 percent contact or use manufacturer's standard fittings designed for this purpose.

Anchoring Railing Ends

Anchor railing ends to metal surfaces with manufacturer's standard fittings using concealed fasteners, unless otherwise indicated.

Anchor Railing Ends to Concrete or Masonry, use drilled-in expansion shields and concealed hanger bolts, unless otherwise indicated.

PROTECTION

Protect finishes of railing systems and handrails from damage during construction period by use of temporary protective coverings approved by railing manufacturer. Remove protective covering at time of Final Acceptance of Completed Works.

Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items which cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units as required.

COMPLETION

Complete work in accordance with Architect Instructions and written variation orders.

WARRANTY

Provide to Owner a Warranty covering satisfactory performance of the complete installation.

END OF SECTION



SECTION 17 TOILET AND SHOWER ACCESSORIES

SCOPE

Perform work described here and shown on drawings including but not limited to: the furnishing of materials and labor necessary to complete the installation of all toilet and bath accessories as shown in drawings and as specified herein.

OTHER TRADES

Co-operate with these other trades to resolve possible problems before starting work: concrete, doors and door frames, blockwork, metal windows, rendering, painting, ceramic tiles, toilet and shower fixtures

SUBMISSIONS

Submit one of each type of accessory complete with appurtenances and finished as specified to the Architect for review and approval before placing order.

MATERIALS AND FABRICATION

Fabricate accessories in accordance with commercial practice, with welds ground smooth. Bend, flange, draw, form, and perform similar operations in a manner to ensure no defects. Flanges of recessed accessories to return to walls to provide a continuous, tight-against the wall installation.

Corrosion-resistant steel shall conform to AISI, Type 302. The exposed surfaces shall have a No. 4 finish, unless otherwise specified.

Brass shall be cast and steel sheet shall conform to ASTM A 366/A 366M and ASTM A 568/A 568M. Surface preparation and pretreatment shall be provided as required for the subsequent finish.

Galvanized-steel sheet shall be hot-dipped, minimum spangle, conforming to ASTM A 526/A 526M, with not less than a 1.25-ounce 35 gram zinc coating in accordance with ASTM A 525. ASTM A 525M. The surface preparation for painting shall conform to ASTM D 2092, Method A.

FINISHES: Finishes on metals not specified otherwise shall be provided as follows:

METAL	FINISH
Corrosion-resisting Steel (Stainless Steel)	General Purpose – w/ Polished or Linished Finish as noted on Architectural Drawings
Aluminium	Satin Anodic, Clear
Carbon Steel	Bright Chromium Plate
Copper Alloy (Brass)	Bright Chromium Plate
Zinc Alloy	Bright Chromium Plate

INSTALLATION

- A Generally:** mounting height to be as indicated on **Architectural Drawing, A850**
- B Provide Suitable Carriers:** the Contractor shall be responsible for providing those portions of the accessory which are not provided with the accessory but are required for the complete installation. All accessories shall be carefully checked to determine the portions which must be provided to complete the installation.



PRODUCTS

PAPER TOWEL DISPENSER: BY OTHERS

Surface-mounted dispensers shall be sized to dispense not less than 300 C-fold paper towels. Dispenser shall be fabricated from not less than 0.96mm thick corrosion-resistant stainless steel, satin finish. Front of the cabinet shall be hinged for access with a continuous corrosion-resistant steel piano hinge or 38mm wide corrosion-resistant steel pin hinges. The lock shall be a spring bolt that will lock when the door is closed. Dispenser shall be fabricated with tight seams and joints with exposed edges rolled. Exposed surfaces shall be smooth and without blemishes. Slots shall be provided at dispenser sides to monitor for refill.

TOILET TISSUE DISPENSER: BY OTHERS

Surface-mounted dispenser shall be sized to dispense not less than two (2) standard roll of toilet tissue or one (1) jumbo roll of toilet tissue. Dispenser shall be fabricated from not less than 0.79mm thick corrosion-resistant stainless steel, satin finish. The front of the dispenser shall be hinged for access and secured with a lock. Dispenser shall be fabricated with tight seams and joints with exposed edges rolled. Exposed surfaces shall be smooth and without blemishes. Slots shall be provided in the face of the dispenser to indicate refill.

GRAB RAILS (also referred to as GRAB BARS): BY CONTRACTOR

Grab Rails shall be fabricated from not less than 1.24mm thick, 40mm outside diameter seamless corrosion-resistant stainless steel tubing. Wall flanges shall be fabricated for a concealed installation from not less than 2.39mm thick corrosion-resistant steel not less than 80mm in diameter. Flanges shall be fully welded to the grab bar. A concealed mounting plate shall be fabricated from corrosion-resistant or galvanized steel. Secure flanges to the mounting plate with not less than four corrosion-resistant steel vandal-resistant setscrews. Exposed surfaces shall have a finish as specified unless the finish is indicated as nonslip. Nonslip finish shall have a peened or light knurled finish.

ROBE HOOK: BY OTHERS

Hook shall be the double type fabricated from satin-finish chromium-plated brass. The projection from the back of the flange to the end of the hook shall be not less than 50 mm. The concealed mounting bracket shall be fabricated from solid brass. Hook shall be secured to the mounting bracket with a locking setscrew.

MIRRORS: BY CONTRACTOR

Clear Mirror Glass shall be toughened safety glass no less than 6.0mm thickness, with integral vinyl backing for safety and mounted on high-moisture resistant plywood backing board no less 12.0mm, adhesive fixing in accordance with manufacturer recommendation.

Mirror frame shall be fabricated from not less than 0.79mm thick corrosion-resistant steel with corners mitered, welded, and ground smooth and a face width of not less than 15mm. Backing sheet shall be fabricated from not less than 1.0mm, thick galvanized steel secured to the frame with concealed screws. Edges and back of the mirror glass shall be protected with continuous wood fill strips and moisture-proof shock-absorbing back padding. Concealed galvanized-steel wall hanger of the size required for the mirror size shall be provided. Mirror shall be hung and locked in place with not less than two vandal-resistant locking screws per mirror.



INSTALLATION

Field measurements shall be taken prior to the preparation of drawings and fabrication to ensure proper fits. Surfaces of fastening devices exposed after installation shall have the same finish as the attached fixtures. Exposed screw heads shall be oval. Install fixtures at the location and height as shown in the drawings. Protect exposed surfaces of accessories with strippable plastic or by other means until the installation is accepted. Coordinate fixture manufacturer's mounting details with other trades as their work progress. After installation, thoroughly clean exposed surfaces and restore damaged work to its original condition or replace with new work.

Recessed Accessories: Set anchors in mortar in masonry construction or fasten to metal studs or framing with sheet metal screws in metal construction.

Surface Mounted Accessories: Mounting on concealed back-plates shall have concealed fasteners. Unless indicated or specified otherwise, install fixtures with sheet metal screws or wood screws in lead-lined braided jute, teflon or neoprene sleeves, or lead expansion shield, or other approved fasteners as required by the construction. Install back-plates in the same manner, or provide with lugs or anchors set in mortar, as required by the construction.

DELIVERY AND STORAGE

Deliver materials to the site in unopened containers, labeled with the manufacturer's names and brands, ready for installation. Store accessories in safe, dry locations until needed for installation.

PROTECTION

Protect finishes of railing systems and handrails from damage during construction period by use of temporary protective coverings approved by railing manufacturer. Remove protective covering at time of Final Acceptance of Completed Works.

Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items which cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units as required.

DELIVERY, HANDLING AND STORAGE

Store materials in designated spaces in a secure manner, keep such spaces locked and inaccessible to those not employed under this section. Store in manufacturer's original sealed containers. Deliver materials in sufficient quantities in advance of the time needed in order that work will not be delayed in any way.

COMPLETION

Complete work in accordance with Architect Instructions and written variation orders.

WARRANTY

Provide to Owner a Warranty covering satisfactory performance of the complete installation.

END OF SECTION



SECTION 18 TOILET AND SHOWER FIXTURES

SCOPE

Perform work described here and shown on drawings including but not limited to: the furnishing of materials and labor necessary to complete the installation of all toilet and bath fixtures as shown in drawings and as specified herein.

OTHER TRADES

Co-operate with these other trades to resolve possible problems before starting work: concrete, doors and door frames, blockwork, metal windows, rendering, painting, ceramic tiles, sanitary / plumbing, electrical, toilet and shower accessories.

SUBMISSIONS

Submit one of each type of fixture complete with appurtenances and finished as specified to the Architect for review and approval before placing order.

MATERIALS AND FINISHES

This specifications covers all plumbing fixtures made from a mixture of white burning clays and finely ground minerals, the wares are subjected to a high temperature rendering them incapable of adsorbing liquid, when unglazed, does not have a mean value of water absorption greater than a 5% of the dry weight making it sanitary and odorless. It is than coated on all exposed surfaces with an impervious non-crazing vitreous glaze giving it a permanent colored finish and retains high quality gloss resistant to acids and alkalis making it easy to maintain.

Refer also to **Sanitary / Plumbing Works Technical Specification and Drawings.**

PRODUCT SPECIFICATION

Water Closet WC-01: American Standard brand, or similar equivalent.

- Madera Flo-Wise, 718mm x 356mm x H381mm PLUS toilet seat, white

Minimum Performance Requirement

- Vitreous china, white and chromium-plated brass with polished finish
- Water Efficiency, <4.5 litres per flush

Water Closet WC-02: American Standard brand, or similar equivalent.

- Madera Flo-Wise, 718mm x 356mm x H381mm PLUS toilet seat, white

Minimum Performance Requirement

- Vitreous china, white and chromium-plated brass with polished finish
- Water Efficiency, <4.5 litres per flush
- ADA compliant, suitable for PWD toilet

Wall Hung Urinal UR: American Standard brand, or similar equivalent.

- Washbrook Flowise, 360 mm x 480 mm x 664 mm

Minimum Performance Requirement

- Vitreous china, white and chromium-plated brass with polished finish
- Water Efficiency, <1.5 litres per flush



Wall Mounted Tapware Assembly (also referred to as Lavatory Faucet):

- “American Standard brand, or similar equivalent.

Minimum Performance Requirement

- Chromium-plated brass with polished finish
- Water Efficiency, <2.0 litres per minute (low-flow and aerated)
- Wall mounted fixture, single hole, cold water only

Hob Mounted Tapware Assembly (also referred to as Lavatory Faucet):

- “American Standard brand, or similar equivalent.

Minimum Performance Requirement

- Chromium-plated brass with polished finish
- Water Efficiency, <2.0 litres per minute (low-flow and aerated)
- Hob mounted fixture, single hole, cold water only

Outdoor Wall Mounted Tapware Assembly:

- “American Standard brand, or similar equivalent.

Minimum Performance Requirement

- Chromium-plated brass with polished finish (suitable finish for outdoor application)
- Minimum 7.5 litres per minute
- Wall mounted fixture, single hole, cold water only

Shower Assembly: American Standard brand, or similar equivalent.

- Flowise Commercial Shower System

Minimum Performance Requirement

- Chromium-plated brass with polished finish
- Water Efficiency, <6.0 litres per minute (low-flow and aerated)

For **Product Technical Specification - refer to Appendix C**

INSTALLATION

Surfaces of fastening devices exposed after installation shall have the same finish as the attached fixtures. Exposed screw heads shall be oval. Install fixtures at the location and height as shown in the drawings. Protect exposed surfaces of accessories with strippable plastic or by other means until the installation is accepted. Coordinate fixture manufacturer's mounting details with other trades as their work progress. After installation, thoroughly clean exposed surfaces and restore damaged work to its original condition or replace with new work.

Surface Mounted Accessories: Mounting on concealed back-plates shall have concealed fasteners. Unless indicated or specified otherwise, install fixtures with sheet metal screws or wood screws in lead-lined braided jute, teflon or neoprene sleeves, or lead expansion shield, or other approved fasteners as required by the construction. Install back-plates in the same manner, or provide with lugs or anchors set in mortar, as required by the construction.

DELIVERY, HANDLING AND STORAGE

Store materials in manufacturer's original sealed containers, off ground and under cover, protected from damage. Deliver materials in sufficient quantities in advance of the time needed in order that work will not be delayed in any way.



COMPLETION

Complete work in accordance with Architect Instructions and written variation orders.

WARRANTY

Provide to Owner a Warranty covering satisfactory performance of the complete installation

END OF SECTION



Appendix A

Geotechnical Investigation

Prepared by SOILS Philippines

September 2015



GEOTECHNICAL INVESTIGATION REPORT

**Subsurface Investigation for the
PROPOSED MULTI-PURPOSE CENTER
INTERNATIONAL ORGANIZATION FOR MIGRATION
Lot 056, Block 12, Brgy. Campesao,
Borongan City, Samar**

SEPTEMBER 2015

**GEOTECHNICAL INVESTIGATION REPORT
Subsurface Investigation for the
PROPOSED MULTI-PURPOSE CENTER
Lot 56, Block 12, Brgy. Campesao
Borongan City, Samar**

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1.0 INTRODUCTION

This report presents the geotechnical evaluation of the results of subsurface investigations conducted at the site of a **PROPOSED MULTI-PURPOSE CENTER**, located at Lot 056, Block 12, Brgy. Campesao, Borongan City, Samar.

The geotechnical investigation consisted of drilling two (2) boreholes within the site in order to assess the subsoil conditions and evaluate its characteristics. The soil samples recovered were then brought to the soil laboratory for analysis and testing. Laboratory tests on selected soil samples include:

- Soil Classification using the USCS (ASTM D2487)
- Grain Size Analysis (ASTM D422)
- Atterberg Limits (ASTM D4318)
- Determination of Moisture Content (ASTM D2216)

This report presents the field and laboratory procedures adopted in the investigation as well as the evaluation of the test results for foundation analysis and design.

Subsurface conditions are presented in the form of idealized soil profiles and borehole logs that also include the results of the field and laboratory tests on soil samples.

Soil-Philippines Index Testing, Inc. undertook the geotechnical investigation at the site on August 14-17, 2015.

The geotechnical investigation followed the procedures recommended by the American Society of Testing and Materials (ASTM).

2.0 PROJECT LOCATION AND REGIONAL GEOLOGY

The proposed project involves a construction of a multi-purpose center in Borongan, Samar. This is an undertaking of the International Organization for Migration (IOM).

The Island of Samar is characterized by an extremely varied physiography, due probably to its complex mountain building process involving series of differential diastrophism. The central highlands with marked accordant peaks, is almost surrounded by karst topography where sinkholes of different dimensions are widespread while coastal area is noted for its gently rolling terrain. (*Reference: Mineral Resource Assessment of Samar Island*)

3.0 FIELD INVESTIGATIONS

The field investigation within the site consisted of drilling two (2) boreholes. The final depth, water level reading and date of drilling are presented in Table 1. (Refer to Borehole Location Plan)

Table 1: Summary of Field Investigation

Borehole Number	Final Depth	Water Level	Date of Drilling
BH-1	12.00 m	1.10 m	17 August 2015
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Washboring procedures were employed in order to advance the drill hole and the Standard Penetration Test was done in order to get the penetration resistance profile of the underlying soils.

The Standard Penetration Test (SPT) was done in accordance with ASTM specifications. For each test, a 2-inch (50.8mm) outside diameter Spoon Sampler is driven into the soil a distance of 18 (460mm) inches by means of a 140 lb. (63.5 kg.) driving mass falling free from a height of 30 inches (760mm). The number of blows needed to drive the sampler 18 inches (460mm) is recorded and the number of blows needed to drive the last 12 inches (305mm) is taken as the N-value. Soil samples were recovered using the spoon sampler and were then taken to the laboratory for analysis and testing.

Complementing the field activities is the laboratory testing of the samples obtained. The results of the field works and laboratory investigation were then used to establish the parameters for determining the type of foundation, level of foundation and bearing capacities.

4.0 LABORATORY TESTING

Representative soil samples obtained during drilling were subjected to the following laboratory tests:

Grain Size Analysis per ASTM D422

This method covers the quantitative determination of the distribution of particle sizes of soils.

Soil was passed through a series of sieves, the weight of soil retained in each sieve determined and recorded. For each sample analyzed, a gradation curve was drawn based on the percent finer weight.

Determination of Moisture Content per ASTM D2216

This method covers the laboratory determination of the water (moisture) content of soil by weight.

The moisture content of a material is defined as the ratio, expressed as a percentage, of the mass of pore water in a given mass of material to the mass of the solid material particles.

Atterberg Limit Test per ASTM D4318

This test method covers the determination of the liquid limit, plastic limit, and the plasticity index of soils.

Liquid Limit of Soils

The liquid limit of a soil is the water content expressed as a percentage of the weight of the oven-dried soil after attaining the condition between the liquid and plastic states.

Plastic Limit and Plasticity Index of Soils

The plastic limit of a soil is the water content, expressed as a percentage of the mass of the oven-dried soil after attaining the condition between the plastic and semi-solid states.

Plasticity Index is defined as the difference between the liquid and plastic limits of the soil.

Soil Classification Tests per ASTM D2487

This standard describes a system for classifying mineral and organo-mineral soils for engineering purposes based on laboratory determination of particle size characteristics, liquid limit and plasticity index.

5.0 RESULTS OF FIELD AND LABORATORY TESTING

The results of the subsurface investigation reveal that the site subsoil predominantly consists of sands and thin layers of gravels of varying consistency and relative condition. Within 3.0 meters depth of BH-1 and 2.0 meters depth of BH-2, SPT N-values are indicative of loose to medium dense condition. Beneath these layers, dense to very dense sands were encountered, generally persisting until termination of the boreholes.

Water level was recorded between 1.10 to 1.40 meters below the ground surface during the conduct of the field tests.

Tables 2 and 3 present the idealized subsurface condition based on the results of field and laboratory testing.

Table 2: Idealized subsurface condition at BH-1

Depth, m	USCS Classification	SPT N-value	Remarks (Relative Condition / Consistency)
0.0 – 2.0	SC	7	Loose
2.0 – 3.0	SM-SP	24	Medium dense
3.0 – 12.0	GW / SM-SP / SP	41 – ‘refusal’	Dense to very dense

Table 3: Idealized subsurface condition at BH-2

Depth, m	USCS Classification	SPT N-value	Remarks (Relative Condition / Consistency)
0.0 – 1.0	SC	4	Loose
1.0 – 2.0	SM-SP	13	Medium dense
2.0 – 12.0	SM-SP / GW	40 – ‘refusal’	Dense to very dense

Based on these results, geotechnical evaluation was carried out to obtain the geotechnical parameters necessary for the analysis and design of foundation and substructures.

6.0 EVALUATION AND RECOMMENDATIONS

Shallow Foundation

Based on the foregoing results, and considering the anticipated loads of the proposed multi-purpose center, the utilization of a shallow foundation system is feasible. Evidently, however, the bearing capacity on the upper layer is curtailed by loose soil layers.

It is recommended that an integrated shallow foundation system consisting of spread footings with tie beams be used for the proposed structure. Depth of foundation shall be at least 1.5 meters from existing ground level, ensuring adequate footing embedment.

Within the level of loose sand, an allowable soil bearing capacity 75 kPa (1,500 psf) may be adopted for analysis considering dead and codal live loads. If a higher bearing capacity would be required, footings may be embedded at 2.5 meters. At this level, an allowable bearing capacity of 120kPa (2,400 psf) may be adopted for analysis considering dead and

codal live loads. These values may be increased by one-third (1/3) for analysis considering transient loads such as wind and earthquake.

In general, Terzaghi's bearing capacity (general shear failure) theory was used in the computation of the ultimate bearing capacity, the equation of which is given as

$$q_{ult} = q_c + q_q + q_\gamma = c' N_c + \gamma_1 D_f N_q + \frac{1}{2} \gamma_2 B N_\lambda$$

where q_{ult} = ultimate gross bearing capacity or soil bearing pressure

c' = cohesion of the soil below foundation level

γ_1 = effective unit weight of soil above foundation level

γ_2 = effective unit weight of soil below foundation level

D_f = depth of footing below lowest adjacent soil surface

N_c, N_q, N_γ = soil-bearing capacity factors, dimensionless terms, whose values relate to the angle of internal friction, ϕ' .

These factors are given as follows:

$$N_q = \frac{e^{2\left(\frac{3\pi}{4} - \frac{\phi'}{2}\right)\tan\phi'}}{2\cos^2\left(45 + \frac{\phi'}{2}\right)}$$

$$N_c = \cot\phi'(N_q - 1)$$

$$N_\gamma = \frac{1}{2} \left(\frac{K_{py}}{\cos^2\phi'} - 1 \right) \tan\phi', \text{ where } K_{py} = \text{passive pressure coefficient}$$

A factor of safety of 3.0 was adopted to obtain the safe bearing pressure. Deformation criteria (settlements) were considered in coming up with the allowable bearing capacity. Estimated settlements are within 25mm to 40mm, which shall be generally elastic and immediate.

Design of Pavements and Slabs-on-Grade

It is recommended that the subgrade underneath pavements and slabs-on-grade be compacted to 95% MDD (maximum dry density). The provision of gravel bedding (crushed aggregates base course), 100 to 150 mm thick, is also recommended to provide a free-draining base course.

Excavations for Foundation

Water levels within the project area is relatively shallow. As such, provision for dewatering shall be made (particularly during the rainy season) to ensure that excavations and subsequent construction of footings are undertaken under relatively dry condition.

Moreover, the stability of excavation cuts shall be ensured. Adequate shoring and bracing shall be provided, when deemed necessary during excavation.

Design of Retaining Structures

In the stability analysis and design of excavation supports or retaining walls, the following parameters may be used. This generally assumes the parameters of loose sand:

Table 4 : Geotechnical Parameters

Angle of friction, ϕ	28°
Cohesion, c	1 kPa
Unit Weight, γ	17 kN/m ³

Lateral loads due to surcharge, as well as the dynamic thrust in the occurrence of an earthquake, shall also be considered in the analysis and design.

Seismic Design Considerations

In the seismic analysis and design of the proposed structure, a zone factor of 0.4 is recommended. This is based on the recommendation of the National Structural Code of the Philippines (NSCP). As to the soil type, it will be prudent to consider a soil type **S_D** in the analysis considering the site subsoil conditions.

If the seismic provisions of the NSCP (2010) shall be adopted, the proximity of near seismic sources shall be considered. Evidently, the most prominent seismic sources in Samar are the Samar lineaments, and to some extent the Central Leyte Fault, part of the Philippine Fault Zone (PFZ). The succeeding figure shows the relative location of the project site from the mentioned seismic sources.

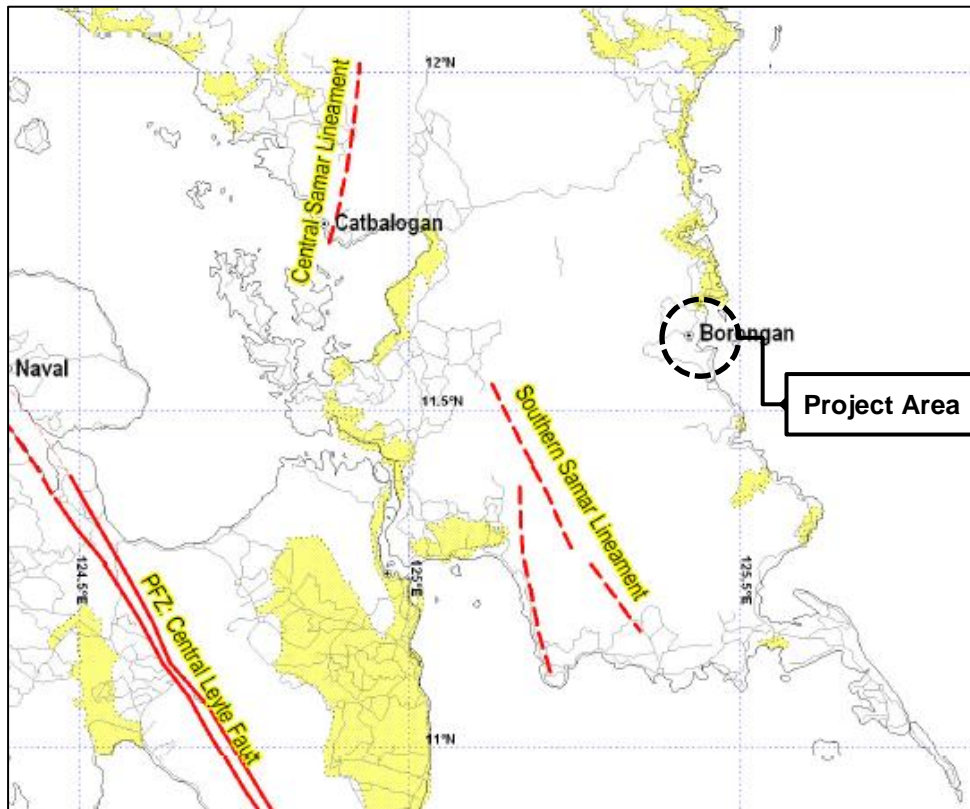


Figure 1: Extract from the Active Faults and Liquefaction Susceptibility Map of Region VIII (PHIVOLCS)

7.0 OTHER COMMENTS

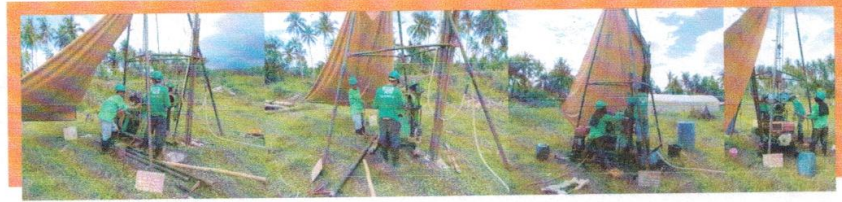
The foregoing findings and recommendations are generally based on the results of the subsurface investigation carried out by **Soil-Philippines Index Testing, Inc.** consisting of two (2) boreholes.

Should any difference in the site subsoil conditions be observed during construction, the undersigned must be informed so that further evaluation and necessary changes in the recommendations can be made.

The design of pavements, foundation and substructures are beyond the scope of this report.

11 September 2015

CHRISTOPHER D. LEE
Civil Engineer (PRC Registration No. 69297)
Accredited DPWH-BRS Materials Engineer
Accreditation No. 2217



GEOTECHNICAL INVESTIGATION REPORT

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LOT 056 BLK. 12, BRGY. CAMPEASO, BORONGAN CITY, SAMAR**

SUBMITTED TO

INTERNATIONAL ORGANIZATION FOR MIGRATION

SEPTEMBER 2015



soilphilippines

SOIL-PHILIPPINES INDEX TESTING, INC.

Rev 0, Effective 01 August, 2015

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4

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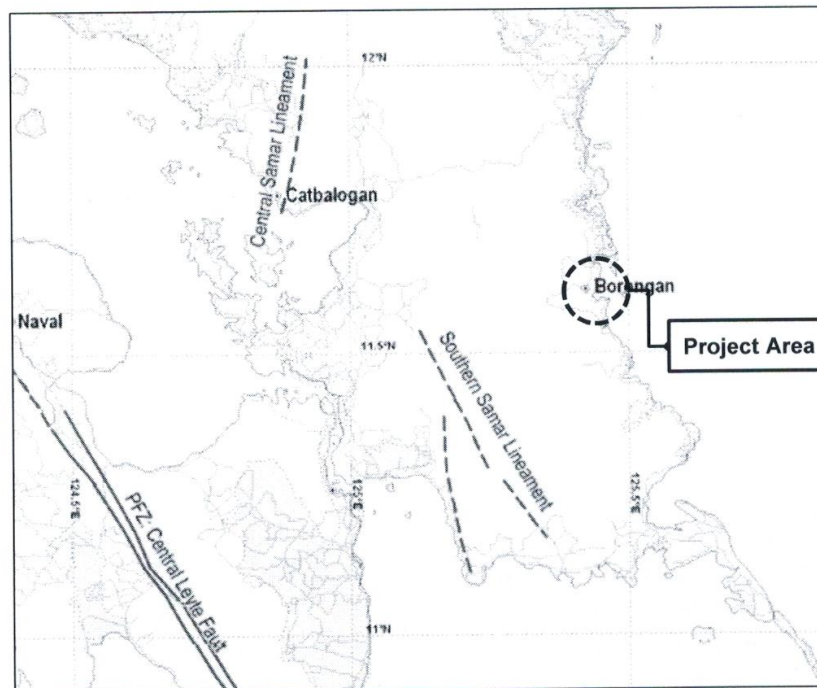


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11 September 2015


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APPENDICES

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Soil Profiles

Final Borehole Logs

Summary of test Results

Natural Moisture Content

Grain Size Distribution Curve

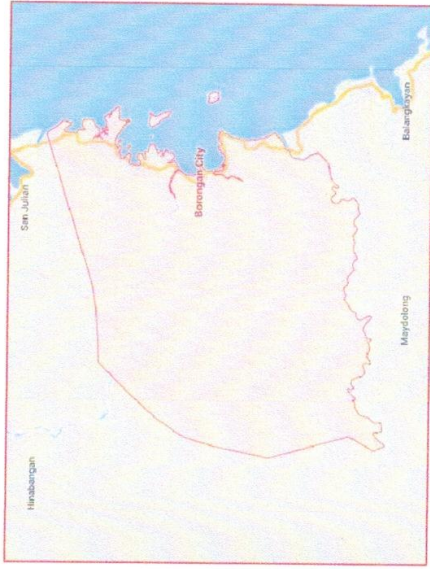
Atterberg Limits

Photographs

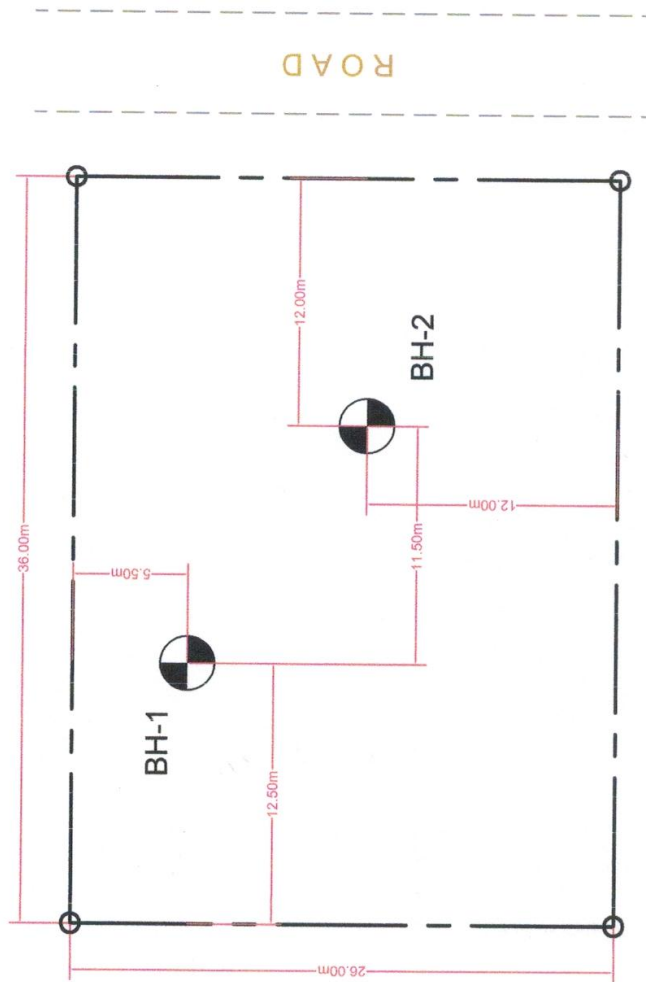




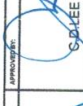

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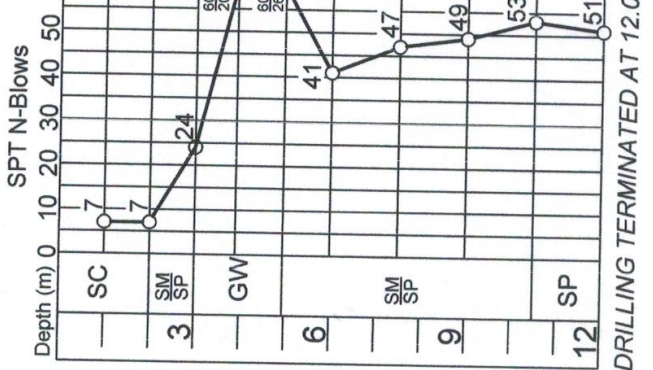


VICINITY MAP



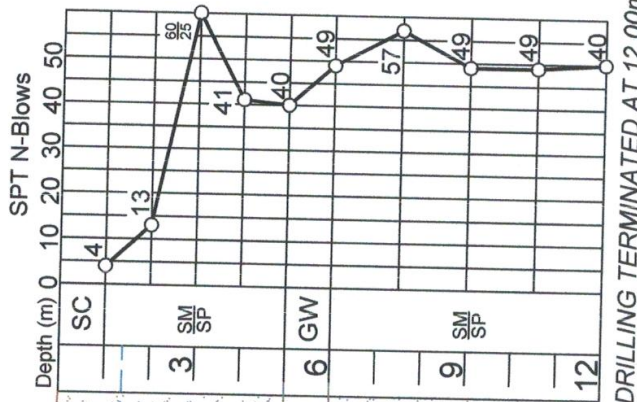
 soilphilippines SOIL PHILIPPINES INDEX TESTING, INC.	PROJECT TITLE: PROPOSED MULTI-PURPOSE CENTER Lot 056 Blk. 12, Brgy. Campeseo, Borongan City, Samar	APPROVED BY:  M.A. REY	APPROVED BY:  G. LEE	SHEET NUMBER: 1 of 1
	CLIENT: INTERNATIONAL ORGANIZATION FOR MIGRATION (IOM)	PREPARED BY:  E.H. BESACULA		BOREHOLE LOCATION

BOREHOLE 1
GWL = G.L. -1.10m



DRILLING TERMINATED AT 12.00m





BOREHOLE 2
GWL = G.L. -1.40m



DRILLING TERMINATED AT 12.00m

SOIL PROFILE ALONG BH-1 & BH-2



 soilphilippines SOIL PHILIPPINES INDEX TESTING, INC.	PROJECT TITLE: PROPOSED MULTI-PURPOSE CENTER Lot 056 Bldg. 12, Brgy. Camapeaso, Borongan City, Samar	DESIGNED BY:  M.A. REYES	CHECKED BY:  E.H.D. SACULA	APPROVED BY:  J. LEE	SHEET NO: 1 of 1
	CLIENT: INTERNATIONAL ORGANIZATION FOR MIGRATION (IOM)	SHEET CONTENT: INTERPOLATED SOIL PROFILE			



SOIL PHILIPPINES INDEX TESTING, INC.



FINAL BOREHOLE LOG AND SUMMARY OF TEST RESULTS

REF NO. SP-FR-TEC-05.01

PROJECT : **PROPOSED MULTI-PURPOSE CENTER**
 LOCATION : **LOT 056 BLK. 12, BRGY. CAMPEASO, BORONGAN CITY, SAMAR**
 CLIENT : **INTERNATIONAL ORGANIZATION FOR MIGRATION**
 Borehole No : 01 GWL = G.L. -1.10m Date Drilled : 08/17/2015 Date Gauged : 08/17/2015
 Final Depth : 12.00m Elevation (m) : N/A Northing : N/A Easting : N/A
 Prepared By : EHD Reviewed By : LMT Approved By : CDJ Sheet No : 1 OF 1

DEPTH, m.	Sample No.	Recovery Sample %	R.Q.D. %	Log Symbol	Soil classification	DESCRIPTION	SPT N - BLOWS			Natural Moisture Content (NMC)	Atterberg Limits		Sieve Analysis % Passing				UCT	
							10	30	50		Liquid Limit (LL)	Plasticity Index (PI)	4 (4.75)	10 (2.00)	40 (0.425)	200 (0.075)	Qu Mpa	Unit weight (g/cc)
1.00	1	56			SC	Dark Brown - Grayish Brown Clayey SANDS and GRAVELS (Loose)	7			27	42	23	70	59	38	21		
2.00	2	100					7			-	-	-	-	-	-	-		
3.00	3	100			SM SP	Dark Gray Poorly Graded SANDS w/ Little Fines (Medium Dense)	24			38	NP	NP	-	100	97	05		
3.90	4	67			GW	Dark Gray Well - Graded GRAVELS and SANDS (Very Dense)				19	NP	NP	46	25	10	1.38		
4.96	5	100								80	28							
6.00	6	78								41	26	NP	NP	98	88	75	05	
7.50	7	89			SM SP	Dark Gray Poorly Graded SANDS w/ Traces of Gravels and Little Fines (Dense - Very Dense)	47			-	-	-	-	-	-	-		
9.00	8	100								49								
10.50	9	89								53								
12.00	10	100			SP	Dark Gray Poorly Graded SANDS w/ Traces of Gravels (Very Dense)	51			26	NP	NP	96	87	74	04		
*** END OF BOREHOLE @ 12.00m ***																		

TYPE OF SOIL AND ROCKS		TYPE OF SAMPLING	CONSISTENCY	MOISTURE	ROCK QUALITY DESIGNATION (RQD)	
CL	Silty / Sandy CLAYS		COHESIVE SOIL (CLAY) N - VALUE CONSISTENCY 0 - 2 - Very Soft 3 - 5 - Soft 6 - 9 - Medium Stiff 10 - 16 - Stiff 17 - 30 - Very Stiff > 30 - Hard		MOISTURE CONTENT (MC) RANGES VALUE 0 - 10 - Dry 10 - 30 - Moist 30 - 70 - Very Moist 70 - 100 - Wet > 100 - Saturated	ROCK QUALITY DESIGNATION (RQD) RQD % ROCK QUALITY > 25 - Very Poor 25 - 50 - Poor 51 - 75 - Fair 76 - 90 - Good 90 - 100 - Excellent
CH	Inorganic CLAYS		COHESIONLESS SOIL (SAND, SILT & GRAVEL) N - VALUE CONSISTENCY 0 - 4 - Very Loose 4 - 10 - Loose 10 - 30 - Medium Dense 30 - 50 - Dense > 50 - Very Dense		PERCENTAGE (% OF SAND, SILT, CLAY & GRAVEL) 0 - 10 % - Trace of (Sand, Gravel, etc...) 10 - 20 % - Some (Silt, Sands, etc...) 20 - 30 % - and (Fine Sand, Clay etc...) > 30 % - Use adjective to qualify the predominant soil type, i, e gravelly, sandy, silty or clayey	
ML	Clayey / Inorganic SILTS					
MH	Eluvial SILTS					
SC	Clayey SANDS					
SM	Silty SANDS					
SW	Well-Graded SANDS					
SP	Poorly Graded SANDS					
GP	Poorly Graded GRAVELS					
GW	Well-Graded GRAVELS					
GC	Clayey GRAVELS					
GM	Silty GRAVELS					
	GRAVELS					
	BOULDERS					
R	SILTSTONE					
O	SANDSTONE					
C	LIMESTONE					
K	CLAYSTONE					
S	TUFF					



SOIL PHILIPPINES INDEX TESTING, INC.

FINAL BOREHOLE LOG AND SUMMARY OF TEST RESULTS
REF NO. SP-FR-TEC-05.01



DPWH - BRS
Accredited

PROJECT : **PROPOSED MULTI-PURPOSE CENTER**
LOCATION : **LOT 056 BLK. 12, BRGY. CAMPEASO, BORONGAN CITY, SAMAR**
CLIENT : **INTERNATIONAL ORGANIZATION FOR MIGRATION**

Final Depth : 12.00m
Elevation (m) : N/A
Northing : N/A
Easting : N/A

Prepared By : EHD
Reviewed By : LMT
Approved By : CDL
Sheet No : 1 OF 1

Borehole No : 02
GWL = G.L. -1.40m

Date Drilled : 08/14-15/15
Date Gauged : 08/18/2015

DEPTH, m.	Sample No.	Recovery Sample %	R.Q.D. %	Log Symbol	Soil classification	DESCRIPTION	SPT N - BLOWS			Natural Moisture Content (NMC)	Atterberg Limits		Sieve Analysis % Passing				UCT	
							10	30	50		Liquid Limit (LL)	Plasticity Index (PI)	4	10	40	200	Qu Mpa	Unit weight (g/cc)
1.00	1	100			SC	Dark Brown Clayey SANDS w/ Some Gravels (Loose)	4			23	44	31	80	69	47	27		
2.00	2	89			SM	Dark Gray Poorly Graded SANDS w/ Little Fines (Medium Dense)	13			29	NP	NP	-	100	97	11		
2.95	3	88			SM	Dark Gray Poorly Graded SANDS w/ Little Fines (Dense - Very Dense)	25			25	NP	NP	100	98	94	07		
4.00	4	89			SM	Dark Gray Poorly Graded SANDS w/ Little Fines (Dense - Very Dense)	41			24	NP	NP	-	100	96	06		
5.00	5	89			SM	Dark Gray Well - Graded GRAVELS and SANDS (Dense)	40			-	-	-	-	-	-	-		
6.00	6	100			GW	Dark Gray Well - Graded GRAVELS and SANDS (Dense)	49			18	NP	NP	46	28	07	1.38		
7.50	7	100			SM	Dark Gray Well - Graded GRAVELS and SANDS (Dense)	57			27	NP	NP	98	91	77	06		
9.00	8	89			SM	Dark Gray Poorly Graded SANDS w/ Traces of Gravels and Little Fines (Dense - Very Dense)	49			-	-	-	-	-	-	-		
10.50	9	89			SM	Dark Gray Poorly Graded SANDS w/ Traces of Gravels and Little Fines (Dense - Very Dense)	49			-	-	-	-	-	-	-		
12.00	10	100				*** END OF BOREHOLE @ 12.00m ***	50			-	-	-	-	-	-	-		

TYPE OF SOIL AND ROCKS		TYPE OF SAMPLING	CONSISTENCY	MOISTURE	ROCK QUALITY DESIGNATION (RQD)
CL Silty / Sandy CLAYS CH Inorganic CLAYS ML Clayey / Inorganic SILTS MH Elastic SILTS SC Clayey SANDS SM Silty SANDS SW Well-Graded SANDS SP Poorly Graded SANDS GP Poorly Graded GRAVELS GW Well-Graded GRAVELS	GC Clayey GRAVELS GM Silty GRAVELS GRAVELS BOULDERS R SILTSTONE O SANDSTONE C LIMESTONE K CLAYSTONE S TUFT		COHESIVE SOIL (CLAY) N - VALUE CONSISTENCY 0 - 2 - Very Soft 3 - 5 - Soft 6 - 9 - Medium Stiff 10 - 16 - Stiff 17 - 30 - Very Stiff > 30 - Hard	MOISTURE CONTENT (MC) RANGES VALUE 0 - 10 - Dry 10 - 30 - Moist 30 - 70 - Very Moist 70 - 100 - Wet > 100 - Saturated	ROCK QUALITY DESIGNATION (RQD) RQD % ROCK QUALITY > 25 - Very Poor 25 - 50 - Poor 51 - 75 - Fair 76 - 90 - Good 90 - 100 - Excellent
			COHESIONLESS SOIL (SAND, SILT & GRAVEL) N - VALUE CONSISTENCY 0 - 4 - Very Loose 4 - 10 - Loose 10 - 30 - Medium Dense 30 - 50 - Dense > 50 - Very Dense	PERCENTAGE (% OF SAND, SILT, CLAY & GRAVEL) 0 - 10 % - Trace of (Sand, Gravel, etc...) 10 - 20 % - Some (Silt, Sands, etc...) 20 - 30 % - and (Fine Sand, Clay etc...) > 30 % - Use adjective to qualify the predominant soil type, i.e. gravelly, sandy, silty or clayey	

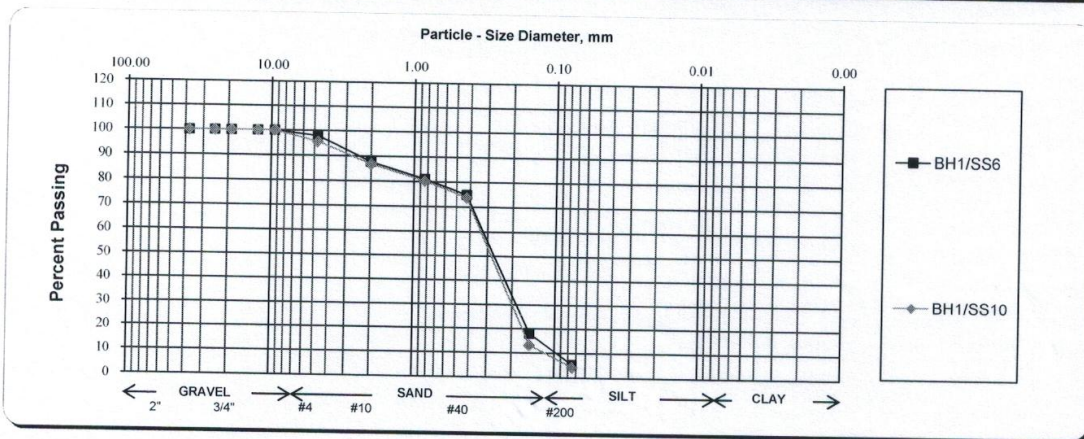
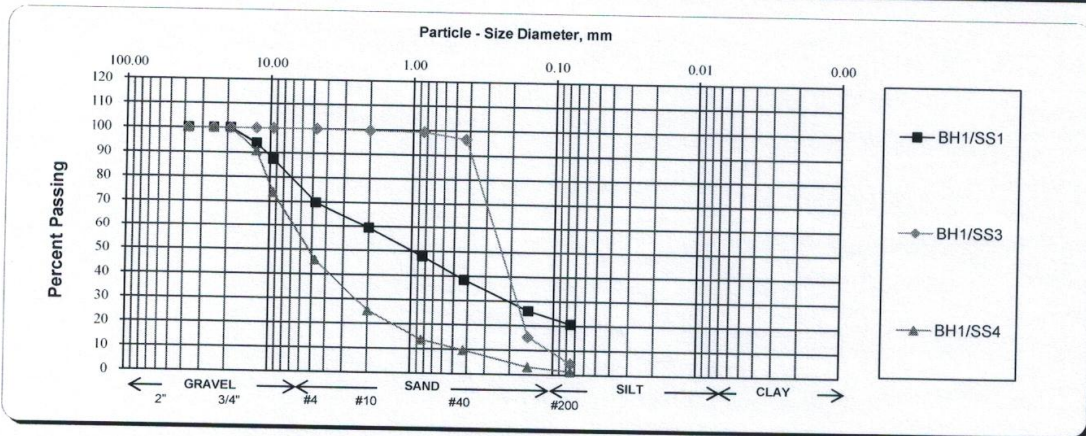
SUMMARY OF TEST RESULTS

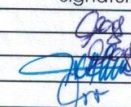
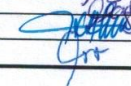
MOISTURE CONTENT DETERMINATION & PARTICLE-SIZE ANALYSIS
SP-FR-TEC-06.01

Ref No. :	SP-CP-ADM-01.01/051523SPMREV1	[X] Borehole
Project :	PROPOSED MULTI-PURPOSE CENTER	[] Test Pits
Location :	Lot 056 Blk. 12, Brgy. Campeaso, Borongan City, Samar	[] Augerhole
Client :	International Organization for Migration (IOM)	BH-1

MOISTURE CONTENT DETERMINATION						
Ref: ASTM D2216						
Sample No.:	1	3	4	6	10	
Moisture Content, %	27.21	37.84	19.09	26.33	26.04	N/A
Sample No.:						N/A
Moisture Content, %	N/A	N/A	N/A	N/A	N/A	N/A

PARTICLE-SIZE ANALYSIS	
Ref: ASTM D422	



Tested By:	Name	Signature	Date
MCD	LIEZL C. ESPERIDA		8/26/2015
PSA	LIEZL C. ESPERIDA		8/27/2015
Reviewed By:	CHRISTOPHER H. ALMERO		9/5/2015
Approved By:	LUZVI M. TUBO		9/7/2015

LAB QUALITY MGT SYSTEM
Effective 01 August 2015

Sheet 1 of 1



2014

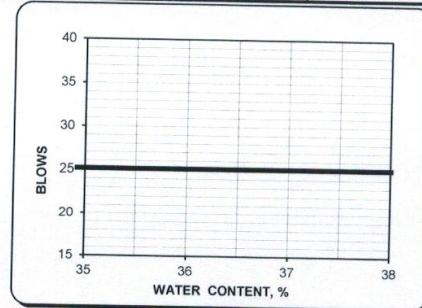
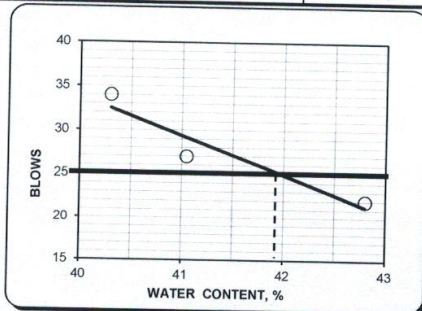
... a Safer Place with SOIL PHILIPPINES ...

SUMMARY OF TEST RESULTS

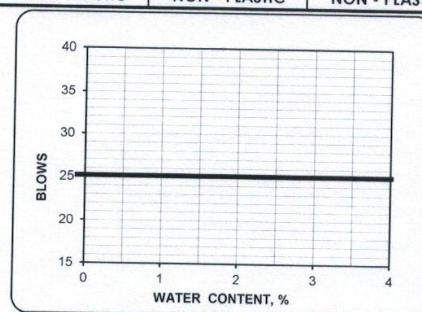
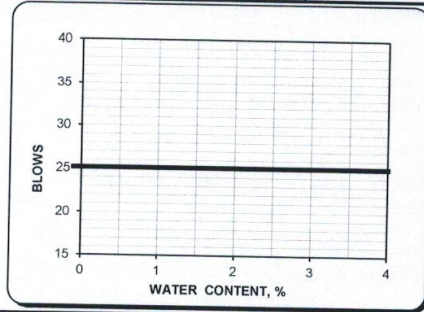
ATTERBERG LIMIT
SP-FR-TEC-07.01

Ref No. :	SP-CP-ADM-01.01/051523SPMREV1	[X] Borehole
Project :	PROPOSED MULTI-PURPOSE CENTER	[] Test Pits
Location :	Lot 056 Blk. 12, Brgy. Campeaso, Borongan City, Samar	[] Augerhole
Client :	International Organization for Migration (IOM)	BH-1

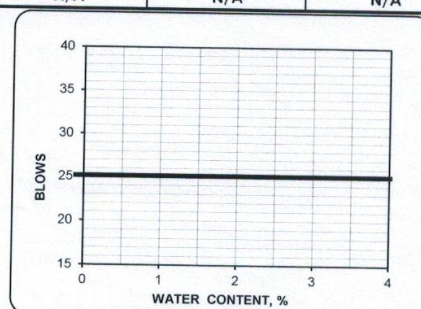
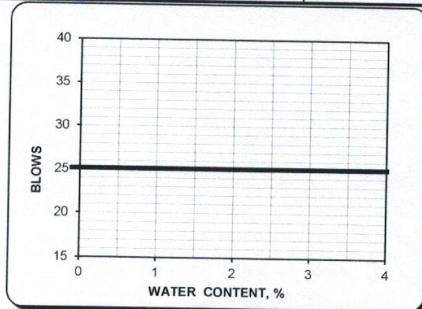
ATTERBERG LIMIT REF: ASTM D4318					
Sample No.		1	Sample No.		3
Liquid Limit, LL	Plastic Limit, PL	Plasticity Index, PI	Liquid Limit, LL	Plastic Limit, PL	Plasticity Index, PI
42	19	23	NON - PLASTIC	NON - PLASTIC	NON - PLASTIC



Sample No.		4	Sample No.		6
Liquid Limit, LL	Plastic Limit, PL	Plasticity Index, PI	Liquid Limit, LL	Plastic Limit, PL	Plasticity Index, PI
NON - PLASTIC	NON - PLASTIC	NON - PLASTIC	NON - PLASTIC	NON - PLASTIC	NON - PLASTIC



Sample No.		10	Sample No.		
Liquid Limit, LL	Plastic Limit, PL	Plasticity Index, PI	Liquid Limit, LL	Plastic Limit, PL	Plasticity Index, PI
NON - PLASTIC	NON - PLASTIC	NON - PLASTIC	N/A	N/A	N/A



	Name	Signature	Date
Tested By:	JOSE ANGELO D. LIWANANG	<i>[Signature]</i>	8/29/2015
Reviewed By:	CHRISTOPHER H. ALMERO	<i>[Signature]</i>	9/5/2015
Approved By:	LUZVI M. TUBO	<i>[Signature]</i>	9/7/2015

LAB QUALITY MGT SYSTEM
Effective 01 August 2015

Sheet 1 of 1



2014

... a Safer Place with SOIL PHILIPPINES ...

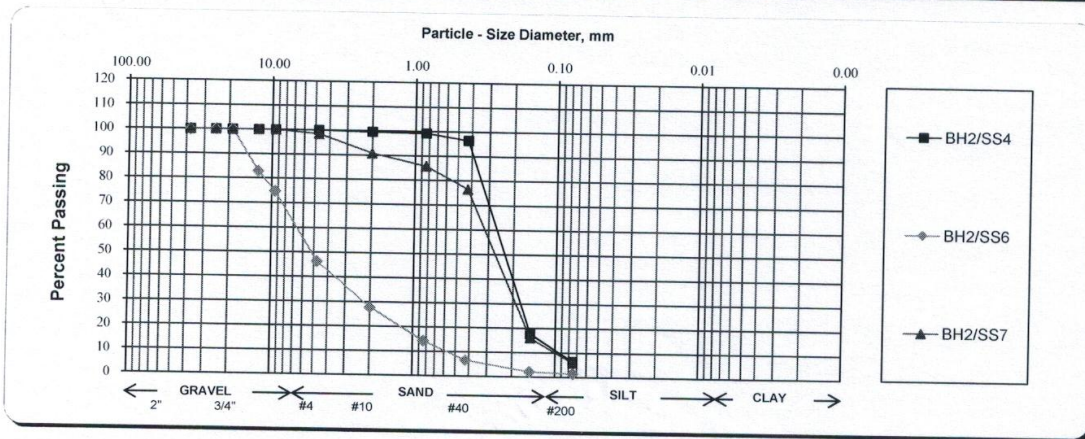
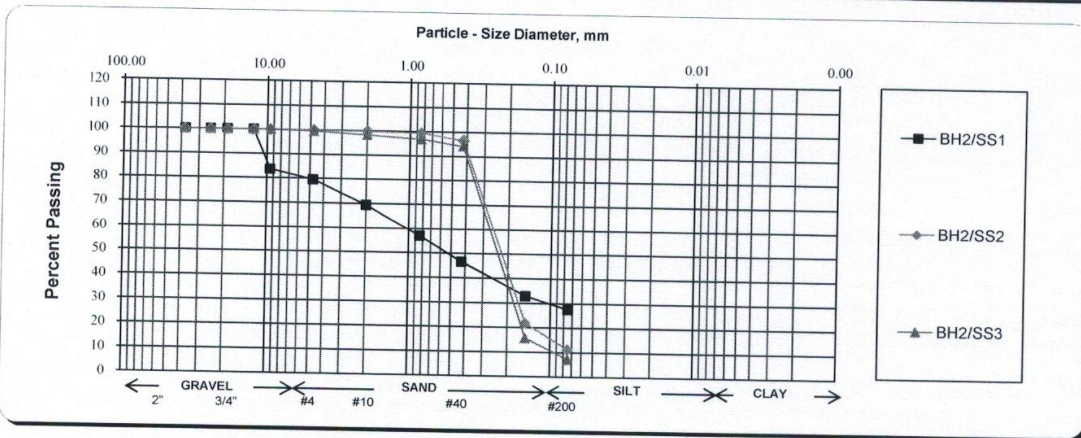
SUMMARY OF TEST RESULTS

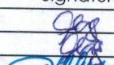



MOISTURE CONTENT DETERMINATION & PARTICLE-SIZE ANALYSIS
SP-FR-TEC-06.01

Ref No.:	SP-CP-ADM-01.01/051523SPMREV1	<input checked="" type="checkbox"/> Borehole
Project:	PROPOSED MULTI-PURPOSE CENTER	<input type="checkbox"/> Test Pits
Location:	Lot 056 Blk. 12, Brgy. Campeaso, Borongan City, Samar	<input type="checkbox"/> Augerhole
Client:	International Organization for Migration (IOM)	BH-2

MOISTURE CONTENT DETERMINATION						
Ref: ASTM D2216						
Sample No.:	1	2	3	4	6	7
Moisture Content, %	22.52	28.85	25.34	24.17	18.02	27.24
Sample No.:						
Moisture Content, %	N/A	N/A	N/A	N/A	N/A	N/A

PARTICLE-SIZE ANALYSIS	
Ref: ASTM D422	



Tested By:	Name	Signature	Date
MCD	LIEZL C. ESPERIDA		8/26/2015
PSA	LIEZL C. ESPERIDA		8/27/2015
Reviewed By:	CHRISTOPHER H. ALMERO		9/5/2015
Approved By:	LUZVI M. TUBO		9/7/2015

LAB QUALITY MGT SYSTEM
Effective 01 August 2015

Sheet 1 of 1



2014

... a Safer Place with SOIL PHILIPPINES ...

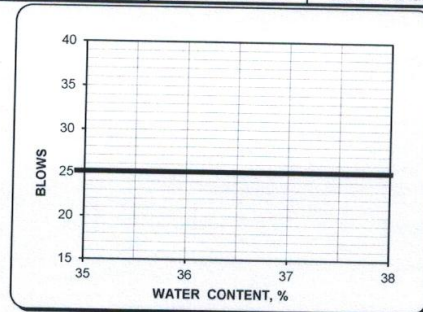
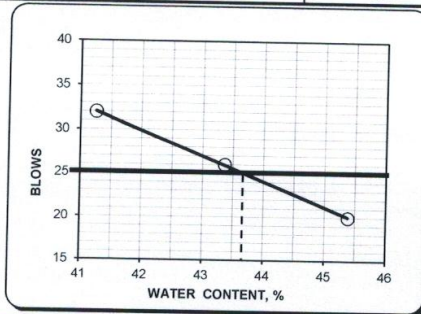
SUMMARY OF TEST RESULTS

ATTERBERG LIMIT
SP-FR-TEC-07.01

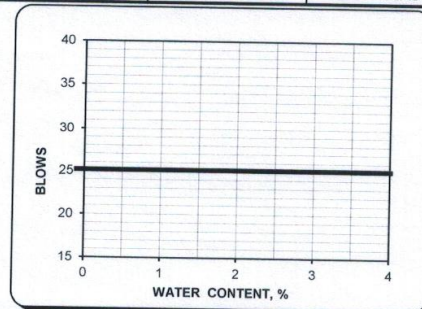
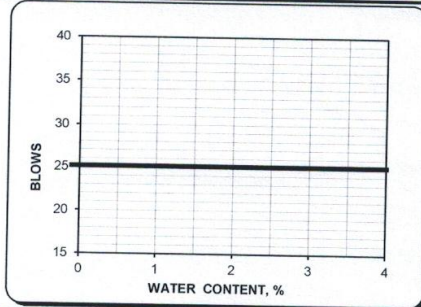
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Project :	PROPOSED MULTI-PURPOSE CENTER	<input type="checkbox"/> Test Pits
Location :	Lot 056 Blk. 12, Brgy. Campeaso, Borongan City, Samar	<input type="checkbox"/> Augerhole
Client :	International Organization for Migration (IOM)	BH-2

ATTERBERG LIMIT REF: ASTM D4318					
------------------------------------	--	--	--	--	--

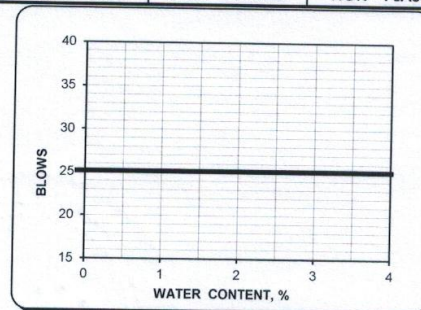
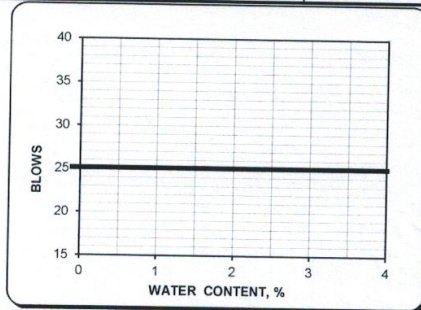
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Liquid Limit, LL	Plastic Limit, PL	Plasticity Index, PI	Liquid Limit, LL	Plastic Limit, PL	Plasticity Index, PI
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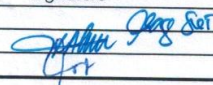



Sample No. 3			Sample No. 4		
Liquid Limit, LL	Plastic Limit, PL	Plasticity Index, PI	Liquid Limit, LL	Plastic Limit, PL	Plasticity Index, PI
NON - PLASTIC	NON - PLASTIC	NON - PLASTIC	NON - PLASTIC	NON - PLASTIC	NON - PLASTIC



Sample No. 6			Sample No. 7		
Liquid Limit, LL	Plastic Limit, PL	Plasticity Index, PI	Liquid Limit, LL	Plastic Limit, PL	Plasticity Index, PI
NON - PLASTIC	NON - PLASTIC	NON - PLASTIC	NON - PLASTIC	NON - PLASTIC	NON - PLASTIC



	Name	Signature	Date
Tested By:	JOSE ANGELO D. LIWANANG		8/29/2015
Reviewed By:	CHRISTOPHER H. ALMERO		9/5/2015
Approved By:	LUZVI M. TUBO		9/7/2015

LAB QUALITY MGT SYSTEM
Effective 01 August 2015

Sheet 1 of 1



Project: Proposed Multi-Purpose Center
Location: Lot 056 Blk. 12, Brgy. Campeaso, Borongan City, Samar
Client: International Organization for Migration

DRILLING WORKS



Borehole 1
Date Drilled: 17 August 2015
GWL: GL -1.10meters
Final depth: 12.00meters

LABORATORY SAMPLES



Prepared By: <i>Chester H. Mape</i> Chester H. Mape	Date: 09/10/2015
Reviewed By: <i>Luzvi M. Tubo</i> Luzvi M. Tubo	Date: 09/11/2015
Approved By: <i>Mary Ann N. Rey</i> Mary Ann N. Rey	Date: 09/14/2015

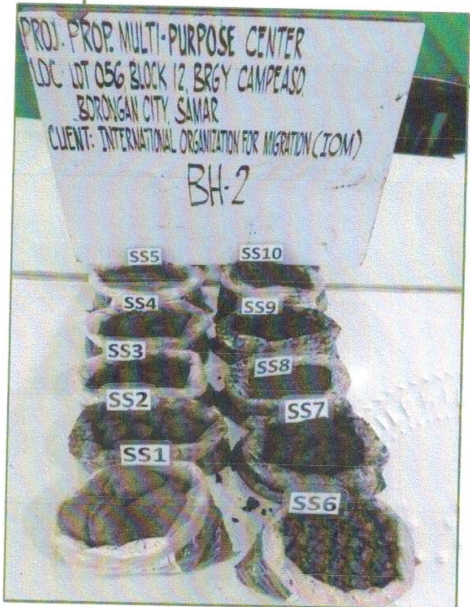
Project: Proposed Multi-Purpose Center
 Location: Lot 056 Blk. 12, Brgy. Campeaso, Borongan City, Samar
 Client: International Organization for Migration

DRILLING WORKS



Borehole 2
 Date Drilled: 14-15 August 2015
 GWL: GL -1.40meters
 Final depth: 12.00meters

LABORATORY SAMPLES



Prepared By: <i>Chester H. Mape</i> Chester H. Mape	Date: 09/10/2015
Reviewed By: <i>Luzvi M. Tubo</i> Luzvi M. Tubo	Date: 09/11/2015
Approved By: <i>Mary Ann N. Rey</i> Mary Ann N. Rey	Date: 09/14/2015

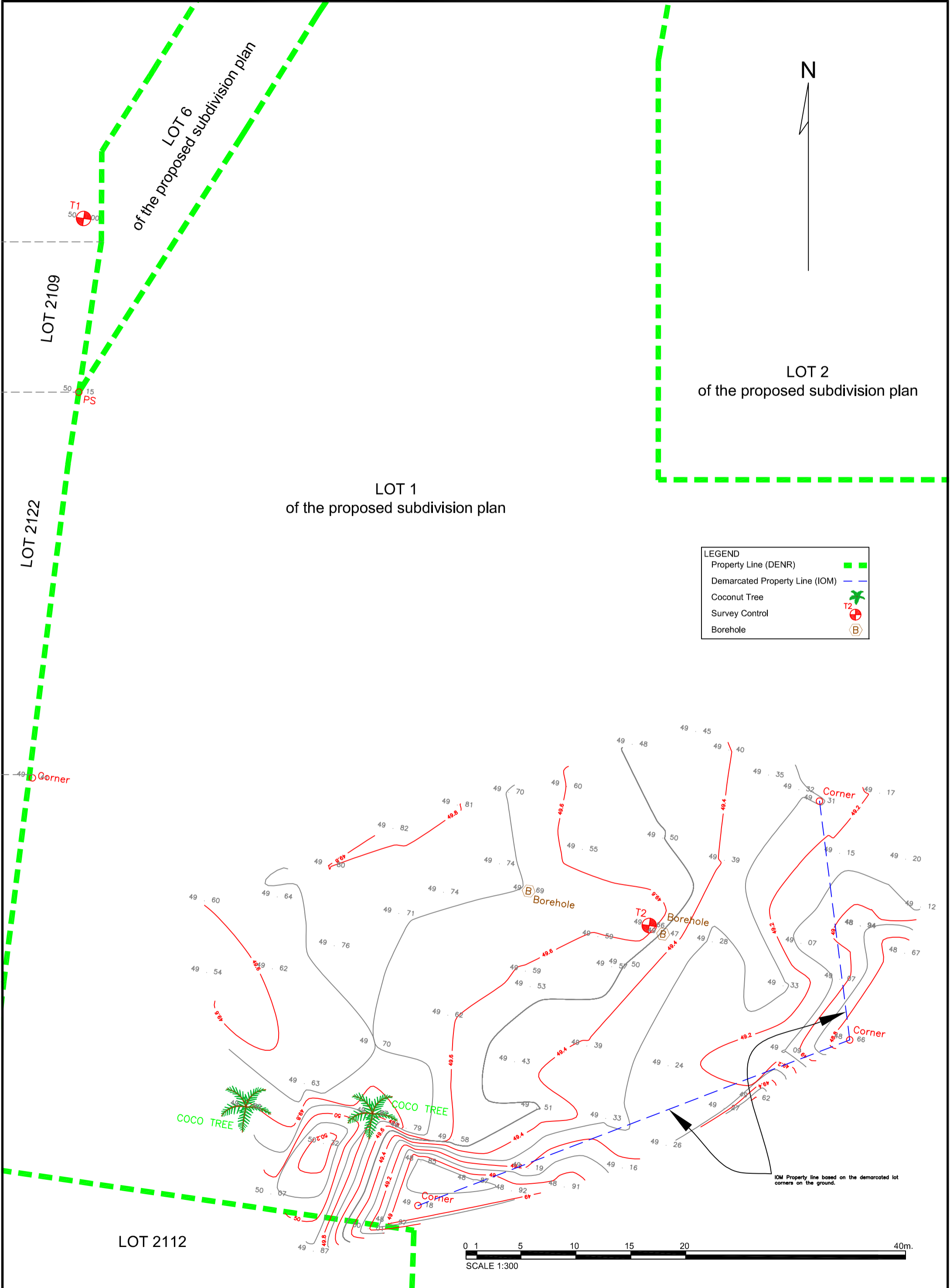
Appendix B

Plan of Survey

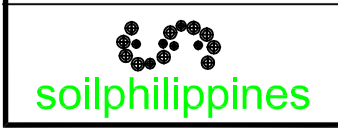
Prepared by SOILS Philippines

September 2015





LEGEND	
Property Line (DENR)	
Demarcated Property Line (IOM)	
Coconut Tree	
Survey Control	
Borehole	



PROJECT TITLE	PROPOSED MULTI-PURPOSE CENTER Portion of the consolidation of Lot 2113 and 2219, Cad. 434-D, Borongan Cadastre, Campesao, Borongan, Eastern Samar
CLIENT	INTERNATIONAL ORGANIZATION FOR MIGRATION

PREPARED BY	Renato Martin S. Lim, Jr. GEODETIC ENGINEER
Reg. Cert. No.	: 4063
License No.	: 265536
Date	: Jun. 20, 1994
Date	: Mar. 06, 2015

SHEET CONTENTS	TOPOGRAPHIC MAP
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Appendix C

Toilet and Shower Fixture

Technical Specifications, supplied by American Standard

<http://www.americanstandard-us.com/products/commercial/>

April 2015



**MADERA™ FloWise® 15" HEIGHT 1.1 GPF
FLUSHOMETER TOILET SYSTEM**

- ❑ **2858.111** 1.1 gpf 15" Height Top Spud Bowl and Manual Flush Valve

BOWL:

- Floor mount elongated flushometer valve toilet
- Vitreous china
- High Efficiency. Operates in the range of 1.1 gpf to 1.6 gpf (4.2 Lpf to 6.0 Lpf)
- Fully glazed 2-1/8" trapway
- 10" or 12" roughing-in
- 15" rim height
- Condensation channel
- Powerful direct-fed siphon jet action
- 10" x 12" water surface area
- 1-1/2" inlet spud
- 100% factory flush tested
- Less toilet seat
- Model 2234.001

MANUAL FLUSH VALVE:

- Self-cleaning brass piston with integral wiper spring prevents clogging and reduces maintenance
- Piston operation delivers superior flush accuracy and repeatability
- Piston valve remains closed and does not need to be reset after loss of water pressure
- ADA compliant non-hold open handle provides automatic shut-off after every flush
- Positive seal ensures leak-free performance
- No external volume adjustment
- Durable chrome-plated cast brass construction is ideal for commercial applications
- Chloramine-resistant EPDM seals
- Adjustable tailpiece for rough-in flexibility
- Can be installed left or right hand
- Model 6047.111

Includes:

- 047007-0070A Inlet Spud (furnished with bowl)
- 481310-100 2 Bolt caps with retainers (furnished with bowl)
- 1" I.P.S. angle stop with back-flow prevention and vandal-resistant cap
- Sweat solder kit including cover tube and wall flange
- High back pressure vacuum breaker with down tube
- Spud coupling & flange for 1-1/2" top spud

To Be Specified:

- ❑ Color: ❑ White
- ❑ Seat:
 - ❑ American Standard #5901.100 Heavy duty open front less cover
 - ❑ American Standard #5905.100 Extra heavy duty open front less cover



SEE REVERSE FOR ROUGHING-IN DIMENSIONS

High-Efficiency Toilet Systems:

- 31.3% water savings when compared to a 1.6 gpf toilet system

System MaP* Score:

- 1,000 grams of miso @ 1.1 gpf

* Maximum Performance (MaP) testing performed by IAPMO R&T Lab. MaP Report conducted by Veritec Consulting, Inc. and Koeller and Company.

Operating Pressure:

Overall Range: 20-125 psi**

Recommended: 25 psi (flowing)-80 psi (static)

** Water pressure over 80 psi is not recommended for most plumbing fixtures.

Flow Requirement:

25gpm (94.6 L/min.)

Nominal Fixture Dimensions:

718 x 356 x 381mm (28-1/4" x 14" x 15")



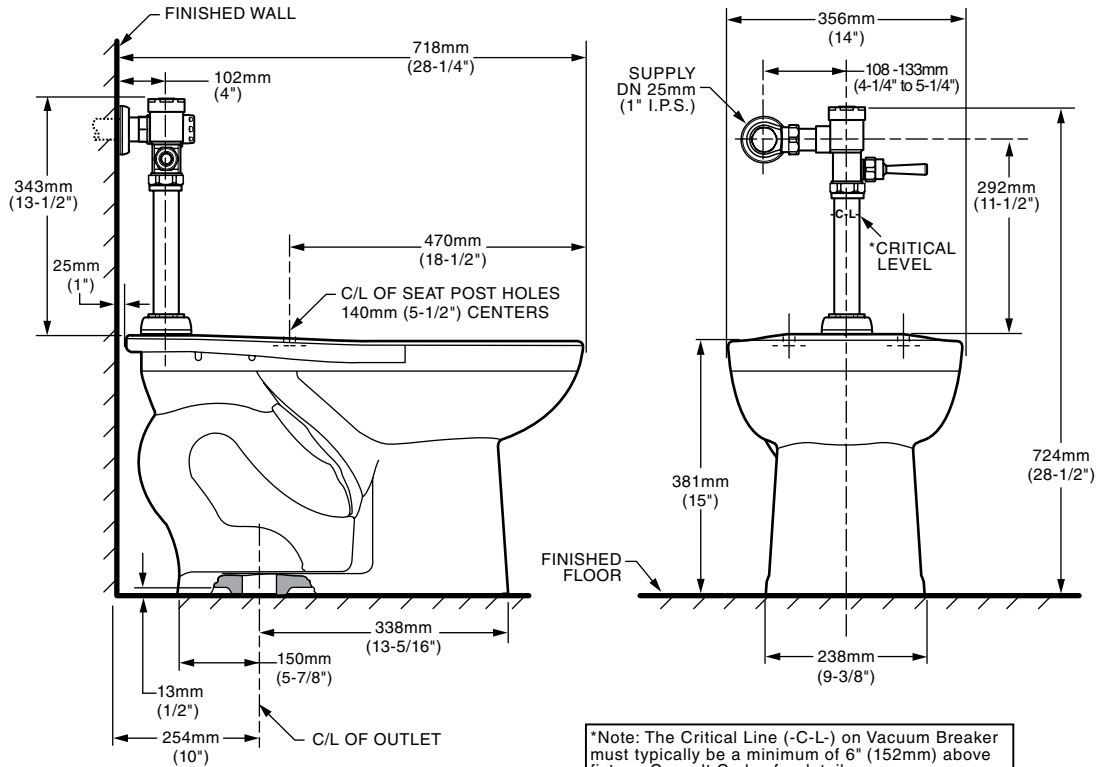
MADERA™ FloWise® 15" HEIGHT 1.1 GPF FLUSHOMETER TOILET SYSTEM MANUAL FLUSH VALVE

**Fixture Compliance Certifications -
Meets or Exceeds the Following Specifications:**

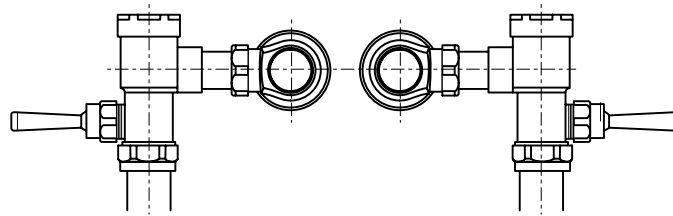
- ASME A112.19.2-2008 / CSA B45.1-08 for Vitreous China Fixtures

Valve Listings:

- ASSE 1037
- ANSI/ASME A112.19.2
- ADA Compliant



*Note: The Critical Line (-C-L-) on Vacuum Breaker must typically be a minimum of 6" (152mm) above fixture. Consult Codes for details.



Valve Left or Right Hand Installation

NOTES:

TO COMPLY WITH AREA CODE GOVERNING THE HEIGHT OF VACUUM BREAKER ON THE FLUSHOMETER VALVE, THE PLUMBER MUST VERIFY DIMENSIONS SHOWN FOR SUPPLY ROUGHING. THIS TOILET DESIGNED TO ROUGH-IN AT A MINIMUM DIMENSION OF 254MM (10") AND A MAXIMUM DIMENSION OF 305MM (12") FROM FINISHED WALL TO C/L OF OUTLET.

IMPORTANT: Dimensions of fixtures are nominal and may vary within the range of tolerances established by ANSI Standard A112.19.2. These measurements are subject to change or cancellation. No responsibility is assumed for use of superseded or voided pages.

**MADERA™ FloWise® 16-1/2" HEIGHT 1.1 GPF
FLUSHOMETER TOILET SYSTEM**

- ❑ **2857.111** 1.1 gpf Top Spud 16-1/2" Height Bowl and Manual Flush Valve

BOWL:

- Floor mount elongated flushometer valve toilet
- Vitreous china
- High Efficiency. Operates in the range of 1.1 gpf to 1.6 gpf (4.2 Lpf to 6.0 Lpf)
- 10" or 12" roughing-in
- 16-1/2" rim height for accessible application
- Condensation channel
- Powerful direct-fed siphon jet action
- Fully glazed 2-1/8" trapway
- 10" x 12" water surface area
- 1-1/2" top spud
- 100% factory flush tested
- Less toilet seat
- Model 3043.001

MANUAL FLUSH VALVE:

- Self-cleaning brass piston with integral wiper spring prevents clogging and reduces maintenance
- Piston operation delivers superior flush accuracy and repeatability
- Piston valve remains closed and does not need to be reset after loss of water pressure
- ADA compliant non-hold open handle provides automatic shut-off after every flush
- Positive seal ensures leak-free performance
- No external volume adjustment
- Durable chrome-plated cast brass construction is ideal for commercial applications
- Chloramine-resistant EPDM seals
- Adjustable tailpiece for rough-in flexibility
- Can be installed left or right hand
- Model 6047.111

Includes:

- 047007-0070A Inlet Spud (furnished with bowl)
- 481310-100 2 Bolt caps with retainers (furnished with bowl)
- 1" I.P.S. angle stop with back-flow prevention and vandal-resistant cap
- Sweat solder kit including cover tube and wall flange
- High back pressure vacuum breaker with down tube
- Spud coupling & flange for 1-1/2" top spud

To Be Specified:

- ❑ Color: White
- ❑ Seat:
 - American Standard #5901.100 Heavy duty open front less cover
 - American Standard #5905.100 Extra heavy duty open front less cover



SEE REVERSE FOR ROUGHING-IN DIMENSIONS

High-Efficiency Toilet Systems:

- 31.3% water savings when compared to a 1.6 gpf toilet system

System MaP* Score:

- 1,000 grams of miso @ 1.1 gpf

* Maximum Performance (MaP) testing performed by IAPMO R&T Lab. MaP Report conducted by Veritec Consulting, Inc. and Koeller and Company.

Operating Pressure:

Overall Range: 20-125 psi**

Recommended: 25 psi (flowing)-80 psi (static)

** Water pressure over 80 psi is not recommended for most plumbing fixtures.

Flow Requirement:

25gpm (94.6 L/min.)

Nominal Fixture Dimensions:

718 x 356 x 419mm (28-1/4" x 14" x 16-1/2")



MADERA™ FloWise® 16-1/2" HEIGHT 1.1 GPF FLUSHOMETER TOILET SYSTEM MANUAL FLUSH VALVE

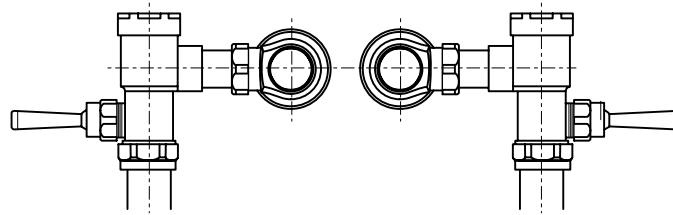
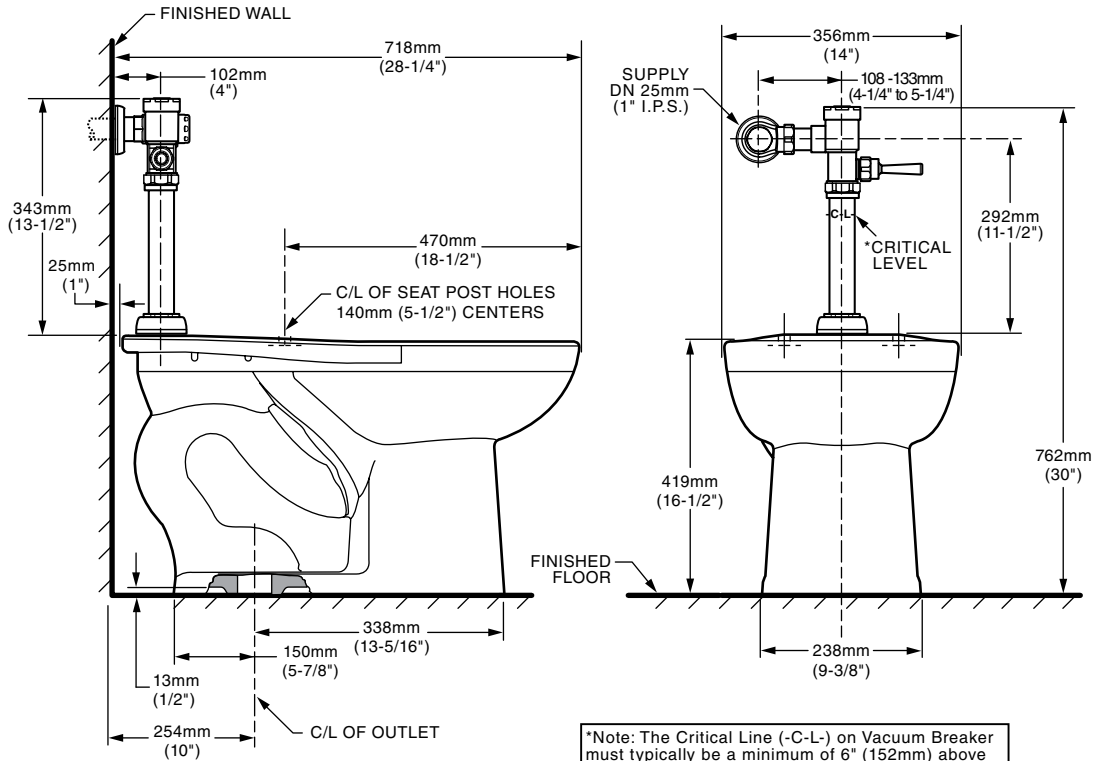
 BARRIER FREE

**Fixture Compliance Certifications -
Meets or Exceeds the Following Specifications:**

- ASME A112.19.2-2008 / CSA B45.1-08 for Vitreous China Fixtures

Valve Listings:

- ASSE 1037
- ANSI/ASME A112.19.2
- ADA Compliant



Valve Left or Right Hand Installation



MEETS THE AMERICANS WITH DISABILITIES ACT GUIDELINES AND ANSI A117.1 REQUIREMENTS FOR ACCESSIBLE AND USABLE BUILDING FACILITIES - CHECK LOCAL CODES.

- When installed so top of seat is 432 to 483mm (17" to 19") from the finished floor.

NOTES:
TO COMPLY WITH AREA CODE GOVERNING THE HEIGHT OF VACUUM BREAKER ON THE FLUSHOMETER VALVE, THE PLUMBER MUST VERIFY DIMENSIONS SHOWN FOR SUPPLY ROUGHING.
THIS TOILET DESIGNED TO ROUGH-IN AT A MINIMUM DIMENSION OF 254MM (10") AND A MAXIMUM DIMENSION OF 305MM (12") FROM FINISHED WALL TO C/L OF OUTLET.

IMPORTANT: Dimensions of fixtures are nominal and may vary within the range of tolerances established by ANSI Standard A112.19.2. These measurements are subject to change or cancellation. No responsibility is assumed for use of superseded or voided pages.



WASHBROOK® FloWise® 0.125 GPF ULTRA HIGH EFFICIENCY URINAL SYSTEM MANUAL FLUSH VALVE

 BARRIER FREE

WASHBROOK® FloWise® 0.125 GPF ULTRA HIGH EFFICIENCY URINAL SYSTEM

- ❑ **6590.503** 0.125 gpf Exposed Top Spud Urinal and Manual Piston-Type Urinal Flush Valve

URINAL:

- Vitreous china
- Ultra High Efficiency. Operates in the range of 0.125 gpf to 1.0 gpf (0.5 Lpf to 3.8 Lpf)
- Flushing rim
- Elongated 14" rim from finished wall
- Washout flush action
- Extended sides for privacy
- 3/4" inlet spud
- Outlet connection threaded 2" inside (NPTF)
- Strainer included
- Meets ASME flush requirements at 0.125 to 1.0 gpf
- Model 6590.001 top spud

MANUAL FLUSH VALVE:

- Self-cleaning brass piston with integral wiper spring prevents clogging and reduces maintenance
- Piston operation delivers superior flush accuracy and repeatability
- Piston valve remains closed and does not need to be reset after loss of water pressure
- Non-hold open handle
- Positive seal ensures leak-free performance
- No external volume adjustment
- Durable chrome-plated cast brass construction is ideal for commercial applications
- Chloramine-resistant EPDM seals
- Adjustable tailpiece for rough-in flexibility
- Can be installed left or right hand
- Model 6045.013 for 3/4" top spud urinals, 0.125 gpf

Includes:

- 2 Wall hangers
- 3/4" I.P.S. angle stop with back-flow protection and vandal-resistant cap
- Sweat solder kit including cover tube and wall flange
- High back pressure vacuum breaker with down tube
- Spud coupling and flange for 3/4" top spud



SEE REVERSE FOR ROUGHING-IN DIMENSIONS

High-Efficiency Urinal Systems:

- 87.5% water savings when compared to a 1.0 gpf urinal system

Operating Pressure:

Overall Range: 20-125 psi**

Recommended: 20 psi (flowing)-80 psi (static)

** Water pressure over 80 psi is not recommended for most plumbing fixtures.

Flow Requirement:

10 gpm (37.9 L/min.)

Nominal Fixture Dimensions:

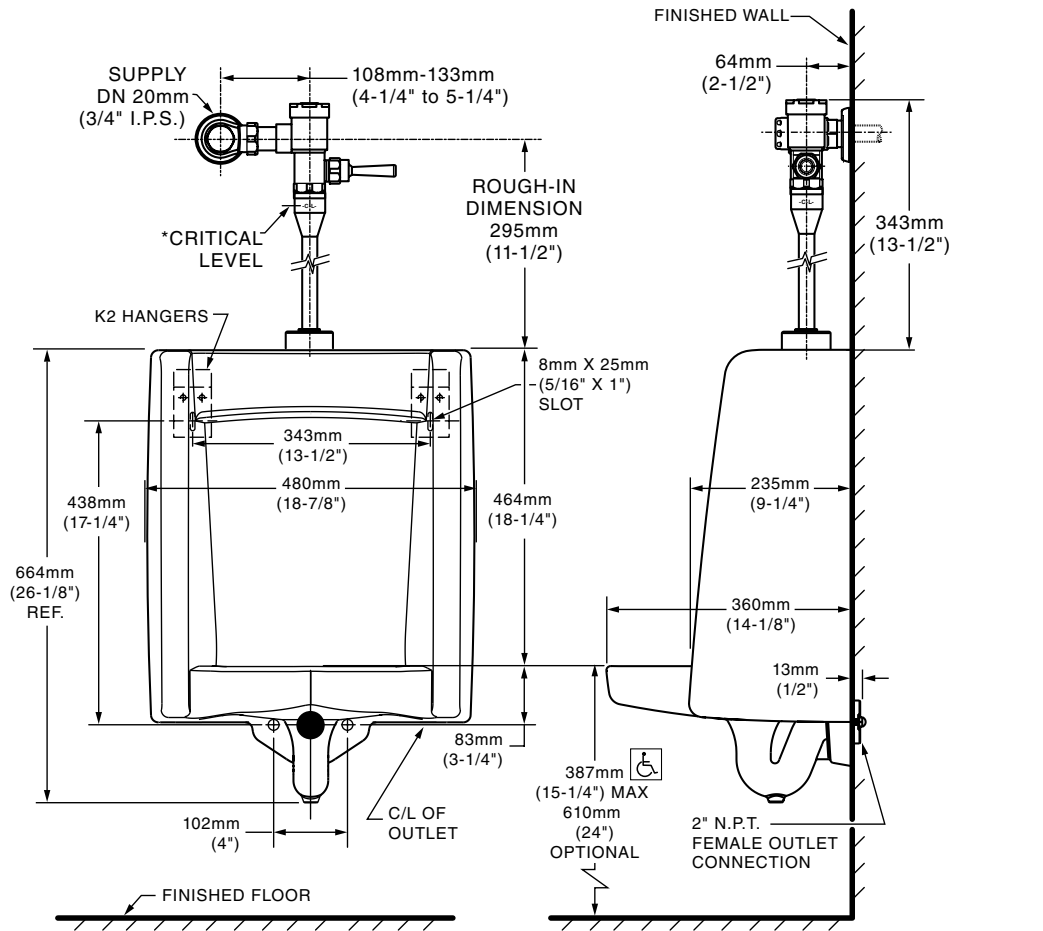
360 x 480 x 664mm (14-1/8" x 18-7/8" x 26-1/8")



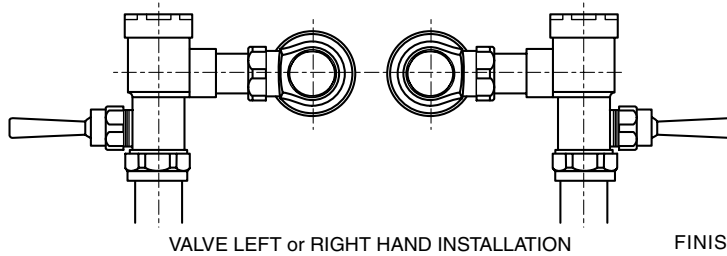
MEETS THE AMERICANS WITH DISABILITIES ACT GUIDELINES AND ANSI A117.1 ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES - CHECK LOCAL CODES.

- When installed so top of rim is 387mm (15-1/4") from finished floor.





*Note: The Critical Line (-C-L) on Vacuum Breaker must typically be a minimum of 6" (152mm) above fixture. Consult Codes for details.



Fixture Compliance Certifications - Meets or Exceeds the Following Specifications:

- ASME A112.19.2-2008/CSA B45.1-08 for Vitreous China Fixtures

Valve Listings:

- ASSE 1037
- ANSI/ASME A112.19.2
- ADA Compliant

NOTES:
PROVIDE SUITABLE REINFORCEMENT FOR ALL WALL SUPPORTS.
IMPORTANT: Dimensions of fixtures are nominal and may vary within the range of tolerances established by ANSI Standard A112.19.2. These measurements are subject to change or cancellation. No responsibility is assumed for use of superseded or voided pages.



FloWise® COMMERCIAL SHOWER SYSTEMS

1.5 GPF SHOWER SYSTEM KIT

WITH HAND SHOWER



MODEL NUMBER:

1662.211 Commercial Shower System Kit

Includes:

• Shower Valve with SS	R120SS
• Colony Soft Valve Only Trim	T675.500.002
• 3-F Hand Shower - 1.5 GPM	1660.502.002
• In-Line Vacuum Breaker	1660.400.002
• Metal Hose	8888.035.002
• Wall Supply	8888.037.002
• 36" Slide Bar	1660.236.002

GENERAL DESCRIPTION:

Complete commercial shower system includes: an R120SS pressure balance valve and trim, a wall supply with 1/2" NPT female inlet and 1/2" NPSM male outlet, a 59" (1500mm) metal shower hose, vacuum breaker, a 3-function personal shower, and a 36" Slide Bar.

Valve features a cast brass body, washerless 47mm ceramic disc valve cartridge with volume and temperature control, back-to-back capability, integrated check valves and hot limit safety stop. Pressure balancing cartridge maintains constant output temperature in response to changes in relative hot and cold supply pressure. One-half inch direct sweat inlets and outlets. With screwdriver stops. Rough-in plaster guard designed for use as thin-wall mounting adapter. Durable metal handle. 3-function water saving hand shower with 1.5gpm/5.7L/min. flow restrictor. Slide bar features an adjustable shower holder which can be set at any height or position along the bar and angle up to 45°.

PRODUCT FEATURES:

VALVE:

Cast Brass Valve Body: Durable.

Ceramic Disc Valve Cartridge: Assures a lifetime of drip-free performance. Allows control over water temperature and volume.

Pressure Balancing Valve Cartridge: Maintains constant output temperature in response to changes in hot and cold supply pressure. Diaphragm system with integrated check valves engineered to eliminate cross flow.

Back-to-Back Capability: Hot and cold can be reversed quickly and easily.

Adjustable Hot Limit Safety Stop: Limits the amount of hot water allowed to mix with cold. Reduces the risk of accidental scalding.

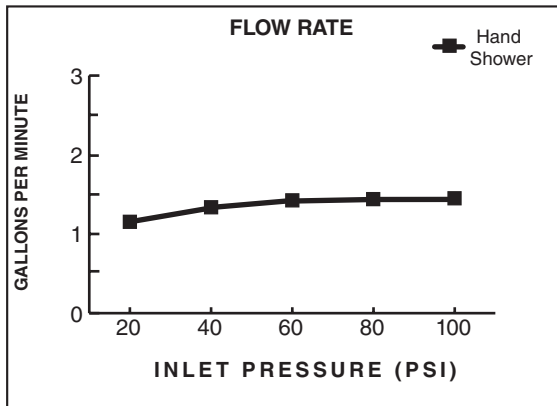
Integral Plaster Guard and Mounting Plate: Protects valve during installation and serves as a mounting plate for thin-wall installations.

PERSONAL SHOWER:

Lightweight, Ergonomic Design: For a sure grip even with wet, soapy hands.

SLIDE BAR:

Simple Height Adjustment: Allows positioning of the personal shower anywhere along the bar.



SUGGESTED SPECIFICATION:

Shower system shall feature a wall supply with 1/2" NPT female inlets and 1/2" NPSM male outlet, 59" metal hose, vacuum breaker, 1.5 gpm/5.7L/min. 3-function water saving personal shower and a 36" Slide Bar. Pressure Balance valve shall feature a cast brass body. Shall feature ceramic disc valve cartridge which controls water temperature and volume. Shall also feature hot limit safety stop. Fitting shall be American Standard Model # 1662.211.002.

CODES AND STANDARDS

Install as required to comply with local code requirements.

ASME A112.18.1
ASSE 1016
CSA B 125

Product Number	Description	Finish
		Polished Chrome
		002

1662.211	FloWise® Commercial Shower System Kit. Contains pressure balance valve with volume and temperature control, trim kit, 3-function water saving hand shower, metal hose, vacuum breaker, wall supply and 36" slide bar. 1.5gpm/5.7L/min.
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Available Modification:

Part Suffix	Description
_SG	Commercial Shower System with 36" Slide-Grab Bar (1662.236) instead of 36" Slide Bar (1660.236)

