DIVISION 00
PROCUREMENT AND CONTRACTING REQUIREMENTS

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1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

1.1.1Clarification Form (See ANNEXES for Official Copy of Form)
1.1.2Addenda: Bid Bulletin
1.1.3Record Clarification Notices (See ANNEXES for Official Copy of Form)
1.1.4Record Amendments (See ANNEXES for Official Copy of Form)
1.1.5Technical Drawings
1.1.6Specifications

1.2 SUMMARY

This section specifies documentary and procedural requirements for handling technical queries, addenda, and revisions during the pre-bid stages.

1.3 PROCEDURES

1.3.1CLARIFICATIONS

1.3.1.1 In case of queries, submit clarification forms upon the official release of the invitation to bid.
1.3.1.2 Submit all queries to the official email account of IFDU (see upper right corner of this page for email address), complete with attachments, i.e. annotated copies of the architectural technical working drawings and/or specifications highlighted in relation to the clarification/query and other attachments deemed necessary by the bidder i.e. sample brochures, etc.
1.3.1.3 Submit equivalent hardcopies of emailed accomplished clarification forms within two days after sending the email. No hardcopies submitted, no official responses will be issued.
1.3.1.4 For phased construction work, include extent of scope of work in clarifications.

1.3.2ADDENDA: BID BULLETIN

1.3.2.1 Issue Bid bulletins in the event of owner-approved changes/addenda with significant cost impact.
1.3.2.2 Issuance of Bid Bulletins are by proponents, to be fairly published to all participating bidders.

1.3.3RECORD CLARIFICATION NOTICES

Record all clarification issuances via a roster of issued clarification notices. Include dates of issuance, status of response, and date responded in the records.

1.3.4RECORD AMENDMENTS

Record all addenda/ amendments issued and answered during the bid phase via a roster of clarification notices. Include dates of issuance, status of response, and date responded in the records.

2. PART 2 PRODUCTS

No queries related to product substitution allowed during the bidding phase. Official technical specifications will prevail.

3. PART 3 EXECUTION

No queries related to product execution allowed during the bidding phase. Official technical specifications will prevail.

END OF SECTION

DIVISION 01
GENERAL REQUIREMENTS

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1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

1.1.1Technical Drawings
1.1.2Specifications
1.1.3Requests for Interpretation
1.1.4Product Samples and Brochures
1.1.5Manufacturer's Data Sheets and Certificates
1.1.6Material Safety Data Sheets
1.1.7Samples and Mock-Ups
1.1.8Work Program and Methodology Submittals

1.2 WORK COVERED BY CONTRACT DOCUMENTS

This section specifies work covered by the contract documents to be consistent with issues Instruction to Bidders and Special Conditions of this contract.

1.3 RELATED SECTIONS

1.3.101 17 00 Execution Requirements

2. PART 2 PRODUCTS

2.1 MANUFACTURER QUALIFICATIONS

Product specifications are itemized per material division with specific manufacturer qualifications, i.e. ISO, ASTM, etcetera. *Manufacturer qualifications are relative and pertinent to each material division. Refer to material division in* subject for detailed manufacturer qualifications.

2.2 MOCK-UPS

Specific material divisions such as ornamental caseworks and steel fabrications require mock-up approvals prior to implementation. See material division for detailed procedures.

2.3 PRODUCT REQUIREMENTS

Refer to signed physical plans for details on the specified product performance requirements. Secure proper product approval from the designers prior to site implementation. Refer to the procedures process of this section for the general procedure.

2.4 PRODUCT SUBSITITUTION

Requests for product substitutions are subject to the approval of the designers and noted by the owners. Follow the proper procedure and attach required submittals as specified per material division. The contractor is obliged to indicate whether or not the substitution will incur an impact on the agreed contract costs, such that the agreed contract cost is rendered insufficient or excessive.

2.5 SUPPLIER QUALIFICATIONS

Only contract suppliers with active ISO qualifications and sufficient supply stocks for items specified requiring mass quantities. Ensure that suppliers are equipped with warehousing facilities within the Project's vicinity, have good service performance records for supplying and handling supplies, and have good delivery records to the project site, with minimal delays, in sufficient quantities, and of maximum quality.

2.6 TESTING AND INSPECTING SERVICES

Observe required testing and inspecting services for items marked critical in particular material divisions. Review testing and inspecting requirements as specified in particular material divisions. The job site is subject to inspection by the owner and designer at any time during the progress of work. Any work found inconsistent with technical working drawings are subject to rework, regardless of whether or not the item subject to rework is found later during the work progress.

2.7 PROCEDURES

2.7.1 SUMMARY – APPROVALS

Secure all product, execution, and substitution approvals consistent with project timelines. No documentary product approval shall be basis or cause of delays in the approved project implementation schedule.

2.7.2 PRODUCT APPROVAL

Attach duly accomplished official approval forms (see Annex), with markings "Product Approval", complete with corresponding submittal attachments and product performance requirements as required per material division to all product approval requests. Attachments will include product samples, mock-ups, manufacturer qualifications, and other documents as indicated in each material division.

2.7.3 PRODUCT SUBSTITUTION APPROVAL

Attach duly accomplished *official approval forms* (see Annex), with markings "Product Substitution", complete with corresponding submittal attachments and product performance requirements as required per material division to all product substitution requests.

In addition to official approval forms, attach a duly accomplished *product comparison form* (see ANNEX), complete with samples, mock-ups, manufacturer qualifications, and other attachments required per material division.

2.7.4 SOURCE QUALITY CONTROL PROCEDURES

Multiple supply sources are acceptable only if the product is the same, consistent, and duly approved. Secure a separate product approval for similar items procured from different suppliers. Refer to material divisions for required submittals. Follow the procedure for product approval (refer to section 2.7.3. PRODUCT SUBSTITUTION APPROVAL).

3. PART 3 EXECUTION

3.1 CONTRACTOR QUALITY CONTROL

This section shall be consistent with eligibility requirements stated in the Instruction to Bidders.

The proponents/owners of the project are entitled to employing a contractor of choice, by bidding following the RA 9184 otherwise known as THE GOVERNMENT SERVICE PROCUREMENT ACT OF 2016 provided that contractors involved in the works are equipped as follows:

3.1.1 All contractors and builders involved in the scope of works of the project, whether general contractors, specialty contractors, or subcontractors are licensed and valid members of the Philippine Contractors Accreditation Board during the time of bidding and the entire duration of the construction of the project.

3.1.2 All contractors have the financial capacity to acquire the appropriate equipment and manpower for use in the completion of the scope of works, especially for specialty construction involving expertise, i.e. paint works, steel fabrications, and other items specified.

3.1.3 All contractors have a sound organizational structure, with a manpower of experienced technical personnel qualified to administer proper supervision of the required work.

3.1.4 All contractors duly comply with civil liabilities as prescribed by the prevailing rule of law in the country and regional jurisdiction wherein the project is situated.

3.1.5 All contractors are liable to the annual renewal of his license as prescribed by law.

3.1.6 Ensure compliance with basic safety requirements as prescribed by the rule of law, including the national building code of the country and regional jurisdiction where project site is situated.

3.1.7 All contractors shall comply with the conditions as stipulated in the Instruction to Bidders and Special Conditions of the Contract.

3.2 EXECUTION REQUIREMENTS

Secure execution approvals by submitting duly accomplished official approval forms (see Annex), with markings "Execution Approval", complete with a detailed work program and methodology. Refer to execution requirements as specified in every material division. Refer to appropriate subsections for detailed execution requirements.

3.3 EXECUTION SUBSTITUTION

Secure execution substitution approvals by submitting duly accomplished official approval forms (see Annex), with markings "Execution Approval", complete with a detailed work program and methodology. Submit execution substitution requests via formally submitted requests.

3.4 FABRICATOR QUALIFICATIONS

Ensure that specialty fabricators follow fabricator qualification requirements as specified in plans.

3.5 INSTALLER QUALIFICATIONS

Ensure that contracted installers will follow qualifications as specified in plans

3.6 *TESTING AND INSPECTING SERVICES*

Ensure that fabricated specialty items are compliant to competent testing and inspecting procedures. Refer to material divisions for detailed performance requirements, tests, and inspection proceedings required per material. Furnish copies of test and inspection results for all contracted fabricators and constructors.

3.7 TESTING LABORATORY SERVICES

Furnish copies of laboratory tests as specified by each material division.

3.8 PROCEDURES

3.8.1 SUMMARY

Approval schedule shall not be in conflict with approved project implementation schedules.

3.8.2 EXECUTION APPROVAL

The general procedure will include the official submission of execution approval forms (see Annexes for a copy of the official form to be utilized) with corresponding execution submittal attachments as specified per material division.

Attachments will include work program and methodology submittals.

3.8.3EXECUTION SUBSTITUTION APPROVAL

For execution substitution, the general procedure will include the official submission of execution approval forms with a clear indication of execution substitution (see Annexes for a copy of the official form to be utilized) with *corresponding submittal attachments and execution performance requirements as specified per material division. The* changes and similarities of the specified from the proposed execution must be clearly outlined and justified.

END OF SECTION

01 00 00	DIVISION 1 GENERAL REQUIREMENTS
01 17 00	Execution Requirements

1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Technical Drawings
1.1.2 Specifications
1.1.3 Requests for Interpretation
1.1.4 Land and property surveys certified by surveyor
1.1.5 *Final property surveys showing the work performed and recorded survey data*

1.2 SUMMARY

This section includes general prescribed proceedings in execution of general construction work. Refer to each material division for specific execution requirements, especially for special fabrications. General construction work is listed as follows:

1.2.1 Construction Layout
1.2.2 Field engineering and surveying
1.2.3 General installation of products
1.2.4 Coordination of owner-installed products
1.2.5 Protection of installed construction
1.2.6 Correction of the Work

1.3 RELATED SECTIONS

1.3.1 Requests for Interpretation

1.4 *WARRANTIES*

The following should be included in the Contractor's warranties:

1.4.1 Warrant that materials and equipment furnished under the Contract are of good quality and new unless otherwise required or permitted by the Contract Documents
1.4.2 Warrant that the Work will be free from defects and conforms to the requirements of the Contract Documents. Work not conforming to the contract documents are defective, therefore subject to revision and correction according to the drawings and specifications.
1.4.3 Warrant that all substitutions implemented on site are properly approved and authorized; work without proper approval are considered defective.
1.4.4 Defects and damages NOT executed by the Contractor, i.e. improper or insufficient maintenance of equipment systems that have been turned-over, improper operation, or normal wear and tear and normal usage are excluded from the warranties. In the event that defects and damages occurred upon partial completion of the project or in the duration of the construction, the Owner and Architect may require the Contractor to furnish satisfactory evidence as to the kind and quality of materials and equipment utilized.
1.4.5 **At the minimum, all warranties should be in pursuant to the provisions of RA 9184 otherwise known as the 2016 GOVERNMENT PROCUREMENT REFORM ACT.**

1.5 *CONTRACTOR RESPONSIBILITIES*

1.5.1 Perform and complete works as stipulated in the technical working drawings, the performance specifications, and related contracted documents.
1.5.2 The contractor shall comply with all permitting requirements as needed to commence the project and to facilitate proper turnover for the full occupancy of the owner. Permits include building permit application, permit requests for tree removal, excavation permits, fencing permits for both temporary and permanent facilities, occupancy permits, and other permits as needed to complete the project and facilitate the smooth turnover of the project. In case of conflict between approved scopes of works, technical drawings, and this specifications, scope of work and physical plans shall prevail.
1.5.3 In performing the work, the contractor is obliged to keep organized, correct, and truthful records of the progress of construction. Included in this documentation are shop drawings, details, execution and work methodology procedures, as well as information furnished by the owner or the designer. Organize the records such that any changes decided upon during construction are traceable.
1.5.4 The contractor is obliged to thoroughly review all contract documents, technical working drawings, and specification and ensure that the implementation on the project site is as true to the drawings as possible. In case of

inconsistencies between drawings, specifications, actual site conditions, and similar issues resulting to confusion on the work to be implemented on site, the contractor is obliged to file a Request for Interpretation/Clarification to the Design Team. Follow procedures as prescribed during the kick-off conference.

1.5.5 Take field measurements and ensure that drawings are feasible. In case of conflict, inform the design team via execution and work methodology approvals or requests for interpretation through the construction management team *and wait for official responses prior to implementation.*

1.5.6 The contractor is obliged to properly inform the Construction Manager of any errors, inconsistencies, or omissions discovered in the technical working drawings. The Construction Manager shall in turn consult with designers to manage and resolve any incurred conflicts.

1.5.7 Carefully examine the existing site conditions and ascertain that the actual surveyed location is accurate.

1.5.8 Secure a copy of contract documents, soil borings, and relevant data in order to verify the nature, location, and character of the project and the site, including without limitation, the surface and subsurface conditions and all structures and obstruction both natural and man-made within and around the project site vicinity. Contracts may be requested from the IPFDU or procured by the contractor depending on stipulations on the scope of work, terms of reference, instruction to bidders, and special conditions of the contract.

1.5.9 The contractor is responsible for all erroneous work administered on site without the due information and approval of the architect. Included in this responsibility is the shouldering of costs in the event that the work is to be revised for correction.

1.5.10 All Site supervision, direction, and administration of all site work is the responsibility of the Contractor.

1.5.11 Construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work under the Contract are the responsibilities of the contractor unless otherwise stated in the contract documents.

1.5.12 If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the evaluation of the jobsite safety of such means, methods, techniques, sequences or procedures is the responsibility of the Contractor. If specifications are deemed unsafe, the Contractor shall give timely written notice to the Owner and Architect via and shall not proceed with that portion of the Work without further written instructions from the Architect.

1.5.13 The contractor is obliged to inform IPFDU through the construction manager or project coordinators of any substitutions to occur on site. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any resulting loss or damage.

1.5.14 The Contractor is responsible for the acts and the quality of work of its employees, subcontractors, including their agents and employees and other work commissioned by the contractor on site.

2. PART 2 PRODUCTS

Refer to specific material divisions for product particulars.

3. PART 3 EXECUTION

3.1 SITE INVESTIGATION PRIOR TO COMMENCEMENT OF WORK

The contractor is to examine existing conditions and verify location of existing site utilities, existing structures, vegetation, and other considerations existing on site before beginning work. Include subsurface equipment in this investigation. Verify invert elevations at points of connections for sanitary sewers, storm sewers, underground electrical wiring, and water service piping existing on site. Furnish location data acquired to the architect. In case of conflict and inquiries, the contractor shall inform the construction manager to facilitate resolution.

3.2 FIELD MEASUREMENTS

Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Verify all dimensions prior to fabrication. Coordinate fabrication schedules with construction progress.

3.3 CONSTRUCTION LAYOUT

Verify all layout shown in the technical working drawings. Engage professional and experienced surveyors to establish information shown on the Drawings, especially related to site benchmarks and layout. In case of discrepancies, inform the Architect via a Request for Interpretation. Record all layout control work, coordinates of benchmarks, including deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member and types of instruments and tapes used. Furnish a copy of the records to the Architects on critical progresses of work.

Engage a professional, experienced, and licensed surveyor to conduct the following activities:

3.3.1 Location and establishment of benchmarks and control points at each story of the construction, and elsewhere needed.
Note: Do not relocate existing benchmarks or control points without securing a written approval from the Architect. Inform the architect of the need for relocation by filing an official Request for Clarification (See Annex for official forms)

3.3.2 Establish dimensions accurately.

3.3.3 Record all benchmark locations, both horizontal and vertical data.

3.3.4 Notify and disseminate to installers, the correct and accurate lines and levels.

3.3.5 Check the accuracy of the location, level and plumb, of every major element as the work progresses and duly notify the Construction Manager of any discrepancies.

3.3.6 Close site surveys with an error of closure equal to or less than the standard established.

3.3.7 *Locate and layout control lines and levels for structures, building foundations, column grids, and floor levels, including* those required for mechanical and electrical work.

3.3.8 Transfer survey markings and elevations for use with control lines and levels when a written approval by the Architect or Construction Manager has been secured.

3.3.9 Establish temporary reference points necessary to complete and commence specific construction work, provided that these reference points are removed when the work in subject has been completed. Do not delete temporary reference points without proper recording.

3.3.10 Prepare certified survey records showing dimensions, locations, elevations, and angles for every major site improvement completed on site, specifically completion of foundation works, completion of every floor or zone as decided by the construction manager with the conformity of owners and designers.

3.3.11 Prepare and submit a final property survey showing the real records and features of the finished project, namely actual floor to floor ceiling heights, final building height, benchmarks and coordinates of critical underground facilities, if any. Show boundary lines, streets, tree data, adjacent properties, landmarks, grade contours, and the distance and bearing from a site corner to a legal point. Certify this document and certify all data as accurate and true and be labeled by authorities as the official property survey.

3.4 INSTALLATION

3.4.1 *Verify that the location of the work to be implemented is accurate, correctly aligned, and correctly elevated.*

3.4.2 Plumb all vertical work and level all horizontal work. Work with specific angles must be properly reviewed on the drawings and correctly laid out.

3.4.3 Unless otherwise indicated with special treatment, conceal all pipes, ducts, and wiring in finished areas.

3.4.4 Unless otherwise indicated, all headroom clearances must be maintained at least 2.40M for mechanically ventilated areas and 2.70M for areas with natural ventilation. Follow indications on technical working drawings if prescribed heights are above the minimum.

3.4.5 Comply with written instructions and recommendation for installation as provided by manufacturers and suppliers.

3.4.6 Conduct installation works at times and conditions that ensures the best possible results.

3.4.7 Maintain installed works in good condition throughout the duration of construction until final completion of the project.

3.4.8 Conduct construction and installation work without damaging the operations of other works within its vicinity.

3.4.9 Do not use tools, equipment and methods, that produces noise levels that are hazardous to human health.

3.4.10 Check that the measurements on the shop drawings are in accordance to actual site conditions.

3.4.11 When using anchors and fasteners, secure the fasteners such that they are accurately located and do not obstruct any mandatory clearance heights. Where mounting heights are not indicated, propose to the Architect via a duly written request for clarification/interpretation to mount components according to standards. Installation proceeds when the architect issues an approval.

3.4.12 Install all joints to the best visual effect, such that all joints are of uniform width, and if the work is exposed, that the joints are arranged as neatly as possible unless otherwise indicated by the technical working drawings and specifications.

3.4.13 Ensure the safety of all installation work and take care not to damage any separate work in the vicinity.

3.4.14 Test all equipment and tools to be used and ensure that it is safe and is in good working condition. Replace all parts as needed to ensure maximum efficiency.

3.5 SITE PREPARATION

If upon investigation, existing site conditions are deemed unsuitable for work intended to commence, duly inform the architect and the owners via written notice. Included in this section are issues on utilities, i.e. electrical posts that need to be relocated, water pipe utilities that need to be adjusted, abandoned, or terminated, as well as other pertinent issues affecting the intended design. Included in the written notice are the following information:

3.5.1 Description of the work to be commenced

3.5.2 List of detrimental conditions

3.5.3 List of unacceptable installation tolerances
3.5.4 Recommended corrections.
3.5.5 Authorities that need to be informed.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

Whenever any portion of work is completed prior to the substantial completion of the project, ensure that the installed or completed portion of work is protected, without damage, and without deterioration up to the substantial completion of the project.

3.7 CORRECTION OF THE WORK

3.7.1 Any defective construction should be repaired, removed, or replaced. This includes the restoration of any damages incurred on the finishes or substrates during the time work.
3.7.2 Repairs include material touch-ups on painted finishes and replacement of units on substrates, or the cutting and patching of portions of masonry or chipped portions of the substrate.
3.7.3 Repair all components that are not in good working condition.
3.7.4 Remove and replace chipped, scratched and broken glass, mirrors, and similar surfaces.
3.7.5 Ensure that the original condition of the finish or substrate is maintained after correction.

END OF SECTION

01 00 00	DIVISION 1 GENERAL REQUIREMENTS	
01 17 10	Final Cleaning	1 of 2

1. PART 1 GENERAL

1.1 RELATED DOCUMENTS
1.1.1 Technical Drawings
1.1.2 Specifications

1.2 SUMMARY
This section specifies administrative and procedural requirements for final cleaning upon completion of scope of works. Specific cleaning agents and procedures are specified in each material division. Ensure that cleaning and waste disposal procedures are compliant with local laws and ordinances. Do not dispose flammable, volatile, and poisonous wastes in storm or sanitary drains of the project. Ensure that no debris, rubbish, or other waste material will be burned, buried, and improperly disposed, especially not within the premises of the project site.

2. PART 2 PRODUCTS
2.1 CLEANING AGENTS
Review product-specific requirements of cleaning agents and materials recommended by the manufacturer or fabricator or the surface and material to be cleaned.

3. PART 3 EXECUTION
3.1 SAFETY AND PRECAUTION
3.1.1 Ensure safety handling of cleaning agents that are hazardous to health or safety of the property. Secure the safe *storage of volatile cleaning agents and ensure that it is only accessible to authorized personnel.*
3.1.2 Organize storage of cleaning materials and agents on site to allow maximum access, no traffic barriers, and no unnecessary material wastage.
3.1.3 Properly dispose debris, scrap, and waste materials on a daily basis. Accumulation of wastes is a safety hazard. Ensure that disposal management proceedings do not destroy the ecology of the project site and its neighboring vicinities.

3.2 PROGRESS CLEANING
3.2.1 Demonstrate sample-cleaning work before cleaning the entire surface area to be cleaned. Check that the cleaning agent and material that was sample-cleaned does not change the immediate properties of its surfaces before proceeding with complete clean-out.
3.2.2 Complete all cleanout works one week prior to the scheduled turnover to ensure maximum time for inspection.

3.3 FINAL CLEANOUT
3.4 Comply with local laws and ordinances for all waste-removal operations.
3.5 Comply with manufacturer's written instructions on maintenance and operations.
3.6 Clean the project site, yard, and grounds of construction activities. Ensure that the landscape development area is clear of any waste material and other foreign substances.
3.7 *Sweep and wipe all paved areas and finished flooring. Remove stains and other deposits.*
3.8 Do not clean surfaces marked for natural weathering.
3.9 Rake all pervious grounds free from foreign waste.
3.10 Remove all construction tools, machinery and equipment from the project site.
3.11 Clean all exposed surface areas, both interiors and exteriors. Ensure that it is free from stains and similar substances.
3.12 Do not paint over labels, especially specialized marks namely "UL" and fire rating marks. Do not excessively clean these labels such that the surface marks become illegible.
3.13 Vacuum all soft surfaces, i.e. carpet flooring, sofa, wooden ceilings, and all surfaces with crevices etc.
3.14 Clean and polish all transparent materials such as mirrors, glass partitions, door lights, vision windows, etc. Replace broken or chipped glass and mirrors and ensure that surfaces are free from scratches. If the glass surface has a texture enhancement sticker, ensure that the sticker is adjoined to the surface neatly and properly and is not chipped off by excessive cleaning.
3.15 Wipe the surfaces of all mechanical and electrical equipment such that it is dust free. There should be no excess lubricants and similar chemicals on the surface of the equipment.

3.16 Clean plumbing and sanitary fixtures to a sanitary condition. Wipe it free of stains and foreign markings, including hard water marks.
3.17 Replace all disposable air filters. Wipe all diffusers, registers, and grills free from surface dust, stains, and foreign markings.
3.18 Clean light fixtures, lamps, bulbs, globes, and reflectors such that it is free from surface dust, stains, and is functional at *maximum efficiency*.
3.19 All bulbs must be in working condition. Replace dimmed, old bulbs with new bulbs in good working conditions.
3.20 The following spaces should be clear of debris and surface dust:
3.20.1 Plenum
3.20.2 Shafts and chutes
3.20.3 Vaults
3.20.4 Manholes
3.20.5 Attics
3.20.6 Utility rooms
3.20.7 Other, similar spaces.

END OF SECTION

01 00 00	DIVISION 1 GENERAL REQUIREMENTS	
01 17 30	Operation and Maintenance Data	1 of 3

1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Technical Drawings

1.1.2 Specifications

1.2 SUMMARY

This section specifies administrative and procedural requirements for the management of operation and maintenance data for turnover to the proponents upon completion of the project.

1.3 PREPARATION OF MAINTENANCE MANUALS

1.3.1 Include in the manual all information specified in individual specification divisions

1.3.2 Ensure that technical personnel charged in the preparation of maintenance manuals are properly trained and experienced. Include clear written instructions to communicate critical steps in maintenance. Accompany written instructions with diagrams and drawings for clarity.

1.3.3 Operation and maintenance manuals must be of a manageable size, bounded by a heavy duty binder, and properly labeled on the front and spine of the hard bound binder.

1.3.4 Neatly fold oversized drawings attach and check that punch holes do not damage any critical information.

1.3.5 Prepare, orient, and transfer knowledge on the following manuals:

- 1.3.5.1 Building operating systems
- 1.3.5.2 Equipment operating systems
- 1.3.5.3 Preservation and maintenance manuals of all products and finishes

1.4 PROCEDURES OF MANAGING MANUALS

1.4.1 Furnish one copy of the operation and maintenance manual to the design team, and another copy to the owner's side via the property management team.

1.4.2 Duly demonstrate the contents of the manual during the turnover process. Coordinate a schedule for site walk-thru and maintenance demonstration.

1.5 MANUAL CONTENT

1.5.1 MATERIAL AND FINISHES MAINTENANCE MANUAL

- 1.5.1.1 Complete manufacturer name
- 1.5.1.2 Manufacturer's address and contact details
- 1.5.1.3 Manufacturer's catalog number
- 1.5.1.4 Care and maintenance instructions
- 1.5.1.5 Color and Texture code and swatch
- 1.5.1.6 Re-ordering information
- 1.5.1.7 Applicable standards
- 1.5.1.8 Chemical composition
- 1.5.1.9 Installation details
- 1.5.1.10 Inspection procedures
- 1.5.1.11 Maintenance information
- 1.5.1.12 Repair procedures

1.5.2 EQUIPMENT OPERATION AND MAINTENANCE MANUAL

Include the following information in the manual:

- 1.5.2.1 General system or equipment description including functions
- 1.5.2.2 Start-up procedures
- 1.5.2.3 Equipment or system break-in
- 1.5.2.4 Routine and normal operating instructions
- 1.5.2.5 Regulation and control procedures
- 1.5.2.6 Instruction on stopping
- 1.5.2.7 Shutdown and emergency instructions
- 1.5.2.8 Required sequences for electric or electronic systems
- 1.5.2.9 Special operating instructions
- 1.5.2.10 Operating characteristics

1.5.2.11 Servicing schedule
1.5.2.12 Control diagrams
1.5.2.13 Circuit Directories
1.5.2.14 Valve tag diagrams
1.5.2.15 Printed operating and maintenance instructions
1.5.2.16 *Maintenance Assembly drawings and diagrams*
1.5.2.17 List recommended spare parts that should be stocked
1.5.2.18 Limiting conditions
1.5.2.19 Performance curves
1.5.2.20 Engineering data and tests
1.5.2.21 Complete nomenclature and number of replacement parts
1.5.2.22 Design factors and assumptions
1.5.2.23 Copies of applicable shop drawings and product data
1.5.2.24 System and equipment manufacturer
1.5.2.25 Equipment model number
1.5.2.26 Equipment serial number
1.5.2.27 Operating Instructions
1.5.2.28 Emergency Instructions
1.5.2.29 Wiring diagrams
1.5.2.30 Safety diagrams
1.5.2.31 Inspection and test procedures
1.5.2.32 Maintenance procedures and schedules
1.5.2.33 Precautions against improper use and maintenance
1.5.2.34 Copies of warranties
1.5.2.35 Repair instructions and spare parts listing
1.5.2.36 Routine operations
1.5.2.37 Trouble-shooting guide
1.5.2.38 Disassembly, repair and re-assembly instructions
1.5.2.39 Alignment, adjusting and checking instructions
1.5.2.40 Supply sources of required maintenance materials and related services
1.5.2.41 Index

2. PART 2 PRODUCTS

2.1 TAGS

Label equipment with proper tags such that it can be properly referred to on the manual.

3. PART 3 EXECUTION

(NOT APPLICABLE)

END OF SECTION

01 00 00	DIVISION 1 GENERAL REQUIREMENTS	
01 17 70	Closeout Procedures	1 of 3

1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Technical Drawings

1.1.2 Specifications

1.2 SUMMARY

This section includes administrative and procedural requirements for closeout proceedings. Warranties and inspection procedures are included.

1.3 PARTIAL OCCUPANCIES

Partial occupancies will be managed following final closeout procedures. Include documents delineating and demarcating the portion that is ready for turnover, i.e. highlighted and demarcated floor plans and a complete listing of equipment systems for final turnover.

1.4 PROCEDURES FOR INSPECTION

1.4.1 Submit a written request for inspection for substantial completion to the owner side.

1.4.2 Deploy an inspection team composed of duly represented owner sides, designer sides, and builder's side for joint inspection.

1.4.3 On the owner's side, prepare a list of items for re-inspection. A copy of the list must be furnished to the owner and the contractors for reference.

1.4.4 Schedule a time for re-inspection of all items not accepted. Correct all punch-listed items until substantial turnover.

1.5 PROCEDURES FOR RE-INSPECTION

1.5.1 *Request for re-inspection when the work identified in previous inspections are completed and corrected.*

1.5.2 Prepare punch lists specific to the item of work for closeout. Indicate a remarks column for marking whether items are accepted or for revision. Indicate causes of revision.

1.5.3 Close and resolve all punch lists by the third round of inspection.

1.5.4 Proceed with Final Completion when all punch lists are accepted.

1.6 PROCEDURES AND DOCUMENTS TO ACCOMPLISH PRIOR TO FINAL INSPECTION OF COMPLETION OF WORK

1.6.1 Advise owner on warranty periods, workmanship bonds, maintenance service agreements, final certifications, and similar documents. Furnish a copy of warranties, certificates and similar documents to the owner.

1.6.2 Obtain all release permits that allow the owners unrestricted access and use of the services, utilities, and other features of the building. Include occupancy permits, operating certificates, and similar documents. Facilitate proper turn over and document release to the client.

1.6.3 Prepare and submit project record documents, operation and maintenance manuals, final completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.

1.6.4 Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.

1.6.5 Deliver labeled keys and permanent locks to the owner. Demonstrate to the owner's personnel in charge of security the due location of all locks and instruct accordingly.

1.6.6 Startup and test all equipment systems.

1.6.7 Submit test/adjust/balance records.

1.6.8 Remove and demolish temporary facilities, mock-ups, construction tools, scaffolds, and similar items from the project site.

1.6.9 Complete all final cleaning and restoration requirements, including painting touch ups and repairs of damaged or exposed finishes

1.6.10 Submit a final application for payment.

1.6.11 Submit a copy of all punch listed items with remarks as completed, corrected, and accepted, duly certified by the architect or the technical working group. Clearly indicate in the punch list that all identified works are inspected, corrected, completed, and accepted.

1.6.12 Submit evidence of final, continuing insurance coverage complying with insurance requirements.

1.6.13 Submit pest-control final inspection report and warranty.

1.7 PUNCH LIST CONTENT

1.7.1 Prepare three copies of the punch list, one copy must be furnished to the designers, one copy for the owner's representative, and one copy for the builders.
1.7.2 Organize spaces for inspection in sequential order, according to the route that will be taken on site.
1.7.3 Organize items applying to each space by major element and by category:
- 1.7.3.1 Ceiling
- 1.7.3.2 *Individual Walls*
- 1.7.3.3 Floors
- 1.7.3.4 Equipment
- 1.7.3.5 Building Systems

1.7.4 Include the following information inside the punch list:
- 1.7.4.1 Project name
- 1.7.4.2 Date of inspection schedule
- 1.7.4.3 Date of re-inspection
- 1.7.4.4 Page number
- 1.7.4.5 Signature of Contractor
- 1.7.4.6 Signature of Architect

1.8 WARRRANTIES

Organize warranty documents into an orderly sequence based on the table of contents of the project manual.
1.8.1 Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents.
1.8.2 Provide heavy paper dividers with plastic covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number If installer.
1.8.3 Identify each binder on the font and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

2. PART 2 PRODUCTS

Use appropriate cleaning agents as recommended by particular manufacturers. See the final cleanout section of this division for detailed procedures.

3. PART 3 EXECUTION

3.1 PEST CONTROL

Inspect that the project site is free of rodents, insects, and other pests. Submit a certification duly issued, signed and certified by an experienced and licensed exterminator.

END OF SECTION

01 00 00	DIVISION 1 GENERAL REQUIREMENTS	
01 26 63	Requests for Interpretation	1 of 2

1. PART 1 GENERAL
   1.1 RELATED DOCUMENTS
   1.1.1 Technical Drawings
   1.1.2 Specifications
   1.1.3 Clarification Form (See ANNEXES for Official Copy of Form)
   1.1.4 Record Clarification Notices (See ANNEXES for Official Copy of Form)

   1.2 SUMMARY
   This section specifies administrative and procedural requirements in the event of clarifications, assistances required in plan interpretation, and other similar information required from the technical and design team to assure maximum accuracy in construction. The contractor is obliged to thoroughly review all contract documents, especially technical drawings prior to the commencement of construction.

   1.3 PROCEDURE
   This section specifies administrative and procedural requirements in the event of clarifications, assistances required in plan interpretation, and other similar information required from the technical and design team to assure maximum accuracy in construction. The contractor is obliged to thoroughly review all contract documents, especially technical prior to the commencement of construction.

   1.3.1 Submit clarification forms upon issuance of notice to proceed.
   1.3.2 Submit all queries to the official email accounts of the IPFDU (see upper right corner of this page for email address), complete with attachments, i.e. annotated copies of the architectural technical working drawings and/or specifications highlighted in relation to the clarification/query and other attachments deemed necessary by the bidder i.e. sample brochures, etc.
   1.3.3 Submit equivalent hardcopies of emailed accomplished clarification forms within two days after sending the email. No hardcopies submitted, no official responses will be issued.
   1.3.4 The IPFDU will only be accountable to changes that are issued with official approvals issued by the IPFDU.

   1.4 RECORD CLARIFICATION NOTICES
   Record all clarification issuances via a roster of issued clarification notices. Include dates of issuance, status of response, and date responded in the records.

2. PART 2 PRODUCTS
   Refer to product approval procedures. Clarification forms are reserved for technical working drawings and specification queries only. All product approvals must be processed accordingly. Refer to the procedure on section 01 25 13 of this *division*.

3. PART 3 EXECUTION
   Execution approvals are separate from clarifications and queries. Refer to the procedure on execution approval in section 01 25 16 of this division.

END OF SECTION

01 00 00	DIVISION 1 GENERAL REQUIREMENTS	
01 26 46	Construction Change Directives	1 of 2
01 26 57	Change Order Requests	1 of 2
01 26 63	Change Orders	1 of 2

1. PART 1 GENERAL
   1.1 RELATED DOCUMENTS
   1.1.1 Technical Drawings
   1.1.2 Specifications

   1.2 SUMMARY
   This section specifies administrative and procedural requirements in the event of modifications on construction directives, such as modifications on the technical drawings, specifications, the adjustment of the agreed scope of work, etc., that shall result to change order requests and change orders. The contractor cannot amend the agreed scope of work unless a change order has been issued by the technical team of the IPFDU.

   The following section includes generic procedural advice for Construction Change Directives, Change Orders, Change Order Requests, and general management of material specifications. Note that material-specific procedural advice is indicated in each material division. **All amendments should be in pursuant to RA 9184 otherwise known as the Government Procurement Act of 2016.**

   1.3 MINOR CHANGES IN WORK
   Minor changes in work are work classified as without cost-impact and can therefore be implemented once a written approval from the IPFDU is secured. This includes resulting advice from Requests for Interpretation, Approved Product Substitution, and approved Execution Substitution. The contractor is *obliged to properly* indicate product substitutions and execution substitutions submitted and as such mark the attached Approval forms to as "Without Cost Impact".

2. PART 2 PRODUCTS
   The designers shall prescribe the performance specification of all materials and finishes on the technical working drawings. The execution of each shall be indicated through this specification or by the prescribed installation manuals and brochures of the approved material. The contractor is obliged to install the material consistent with requirements stipulated on the plans and on this specification. Any material replacement or substitutions shall be approved by the IPFDU. If with cost impacts, such replacements shall incur change orders which shall be reviewed and approved by the procuring entity upon the recommendation of the IPFDU prior to implementation. No changes with significant cost impacts shall be implemented with the approval of the procuring entity.

3. PART 3 EXECUTION
3.1 CHANGE ORDER PROCEDURES
   3.1.1 The owner/ procuring entity will issue via a written request, official changes that are to be implemented on the project.
   3.1.2 No amendments to the original contract work shall commence on the project site without official approvals and orders by the procuring entity.
   3.1.3 Amendments that are not aligned with the guidelines of RA9184 are not acceptable.
   3.1.4 The contractor, owner, and designers are to maintain detailed records of all construction change directives.

END OF SECTION

DIVISION 02
SITEWORKS

02 00 00	DIVISION 2 SITEWORKS	
02 36 1	Termite Control	1 of 3

1. **PART 1 GENERAL**

1.1 RELATED DOCUMENTS

1.1.1Technical Drawings
1.1.2Specifications
1.1.3Product Brochures
1.1.4Work and Methodology Submittals
1.1.5Structural Engineering Specifications for Excavation Work (By Structural Designer)

1.2 SUMMARY

This section includes provisions on termite management systems to be employed on the project site.

1.3 GENERAL PROVISION

Include external and internal termite control, namely soil treatment for all elements of the project that are in contact with the ground such as foundations and slabs on ground. Termite control systems employed should be installed such that replenishment/re-treatment systems will not incur any damages/demolition work on the project site throughout the duration of the construction. Chemical Barrier systems are acceptable.

1.4 MAINTENANCE

Contracted manufacturers are to advise the proper maintenance procedures of termite control systems, including advised schedules of maintenance, allowable product substitutions if any, proper work methodology. Include *provisions on continuous service including monitoring, inspection, re-treatment, and troubleshooting procedures for* occurrence of termite activity within the five (5) year warranty and a separate contract options for continuing services after the expiration of the warranty.

1.5 SUBMITTALS

Attach the following information to a duly accomplished Product Approval Form and/or Execution Approval Form.

1.5.1PRODUCT APPROVAL ATTACHMENTS

The contractor is to facilitate the Product Approval request, regardless of whether the termite control work is subcontracted. Whether subcontracted or applied by the Contractor, submit the following documents"

1.5.1.1 Technical data including a list of termiticide products to be administered on site, including the Food and Drug Administration-registered (FDA-registered) labels of all products.
1.5.1.2 Include and emphasize the approximated number of years of effectivity of the termiticide system.
1.5.1.3 Include lists of completed projects by manufacturer/installer/applicator. The list of projects should include the name of the project, the address, the architects, owners, and builders of previous projects indicated in the list.
1.5.1.4 A copy of the official accreditation of termiticide manufacturer, if any.
1.5.1.5 A copy of the license and registration of the termiticide operator's registration from the Food and Drugs Administration.

1.5.2EXECUTION APPROVAL ATTACHMENTS

1.5.2.1 Work Methodology indicating the following information:
1.5.2.1.1 Date and time of application
1.5.2.1.2 Moisture content of soil before application
1.5.2.1.3 Brand name and manufacturer of termiticide
1.5.2.1.4 Quantity of Undiluted termiticide used.
1.5.2.1.5 Dilutions, methods, volumes, and rates of application used.
1.5.2.1.6 Areas of application
1.5.2.1.7 Water source for application
1.5.2.1.8 Application plan indicating the method or list of steps of how the treatment will be applied

1.6 QUALITY ASSURANCE

Only contract applicators with significant experience in the application of termite control systems. Application procedures can only be conducted in the presence of qualified installers and specialists, who are duly licenses according to pertinent regulations.

1.7 WARRANTIES

Submit an application warranty, signed and certified by the Pest Control Operator/ Applicator, and contractor that certifies that the termite control work administered on site will prevent infestation of subterranean termites for at least five (5) years. If termite activity occurs during the warranty period, re-treat the soil, repair and replace damages caused by termite activity or infestation.

2. PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

2.1.1 Ensure that all termiticide systems applied on site are effective against infestation for at least five (5) years.
2.1.2 Ensure that all termiticde systems are approved by the Food and Drug Administration

2.2 TERMITICIDES FOR SOIL TREATMENT

2.2.1 Ensure the use of non-repellent FDA-registered termiticides that are compliant with all legal codes.
2.2.2 Ensure the use of termiticides that are not harmful to vegetation.
2.2.3 Ensure that the instructions of the FDA-Registered Label are affixed on all containers including the maximum quantity and rate of concentration allowed per use, as well as safety instructions.
2.2.4 Chemical solutions should be classified as either Chemical Barrier Systems or Replenish/ Re-treatment systems.

2.3 DELIVERY AND STORAGE

2.3.1 Ensure that the delivery of all termiticides to the project site are done in safe conditions.
2.3.2 Ensure that all containers are properly sealed and labeled as supplied by the formulator of the chemicals. Check that all labels are complete and bear correct application instructions.
2.3.3 Minimize the length of temporary storage of insecticides at the project site.
2.3.4 Ensure that no chemical infests any potable waters stored or managed on site.
2.3.5 Ensure that the storage of chemicals are safe and not hazardous to human health.

3. PART 3 EXECUTION

3.1 JOB CONDITIONS

Do not apply soil treatment solutions until excavating, filling, and grading operations are completed unless otherwise specified by the manufacturer, with the approval of the Construction Manager. Do not apply soil treatment solutions to excessively wet soils or during inclement weather. Ensure that the application instructions of the manufacturer are duly followed.

3.2 PREPARATION AND EXAMINATION OF APPLICATION AREA

3.2.1 *Examine all areas for application and ensure that the moisture content of the area for application is of levels suitable* to the optimum performance of termiticides. Check substrates, earthworks, landscaping, slab and foundation work, and other conditions that can impact the performance of the termite control system.
3.2.2 Correct all conditions that are not suitable for application. Proceed with application of the termite control system only when all conditions that need correction have been implemented.
3.2.3 Remove foreign matter and other surface materials that could decrease the effectiveness of the treatment.
3.2.4 Loosen, rake, and level all the soil and earth subsurface that need to be treated except areas that require compaction for structural purposes of the project. Secure the approval of the construction manager before loosening soil that is near slabs, foundation, and footings, and other soil compacted for critical parts of the building.
3.2.5 If there are wood forms present on site, check whether the wood forms can be exposed to termiticides.
3.2.6 Ensure that the application of termiticides do not damage other wood elements available on the project site, unless the approval of the Construction Manager has been secured.
3.2.7 Ensure that no vegetation or major trees that are part and critical to the design of the project are hazardously affected by the termiticides for application.
3.2.8 Remove all wood and other termite-edible materials such as stakes, formworks and construction waste from soil around foundations.
3.2.9 Check and comply all pertinent laws, local codes and ordinances pertinent to the jurisdiction of the project site and ensure that there are no violations.

3.3 APPLICATIONS

3.3.1 Consistently mix all termiticde solutions. Check the labels and prescribed methods of applications of the chemical to be utilized and ensure that it is duly followed.

3.3.2 Ensure that the chemical barrier applied between the building, its structural and other elements can protect the project from infestation of termite colonies.

3.3.3 Treat soil materials beneath ground-supported slabs, foundations, footings, etc, before concrete works are commenced.

3.3.4 Treat soil surfaces surrounding the perimeter of foundation walls, footings, ground-laid pipes and conduits, piers, other bases, i.e. porches, ground lobbies, , and other physical built elements inherent to the structure that have ground contact.

3.3.5 Avoid the washout and similar disturbances of soil surrounding treated surfaces. Upon the technical advice of the applicator, re-treat in case of washout.

3.3.6 *Treat voids in masonry, as well as expansion joints, control joints, and other areas where slabs can be penetrated by* termites.

3.3.7 Ensure that the termiticide solution is not diluted during aoplication.

3.3.8 Post appropriate warning signs during application to ensure maximum surface.

3.3.9 Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

END OF SECTION

1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Technical Drawings

1.1.2 Specifications

1.1.3 Structural Engineering Specifications for Excavation Work (By Structural Designer)

1.1.4 Tests and Laboratory work Results

1.2 SUMMARY

This section includes requisites and stipulations on concrete pavement work, namely curbs and gutters, pedestrian ramps, driveways, outdoor concrete stairs on the ground floor level, walkways and sidewalks, embossed pedestrian crossings, unit paver concrete floor base, exterior podiums, concrete stages, and other concrete paving elements consistent to the technical working drawings.

1.3 RELATED SECTIONS

1.3.1 Joint Sealants

1.4 GENERAL PROVISION

1.4.1 Ensure that all concrete mixes follow the specifications of structural designers and landscape architects.

1.4.2 Verify all indications on the technical working drawings and issue Requests for Clarification in case of conflicting indications.

1.4.3 Comply with all local codes and ordinances governing the project site if the local standards are more stringent with than indicated on drawings but do not implement any such standards without verifying with the architect. Secure an official advice from the Architect via a Request for Clarification prior to implementing any work that deviates from the technical working drawings.

1.4.4 Implement all landscape and concrete pavement work such that safe vehicular and pedestrian access is retained and maintained on site, as required for construction and other activities.

1.4.5 Always use form-release agents on formwork surfaces prior to concreting.

1.4.6 Maintain the quality of concrete surfaces as indicated and make sure that removal of forms do not tarnish, destroy, or impair the concrete surface.

1.4.7 Protect existing concrete pavement on site ***ONLY if found suitable to the proposed design*** as indicated in the technical working drawings. Unless indicated in the technical working drawings, do not demolish, damage, or destroy existing concrete pavements, especially pavements that are passable or subject to pedestrian and vehicular use. In case of damages on the existing concrete pavements due to construction work, the contractor is obliged to shoulder repairs of existing pavements. If existing concrete pavements are found in conflict with the design as indicated on the technical working drawings, submit a request for clarification.

1.5 MAINTENANCE

1.5.1 When portion of the pavement work has been completed, ensure that it is properly protected and secured that no pedestrian or vehicular access damages the completed work especially during the curing stages.

1.5.2 Until the work has not been accepted by the parties involved, maintain the pavement as clean as possible. Remove surface stains and material spillage. Regularly sweep the completed concrete pavement work such that it is free of dusts that can affect the quality of the surface material.

1.6 SUBMITTALS

1.6.1 PRODUCT APPROVAL ATTACHMENTS

1.6.1.1 Submit mix design for each mixed to be used.

1.6.1.2 Submit manufacturer's product data, particularly application and installation instructions for cement, additives, and other materials used.

1.6.1.3 For concrete pavement mixes, submit data showing the compressive strength, slump limit, and air content of the concrete. The contractor must certify this concrete mix as true and accurately applied on site.

1.6.1.4 For loose stone aggregates used as site decoration, submit actual samples of the aggregate sample attached to the Product Approval Form. Ensure that the product code and other unique identifiers of the sample are clearly indicated on the approval form.

1.6.1.5 Ensure that all horizontal and vertical exposed surfaces are smooth, continuous, and straight, unless otherwise indicated on the technical working drawings. Refer to the technical working drawings for other details.

1.6.2EXECUTION APPROVAL ATTACHMENTS

1.6.2.1 Detailed work methodology, indicating at least the following

1.6.2.1.1 Date and time of application

1.6.2.1.2 Area of application

1.6.2.1.3 Restoration procedures upon completion of work.

2. PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS (CONCRETE MIX)

Mix concrete using the standard portland cement, aggregated, sand, and water combination and ensure that the compressive strength is 3000psi minimum at the 28th day of curing, unless otherwise stipulated by the structural designer. Ensure that the concrete slump limit is at 75mm or 3 inches and that the air content is at maximum 5% to 8%. Comply with requirements of Division 03 Section "Concrete Floor Topping" for details on concrete mix design, sampling and testing, and quality control.

2.2 PERFORMANCE REQUIREMENTS CONCRETE MATERIALS (PAVEMENT)

Follow as indicated in the structural consultant/designer plans. Ensure the following qualities of concrete, unless otherwise specified by the structural designer. In which case, the specifications of the structural designer prevails.

2.2.1Portland Cement: ASTM C 150, Type I; Furnish Grey cement

2.2.1.1 Normal Weight Aggregate: ASTM C 33, uniformly graded, from a single source, with coarse aggregate as indicated in Structural Consultant's Specifications.

2.2.2Ensure that fine Aggregates are free of materials with deleterious reactivity to alkali in cement.

2.2.3Ensure that the sizes, color and percentage of exposed decorative aggregates are as intended for the project. Refer to the technical working drawings for details.

2.2.4Use aggregate Mix Type 1B: 10mm size; percentage as intended for the project.

2.2.5Use aggregate Mix Type 1A: 3mm size; percentage as intended for the project.

2.3 PERFORMANCE REQUIREMENTS — STEEL REINFORCEMENTS

Ensure the following qualities of steel reinforcements, unless otherwise specified by the structural designer. In which case, the specifications of the structural designer shall prevail.

2.3.1Use Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

2.3.2Use Deformed-Steel Welded Wire Fabric: ASTM A 497, flat sheet.

2.3.3Use Reinforcing Bars: Deformed steel bars, ASTM A 615, Grade 60, deformed.

2.3.4Use Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.

2.3.5Use Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60 (Grade 420), deformed bars; assembled with clips.

2.3.6Use Tie Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed

2.4 PERFORMANCE REQUIREMENTS — CURING MATERIALS

2.4.1When using curing materials, use liquid-membrane forming and sealing curing compound. Comply with ASTM C 309, Type I, Class A and ensure that moisture loss is no more than 0.055 gr./sq.cm. When applied at 200 sq ft/gal., unless specified otherwise on the technical working drawings or by the structural designer.

2.4.2When using anti-spalling compound, use a combination of boiled linseed oil and mineral spirits, complying with AASHTO M-233.

2.5 PERFORMANCE REQUIREMENTS — EXPANSION JOINT MATERIALS

Refer to and comply with requirements of Division 07 Section "Joint Sealants".

2.6 PERFORMANCE REQUIREMENTS — FORMS

2.6.1Use standard form materials, i.e. plywood, metal, metal-framed plywood, phenolic boards, and other standard form materials available in the market.

2.6.2When curved surfaces are indicated on the technical working drawings, ensure the use of flexible forms or curves.

2.6.3All forms must be attached with a commercially formulated form-release agent that does not damage the resulting concrete surface.

3. *PART 3 EXECUTION*

3.1 SURFACE PREPERATION

3.1.1Compact sub-base surface and remove all loose material before concrete placement. Check any unstable areas and conduct additional compaction when needed.

3.1.2Commence paving works only when all compaction work has been corrected.

3.2 FORM CONSTRUCTION

3.2.1Check technical working drawings to determine accurate setting of forms as to required grades and lines.

3.2.2Check the alignment of the assembled formwork. Ensure that the displacement tolerance of the resulting concrete work is not more than 3mm for horizontal faces and not more than 6mm for vertical faces. Install secure braces on the formworks to ensure alignment.

3.2.3Ensure that forms are applied with the appropriate form-release agent prior to installation to make sure that separation from cured concrete will not incur any damages.

3.2.4Clean forms after each use.

3.3 REINFORCEMENT

3.3.1Refer to the drawing and specifications of the structural designer for the installation of reinforcements. For details in execution, check Division 03 sections of this specification.

3.4 CONCRETE PLACEMENT

3.4.1Comply with requirements of Division 03 sections for mixing and placing concrete.

3.4.2Check all line and grade of forms before concrete placement.

3.4.3If a dampened conditions are required at the time of concrete placement, ensure that the sub-base is properly moistened.

3.4.4Ensure that elevations and alignments of concrete manholes are accurate before placing concrete.

3.4.5Only use concrete placement methods that prevent segregation of the concrete mix.

3.4.6Use internal vibrator to consolidate concrete along face of forms and areas adjacent to transverse joints. Use square-faced shovels via hand spreading to consolidate concrete placed near joint assemblies, reinforcement, or side forms. Do not use a vibrator to consolidate concrete in these areas. Consolidate with care such that dislocation of reinforcing, dowels, and joint devices is avoided. In case of dislocation, make sure to correct the alignment prior to concrete setting.

3.4.7Make sure that a bonding agent is used at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

3.4.8Make sure that concrete placement in horizontal surfaces is as continuous as possible. If the interruption between concrete placements is more than thirty (30) minutes, use a construction joint.

3.4.9For pavement lanes adjacent to each other and placed separately, do not allow equipment to pass through the lane with previously poured concrete until the lane has cured enough to gain the concrete strength required to carry loads.

3.5 FABRICATED BAR MATS

3.5.1Ensure that fabricated bar mats are clean and free from excessive rust and dust.

3.5.2Check that bars are not distorted in a way that affects its strength or that it deviates away from the indications of the structural engineer.

3.5.3When arranging bar mats, follow the technical working drawings issued by the structural engineer.

3.5.4 Establish a minimum of 2-inch mat overlaps for adjacent maps.

3.5.5When placing concrete on mats with a required finish surface, place the concrete in two batches. The first concrete placement batch should be up to beneath the finish surface level only. The second batch will be dedicated to the

surface finish. Check the thickness of the surface finish according to technical working drawings. If not indicated, un-bonded toppings should be at least 70mm thick. A 50mm topping thickness is acceptable only if bonding agents are used. The time gap between the placements should not be more than 15minutes.

3.6 JOINTS

3.6.1 Construction joints must be installed where necessary such as at the end of concrete placements and in between concrete placements that have a huge time gap between placements. Install dowels for concrete placements designed to withstand heavy loads.

3.6.2 For weakened planes, use contraction joints or expansion joints such that there shall be no unnecessary breakage for the concrete.

3.6.3 Ensure that the layout of contraction joints are as square-shaped as possible. The length to width ratio of the square must never exceed 1 ½ to 1.

3.6.4 For expansion joints between concrete curbs and pavements, catch basins and manholes, inlets, structures, walks, and other objects, use a pre-molded filler to ensure the smooth plane of the abutments.

3.6.5 When using joint fillers, ensure that full width and depth of the joint is not less than 12.7mm or 25mm. The joint filler must be flushed with the finished concrete surface. Refer to Division 07 Section "Joint Sealants" for material and installation performance requirements of joint sealers.

3.6.6 Dry-cut joints are acceptable provided that it is positioned on the pavement within 1-4 hours after the completion of pouring and finishing.

3.6.7 Install isolation joints at the intersections of horizontal and vertical surfaces such as slabs and columns, walls and footings and where curbs or sidewalks meet other concrete structures.

3.7 CURBS AND GUTTERS

3.7.1 Refer to the site development plan details to identify the correct location and details of curbs.

3.7.2 Ensure that required cross-section, lines, grades, finish and jointing are as specified for the formed concrete.

3.7.3 In case of curb inlet manholes, refer to the technical working drawings in the Site Development and Drainage plan.

3.8 CONCRETE FINISHING

3.8.1 Smooth concrete finishes by screeding and floating. The use of mechanical floating device is preferred.

3.8.2 When the use of a mechanical floating and screeding device is not possible, ensure that hand power methods deliver consistent finishes, free from unwanted lumps.

3.8.3 For float finishes, ensure that floating works begin only when bleed-water sheen is no longer visually present on the concrete surface. Check that the concrete of the surface being finished is stiff. Refer to technical working drawings whether the indicated area is dedicated as float finish.

3.8.4 For burlap finishes, use damp burlap across float finished concrete. Ensure that the texture is uniformly installed.

3.8.5 For fine textured-broom finish, use a soft bristle broom across float-finished concrete surface.

3.8.6 For medium to coarse texture broom finish, use a soft bristle broom to etch 1.6mm to 3mm deep marks on the concrete surface.

3.8.7 Check all technical working drawings for the appropriate application areas of respective concrete finishes.

3.8.8 Check all planes and slope marks of the finishes.

3.8.9 When finishing, ensure that the slope marks as indicated in the technical working drawings are followed. Avoid surfaces that allow for water accumulation unless indicated in the technical working drawings.

3.8.10 Check that the texture of the final finish is approved. Submit a mock-sample of the concrete finish to the designers and secure an approval prior to completion of work. Indicate the area of application.

3.8.11 Use an edging tool to round-finish edges of slabs, gutters, back top edge of curb, and formed joints. Round up to 12.7, radius unless otherwise indicated on the technical working drawings.

3.8.12 Eliminate all excess moisture or surface sheen on the concrete

3.9 CURING

3.9.1 Do not allow any traffic on the concrete during first fourteen (14) days of curing.

3.9.2 Refer to Division 3 provisions of this specification for specific curing methods depending on area of application.

3.10 REPAIRS AND PROTECTION

Ensure that all finished concrete surfaces are properly protected until acceptance of work. In case of damages and any chipping, repair all chipped or damaged portions. Use a bonding agent when repairing damages to ensure proper adhesion to the original concrete surface.

Make sure that all concrete surfaces are washed clean and free of stains, discolorations, dirt and other foreign material.

END OF SECTION

02 00 00	DIVISION 2 SITEWORKS	
02 78 0	Unit Pavers	1 of 5

1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

1.1.1Technical Drawings

1.1.2Specifications

1.1.3Shop Drawings – Tile Setting Layout

1.2 SUMMARY

This section includes provisions and recommendations on the installation of unit pavers along parking areas and other areas as indicated in the technical working drawings.

1.3 RELATED SECTIONS

1.3.1Concrete Finishes

1.3.2Concrete Floor Topping

1.4 GENERAL PROVISION

1.4.1For all unit pavers to be installed on site, submit an actual sample to the technical team for approval. Verify shape and pattern of concrete pavers on the working drawings. Submit product samples as per specified items on drawings. Refer to the technical drawings for the cut, pattern, design, material size and prescribed dimensions of the unit pavers if any.

1.4.2If pavement unit designs available in the market significantly differ from the specified items, request for product substitution and justify. Products approved by IPFDU designers will prevail over specified unit designs.

1.4.3Prior to complete installation, prepare a mock-up sample on site at least 1000mm X 1000mm and have it approved by the IPFDU prior to complete installation. Attach photos of the mock-up to the official request for approval and request for the architect and/or the architect's representative to see the actual mock-up. Refer to Division 01for procedures on request for approval.

1.4.4Verify all indications on the technical working drawings and issue Requests for Clarification in case of conflicting indications. Refer to Division 01for procedures on requests for clarification.

1.4.5Implement all unit paver works such that safe access is maintained on site, as required for construction and other activities. Zone the pavement works such that ample vehicular and pedestrian access is maintained on site to continue other construction activities.

1.4.6Do not modify the surface texture of approved unit paver samples. Do not paint, polish or scratch the unit pavers installed on site such that its visual and compressive properties are substantially altered by the modification. Install unit samples as originally approved.

1.5 MAINTENANCE

1.5.1In case of damages during installation, take care to remove the defective units and replace with fully functioning and visually acceptable units. Ensure that the replacement of unit pavers do not damage the adjacent pavers already installed.

1.5.2Keep the installed pavements clean and free of discoloration, foreign substances, and other elements. In case of stained unit pavers, make sure to clean, wipe, and restore the stained units to its original surface quality.

1.5.3For phased construction work, make sure to protect all completed pavement work subject to damages due to exposure to heavy equipment. Restore any damages incurred during construction work.

1.6 SUBMITTALS

1.6.1PRODUCT APPROVAL ATTACHMENTS

1.6.1.1 Submit samples of unit pavers for approval. Refer to the technical working drawings for the indicated area of application. Label and code the samples according to the area of application. If the architect finds unacceptable and unapproved samples installed on site, these items are subject to re-work. Samples without proper are not acceptable.

1.6.1.2 Indicate the compressive capacity of the sample. Ensure that the sample submitted for approval is labeled as "for vehicular traffic" if the compressive capacity of the unit paver is suitable for heavy vehicular access. If the capacity of the sample submitted for approval is only for pedestrian traffic, indicate "for pedestrian traffic only" on the sample label. Check the technical working drawings and verify the appropriate area of application. In case of conflicts, submit a request for clarification. Refer to section "01 26 63 Requests for Interpretation.

1.6.1.3 Sample data showing compressive strength and water absorption capacity.

1.6.1.4 If the unit paver is concrete, submit data showing the concrete, water, and aggregate mixture proportioning.

1.6.1.5 If the unit paver is stone, submit data showing the abrasive Hardness of the stone, the compressive strength. *Attach engineering test analysis results or compressive strength certifications for stone unit pavers.*

1.6.2EXECUTION APPROVAL ATTACHMENTS

1.6.2.1 Submit a detailed work methodology, indicating at least the following

1.6.2.1.1 Date and time of application

1.6.2.1.2 Area of application

1.6.2.1.3 Curing period and certifications of shortened curing periods by manufacturers, if any.

1.6.2.1.4 Shop drawings showing the tile layout, with complete indications on the start and end of the tile layout. Legibly indicate the sloping and drainage direction of surface water runoff. Be sure that shop drawing submittals are in the correct and legible scale. Include detailed shop drawings on the configuration of the paving unit, showing height, width, length, thickness dimensions, etc. for every unit paver design specified on site.

1.6.2.1.5 When using stone unit pavers on thresholds, stair units nosing, stair steps and risers, be sure to indicate in the shop drawings the mortar bedding method and the dimensions of the proposed lippage.

1.7 QUALITY ASSURANCE

1.7.1Guarantee that installers are experienced and have successfully completed paver installations similar to the approved sample.

1.7.2*The contractor is responsible for sourcing the materials.*

1.7.3In case of multiple sources or suppliers, confirm and guarantee that the installed pavers are similar by seeking the approval of the design team through the assistance of the construction manager. When proposing to utilize unit pavers from a second source, submit both the existing sample on site from the original source, and the second sample from the new source. Label the samples properly and accordingly. Indicate areas of application and indicate whether the sample is for pedestrian or vehicular access. Repeat approval process for every new unit sample from a new source supplier, in case of multiple sources.

1.7.4Install a mock-up at least 1000mm x 1000mm on site. Notify the architect at least one week in advance to request for a site visitation and have the mock up approved by the architect through a request for execution approval. Attach a photo of the mock-up the approval form. The photo should be properly labeled with the following information: (1) location of installation, (2) date of mock-up approval. Wrongly installed unit pavers without mock-up approvals will be subject to re-work.

1.7.5When weather during unit paver work is extremely hot, ensure that the substrate or the area of application is cooled enough such that temperature and humidity conditions will not cause excessive evaporation of setting beds and grout. Do not install pavement units on wet areas.

1.8 DELIVERY STORAGE, AND HANDLING

1.8.1*When unit paver items are delivered on site prior to installation, ensure that the pavers are stored without any* damages. Properly discard unit pavers with chipped corners, split pavers with hairline cracks, and other cracks that affect the quality of the unit both visually and strength-wise. Do not install defective unit pavers on site.

1.8.2Stored unit pavers must be kept clean. Store unit pavers away from substances, i.e rain, chemicals, and other materials that can cause discoloration and disintegration on the pavement units affecting its strength and visual quality.

1.8.3Store grout and mortar materials in areas where it will not be damaged by excessive moisture content and unfit temperature. Keep the storage location of mortar and grout materials dry, or enclose the items in water proof containers.

1.8.4If using combustible grout and mortar materials, ensure that the storage location of items on site are away from fire, heat, or other flammable conditions.

1.8.5The contractor is responsible for replacing unusable items due to damages incurred during site storage.

2. PART 2 PRODUCTS

2.1 PEDESTRIAN CONCRETE PAVERS

2.1.1Concrete mix used for pavers is a mixture of Portland Cement Type II or Type III, Fine and Course Aggregates at ASTM 33.

2.1.2*Concrete strength shall be 20Mpa (3000-psi) compressive strength attained at 28 days of curing, ASTM C 39*

2.1.3Water absorption maximum 5%

2.2 VEHICULAR CONCRETE PAVERS

2.2.1Verify shape and pattern of concrete pavers on the architectural working drawings.

2.2.2Concrete mix used for pavers is a mixture of Portland Cement Type II or Type III, Fine and Course Aggregates at ASTM 33.

2.2.3Concrete strength shall be 55Mpa (8000-psi) compressive strength attained at 28 days of curing, ASTM C 39.

2.2.4Water absorption maximum 5%

2.3 STONE UNIT PAVERS FOR VEHICULAR TRAFFIC

2.3.1Ensure that all stone unit pavers for vehicular traffic are at least 750mm thick, unless otherwise indicated on the drawings.

2.3.2For, stone unit pavers under 750mm thickness but with compressive capacity equal or greater to 55MPa (8000-psi), submit product data certifying the compressive strength and submit engineering/test analysis if any.

2.3.3Ensure that the minimum abrasive hardness of stone unit pavers are at 12.0 unless otherwise indicated in the technical working drawings.

2.3.4*Check technical working drawings to verify stone patterns. Submit samples that are exact or nearest to the required* color, size, dimensions, and properties of each stone unit paver as indicated on the drawings.

2.3.5Check joint width between stones in accordance to the technical working drawings. If not indicated, submit a request for clarification to the architectural design team.

2.3.6Ensure ASTM conformance of stone unit pavers as follows:

2.3.6.1 Granite: ASTM C615; verify dimensions on area of application as indicated in technical working drawings.

2.3.6.2 Limestone: ASTM C568; verify dimensions on area of application as indicated in technical working drawings.

2.3.6.3 Marble: ASTM C503; verify dimensions on area of application as indicated in technical working drawings.

2.3.6.4 Quartz-based Stone: ASTM C616; verify dimensions on area of application as indicated in technical working drawings

2.3.6.5 Slate: ASTM C629; verify dimensions on area of application as indicated in technical working drawings.

2.3.6.6 Serpentine: ASTM C1526; verify dimensions on area of application as indicated in technical working drawings.

2.3.6.7 Travertine: ASTM C1527; verify dimensions on area of application as indicated in technical working drawings.

2.4 PORTLAND CEMENT MORTAR SETTING BED

2.4.1*Verify the correct area of application in the technical working drawings. In case of queries, submit appropriate* requests for clarification.

2.4.2Use Portland Cement ASTM C 150 Type I or Type II.

2.4.3Use Hydrated Lime ASTM C 207, Type S of ASTM C207. When using hydrated lime, be sure to wet out the lime in the mixing procedure. Check the execution requirements for lime mixing.

2.4.4Use aggregates complying to ASTM C 144.

2.4.5Use potable water that is free of oils, acids, alkalies, salts, organic materials or other substances that are damaging to mortar or any metal in the wall.

2.4.6When using reinforcing wire fabric, use galvanized welded wire fabric 100mm X 100mm (W1.4/W1.4), ASTM A 185.

2.5 MORTAR MIXES

2.5.1Use Portland Cement/Lime Setting-bed Mortar, Type M of ASTM C 270 with at 2500psi.

2.5.2Ensure high compressive strength of the mortar mix to avoid re-works and breakage on site.

2.6 ACCESSORIES

2.6.1Use tile spacers when possible to ensure consistency of distances.

2.6.2 Assume 5mm grout thickness, unless otherwise indicated on the technical working drawings. Verify grout-grout distances on the technical working drawings.

3. PART 3 EXECUTION

3.1 PROJECT CONDITIONS

Ensure that on-site weather is suitable for unit paver works. Do not install unit pavers during extremely hot weather conditions in order to ensure good quality of work. Use industrial cooling fans and other appropriate cooling methods on site to ensure that the temperature of the substrate is ready for accepting the mortar setting beds and unit pavers. Do not apply mortar to substrates with temperatures of 38 degree C (100 degree F) and above.

Contractor must keep traffic off the completed installation works for at least 48 hours, unless otherwise required or certified by the unit paver manufacturer.

3.2 PREPARATION

Make sure that substrates and areas subject for work are free of dirt dust, debris, and loose particles. Sweep, vacuum, or wash the substrate area clean prior to application. When washing the substrate clean, take care to remove any excessive amounts of water from the surface before beginning mortar setting and unit paver layout.

3.3 INSTALLATION, GENERAL

3.3.1 Allowable grouting between units is from 0mm minimum to maximum 5mm.
3.3.2 Use motor-driven masonry equipment when cutting unit pavers.
3.3.3 Ensure that modified pavement units are cleanly and sharply cut, and free of unchipped edges.
3.3.4 Double-check the patterns and cut the units accordingly to fit and match the ***approved*** tile layout.
3.3.5 For portions of the pattern requiring full units, use full unit pavers. Do not adjoin cut pavers to make one full unit.
3.3.6 Do not hammer cut the units to avoid chipping and wastage.
3.3.7 For unit pavers adjoining curbs, slabs, and other homogenous surfaces, do not exceed 1mm vertical flush or lippage to the abutting faces, especially for pavement areas with pedestrian access. Ensure that the finish surfaces are level and following the slope requirements indicated in the technical working drawings.
3.3.8 For stone pavers,

3.4 REPAIR, POINTING, CLEANING, AND PROTECTION

3.4.1 Neatly remove excess grout from exposed surfaces. Scrub and wash the surfaces clean and take care not to damage the original surface condition of the unit pavers.
3.4.2 Point the grout following the requirements of the technical working drawing. For flush pointing, ensure that the grout is level with the unit pavers allowing for no more than 0.20mm lippage. For bucket handle, recessed, and weatherstruck pointing, a maximum depression of up to 0.30mm is tolerable, unless otherwise indicated in the technical architectural drawings.
3.4.3 Protect all completed unit pavement work so that it stays free of damages.
3.4.4 Remove and replace all unit pavers damaged during installation.

END OF SECTION

DIVISION 03
CONCRETE

03 00 00	DIVISION 3 CONCRETE	
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1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Technical Architectural Drawings
1.1.2 Specifications
1.1.3 Shop Drawings – Setting Layout

1.2 SUMMARY

This section includes provisions and recommendations on cast-in-place and pre-cast concrete works with both architectural and structural purposes, foundations, floors and slabs on grade, equipment pads and anchors, light pole bases, thrust blocks, manhole bases, pits and vaults.

Architectural precast works include pre-cast partitions for interiors, wall panels, concrete pads for mechanical equipment, wheel stops, interior precast concrete as indicated in the Architectural technical working drawings.

Verify instructions for specialized architectural concrete elements particularly statues, concrete louvres and any architectural element with specialized aesthetics. For specialized architectural concrete elements, refer to specifications on technical working drawings or to the specifications of a designated designer if any.

Control, expansion and contraction joint devices associated with concrete work not part of pavement work, including joint sealants, are also discussed in this section.

1.3 RELATED SECTIONS

1.3.1 Concrete Pavement
1.3.2 Concrete Finishes
1.3.3 Concrete Floor Topping
1.3.4 Final Cleaning

1.4 GENERAL PROVISION

1.4.1 Ensure that all concrete mixes follow the specifications of structural designers and architects.
1.4.2 Verify all indications on the technical working drawings and issue Requests for Clarification in case of conflicting indications.
1.4.3 Do not modify the appearance, strength, and durability of the concrete architectural elements without any approval issued by the architect of record and the structural designer of record. Submit a request for approval for any modifications proposed. Any modifications found on site without corresponding approvals are subject to re-work at the expense of the contactor.
1.4.4 Do not modify designs as indicated in the drawings. If modifications are necessary due to actual site conditions, submit shop drawings and annotate reasons for modification. Take care to highlight and explain the portion to be modified by indicating annotated technical drawing clouds.
1.4.5 Comply with all local codes and ordinances governing the project site. If the local standards are more stringent or conflicting with that indicated on drawings, submit a request for clarification and indicate the code or cause of conflict. Do not implement any such code standards without verifying with the architect.
1.4.6 Secure an official advice from the Architect via a Request for Clarification prior to implementing any work that deviates from the technical working drawings.
1.4.7 Implement all concrete casting work such that safe vehicular and pedestrian access is retained and maintained on site, as required for construction and other activities.
1.4.8 Always use form-release agents on formwork surfaces prior to concreting. Refer to the formworks portion of this section.

1.4.9 Contractor may request for design mix substitution to be approved by the structural designer. Refer to the Section 01225 13 Product Substitution Procedures of this specifications for product substitution procedures.

1.4.10 Never overlay fresh concrete on existing concrete found on site unless otherwise approved by the structural consultant. Refer to the execution portion of this section for instructions on batch-laid concrete casting. Ensure that the maximum strength of the concrete is attained. Submit concrete samples subject to laboratory test work. Refer to submittal attachments required for details.

1.4.11 For exposed concrete finishes with specialized texture and color, secure an approval of the final finish from the architect of record. Refer to Division 03 35 0 Concrete Finishes.

1.5 MAINTENANCE

1.5.1 Maintain the quality of poured concrete surfaces as indicated and make sure that removal of forms do not tarnish, destroy, or impair the concrete surface.

1.5.2 Keep the casted concrete free of discoloration, foreign substances, and other elements.

1.5.3 Keep pre-cast concrete delivered on site free of discoloration, foreign substances, and other elements. Refer to the delivery, storage, and handling portion of this Section for details.

1.5.4 In case of damages or surface alterations as a result of on-going construction work and other similar activities that modify the qualities of the concrete after pouring, ensure that the quality of the concrete surface is restored according to indications on the technical working drawings or by the approved shop drawings before final turnover.

1.6 SUBMITTALS

1.6.1 PRODUCT APPROVAL ATTACHMENTS

1.6.1.1 Submit manufacturer's product data, particularly application and installation instructions for cement, cementitious materials, additives, admixtures, bearing pads, and other materials used. Submit material certificates as signed or certified by manufacturers.

1.6.1.2 For concrete surfaces subject to weather exposure and surface water run-off, submit the manufacturer's data of the approved waterproofing material. Include manufacturer's application and installation instructions for waterproofing, particularly data on concrete surface finish and conditions as needed.

1.6.1.3 Submit mix design for each concrete mix to be used.

1.6.1.4 Submit a minimum of three properly labeled samples of each concrete mix delivered on site and for every mix approved by the designers.

1.6.1.5 Submit separate sample cylinders for every 115 cubic yards of concrete mix delivered.

1.6.1.6 Label all concrete cylinder submittals properly and submit laboratory test reports indicating the concrete mix performance for every 7th, 21st, and 28th day of curing. Laboratory test results should include:

1.6.1.6.1 Slump requirement

1.6.1.6.2 Air content requirement

1.6.1.6.3 Project number

1.6.1.6.4 Project name

1.6.1.6.5 Project location

1.6.1.6.6 Area of application (Indicate in drawings)

1.6.1.6.7 Sample date

1.6.1.6.8 Cure type

1.6.1.6.9 Actual slump according to test

1.6.1.6.10 Actual air content according to test

1.6.1.6.11 Unit Weight (Fresh)

1.6.1.6.12 For areas with exterior exposure, indicate water absorption test results.

1.6.2 EXECUTION APPROVAL ATTACHMENTS

1.6.2.1 Detailed work methodology, indicating at least the following

1.6.2.1.1 Date and time of application

1.6.2.1.2 Area of application

1.6.2.1.3 Restoration and cleaning procedures upon completion of work.

1.6.2.1.4 Shop drawings showing fabrication details, for items i.e. concrete railings, if any, wheel stoppers, and other similar architectural elements. Include plans, elevations, shapes and cross-sections in drawings. All drawings must be properly labeled, drawn to scale, and complete with dimensions. Include reinforcement details, locations, tolerances,

and dry joint treatments if casting is in multiple phases. If the architectural concrete will be accepting veneer, i.e. stone units, indicate relationship of architectural pre-cast concrete units to adjacent materials.

1.6.2.1.5 On shop drawings submitted with proposed modifications, clearly indicate modifications through drawing clouds.

1.7 *QUALITY ASSURANCE*

1.7.1 Comply with ACI 117-90 for Tolerances for Concrete Construction and Materials, unless otherwise indicated on drawings and specifications.

1.7.2 Unless, otherwise specified by the designer, comply with ACI 301 for specifications for Structural Concrete for Buildings.

1.7.3 Comply with field-testing requirements as specified in ACI 301.

1.7.4 Ensure that testing agencies for field tests of concrete samples as required shall be by an ACI Concrete Field Testing Technician Grade I certified in accordance with ACI CPI or equivalent. Ensure that testing agencies are independent and qualified according to ASTM C 1077 and ASTM E 329.

1.7.5 For pre-cast architectural concrete fabricated off site, ensure that the fabricator is experienced in producing architectural pre-cast concrete units similar to items specified in the project.

1.7.6 Measure the fresh concrete temperature at the point and time of discharge in accordance with ASTM C 1064/C1064M. Frequency of temperature determination shall be in accordance with ASTM C 94/C 94M and at the option of the inspector.

1.7.7 When working in hot weather, ensure that the temperature of freshly produced concrete at discharge will not exceed the maximum allowable concrete temperature as specified by structural designers or herein specified standards.

1.7.8 Reduce hot temperatures on site bay casting shade on aggregate stockpiles, sprinkling water on coarse aggregate *stockpiles; using chilled water for concrete production; substituting chipped or shaved iced for portions of the mixing* water; and cooling concrete materials using liquid nitrogen. Submit work methodologies on concrete cooling methods that will be used. Indicate the order of initiation in the case of multiple methods.

1.7.9 For pre-mixed concrete freshly delivered on site, ensure that deliveries are in accordance with ASTM C 94/C 94M. As such, discharge pre-mix fresh concrete within 1-1/2 hours or before the truck-mixer drum has revolved 300 revolutions, whichever comes first.

1.7.10 Conduct concrete placement and finishing operations as quickly as on-site conditions will allow.

1.7.11 In hot weather, control concrete surface bleed-water evaporation with application of evaporation reducers, plastic sheeting fog spray, or wind breaks. Use materials and method in accordance with ACI 308.1

1.7.12 Cure concrete in accordance with ACI 308.1. Maintain curing conditions until specified levels of durability in the concrete have been achieved. Apply ACI 308R "Standard Practice for Curing Concrete", unless otherwise specified.

1.7.13 The Contractor is required to provide impermeable, watertight concrete and joints in structures and divider walls designed to hold water or other solution.

1.7.14 Repair honeycomb, cracks and such imperfections developed in casted concrete at the Contractor's expense until such is approved. Concrete work or joints with imperfections that cannot be successfully repaired are subject to rework at the contractor's expense.

1.7.15 Test concrete surfaces exposed to surface water run-off by filling each basin, tank, or compartment with *water to within one 300mm of the top of the structure. If the water level in the basin, tank or compartment being* tested falls more than 25mm in 24 hours, determine and repair the cause of leakage until water tightness is achieved.

1.7.16 All repair work required as a result of the tests for water-tightness shall be the Contractor's expense.

1.8 PERFORMANCE REQUIREMENTS

1.8.1 FIRE PERFORMANCE RATING

1.8.1.1 Comply with 1 hour fire resistance rating for party walls and corridor walls.

1.8.1.2 Comply with 2 hour fire resistance rating for fire-barrier walls, particularly vertical fire exits and shafts.

1.8.1.3 Comply with requirements of the governing Fire Code of the Philippines (RA 9514) and the Philippine Building Code (PD 1096).

1.8.2 STRUCTURAL PERFORMANCE

1.8.2.1 Ensure compliance of load requirements for dead load, live loads, seismic loads, and other applicable loads as computed and designed by the Structural consultant and designers.

1.8.2.2 Provide positive anchorage for pre-cast, pre-fabricated architectural concrete attached to the building. Anchorage details must be properly evaluated and approved by qualified professionals and structural designers.

1.8.2.3 Ensure compressive strength of 7.0 to 10.5Mpa unless otherwise stated in specifications by structural designers.
1.8.2.4 Check concrete weight at 185.53 to 307.59 kg/sqm unless otherwise specified or approved by structural designers.

1.8.3TERMITE RESISTANCE
Ensure that concrete walls are free of cracks, such that termite entry is prevented.

1.8.4 MOLD RESISTANCE RATING
Ensure that all concrete elements and walls are properly treated such that walls are free of food sources that *encourage mold growth.*

1.8.5 SOUND PERFORMANCE RATING
If possible, attain 51 to 62 Sound Transmission Class (STC) in decibels (dB).

1.8.6 ZOCALO
Provide 100mm high reinforced concrete upstand zocalo at floor level for all toilet and kitchen applications, and where indicated by the architect. Provide proper anchorage and ensure waterproofing requirements. Refer to Division 7 Thermal and Moisture Protection.

1.8.7 VISUAL APPEARANCE OF CONCRETE WALLS
All finished concrete surfaces should be consistent in appearance unless otherwise indicated in the technical working drawings.

1.9 DELIVERY AND STORAGE

1.9.1Store all raw materials, equipment, and accessories for cast-in-place concrete in an organized manner such that it doesn't obstruct any on-going construction works.
1.9.2Allocate proper spaces in anticipation of pre-mixed concrete delivery trucks. Time the delivery so as not to obstruct other *on-going construction works, and day-to-day activities within the project site vicinity.*
1.9.3Store pre-cast concrete units properly to prevent contact with soil, staining, cracking, distortion, warping, or other physical damage.
1.9.4Organize stored pre-cast units so labels are clearly visible and items are easily identifiable. Avoid arrangement of pre-cast units that could cause cracking or damage.
1.9.5Arrange on-time delivery of architectural precast concrete units in quantities and at times that does not disrupt agreed construction schedule.
1.9.6During delivery, take care to protect pre-cast units during shipment on non-staining shock-absorbing material. Handle and transport units in a position consistent with their shape and design in order to avoid excessive stresses that could cause cracking or damage.
1.9.7Lift, transport, and handle the transfer of units to the installation site properly such that items are kept free of deformities.

1.10 WARRANTIES

Ensure a Five (5) year warranty for all interior pre-cast concrete items and ten (10) years for exterior concrete specified under this section, for protection against water penetrations, air penetrations, sealant disengagement, falling-off of surface finish resulting to breakdown in weather-tightness and thermal resistance; failure on mold, termite and seismic *resistance. Warranty count shall begin from date of substantial completion and project turnover.*

2. PART 2 PRODUCTS

2.1 MATERIALS

2.1.1CEMENTITIOUS MATERIALS
2.1.1.1 Use Portland Cement: ASTM C 150, Type I or III, standard gray or white cement.
2.1.1.2 Do not use fly ash and gray silica fume for exposed exterior surface applications.
2.1.1.3 Limit use of fly ash to 20 to 40% replacement of portland cement by weight; ground granulated blast-furnace slag to 15 to 25% of Portland cement by weight; and metakaolin and silica fume to 10% of Portland cement by weight.
2.1.1.4 When using fly ash, comply with ASTM C 618, Class C or F with maximum loss on ignition of 3%.
2.1.1.5 When using metakaolin, comply with ASTM C 618, Class N.