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.

2.2.1*Portland 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.

2.3.5*Use 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

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

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

2.6.3 All 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

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

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

3.2 FORM CONSTRUCTION

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

3.2.2 Check 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.

3.2.3 Ensure 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.

3.2.4 Clean forms after each use.

3.3 REINFORCEMENT

3.3.1 Refer 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

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

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

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

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

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

3.4.6 Use 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.

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

3.4.8 Make 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.

3.4.9 For 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

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

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

3.5.3 When 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.

3.5.5 When 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

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02 78 0	Unit Pavers	1 of 5

1. PART 1 GENERAL

1.1 RELATED DOCUMENTS

1.1.1 Technical Drawings

1.1.2 Specifications

1.1.3 Shop 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

1.3.1 Concrete Finishes

1.3.2 Concrete Floor Topping

1.4 GENERAL PROVISION

1.4.1 For 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.

1.4.2 If 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.*

1.4.3 Prior 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 01 for procedures on request for approval.

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

1.4.5 Implement 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.

1.4.6 Do 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

1.5.1 In 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.*

1.5.2 Keep 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.

1.5.3 For 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

1.6.1 PRODUCT 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.

1.7.2The 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

1.8.1When 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

2.1.1 Concrete 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

2.1.3 Water absorption maximum 5%

2.2 VEHICULAR CONCRETE PAVERS

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

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

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

2.2.4 Water absorption maximum 5%

2.3 STONE UNIT PAVERS FOR VEHICULAR TRAFFIC

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

2.3.2 For, 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.

2.3.3 Ensure 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.

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

2.3.6 Ensure 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.

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

2.4.3 Use 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.

2.4.4 Use aggregates complying to ASTM C 144.

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

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

2.5 MORTAR MIXES

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

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

2.6 ACCESSORIES

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

2.6.2Assume 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

3.3.1Allowable grouting between units is from 0mm minimum to maximum 5mm.
3.3.2Use motor-driven masonry equipment when cutting unit pavers.
3.3.3Ensure that modified pavement units are cleanly and sharply cut, and free of unchipped edges.
3.3.4Double-check the patterns and cut the units accordingly to fit and match the ***approved*** tile layout.
3.3.5For portions of the pattern requiring full units, use full unit pavers. Do not adjoin cut pavers to make one full unit.
3.3.6Do not hammer cut the units to avoid chipping and wastage.
3.3.7For 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.
3.3.8For stone pavers,

3.4 REPAIR, POINTING, CLEANING, AND PROTECTION

3.4.1Neatly 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 weather struck pointing, a maximum depression of up to 0.30mm is tolerable, unless otherwise indicated in the technical architectural drawings.
3.4.3Protect all completed unit pavement work so that it stays free of damages.
3.4.4Remove and replace all unit pavers damaged during installation.

END OF SECTION

DIVISION 03
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,