## I. INTRODUCTION:

These specifications shall encompass all the work necessary for the project "PROPOSED RENOVATION OF THE INTEGRATED TECHNOLOGY BUILDING FOR COLLEGE OF MEDICINE (PHASE 3)" and as further defined herein. The work shall include furnishing all labor, materials, equipment, tools, facilities and transportation to complete the project in accordance with the drawings and specifications.

The drawings and the specifications are complementary to each other. Drawings are graphic means of showing the work to be done. They are particularly suited to showing where materials are located. Thus, drawing exists essentially to show sizes, location, and placement. Not all works, however, can be presented in the drawings. Generalized works are usually in statement form; hence the Contractor is strongly advised to read the specification carefully.

Specification on the other hand, is used to describe the materials, construction techniques, samples, shop drawings, guarantee, and the other contract requirements. Together, the Drawings and the Specification are used to inform the contractor. In cases where specified brand carries with it the manufacture's specifications, the manufacture's specification shall hold the precedence over this specification.

## II. THE LANGUAGE OF THE SPECIFICATIONS:

The specifications are the abbreviated type and include incomplete sentences. The selection of sentence structure depends on the underlying principles of the specifications:

a. That the technical specifications are only one part of the Contract Document.
b. That the contract is between the Owner and the General Contractor; and
c. That the General Contractor is the only party responsible for completing the work in accordance with the Contract Document

***Therefore:***

A. Only the General Contractor is referred to in the specification so as not to violate the intent of the contract and so as not to undermine the proper chain of command.

B. Any reference to Specialty Trade Contractors in the technical Specifications is made only in so far a selection of specialty Trade Contractors is made through bidding. Once the Specialty Trade Contractions are selected and assigned to the General Contractor, the General Contractor assumes all responsibilities for the execution of the whole project in accordance with the Contract Documents. Therefore, in the contract between the Owner and the General Contractor, the Specialty Trade

C. The omission of the phrase "the contractor shall" is intentional because the whole specifications are directed to the Contractor. Omitted words or phrases shall be supplied by the interference in the same manner, as they are when a "note" occurs in the drawings.

D. Where "as shown", "as intended", "as detailed", or words similar import are used, it shall be understood that the reference in the drawings accompanying the specifications is made unless otherwise stated.

E. Where "as directed", "as required", "as permitted", "as authorized", "as approved", "as accepted", or other words similar import are used, it shall be understood that the direction, requirements, permission, authorization, approval, or acceptance of the Architect is intended unless otherwise stated.

F. As used herein, "provide" shall be understood to mean "provide complete in place" that is "furnished and installed".

## III. GENERAL REQUIREMENTS:

1. The contractor shall secure from the government agencies all necessary licenses and permits needed.
2. Cleanliness shall be maintained at all times within the job site and its immediate premises.
3. If errors or omissions appear in the drawings, specifications or other documents, these shall be referred to the designing architect.
4. All applicable provisions of the different divisions of the specification for each work trade shall apply for all items cited in this summary.
5. Materials deemed necessary to complete the work but not specifically mentioned in the specification, working drawings, of in the Contract Document, shall be supplied and installed by the Contractor without extra cost to the Owner. Such material shall be of the highest quality available and install and applied in a workmanlike manner at prescribed or appropriate locations.
6. Materials specifically mentioned in this Summary shall be installed following efficient and sound Engineering and Construction practice, and especially as per Manufacture's application and installation specification, which shall govern over all works, alluded in this Specification.
7. The Contractor shall clean the site and dispose waste after the completion of the project.

## IV. PREPARATION OF SITE:

Preparation of the working area at site covers the requirements for providing all the temporary work at the project site, on-site storage facilities, implementing security requirements and safety protocols in the project site as required for the

proper performance and completion of the work. All temporary installation used for the work shall be removed after completion of the Work.

## V. STANDARD SPECIFICATIONS

### PART 1. MOBILIZATION AND DEMOBILIZATION

#### 1.1 General Requirements

Mobilization shall mean the transport to the project site of personnel and equipment as stipulated in the proposal of the Contract of the project while demobilization shall be the subsequent removal from the site after the completion of the project. Approval of the Engineer is required when one opted to demobilize any major equipment before the completion of the project.

#### 1.2 Method of Measurement

Mobilization and Demobilization shall be paid by lot.

#### 1.3 Basis of Payment

Method of Measurement shall be paid for at the Contract Unit Price or for the item listed below. Such payment shall be full compensation for furnishing, maintaining, and ensuring against loss of any equipment/tools.

Payments shall be made under:

| Pay Item Number | Description | Unit of Measurement |
|---|---|---|
| 1 | Mobilization and Demobilization | Lot |

### PART 2. DEMOLITION WORKS

#### 2.1 Description

This work shall consist if the removal wholly or in part, and disposal of existing partition, roofing, pedestal and ceiling which are not designed or permitted to remain, except for the obstructions to be removed and disposed of under other terms in the contract.

#### 2.2 Method of Measurement

Demolition Works shall be paid by lot.

#### 2.3 Basis of Payment

Method of Measurement shall be paid for at the Contract Unit Price or for the item listed below. The payment shall include labor, equipment, tools and incidentals to complete the work prescribed in this item.

Payments shall be made under:

| Pay Item Number | Description | Unit of Measurement |
|---|---|---|
| 2 | Demolition Works | Lot |

**PART 3. WALL FINISHING WORKS**

**3.1 Description**

This work shall consist of requirements for the installation of embossed exterior acrylic logo and letters on the building facade as shown on the Plans and in accordance with this specification.

**3.2 Material Requirements**

3.2.1 Acrylic Logo and Letters

Acrylic logo and letters shall conform to the requirements as defined in the plans, 150mm thk. This emphasizes that the logo and letters must adhere to the detailed specifications outlined in the project plans. This includes the design, placement, and any other specific design elements, color schemes, or finishes required.

3.2.2 Color Requirement

All exterior signage will have a distinct visual hierarchy, with a prominent gold logo and clear white text.

**3.3 Construction Requirements**

The acrylic logo, constructed from 150mm thick gold acrylic sheet, will be meticulously fabricated to the exact dimensions and embossed pattern specified in the design documents. The logo will be professionally embossed to achieve the desired depth and detail, ensuring a high-quality finish. The logo will be securely attached to the support structure using appropriate adhesives, ensuring proper alignment and stability. A weatherproof sealant will be applied around the edges and attachment points to protect against moisture and prevent damage. The completed logo will undergo a thorough visual inspection for accuracy, quality of embossing, and overall appearance, ensuring it meets the highest standards of craftsmanship. Detailed fabrication drawings and installation instructions will be provided to the contractor, ensuring a smooth and successful installation process.

**3.4 Method of Measurement**

Wall Finishing Works shall be paid by lot.

**3.5 Basis of Payment**

Method of Measurement shall be paid for at the Contract Unit Price or for the item listed below. The payment shall include materilas, labor, equipment, tools and incidentals to complete the work prescribed in this item.

Payments shall be made under:

| Pay Item Number | Description | Unit of Measurement |
|---|---|---|
| 3 | Wall Finishing Works | lot |

**PART 4. CEILING WORKS**

Refer to the Approved Plan.

**4.1 Description**

This section covers the requirement for providing all ceiling work at the Project site. The work shall include furnishing all labor, materials, equipment, tools and transportation necessary to complete the work indicated on the drawings and specified herein.

**4.2 Materials Requirements**

All framing works for ceiling must be replace. Framing system shall be straight, light, non-combustible and not susceptible to termite damage. Screws shall be used to connect framing components and fasten other materials to the framing. All ceiling eaves inclusive to renovation must be replaced with Rib Type Spandrel Ceiling.

**4.3 Construction Requirements**

The spandrel panels used for exterior ceiling applications shall be made of with a minimum thickness of 0.4 mm. These panels must be factory-finished with a weather-resistant coating to ensure durability and resistance to corrosion from environmental exposure. The color and profile of the panels shall follow the architectural design or client's specification, with tongue-and-groove edges to ensure a clean, interlocking installation.

Prior to the installation of the spandrel panels, a sturdy and level ceiling framing system must be in place. The main support shall consist of furring channels spaced accordingly to the plan. It is essential that all framing elements are level and properly aligned before beginning panel installation.

Installation of the spandrel panels shall begin at one side of the ceiling area. Each panel must be securely interlocked with the next using the tongue-and-groove system, and fastened to the furring channels with self-drilling screws. These screws must be rust-resistant and installed at regular intervals. The installer must avoid overtightening, which could deform the panel surface. Proper spacing and alignment must be maintained to ensure a seamless and uniform appearance.

Edge moulding shall be installed along all ceiling perimeters to provide a neat, finished look and to support the ends of the spandrel panels. The edge moulding must match the finish of the spandrel panels and be securely fastened to the wall or adjacent structure. This moulding also helps accommodate minor thermal expansion and contraction of the panels, and serves to conceal any uneven cuts or gaps at the edges.

If the ceiling conceals mechanical, electrical, or plumbing services, appropriate access panels shall be provided. Additionally, for applications requiring ventilation, selected spandrel panels may be perforated or ventilated, as specified. All cut edges, penetrations, and joints must be properly sealed to prevent water intrusion and to enhance resistance to wind uplift in exposed areas.

4.3.3 Quality of Materials

All materials to be incorporated in the carpentry and joinery works shall be of good quality. Before incorporation in work, all materials shall have been inspected/accepted by the Engineer of his authorized representative.

4.3.4 Storage and Protection of Materials

Boards and other materials shall be protected from dampness during and after delivery at the site. Protect surrounding areas and surfaces to preclude damage. Avoid soiling, spatter, and damage to work of other trades. Use cover cloths or other means of protection. Remove, clean, and repair or damaged work. Materials shall be delivered well in advance of actual need and in adequate quantity to preclude delay in the work.

4.3.5 Shop Drawings

Shop drawings complete with essential dimensions and details of construction, as may be required by the Engineer in connection with carpentry and joinery work, shall be submitted for approval before proceeding with work.

4.3.6 Storage of Materials

All new materials shall be delivered by the manufacture in original, unopened, undamaged containers with identification labels intact. All materials shall be stored protected from exposure to rain, or other harmful weather conditions.

**4.4 Method of Measurement**

Ceiling Works shall be paid by sq.m

**4.5 Basis of Payment**

Method of Measurement shall be paid for at the Contract Unit Price or for the item listed below. The payment shall include labor, equipment, tools and incidentals to complete the work prescribed in this item.

Payments shall be made under:

| Pay Item Number | Description | Unit of Measurement |
|---|---|---|
| 4 | Ceiling Works | sq.m |

## PART 5. PAINTING WORKS

All painting works of this project, except as hereinafter specified, shall be done with the prescribed painting products. The painting contractor shall supply all labor, paint materials, tools, staging and equipment, and shall perform all painting and finishing work as shown in the schedule of painting and finishing work for this project.

The painting contractor shall store his materials in one place in the building to be kept neat and clean, care being taken in the storage of paints, oils, etc. to prevent danger of fire. Oily rags shall be kept in metal containers and shall be removed from the building every end of the working day.

Upon completion of the painting works, the painting contractor shall be removing any spots from all finish work. He shall present his work to the Project Owner or Architect/Engineer in-charge of construction, free from blemishes and rubbish generated by his workers.

It shall be the painting Contractor's responsibility to protect his work and those of other contractors during the time his work is underway. He shall be responsible for any damage for the work or property of other caused by his employees or by himself.

Before any painting is done surfaces shall be cleaned, smoothed and freed from dust, dirt, grease, mortar, rust and other foreign substances. All parts where paint remover has been used all paint and paint materials shall be delivered to the building site in unbroken packages, bearing the marks of specified brand. No adulteration of specified paints with other brands shall be allowed.

### 5.1 Painting Works (Masonry/Concrete)

5.1.1 Scope

The work shall consist of cleaning and preparing masonry/concrete surfaces and applying protective paint coatings.

5.1.2 Materials

All painting materials shall be deliver to the work site in original containers with seals and labels intact. Containers shall not be opened until after they have been inspected.

5.1.3 Application of Paint

Specified patching and repair of the facade must be polished as specified in the plan and details. Application of exterior substrates before painting must be performed with necessary preparation.

Repainting of masonry/concrete with surface defects shall be repaired and all surfaces shall be scraped to remove deteriorated coatings and other deleterious materials. Surfaces shall then be cleaned with any commercial cleaner to remove all grease, oil, and chemical residues. Paint materials shall be kept sealed or covered when not in use. Color pigments shall be used to produce the exact shades paint, which shall conform to the approved color scheme of the building. If brushes are used, they shall have sufficient body and length of bristle to spread paint in a uniform

coat. Paint shall be evenly spread and thoroughly brushed out and no residual brush marks shall remain. On surfaces which are inaccessible for brushing, paint shall be applied by spray, or other means as approved.

All painting works of this project, except as hereinafter specified, shall be done with the prescribed painting products. The painting contractor shall supply all labor, paint materials, tools, staging and equipment, and shall perform all painting and finishing work as shown in the schedule of painting and finishing work for this project.

The painting contractor shall store his materials in one place in the building to be kept neat and clean, care being taken in the storage of paints, oils, etc. to prevent danger of fire. Oily rags shall be kept in metal containers and shall be removed from the building every end of the working day.

Upon completion of the painting works, the painting contractor shall be removing any spots from all finish work. He shall present his work to the Project Owner or Architect/Engineer in-charge of construction, free from blemishes and rubbish generated by his workers.

It shall be the painting Contractor's responsibility to protect his work and those of other contractors during the time his work is underway. He shall be responsible for any damage for the work or property of other caused by his employees or by himself.

Before any painting is done surfaces shall be cleaned, smoothed and freed from dust, dirt, grease, mortar, rust and other foreign substances. All parts where paint remover has been used all paint and paint materials shall be delivered to the building site in unbroken packages, bearing the marks of specified brand. No adulteration of specified paints with other brands shall be allowed.

**5.2 Method of Measurement**

Painting Works shall be paid by sq.m

**5.3 Basis of Payment**

Method of Measurement shall be paid for at the Contract Unit Price or for the item listed below. The payment shall include labor, equipment, tools and incidentals to complete the work prescribed in this item.

Payments shall be made under:

| Pay Item Number | Description | Unit of Measurement |
|---|---|---|
| 5 | Painting Works | Sq.m |

## PART 6. CISTERN TANK

### 6.1 Description

This item shall consist of all work required for the installation of Cistern Tank at the specified area of the project, including but not limited to supply and delivery, excavation, foundation preparation, tank installation, and connections to pipes.

### 6.2 Construction Requirement

Excavation or other structural works must conform as specified in details set. Plumbing works and it's mechanical components are inclusive to the scope of work. Concrete shall be mixed well using the proportion specified by the Engineer. Hand mixing shall be done, using shovels, on a level concrete slab or steel plate. Mix aggregate and cement until the color is uniform. Spread the mixture out and sprinkle water over the surface. Continue with this process until the right amount of water has been mixed in. Mixture shall be free from impurities such as dirt and grass. If batch mixer is used, accurate timing and measuring devices shall be observed as per manufacturer's recommendation.Aggregates shall conform to the applicable requirements of Subsection 900.2.2, Concrete Aggregates of Item 900, Reinforced Concrete. Water shall conform to the applicable requirements of Subsection 900.2.3, Water of Item 900, Reinforced Concrete. Reinforcing steel shall conform to the applicable requirements of Item 902, Reinforcing Steel. Specifically:

Excavation

Except when specifically provided to the contrary, excavation shall include the removal of materials of whatever natured encountered, including all obstructions of any nature that would interfere with the proper execution and completion of the work. The removal of said materials shall conform to the lines and grades shown or ordered. Unless otherwise provided, the entire construction site shall be stripped of all vegetation and debris, and such materials shall be removed from the site prior to performing any excavation or placing any fill. The contractor shall furnish, place, and maintain all supports and shoring that may be required for the sides of the excavations, and all pumping, ditching, or other approved measures for the removal or exclusion of water, including taking care of storm water and waste water reaching the site of the work from any source so as to prevent damage to the work or adjoining property.

Excavation beneath proposed structures. Except where otherwise specified for a particular structure or ordered by the engineer, excavation shall be carried to the grade of the bottom of the footing or slab. Where shown and ordered, areas beneath proposed structures shall be over-excavated. When such over-excavation is shown on the drawings, both over-excavation and subsequent backfill to the required grade shall be performed by the contractor at his own expense.

Concreting Works

Forms for exposed concrete structure shall be of steel or new plywood panels. All other forms shall be of steel panels, plywood or surfaced lumber. Forms

shall not be removed until permission to do so has been received from the engineer or until the concrete has obtained eighty (80%) of its 28-day strength.

Placement of concrete

As concrete is placed in forms or in excavations, it shall be thoroughly settled and compacted throughout the entire depth of the layer which is being consolidated, into a dense homogeneous mass. Except in special case where their use is deemed impractical by the engineer, the contractor shall use high-speed internal vibrators of an approved immersion type.

The tank shall be provided with manhole and cover.

Rebar Works

Placing Reinforcement

All reinforcement shall be placed in accordance with the plans furnished by the Engineer. In case any doubt or ambiguity in placing of steel, the Contractor shall consult with the Engineer whose decision shall be final in such cases. All loose rust or scale, all adhering materials, and all oil or other materials which tend to destroy bond between the concrete and the reinforcement shall be removed before placing the steel and before concreting begins. Metal reinforcement shall be accurately placed and adequately secured by using annealed iron wire ties or suitable clips at intersections and shall be supported by concrete or metal supports, spacers or metal hangers. All bars shall be bent cold. Reinforcement steel shall not be straightened or rebent in a manner that will injure the material. Bars with kinks or bends not shown on the drawings shall not be used. Heating of the reinforcement will be permitted only when approved by the Engineer.

Miscellaneous Metalwork

Other works shall be furnish, fabricate and install for all the miscellaneous metalwork as specified and shown. Miscellaneous metalwork is defined as all items required to be fabricated from structural steel shapes, plates, bars and their products.

Plumbing

Install water pump, pipes, specials, fittings, closure pieces, valves, supports, bolts, nuts, gaskets, jointing materials and all other appurtenances as shown and as required to provide a complete and workable installation. Where pipe supports details are shown, the supports shall conform thereto and shall be placed as indicated; provided, that the support for all exposed piping shall be complete and adequate regardless of whether or not supporting devices are specifically shown. At all times when the work of installing pipes is not in progress, all openings into the pipe and the ends of the pipe in trenches shall be kept tightly closed to permit entrance of animals and foreign materials.

Waterproofing

Waterstop rubber must be installed at every construction joint in the cistern tank. This involves carefully positioning the waterstop rubber strip along the joint, ensuring it's centered and securely bonded. Allow the adhesive to cure completely before proceeding with the next construction phase. The waterstop rubber should extend into the concrete pour by a sufficient depth to prevent water from bypassing the seal.

In concrete: The method of application of admixture and other details is based on the manufacturer's specification.

In plaster: The concrete surface, to be plastered, is cleaned thoroughly and kept wetted for 24 hours. The plaster in cement sand mortar mixed in proportion varying from 1:1 to 1:4 by volume along with the waterproofing admixture and laid in appropriate thickness and in layers not exceeding 15mm layer or as per manufacturer's specification.

**6.3 Method of Measurement**

Cistern Tank shall be paid by lot.

**6.4 Basis of Payment**

Method of Measurement shall be paid for at the Contract Unit Price or for the item listed below. The payment shall include labor, equipment, tools and incidentals to complete the work prescribed in this item.

Payments shall be made under:

| Pay Item Number | Description | Unit of Measurement |
|---|---|---|
| 6 | Cistern Tank | lot |

**PART 7. OVERHEAD WATER TANK**

**7.1 Description**

This item shall consist of furnishing and installation of water system inclusive for overhead water tank and all accessories ready for service in accordance with the Plans and this Specification.

**7.2 Construction Requirements**

All concrete shall be deposited, vibrated and cured in accordance with ACI-318-89. Before concrete is poured, check with all trades to ensure proper placement relating to the works at least 4 days before the pouring of concrete. Provide adequate ties for all steel bars and stirrups. All reinforcing steel shall be placed at correct distance from the forms by adequate concrete blocks, steel chairs, or ties in accordance with the latest ACI code.

All reinforcing bars shall be clean of rust, grease or other deleterious materials which tend to impair bond. All reinforcing bars shall be accurately and securely placed before

pouring concrete or applying mortar or grout. Lapped splices shall be staggered where possible at 30% of the total number of vertical bars on every column. No steel shall be fabricated or erected until shop drawings have been approved by the engineer and shall conform to the code of standard practice as amended to date. All shop and field welding shall be in accordance with AWS D.1.1 and performed by qualified welders. Bolts for structural steel member connection shall conform to ASTM A325 specifications.

Concrete shall be mixed well using the proportion specified by the Engineer. Hand mixing shall be done, using shovels, on a level concrete slab or steel plate. Mix aggregate and cement until the color is uniform. Spread the mixture out and sprinkle water over the surface. Continue with this process until the right amount of water has been mixed in. Mixture shall be free from impurities such as dirt and grass. If batch mixer is used, accurate timing and measuring devices shall be observed as per manufacturer's recommendation.

Aggregates shall conform to the applicable requirements of Subsection 900.2.2, Concrete Aggregates of Item 900, Reinforced Concrete. Water shall conform to the applicable requirements of Subsection 900.2.3, Water of Item 900, Reinforced Concrete. Reinforcing steel shall conform to the applicable requirements of Item 902, Reinforcing Steel.

7.2.1 Footing

The footing construction involves excavating the area to the specified depth and width, ensuring a level and compacted base. Formwork is then constructed using suitable materials to achieve the required dimensions of 0.80m x 0.80m, ensuring it is plumb, level, and braced for stability. Eight pieces of 20mm diameter footing reinforcement bars are placed within the formwork, properly tied together at all intersections, maintaining the specified spacing and cover. Concrete is then poured into the formwork, ensuring proper compaction and vibration to eliminate air pockets, maintaining a consistent mix and ensuring proper curing conditions. After the concrete reaches sufficient strength, the formwork is removed and the finished footing is inspected for any defects or inconsistencies, ensuring it meets the specified requirements.

The subgrade shall be properly compacted and leveled to provide a stable foundation. All materials used in the footing construction, including concrete and rebar, shall meet the specified requirements outlined in the project specifications. Proper material handling and storage are essential; rebar shall be stored in a dry, protected area to prevent rusting and corrosion, while concrete shall be protected from direct sunlight and wind during curing to ensure proper hydration and strength development.

7.2.2 Wall Footing

The construction of the wall footing involves excavating four separate areas to the specified depth and width (0.30m x 1.48m), ensuring a level and compacted base for each footing. Formwork is then constructed using appropriate materials to achieve the required dimensions, ensuring it is plumb, level, and adequately braced to support the weight of the concrete. Three pieces of 12mm diameter reinforcement bars are then placed within each formwork, securely tied together at all intersections

with 10mm stirrups spaced every 300mm, maintaining the specified spacing and cover. Concrete is poured into the formwork, ensuring proper compaction and vibration to eliminate air pockets, maintaining a consistent mix and ensuring proper curing conditions.

The subgrade shall be properly compacted and leveled to provide a stable foundation. All materials used in the footing construction, including concrete and rebar, shall meet the specified requirements outlined in the project specifications. Proper material handling and storage are essential; rebar shall be stored in a dry, protected area to prevent rusting and corrosion, while concrete shall be protected from direct sunlight and wind during curing to ensure proper hydration and strength development.

7.2.3 Column

Four columns, each with a square cross-section of 0.30m x 0.30m, shall be constructed as per the following specifications. Each column will be supported on a properly prepared foundation, as detailed in the foundation drawings. Reinforcement for each column will consist of four pieces of 16mm diameter vertical reinforcement bars, spaced evenly around the perimeter. These bars will be tied together using 10mm diameter ties, with three ties spaced at 50mm intervals at the bottom of the column, followed by five ties spaced at 100mm intervals, and the remaining ties spaced at 150mm intervals along the remaining height of the column. Column ties shall be protected everywhere by a covering of concrete cast monolithically with the core with a minimum thickness of 40mm and not less than 40 times the maximum size of coarse aggregate in millimeters. The total height of each column will be 0.95m.

The concrete used for the columns shall be a minimum of the specified grade concrete meeting the specified requirements for compressive strength and workability. Construction will involve building formwork using suitable materials to achieve the required dimensions, ensuring it is plumb, level, and adequately braced for stability. The reinforcement bars will be carefully placed within the formwork, ensuring they are securely tied together at all intersections and maintain the specified spacing and cover.Where columns change in size, vertical reinforcement shall be offset at a slope monolithically with the core with minimum thickness of 40mm and not less than 40 times the maximum size coarse aggregate in millimeters. Unless otherwise indicated in the plans, lap splices for vertical column reinforcement shall be made within the center half of column height, and the splice length shall be less than 40 bar diameters. Welding or approved mechanical devices may be used provided that not more than alternate bars are welded or mechanically spliced at any level and the vertical distances between these welds or splices of adjacent bars is not less than 600mm.

Concrete will be poured into the formwork in a continuous and controlled manner, ensuring proper compaction and vibration to eliminate air pockets. Proper curing will be essential to achieve full strength; this typically involves covering the concrete with damp burlap or plastic sheeting to prevent rapid drying and cracking. It is imperative to store rebar in a dry, protected area to prevent rusting and corrosion, and to shield concrete from direct sunlight and wind during curing to ensure proper

hydration and strength development. Concrete shall not be poured during extreme weather conditions, such as freezing temperatures, heavy rain, or high winds. All construction work shall comply with applicable building codes and regulations.

7.2.4 Water Tank

Water Tank - The materials used for 5000L water storage structures shall provide stability and durability, as well as protect the stored water. Steel structures shall follow the current American Water Works Association standards concerning steel tanks, standpipes, reservoirs, and elevated tanks wherever they are applicable. Other materials of construction may be acceptable when properly designed to meet the requirements of this specification. The tank shall be provided with drain pipes, distribution pipe outlet, overflow pipes and air vent.

7.2.5 Framework

The framework for the overhead water tank shall be installed meticulously, adhering to the approved plan. The 5mm thick steel plate connector, serving as the base for the steel column, will be fully welded to the base plate, ensuring a secure and robust connection. Four 12mm threaded bars, secured with washers and lock nuts, will further anchor the column base plate to the foundation. A stiffener plate, fully welded to both the steel column and base plate, will enhance strength, distribute load evenly, and prevent fatigue in the joint. A 4" diameter SCH GI pipe, acting as a foot for the frame system, will be securely attached to the base plate, providing a stable base for the entire structure. All materials shall be of the specified type and grade, and their installation shall be performed with exemplary craftsmanship, ensuring proper alignment, secure fastening, and adherence to the project specifications.

7.2.6 CHB

The 4" thick concrete hollow block (CHB) for the Overhead Watertank will incorporate a reinforcement system to enhance its structural integrity. This will include10mm diameter rebars, both horizontally and vertically, spaced at 600mm intervals.

7.2.7 Concrete Hollow Blocks

7.2.7.1 Mixing

Concrete shall be mixed well using the proportion specified by the Engineer. Hand mixing shall be done, using shovels, on a level concrete slab or steel plate. Mix aggregate and cement until the color is uniform. Spread the mixture out and sprinkle water over the surface. Continue with this process until the right amount of water has been mixed in. Mixture shall be free from impurities such as dirt and grass. If batch mixer is used, accurate timing and measuring devices shall be observed as per manufacturer's recommendation.

7.2.7.2 Installation

1. All masonry work shall be laid true to line, level, plumb and neat in accordance with the Plans.

2. Units shall be cut accurately to fit all plumbing ducts, opening for electrical works, and all holes shall be neatly patched.

3. No construction support shall be attached to the wall except where specifically permitted by the Engineer.

4. Masonry unit shall be sound, dry, clean and free from cracks when placed in the structure.

5. Proper masonry units shall be used to provide for all window, doors, bond beams, lintels, plasters etc., with a minimum of unit cutting.

6. Where masonry units cutting is necessary, all cuts shall be neat and true to line.

7. Units shall be placed while the mortar is soft and plastic. Any unit disturbed to the extent that the initial bond is broken after initial positioning shall be removed and re-laid in fresh mortar.

8. Mortar should not be spread too far ahead of units, as it will stiffen and loose plasticity, especially in hot weather. Mortar that has stiffened should not be used. ASTM C270, Standard Specification for Mortar for Unit Masonry requires that mortar be used within 21/2 hours of initial mixing.

7.2.8 Reinforcement for Concrete Hollow Blocks (Grade 40)

This item shall consist of furnishing, bending, fabricating and placing of steel Reinforcement of the type, size, shape and grade required in accordance with this specification and in conformity with the requirements shown on the plans or as directed by the Engineer. Reinforcement shall be done in accordance with the structural Plans as to size, spacing and other requirements of Section 902.3 of Item 902, Reinforcing Steel. Reinforcement shall be clean and free from loose, rust, scales and any coatings that will reduce bond.

7.2.8.1 Placing and Fastening

All steel reinforcement shall be accurately placed in the position shown on the plans or required by the Engineer and firmly held there during the placing and setting of the concrete. Bars shall be tied at all intersections except where spacing is less than 300mm in each direction, in which case, alternate intersections shall be tied. Ties shall be fastened on the inside.

Concrete placed in violation of this provision may be distance from the forms shall be maintained by means of stays, blocks, ties, hangers, or other approved supports, so that it does not vary from the position indicated on the plans by more than 6mm. blocks for holding reinforcement from contract with the forms shall be precast mortar blocks of approved shapes and dimensions. Layers of bars shall be separated by precast mortar blocks or other equally

suitable devices. The use of pebbles, pieces of broken stone or brick, metal pipe and wooden blocks shall not be permitted. Unless otherwise shown on the plans or required by the Engineer, the minimum distance between bars shall be 40mm. Reinforcement in any member shall be placed and then inspected and approved by the Engineer before the placing of concrete begins.

7.2.9 Finish and Appearance

1. All units shall be sound and free of cracks or other defects that interfere with the proper placement of the unit or significantly impair the strength or permanence of the construction. Minor cracks, incidental to the usual method of manufacture or minor chipping resulting from customary methods of handling in shipment and delivery, are not grounds for rejection.

2. Where units are to be used in exposed wall construction, the face or faces that are to be exposed shall not show chips or cracks, not otherwise permitted, or other imperfections when viewed from a distance of not less than 6.1 m under diffused lighting.

a. Five (5) percent of a shipment containing chips, not larger than 25.4 mm in any dimension, or cracks not wider than 0.5 mm and not longer than 25 percent of the nominal height of the unit, is permitted.

3. A shipment shall not contain more than five (5) percent of units, including broken unit that do not meet the requirements of the above provisions

7.2.10 Portland Cement

It shall conform to the applicable requirements of Item 700, Hydraulic Cement. Portland Cement Type I meeting the requirements of AASHTO M 85 (ASTM C 150 M) - Standard Specification for Portland Cement, shall be used unless otherwise provided for in the Special Provisions.

Portland-Pozzolan Cement Type IP meeting the requirements of AASHTO M 240M Standard Specification for Blended Hydraulic Cement/ASTM C 595-Standard Test Method for Drying Shrinkage of Mortar Containing Hydraulic Cement, shall be allowed for use.

For both Portland Cement Type I and Portland-Pozzolan Cement Type IP, trial mixes shall be done and shall meet the specification requirements for concrete. The AASHTO/ASTM provisions pertinent to the use of Portland-Pozzolan Cement Type IP shall be adopted. Different brands or the same brands from different mills shall not be mixed nor shall they be use alternately unless the mix is approved by the Engineer.

Cement which for any reasons, has become partially set or which contains lumps of caked cement shall be rejected. Cement salvaged from discarded or used bags shall not be used. Samples of cement shall be obtained in accordance with AASHTO R 71 (ASTM C 183M) - Standard Practice for Sampling and Amount of Testing of Hydraulic Cement.

The amended Specification shall form part of the DPWH Standard Specifications for Highways, Bridges and Airports.

### 7.3 Storage of Materials

The blocks shall be stored in such a way as to avoid contact with moisture at site. They shall be stock-piled on planks or other supports free from contact with ground and covered to protect against wetting. The block shall be handled with care and damaged units shall be rejected. All materials shall be delivered by the manufacturer as undamaged. Materials shall be stored protected from exposure to rain, or other harmful weather conditions.

Structural material, either plain or fabricated, shall be stored above the ground upon platforms, skids or other supports. It shall be kept free from dirt, grease or other foreign matter, and shall be protected as far as practicable from corrosion.

### 7.4 Method of Measurement

Overhead Watertank shall be paid by lot.

### 7.5 Basis of Payment

Method of Measurement shall be paid for at the Contract Unit Price or for the item listed below. The payment shall include labor, equipment, tools and incidentals to complete the work prescribed in this item.

Payments shall be made under:

| Pay Item Number | Description | Unit of Measurement |
|---|---|---|
| 7 | Overhead Watertank | lot |

## PART 8. SEWAGE TREATMENT FACILITY

### 8.1 Description

This item shall consist of the construction, installation, and completion of a Sewage Treatment Facility in accordance with this Specification and as shown on the Plans. The work includes all necessary civil, mechanical, and electrical works, as well as furnishing all labor, materials, tools, equipment, and incidentals required to complete the facility in a safe and functional condition.

The specifications, design criteria, performance requirements, and layout of the Sewage Treatment Facility shall be as indicated in the Plans and other Contract Documents. All works shall conform to the requirements set forth by relevant environmental and sanitation regulations.

### 8.2 Method of Measurement

Sewage Treatment Facility shall be paid by lot.

### 8.3 Basis of Payment

Method of Measurement shall be paid for at the Contract Unit Price or for the item listed below. The payment shall include labor, equipment, tools and incidentals to complete the work prescribed in this item.

Payments shall be made under:

| Pay Item Number | Description | Unit of Measurement |
|---|---|---|
| 8 | Sewage Treatment Facility | lot |

## PART 9. SITE CLEARING

### 9.1 Description

This item shall consist of clearing, removing and disposing all unnecessary materials and debris as designated in the Contract, except those objects that are designated to remain in place or are to be removed in consonance with other provisions of this Specification. The work shall also include the preservation from injury or defacement of all objects designated to remain.

The Engineer will establish the limits of work and designate all things to remain. If perishable material is burned, it shall be burned under the constant care of component watchmen at such times and in such a manner that the project site, other adjacent property, or anything designated to remain on the right way will not be jeopardized. If permitted, burning shall be done in accordance with applicable laws, ordinances, and regulation.

In the event that the Contractor is directed by the Engineer not to start burning operations or to suspend such operations because of hazardous weather conditions, material to be burned which interferes with subsequent construction operations shall be moved by the Contractor to temporary locations clear of construction operations and later, if directed by the Engineer, shall be placed on a designated spot and burned.

Materials and debris which cannot be burned and perishable materials may be disposed off by method and at locations approved by the Engineer, on or off the project.

### 9.2 Method of Measurement

Site Clearing shall be paid by lot.

### 9.3 Basis of Payment

Method of Measurement shall be paid for at the Contract Unit Price or for the item listed below. The payment shall include labor, equipment, tools and incidentals to complete the work prescribed in this item.

Payments shall be made under:

| Pay Item Number | Description | Unit of Measurement |
|---|---|---|
| 9 | Site Clearing | lot |