

**DEPARTMENT OF SCIENCE & TECHNOLOGY  
PHILIPPINE SCIENCE HIGH SCHOOL-SOCCSKSARGEN REGION CAMPUS  
BRGY. PARAISO, KORONADAL CITY**

# **MATERIAL RECOVERY FACILITY**

**TECHNICAL SPECIFICATIONS**

## **TECHNICAL SPECIFICATIONS**

### **1.0 SCOPE OF WORKS/GENERAL REQUIREMENTS**

#### **1.01 GENERAL**

The WORK shall consist of the furnishing, installation of materials, provision of labor, tools and equipment, transport vehicles, supervision, security of resources and all incidentals necessary for the satisfactory completion of the MATERIAL RECOVERY FACILITY of the Philippine Science High School – SRC area.

Materials and workmanship deemed necessary to complete the works but NOT specifically mentioned in the Specifications, Working Drawings, or in the other Contract Documents, shall be supplied by the contractor without extra cost to the Owner. Such materials shall be of the highest quality available, and implemented in a workmanlike manner at prescribed locations.

#### **1.02 CONTRACTOR'S USE OF THE PREMISES**

- A. The contractor shall confine his equipments, storage of materials and the operation of his workmen to limits indicated by law, ordinance, and permits, and shall leave all walks, driveways, roads and entrances unencumbered.
- B. The contractor shall keep the premises and the building free from accumulations of waste or rubbish caused by his employees, equipment's and all rubbish from under and about the PROJECT, all his tools, formworks, and other surplus materials; and he shall leave the premises clean . The Contractor shall furnish or provide necessary surfacing materials to avoid loss of time due to muddy conditions.
- C. The contractor's personnel are strictly not allowed for the following:  
Smoking, except at designated smoking area; Gambling of any kind throughout the work area; Bringing or taking drugs of abuse, alcoholic drinks; Fire arms, weapons of any kind; Fighting at the construction site; Visitors and relatives of the contractor's personnel except at designated Receiving areas for all visitors; parking of vehicles, motor, bikes at any Place except at designated parking area.

#### **1.02 TEMPORARY STRUCTURES AND FACILITIES**

- A. Temporary Office and Contractor's Building

The Contractor shall at all times provide and maintain adequate weather tight temporary offices with water, light, and toilet facilities for the use of the architect, resident engineers, inspectors, contractor's personnel.

B. The temporary buildings for housing men, or the erection of tents or other forms of protection will be permitted only at such places as the Owner or Resident Engineer shall designate; and the sanitary conditions of the grounds in or about such structures shall at all times be maintained in a manner satisfactory to the owner and the Resident Engineer.

C. Temporary Sanitary Facilities and First Aid Station

The Contractor shall provide, construct and maintain for the duration of the contract, ample sanitary toilet accommodation and other necessary convenience including water connections for the use of personnel and laborers, properly secluded from public observation, in such manner and at such points as shall be approved by the Resident Engineer; provide proper drainage for used water; use shall be strictly enforced. The Contractor shall keep all places clean and free from flies; removing all connections and appliances connected therewith prior to the completion of the contract, and leave the premises perfectly clean.

D. Temporary Barricades and Guard Lights

The Contractor shall furnish and put up all temporary barricades and guard lights necessary for the protection, proper execution and completion of work.

E. Temporary Water and Power Facilities

The Contractor shall make all necessary arrangement with the local utility companies in order that the temporary facilities for water and power are sufficiently provided until the completion of work. All expenses incurred in connection therewith shall be paid for by the contractor.

### **1.03 COORDINATION**

A. Project Coordination

The Contractor shall supervise and coordinate the works in order to achieve an efficient and satisfactory implementation of the scheduling, delivery and storage of materials, equipment and proper installations in conformity with the Drawings, Specifications, Contract documents and instructions.

All works shall be properly coordinated with the owner, Architect and Construction Manager.

The Contractor shall request project coordination protocols and submit RFI (Request for information) in case of verification or clarification.

## **1.04 PROJECT MEETINGS**

### **A. Pre-construction Conferences**

A pre-construction meeting between the Procuring entity or other representatives designated by the Owner and the Contractor shall be held at the site prior to the commencement of the work. This meeting shall be for the purpose of resolving current problems. Further orienting the contractor to the requirements of the Drawing and Specifications, informing the Contractor.

### **B. Progress Meeting**

The contractor shall meet weekly or as required with the procuring entity or the owner's representative to verify the progress of the work.

## **1.05 SUBMITTALS**

### **A. Construction Schedules**

- a. The contractor shall inform the procuring entity or the owner's representative for the start of work.
- b. The contractor shall file an inspection request for every activity done which needs approval prior to another phase of activity.

### **B. Network Analysis Schedule**

The contractor shall prepare a PERT-CPM/SCURVE/Construction schedule to indicate the following:

- a. All activities necessary to complete the project.
- b. Monthly value of each activity.
- c. Shop Drawing, Product Data, and Samples
- d. The contractor shall review, stamp with his approval, and submit shop drawings and material submittals for approval of the Resident Engineer for conformance of the design concept and information given in the contract documents. Approvals have to be given before any installation.
- e. Where samples are specifically required to be submitted for approval, no work involving the samples/materials shall proceed until written approval has been obtained from the procuring entity.

## **2.0 SITEWORK**

### **A. Examination of Site**

Preliminary survey of the site is required to examine the existing conditions; establishing site elevations relative to the implementation of the works. No increase in

cost or extension of performance time will be considered for failure to verify and know actual site conditions. The Contractor shall be responsible in setting reference lines or elevations (bench marks) prior and during implementation of the WORK. It is the responsibility of the Contractor for these reference lines or bench marks to be maintained till the completion of the works.

## **B. Protection on Risk/Hazard**

Protect adjacent properties, persons, shrubs, trees, lawns, structures and utilities against harm or damage. The Contractor shall employ appropriately qualified personnel, skilled as required in their occupations. The Owner may require the Contractor to remove or dismiss person who persist in any misconduct, incompetent in his duties, fails to conform with any provision of the Contract, persist in conduct prejudicial to safety, health or protection of the environment. The Contractor is responsible for the security of his personnel, tools, equipments going to and fro at jobsite including keeping off unauthorized personnel from the jobsite . Tools, equipments including personal tools are subject for inspection at the security gate. Sign boards and notices for safety instructions are required at the working site.

## **C. Normal Working Hours/Delays**

Normal working hours will be from 7:00am to 5:00pm Monday thru Sunday. Saturday and Sunday works must be notified to the owner or Resident Engineer for proper supervision. Contractor must assure that workers complete their work in a safe manner till designated time unless with an approved overtime from the Campus Director/In-Charge for an extension of working hours .

## **D. Contractor's Equipments**

The Contractor shall provide all equipments necessary for the completion of the WORKS. Dumptrucks for hauling of construction materials; Standby Generator to facilitate continuous working during brown outs ; Welding machine for welding jobs, One bagger mixer for concrete works; bar cutter and other necessary hand tools All of the Contractor's equipments when brought to the site shall deemed be intended for the execution of the works. Pulling out of the equipments necessary for the activities must have approval/consent from the owner.

## **E. Earthworks:**

### **1. Clearing/Grading**

Prior to backfilling , clear and grade the area along line of roadway at required elevations as shown on the plans. Sub surface conditions encountered which were unforeseen shall be reported to the Owner or representative for inspection and possible resolutions.

### **2. Materials**

Fill or borrow materials. Granular non-plastic material, laboratory-approved, inert materials from off-site or approved quarry source (Item 200/201)

### **3. Backfilling**

- a. Prior to backfilling , remove all trash and debris present on site and deliver only material from approved source.
- b. Backfilling works shall be graded and compacted at every 20cm thick layers passing required compaction test.
- c. Backfilling works include 8m width of the roadway area. The Contractor shall give notice to the Owner/representative whenever previous work shall be ready to be covered up or putting out of view so the Owner/representative may then carry out the inspection, measurement or testing without unreasonable delay or can inform the Contractor if tests are unnecessary.

### **4. Soil Compaction**

Embankment materials to be used at roadway shall be Item 200 placed in 200mm (8") in loose layers. Final Layer will be Item 201. Each layer shall be moisture conditioned and compacted with 100% compaction thru a field density test conducted by an accredited testing unit, cost of test shall be borne by the contractor and test results furnished to the Owner.

## **3.00 CONCRETE**

### **A. Concrete Formworks**

- a. Provide forms that will produce correctly aligned concrete; choice or fitting shall be done correctly and support of forms shall be done rigid ; extra care must be exercised during removal of forms so settled concrete will not be deformed.

### **B. Concrete Steel Reinforcement:**

1. Steel Reinforcements shall be Intermediate Grade Steel G40 (Fy = 40,000 psi) deformed billet steel ASTM A615 as indicated on the plans.
2. Use Ga. 16 galvanized iron (G.I) annealed tie wires at joints or laps of placed reinforcements as indicated on the plans.
3. Provide concrete spacers to be able to attain sufficient concrete covers for steel reinforcements.
4. The Owner, his duly authorized representative shall have the right to order the test in an accredited testing unit of any steel supplied by the Contractor, incorporated into the concrete or reinforced concrete. Samples shall be provided by the contractor without cost to the owner and expenses for testing shall be borne by the contractor and copies of results shall be furnished to the procuring entity.

C. **Cast-in- Place Concrete**(To comply with the provisions of latest editions of ASTM, ACI,NSCP,NBCP)

**1. Cement:**

Cement shall be as per ASTM standard Specification for Portland Cement Type 1(40kgs/bag). Use one (1) brand for the whole duration of concreting works.

**2. Aggregates:**

- a. Gravel: Crushed rocks from reputable supplier or Well graded, Clean, hard particles of gravel, specific gravity of 2.6 . Use G1 for Gravel Bedding, 3/4"(19mm dia.) minimum to 1-1/2"(37mm dia.)maximum diameter for concrete pavement.
- b. Sand: Clean, washed, hard and durable grains of natural sand, specific gravity of 2.6, free from coagulate lumps with not more than 1% of clay and silt by volume.
- c. Water: Fit for drinking, free from injurious amount of oil, acids, alkali, organic materials and other deleterious substances.

**3. Concrete Mixtures:**

- a. Class A , 20.7 Mpa (3000 psi)design mixture **1:2:3** for concrete pavement
- b. The contractor shall submit mix designs , obtained from samples made in accordance with "Standard Method of taking and curing concrete compression and flexure specimens (ASTM designation C192)" and "Standard method of test compressive strength of molded concrete cylinders (ASTM designation C39)" for each strength required stating the proposed slump and the proportional weights of cements, saturated surface dry aggregates, and water. This mixes shall have been proved by preliminary test 30 days before concreting and shall have a 28day strength 15 percent higher than the ultimate required. No substitutions shall be made in the materials or mix without test to show that the quality of concrete is satisfactory.
- c. Job mix adjustment of water content shall be allowed only on permission of the Engineer and provided that cement is also added to keep the original water- cement ratio of the design mix.
- d. No hand mixing shall be allowed, except in case of emergency such as mixer breakdown during pouring operations and shall stop at the first allowed

construction joint. All concrete shall be machine mixed for at least 1-1/2 minutes after all materials including water are in the mixing drums.

- e. Re- tempering of concrete shall not be permitted.

#### **4. Concrete Admixtures (if any, as required)**

- a. Air- entraining admixtures- Contractor to submit material with feasible strength tests results before installation.
- b. Accelerators- Contractor to submit material with feasible strength tests results before installation.
- c. Water Reducing Retarder - Contractor to submit material with feasible strength tests results before installation.

#### **5. Curing concrete**

- a. Keep concrete continuously wet or moist for at least one week after placing.
- b. Curing shall begin as soon as concrete has attained initial set.

#### **6. Repair of Concrete**

Imperfections shall be repaired within 24 hours after removal of forms. Fins shall be neatly removed from exposed surfaces.

- a. Where large bulges and abrupt irregularities protrude, it shall be removed by bush hammering and grinding.
- b. All materials, procedures and operations used in the repair of concrete shall be as directed.
- c. The cost of all materials, labor and equipment used in the repair of all materials shall be borne by the contractor.

#### **D. Test on Concrete:**

Reasonable number of tests on concrete may be required by the owner during the progress of the work. Not less than three cylindrical samples 15cm diameter shall be made for each test of which at least two shall be reserved for the 28 day test. Concrete samples shall be secured and molded in accordance with "Method of sampling concrete (ASTM designation C172) and method of making and curing concrete compression and fixture test specimens in the field (ASTM Designation C31)." The contractor shall provide samples to be taken at the construction site. The contractor shall take care of transporting the samples to the approved testing laboratory without cost to the owner. In any case of failure to meet specified strengths, the contractor may, at his expense, obtain




concrete core sampling from the poured concrete and the compressive strength must bear conclusive evidence of its strength and integrity, provided the boring will not impair the safety of same as determined by the competent testing authority shall be taken as part of the structure and can satisfactorily replace required test to determine adequacy of effected parts. Failure to reach required strength for concrete pavement shall mean **demolish and replace of** the section covered by the said set of samples . These tests shall be in accordance with ACI 318.87 recommendations. Testing cost is to be borne by the contractor.

**E. As Built Drawings:**

As Built drawings shall be submitted for approval which these drawings represent the Work as constructed ; the actual locations of underground work, if any, ; the final elevations and locations of all improvements and document changes in original WORK and in accordance with the requirements . Changes in Elevations or Line of the roadway and other changed details must have been reflected . As Built drawings shall be in accordance with the “Manual of Standard Practice for Detailing Reinforced Concrete Structures” (ACI315).

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