

## **APPENDIX A – TECHNICAL SPECIFICATIONS**

### **PROVISION OF ACCESS CONTROL, PLOTS 1-3, GIE.**



**GUYANA SHORE BASE INC**

Plantation A, Houston District,  
Greater Georgetown, Guyana

## **1. Technical Specifications**

### **General**

#### **Defective Work**

The Company reserves the right to check the work executed by the Contractor at such times as he deems fit; there is, however, no duty on the part of the Company to make such checks and any failure by him to observe errors shall not relieve the Contractor of his responsibilities in these respects.

#### **Materials and Workmanship**

All materials and workmanship shall conform to the highest standard and quality and shall always be to the approval of the Company. Materials rejected by the Company shall be removed immediately from the site and replaced with that in accordance with these specifications. Workmanship rejected by the Company shall be taken down/demolished immediately, and the work re-done to the approval of the Company.

#### **Proprietary Products**

All proprietary products shall be used strictly in accordance with the manufacturer's instructions unless otherwise described or instructed in writing by the Company.

#### **Materials and Workmanship**

Description of materials and workmanship together with relevant preambles and pricing notes given elsewhere in these documents shall be read as applying equally to the Works described.

All work shall be executed with as little noise and disturbance as possible.

The Contractor shall coordinate and seek approval from the Company before switching off, shutting off, or disconnecting any live services at the facility and shall include for all incidental expenses and temporary reconnection of the services to the public facility during the construction period. HSE requirements shall be strictly complied with.

Works shall include for providing and erecting all necessary temporary casings and protection for works likely to be damaged during the alterations and all necessary tarpaulins, dust screens, temporary coverings, fans, temporary gutters, down pipes, chutes, etc. required for the protection of the general public, staff, etc., to the entire satisfaction of the Engineer and Local Authority.

Works shall include for the making good and reinstatement of damage or disturbance caused by their execution and the clearing away of all rubbish arising. The Contractor at his own cost reinstate to match the existing any part or parts of the existing building

which may suffer damage due to his building operations. The whole of the Works shall be done at such times during the progress of the Works as may be convenient and expedient and the Contractor must take responsibility for damage due to premature removal of brickwork, cladding, timber, etc.

### **Requirements of Specification and Standards**

The Contractor shall fulfill all requirements and obligations under all Clauses of the Specification. Neither the following clauses of this Specification nor the detailed description therein nor the quantities shall limit the obligation of the Contractor under the Conditions of Contract.

Where items are not included in the Bill of Quantities for any such requirements or obligations, the cost of such requirements or obligations shall be deemed to be spread over all the items of the Bills of Quantities.

All American, British or other Standards, including Codes of Practice, mentioned herein shall be deemed to form part of this Specification. All reference to such standards shall be to the latest edition or revision thereof unless otherwise stated. Where a specific standard is referred to in this Specification, another standard will be acceptable provided that it ensures an equal or higher quality of material and workmanship as compared with the standard referred to. If the Contractor intends to use such alternative standard, he shall notify the Company thereof, submitting with his notice 1 original copy, in English, of the proposed standard, and shall not order any material or perform any work unless and until he has obtained the Company's approval of such standard.

Brand names used in the Specification or in the Drawings are only intended to define a standard of quality and performance and the Contractor may use alternative products of at least equal quality and capacity. When alternatives are offered, the Contractor shall submit to the Company for approval a statement detailing the alternatives, and shall include full technical descriptions, drawings, and specifications, and shall provide such full information as is required to enable the Contractor to demonstrate to the Company that the alternative is equivalent to the item specified. Any further information that the Company may require shall be produced by the Contractor when called for.

### **Mobilization and Demobilization**

Mobilization shall consist of initiating the Contract and includes the following: transporting to site and setting up the Contractor's plant - required on and off the site - offices, storage areas, etc. providing access to the project site, obtaining necessary permits and licenses, and payments of fees, protecting existing utilities, lighting work areas, contractor's facilities, providing working drawings, sampling and testing materials, providing required insurance, bonds, etc., as may be additional to that specified in the Condition of the Contract.

Demobilization shall consist of all clearing up, dismantling operations, removal off site of all plant and equipment and reinstatement of existing areas.

Such materials as are required, that are not to be a part of the completed contract, shall be determined by the Contractor.

All work done in providing the facilities and services under this item shall be done in a safe and workmanlike manner.

## **Construction Facilities**

### **Hoisting**

Provide, operate and maintain hoists [cranes] required for moving workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof. Devices/equipment shall be certified.

Hoists [cranes] shall be operated by a qualified operator.

### **Site Storage/Loading**

Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.

Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

### **Construction Parking**

Parking will be permitted on site for equipment that will aid in the Work provided it does not disrupt the performance of base operations or work.

Parking will not be permitted for personal vehicles at the site.

### **Provide and maintain adequate access to Project Site**

If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.

Reinstate runways and taxi areas used by Contractor's equipment.

### **Security**

Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

### **Contractor's Facilities**

The contractor shall provide offices and supporting facilities as necessary. Provide a clearly marked and fully stocked first aid kit in a readily available location. All incidents shall be reported to QHSSE.

Subcontractors may provide their own offices as necessary.

### **Equipment, Tool and Materials Storage**

Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

### **Sanitary Facilities**

Provide sanitary facilities for the workforce in accordance with governing regulations and the Company's Policies.

Post notices and take such precautions as required by local health authorities. Keep the area and premises in sanitary condition.

### **Survey and Setting Out**

The Contractor shall establish reference base lines, reference benchmarks and monuments for the Work covered in this Contract based on the survey information provided by the Company. Using this reference control, the Contractor shall take the necessary topography, locate all earthwork and structures, and establish all grades necessary for the accomplishment of the Work. The Contractor shall carefully preserve all marks, reference points and stakes established, and in the case of negligent or careless removal, damage or destruction, such points, marks or stakes shall be replaced by the Contractor at its expense. The Contractor shall also be responsible for any mistakes caused by their loss or disturbance.

Any monuments not referenced by the Company that are disturbed by construction operations shall be reset by the Contractor in accordance with recognized engineering and surveying practice. Property corners, fences, or any other indications of property lines shall be referenced by the Contractor prior to construction and reset after completion of construction in accordance with recognized engineering and surveying practice.

All working control established by the Contractor may be checked by the Company. Prior to establishing the working control, the Contractor shall provide, at the Company's request, sufficient copies of an illustration of the working control relative to pertinent

construction. When the Contractor has established the working control, the Company shall be notified for a survey check 24 hours before any Work is started. The Company will check all forms prior to placing concrete. All checks by the Company will be independent. The responsibility for correctness and adequacy of control shall be borne by the Contractor.

The contractor shall set out sections of the work at such times as may be necessary to enable the Company to carry out temporary or permanent alterations to their services and approaches.

## **Project Schedule**

### **Construction Schedule**

The construction schedule (level 4) shall be kept up to date and the current updated schedule shall be submitted to the Company as specified in the condition of contract with each request for payment or as requested by the Company.

The construction schedule shall in general determine the order in which the work is to proceed. The Company, however, may order and authorize changes to this schedule whenever such changes are of definite advantage to the Company or necessary for the operations of the Company.

The Contractor shall furnish sufficient forces, construction equipment and plant as may be necessary to ensure the expedited completion of the work in accordance with the submitted schedule. If the Contractor in the opinion of the Company lags in any activity listed in the construction schedule, then the Contractor shall be obligated to implement additional resources as approved by the Company to compensate for lost time and achieve the completion of works in a timely manner.

Failure of the Contractor to comply with the requirements of the Company may be grounds for determination by the Company that the Contractor is not proceeding at such rates that will ensure completion within the specified time and may result in the termination of the right of the Contractor to continue the work.

## **Method of Construction**

When so specified or directed by the Company, the Contractor shall submit the proposed method of construction for specific portions of the work for review. This submittal shall include detailed description of all phases of the construction operation to fully explain to the Company the proposed method of construction. If required by the Specifications, submit working drawings to supplement description. Review and approval by the Company will be in accordance with the approval process herein and shall not relieve the Contractor from his responsibility regarding fulfillment of the terms of the Contract. All

risks associated with the proposed method remain the Contractor's responsibility and the Company shall have no responsibility, therefore. After reviewing, if in the opinion of the Contractor, modifications are necessary, submit such modifications in detail including reasons for the modifications. Modifications shall not be implemented without review by the Company.

## **Records**

The Contractor is required for the following:

- The Contractor shall keep one record, a copy of all Contract Documents, reference documents, and all Required Submittals at the Work Site in good order and annotated to show all revisions made during the construction process. Such annotations shall be kept current and will be inspected monthly by the Company. Failure to maintain current record drawings will cause delay for interim payments. Record drawings shall always be available to the Company during the performance of the Contract and the Contract Time.
- All of the following documents and Contractor's Required Submittals shall be made a part of the record drawings.
- Contract Drawings. Contractor shall annotate or redraft, as required, to show all revisions, substitutions, variations, omissions and discrepancies made or discovered during construction concerning location and depth of utilities, piping, duct banks, conduits, manholes, pumps, valves, vaults and other equipment. Revisions shall be made and shown on, all drawing views with actual dimensions established to permanent points.
- Contractor's Drawings. Same as above. Include, for example, actual layouts of piping and valves with references to landmarks. Sections and details shall be added as required, for clarity. Drawings shall be revised to show actual installations. Prior to preliminary inspection, furnish a reproducible of the record drawings. At the completion of the Contract and before Final Payment is made, furnish to the Owner and Company with one hard copy and one soft copy (editable and non-editable formats) of the final approved record drawings reflecting all revisions herein described. If drawings are available in digital format, also include one complete set on memory stick in AutoCAD format.
- The Contractor shall keep a complete up-to-date record of the actual construction of all Work called for under the Contract Drawings and Specifications of this Contract and as ordered by the Company. The Company will make available to the Contractor one set of full-size prints of the original Contract Drawings and one set of digital files, when available, on which the Contractor shall make the necessary edits to indicate the major changes.

## **Operation and Maintenance Manuals**

The Contractor shall furnish the Operation and Maintenance catalog information and Operation and Maintenance Manuals for all equipment and devices where applicable. Unless otherwise indicated, a separate manual shall be furnished for each piece of equipment and/or system. The manual shall include complete information necessary to operate, maintain and repair the equipment. Specifically, the manual shall include detailed assembly drawings with parts list and numbers, and recommended spare parts list with recommended quantity, manufacturer's price, supplier's address and telephone number.

## **Traffic Safety and Control**

The Contractor shall provide, erect and maintain such traffic signs, lamps, barriers and traffic control and such other measures as may become necessary because of the construction of the Works. Compliance with this Clause shall not relieve the Contractor of any of his obligations and liabilities under the relevant sections of this Contract.

The Contractor after consultation with statutory and other authorities concerned shall submit to the Owner and Company for approval a Program based on such consultation that shows the scheme of traffic control he proposes for carrying out the construction of the Works and before commencing any work that affects the use of public or private roadways and thereafter he shall furnish any additional details and information as may become necessary as the construction of the Works progress or as may be required by the Company.

The Contractor shall not commence any work that will affect the Company's operations until all the necessary traffic safety measures required are fully operational and has the Company's approval. The Contractor shall keep clean and legible at all times all traffic signs, lamps, barriers, and traffic control signals and he shall position, reposition, cover or remove them as may be required by the progress of the Works.

## **Submittal Procedures**

### **Administrative**

Submit to the Company submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

Work affected by submittal shall not proceed until review is complete.



Review submittals prior to submission to the Company. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.

Notify the Company, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

Verify field measurements and affected adjacent Work are coordinated.

The contractor's responsibility for errors and omissions in submission is not relieved by the Company's review of submittals.

Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Owner/Owner's Representative review, unless provided written acceptance of specific deviations.

Keep one reviewed copy of each submission on site.

### **Designs and Design Drawings**

This should include manufacturer and supplier details, model numbers and specifications.

### **Shop Drawings and Product Data**

The term shop drawings means "drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work."

Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

Allow 3 working days for the review of each submission.

Adjustments made on shop drawings by the Company are not intended to change Contract Price. If adjustments affect the value of Work, state such in writing to Owner/Owner's Representative prior to proceeding with Work.

Make changes in shop drawings as required, consistent with Contract Documents. When resubmitting, notify Owner/Owner's Representative in writing of any revisions other than those requested.

Accompany submissions with transmittal letter containing:

- Date
- Project title and number
- Contractor's name and address
- Identification and quantity of each shop drawings, product data and sample
- Other pertinent data

Submissions shall include:

- Date and revision dates
- Project title and number
- Name and address of:
- Subcontractor
- Supplier
- Manufacturer
- Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.

Details of appropriate portions of Work as applicable:

- Fabrication
- Layout, showing dimensions, including identified field dimensions, and clearances
- Setting or erection details
- Capacities
- Performance characteristics
- Standards
- Operating weight
- Wiring diagrams
- Single line and schematic diagrams
- Relationship to adjacent work
- After the Company's review distribute copies to trades as necessary.

Submit one electronic copy in editable and non-editable formats of shop drawings for each requirement requested in the relevant specification sections and as the Company may reasonably request. Submit an electronic copy in PDF format of product data sheets or brochures for requirements requested in specification Sections and as requested by

the Company where shop drawings will not be prepared due to standardized manufacture of product.

If upon review by the Company, no errors or omissions are discovered or if only minor corrections are made, electronic copies will be returned, and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

### **Samples**

Submit for review samples as requested in respective specification Sections. Label samples with origin and intended use.

Deliver samples prepaid to the Company at the business address.

Notify the Company in writing, at time of submission of deviations in samples from requirements of Contract Documents.

Where color, pattern or texture is criterion, submit full range of samples.

Adjustments made on samples by the Company are not intended to change Contract Price.

Make changes in samples which the Company may require, consistent with Contract Documents.

Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

## **Concrete Work**

### **General**

Concrete shall be made with cement, fine aggregate, coarse aggregate and water. No other agent shall be incorporated in the mix without the prior approval of the Company. The Contractor shall ensure that the use of any such approved additive will not adversely affect the strength, durability or appearance of the finished concrete Works.

### **Definitions**

The following terms whenever used in this Specification shall be taken to have the meaning assigned to them below;

- "Plain Concrete" shall mean concrete used in members made with a structural grade of concrete, listed, but not containing steel reinforcement.
- "Structural props" shall mean those components of the strutting formwork, which will be retained from concrete faces.
- "Satisfactory" shall mean to the satisfaction of the Company or his representative.
- "Approved" shall mean to the satisfaction of the Company or his representative.
- "Required" shall mean require by the terms of this Specification or any other Contract documents.
- "Passed by the Company or his representative" shall mean accepted as complying with the Specification's requirements as far as can be judged from visual inspection.
- "Current issue" shall mean latest issue at the date of tender invitation.
- "Failure to comply with this Specification" shall mean failure to comply satisfactorily with all the requirements of this Specification.

### **Responsibility**

No approval or acceptance by the Company or his representative shall in any way relieve the Contractor of his responsibility for the quality of materials and the standard of workmanship in the finished Works, and for the strength, durability and appearance of the finished concrete Works.

### **Plain Concrete**

Plain concrete shall comply with all the relevant requirements for the reinforced concrete.

### **Material**

#### **General**

All materials in the Works shall comply in all respects with the best standard available locally, based on the relevant ASTM except for any deviations specifically authorized in subsequent clauses of this Specification.

The constituent materials of concrete shall be cement, aggregates and water. No admixtures to this concrete shall be permitted without the prior approval of the Company.

### **Cement**

Cement shall be Portland Cement complying with ASTM C150. All cement shall be delivered to site in sealed bags.

No re-bagged cement will be permitted during the course of the construction, and every endeavor shall be made to ensure that the color of the cement is constant throughout the contract except with permission of the Company.

### **Aggregates**

Aggregates shall comply with the recommendations of the relevant ASTM C33. In special circumstances, a deviation from the code in respect of grading of aggregate may be accepted, subject to the prior approval of the Company.

The nominal maximum sizes of coarse aggregates shall be 20mm, except where otherwise directed by the Company.

### **Water**

Water to be used in the Works shall be clean and free from all harmful matter, in suspension or solution that would have adverse effects on setting, hardening and strength of Portland Cement. A continuous supply of water shall be available during all mixing, placing and curing operations.

### **Storage**

All cements shall be stored in weather proof shed of adequate size having a raised dry floor.

Aggregates shall be stored on hard paved areas with adequate dividing walls, or in approved containers to prevent mixing of different types of aggregates and be kept clean and free from contamination.

Cement and aggregates shall be used in the order in which they are received on the site and their storage shall be arranged to facilitate this procedure.

Reinforcement shall be stored in racks clear of the ground. Where materials are to be stored on suspended floors or roofs, the Contractor shall ensure that such storage will not overload or distort the structural frame.

All materials which have been damaged and contaminated, or do not comply with the requirements of this Specifications shall be rejected and shall be removed from the site immediately at the Contractor's expense.

### **Tolerances**

Formwork: ACI 117, except the elevation tolerance of formed surfaces before removal of shores is +0 mm (+0 inch) and -20 mm (-3/4 inch) or as outlined in specifications.

Reinforcement Fabricating and Placing: As outlined in drawings and Specifications.

Cross-Sectional Dimension: As outlined in drawings and Specifications.

Slab Finishes: As outlined in drawings and Specifications

Test entire slab surface, including those areas within 600 mm (2 feet) of construction joints and vertical elements that project through slab surface.

Maximum elevation changes which may occur within 600 mm (2 feet) of any column or wall element is 3 mm (0.125 inches)

Allow sample measurement lines that are perpendicular to construction joints to extend past joint into previous placement no further than 1500 mm (5feet)

### **Concreting**

#### **Mixing**

Concrete shall be mixed in approved mechanical batch type concrete mixer. Mixing shall be continued until there is a uniform distribution of the materials in the mixer and the mass is uniform in color. The mixing time for each batch shall not be less than the minimum period recommended by the mixer manufacturer.

The volume of mixed materials in each batch shall not exceed the rated capacity of the mixer. Each batch of concrete shall be completely discharged before the mixer drum is re-charged. The mixer drum shall be thoroughly washed out with clean water when mixing ceases, including short stoppages for meals or on any change of type of cement used in the mix

#### **Transporting**

Concrete shall be transported as rapidly as possible from the mixer to its final position without segregation or loss of any of the ingredients.

All plant and equipment used for transporting concrete shall be kept clean; all containers used for transporting concrete shall be thoroughly washed out whenever mixing ceases.

Runs and gangways for concrete transporters and main runs for foot traffic shall not be supported or allowed to bear on the fixed reinforcement.

### **Placing**

Concrete shall not be placed without a pre-pour inspection being conducted by the Company a minimum of 24 hours prior to the placement of concrete. Any deviations shall be corrected and a subsequent inspection conducted and signed approved by the Company.

Concrete shall be placed while still sufficiently plastic for adequate compaction.

At all times when reinforced concrete is being placed, a competent steel fixer shall be in continuous attendance on the concrete; he shall adjust and correct the position of any reinforcement which may be displaced.

The Contractor shall keep on site a complete record of the Works showing the time and date when concrete is placed in each part of the Works. This record shall be available at all times for inspection by the Company.

### **Compacting**

Concrete shall be thoroughly compacted by mechanical means; vibrating, during the placing and shall be carefully worked around all reinforcement and embedded fixtures and into the sides and corners of the formwork, using a heavy-duty, and high frequency vibrator.

## **Standard of Workmanship**

### **General**

After removal of the formwork, no treatment of any kind other than that required for curing the concrete shall be applied to the concrete faces until the Company or his representative has inspected them

### **Plastered concrete faces**

All concrete faces, which are to be plastered or rendered in the finished Works, are to be thoroughly hacked with a suitable tool to provide an adequate surface key.

The use of adhesives or other preparations on any concrete faces shall be subject to the prior approval of the Company.

## **Working Tolerances**

Unless otherwise indicated on the drawings, the setting out dimensions and levels of the finished Works shall be within the maximum tolerances shown below.

At any construction joint, in a continuous concrete face, any discrepancy in the face across the joint shall not exceed 3mm.

Columns and walls shall not be more than 6mm out of plumb in any one-story height, and not more than 20mm out of plumb in the total height.

Table 1 - Maximum Tolerances

<b>DESCRIPTION</b>	<b>MAXIMUM TOLERANCE</b>
All dimensions of 3.1m and over	6mm
All dimensions less than 3.1m.	3mm
Slab top surfaces levels (all points in the surfaces)	6mm

## **Defective Work**

Where, in the opinion of the Company, any of the finished Works, or the materials or workmanship in any part of the Works, does not comply with all the relevant requirements of this Specification, that part of the Works shall be classed as defective work.

All work classed, as defective work shall be cut out and removed from the Works and replaced to the satisfaction of the Company.

The extent of the work to be removed and the methods to be used in the removal and replacement of this work shall be in accordance with the Company directions. In all cases, cutting out of defective concrete work shall be carried back to a satisfactory construction joint before the replacement of the defective work and any other work thereby affected is commenced.

All removal and replacement of defective work and all costs or charges arising from such removal or replacement shall be at the Contractor's expense.

## **Other Matter**

Where additional information is necessary, the recommendation in the relevant ASTM guidelines will be deemed to apply.



## **Chain Link Fence**

### **Part 1 – General**

Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.

Relevant Standards and Codes:

#### **ASTM International:**

- ASTM A121 Specification for Metallic-Coated Carbon Steel Barbed Wire
- ASTM A392 Specification for Zinc-Coated Steel Chain-Link Fence Fabric
- ASTM A491 Specification for Aluminum-Coated Steel Chain-Link Fabric
- ASTM A780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings
- ASTM A817 Specification for Metallic-Coated Steel Wire for Chain Link Fence
- Fabric and Marcellled Tension Wire
- F. ASTM A824 Specification for Metallic-Coated Steel Marcellled Tension Wire for Use with Chain Link.
- ASTM F552 Standard Terminology Relating to Chain Link Fencing
- ASTM F567 Standard Practice for Installation of Chain Link Fence
- ASTM F626 Specification for Fence Fittings
- ASTM F1043 Specification for Strength and Protective Coatings of Steel Industrial Chain Link Fence Framework
- ASTM F1083 Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
- ASTM F1345 Specification for Zinc-5% Aluminum-Mischmetal Alloy-Coated Steel Chain-Link Fence Fabric

#### **American Welding Society**

- AWS D1.1:2020 - Structural Welding Code
- AWS D1.8 -Structural Welding Code -Seismic Supplement

#### **American Institute of Steel Construction (AISC)**

- AISC -Steel Construction Manual

**Submittals**

Shop drawings for structural steel fabrications shall be submitted for review prior to fabrication. Examples include, but are not limited to:

- The Contractor shall survey, review and confirm as-built conditions prior to developing shop drawings. Field modifications to suit as-built conditions shall be at the Contractor's expense.
- Manufacturer's Certificate: Submit certification that manufactured products (including bolts, nuts and washers) meet or exceed specified requirements. Manufactured products are to be delivered in unopened containers. Certification numbers must appear on product containers for bolts, nuts and washers and the numbers shall correspond to the identification numbers on the Manufacturer's Certificate. The Manufacturer's symbol and grade markings must appear on bolts, nuts and washers. Submit manufacturer's certification that structural shapes contain specified percentage recycled material.
- Product data: Submit certification that manufactured products meet or exceed specified requirements. Weld filler material including filler metal Charpy V-Notch test values, electrodes, fluxes and shield gases.

**Quality Assurance**

- Welders shall be qualified for each process, position and joint configuration.
- The Contractor shall maintain one copy of each reference document on site.

## Part 2 - Products

### Materials:

- **Chain Link Fabric**

- Zinc-Coated Steel Fabric: ASTM A392 hot dipped galvanized before or after weaving.
  - Class 1 - 1.2 oz/ft<sup>2</sup> (366 g/m<sup>2</sup>)
  - Class 2 - 2.0 oz/ft<sup>2</sup> (610 g/m<sup>2</sup>)
- Aluminum-Coated Steel Fabric (Aluminized): ASTM A491 3.
- Zinc-5% Aluminum-Mischmetal Alloy Coated Steel Fabric: ASTM F1345:
  - Class 1 – 0.6 oz/ft<sup>2</sup> (183 g/m<sup>2</sup>)
  - Class 2 – 1.0 oz/ft<sup>2</sup> (305 g/m<sup>2</sup>)

- **Round Steel Pipe Fence Framework**

- Round steel pipe and rail: Schedule 40 standard weight pipe, in accordance with ASTM F1083, 1.8 oz/ ft<sup>2</sup> (550 g/m<sup>2</sup>) hot dip galvanized zinc exterior and 1.8 oz/ft<sup>2</sup> (550 g/m<sup>2</sup>) hot dip galvanized zinc interior coating.

- **Tension Wire**

- Metallic Coated Steel Marcellled Tension Wire: 7 gauge (0.177 in.) (4.50 mm) marcellled wire complying with ASTM A824
  - Type I Aluminum-Coated (Aluminized) 0.40 oz/ft<sup>2</sup> (122 g/m<sup>2</sup>)
  - Type II Zinc-Coated, ASTM A817 Class 4 - 1.2 oz/ft<sup>2</sup> (366 g/m<sup>2</sup>)
  - Type II Zinc-Coated, ASTM A817 Class 5 - 2.0 oz/ft<sup>2</sup> (610 g/m<sup>2</sup>)

- **Fittings**

- Tension and Brace Bands: Galvanized pressed steel complying with ASTM F626, minimum steel thickness of 12 gauge (0.105 in.) (2.67 mm), minimum width of 3/4 in. (19 mm) and minimum zinc coating of 1.20 oz/ft<sup>2</sup> (366 g/m<sup>2</sup>). Secure bands with 5/16 in. (7.94 mm) galvanized steel carriage bolts.
- Terminal Post Caps, Line Post Loop Tops, Rail and Brace Ends, Boulevard Clamps, Rail Sleeves: In compliance to ASTM F626, pressed steel galvanized after fabrication having a minimum zinc coating of 1.20 oz/ft<sup>2</sup> (366 g/m<sup>2</sup>).

- Tension Bars: In compliance with ASTM F626. Galvanized steel one-piece length 2 in. (50 mm) less than the fabric height. Minimum zinc coating 1.2 oz. /ft<sup>2</sup> (366 g/m<sup>2</sup>).

### **Part 3 - Execution**

#### **Preparation:**

- **Posts**

- Posts shall be set plumb in concrete footings.
- Top of concrete footing to be crowned to shed water away from the post.
- Line posts installed at intervals not exceeding 10 ft. on center.

- **Rails**

- Rails shall be connected to the posts by fillet welds which shall be all around. Upon completion the welds shall be cleaned with a protective coating applied

- **Terminal posts**

- End, corner and gate posts shall be braced and trussed.

- **Chain Link Fabric**

- Install fabric to outside of the framework with no ground clearance. Attach fabric to the terminal post by threading the tension bar through the fabric; secure the tension bar to the terminal post with tension bands and 5/16 in. (7.94 mm) carriage bolts spaced no greater than 12 inches (304.8mm) on center.
- Chain link fabric to be stretched taut free of sag.
- Fabric to be secured to the line post with tie wires spaced no greater than 12 inches (304.8 mm) on center and to horizontal rail spaced no greater than 18 inches (457.2 mm) on center.
- Aluminum alloy tie wire shall be installed following ASTM F567:
  - Wrap the tie around the post or rail and attached to a fabric wire picket on each side of the post or rail by twisting the tie wire around the fabric wire picket two full turns, cut off excess wire and bend over to prevent injury.
- Preformed 9-gauge power fastened wire ties shall be installed following ASTM F567:

- Wrap the tie a full 360° around the post or rail and fabric wire picket, using a variable speed drill, twist the two ends together three full turns, cut off any excess wire and bend over to prevent injury.
- Secure the fabric to the tension wire by crimping hogs rings around a fabric wire picket and tension wire.

- **Bolts**

- Carriage bolts used for fittings shall be installed with the head on the secure side of the fence. All bolts shall be peened over to prevent removal of the nut.