PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. General and supplemental provisions of the Contract apply to this work.

1.2 SUMMARY

A. Provide a fence enclosing the entirety of the property along the property line, complying with the requirements of this specification.

B. This Specification includes the following:
   1. Galvanized steel coated chain link fabric
   2. Galvanized steel framework and fittings
   3. Swing gates
   4. Barbed wire
   5. Installation

1.3 REFERENCES

A. ASTM A392 Specification for Zinc-Coated Steel Chain-Link Fence Fabric

B. ASTM A780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

C. ASTM A824 Specification for Metallic-Coated Steel Marcelled Tension Wire for Use With Chain Link

D. ASTM F567 Standard Practice for Installation of Chain Link Fence

E. ASTM F626 Specification for Fence Fittings

F. ASTM F900 Specification for Industrial and Commercial Swing Gates

G. ASTM F1083 Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
1.4 DEFINITIONS


B. CLFMI: Chain Link Fence Manufacturers Institute.

C. Chain link fabric – A fencing material consisting of wire helically wound and interwoven in such a manner as to provide a continuous mesh without knots or ties except in the form of knuckling or twisting at the top and bottom of the mesh to form the fabric selvage.

D. Selvage – The top and bottom edge finish on woven chain link formed by joining adjacent pairs of wire pickets. The selvage may be knuckled or twisted.
   1. Knuckled selvage refers to bending the adjacent pairs of wire back into a tight loop.
   2. Twisted selvage refers to twisting the adjacent pairs of wire together in a close helix of 1 ½ machine turns, which is equivalent to three full twists.

E. Mesh size – The minimum clear distance between the wires forming the parallel sides of the mesh.

F. Terminal post – A post to which the chain link fabric is terminated using specific fittings; this includes end post, corner post, gate posts and pull posts. A terminal post used to accommodate a grade or placed at intervals on long stretches of fence.

G. Line post – Intermediate posts spaced between the terminal posts.

H. See Typical Fence Section drawing for details of various fence fittings; tension bar, truss rod, tension band, brace band, rail end and barb arm.
1.5 SUBMITTALS

A. Shop drawings: Provide a site plan showing layout of fence location, with dimensions, location of gates and opening sizes, cleared area, elevation of fence, gates, footings, and details of attachments.

B. Product Data: Provide manufacturer’s material descriptions, construction details, dimensions of individual components and profiles, and finishes for the following:
   1. Fence and gate posts, rails, and fittings.
   2. Chain-link fabric, reinforcements, and attachments.
   3. Gates and hardware.

C. Certifications: Provide signed manufacturer’s material certification that products are in compliance with the current ASTM standards. See Section 1.3 for referenced standards.

1.6 QUALITY ASSURANCE

A. Fence Contractor: Company with demonstrated successful experience installing similar projects and products in accordance with ASTM F567 and have at least 5 years demonstrated experience.

B. Source Limitations for Chain-Link Fences and Gates: Obtain each color, grade, finish, type, and variety of component for chain-link fences and gates from one source with resources to provide chain-link fences and gates of consistent quality in appearance and physical properties.

PART 2 – PRODUCTS

2.1 CHAIN LINK FABRIC

A. Steel Chain Link Fence Fabric shall be not less than 2.75 meters high.

B. Mesh and Wire Size: 50mm (2”) mesh, 3.76 mm diameter (9 gauge) wire.

C. Zinc-Coated Fabric: Fabric shall comply with ASTM A392, with zinc coating applied to steel wire before weaving according to ASTM A817. Fabric shall be
Type II, zinc coated (hot dip galvanized) with a minimum zinc coating of 1.20 oz/ft² (366 g/m²).

D. Fabric selvage: Provide selvages twisted at top of fence and knuckled at bottom of fence.

2.2 FENCE FRAMEWORK

A. Framework shall be standard weight, Schedule 40, hot dip galvanized round steel pipe complying with ASTM F 1083. Comply with ASTM F 1043, Material Design Group IA, external and internal coating Type A, consisting of not less than 1.8-oz./sq. ft. (0.55-kg/sq. m) zinc; and the following requirements:

1. Corner, End and Pull Posts shall be equivalent to a minimum of 73 mm (2-7/8 inch) O.D galvanized Schedule 40. Pull posts shall be used at all abrupt changes in grade and at intervals no greater than 152 meters (500 feet). On runs over 152 meters (500 feet), pull posts shall be evenly spaced between corner and end posts.

2. Line Posts shall be a minimum of 60.3 mm (2-3/8 inches) O.D galvanized Schedule 40 steel pipe. Posts shall be spaced equidistant in the fence line with a maximum spacing of 3 meters (10 feet) on center.

3. Post Brace Rails shall be equivalent to a minimum of 42.2 mm (1-5/8 inches) O.D galvanized Schedule 40 steel pipe. Provide brace rail with truss rod assembly for each gate, end, and pull post.

2.3 TENSION WIRE

A. Provide Metallic Coated Steel Marcelled Tension Wire, 7 gauge (4.50 mm) (0.177 in.) complying with ASTM A824. Galvanizing shall be Type II with a minimum zinc coating of 1.20 oz/ft² (366 g/m²).

2.4 BARBED WIRE

A. Provide (Type I) three strand outrigger arm 45 degrees (from the vertical plane) on top of all fencing and gates. Outrigger arm shall be angled to the outside of the fenced area. Barbed wire outrigger arms shall be in compliance with ASTM F626, pressed steel, hot dip galvanized after fabrication, minimum zinc coating of 1.20 oz./ft² (366 g/m²), capable of supporting a vertical 113 kg (250 lb) load.
B. Provide three (3) strands of Zinc-Coated Steel Barbed Wire at the top of all fencing and gates, complying with ASTM A121. Barbed wire shall be Standard Size and Construction: 2.51 mm (0.099 inch) diameter line wire with 2.03 mm (0.080 inch) diameter, 4-point round barbs (or 2-point, if 4-point is not locally available) spaced not more than 5 inches (127mm) O.C.

2.5 FITTINGS

A. Provide post caps for all posts. Terminal Post Caps, Line Post Loop Tops, Rail and Brace Ends, Boulevard Clamps, and Rail Sleeves shall be in compliance to ASTM F626, pressed steel hot dip galvanized after fabrication having a minimum zinc coating of 1.20 oz/ft² (366 g/m²).

B. Tension and Brace Bands: Hot dip galvanized pressed steel complying with ASTM F626, minimum steel thickness of 12 gauge (2.67 mm) (0.105 in.), minimum width of 19 mm (3/4 in.) and minimum zinc coating of 1.20 oz/ft² (366 g/m²). Secure bands with 7.94 mm (5/16 in.) galvanized steel carriage bolts.

C. Truss Rod Assembly: In compliance with ASTM F626, 9.53 mm (3/8 in.) diameter steel truss rod with a pressed steel tightener, hot dip galvanized with minimum zinc coating of 1.2 oz/ft² (366 g/m²). Assembly shall be capable of withstanding a tension of 2,000 lbs. (970 kg).

D. Tension Bars shall be in compliance with ASTM F626. Provide hot dip galvanized steel one-piece bars, with a length 50 mm (2 in.) less than the fabric height. Minimum zinc coating shall be 1.2 oz./ft² (366 g/m²). Bars for 2 in. (50 mm) mesh shall have a minimum cross section of 4.8 mm (3/16 in.) by 19 mm (3/4 in.).

E. Tie Wire and Hog Rings: Provide hot dip galvanized steel wire, minimum zinc coating 1.20 oz/ft² (366 g/m²), 9 gauge (3.76 mm) (0.148 in.) in compliance with ASTM F626.

2.6 SWING GATES

A. Provide one (1) 4.35 meter (12 foot) opening with a double swing gate on the major access way to the site.

1. Match gate fabric to that of the fence system.

2. Gateposts shall be a minimum of 73mm (2-7/8 inch) O.D hot dip galvanized Schedule 40 steel pipe, complying with ASTM F1083.

3. Double swing gate shall be hot dip galvanized steel pipe, welded fabrication, in compliance with ASTM F900. Gate frame members shall be a minimum of 48.3
mm (1.90 in.) O.D. schedule 40 galvanized steel pipe, in compliance with ASTM F 1083.

4. Frame members shall be spaced no greater than 2.44 meters (8 ft.) apart vertically and horizontally.

5. Protect welded joints by applying zinc-rich paint in accordance with ASTM Practice A780.

6. Barbed wire mounting shall transition to vertical at the center of the gates to allow inward swing.

7. Hardware: Provide hinges, latches permitting operation from both sides of gate, and keepers for each gate leaf. Fabricate latches with integral eye openings for padlocking; padlock shall be accessible from both sides of gate.

2.7 CONCRETE

A. Concrete for post footings shall be normal-weight concrete with not less than 20.7 MPa (3000 psi) compressive strength at 28 days, 75 mm (3-inch) slump, and 25 mm (1-inch) maximum size aggregate.

PART 3 – EXECUTION

3.1 PREPARATION

A. Verify the layout information for chain-link fences and gates shown on Shop Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

B. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 150 meters (500 feet) or line of sight between stakes. Indicate locations of any known underground structures, benchmarks, and property monuments.

C. Clear, grub, and grade fence line, removing debris and providing a 1-meter clear area on either side of the fence. Indicate in the Shop Drawings the extent of the area to be cleared and grubbed.
3.2 FRAMEWORK INSTALLATION

A. Posts: All Posts shall be set plumb in concrete footings in accordance with ASTM F567. Minimum footing depth shall be per manufacturer’s recommendations, but no less than 1 meter. Minimum footing diameter shall be per manufacturer’s recommendations, but no less than 300 mm (12 in.). For swing gate posts, the foundation diameter shall be not less than 450 mm (18 in.). Top of concrete footing shall be at grade, crowned to shed water away from the post.

B. Fabric shall not be attached to posts until the concrete footings have cured for at least five days.

C. Tension wire: Shall be installed 100 mm (4 in.) up from the bottom of the fabric and 100 mm (4 in.) down from the top of the fabric. Tension wire shall be stretched taut, independently and prior to the fabric, between the terminal posts and secured to the terminal post using a brace band. Secure the tension wire to each line post with a tie wire.

D. Post Bracing Assemblies: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Install braces at end and gate posts and at both sides of corner and pull posts. Locate horizontal braces at two-thirds fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.

3.3 CHAIN LINK FABRIC INSTALLATION

A. Chain Link Fabric: Install fabric to outside of the framework. 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 7.94 mm (5/16 in.) carriage bolts spaced no greater than 305 mm (12 in.) O.C. Chain link fabric shall be free of sag, and secured to the line post with tie wires spaced no greater than 300 mm (12 in.) O.C. Secure fabric to the tension wire with hog rings spaced no greater than 450 mm (18 in.) O.C.

B. Fabric shall be pulled tight so that the maximum deflection of the fabric is 50 mm (2 in) when a 22.5 kilograms (50 pounds) pull is exerted perpendicular to the center of the panel.

C. Tie wire shall be wrapped 360 degrees around the post or rail and the two ends twisted together three full turns. Excess wire shall be cut off and bent over to prevent injury.

D. The bottom of the fence fabric shall meet the finished grade such that it prevents surreptitious human entry.
3.4 BARBED WIRE INSTALLATION

A. Barbed Wire: Stretched taut, free of sag, between terminal posts and secured in the slots provided on the line post barb arms. Attach each strand of barbed wire to the terminal post using a brace band.

3.5 GATE INSTALLATION

A. Swing Gates: Installation of swing gates shall be in compliance with ASTM F 567. Direction of swing shall be inward. Gates shall be plumb in the closed position having a bottom clearance of 75 mm (3 in.) above grade. The ground under the swing arc shall be graded to allow for operation.

3.6 NUTS AND BOLTS

A. 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.

3.7 ELECTRICAL GROUNDING

A. Grounding: The fence shall be grounded every 100 meters (110 yards) by a 1.8 meter (6 foot) ground rod connected to the fence fabric with grounding clamps and number 10 gauge wire.

3.8 CLEAN UP

A. Clean Up: The area of the fence line shall be left neat and free of any debris caused by the installation of the fence.

END OF SPECIFICATION