SECTION 281609 - E-FIELD DETECTION SYSTEM

Use this section in conjunction with section 281603. Also, see information at end of section.

1. GENERAL
   * + 1. RELATED WORK SPECIFIED ELSEWHERE
          1. Video Training Programs: Section 017900.
          2. Chain Link Fence: Section 323113.
          3. Fence Accessory Stations For Perimeter Security Systems: Section 281602.
          4. Perimeter Security Multiplex System: Section 281603.
       2. SYSTEM DESCRIPTION
          1. The E-Field detection system shall operate as a zoned, automatic, supervised, detection and alarm system, integrated with the perimeter security multiplex system (Section 281603) to alert security personnel of an attempted breach of the perimeter security fence.

Field wires, sense wires and control units located on the fence posts detect intruders attempting an escape from the security area.

* + - * 1. The sense wires and control units interpret a compound signal form consisting of E-Field amplitude change (mass of intruder), rate of change (movement of intruder), and preset time disturbance (time intruder is in pattern). These parameters form the signature of human movement, and when all exist simultaneously an alarm condition is generated.

Slow movement processing by the control units detect movement of an adult from 10 cm to 4 meters/sec.

* + - * 1. The alarm condition is transmitted to the perimeter security console.
        2. Any zone may be placed in access mode at the control console (Section 281603).
        3. Various colored lamps and audible alarm (with silencing switch) operate in conjunction with zoning, trouble, access and alarm to indicate status of system (Map display-see Section 281603).
        4. Control units are able to operate at different field generator frequencies so that adjacent zones do not interfere with each other.
        5. Supervision of the system causes a supervision alarm to signal if:

Field or sense wires are cut or shorted to ground or to each other.

The received E-Field signal is substantially reduced.

There is an excessive permanent change in fence coupling due to excessive foliage growth underneath the E-Field fence, loosening and sagging fence wires, snow build-up, etc.

Cover is removed from control units.

* + - * 1. Failure of the A.C. operating power automatically transfers the system to the secondary standby power supply (batteries). System operates under maximum normal load condition for 8 hours at 70 degrees F, to 4 hours at minus 30 degrees F.

Check with client to see if buried fabric is required.

* + - * 1. Fence fabric buried below the E-Field system shall prevent an individual from tunneling below the E-Field system.
      1. SUBMITTALS
         1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
         2. Manufacturer’s installation instructions shall be provided along with product data.
         3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
         4. Waiver of Submittals: The “Waiver of Certain Submittal Requirements” in Section 013300 does not apply to this Section.
         5. Submittals Package: Submit the shop drawings, product data, and quality control submittals specified below at the same time as a package.
         6. Shop Drawings:

Composite wiring and/or schematic diagrams of the complete system as proposed to be installed (standard diagrams will not be accepted).

* + - * 1. Product Data:

Catalog sheets, specifications and installation instructions.

Bill of materials.

Detailed description of system operation (format similar to 1.02 System Description).

Total electrical load of the complete system in supervisory and alarm conditions.

Name, address and telephone number of nearest fully equipped service organization.

* + - * 1. Quality Control Submittals:

Copy of license for installing Security Systems:

Also include copy of identification card issued by the Licensee for each person who will be performing the work.

Installers’ Qualifications Data: Include the following for each person who will be performing the Work:

Name.

Employers name, business address and telephone number.

Name and address of the required number of similar projects worked on which meet the experience criteria.

Company Field Advisor Data: Include:

Name, business address and telephone number of Company Field Advisor secured for the required services.

Certified statement from the Company listing the qualifications of the Company Field Advisor.

Services and each product for which authorization is given by the Company, listed specifically for this project.

* + - * 1. Contract Closeout Submittals:

Test Report: System acceptance test report.

Certificate: Affidavit, signed by the Company Field Advisor and notarized, certifying that the system meets the contract requirements and is operating properly.

Operation and Maintenance Data:

Deliver 2 copies, covering the installed products, to the Director’s Representative. Include:

Operation and maintenance data for each product.

Complete point to point wiring diagrams of entire system as installed. Number all conductors and show all terminations and splices. (Numbers shall correspond to numbered tags installed on each conductor.)

Name, address, and telephone number of nearest fully equipped service organization.

* + - 1. QUALITY ASSURANCE
         1. Installers’ Qualifications: The persons installing the Work of this Section and their supervisor shall be personally experienced in security systems and shall have been engaged in the installation of security systems for a minimum of 3 years.

Furnish to the Director the names and addresses of 5 similar projects which the foregoing people have worked on during the past 2 years.

* + - * 1. Source Quality Control: The Company producing the system shall have test facilities available which can demonstrate that the proposed system meets contract requirements.
        2. Equipment Qualifications For Products Other Than Those Specified:

At the time of submission provide written notice to the Director of the intent to propose an “or equal” for products other than those specified. Make the “or equal” submission in a timely manner to allow the Director sufficient time to review the proposed product, perform inspections and witness test demonstrations.

If products other than those specified are proposed for use furnish the name, address, and telephone numbers of at least 5 comparable installations that can prove the proposed products have performed satisfactorily for 3 years. Certify in writing that the owners of the 5 comparable installations will allow inspection of their installation by the Director's Representative and the Company Field Advisor.

Make arrangements with the owners of 2 installations (selected by the Director) for inspection of the installations by the Director's Representative. Also obtain the services of the Company Field Advisor for the proposed products to be present. Notify the Director a minimum of 3 weeks prior to the availability of the installations for the inspection, and provide at least one alternative date for each inspection.

Only references from the actual owner or owner’s representative (Security Supervisor, Maintenance Supervisor, etc.) will be accepted. References from dealers, system installers or others, who are not the actual owners of the proposed products, are not acceptable.

Verify the accuracy of all references submitted prior to submission and certify in writing that the accuracy of the information has been confirmed.

The product manufacturer shall have test facilities available that can demonstrate that the proposed products meet the contract requirements.

Make arrangements with the test facility for the Director's Representative to witness test demonstrations. Also obtain the services of the Company Field Advisor for the proposed product to be present at the test facility. Notify the Director a minimum of 3 weeks prior to the availability of the test facility, and provide at least one alternative date for the testing.

Provide written certification from the manufacturer that the proposed products are compatible for use with all other equipment proposed for use for this system and meet all contract requirements.

Edit number of hours to suit.

* + - * 1. Company Field Advisor: Secure the services of Company Field Advisor for a minimum of 80 working hours for the following:

Render advice regarding installation and final adjustment of the system.

Witness final systems test and certify with an affidavit that the system is installed in accordance with the contract documents and is operating properly.

Train facility maintenance personnel in operation and routine maintenance of the system (minimum of 16 hours).

Train facility security personnel in operation of the system (minimum four 2 hour sessions).

Explain available service programs to facility supervisory personnel.

* + - * 1. Service Availability: A fully equipped service organization capable of guaranteeing response time within 8 hours to service calls shall be available 24 hours a day, 7 days a week to service the completed system.
      1. PROJECT CONDITIONS

Edit temperature and humidity to suit.

* + - * 1. The system shall meet all requirements at the following ambient temperatures and humidity (actual site conditions):

Maximum ambient temperature: 110 degrees F.

Minimum ambient temperature: -30 degrees F.

Relative humidity: 15 percent to 100 percent.

* + - 1. MAINTENANCE
         1. Spare Parts:

Change quantities to suit.

One zone processor unit.

600 feet of field and sense wire.

One sense filter.

Two terminators of each type.

Eight of each type insulator.

One drain coil.

Eight terminal boot kits.

Four winders.

1. PRODUCTS
   * + 1. E-FIELD DETECTION SYSTEM
          1. Zone Processor Unit: Stellar Security Products, Inc.’s Model EF-820, having:

Stainless steel NEMA 4 enclosure.

Dual zone control.

Separate relay outputs for alarm and supervision for each zone.

Tamper switch.

Operates on 12 VDC.

Test and calibration meter.

Lightning and surge protection.

* + - * 1. Sense Filter: Stellar Security Products, Inc.’s Model 8333.
        2. Drain Coil: Stellar Security Products, Inc.’s Model 3131-3.
        3. Insulators:

Tension Type: (Used on start tension, and end points) Stellar Security Products, Inc.’s Model 5020.

Interim Type: (Used on interim points) Stellar Security Products, Inc.’s Model 5001.

* + - * 1. Terminal Boot Kit: Stellar Security Products, Inc.’s Model 5012.
        2. Connecting Link: Stellar Security Products, Inc.’s Model 5013.
        3. Winder: Stellar Security Products, Inc.’s Model 5014.
        4. Mounting Bracket: (Used for mounting adjacent tension insulators) Stellar Security Products, Inc.’s Model 5015.
        5. Tension Spring: Stellar Security Products, Inc.’s Model 2350.
        6. Interconnect Lug: Stellar Security Products, Inc.’s Model 2373.
        7. Terminators: Stellar Security Products, Inc.’s Models 8348/8349.
        8. Field and Sense Wire: Stellar Security Products, Inc.’s Model 2361-2, having:

Material: 305 stainless steel, cold drawn.

Diameter: .040” + .001”.

Ultimate Tensile Strength: 250,000 psi.

Working Stress: 112,000 psi.

Linear Thermal Expansion: .0000096 in/in-F.

Young’s Modulus: 28,000,000 psi.

* + - * 1. Sealant: Dow/Corning’s 3145 RTV.
        2. 45 Degree Standoff: Stellar Security Products, Inc.’s Model 5101-2.
        3. Central 12 volt nominal DC power supply and batteries for powering zone processor units, having:

Power supply capacity suitable for powering all zone processor units and recharging the batteries.

Batteries sized to operate all zone processor units for 4 hours upon loss of AC power.

Sealed, lead-acid, gelled electrolyte batteries.

Mount power supply and batteries in Perimeter Alarm System console.

* + - 1. INTERCONNECTION CABLE
         1. Type EFC: Coaxial cable with a maximum capacitance per foot of 13.5 (RG-62U); Belden Corp’s. 8254, or Remee Product Corp.’s 1592.
         2. Type MCC-E: Multiconductor cable with 6 individually shielded twisted pairs of insulated 20 AWG stranded copper wires enclosed in a jacket suitable for direct burial in earth; Belden Corp’s. 9886, Remee Products Corp.’s 3039DB.
      2. SURGE SUPPRESSORS
         1. Equip system with surge suppressors to protect equipment from voltage transients and lightning surges.
      3. STEEL POSTS, TOPS AND ACCESSORIES
         1. Comply with ASTM A 120 for requirements of Schedule 40 piping.
         2. Posts:

For Start, End and Tension Points:

Pipe: 2.875 inches OD, 5.79 lb per lin ft (Schedule 40).

For Interim Points:

Pipe: 2.375 inches OD, 3.65 lb per lin ft (Schedule 40).

* + - * 1. Finishes:

Pipe: Galvanized in accordance with ASTM A 120, 2.0 oz zinc per sq ft.

* + - 1. CONCRETE BASES
         1. Portland cement concrete having minimum compressive strength of 2,500 psi at 28 days.
         2. Construct bases as shown on drawings.
      2. WALL MOUNTED
         1. Vertical Wall Mount Bracket: Stellar Security Products, Inc.’s Model 5040.
         2. Connecting Link: Stellar Security Products, Inc.’s Model 5021.
      3. ACCESSORIES
         1. System shall include all accessories required to perform the functions summarized in SYSTEM DESCRIPTION and indicated on the drawings.
      4. MARKERS AND NAMEPLATES
         1. Markers: Premarked self-adhesive; W.H. Brady Co.’s B940, Thomas and Betts Co.’s E-Z Code WSL self-laminating, Ideal Industries’ Mylar/Cloth wire markers, Markwick Corp.’s permanent wire markers, or Plastic Extruded Parts Inc.’s Flexible Sleeve or ID Band Markers.
         2. Nameplates: Phenolic engraved plates; minimum 3/4 inch wide and length as required by inscription, as manufactured by Seton Nameplate Corp.
      5. GROUNDING
         1. Ground Strap: #6 AWG solid bare soft copper wire.
         2. Rod Electrode: Solid copper or copper-clad grounds rods; 3/4 inch minimum diameter, 8’-0” long.

1. EXECUTION
   * + 1. INSTALLATION
          1. Space posts equidistant, maximum 10 feet on center.
          2. Earth: Excavate trenches and holes as indicated for posts. Set posts in center of hole and fill hole with concrete. Plumb and align posts. Vibrate or tamp concrete for consolidation. Finish concrete in a dome shape above ground to shed water.
          3. Backfill: Place backfill and fill materials in layers not more than 6 inches in loose depth. Before completion, moisten or aerate each layer as necessary to facilitate compaction to the required density. Do not place backfill or fill material on surfaces that are muddy, frozen, or that contain frost or ice.
          4. Compaction: Compact each layer of fill and backfill to 90 percent maximum density. Compact bearing surface material at a moisture content suitable to obtain the required densities, but at not less than 3 percent drier than the optimum content as determined by ASTM D 1557.
          5. Start, End and Tension Points (Posts):

Install posts plumb within 5 degrees (plus or minus one degree) in 2 planes.

Use tension posts at angle changes greater than 20 degree from line of sight, 30 degree elevation and at intervals no greater than 150 feet. Space tension posts evenly between start or end posts.

Test post rigidity by applying a 50 pound force perpendicular to the post (and fabric) at 5 feet above ground level. The post movement measured at the point where the force is applied shall be less than plus or minute 3/4 inch from the relaxed position.

* + - * 1. Interim Points (Posts):

Space posts equidistant in the fence-line, with maximum of 10 feet on center.

Install posts plumb within 5 degrees (plus or minus one degree) in 2 planes.

Test post rigidity by applying a 50 pound force perpendicular to the post (and fabric) at 5 feet above ground level. The post movement measured at the point where the force is applied shall be less than plus or minus 3/4 inch from the relaxed position.

* + - * 1. Install E-Field detection system in accordance with the Company’s printed instructions and interconnect with perimeter security multiplex system (Section 281603) for a complete integrated system.
        2. Tag conductors at terminal strips (designations shall correspond with point to point wiring diagrams).
        3. Ground all zone processor units, drain coils and terminators with an 8’ ground rod.
        4. Ground Strap Installation:

Dig a trench 6 to 8 inches deep from one end of each E-Field zone to the other and about 12 inches from the posts.

Install a number 6 AWG solid bare soft copper wire to either the ground rod installed at the controller or the ground rod installed at the end post for terminator grounding. This should be a minimum of eight (8) feet in length.

Unreel and lay the bare copper wire into the trench.

At the end of the wire, opposite where it was attached to the ground rod, allow enough wire to reach the end post and cut off the wire.

* + - 1. FIELD QUALITY CONTROL
         1. Preliminary System Test:

Preparation: Have the Company Field Advisor adjust the completed system and then operate it long enough to assure that it is operating properly.

Run a preliminary test for the purpose of:

Determining whether the system is in a suitable condition to conduct an acceptance test.

Training Facility Personnel.

Checking and adjusting equipment.

* + - * 1. System Acceptance Test:

Preparation: Notify the Director’s Representative at least 3 working days prior to the tests so that arrangements can be made to have a Facility Representative witness the tests.

Make the following tests as an integral test required for Section 281603:

Test each system function step by step as summarized under SYSTEM DESCRIPTION.

Perform simulated escape attempts listed below at 50 foot intervals unless otherwise directed (Director’s Representative shall select exact location and type of escape attempt or combination of attempts). Each penetration of the E-Field system shall produce an alarm. If it does not, wait 30 seconds and repeat in the same location. If misses are repeated in the same location, the entire zone must be corrected and retested. The simulated escape attempts shall be performed by a person weighing 100 lbs or more. Provide safety equipment and take proper precautions when performing tests. Terminate each attempt upon detection.

Walk Test: Walk slowly across detection zone perpendicular to the E-Field.

Run Test: Run quickly across detection zone perpendicular to the E-Field.

Crawl Test: Crawl as low as possible on hands and knees across detection zone perpendicular to the E-Field.

Belly Crawl: Crawl on stomach across detection zone perpendicular to the E-Field. (2 to 3 inches per second).

Perform the following tests to show that the system will not alarm from the following stimuli:

A person weighting 100 to 200 lbs. walking at 3 mph within 10 feet of the protected fence.

Omit subparagraph below if horse mounted patrols are not used.

A person on horseback riding at 3 mph within 15 feet of protected fence.

Supply all equipment necessary for system adjustment and testing.

Submit written report of test results signed by Company Field Advisor and the Director’s Representative. Mount a copy of the final report in a plexiglass enclosed frame assembly adjacent to the security console.

* + - * 1. System Testing and Adjusting During Guarantee Period:

After satisfactory completion of acceptance test, Facility personnel will investigate and record all system alarms. If the system does not meet the following criteria it shall be considered defective under the terms of paragraph 9.8 of the General Conditions:

False alarms that are internally generated within the system shall not exceed one per 100 hrs.

False alarms caused by the following weather conditions shall not exceed one per zone per 48 hours:

Wind up to 30 mph.

Rain up to 3 inches per hour.

Snow up to 5 inches per hour.

Within one week of notification that any zone does not meet the above criteria, make arrangements for the Company Field Advisor to correct the zone and retest in accordance with 3.02 B.2. b. & c.

END OF SECTION 281609

The remainder of this section is for information only.

Add a. and b. to 3.01 if existing fence posts are being used.

Remove fabric from existing posts.

Replace 2-3/8 inch posts with 2-7/8 inch posts (all corner, end, start and tension) as indicated on drawings.

END OF INFORMATION 281609