

# ELAN

## Technologies

### Inc.



# Comcore® Manhole Antenna Covers

## COMMUNICATIONS



- Traffic Grade
- 824 – 940MHz
- Up to 2.5GHz
- Custom Tuned
- Rugged Design
- Lightweight

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Elan Technologies and Comcore Utilities Products, Inc. introduce a unique solution for monitoring sewers and other underground utilities: a composite cover that functions as a bi-polar antenna for manholes and vaults. The antenna cover is ideal for communicating with below grade instrumentation.



The cover is made of a unique composite material, Comcore®, designed to be lightweight and support HS-20 traffic loads. The Comcore® cover is fabricated to the shape and size that is required (round, square, rectangular) and can be provided with or without a manhole rim.

Comcore® is transparent to radio signals. The Antenna Cover incorporates the components for a heavy-duty antenna tuned for Spread Spectrum, CDMA, GSM, licensed FM, and other common frequencies. The Antenna Cover comes with a cable and connector that meet your specifications.

In operation, the Comcore® Antenna Cover allows wireless communication between two sites with one site being below grade and the other a fixed or mobile radio network or computer home base. Elan can also provide low power, battery operated instrumentation and radio equipment to integrate with the cover.

Comcore® Antenna Covers are sold exclusively through Elan Technologies as a distributor, with their instrumentation packages or as a rep to O.E.M accounts. For information on Comcore® Antenna Covers, contact Elan Technologies on the web at [www.elantechnologies.net](http://www.elantechnologies.net) or 815-463-8105.

### Contact ELAN Technologies

ELAN provides innovative, custom solutions for your application. Call our communication engineers today at 815-463-8105 for your difficult radio applications.

# Procurement Specification

## General Bid Requirements

There shall be furnished \_\_\_\_\_ copolymer traffic grade manhole covers with integrated communications antennas supplied. The cover shall be as manufactured by Comcore UPI and supplied by Elan Technologies, 630-697-2000. Vendors other than Elan Technologies wishing to quote on equipment in this section shall:

- A. Submit detailed drawings and structural calculations by a structural P.E. to show design and fabrication will meet the specified requirements;
- B. Provide certified test results on materials of construction by an independent laboratory to show compliance to specifications;
- C. Provide a list of ten (10) similar installations with similar antenna frequencies, communications equipment and quantity (equal or greater) with contact name, address and phone number.

Acceptable alternate vendors will be listed by Addendum.

- 1. The naming of a vendor is to define minimum acceptable product performance. Other vendors may be approved as equal if they meet the specifications.
- 2. Listing by addendum does not exempt vendors from meeting specifications and Vendors shall list exceptions on their proposal. Proposals "without exception" which are installed and found not to meet the specifications, including communication performance requirements, within the first year of operation will refund the purchase price in full and provide the difference, if any, between the purchase price and the specified equipment. The vendor will also pay for the removal and reinstallation of the installation of the specified equipment. If the purchase is through a contractor, the contractor shall replace the equipment and install the specified equipment at no cost to the owner.

## General Manhole Cover Description:

The manhole cover shall be designed for traffic grade. The cover shall have an antenna embedded into the cover body. The antenna shall not exceed the outside dimensions of the manhole lid, presenting no portion at a level higher than the flat plane of the cover and ring. Covers with any antenna protrusion are not acceptable. Antennas applied as a retrofit, through bolting to existing metallic or copolymer covers are not acceptable. Antennas installed adjacent to the manhole, requiring street surface disruption and/or repair, are not acceptable. The manhole antenna shall be capable of integrating into the owners existing communications network. The cover shall be solid; grating material or holes in the surface or through the body of the cover are not acceptable.

The manhole cover shall be made of a copolymer material with the following properties: The material shall be resistant to fuels, oils, corrosive chemicals and other road chemicals. The manhole cover shall not exceed 6.5 lbs per square foot. The material shall be non-sparking and non-conductive to prevent external exposure to voltage or current within the manhole. The material shall be non-thermally conductive to prevent external exposure to high temperatures from within the manhole should a manhole fire exist. The cover will have a service range of -80 F to 200 F. The material shall be transparent to RF signals.

The manhole dimensions shall be approximately: (insert). Refer to drawings for specific dimensional data. The cover shall be rated for a maximum highway loading (AASHTO-H20 fatigue load) with the capability to successfully carry an H20 load for a minimum fatigue life of 500,000 cycles according to the protocol developed by the Construction Research Center, Georgia Technical Institute entitled "The Testing and Evaluation of Composite Manhole Covers". Each cover shall have a diamond pattern, skid resistant surface that either meets the Cal-Trans test for skid resistance or has a demonstrated, coefficient of friction of 0.65 when dry. The cover will be standard black in color.

The manhole cover shall have the capability of accommodating antennas to support frequencies from 450MHz to 2.5 GHz, thus supporting each of the following communications methods: CDPD; FM Licensed Radio; Spread Spectrum (902-928MHz); Spread Spectrum (2.4GHz); GSM. Integrated antenna covers utilizing only one frequency or set of frequencies are not considered equal. The manhole antenna covers for this project shall be supplied to communicate with \_\_\_\_\_ (insert communication method from above) devices. The antennae shall be tuned to the following frequency: \_\_\_\_\_.

The manhole cover shall include an N-Female connector appropriate to the cabling and communications means attached on the underside of the cover. The N-Female connector shall be protected by a housing or shroud to prevent damage should the manhole cover be placed flat on the ground, connector side down. A jumper cable shall be supplied with the manhole cover to connect the antenna cover to the radio. The jumper cable shall be \_\_\_\_\_ inches long with the radio end to match a \_\_\_\_\_ (specify: radio/GSM/CDMA modem, etc.) and the manhole cover end to match the antenna cover.

Antenna performance is critical to the success of the project and the following signal characteristics are required to insure optimum performance in the application. Substitutions to these characteristics are not acceptable. The antenna cover shall have the following signal characteristics

VSWR at Resonant Point	1.5:1 or less	Polarization:	Vertical
Nominal Impedance:	50 ohms	Max. Power Input:	125 Watts
Gain:	3.5 dB	Lobe Pattern:	Edge-slot Radiator
Radiation Pattern:	Omni-Directional	Polarization:	Bi-Polar

Performance criteria for the manhole antenna shall be the standing wave ratio, a reference (describe.....). The antenna cover shall provide a minimum standing wave ratio of \_\_\_\_\_ when installed at any site. Antennae negatively impacted by manhole frames or rims are unacceptable. In addition to the criteria above, a diagnostic test and report shall be provided for each antenna and jumper combination prior to shipment. The report shall include the following factory tests: standing wave ratio, reflected signal strength, signal loss, signal noise and other appropriate parameters and be used as a baseline for future diagnostics. The report shall be provided with the manhole covers.

**Manhole Security.** The manhole cover shall be provided with lock-down security utilizing penta head bolts for anchoring the manhole lid to the manhole frame. (Optional) The manhole shall be supplied with security bolts requiring a key-socket for removal, registered specifically to the owner.

## Options

- 1. The cover shall include the following name and/or logo on the face of each cover. The name/logo shall be cast into the cover during manufacture. (describe)
- 2. Monitoring Package. The cover shall be supplied complete with an monitoring package including (describe)

