



**ELECTRICAL SCOPE OF WORK 240717-01-SH
DFS SEWER COLLECTION SCADA
CASTROVILLE, TEXAS
AUGUST 8, 2024**

The proposed TAC II SCADA System is designed specifically for water and wastewater applications. Highlights include ease-of-use and obsolescence-proof engineering. Every improvement we make to our system hardware and software is downward compatible with every one of our TAC II SCADA Systems, including those installed nearly 30 years ago. Even our oldest customers can take full advantage of our latest innovations and improvements. No other manufacturer has taken such extreme measures to assure the support of their systems and to prevent obsolescence.

Please keep in mind that many of the features and services offered free of charge by DFS are either line-item costs and/or reoccurring costs with other SCADA system providers. Such DFS features and services include but are not necessarily limited to:

- No access limits or charges for additional user seats
- No annual user fees
- No annual software license fees
- No incremental group rates for future points or tags
- No annual maintenance fees or annual service contract required
- No cost for SCADA software and/or module firmware revisions for life - All revisions and updates are available free of charge
- No cost for telephone-based technical support
- SCADA Server remote access connection (secure VPN by owner) permits our technicians to troubleshoot in real time alongside your operators and technicians
- Multiple communication/protocol drivers and system/user partitioning
- Three (3) year warranty on DFS hardware (including radio) against lightning and surge damage.

When comparing SCADA systems, it is of the utmost importance to consider the life cycle. The life cycle of a SCADA system is determined by the brand and provider support, durability, availability, as well as compatibility of replacement parts. In most cases, the life cycle of other SCADA systems is only 7 to 10 years. On the other hand, DFS has yet to define our SCADA system's life expectancy. Many of our SCADA systems have been in continuous use for well over 20 years and are still running strong.

We ask that you consider what other SCADA system providers charge per year for the above-mentioned features and services, and extrapolate such cost over the life cycle expectancy of the system. We believe that when you compare the extrapolated value of other SCADA systems to that of DFS, you will see that DFS provides the most economical and durable SCADA system in the industry.

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- **SCADA SOFTWARE & FREE SERVICES FOR LIFE OF SYSTEM:**

The proposed HT4 SCADA Software is manufactured by DFS and operates on a wall-mounted Hyper SCADA Server. A typical off-the-shelf “Windows PC” is utilized for the HMI operator interface. Great attention has been paid to ease of use. The HMI platform is the familiar Internet Browser

Distinct benefits and savings are unlimited RTU I/O points, unlimited user access seats, built-in reports, trending tools, 911 alarm notification, 411 remote access, mobile phone access, and the Maria DB open-source database. It’s important to note there are no ongoing costs associated with the use of DFS SCADA Software. All updates, revisions, and future releases of the HT4 SCADA software are available free of charge for the life of your system. **NO MAINTENANCE CONTRACT REQUIRED!**

HT4 MOBILE: This system includes HT4 Mobile, which is an interface developed by DFS for use with a smartphone’s browser app. Please note that HT4 Mobile requires secure Internet access to the HSS via a secure VPN connection. This secure VPN connection, as well as the smartphone(s) with cell carrier service, are the responsibility of the Owner. Tablets or iPads are recommended for remote SCADA access.

- **WARRANTY AND CUSTOMER SUPPORT: (INCLUDES 3-YEAR SURGE/LIGHTNING WARRANTY)**

DFS warrants the proposed system to be free from defects in materials and workmanship for a period of one year. All DFS plug-in modules, radios, power supplies, and pump controllers, carry an additional two-year return-to-factory warranty and are covered against damage due to surge/lightning for the entire 3-year period. Our Service Department operates 24/7/365 to administer all service-related issues. DFS service personnel are full-time DFS employees. DFS telephone-based technical support is provided free of charge for the life of the system. **NO MAINTENANCE CONTRACT REQUIRED!**

The proposed Hyper SCADA Server (HSS) incorporates remote maintenance access, which will allow DFS to perform remote diagnostics and troubleshooting free of charge (during normal business hours) for the life of the system. We have found that most service issues can be resolved remotely, resulting in an immediate resolution. A VPN network router and static public IP, provided by the City, will provide an Internet connection that will permit DFS (and City personnel) remote access to the HSS for maintenance, warranty support, updates, and upgrades.

The HSS also incorporates a “911” alarm dial-out feature. The Owner will be required to provide one (1) telephone line (standard dial-up or POTS line) to the HSS that is dedicated to the system’s 911 feature (a modem). Alternatively, a VoIP based solution may be possible upon further discussion.

Note: *All wire terminations and associated work inside the existing control panels, ancillary panels, etc., are to be performed by City or City’s Electrical Contractor. Antenna mounting will also be done by the City’s Electrical Contractor. This includes any required tower or structure for the mounting of antennas.*

PUBLIC WORKS BILL OF MATERIAL & SERVICES:

1. TACII CENTRAL SITE PACKAGE:

THIS ITEM INCLUDES THE FOLLOWING:

A. HYPER SCADA SERVER (HSS002-2 **FULLY REDUNDANT**):

- (1) Enclosure Assembly w/Door Window (Steel, 24”W x 30”H x 8”D)
- (2) Modular Backplane
- (2) Hyper Server Module (HSM003)
- (2) Network Switch Module (NSM001)
- (1) Network Fiber Module (NFM001, connection to CTU)
- (2) Power Supply Module
- (2) 7.0 aH Backup Battery (UPS)

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- (2) RJ-45 Ethernet Surge Protector
- (1) Debian Linux OS w/SQL Software
- (1) Maria DB SQL Relational Database
- (1) HT4 SCADA Software
- (1) HT4 Mobile (smartphone & service by Utility)
- (1) Symphony Harmonious Pump & Flow Management (HSS & Sewer Collection RTUs)

B. CENTRAL TERMINAL UNIT (CTU) INSTALLED AT WATER & WASTE WATER UTILITY OFFICES INDOORS:

- (1) CTU202 NEMA 4X White Composite Enclosure 15.5”H x 13.38”W x 7.69”D
- (1) CTU202 Modular Backplane
- (1) Power Supply Module (PSM003)
- (1) Telemetry Interface Module (TIM001) Radio
- (1) Fiber Interface Module (FIM001)
- (1) Lot Fiber Optic Cable (Multi-Mode), routed from the CTU to the HSS
- (1) 2.6 aH Backup Battery (UPS)
- (1) 10 AMP Breaker
- (1) Lot Terminal Hardware
- (1) RTA209 Yagi Antenna & Coaxial Cable Assembly
- (1) Lot RTC600 Coaxial Cable with Connectors
- (1) FCC Licensing
- (0) COMPUTER WORK STATION (PC): **BY THE CITY OF CASTROVILLE**
- (0) VPN ROUTER: **BY THE CITY OF CASTROVILLE**

C. CENTRAL SITE ONSITE SERVICES

DFS will provide field services for the wiring inside the HSS and CTU, startup, and commissioning per WORK TO BE PROVIDED BY DFS.

D. OPERATOR TRAINING

The initial Operator Training will cover an introduction to the Hyper SCADA Server (HSS) and TCU800 Remote Terminal Unit (RTU). Multiple introductory training courses will be provided via a live online presentation. Also included is one additional day of onsite advanced training to be scheduled at the utility’s convenience. The onsite course will be taught in a single 8-hour day. Please note that the maximum number of attendees for onsite training is four (4) people due to the material presentation and effective instructor/student ratio.

RADIO COMMUNICATION ANTENNA INSTALLATION REQUIREMENTS:

- CTU - Public Works RTA209 Offset Yagi at 21’ above ground level (agl) directed at 202°M.
 - FTU - to/from Remotes: RTA209 Omni directional antenna installed at 55’ agl on existing tower, directed at 49°M. See **NOTE** below.
 - FTU to/from CTU - Yagi RTA209 directional antenna installed at 21’ agl directed at 202°M.
 - Airport (New East LS) - Yagi RTA209 directional antenna installed at 21’ agl directed at 251°M.
 - Koenig Park LS - Yagi RTA209 directional antenna installed at 21’ agl.
 - Main LS - Yagi RTA209 directional antenna installed at 21’ agl directed at 318°M.
 - Riverside LS - Yagi RTA209 directional antenna installed at 21’ agl directed at 211°M.
 - Country Village LS - Quoted Separately. See DFS Quotation 240124-02-HRH3.
- **IMPORTANT FTU TOWER NOTE:** All radio tower construction will be done by others. To not disrupt any of the existing frequencies or the new DFS frequency, antenna separation will be as follows:
- a) Consideration should be given to securing the tower base to the existing concrete.

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- b) Install one additional 10' tower section onto the existing tower. This will require removing the top section, installing the new mid-section, and reinstalling the top section.
- c) Mount the DFS Omni directional antenna at the top of the tower.
- d) Install a DFS Yagi directional antenna 5' below the DFS Omni antenna.
- e) Re-mount the existing Omni antenna 5' below the DFS Yagi antenna.
- f) Route the DFS Omni, and Yagi coax to the DFS forwarding Terminal Unit (FTU) installed on the existing rack next to the GST. Reuse the existing coax for the existing Omni antenna.

SUMMARY OF SCOPE

DFS will provide the Central Site Equipment (CSE), a Forwarding Terminal Unit (FTU), and four (4) Remote LS RTUs. The FTU will be located at Medina GST. The sewer collection locations are Airport (New East) LS (RTU201), Koenig Park LS (RTU203), Main LS (RTU205), and Riverside LS (RTU207). DFS will also provide Vega well-level transducers for the lift stations.

DFS will manufacture the RTUs and provide automation configurations. DFS will provide field services for the wiring inside the DFS panels, startup, and commissioning to support the provided SCADA system.

All physical installations (panels, antennas, transducers, etc.) are by others. The Utility shall hire an electrical contractor to perform all installation work.

FIELD BILL OF MATERIAL & SERVICES:

A. Forwarding Terminal Unit (FTU) Assembly:

- (1) FTU Enclosure White NEMA 4X 15.5Hx23Wx6D 316 SS RTU204 w/MBP001-4 Backplane
- (1) PSM003-1 Power Supply Module
- (2) TIM007 (Radio) Module
- (1) Analog Monitor Module (AMM002)
- (2) Edco DRS-36 Analog Surge Protector
- (2) RF pigtail
- (1) SPS001 RTU Surge Protection Kit
- (1) 10 Amp Breaker
- (2) Polyphaser Coaxial Surge Protector
- (1) 2.6 Ah Backup Battery
- (1) Lot Terminal Hardware
- (1) 21' Aluminum Mast and Mast Support for CTA209 Dipole Omni
- (1) CTA209 Dipole Omni (4 Lobes) & Coaxial Cable Assembly
- (1) RTA209 Yagi Antenna & Coaxial Cable Assembly
- (1) Lot RTC-600 Cable w/Connectors
- (1) FCC Licensing Services
- (1) Project Management, Testing, Configs, Base-page Update & Startup Services

B. TCU800 RTU Assembly:

- (4) TCU800 Enclosure w/Plate, 24Hx20Wx8D 316 SS
- (4) TCU800 Pump Controller w/Radio
- (4) Deluxe Snap-in Installation Kit w/Wire Harness (*includes 1 Relay for Alarm Output*)
- (4) TCU800 Harness Relay Adder Kit (*adds 4 Relays for Pump & Aux Outputs*)
- (4) RF pigtail
- (4) RTU Surge Protection Kit
- (4) 3-Phase Surge Protector Kit
- (4) Polyphaser Coaxial Surge Protector
- (4) 7.0 Ah Backup Battery

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- (4) RTA209 Yagi Antenna & Coaxial Cable Assembly
- (4) TCU Wiring Services, Limited to TCU800 internal enclosure terminations
- (4) Project Management, Testing, Configs, Base-page Update & Startup Services
- (4) FCC Licensing Services

C. Lift Station Wet-Well Level Transducer:

- (4) VegaPuls C 21 RA-222 23X Surface Mount Level Transducer w/32' 4-20mA Cable (install by others)

D. SPARE PARTS:

- (1) Power Supply Module (PSM003)
- (2) Telemetry Interface Module (TIM007) Radio
- (1) Fiber Interface Module (FIM001)
- (1) TCU800 w/radio

WORK TO BE PERFORMED BY DFS:

1. DFS will provide and ship the proposed equipment for installation by others.
2. DFS will perform all wire terminations inside DFS panels.
3. DFS will complete all TCU800 configurations at the central site. Central site configurations include a default-generated graphical screen (no custom screens).
4. DFS will provide on-site start-up services.

WORK TO BE PERFORMED BY THE CONTRACTOR / UTILITY / OTHERS:

1. The Utility will contract an Electrical Contractor licensed in Texas to perform all required installations for the proposed equipment.
2. All required antenna towers will be supplied and installed by the electrical contractor.
3. All recommended modifications to existing tower(s) are the responsibility of others.
4. The contractor shall mount the TCU Enclosure within 15' of the tower (by others) to minimize coaxial cable length. All required panel mounting structures and related hardware are the responsibility of others.
5. The electrical subcontractor will provide and install the conduit, signal wire, and 120 VAC power in accordance with the NEC. AC service wires, digital signal wires, and analog circuit wires shall not occupy the same conduits. Analog signals require a shielded 2-conductor wire. DFS recommends 16 AWG stranded wires for all other signals. Terminals with the TCU cannot accept signal wires that are solid core or larger than 12 AWG.
6. The TCU800 Pump Controller shall assume complete control of the lift station pumping operation. The Pump Control Panel must have a "TCU interface terminal strip" for all TCU800 RTU wire connections. DFS will not modify any wiring beyond this terminal strip. Please note the proposed TCU800 is designed to operate up to three (3) fixed-speed pumps (No VFDs).
7. Wire terminations external to the TCU are the responsibility of others. DFS services are limited to terminating wires at the TCU.
8. Conduit for tower/antenna coax cable. This conduit shall be 1" minimum and routed from the base of the proposed tower installation to the DFS RTU panel for coaxial cable. All bends shall conform to NEC for smooth radius (lead sheath) bends 11" min. No LBs or right-angle fittings are permitted on this conduit.
9. **Grounding and Bonding of the antenna tower, tower ground rod, RTU, and Power Utilities ground rod is the responsibility of others. All ground lugs and taps must be bonded using a continuous single 6 AWG solid bare copper wire. Improper grounding will void the DFS lightning and surge warranty. A DFS grounding procedure is available online <https://dataflowsys.com/wp-content/uploads/2023/12/DFS-RTU->**

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[Grounding-Procedure.pdf](#)

10. Provide and install all required instrumentation, including manufacturing of mounting rack/posts and sunshield requirements.
11. Surge protection to protect devices outside of the DFS TCU/RTU panel is responsibility of instrumentation / device provider / others. Providers of instrumentation, devices and services are responsible for signal/noise quality to meet the requirements of the control/telemetry system.
12. All required underground locate information must be provided before DFS installation services can be scheduled. DFS will provide an underground locate information form. The Contractor will be the underground locate Point of Contact. The Contractor must provide a contact name and phone number for use by locate services should they need to gain access to a secured construction area or are unable to find the site based on the locate information provided by the Contractor.
13. Demolition, removal, and/or relocation of existing equipment where required.
14. Any required permitting and associated fees.

END OF SCOPE OF WORK