



Contractor License #422364  
Contractor DIR #1000000899

**CONTROL SYSTEM INTEGRATION • INSTRUMENTATION SERVICES  
SCADA/AUTOMATION • PLC/HMI • ELECTRICAL • CALIBRATION • MAINTENANCE**

October 30, 2024

Tuolumne City Sanitary District

Sent via Email: [jcooley@tcsdistrict.com](mailto:jcooley@tcsdistrict.com); [brendatsd@frontier.com](mailto:brendatsd@frontier.com)

Attn: Jeff Cooley  
Subject: Tuolumne City SD - SCADA Improvements  
Reference: 30-43328

Dear Jeff,

Telstar Instruments is pleased to provide a quote for the referenced project.

**By accepting this proposal from Telstar you agree to treat this as confidential information.**

We are pleased to provide the following scope of work for the SCADA improvement project located in at the Tuolumne City Sanitary District Wastewater Treatment Plant. Telstar presents a comprehensive proposal for the upgrade and enhancement of the SCADA system for the referenced project. The project will be executed in two phases to ensure an efficient and methodical approach to upgrading the District's SCADA infrastructure.

A detailed scope of services for **Phase 1** is provided below, which outlines the specific tasks and deliverables related to the initial implementation of the SCADA system. This phase will include hardware and software configuration & implementation, Programming additional PLC SCADA functionality Remote access and operational training. Additionally, an allowance has been reserved for **Phase 2**, which focuses on additional SCADA improvements. This allowance will cover enhancements, additional features, and any necessary upgrades identified in the Deficiency List, attached for reference.

**Phase 1: SCADA System Integration**

At present, the District does not have a fully functional SCADA system in place. In this initial phase, Telstar proposes to establish the necessary SCADA hardware and software environment. This will be based on data from the existing Rockwell HMI display system. Key features such as alarm call-out functionality and remote access will be incorporated, in addition to standardizing SCADA tags and screens across the system. Also, the Programming Functional Task items from the Deficiency List (highlighted in green) are included in this Phase 1 Scope of Work.

**SCOPE OF SUPPLY / SERVICES (Phase-1)**

1. Procurement of SCADA System Software: Ignition Pro License (Quantity 1): This license will support full redundancy, supports unlimited seats and tags, which ensures scalability and includes the following key modules:

4017 Vista Park Court, **Sacramento**, CA 95834 Phone 916-646-1999, Fax 916-646-1096  
1717 Solano Way, Unit 40, **Concord**, CA 94520 Phone 925-671-2888, Fax 925-671-9507  
202 South Douty Street, **Hanford**, CA 93230 Phone 559-584-7116, Fax 559-584-8028

- Vision Module (unlimited)
- SMS Alarm Notification Module
- SQL Bridge Module
- Tag Historian Module
- Report Module
- OPC UA Server Module with Core Drivers
- Software Support: Basic level support for the software will be included for a 1- year term.

There are four options for the Ignition software support from the manufacturer. Telstar has included Option (b) the Basic Care license support for one year in our scope of services. This will give you an idea of yearly support costs going forward for maintenance budgeting. For comparison purposes, the license cost is approximately \$32,000.00.

- a) **Decline Support and Upgrade Protection (0%) of the License Cost:**  
Your purchase of Ignition comes with 90 days of complimentary email and phone technical support. After 90 days, free support is limited to email only. If an upgrade is needed and a support plan is not in place, you will have to pay 65% of the software's current retail price.
- b) **Basic Care ( 16%) of the total License Cost/Year:** Basic Care is the starting point for protecting your software investment. Basic Care comes with Upgrade Protection which includes unlimited free upgrades to purchased Ignition modules throughout the duration of the Support Plan. The Upgrade Protection component alone provides significant ROI; however, you also receive unlimited email and web support throughout the year.
- c) **Total Care ( 20%) of the License Cost/Year:** Total Care is the flagship support product, offering phone support during business hours, email, and web support throughout the year. All of this is built on top of Upgrade Protection, which includes unlimited free upgrades to purchased Ignition modules while your Support Plan is active.
- d) **Priority Care ( 24%) of the License Cost/Year:** Priority Care is premium support, providing unlimited phone, email, and web support at the highest priority level during business hours. In addition to priority treatment, you also get Upgrade Protection, which includes unlimited free upgrades to purchased Ignition modules throughout the life of your Support Plan.

There are two options for SMS (text) alarm notification. Telstar has included installation of Option (b) SMS notifications using Twilio in our scope of services. The monthly fee for either option is not included in Telstar's current scope cost. Monthly / yearly support costs are included for each option for maintenance budgeting.

- a) **SMS with Cellular Modem:**  
This option requires a dedicated cellular modem with a carrier SIM card. The data plan will be provided by the Tuolumne SD. Inductive Automation officially supports

three Airlink devices: RV50/RV50X, and RV55. This option utilizes the SIM card's cellular service, with an estimated cellular data plan cost of \$35 to \$40 per month.

b) **SMS using Twilio Server:**

This option does not require a cellular modem. SMS notifications are sent through the Twilio SMTP service. It leverages the existing internet connection, which is Starlink, to transmit alarm messages. The estimated cost for Twilio service is \$10 to \$15 per month.

2. **Procurement of SCADA System Hardware:**

- **Servers:** Two (2) Dell PowerEdge R650 Rackmount Servers will be installed to ensure redundancy. The servers will feature Intel® Xeon® Silver 4310 2.1G, 12C/24T, 10.4GT/s, 18M Cache, Turbo, HT (120W) DDR4-2666 , with additional processor Intel® Xeon® Silver 4310 2.1G, 12C/24T, 10.4GT/s, 18M Cache, Turbo, HT (120W) DDR4-2666, with 64GB memory, SSD drives (qtyX2) 800GB SSD SAS ISE, Mixed Use, up to 24Gbps 512e 2.5in with 3.5in HYB CARR, AG Drive , (qty 2) Windows Server 2022 Standard Edition, Add License,16CORE,NO MEDIA/KEY, 5- pack of Windows Server 2022/2019 User CALs (Standard or Datacenter), 5-pack of Windows Server 2022 Remote Desktop Services, User, Dell ProSupport will be included with a 3-year mission-critical support agreement.
- **Virtualization:** Configure Server with Microsoft's hardware Hyper-V virtualization with Windows Server® 2022 Standard Edition.
- **Workstation Computers:** one (1) OptiPlex 7090 small form factor PCs with 24- inch monitors, Windows 11, and MS Office Home & Business 2021 will be provided.
- **Uninterruptible Power Supply (UPS):**  
Telstar will utilize the existing battery backup power connections for the server system and the workstation. This assumes the servers and workstation will be installed in the physical same room to utilize the existing UPS.
- **Network Infrastructure:**  
Telstar will utilize the existing ethernet switch for network integration.

3. **Software & Hardware Installation:** Telstar will install the above-mentioned hardware in the existing server rack and configure the Ignition SCADA system software. This will include setting up the servers for redundancy with automatic failover functionality to ensure continuous operation of the Ignition SCADA system.

4. **Workstation Configuration:**

Telstar will configure the existing workstations to function as SCADA clients. We assume the existing workstations have network connectivity to the SCADA network and an up-to-date operating system.

5. **SCADA Application Development and Implementation:**

- **Functional Requirements Workshop:** Telstar will organize a workshop to finalize the system's graphical interface, process flow, color conventions, animation strategies, database tag names, and alarm handling. The workshop will also define

historical data management, alarm systems, and reporting strategies.

- **Transfer of Existing HMI Data:** The data currently displayed on the existing Allen Bradley Rockwell HMI system will be transferred to the Ignition SCADA platform. The existing graphical screens and functionality will serve as the basis for this new programming.
  - **Historian and Reporting:** Ignition's Historian & Report module will be programmed to generate daily, weekly, monthly, and yearly automated reports. Reports will cover key operational metrics such as:
    - Flow reports (e.g., RAS Flow, WAS Flow, Headworks Inlet Flow)
    - Plant analyzers' data (e.g., Aeration Basin Dissolved O2 levels, Effluent Chlorine Residual)
  - **Alarm Notification System:** Telstar will configure District-selected SCADA alarms for SMS alarm notifications
  - **Workstation Setup:** One workstation at the plant will be configured as an Ignition client for accessing the SCADA system 24/7.
  - **Startup and Commissioning:** Telstar will provide startup and commissioning of the new SCADA system to ensure proper functionality and integration.
6. **Remote Access Implementation:** Telstar will procure and install a Cisco Firepower 1010 Next-Generation Firewall, configured for secure SCADA remote access. The firewall will provide Threat Defense Protection with a subscription license for 5 years.

There are various ways to accomplish remote access depending on your security requirements. For remote access, Cisco AnyConnect (Option 1) is included in the scope, covering the first 5 years of software subscription. Below are additional remote access options:

a) **Option 1: Cisco AnyConnect Plus:**

- Cisco AnyConnect Plus: 5-year subscription license + 5 years of Software Application Support and Upgrades.
- This subscription-based VPN client software provides secure access to the SCADA system over the internet. Once the VPN connection is established, users can access the SCADA client through a web interface.
- Pros and Cons:
  - Pros: Industry-leading security and reliability.
  - Cons: Configuration and maintenance require highly skilled IT or Cisco network specialists.
  - Cost: Higher initial configuration cost due to the specialized expertise needed, but low software license cost over time.
- Estimated renewal cost (current): \$800.00 per 5 years.

b) **Option 2: TeamViewer Desktop Sharing Application:**

- TeamViewer Premium: Includes one additional concurrent connection to enable remote access from mobile devices.

- Cost: \$213.70/month.
- Pros and Cons:
  - Pros: Simple setup with easy access via mobile and desktop devices.
  - Cons: Recurring monthly subscription cost.

c) **Option 3: DMZ with Azure Virtual Desktop (VDI):**

This is a high-end solution offering the most secure remote access. It includes deploying a DMZ Architecture along with Azure Virtual Desktop (VDI).

- **DMZ Architecture:**

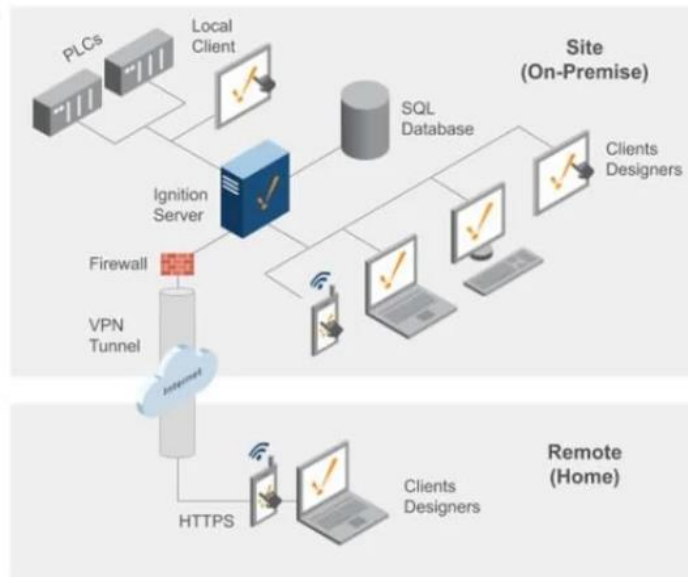
A demilitarized zone (DMZ) is a subnetwork that allows secure access to exposed services while keeping the internal network protected behind a firewall. This architecture acts as a buffer between the internal network and untrusted external networks such as the internet.
- **Azure Virtual Desktop (VDI):**

The remote SCADA connectivity will be achieved using **Azure VDI** (formerly Windows Virtual Desktop). This system provides virtual desktops and applications securely in the cloud, using **Remote Desktop Protocol (RDP)**.
- **Infrastructure Requirements:**
  - Additional server hardware with OS licenses.
  - Ignition DMZ gateway license.
  - Azure VDI RDP licenses.
  - IT Network security Professional for configuration and maintenance
- **Cost:**

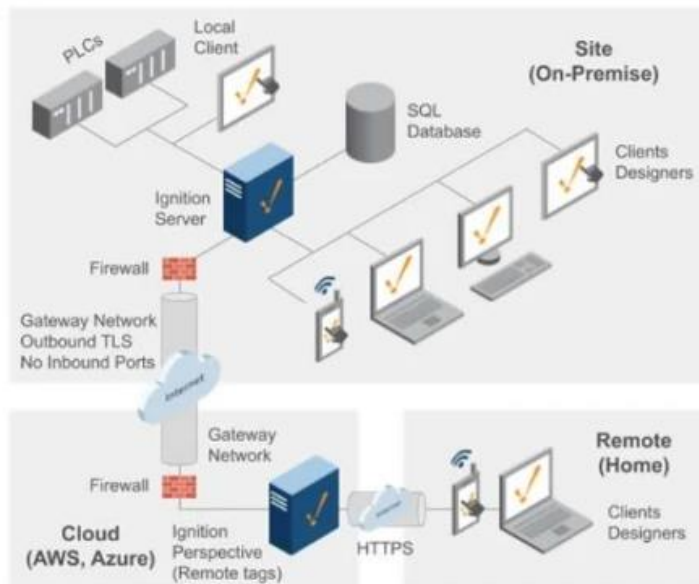
The configuration and implementation is estimated to cost between \$50,000 and \$60,000.

The following diagrams provide graphical detail of remote access architecture for the proposed Option 1 (first diagram) and the out of scope Option 3 (second diagram) for reference.

## Ignition for Remote Process Control - Architecture Examples



## Ignition for Remote Process Control - Architecture Examples





**7. Remote Sites Integration:**

- Black Oak Casino Reservoir: This system comprises two Allen Bradley PLCs (Main and Remote). Telstar will establish communication between these PLCs and the new Ignition SCADA system. Data will be integrated into the SCADA system, with automatic reports and alarms generated as per the operator's requirements.
- Reservoir and Pond System: Similar to the Black Oak Casino Reservoir, Telstar will integrate two Allen Bradley PLCs (Pond and Pump Station PLCs) into the SCADA system. Critical data such as flow rates and totalizers will be monitored, with alarm call-outs programmed into the system.

**8. Critical Items Programming from the Deficiency List Scope:**

Telstar has identified the items marked (and highlighted in green) on the attached Deficiency List that require only PLC and SCADA programming efforts or services. The items listed with comments as "Included in Scope Phase 1" are part of the Phase 1 scope of work.

- 9. Training:** Telstar will provide 8 hours of operational training immediately after the SCADA system implementation. An additional 8 hours of follow-up training will be scheduled after a period of operation, allowing the team to gain hands-on experience and better understanding of the system. This follow-up session will address any operational questions and additional training.

Hardware, Software, and Materials Price (Tasks 1, 2, and 6) .....	\$84,818.00
Labor for Tasks 3 and 4 Software and Hardware Configuration (48 hours) .....	\$12,704.00
Labor for Task 5 SCADA Application Development (344 hours) .....	\$87,924.00
Labor for Task 6 Remote Access Implementation (54 hours) .....	\$13,356.00
Labor for Task 7 Integration of Remote Sites (80 hours) .....	\$19,178.00
Labor for Task 8 Critical Items from Deficiency List (160 hours) .....	\$41,956.00
Labor for Task 9 Training (24 hours) .....	\$6,660.00
<b>Total Lump Sum Price (Phase 1) .....</b>	<b>\$266,596.00</b>

Labor breakout prices above include Telstar Software, Cables, License Charge, and Mileage/Per diem.

Shipping and handling for Telstar supplied materials IS INCLUDED.

Sales tax for materials IS INCLUDED.

**Phase 2: Budget Allowance for Additional SCADA System Improvements**

The remaining items from the Deficiency List noted as "Phase 2" will need further clarification, as their completion may require panel installation, equipment setup, and conduit/wiring installation prior to functional programming. Telstar will assess these items in greater detail during a later project phase. Based on the District's recommendations and the assessment, we will either proceed with these items on a time-and-material basis or provide a lump sum cost for the listed items. **Time and material Rates are provided** below for reference.

**SCOPE OF SUPPLY / SERVICES (Phase 2)**

Deficiency List attached for reference.

**Phase 2 Allowance Budget Assigned ..... \$222,664.00**



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**TIME AND MATERIALS RATES**

Principal Engineer (Registered CA Professional Engineer) .....	\$268.00/hr
Engineer .....	\$212.00/hr
CAD Technician .....	\$114.00/hr
Senior SCADA/PLC Applications Programmer/Software Developer .....	\$268.00/hr
SCADA/PLC Applications Programmer/Software Developer .....	\$222.00/hr
PLC/SCADA-HMI Programming Software, Cables, License, Etc charge (*) .....	\$21.00/hr
CA State Certified Journeyman Electrician (Based on PW Determination TUO 2024-1) .....	\$188.75/hr
Electrician Apprentice required by 1775 LC (Based on PW Determination TUO 2024-1) .....	\$155.00/hr
Instrumentation Field Technician/Controls Systems Specialist .....	\$202.00/hr
Administrative .....	\$114.00/hr
Materials/Equipment Markup .....	Cost +20%
Mileage, Per diem, Fuel Surcharge .....	Per Federal Guidelines

**Phase 2 (Time & Material) CLARIFICATIONS, EXCEPTIONS, AND EXCLUSIONS**

- a. Material price is valid for seven (7) days from date referenced on this quote (Refer to COVID clause RE: MATERIAL PRICING AND DELIVERY under Terms and Conditions)
- b. This quotation is based on the inclusion of Telstar's standard Terms and Conditions as part of any purchase order, contract or other agreement.
- c. Time and materials rates are valid through June 30, 2025.
- d. Technician billable time starts from point of origin and continues to time of return to Telstar office or point of origin. Travel time is billed as straight time.
- e. Overtime rate is applied for hours worked in excess of 8 up to and including 12 hours Monday–Friday during normal business hours of 7 am to 5 pm. Overtime is applied for hours worked up to and including 12 hours on Saturday and up to and including 8 hours on Sunday. Double-time rate is applied for hours worked in excess of 12 hours Monday-Saturday and for hours worked in excess of 8 hours on Sunday. Overtime rate will be billed at 1.5 times base rate and double-time will be billed at 2 times base rate.
- f. On-site service calls carry a 4-hour minimum per person; time over 4 hours is charged as 8 hours. The minimum charge for remote support is 2 hours.
- g. Telstar is available 24 hours per day, 7 days a week to provide remote and on-site service. On-site emergency calls carry a 4-hour minimum.
- h. A flat rate emergency fee is charged for all unscheduled work.
- i. Travel time is billed portal to portal at above hourly rates.
- j. A fee of 2% will be applied to all invoices paid by credit card.



## Project Exclusions:

1. Please note that the scope of this recommendation does not include the estimation for PLC replacement costs.
2. Telstar will not be liable for any loss, damage, or disruption caused by any cybersecurity incidents.

## Telstar's Recommendations for PLC Replacement (Not Included in this Scope of Services):

Telstar recommends replacing the existing obsolete PLCs with new firmware and hardware that are currently supported by the manufacturers to ensure long-term reliability and maintainability.

### 1. Tesco CPNL-05-03 Panel:

This panel includes a ControlLogix L62, which was discontinued by Rockwell in 2017. The recommended replacement is the CONTROLLOGIX 1756-L72. Additionally, the panel houses a Rockwell PanelView 2711P-K7C4D1, which was discontinued in 2012. The suggested upgrade is the PanelView Plus 7. Lastly, this panel contains a RACO alarm dialer, and we recommend replacing this with a new unit for improved functionality.

### 2. BIOLac Parkson Control Panel:

This panel is equipped with an SLC 5/05 PLC, which was discontinued in 2018. The recommended replacement is the ControlLogix series. The PanelView is a 2711-B6C20, which was discontinued in 2012, and the suitable replacement is also the PanelView Plus 7.

### 3. Panel with ML1500 PLC:

This panel features an ML1500 PLC, which was discontinued in 2017. The recommended replacements are the Micro 850, CompactLogix, or MicroLogix 1200. The panel also includes a discontinued Maple OIT 3185, for which new replacement options are available. Additionally, the panel contains a RAD-ISM-900 wireless radio, but according to the information provided, it is not currently in use. In the future, this panel will communicate with SCADA using a wired Ethernet connection.

### 4. Wess Control Panel:

This panel utilizes an ML1100 PLC, another discontinued product. The recommended replacements are the Micro 850, CompactLogix, or MicroLogix 1200.

## TERMS AND CONDITIONS

**Base Terms:** Quotation is valid for 30 days from the date of Telstar's quotation. Payment is due and payable 30 days from date of invoice. If payment is not received by the 30th day, a .05% daily service charge (18-3/4% per annum) will be charged on all accounts past due. In the event of a dispute concerning payment, attorney's fees, court costs and costs of collection will be paid to the prevailing party. The cost for permits and bonding are excluded unless expressly referenced in Telstar's quotation. Our standard insurance applies unless agreed to in writing by Telstar. Telstar's standard one year parts only warranty applies to this quotation. All other warranties, express or implied, or referenced elsewhere in contract documents are excluded, including but not limited to implied warranties of merchantability or fitness for purpose. Unless expressly stated in Telstar's estimate, this quote is based on standard straight time hours and does not include any prevailing wage rates. The price quoted herein is for the labor and materials specifically listed within the body of this quote. Service calls are charged at a 4-hour minimum per person, excluding travel time. Unless expressly stated in the quotation, training, operation and maintenance manuals, and preparation of as built drawings are excluded from Telstar's scope of work.



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**Limitation of Liability:** (a) In no event shall Telstar, its suppliers or subcontractors be liable for special, indirect, incidental or consequential damages, whether in contract, warranty, tort, negligence, strict liability or otherwise, including, but not limited to, loss of profits or revenue, loss of use of the Equipment or any associated equipment, cost of capital, cost of substitute equipment, facilities or services, downtime costs, delays, and claims of customers of Customer, its officers, directors, members employees or any third parties for any damages. Telstar's liability for any claim whether in contract, warranty, tort, negligence, strict liability, or otherwise for any loss or damage arising out of, connected with, or resulting from this Agreement or the performance or breach thereof, or from the design, manufacture, sale, delivery, resale, repair, replacement, installation, technical direction of installation, inspection, operation or use of any equipment covered by or furnished under this Agreement, or from any services rendered in connection therewith, shall in no case exceed twenty-five percent (25%) of the purchase price allocable to the Equipment, part or Services that is the subject of the claim. (b) All causes of action against Telstar Instruments arising out of or relating to this Agreement or the performance or breach hereof shall be deemed barred unless brought within one year from the date of discovery or other accrual. (c) In no event, regardless of cause, shall Telstar Instruments be liable for liquidated damages, offsets or penalties of any kind or to indemnify, defend or hold harmless Customer, its officers, directors, members, employees or any third party, arising from or related to the Equipment and/or Services provided by Telstar.

**Force Majeure:** Telstar shall neither be liable for loss, damage, detention or delay nor be deemed to be in default for failure to perform when prevented from doing so by causes beyond its reasonable control including but not limited to acts of war (declared or undeclared), Acts of God, fire, strike, labor difficulties, acts or omissions of any governmental authority or of Customer, compliance with government regulations, insurrection or riot, embargo, delays or shortages in transportation or inability to obtain necessary labor, materials, or manufacturing facilities from usual sources or from defects or delays in the performance of its suppliers or subcontractors due to any of the foregoing enumerated causes. In the event of delay due to any such cause, the date of delivery will be extended by period equal to the delay plus a reasonable time to resume production, and the price will be adjusted to compensate Telstar Instruments for such delay.

**Cancellation:** In the event of cancellation by Customer, Customer agrees to fully reimburse and compensate Telstar for all costs associated with this Quotation or subsequent order, including but not limited to engineering, labor, materials, quote and estimating time, and product return fees, plus a ten percent (10%) markup to compensate for disruption in scheduling, planned production, indirect costs and profit. Payment for cancellation shall be due within ten (10) days from the date of submission of charges by Telstar.

**Entire Agreement:** This Quotation constitutes the entire agreement between Telstar and Customer. There are no agreements, understandings, restrictions, warranties, or representations between Telstar and Customer other than those set forth herein or herein provided. This Quotation may only be amended, changed or revised by a written amendment signed by an authorized representative of Telstar. No oral or implied agreements shall be of any force or affect.

**Precedence:** In the event Telstar is issued an authorization for work, Purchase Order, Contract or similar Agreement with conflicting Terms and Conditions than those set forth herein, these Terms and Conditions will take precedence and will supersede any and all other conflicting Terms and Conditions.

**Submittals:** In the event Telstar receives a Notice to Proceed or a written statement to proceed with submittals, Telstar will be entitled to compensation based on percent of completion of submittal cost to Customer. Telstar will prepare only one set of submittals, and any resubmittals shall be subject to an additional charge for engineering time and other costs in preparing re-submittals.

**Prevailing Wages:** Customer must promptly inform Telstar when a project will be registered on the Department of Industrial Relations. Customer must inform Telstar if Certified Payroll Reports are required to be submitted to Customer. If Customer requests Certified Payroll Reports beyond four weeks in arrears, Customer may be charged an administrative processing fee of \$50.00 per week generated for said reports.

**Authorized Signers:** Only the following authorized signers of Telstar have the complete legal authority to bind contractual documents: John D. Gardiner (President), Kyle A. Johnsen (Vice President), Robert S. Marston (Secretary), Benjamin R. Herston (Treasurer). If a document is signed by an unauthorized signer, the document will be void and unenforceable.

**Industry Material Pricing and Delivery:** Telstar is unable to hold prices on materials for more than 7 days. Prices for plastic, copper, steel, and other commodities fluctuate daily. Our vendors and manufacturers are experiencing



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unprecedented delays due to current industry labor shortages, shortage of containers, port congestion, and raw material shortages, that have extended lead times significantly. Telstar reserves the right to amend the delivery date and pricing of materials set forth in this quotation. Telstar considers any of the above related changes imposed by our vendors and manufacturers as outside its reasonable control and subject to Force Majeure provisions.

**Insurance:** Telstar's standard insurance limits will apply.

**Open Shop:** Telstar is an Open Shop contractor and will not be signatory to any unions.

We look forward to working with you on this project. If you have any questions, please contact me at the phone number below.

Sincerely,

Suresh Patil  
Programming Manager  
Telstar Instruments  
spatil@telstarinc.com  
(916) 646-1999

SR	Tuolmne SD Deficiency /Tasks List	Priority	Telstar Scope Inclusion
1	<b>Alkalinity Building</b>		
	1.Connect shower/eyewash station in Alkalinity building to SCADA alarm. Eyewash station in alkalinity building has one spare conduit for power. Alarming may need to be wireless.	Low	Need detailed ENG. Phase 2
	2.Chemical feed pumps should be equipped with wessure sensors to detect when there pressure builds up in the chemical feed line. When pressure is detected the pumps should deactivate and an alarm in SCADA should trigger. This may need to be wireless as well.	Low	Need detailed ENG. Phase 2
	3.Level indicators in the two mini-bulk storage caustic storage tanks would be an added benefit to remote viewing. This would give early warning when remaining storage levels run low; however, daily checks would still be conducted.	Med	Need detailed ENG. Phase 2
2	<b>Headworks</b>		
	1.The headworks screw screen has cleaning jets that spray potable water when the upstream level sensor signals the bar screen to activate. This setup cannot differentiate between high flows due to I&I or when the bar screen is starting to clog. As a result, the jets stay on during high flows and use large and unnecessary amounts of potable water. The solution would be to have the downstream flow meter ultra-sonic (post bar screen) communicate with the upstream level sensor to determine if high liquid level is a result from high flows or a clogging bar screen.	Med	Need detailed ENG. Phase 2
	2.Headworks screening should have Run Times displayed in SCADA. Run times are displayedHIGH locally at the headworks OIT screen but the local micrologix does not communicate with the rest of SCADA. SCADA can only see if the equipment is running or not, and influent flows.	High	Included in Phase 1 Scope
	3.Influent flow is metered using a transducer ultrasonic which sits atop a six-inch parshall flume. To my understanding this device is less accurate when detecting liquid levels within one foot of the transducer. The transducer has been witnessed to become submerged during high flows.The transducer should be raised to a level that maintains accuracy, regardless of flows	High	Need detailed ENG. Phase 2
	4.On a few occasions, the headworks bar screen has failed to turn on when called despite redundant protection. The MCC is controlled by a primary level indicator (ultra-sonic) and a backup float switch. When neither switch fails to activate the bar screen no alarm event is triggered and no callout occurs. This is difficult to troubleshoot as it happens very intermittently; however, it poses a potentially serious problem in regards to spilling out of the open channel design. A proposed project of installing an overflow pipe from the Headworks to the Aeration Basin would not add protection	High	Need detailed ENG. Phase 2
3	<b>Apple Colony Pump Station</b>		
	1. When there is a transfer of power during a pump cycle, the pump station does not always come back online until PLC reset button on Tesco panel OIT screen is pressed.	High	Need detailed ENG. Phase 2
	2.Lift stations would be better eq-uipped with ultra-sonic or transducer level indicators instead of, float switches. Liquid levels should be displayed on P&ID screen and have the capability to beviewed remotely ,	High	Need detailed ENG. Phase 2
	3.There is a proposed project of replacing the lift station. This has not been designed yet but considerations should be made for additional 1/0 to include a flow meter, seal leak, and over temp alarms for three pumps.	High	Need detailed ENG. Phase 2
	4.Corrections need to be made to control automated independent alternating sequencing. Currently, SCADA shows the option for changing the sequence, but no actual changes occur when toggling the option in SCADA. As a result, one pump always has twice as many start times and differing run times. Staff records these values daily, but it would be more convenient to have this automated. Automation would include logging daily run/start times, resetting monthly run/start times, and monthly spreadsheet printouts.	High	Included in Phase 1 Scope
4	<b>Proposed Wet-Well</b>		
	A proposed wet-well is suggested to be installed in the location of Overflow Pond-1. Additional 1/0 should be reserved for a two-pump pump station with a flow meter.		Need detailed ENG. Phase 2
5	<b>Dissolve O2 Probe</b>		
	1.Attached to the inline Hach LDO dissolve O2 probe is a Rosemount air blast unit designed to clean debris from the O2 probe lens. Staff has never been able to get this set up to work on a scheduled time event. From my readings, the Rosemount unit can be controlled by the Hach SC200 controller		Need detailed ENG. Phase 2
6	<b>Blower Sequence</b>		
	1.The blowers long ago were observed to have a Lead/Lag function where another blower would come on at a low frequency and slowly ramp up to meet dissolve oxygen demands, if dissolve O2 levels fell below a preset value. This function no longer occurs and needs to be restored.	High	Included in Phase 1 Scope

SR	Tuolmne SD Deficiency /Tasks List	Priority	Telstar Scope Inclusion
<b>7</b>	<b>Interface</b>		
	1.P&ID screen is generic.	High	Included in Phase 1 Scope
	2.Equipment should be properly labeled in SCADA instead of MCC number.	High	Included in Phase 1 Scope
	3.SCADA should display VFD frequency for blowers and sludge pumps.	High	Included in Phase 1 Scope
	4.Real time and totalizer flows should be displayed in gallons and not million gallons per day notation	High	Included in Phase 1 Scope
	5.The flow totalizer screens should display three totalizers per flow meter and include, 1) annual totalizer; 2) daily (previous day) resettable totalizer; and 3) daily accumulative flow (flow that has been received from the beginning of the day).	High	Included in Phase 1 Scope
	6.SCADA should be capable of viewing remotely at each operator's desktop computer and/or a smartphone app. A discussion is needed for remote control benefits vs cyber security threats, as that has been a past concern.	High	Included in Phase 1 Scope
	7.Each operator should have their own login credentials. All changes made within SCADA should logged which operator made which changes.	High	Included in Phase 1 Scope
	8.The effluent flow meter 20 mA scale was changed from one MGDto two MGD. The bar indicator in SCADA needs to be adjusted to reflect this change. No functional <i>server</i> in service.	High	Included in Phase 1 Scope
	9.The current sludge waste valve is set up to waste on a time basis. Proper wasting volumes are determined daily in the lab which should tell the operator how much to waste. An optimal SCADA system would have a place for the operator to enter a value in gallons to waste and the system execute. This is achievable due to the existing automatic wasting valve. (Automated wasting valve not currently operational. Staff manually opens a valve to waste on a timed basis.	High	Included in Phase 1 Scope
	10.Operators should be able to easily change the time in the OIT screens for daylight savings time changes, or have time adjusted and updated automatically via internet. Time changes should be tracked in an event logger.	High	Included in Phase 1 Scope
	11.In the past, when improvements have been made to PLC programming the District has had to pay for programmers to reverse engineer PLC coding. Upon completion of this project, there should be programming schematic drawings that is easily interpreted by any programmer, with propriety rights to the District.	High	Included in Phase 1 Scope
	12.Monthly and annual reports needs improvement. Currently, the reports that SCADA logs are not accurate and are of little use for self-monitoring reports. Once corrected, staff should be trained how to get various data to populate into monthly reports	High	Included in Phase 1 Scope
	13.The trends screen is generic and not user friendly. This screen should be modernized and allow the District to remove the chart recorder in the Blower Building.	High	Included in Phase 1 Scope
	14.Changing the blower sequence is not user friendly. It will call for the blowers to rotate at midnight following the seven day cycle. Operators should have direct control over this, or at least have the blowers rotate during normal working hours. Issues with blowers not coming on creates a callout in the middle of the night.Parkson logics w/staff. the blowers rotate during normal working hours. Issues with blowers not coming on creates a callout in ...Parkson logics w/staff.	High	Parkson
<b>8</b>	<b>Alarms</b>		
	1.Alarm history reset should be eliminated.. Once in a while an operator will accidently hit this button and erase all previous..alarms..SCADA should keep a historical log of-all-alarm events. An option to printout monthly alarms would be beneficial		Need detailed ENG. Phase 2
	2.Win-911 (alarrning-software) could better stare spedfic alarms. It currently will say "XDCR fail" and _not Transducer fail, or “CNPL 08-,O2 fail” instead of Apple.Colony Pump-2 Fail. (Win-911 is located on the crashed server and not operational).		Need detailed ENG. Phase 2
<b>9</b>	<b>Baker's Ranch Improvements</b>		
	Considerations should be made for the future Tailwater/Berm Project. It is proposed to include the installation of soil moisture probes, a shutoff switch to the irrigation pump, and an automatic valve on the gravity irrigation system. Extra 1/0 should also be available for surveillance, an inline pH probe, and freeboard level indicator.		Need detailed ENG. Phase 2
<b>10</b>	<b>Future Expansion Considerations</b>		
	1.A future dewatering facility would likely include an inline sludge pump, a filtrate return pump, and two chemical feed pumps. The sludge pump should be metered. There should spare 1/0 to support five additional alarms depending on the type of equipment installed		Need detailed ENG. Phase 2
	2.This might not be SCADA related, but a computerized maintenance program would be a great addition to guide routine maintenance in everything from the collection system to vehicle maintenance. This software can be installed on the SCADA servers. (Cal-CAD)		Need detailed ENG. Phase 2

SR	Tuolmne SD Deficiency /Tasks List	Priority	Telstar Scope Inclusion
	3.The reservoir is currently undergoing a study to evaluate seasonal pH fluctuations. It is likely the District will add the Parkson aftermarket Wave-Ox system to denitrify at the WWTP instead of the reservoir. Any modifications to the Parkson PLC cabinet would fall under Parkson's scope; however, considerations should be made when updating the P&ID screen.		Need detailed ENG. Phase 2
11	Sludge Pumps		
	New sludge pumps need to be integrated into SCADA with flow-based control. Flow-base should run off effluent mag meter as the influent flow fluctuates dramatically due to the bar screen's on/off cycles. New sludge pumps need to be integrated into SCADA. We have learned the new pumps occasionally get air-locked. A fault should occur when the pumps a re on and there is no corresponding, or inadequate RAS flow		Need detailed ENG. Phase 2
12	Floating Mixers		
	The two floating aerators came with Perma greasers that had to be manually turned on. They were replaced with Bluetooth greasers. An ideal setup would be for the greasers to be replaced with hardwired greasers that come with the equipment. Would this be covered by plant-wide wifi?		Need detailed ENG. Phase 2
13	Security		
	1.SCADA should include future use of surveillance, also to be viewed remotely.		Need detailed ENG. Phase 2
	2.In addition to surveillance, enhanced security could be implemented at the WWTP entrance. Improvements would include having the gate closed at all times with a call box linked to the Office Manager's work station who could remotely open the gate from the office. This feature should be afforded to all staff's mobile devices, as well. A proximity sensor would need to be installed on the gate for egress.		Need detailed ENG. Phase 2
	3.Internet service provided by Frontier Communications is unreliable. A better service provider would be Comcast. A service survey was conducted in 2023, resulting in a setup cost around \$20,000.Starlink installed		Need detailed ENG. Phase 2