

City of Kirksville, Missouri
Water Treatment Plant
Electrical and SCADA design for Duplex Grinder Pump Station and Duplex
Lift Station Project

1. Overview and Understanding:

This project will include the design of electrical and SCADA system for a duplex grinder pump station and a submersible duplex lift station located outside the water treatment plant as per the preliminary drawings as part of the request of proposal.

The owner City of Kirksville will be responsible for the mechanical, structure and civil design of the lift stations. Gupta and Associates, Inc. (GAI) will be responsible for the design of electrical and SCADA system design and will perform this engineering design work as a consultant to the City of Kirksville.

The engineering work is to be provided through the following phases:

- **Preliminary Design Report**
 - None in this project
- **Electrical & SCADA Design**
 - Two submittals of plans and specifications for review (60% and 90%)
 - Opinion of Probable Construction Cost estimates at each interim submittal and a final
 - Bid Ready Submittal for publication
- **Bidding Assistance**
 - Advertisement through Conformed Drawing Submittal for publication
- **Construction Phase Assistance**
 - Review of electrical and instrumentation shop drawings and produce as built drawings.
 - Provide inspection for substantial completion.

Design Considerations:

- Design Electrical and SCADA system for Grinder Lift Station and Submersible Lift Station, the preliminary details of the lift stations are as followings:
 - **Grinder Lift Station:**

The grinder lift station will consist of two submersible chopper pumps with a motors rated at 1 hp each at 480V. The control panel and associated float switches will be provided by the pump supplier.
 - **Lift Station:**

The lift station will consist of two submersible pumps with a motors rated at 23 hp each at 480V. The control panel and associated float switches will be provided by the pump supplier
 - **Power Supply:**

Power to the Lift stations will be provided from the existing motor control center (MCC) at 480V, which is located on the second floor of the administration building. Conduit and wires will be routed to the lift stations control panel which will be located next to the lift stations. Since there is a backup generator hookup

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at the water treatment plant an individual manual generator receptacle is not required at each of the lift stations.

○ **SCADA Interface:**

The lift stations will be monitored from the existing Human Machine Interface (HMI) which is located in the administration building. Following signals will be monitored from each lift station:

Pump P1-Run Status

Pump P1- Off Status

Pump P1-Fail Alarm

High Level Alarm

Pump P2- Run Status

Pump P2-Off Status

PumpP2- Fail Alarm

In addition a remote enable/disable signal will be provided for the lift station. The SCADA system upgrade, PLC programming and HMI screen modifications will be provided by Micro-Comm. Inc.

○ **Schedule:**

The 60% plans and specifications due within 60 days from notice to proceed
The 90% plans and specifications due after 30 days from receiving written comments.

The 100% plans and specifications due with in two weeks from receiving final written comments.

2. Work Phase Description:

GAI is to provide the following for the design of the project as described above for each of the required submittals:

- Plan Drawings and Construction Specifications
- Opinion of Probable Construction Costs (OPCC)

2.1.Task 1 – Project Management:

This work will be done on a consultant basis where GAI is working for City of Kirksville.

- GAI will provide invoicing every two months for this work to City of Kirksville.
- GAI will participate in a telephone kick-off meeting with City of Kirksville to discuss the project, introduce the engineers, establish schedule, milestones and deliverables etc.
- GAI will participate in monthly review meetings to discuss progress, design issues and project coordination.

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- GAI will participate in a design review meeting over the telephone after each of the 60% and 90% submittals.
- City of Kirksville will provide meeting minutes to meetings conducted over phone.

2.2.Task 2 – Electrical & SCADA Design Construction Plans and Specifications:

2.2.1. Task 2.1 – Design Documents:

GAI will provide half-size hard copies of plan drawings in 11” X 17” format for the 60% and 90% submittal for review. The plans and specifications will also be e-mailed to City of Kirksville for review and comments. The bid ready set of plans will be signed and sealed half-sized as well. The following is a preliminary list of plan drawings to be provided:

Sheet Number	Description	60% Submittal	90% Submittal
General Sheets			
E-01	Electrical Symbols & Legend	X	X
E-02	Electrical General Notes	X	X
E-03	Electrical Overall Site Plan	X	X
E-04	Electrical MCC One Line Diagram- Modifications	X	X
E-05	MCC Elevation View & Details	X	X
E-06	Grinder Pump Station & Lift Station One Line Drawing	X	X
E-07	Grinder Lift Station- Electrical Plan & Details	X	X
E-08	Lift Station-Electrical Plan & Details	X	X
E-09	Electrical Section & Details		X
E-10	Grinder Pump Station-P&ID	X	X
E-11	Lift Station-P&ID	X	X
E-12	Electrical Standard Details		X

The following is a preliminary list of construction specifications to be provided:

Spec Number	Description
Electrical	
16000	Electrical - General Provisions
16045	Electrical Support Hardware
16110	Raceways, Boxes, and Fittings

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Spec Number	Description
16120	Wires and Cables (600 Volt Maximum)
16486	Mechanical Equipment Manufacturer's Provided Control Panels
16600	Underground System
16660	Grounding System

GAI will incorporate the comments provided by City of Kirksville before the next submittal. The City of Kirksville will submit the plans and specification to the MDNR for their review and approval. GAI will provide responses to the questions pertaining to electrical and SCADA to the City.

2.3.Task 3 – Bidding Assistance:

This scope includes bidding assistance as follows:

- Providing response to City of Kirksville for addenda and requests for information and questions from the contractor.
- Conformed Plans consisting of one hardcopy set with half size drawings and one (1) electronic copy in native AutoCAD, 2009 format. Specifications consisting of hard copy and electronic copy (Microsoft office format).
- GAI will participate in the Prebid conference call

2.4.Task 4 – Construction Services:

This scope includes services as follows:

- GAI will participate in a Preconstruction conference call
- Review electrical and instrumentation submittals, which will include lift station control panels by pump supplier.
- Provide response to the questions from the contractor pertaining to electrical and instrumentation design during construction
- GAI will provide one (1) substantial completion inspection for electrical and instrumentation.
- GAI will produce As-Built Plans based on markups provided by the contractor and City inspection. GAI will provide one hardcopy set with half size drawings and one (1) electronic copy in native AutoCAD, 2009 format.

3. Sub-Consultants:

GAI does not anticipate requiring any sub-consultants to do this work.

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4. Fee:

GAI will perform these services on a fixed fee lump sum basis, based upon the following:

Task 1 – Project Management

Engineering Labor:	\$2,160.00
Reimbursable Expenses:	\$50.00

Task 2 – Design Phase

Engineering Labor:	\$12,240.00
Reimbursable Expenses:	\$100.00

Task 3 – Bidding Phase

Engineering Labor:	\$1,280.00
Reimbursable Expenses:	\$50.00

Task 4 – Construction Phase

Engineering Labor:	\$2,720.00
Reimbursable Expenses:	\$30.00
Substantial Inspection Trip	\$1,900.00

Total:	\$20,530.00
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5. Clarifications:

The following items apply to this proposal:

- Opinions of Probable Construction Costs are engineering estimates and are not warranted.
- The City of Kirksville will provide GAI CAD files for the pump station and associated site plan, section and details.
- The City of Kirksville will provide all necessary front end specifications for the bid document
- The City will assemble, distribute the plans and specifications for bidding
- The City of Kirksville will provide construction phase services, except the services provided by GAI as noted above.
- The design phase to be completed in four to six months from notice to proceed