

Village of Orland Park, Illinois

**Main Pumping Station MCC
Replacement**

**Scope of Engineering
Services**



Main Pumping Station MCC Replacement

Project Background

The Village of Orland Park (Village) Main Pumping Station provides potable water for the Village's water distribution system. The Main Pumping Station was originally constructed in 1985 and the majority of the equipment is nearing 30 years old. Over the past few years, the electrical system has become harder to maintain as components have become obsolete and spare parts more difficult to obtain.

In order to plan for future improvements, the Pumping Station Evaluation Report (Report) was developed in 2016. The Motor Control Center (MCC) Replacement Project will implement the improvements identified in the Report to improve electrical system reliability, efficiency, safety, and mitigate difficulties associated with aging electrical equipment.

The MCC Replacement Project will incorporate the following design elements:

- Replacement of existing MCC and reduced voltage starters with new MCC and new reduced voltage starters.
- Incorporation of electrical safety features into the new electrical equipment.
- Programmable Logic Controller (PLC) based automatic transfer switch with manual re-transfer.
- Connection point for a portable generator.

Project Tasks

The MCC Replacement Project will include the following tasks:

Task 1 – Project Management

- 1.1 Kickoff Meeting – Conduct a kickoff meeting with representatives from the Village. The kickoff meeting will be attended by the Project Director, Project Manager, Lead Electrical Engineer, and Electrical Engineer. A site visit will be held immediately after the kickoff meeting. Draft meeting notes will be delivered to the Village within 5 business days of the meeting.

Deliverables – Kickoff Meeting Agenda, Draft Meeting Notes, and Final Meeting Notes

- 1.2 Develop Project Schedule – A draft project schedule will be prepared for the kickoff meeting. Following the kickoff meeting, a project schedule incorporating the Village's comments will be prepared and delivered to the Village within 5 business days of the meeting. The schedule will be updated as the project progresses.

Deliverables – An electronic PDF copy of the Project Schedule will be provided.

- 1.3 Monthly Invoicing – Develop monthly invoices for submittal to the Village. Oversee budgets on a weekly basis to ensure budgets are progressing at the rate of scheduled work.



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Deliverables – Monthly Invoices

- 1.4 Review Meetings – Conduct 3 review meetings, at the 60%, 90%, and 100% design phases with the Village to review technical aspects of the project, cost, and schedule. Meetings will be used to facilitate decision making. The Project Manager, Lead Electrical Engineer, and Electrical Engineer will attend the meetings. The Project Director will attend one meeting. Draft meeting notes will be delivered to the Village within 5 business days of each meeting.

Deliverables – Agendas, Draft Meeting Notes, and Final Meeting Notes

- 1.5 Quality Assurance and Quality Control – Perform QA/QC review prior to submittal of each major milestone.

Task 2 – Design

- 2.1 Drawings - Prepare construction contract drawings for use in soliciting competitive bids and entering into a construction contract with a contractor. Drawings will be prepared using AutoCAD.

Deliverables – 3 hard copy sets (11"x17") and an electronic PDF set of the drawings will be provided at the 60% and 90%, and 100% milestones.

- 2.2 Specifications – Prepare construction specifications for use in soliciting competitive bids and entering into a construction contract with a contractor. Standard Construction Specifications Institute (CSI) MasterFormat 2004 will be used. The Village's standard front end specifications will be used to the extent possible.

Deliverables – A list of anticipated specifications will be provided at the 60% milestone. Three hard copy sets and an electronic PDF set of the specifications will be provided at the 90% and 100% milestones.

- 2.3 Opinion of Probable Construction Cost – Prepare Association for the Advancement of Cost Engineering (AACE) construction cost opinions consisting of Class 2 for 60% completion and Class 1 for 90% and 100% completion.

Deliverables – An electronic PDF of the opinion of probable construction cost will be provided at the 60%, 90%, and 100% milestones.

- 2.4 Construction Schedule – Develop a schedule of construction activities from contractor Notice to Proceed to Substantial Completion. The schedule will take into account work that needs to be performed during season low demand periods and overnight so as not to impair the Village's ability to provide uninterrupted water service. The construction schedule will be provided with the 90% deliverable and updated for the 100% deliverable.





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Deliverables – Electronic PDF of the Construction Schedule.

- 2.5 Electric Utility Company Coordination – Coordinate with Commonwealth Edison (ComEd) as required to facilitate the revised electric service to the Main Pumping Station.

Deliverables – Notes from correspondence with ComEd.

- 2.6 Electrical Conduit Inspection – Retain the services of a qualified, experienced firm to locate and examine the spare underground conduits installed at the Main Pumping Station site for a future second utility feeder. The conduits will be examined via CCTV to determine suitability for use for the second utility transformer and feeder.

Deliverables – Conduit Inspection Technical Memorandum

Task 3 – Bid Assistance

- 3.1 Pre-Bid Meeting – Attend 1 pre-bid meeting and prepare meeting notes. The Project Manager will lead the meeting.

Deliverables – Meeting agenda, sign-in sheet and meeting notes

- 3.2 Bidder Inquiries – Respond to bidder inquiries during the bidding period. For the purposes of this proposal it is assumed that responses to 8 bidder's questions and a bidder inquiries memo will be provided.

Deliverables – Bidder inquiries memo

- 3.3 Addenda – Prepare addenda as needed to clarify the Contract Documents. This proposal assumes the preparation of 1 addenda with changes to two drawings and a memo describing the changes.

Deliverables – Electronic PDF of addenda to the Contract Documents, 2 addendum drawings and addendum memo

- 3.4 Bid Report – Tabulate bids and prepare a Bid Report.

Deliverables – Bid Tabulation and report with recommendation for award



Task 4 – Design Services During Construction

- 4.1 Submittals – Log, review, and take appropriate action on Contractor submittals for compliance with the Contract Documents. This proposal assumes 20 minor submittals requiring 2 hours for the first review and 1 hour for the second review and 1 major submittal (Motor Control Center) requiring 16 hours for the first review and 8 hours for the second review.

Deliverables – Submittal review responses

- 4.2 Change Orders, Supplemental Drawings, and Requests For Information (RFI) – Review field initiated proposed changes. Prepare proposed changes where appropriate. Assist with the development and preparation of any change orders that may be required and review the Contractor's cost proposals. Prepare clarifications and supplemental drawings to provide addition detail and information to further the Contractor's understanding of the contract scope and design intent. Respond to Contractor Requests For Information for routine interpretations of the Contract Documents. This proposal assumes 2 field initiated proposed changes requiring 8 hours of time for the Lead Electrical Engineer and CAD Technician each and 12 RFIs requiring 1 hour for the Lead Electrical Engineer and 2 hours for the Electrical Engineer each.

Deliverables – Change order responses with supplemental drawings, RFI responses

- 4.3 Site Visits During Construction – Visit the project site on a bi-weekly basis to review construction progress. Participate in project meetings when requested to do so in advance by the Village. Provide assistance by technical design staff at appropriate junctures through the course of the project in determining the acceptability of installation of new work prior to acceptance and start-up. For the purposes of this proposal it is assumed that the construction duration will be 16 weeks. Each visit will be 4 hours plus 1 hour for preparation of field reports for a total of 160 hours to be performed by the Lead Electrical Engineer.

Deliverables – Bi-Weekly construction progress reports.

- 4.4 Start-up Assistance – Participate in field start-up evaluations and adjustments for the new electrical and instrumentation equipment. Prepare an outline for MCC and Instrumentation Operation and Maintenance (O&M) Manual to be reviewed by the Village. Prepare an O&M Manual incorporating the Village's comments on the outline. This proposal assumes 1 site visit for 8 hours each for the Lead Electrical Engineer and the I&C Engineer to perform start-up evaluations.

Deliverables – Startup Reports, 3 hard copies and an electronic PDF copy of the O&M Manual.



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- 4.5 Record Drawings – Revise the Contract Documents to show conditions recorded by the Contractor on prints of the Contract Drawings maintained by the Contractor in the field.

Deliverables – Three hard copy (11"x17") sets and an electronic PDF set of the drawings.

- 4.6 Arc Flash Study – Perform a short circuit, coordination, and arc flash study for the Main Pumping Station electrical system based on the final electrical configuration after completion of construction. Utilize the SKM PowerTools for Windows software for the performance of the study. Provide arc flash labels for electrical equipment and coordinate the label format with the Village. Data for performance of the study will be provided to Greeley and Hansen by the Contractor. Labels will be placed on the equipment by Greeley and Hansen.

Deliverables – Arc flash study report, SKM PowerTools model, arc flash labels.





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Preliminary Drawing List

Drawing	Title
E-01	Symbol Legend
E-02	Electrical Site Plan
E-03	Demolition One Line
E-04	Demolition Power Plan - Upper Level
E-05	Demolition Power Plan - Lower Level
E-06	One Line Diagram
E-07	Schematic Diagrams
E-08	Block Diagrams
E-09	Power Plan - Upper Level
E-10	Power Plan - Lower Level
E-11	Schedules
E-12	Details

Preliminary Specifications List

Specification Section	Title
26 05 00	Basic Electrical Material and Methods
25 05 05	Miscellaneous Electrical Work
26 05 10	Electric Utility Coordination and Requirements
26 05 19	Wires and Cables - 600 Volts and Below
26 05 26	Grounding
26 05 33	Electrical Raceway Systems
26 05 43	Underground Electrical Distribution System
26 05 53	Electrical Identification
26 05 73	Short Circuit and Coordination Study
26 08 00	Electrical Testing Requirements
26 09 13	Electrical Monitoring System
26 12 00	Pad-Mounted Transformers
26 24 15	Portable Generator Termination Cabinet
26 24 19	Motor Control Centers
26 33 53	Uninterruptible Power Supply Systems
26 36 23	Automatic Transfer Switches
40 00 00	Control Descriptions



Tasks	Project Director	Project Manager	Senior Electrical Engineer	Lead Electrical Engineer	Electrical Engineer	I&C Engineer	CAD Technician	Word Processing	Totals
Hourly Rate	\$ 176	\$ 169	\$ 222	\$ 182	\$ 133	\$ 199	\$ 113	\$ 110	
Task 1 - Project Management									
Task 1.1 - Kickoff Meeting	6	6		6	6				24
Task 1.2 - Develop Project Schedule	2	8							10
Task 1.3 - Monthly Invoicing		12							12
Task 1.4 - Review Meetings	4	12		24	24				64
Task 1.5 - QA/QC	12	12	40						64
Subtotal Hours Task 1	24	50	40	30	30	0	0	0	174
Subtotal Task 1	\$ 4,224	\$ 8,450	\$ 8,880	\$ 5,460	\$ 3,990	\$ -	\$ -	\$ -	\$ 31,004
Task 2 - Design									
Task 2.1 - Drawings			24	96	192		144		456
Task 2.2 - Specifications			8	32	60	40		8	148
Task 2.3 - Opinion of Probable Construction Cost		2		8	16				26
Task 2.4 - Construction Schedule		8	8						16
Task 2.5 - Electric Utility Company Coordination		4	2	4					10
Task 2.6 - Electrical Conduit Inspection		8		8					16
Subtotal Hours Task 2	0	22	42	148	268	40	144	8	672
Subtotal Task 2	\$ -	\$ 3,718	\$ 9,324	\$ 26,936	\$ 35,644	\$ 7,960	\$ 16,272	\$ 880	\$ 100,734

Tasks	Project Director	Project Manager	Senior Electrical Engineer	Lead Electrical Engineer	Electrical Engineer	I&C Engineer	CAD Technician	Word Processing	Totals
Hourly Rate	\$ 176	\$ 169	\$ 222	\$ 182	\$ 133	\$ 199	\$ 113	\$ 110	
Task 3 - Bid Assistance									
Task 3.1 - Pre-Bid Meeting		8		8					16
Task 3.2 - Bidder Inquiries			2	8					10
Task 3.3 - Addenda		1	2	4	8		8		23
Task 3.4 - Bid Report	1	2	2	8				2	15
Subtotal Hours Task 3	1	11	6	28	8	0	8	2	64
Subtotal Task 3	\$ 176	\$ 1,859	\$ 1,332	\$ 5,096	\$ 1,064	\$ -	\$ 904	\$ 220	\$ 10,651
Task 4 - Design Services During Construction									
Task 4.1 - Submittals		4	4	16	72				96
Task 4.2 - Change Orders, Supplemental Drawings, and RFIs	1	4	6	12	48		16		87
Task 4.3 - Site Visits During Construction				160					160
Task 4.4 - Start-up Assistance			8	40		40		4	92
Task 4.5 - Record Drawings				6			24		30
Task 4.6 - Arc Flash Study			8	12	60				80
Subtotal Hours Task 4	1	8	26	246	180	40	40	4	545
Subtotal Task 4	\$ 176	\$ 1,352	\$ 5,772	\$ 44,772	\$ 23,940	\$ 7,960	\$ 4,520	\$ 440	\$ 88,932
Subtotal Task 1-4									\$ 231,321
Total Hours	26	91	114	452	486	80	192	14	
Total	\$ 4,576	\$ 15,379	\$ 25,308	\$ 82,264	\$ 64,638	\$ 15,920	\$ 21,696	\$ 1,540	
							Sub-consultants		
							Conduit Inspection	\$	5,250
							Other Direct Costs		
							Other Direct Costs	\$	750
							Total Tasks 1-4		
							Total Tasks 1-4	\$	238,000