Attachment 14A5

# HOLLAND BOARD OF PUBLIC WORKS
## Professional Design Services Proposal
## Pine Avenue Substation - New Construction

**Presented By: Theka Engineering**

**Date: August 5, 2015**

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## *INTRODUCTION AND QUALIFICATIONS*

Theka Engineering Associates Inc. ("Theka") is pleased to present the following stipulated price proposal for consideration to the Holland Board of Public Works. Theka has had an extensive and mutually beneficial working relationship with the Holland Board of Public Works and looks forward to building on that relationship with this project.

Theka will utilize its staff of thirteen (13) electrical engineers (8 holding P.E. licenses) and four (4) computer-aided drafting persons to meet or exceed schedule expectations.

Theka Associates has been providing comprehensive engineering solutions for power, industrial and communication clients for more than 30 years. Theka Engineering plays an integral role in the design-bid-build and design-build processes, providing customers with one of the most efficient power and electrical engineering resources available.

## *PROJECT CONTACT INFORMATION*

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## *RECENTLY COMPLETED DESIGN-BID-BUILD PROJECTS*

- **New 69kV to 12.47kV Distribution Substation**
  Customer: Alcoa Howmet

- **DTE Energy Substation Upgrades (Design Only)**
  Ongoing contract with DTE Energy to provide engineering services for substation upgrade projects

- **Greenly St. Substation**
  New double-ended substation design
  Customer: Holland Board of Public Works

- **James St. Substation**
  Protective Device and Panel Replacement
  Customer: Holland Board of Public Works

- **Substations for Various Landfill Energy Projects**
  Customer: Granger Energy

- **138kV Substation Reconstruct**
  Customer: Nugent Sand

## *RECENTLY COMPLETED DESIGN-BUILD PROJECTS*

- **138kV Double-Ended Substation With 13.2kV Metal-Clad Switchgear**
  Customer: Argonne National Laboratories

- **Pine Tree Acres Landfill, MI 120kV OH Line Interconnect**
  Customer: Landfill Energy, Wixom, MI

- **Brevard Co. Landfill, FL – Florida Power & Light 12.47kV OH Line Interconnect**
  Customer: Landfill Energy, Wixom, MI

- **40kV Doubled Ended Substation Upgrade**
  Transformer upgrade and 46kV SF6 breaker addition
  Customer: City of Croswell, MI

## SUBSTATION DESCRIPTION

The City of Holland, Michigan, Board of Public Works (BPW) plans to construct a new 138/12.47kV substation. Pine Avenue substation will be located on a piece of property currently owned by the city, located on the Northwest corner of Pine Ave and 3rd St. Initially it will serve existing circuits that are currently fed off of the James De Young Plant generator buses via new underground exits and interconnects. Pine Avenue Substation will consist of two 20/26/33/37 MVA, 138/12.47kV transformers; three 138kV circuit breakers, two 138kV circuit switchers, 15kV low profile substation bus structure, three 15kV circuit breakers, eight 15kV distribution circuits with conduits to tie into the existing distribution system, and a control enclosure with protection, control, SCADA, and auxiliary systems. The substation arrangement, type and quantity of equipment, and substation size will be determined during the preliminary stage of the project. The preliminary design will explore low profile arrangements, underground cable, and architectural treatments to reduce the substation's visual and auditory impact. It is anticipated that the electrical design of Pine Avenue Substation will closely resemble that of the Greenly St. Substation.

## DELIVERABLES

Specifications and drawings will be prepared in sufficient detail for Owner review prior to procurement of materials or prior to solicitation of a bid for construction. Drawings and documentation for review will be posted on Theka's FTP website in PDF format. No hard copies will be provided during the review process. HBPW will be notified through email of newly posted documentation.

Theka plans to submit drawings for review in stages. Theka will develop a Project Procedure Manual/Project Design manual to be submitted for review. The manual shall establish project organization, communication reports, schedules, design basis, specifications, drawings, contracts, purchasing, and construction inspection.

Record drawings will be provided in AutoCAD format with the version to be determined by Owner. Drawings to be size Arch D (24" x 36"). Additionally a .pdf and (2) hard copies will be supplied.

## *EXECUTION*

Theka's goal is to provide a high quality, economical design by modifying the proven existing Greenly St. design wherever possible. Design items from Greenly St. that are anticipated to be re-used with little to no modification include:

- Drawing list, one line, three line, and DC schematic drawings
- Relay control panel layout and wiring diagrams
- Modified manufacturer equipment wiring diagrams
- Cable schedule and bill of material
- Electrical equipment and bus layout
- Structural steel elevation & design
- SCADA and relay program files
- Equipment and construction specifications

Items requiring more substantial design / re-design include:

- Site plan and drainage
- Foundations
- Oil containment
- 138kV substation entrance and structure
- Conduit and manhole layout
- Relay control enclosure design
- Ground grid design

Engineering/design will be coordinated with Owner desired equipment and preferences where possible, and will incorporate appropriate provisions from applicable design codes and standards. Drawings and other electronic files developed under this contract will be the property of Holland Board of Public Works.

Theka requests the following from Holland BPW in order to provide a complete project and maintain schedule.

- Provide a singular responsible person for TAI contact.
- Review submitted documentation and provide prompt commentary on all submittals
- Provide existing 138kV system phasing diagram and other information as requested

## *PROFESSIONAL SCOPE OF SERVICES*

Engineering firm is to provide a complete project including but not limited to the following:

- Develop specifications and solicit pricing for Owner purchased equipment. This includes drawings and specifications for relay control panels similar in design / specification to Greenly St. Substation panels. Excludes power transformers.
- Evaluate proposals / pricing for Owner purchased equipment and make recommendations. Excludes power transformers.
- Review and comment on approval drawings for Owner purchased equipment. Includes power transformers.
- Attend bi-monthly design meetings with Owner
- Develop master drawing list and submit to Owner for approval
- Perform and document design calculations as appropriate
- Develop 30% drawing package for Owner comment and approval. To include:
    - Functional one line & phasing diagram
    - Site plan
    - Drainage and grading
    - Foundation plan
    - Electrical equipment & bus layout / plan
- Develop 70% drawing package for Owner comment and approval. To include:
    - Updated drawings from 30% drawing package incorporating Owner comments
    - Structural steel detail / elevation drawings & foundation detail drawings
    - Electrical elevation drawings
    - Oil containment system drawings
    - Relay control enclosure plan drawing
    - 138kV entrance drawing with calculations
    - Conduit and vault layout and detail drawings
    - AC three line and DC control schematics
- Develop 100% drawing package for Owner comment and approval. To include:

  - Updated drawings from 70% drawing package incorporating Owner comments
  - Relay control enclosure detail drawings
  - Grounding plan and details
  - Cable schedule / bill of material
  - Control panel layout, elevation, and wiring diagrams
  - Modified manufacturer wiring diagrams for breakers & transformers
- Develop construction bid documents and submit to Owner for comment and approval
- Develop complete bid package incorporating Owner comments from bid documents and 100% drawings
- Solicit construction bids, evaluate bids and make recommendation
- Coordinate with Owner to establish SCADA and fiber optic communications interface requirements. It is understood that this will be similar to Greenly St. Substation.
- Develop and provide protective settings in downloadable setting files for applicable protective devices
- Attend major equipment factory testing as Owner's Representative per Holland BPW directive (Holland BPW to pay standard hourly rates and travel expenses).
- Provide construction support services including but not limited to:
  - On site pre bid meeting
  - On site preconstruction meeting and establish construction schedule
  - Review and make recommendation related to contractor's material submittals
  - Site visits, once a week minimum
  - Review and approve contractor invoicing
- Provide commissioning of substation including but not limited to:
  - Installation of all device settings on new and affected existing equipment
  - Functional testing of SEL devices, connected major equipment and overall protection scheme
  - Verifying with Holland Board of Public Works personnel the receipt of all monitoring, alarm, and status information
  - Functionally test fiber optic line differentials to adjacent facilities
  - Does not include power transformers (To be performed by manufacturer)

- Provide as recorded drawings and documents, (2) hard copies and (1) electronic copy. Anticipate delivery 10-12 weeks after completed construction and commissioning activities.

### *SCOPE BY OTHERS*

- Site comparison and suitability evaluation by Owner
- Environmental assessment (if necessary) by Owner
- Soil borings and geotechnical report adequate for foundation design
- Acquisition of variance and all permits for property use, by Owner. No services for such permitting are provided for in this proposal
- Permanent fence or wall and gate design
- Construction related permitting including: building, electrical, roadway, drainage, etc. are the responsibility of the Construction contractor
- Adjacent 138kV Overhead Line design; spans, tension, pole position, etc.
- Updated transmission and distribution load flows, short circuit, and fault analysis
- Project requirements exceeding existing HBPW designs to meet transmission grid operator requirements
- Any inadequacy pertaining to local transmission grid that may require additional study or professional services; i.e. proposed transformation exceeds area transmission system capabilities, etc.
- Grid interconnect related studies performed by transmission grid owner/operator
- System equipment identification and numbering to be applied to documents as this identification relates to Holland Board of Public Works switching and SCADA system
- All central SCADA software development and fiber optic network device changes, material identification, material specification, and setup are to be completed by Holland Board of Public Works
- Fiber optic network connection documentation
- Power transformer vacuum filling and commissioning to be performed by transformer manufacturer
- Setting development for 12.47kV reclosers

## PRELIMINARY PROJECT SCHEDULE

If an engineering contract is executed in the near future Theka estimates that a completed project could be energized sometime in the first quarter of 2017.

## SCHEDULE (POST CONTRACT EXECUTION)

| | |
|---|---|
| Contract Execution | 2 weeks |
| Commencement Meeting | 4 weeks |
| Drawing List | 5 weeks |
| Major Equipment RFQ | 6 weeks |
| Major Equipment Ordered | Holland Board of Public Works |
| Drawings 30% IFR | 10 weeks |
| Drawings 75% IFR | 16 weeks |
| Drawings 100% | 20 weeks |
| Construction Bid Package | 22 weeks |
| As Recorded Documents | Post Construction 10 weeks |

## ANTICIPATED MAJOR EQUIPMENT DELIVERY ARO

| | |
|---|---|
| Power transformers | 35-40 weeks |
| 138kV Gas Circuit Breakers | 24-30 weeks |
| 15kV Vacuum Circuit Breakers | 20 weeks |
| 138kV PTs | 20 weeks |
| Structural & Electrical Package | 22 weeks |
| Relay Control Panels | 10-16 weeks |
| S&C Circuit Switchers | 16 weeks |
| Cooper Form 6 Reclosers | 13 weeks |

### *STIPULATED PRICE: DESIGN, CONSTRUCTION SUPPORT & COMMISSIONING*

**Stipulated price** **$ 246,080.00**

**Plus: Expenses associated with manufacturer witness tests will be invoiced at cost.**

### *RATES – ALL INCLUSIVE*

| CLASSIFICATION | PAY RATE |
|---|---|
| PROJECT ENGINEER IV | $ 125.00/HR |
| PROJECT ENGINEER III | $ 115.00/HR |
| PROJECT ENGINEER II | $ 105.00/HR |
| DESIGNER/CAD III | $ 85.00/HR |
| DESIGNER/CAD II | $ 65.00/HR |
| ADMINISTRATIVE ASSITANT | $ 55.00/HR |

### *PAYMENT*

Services will be invoiced monthly and due (30) thirty days after date of issue; a 5% retainer is acceptable to the engineer.

### *CLARIFICATIONS*

No consequential damages will be accepted by the engineer. No financial penalty will be accepted by the engineer due to schedule without negotiating terms.

## *DESIGN AND CONTRACT ADMINSTRATIVE RESOURCES*

SPECTEXT® is a database of pre-written full-length, short-form and outline master guide specification Sections designed to be used for preparation of project specifications and to create a company master specification system. SPECTEXT® is legally coordinated with Engineers Joint Contract Documents Committee (EJCDC) contract documents minimizing document conflicts.

Engineers Joint Contract Documents Committee (EJCDC) - For more than 30 years, the Engineers Joint Contract Documents Committee (EJCDC)-a broad coalition of stakeholders in the project delivery process-has been developing and endorsing quality contract documents and encouraging their use through education and promotion. EJCDC documents are prepared with the advice of legal counsel and reflect the experience and knowledge of the many engineers, owners, contractors, and other construction-related professionals who comprise the committee.

PLS-CADD - is the most powerful overhead power line design program on the market. PLS-CADD runs under Microsoft Windows and features an easy to use graphical user interface. It integrates all aspects of line design into a single stand-alone program with a simple, logical, consistent interface. This sophistication and integration leads to more cost-effective designs being produced in only a fraction of the time required by traditional methods. The PLS-CADD solution has been adopted by more than 1000 organizations in over 100 countries.

SKM Ground Mat - is a program for substation ground grid design and analysis. It is designed to help optimize grid design or reinforce existing grids of any shape. It uses a general-purpose finite element algorithm for potential analysis and graphical facilities to validate ground system efficiency.

AutoCAD multiple versions

KIP America Wide Format Printing and Scanning System – KIP C7800