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ADDENDUM NO. 1

REQUEST FOR QUOTATIONS (RFP) NO.: 1220-030-2017-032

TITLE: CONSULTING SERVICES – LOW CARBON THERMAL ENERGY STUDY

ADDENDUM ISSUE DATE: MAY 18, 2017

CLOSING DATE: 3:00 P.M. ON JUNE 5, 2017

INFORMATION FOR CONTRACTORS

This Addendum is issued to provide additional information and clarifications to the RFP for the above named project, to the extent referenced and shall become a part thereof. No consideration will be allowed for extras due to the Proponent not being familiar with this addendum. This Addendum No. 1 contains seven (7) pages in total.

Strike Schedule A – Scope of Services as provided in the original RFP document and replace with the attached Schedule A – Scope of Services.

END OF ADDENDUM

All Addenda will become part of the RFP Documents.

SCHEDULE A - SCOPE OF SERVICES

1. Project Background

The City of Surrey owns and operates a district energy (DE) system in the rapidly growing City Centre area. The continued expansion of DE in City Centre provides an opportunity for the City to realize a community scale reduction in greenhouse gas (GHG) emissions from buildings through the application of low-carbon energy. The City of Surrey's Sustainability Charter (2008/2016) identifies the development of a district energy network fueled by low-carbon sources as a desired outcome of the Energy and Climate sub-themes.

In order to achieve the commitments of the Sustainability Charter, a District Energy Strategy has been included within the City of Surrey's Community Energy and Emissions Plan (CEEP, 2014). The objective of the District Energy Strategy is to increase local, low-carbon thermal energy generation in an effort to reduce GHG emissions and increase resilience to fluctuating energy supply costs. The District Energy Strategy outlines the need to integrate low-carbon energy sources as soon as possible in order to meet stated carbon intensity targets (0.07 tCO₂e/MWh, Sustainability Charter 2016). At present, District Energy operations are 100% fueled by Natural Gas.

To meet the stated low-carbon energy integration targets, the City of Surrey must currently decide which energy source options to pursue. Information regarding available capacity of local, low-carbon thermal energy sources is required in order to assist in making this decision. Associated capital and operating costs are also required. To achieve low-carbon energy targets, the City of Surrey envisions pursuing either Biomass from clean urban wood waste and/or Waste Heat Recovery as thermal energy sources. Preliminary site locations for two potential low-carbon energy plants have been determined by the City of Surrey.

2. Project Objectives

The objectives of this project are to assess the available low carbon thermal energy capacity and the lifecycle capital/operating costs of delivered energy from a Biomass and/or a Waste Heat Recovery plant to City of Surrey DE customers.

3. Project Activities – IN SCOPE

- **General**
 - Review previously completed background studies regarding City of Surrey DE system.
 - Meet with City staff to gain an understanding of the operating parameters and long term objectives of the City of Surrey DE system.
 - Identify both base and peak load expectations based on demand forecast.
 - Generate generic energy load duration curve to assist in determining optimal low-carbon energy supply capacity.
 - Assess and identify relevant stakeholders related to the development of low-carbon district energy in Surrey. Develop a stakeholder management and communication

framework, which is to be implemented by others in future phases of system development.

- **Biomass**

- Capacity

- Determine optimal thermal energy capacity of a Biomass facility based on the City's low-carbon objectives, availability of feedstock, technical and economic viability.
- Identify a phased approach to increasing low-carbon heat supply in order to meet the low-carbon energy intensity target as demand grows.
- Identify any minimum or maximum capacity constraints.

- Design

- Evaluate commercially proven biomass technologies and propose recommended option.
- Develop detailed Process Flow Diagrams (PFD) for selected technology. PFD's to include detailed design information regarding:
 - Fuel storage
 - Thermal energy generation
 - Thermal energy transfer to DE network
 - Flue gas processing
 - Secondary systems (e.g. heat recovery, filtered particulate removal, support utilities).
 - Include tie-in locations for potential future addition of Combined Heat & Power (CHP). Develop separate PFD drawing which includes potential future CHP equipment.
 - *PFD's shall include all major process equipment (e.g. vessels, exchangers, rotating equipment), as well as show location of control valves, process meters and filtration systems. Drawings shall include preliminary sizing of these major components, as well as Heat & Material balances and operating temperatures/pressures.*
- Determine piping and equipment sizing in order to integrate Biomass thermal energy with existing DE distribution network.
- Determine required plant building footprint based on optimal capacity and phasing requirements. Include preliminary plant equipment layout drawing.
- Develop a comprehensive site plan including vehicle movement and transportation access requirements
- Develop one high-quality rendering of plant and site.
- Develop fuel supply logistics plan based on local (Lower Mainland) Biomass suppliers.
 - Focus initially on feedstock available within the City of Surrey generated from municipal operations (e.g. urban forestry program).
 - Assess viability of using biosolids produced at the Surrey Biofuels Processing Facility.

- Develop a plan outlining proposed strategy for plant capacity expansion. This plan shall identify capacity expansion bottlenecks and shall illustrate cost-effectiveness of proposed expansion strategy.
 - Determine total air pollutant emissions from the Biomass Plant in order to inform exhaust filtration requirements.
 - Identify design features which would be required in order to accommodate potential addition of electricity generating equipment (CHP) to the Biomass facility. Determine optimal electricity generating capacity of potential CHP equipment.
 - Cost
 - Establish capital cost estimate (Class C, $\pm 25-40\%$) for the Biomass plant.
 - Include an itemized summary of costs such as
 - Mechanical/Electrical equipment
 - Building/structure construction
 - Site servicing (eg. transportation access requirements and utility services)
 - Piping connection to distribution network
 - Engineering design
 - Recommended contingency
 - Costs associated with design features to accommodate potential future CHP plant, including plant equipment layout.
 - Establish operating cost estimate; including maintenance, staff and fuel related costs.
 - Include separate cost estimate for future CHP equipment.
 - **Waste Heat Recovery**
 - Capacity
 - Determine optimal thermal energy capacity of a Sewer Heat Recovery (SHR) plant based on the City's low-carbon objectives, availability of waste heat, technical and economic viability.
 - Evaluate potential to integrate waste heat recovery from neighbouring facilities into design of SHR plant. The City of Surrey will provide process information related to available waste heat from neighbouring facilities.
 - Identify a phased approach to increasing low-carbon heat supply in order to meet the low-carbon energy intensity target as demand grows (note: the availability of waste heat may limit the potential capacity to an amount less than what is required to meet the low-carbon target. This does not rule out this technology as a current or future option)
 - Identify any minimum or maximum capacity constraints. Assess any impacts to sewer heat recovery capacity as result of a new wastewater treatment facility upstream of selected plant site and/or increases in flows resulting from population growth; coordinate review with Metro Vancouver.
 - Design
 - Evaluate commercially proven and novel SHR technology options. Propose recommended option.

- Develop detailed Process Flow Diagrams (PFD) for selected technology. PFD's to include detailed design information regarding:
 - Configuration of connection to main utility sewer line.
 - Circulation pumps
 - Filtration/Solids handling
 - Heat exchangers
 - Heat pumps
 - Peaking natural gas boilers (if deemed necessary)
 - Secondary systems (e.g. odour control, filtered particulate removal, support utilities).
 - *PFD's shall include all major process equipment (e.g. vessels, exchangers, rotating equipment), as well as show location of control valves, process meters and filtration systems. Drawings shall include preliminary sizing of these major components, as well as Heat & Material balances and operating temperatures/pressures.*
- Determine piping and equipment sizing in order to integrate SHR thermal energy with existing DE distribution network.
- Determine required plant building footprint based on optimal capacity and phasing requirements. Include preliminary plant equipment layout drawing.
- Develop a comprehensive site plan including vehicle movement and transportation access requirements
- Develop one high-quality rendering of plant and site.
- Develop a plan outlining proposed strategy for plant capacity expansion. This plan shall identify capacity expansion bottlenecks and shall illustrate cost-effectiveness of proposed expansion strategy.
- Cost
 - Establish capital cost estimate (Class C, ±25-40%) for the SHR plant.
 - Include an itemized summary of costs such as
 - Mechanical/Electrical equipment
 - Building/structure construction
 - Site servicing (eg. transportation access requirements and utility services)
 - Piping connection to distribution network
 - Engineering design
 - Recommended contingency
 - Establish operating cost estimate; including staff and maintenance related costs.

4. Project Activities – OUT OF SCOPE

- Low-carbon energy plant site selection.
 - Biomass and SHR plant locations will be provided by the City of Surrey.
- Thermal energy demand forecasts
- Raw sewer data collection.

- Flowrate and temperature data from proposed plant site will be provided by the City of Surrey.
- Public consultation.
- Plant emission dispersion analysis.

5. Project Completion Statement

District Energy Utility management will be able to decide which low-carbon energy options to pursue in further detail. Primary criteria for decision making will be cost-effectiveness and alignment with the City's sustainability strategies (e.g. maximize GHG reductions to achieve target carbon intensity of DE system). Secondary criteria for decision making will include degree of novelty in proposed technology, ease of operability and ability to integrate low-carbon thermal energy into the existing system.

Low-carbon energy capacity, as well as associated capital and operating costs, can be incorporated into internal Pro forma business models. The City of Surrey is able to complete an analysis of 30 year levelized costs associated with low-carbon energy options.

6. Project Assumptions

- As long as the raw sewer outlet temperature from SHR is maintained above specified minimum value, there is no restraint on capacity of heat which can be recovered.
- Consultant to determine equipment redundancy within their design. Availability of base load thermal generating capacity must be adequately high. The proposed design must not result in outages of thermal energy output based on planned maintenance.

7. Project Constraints

- Scope of design and cost estimate work to be limited to Biomass and SHR low-carbon thermal energy supply options. Consultant may propose rationale to include a third low-carbon energy supply option prior to kick-off meeting.
- Available site space for low-carbon energy plants will be provided by the City of Surrey.
- Emissions produced from low-carbon energy plants must adhere to Metro Vancouver air quality guidelines.

8. Internal Stakeholders

- City of Surrey District Energy Staff
- City of Surrey Engineering Departments (Utilities, Design & Construction)
- Consultant Team
- Metro Vancouver
- Additional stakeholders may be determined by the consultant or the City's project team during the consultants development of the stakeholder management plan.

9. Project Deliverables

- I. Kick-off meeting to confirm scope of work, assumptions, data sources, contacts, work plan, etc.
- II. Preliminary technology screening.
- III. Technical meetings as required.
- IV. Draft report, including associated Class C cost estimates for Biomass and SHR facilities.
- V. Meeting to review draft report and discuss revisions.
- VI. Final report.
- VII. Other interactions as necessary to ensure the study objectives will be met.

10. Schedule

Consultant is required to submit a timeline for submission of key project deliverables. The project must be completed and Final Report submitted by October 31, 2017.

11. Consulting Team Qualifications

The proposed consulting team should include mechanical and electrical engineering capabilities, and should also consider including civil/architectural support. The proposed consulting team should demonstrate expertise in:

- A. District energy systems;
- B. Design of alternative energy systems including biomass and sewer heat recovery; and
- C. Cost estimating of relevant mechanical/electrical equipment, as well as construction and operational requirements.

12. Budget

The project budget is \$220,000.