



April 7, 2014

Subject: Letter of Clarification No. 1 to Invitation to Bid No. S19-C24912 to Furnish and Install a Variable Frequency Drive for the Public Works and Engineering Department.

To: All Prospective Bidders:

This letter of Clarification is being issued for the following reasons:

- **To revise Section “B” Scope of Work/Technical Specifications and respond to questions posed by perspective bidders.**

- 1.) Remove Page Nos. 8, 14 & 16 of 29 and replace with Page Nos. 8, 14 & 16 of 29 marked, REVISED 4/7/2014.
- 2.) The following questions and City of Houston responses are hereby incorporated and made a part of the Invitation to Bid:

Question# 1 If a Circuit Breaker would be required along with the standard disconnect, the width will become: 48.8” [24” (Added Cubical for the Circuit Breaker) plus 24.8” (R7i Enclosure)for a total of 48.8”]. Therefore, which one is required?

Answer: The Standard Disconnect width shall become: 48.8” versus Input Disconnect rated at 100KAIC with a width of 24.8.” See the attached revised page number 8 of 29 marked, REVISED 4/7/2014.

Question# 2 The R7i frame size includes the door interlocked switch as call out in 5.9.3 and package has a 100KAIC rating. But 5.3.11 call for a input circuit breaker. If a circuit breaker is required, it will 24" to the R7i width. Is the circuit breaker required?

Answer: Yes the circuit breaker is required. There is a breaker on the front of the existing drives and the drives are about 25" wide. Space for the third drive has been allowed for. See the attached revised page number 14 of 29, REVISED 4/7/2014.

Question# 3 Section 5.3.16 calls for a integrally-mounted Siemens S7-315-DP PLC while Section 6.12 states the following points (which are standard feedback point on the VFD) need to be wired back to the PLC, indicating the PLC is not integrally mounted in the VFD. Is the PLC to be inside the new VFD or not?

Answer: No.

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Question# 4 Section 5.8.4 call for serial Communication via Profibus or Ethernet. Which is required Profibus or Ethernet? If serial Communications is being used what is the purpose of a integrally mounted Siemens PLC?

Answer: Profibus is required; however, the current communications between the PLC and the VFD are analog and discrete signals. See the attached revised page number 16 of 29 marked, REVISED 4/7/2014.

Note: No further questions will be accepted after the publication of this Letter of Clarification.

When issued, Letter(s) of Clarification shall automatically become a part of the solicitation documents and shall supersede any previous specification(s) and/or provision(s) in conflict with the Letter(s) of Clarification. All revisions, responses, and answers incorporated into the Letter(s) of Clarification are collaboratively from both the Strategic Purchasing Division and the applicable City Department(s). It is the responsibility of the bidder/respondent to ensure that it has obtained all such letter(s). By submitting a bid on this project, bidders/respondents shall be deemed to have received all Letter(s) of Clarification and to have incorporated them into this solicitation and resulting bid.

Furthermore, it is the responsibility of each Contractor to obtain any previous Letter of Clarification associated with this solicitation.

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Attachments: Revised Page Nos. 8, 14 & 16 of 29.

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SECTION B
SCOPE OF WORK

1.0 SCOPE OF WORK SUMMARY

REVISED 4/7/2014

1.1 The Contractor shall be required to furnish all labor, materials, equipment, supervision, transportation and ancillary items necessary to remove and properly dispose of the existing variable frequency drive at the 69th Street Wastewater Treatment Plant (69th WWTP) Pump Station #11. The Contractor shall also be required to furnish and install one new 150 HP, 460V/60HZ variable frequency drive and associated equipment at the aforementioned location in strict accordance with the specifications/scope of work herein.

1.2 *The standard disconnect width of circuit breaker for the VFD shall become 48.8."*

2.0 Performance Time

2.1 The Contractor shall have **70 calendar days** to order all supplies/equipment and complete all the work associated with and required by the contract/purchase order after receipt of the written Notice to Proceed from the City.

3.0 Warranty

3.1 Warranty shall be 24 months from the date of certified start-up, not to exceed 30 months from the date of shipment. The warranty shall include all parts, labor, travel time, and expenses.

4.0 SPECIFIED EQUIPMENT OR EQUIVALENT:

4.1 Wherever in the specifications any materials or processes are indicated or specified by patent or proprietary name and/or by name of manufacturer, such specifications shall be deemed to be used for the purpose of facilitating descriptions of the performance, materials and/or processes desired and shall be deemed to be followed by the words, "or equivalent", if not so stated in the specifications herein.

4.2 The burden of proof shall rest with the bidder, in the course of a technical evaluation, to prove that the proposed item(s) are equivalent to the performance, materials, processes, or articles specified. DETERMINATION AS TO WHETHER THE ITEM (S) BID IS (ARE) EQUIVALENT TO THOSE SPECIFIED SHALL REST SOLELY WITH THE CITY PURCHASING AGENT AND THE RECEIVING DEPARTMENT.

5.0 BRAND NAME OR TRADE NAME:

5.1 Any manufacturer's names, trade names, brand names, or catalog numbers used in the specifications are for the purpose of describing and establishing the general quality level, design and performance desired. Such references are not intended to limit or restrict bidding by other Contractors/Suppliers, but are intended to approximate the quality design or performance that is desired. Any bid that proposes like quality, design or performance, will be considered. Equivalent products will be considered, provided a complete description and product literature is provided. Unless a specific exception is made, the assumption will be that the item bid is exactly as specified on the Invitation to Bid.

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- 5.3.1 The overload rating of the drive shall be 110% of its variable torque current rating for 1 minute.
- 5.3.11 ***The VFD shall have input circuit breaker motor circuit protector standard in the drive enclosure, 60,000 amps interrupting capacity. Circuit breaker shall be pad lockable in the "Off" position. A circuit breaker shall be required and there is enough space for the third drive.***
- 5.3.12 The VFD shall have an optional DC link reactor to reduce the harmonics to the power line and to increase the fundamental power factor.
- 5.3.13 The VFD shall be optimized for a 3 kHz carrier frequency to reduce motor noise and provide high system efficiency. The carrier frequency shall be adjustable by the start-up engineer.
- 5.3.14 The VFD shall have a manual speed potentiometer in addition to using the keypad as a means of controlling speed manually.
- 5.3.15 The VFD shall not contribute any short-circuit current to an upstream short-circuit fault.
- 5.3.16 The VFD shall be provided with an integrally-mounted Siemens S7-315-DP programmable logic controller with expansion modules as required to facilitate the remote monitoring and control of the VFD system through the existing and proposed PLC-based control system.
- 5.3.17 The VFD shall be high-efficiency (≥ 0.95), high power factors (≥ 0.95), low – harmonic type, see Item 1.04, A.5.
- 5.3.18 The VFD shall not interfere with power factor correction capacitors on the switchgear bus. If there is potential conflict, the VFD manufacturer shall be responsible for de-tuning of any affected capacitor per specification section 16412.
- 5.3.19 The VFD must be able to operate with ambient, no internal dedicated cooling to chill ambient air will be permitted
- 5.4 All VFD's shall have the following adjustments:
 - 5.4.1 Interposing power blocks ahead of the main circuit breaker input terminals to facilitate connection of the power feeders sized as shown on the drawings.
 - 5.4.2 Three (3) programmable critical frequency lockout ranges to prevent the VFD from continuously operating at an unstable speed.
 - 5.4.3 PI set point controller shall be standard in the drive, allowing a pressure or flow signal to be connected to the VFD, using the microprocessor in the

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- 5.4.4 Adaptable Electronic Motor Overload (1 2t). The Electronic Motor Overload protection shall protect the motor based on speed, load curve, and external fan parameter. Circuits which are not speed dependent are unacceptable. The electronic motor overload protection shall be UL Listed for this function.
- 5.5 Speed command Input shall be via:
 - 5.5.1 Keypad.
 - 5.5.2 Two Analog inputs, each capable of accepting a 0-20mA, 0-10V, 2-10V signal. Input shall be isolated from ground. The analog input should be able to be inverted, so that minimum reference corresponds to maximum speed, and maximum reference corresponds to minimum speed. The minimum and maximum values (gain and offset) shall be adjustable within the range of 0-20 mA and 0-10 Volts.
- 5.6 Serial communications:
 - 5.6.1 The VFD shall have RS-232 and RS-485 ports as standard.
 - 5.6.2 The VFD shall be able to communicate with programmable logic controllers (PLC's), distributed control systems (DCS), and direct controls (DDC).
 - 5.6.3 Serial communication capabilities shall include, but not be limited to, run-stop control, speed set adjustment, proportional/integral PI controller adjustments, current limits, and accel/decel time adjustments. The drive shall have the capability of allowing the DDC to monitor feedback such as output speed/frequency, current (in amps), power (in kwh), relay outputs, and diagnostic fault information.
 - 5.6.4 *The VFD shall provide communication [PROFIBUS] protocol, either built-in or on an integrated communication boards.***
- 5.7 Accessories to be furnished and mounted by the drive manufacturer.
 - 5.7.1 Customer Interlock Terminal Strip-Provide a separate terminal strip for connection of freeze, fire, smoke contacts, and external start command. All external interlocks and start/stop contacts shall remain fully functional whether the drive is in hand or auto.
 - 5.7.2 All wires to be individually numbered at both ends for ease of troubleshooting.
 - 5.7.3 Door interlocked disconnect switch which will disconnect all input power from the drive and all input power from the drive and all internally mounted options. The disconnect handle shall be through- the- door type, and be pad lockable in the "Off" position.
 - 5.7.4 The VFD shall have a manual speed potentiometer in addition to using the keypad as a means of controlling speed manually.