



## STAFF REPORT ACTION REQUIRED

### Procurement Authorization – Supply of BAE Propulsion Parts for the Hybrid Bus Fleet

<b>Date:</b>	July 11, 2016
<b>To:</b>	TTC Board
<b>From:</b>	Chief Executive Officer

#### Summary

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The purpose of this report is to obtain authorization for the award of a contract for a thirty (30) month period for the supply of various BAE propulsion parts that are required to support the TTC's existing Orion Hybrid bus fleet maintenance needs. The main components of the Hybrid system are propulsion control systems, traction motors, generators and are essentially the core parts to move the bus and represent the majority of the value of the contract. BAE is the original equipment manufacturer and the only source of supply as BAE holds the proprietary rights to the propulsion system on the Orion Hybrid bus fleet.

#### Recommendations

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It is recommended that the Board authorize:

- 1) The award of an inventory supply contract for various BAE propulsion and associated parts for the TTC's Orion Hybrid bus fleet for a thirty (30) month period (approximately July 2016 to December 31, 2018) to BAE Systems Control Inc. (BAE) in the total upset limit amount of \$32,810,500 USD including applicable taxes (which is equivalent to approximately \$43,178,600 CDN, based on the exchange rate of 1.316 dated May 25, 2016) on the basis of sole source.

#### Financial Summary

Traction motors, generators and propulsion control systems with an estimated procurement authorization value to December 31, 2018 of \$ 29,882,000 USD are charged to the capital budget. Other items with an estimated procurement value to December 31, 2018 of \$2,928,500 are charged to the operating budget. The total estimated cost for the hybrid bus components included in the February 17, 2016 Council approved 2016-2025 Capital Budget is \$66 million and sufficient funds are available in both the 2016 Capital

and Operating Budgets. Sufficient funds will also be incorporated into future Operating and Capital Budgets.

The Chief Financial & Administration Officer has reviewed this report and agrees with the financial impact information.

## **Issue Background**

The TTC has a fleet of 691 Orion hybrid low floor transit buses which were delivered to the TTC between 2006 through 2009. When purchased, the bus manufacturer provides their standard bus design with minor modifications to meet the specific requirements of each transit authority. Generally, the components used to build the buses are common in the heavy truck and bus industries with the exception of the hybrid propulsion system.

The TTC requests detailed cross reference parts information as a contract requirement to ensure, where possible, that we are aware of the original equipment manufacturer (OEM) of the various bolt-on components and available piece parts for repair and rebuild. This decision was made several years ago as a result of the bus manufacturers only including their part numbers which made it impossible to obtain competitive pricing from the supply industry. However, there are still many parts that the manufacturer designs and produces themselves, and therefore some parts will only be available from the bus manufacturer. The requested additional parts information specified allows staff to obtain competitive pricing for many of the more common parts through multiple distributors, when available, however there are still many parts that are only available through single distributors as a result of in-house designs by the bus manufacturer, or exclusivity arrangements made between the bus manufacturers and component sub-suppliers.

Although the TTC could, and does, consider reverse-engineering specific parts, it is done only when absolutely necessary due to the time and effort involved, and the increased risk and liability of not using OEM parts. If the TTC has to reverse-engineer a part, it is a process that can take several years to design, manufacture, and install the parts, and then conducts a comprehensive evaluation to verify the performance and reliability of those parts in revenue operation prior to the part being considered for approval for system wide implementation.

TTC has an ongoing requirement for various BAE propulsion system components (i.e. propulsion control systems, traction motors, generators, etc.) that are used as inventory stock to maintain the TTC Orion hybrid bus fleet. These are essentially the core propulsion units necessary to make the bus move, and employ the vast majority of the value. BAE holds the proprietary rights to the propulsion system and is the sole source supplier (OEM and only source of supply).

## **Accessibility/Equity Matters**

Not having parts to maintain our hybrid vehicles may result in these vehicles being held back from service which has a direct impact on our customers.

## Comments

The original Request for Bids (RFB) was issued to BAE on November 11, 2014 for the supply of BAE propulsion parts for the hybrid bus fleet for up to a three-year term on the basis of sole source, however, BAE did not submit a bid. Subsequently, BAE was again requested to submit a bid based on revised estimated quantities on May 2, 2016 due to the time that had elapsed.

The RFB requested firm pricing for 34 items out of which 33 items were quoted. One (1) item (new generator) was not quoted as BAE was not able to provide pricing at the time of the bid but did advise that there is a minimum order quantity of 50. In the interim, TTC will continue to buy the remanufactured generator as needed.

Another item was deselected as it is no longer sole source to BAE and will be sourced on a competitive basis.

Wherever possible and when available, subject to proprietary restrictions with BAE, staff will review and evaluate alternates. As a result, 32 items are recommended for award. Refer to Appendix A for details.

Five (5) of the items (traction motor, generator, and the 3 types of propulsion control systems) recommended are remanufactured (or reconditioned/exchange) parts. These items represent approximately 73% of the total recommended upset limit amount. When purchasing a remanufactured item, a damaged or worn unit (i.e. core) is requested by BAE. BAE will then supply a remanufactured unit by either repairing that particular core, or supplying an existing unit that has previously been repaired. In this regard, TTC is required to return a core to BAE within 15 working days of receipt of the remanufactured unit. If the TTC does not have a core to supply BAE when purchasing a remanufactured part, an additional core charge will be applied. The price comparison discussed below compares only the reconditioned unit prices, exclusive of core charges. Core charges are not included in the recommendation for award.

In relation to the above remanufactured items, TTC also requested BAE to provide pricing for the 3 new types of propulsion control systems for which TTC is not required to supply cores to BAE. New parts are used to increase the float of inventory as these new parts will become “cores” that are used to return to BAE for repair under the “remanufactured” parts. These new items represent approximately 23% of the total recommended upset limit amount.

BAE submitted pricing in US funds, TTC broker, ICECORP Logistics Inc. will be responsible for the freight and customs clearance.

Staff contacted BAE to negotiate price reductions; BAE was not able to reduce pricing. BAE advised that due to the non-committed quantities over the term of the contract, BAE was unable to provide any price reductions. BAE stated that its revised updated pricing is

based on TTC's revised (reduced) forecasted requirement based on a TTC inventory requirement change. BAE advised it has offered its best prices and could not reduce pricing any further.

A comparison of BAE'S submitted price with the last purchase price (between the period September 2014 to May 2016) of the recommended items revealed an overall increase of 2.37% during the first year of the contract, a 0.08% increase during the second year of the contract compared to first year pricing and a 0.08% increase during the third year of the contract compared to second year pricing. The price comparison was performed based on US funds since both the last purchase and current bid pricing are in US funds.

BAE's bid submission included its own terms and conditions. These terms have been reviewed previously by the TTC's Legal Department and are considered acceptable.

This contract includes a contingency of approximately 5% for freight and 20% for variances between forecasted and actual usage and new parts yet to be identified which may be added to the contract during the contract term.

## **Attachments**

Appendix A – Part Description

## **Contact**

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Appendix A

**PART DESCRIPTION**

<b>Part Description</b>	<b>Extended Part Description</b>
PCS	TYPE: PROPULSION CONTROL SYSTEM - PCS BLACK LOCATION: RIGHT REAR OF BUS BEHIND REAR AXLE SIZE: 2-FT X 3-FT X 1-FT RELATED TTC CODE: SC 053897 (EXRB-REPAIRED); 062131 (CORE), 062157, 062158
KIT	TYPE: A/C TRACTION GENERATOR CONNECTOR KIT LOCATION: TRACTION GENERATOR OTHER: HYBRID BUS APPLICATION
FAN	TYPE: A/C TRACTION GENERATOR FAN LOCATION: TRACTION GENERATOR
PLATE	TYPE: A/C TRACTION GENERATOR ADAPTOR PLATE ASSY. LOCATION: TRACTION GENERATOR OTHER: HYBRID BUS GRP. RELATED TTC SC: 065303
KIT	TYPE: AC TRACTION GENERATOR BEARING KIT LOCATION: TRACTION GENERATOR
KIT	TYPE: A/C TRACTION GENERATOR HARDWARE KIT LOCATION: TRACTION GENERATOR
BOLT	TYPE: A/C TRACTION GENERATOR EYE BOLT LOCATION: TRACTION GENERATOR
CARTRIDGE	TYPE: A/C TRACTION MOTOR CARTRIDGE OTHER: YOKE SEAL LOCATION: TRACTION MOTOR
CARD - EXRB	TYPE: PROPULSION CONTROL SYSTEM CARD OTHER: SCIE CCA LOCATION: INSIDE PCS (WHITE & BLACK) RELATED TTC CODE: 063757 (CORE)
PCS	TYPE: PROPULSION CONTROL SYSTEM LOCATION: FOR INSTALLATION FOR ORION VII HYBRID NG RELATED TTC CODES: 063128 (CORE), 063127 (EXRB) OTHER: G9- PCS WHITE - BUY NEW

MOTOR-EXRB	TYPE: A/C TRACTION MOTOR OTHER: WITH SENSOR PORT LOCATION: REAR OF BUS CONNECTED TO DIFFERENTIAL RELATED TTC CODE: 062120 (MOTOR - CORE)
GENERATOR - EXRB	TYPE: GENERATOR P3 LOCATION: REAR OF BUS CONNECTED TO ENGINE OTHER: ACTG FOR HYBRID BUSES ONLY.
PCS - EXRB	TYPE: PROPULSION CONTROL SYSTEM - PCS LOCATION: RIGHT REAR OF BUS BEHIND REAR AXLE SIZE: 2' X 3' X 1' RELATED TTC CODE: 062121 (PCS - CORE) OTHER: PCS BLACK
PCS - EXRB	TYPE: HYBRID PROPULSION CONTROL SYSTEM (PCS) OTHER: PCS WHITE G7 NOTE: INCLUDES BUSES 1200-1684 (1308) ONLY LOCATION: MOUNTED ON ROOF AT REAR OF BUS RELATED TTC SC (EXRB): 063127 - PCS G9; 053897 - PCS BLACK
FILTER	TYPE: AIR FILTER (CONTITECH) LOCATION: BATTERY TUB AT COOLING FANS SIZE: APPROX. 34-INS X 10-INS USE STOCK CODE: 062251
COVER	TYPE: REAR END BELL COVER LOCATION: AC TRACTION GENERATOR TO ENGINE RELATED TTC CODE: 039673 (END BELL HARDWARE KIT)
HARNESS	TYPE: J20 HARNESS LOCATION: PROPULSION CONTROL SYSTEM (PCS)
PCS	TYPE: PROPULSION CONTROL SYSTEM - G7 PCS WHITE LOCATION: REAR - ROOFTOP OF BUS RELATED TTC CODE: SC 053899 (EXRB-REPAIRED); 061334 (CORE), 062157, 039664
HARNESS	TYPE: HV HARNESS (ROOF MOUNT PCS) LOCATION: PCS (PROPULSION CONTROL SYSTEM) TO ACTM (AC TRACTION MOTOR)
HARNESS	TYPE: PCS DC POS TO ESS HARNESS LOCATION: PS (PROPULSION CONTROL SYSTEM) TO ESS (ENERGY STORAGE SYSTEM) OTHER: FOR 1308 BUS GRP USE SC 052167

HARNESS	TYPE: PCS DC NEG TO ESS HARNESS LOCATION: PCS (PROPULSION CONTROL SYSTEM) TO ESS (ENERGY STORAGE SYSTEM) OTHER: FOR 1308 BUS GRP USE SC 052168
HARNESS	TYPE: MAIN HARNESS (WPCS) LOCATION: PCS (PROPULSION CONTROL SYSTEM)
FILTER	TYPE: ESS COLD WEATHER FRONT FILTER LOCATION: FRONT OF BATTERY TUB RELATED TTC CODE: IR-002696 (SIDE FILTER) OTHER: 1 PER BUS (NON-REUSABLE)
ADAPTER	TYPE: ACTG H/V STRAIN RELIEF ADAPTER LOCATION: AC TRACTION GENERATOR
FUSE	TYPE: FUSE VOLTAGE: 800VDC AMPERAGE: 250A LOCATION: ESS (ENERGY STORAGE SYSTEM) OTHER: BUSSMANN FUSE WITH BOLT DOWN CONNECTORS
CARD	TYPE: HIGH VOLTAGE CCA CARD LOCATION: HYBRID PCS ASSY
PCS - EXRB	TYPE: PROPULSION CONTROL SYSTEM - G9 PCS WHITE LOCATION: REAR - ROOFTOP OF BUS RELATED TTC CODE: SC 050555 (BUY); 063128 (CORE) NOTE: INCLUDES BUSES 1685-1689 (1308) AND 1700-1829 (1329)
CLAMP	TYPE: FAP WIRE AND TUBE CLAMP LOCATION: ACTG FRESH AIR SYSTEM FULL BOX SILICONE CUSHION, ENGINE COMPARTMENT SIZE: 1-IN STAINLESS STEEL
ADAPTER	TYPE: FAP 90-DEG HOSE ELBOW ADAPTER SIZE: MALE SAE 7/8-14 TO MALE JIC 7/8-14 LOCATION: FRESH AIR PLENUM
ELBOW	TYPE: FAP 90-DEG HOSE ELBOW ADAPTER SIZE: MALE SAE 1.0625-12 TO MALE JIC 1.0625-12 LOCATION: FRESH AIR PLENUM
UNION	TYPE: FAP 90-DEG ELBOW UNION SIZE: FEMALE FLARE SWIVEL TO MALE FLARE LOCATION: FRESH AIR PLENUM
HOSE	TYPE: FAP HOSE ASSEMBLY LOCATION: HYBRID FRESH AIR PLENUM