Revised: March/13

TORONTO TRANSIT COMMISSION
REPORT NO.

MEETING DATE: July 23, 2014

SUBJECT: **TORONTO-YORK SPADINA SUBWAY EXTENSION PROJECT SALE OF TUNNEL BORING MACHINES AND AUXILIARY EQUIPMENT**

ACTION ITEM

RECOMMENDATION

It is recommended that the Board approve the sale of the four tunnel boring machines (TBMs) and parts to Lovsuns Tunneling Canada Ltd. to be removed from site and transported by the purchaser off site for a total value of $9.200M (excluding tax). From a budget perspective the Executive Task Force (ETF) approved the sale of these TBMs for a minimum of $9.200M on June 25, 2014.

BACKGROUND

The Toronto-York Spadina Subway Extension project is a $2.634 billion infrastructure construction initiative jointly funded by the Government of Canada, the Province of Ontario, the City of Toronto and the Regional Municipality of York. This extension will provide a crucial expansion to the existing Toronto Transit Commission's Line 1 (Yonge-University-Spadina) and for the first time, cross the City of Toronto boundary into the City of Vaughan. The 8.6 km subway extension will provide a high quality rapid transit service connected to the fastest growing region in the Greater Toronto Area and will have six stations along the route with accompanying commuter parking facilities and bus terminals. Two of the stations will be entirely in the Regional Municipality of York and one station and its ancillary structures will straddle the boundary between Toronto and York Region.

The Board approved the purchase of four TBMs from Caterpillar Tunnelling Canada Corporation, formerly Lovat Inc., on July 8, 2009 for use in the construction of the Toronto-York Spadina Subway Extension.

Tunnelling of the Toronto-York Spadina Subway Extension started on April 2011 and has now been completed.

In late 2012 as the conclusion of tunnelling was approaching efforts were initiated to sell the TBMs. This included:

- Request to prospective purchasers in North America soliciting interest in the purchase of the TBMs. No interest expressed by any firm.

- Caterpillar was contacted and indicated that it had no interest in the buy back.

- External engineering firm was retained to provide an independent opinion as to the used TBM condition, TBM value and potential. The opinion provided was not favourable given the abandonment of TBM manufacturing, support by Caterpillar and the general market conditions.

- Four TBMs publicly advertised for sale, soliciting two bids, the highest at $1.487M (tax included) for the TBMs, which was not accepted.

- Following the public tender process, two offers to purchase were received, the highest for $4.20M, which was not pursued by the prospective purchaser.

- In February 2014, Caterpillar announced the sale of its TBM assets in Toronto to Liaoning Consecience Industry Co., Ltd., who subsequently adopted a new Canadian corporate name “Lovsuns”.

- Two of the four TBM power substations sold to Metrolinx for $0.31M.

- In May, Lovsuns offered to purchase the four TBMs for $9.0M. TTC staff requested a better price.

- Lovsuns increased their offer to $9.2M indicating that it would not increase it more and expressed urgency in finalizing the sale.

BUDGET IMPACT (EXCLUDING TAX)

On July 9, 2009, four TBMs ($12.930M each, excluding tax) were purchased for a total of $51.720M.

The expected resale value of the TBMs factored into the TYSSE budget is $15.500M

Two TBM power substations sold to Metrolinx ($0.310M)

Proposed sale of four TBMs to Lovsuns ($9.200M)

Impact of re-sale to TYSSE budget: ($5.990M).

DISCUSSION

a) Status of TBMs

The TBMs are now over four years old and in need of refurbishment and repairs to make them operable. The TBMs are in storage, secured but partly unprotected from the elements, northwest of Toronto. It is expected that the TBMs will progressively degrade with time. There is currently no facility or organization that builds, repairs or maintains similar machines in Canada.

The TBMs required maintenance and repairs, as expected throughout the tunnelling operations. When operating, the TBMs performed well, achieving up to 45 meters per day advance on numerous occasions. By comparison, the maximum advance achieved by the Sheppard TBMs was 28 meters per day.

There is currently no more technical support available from Caterpillar. However, Lovsuns have verbally indicated that they may be starting some operation at the plant, although this has not been confirmed nor has the nature of this operation.

In 2002, a study indicated that retaining the TBMs used to tunnel the Sheppard Subway, on speculation that they could be used on subsequent tunnelling operations, was not advisable. It foresaw that technical improvements and subsequent performance increasing 5 to 8% per year over seven years would render the Sheppard TBMs obsolete. This was confirmed by the performance of TBMs on TYSSE.

Both Sheppard TBMs were sold and transported off shore.

Also, between the completion of Sheppard and the start of TYSSE, NAFTA fire ventilation standards required an increase in tunnel diameter, rendering the Sheppard TBMs unusable for TYSSE.

b) Consideration of Using TYSSE TBMs on the Scarborough Subway Extension

As reported to the Board at its meeting of June 24, 2014, work on the Scarborough Subway Extension is now underway and the award of the environmental assessment Consultant Contract is scheduled for August 2014.

The extension will be a subway, which will require TBMs. Staff reviewed the option of purchasing the TYSSE TBMs, as compared to the purchase of new TBMs. The following issues were considered.

COST

To compare the costs of new TBMs to the purchase of the TYSSE TBMs, costs to properly store and refurbish the TYSSE TBMs must be considered. The TYSSE TBMs are not refurbished for re-use and not in a suitable location for long term storage. TYSSE had a consultant inspect two of the TBMs in the fall of 2013, which led to an estimate of costs to ship, prepare for storage, storage and ultimately the refurbishment, return and on site assembly of the TYSSE TBMs. Factoring in these costs, there is a net savings of $25.3M for the purchase of the TYSSE TBMs (Table 1 – Line A).

SCHEDULE

The start of construction activities is driven by the EA process and the acquisition of property. Based on the timing of these activities, either refurbished or new TBMs would satisfy the schedule. As a result, there is no opportunity to advance the schedule by use of refurbished TBMs.

TECHNOLOGY IMPROVEMENTS

As with other technologies, TBMs continue to evolve and as a result, there are improvements in productivity, which is measured as an increase in meters of tunnelling per day. As previously noted in this report, TYSSE achieved a forecasted improvement in productivity of 5-8% over the Sheppard Subway. It is expected that in what will be approximately eight years between the purchase of the TYSSE TBMs and the purchase of new Scarborough subway TBMs, there will be a commensurate improvement.

An increase in meters per day translates directly to a schedule reduction. For evaluation, 7km was used for the Scarborough subway and based on a 6.5% improvement (5-8% averaged), there is a possible schedule reduction of approximately 1.7 months. Based on calculations used to escalate the project costs through 2023, a one month delay of the project results in an added cost of $13M. Factoring this over 1.7 months results in a potential savings of $22M. This amount has been factored into Table 1 and results in a net savings of $3.3M for the TYSSE TBMs. It is noted that this is for comparison purposes only and has no impact on the Scarborough subway budget.

TABLE 1

	Description	TYSSE TBMS	New TBMs	Difference
A	**TOTAL COST for 4 TBMs**	$28.8M	$54.1M	($25.3M)
B	**Productivity Improvement of New Technology**	NA	$22M	$22M
A - B	**Cost Factoring in Productivity Improvement**	$28.8M	$32.1M	($3.3M)

SUMMARY

Based on the above, there are no schedule benefits of acquiring the TYSSE TBMs. While cost benefits marginally favour the TYSSE TBMs, the amount is not significant when the risks of refurbished equipment breakdowns or the increased productivity of new TBMS are considered.

The preferred option given consideration of all factors is to sell the TYSSE TBMs as recommended.

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