City of Richmond

Report to Council

To:	Public Works and Transportation Committee	**Date:**	January 30, 2003
From:	Eric G. Gilfillan Director, Operations	**File:**	0005-01
Re:	**Purchase of Hydro Excavation Equipment**		

Staff Recommendation

1. That the Union and Staff review options to decrease City costs, implement any improvements identified and review/revise the Hydro Excavator business case upon the expiration of 6 months.

2. That purchase of Hydro Excavation equipment be delayed to the 2004 budget subject to the business case results.

Eric G. Gilfillan
Director, Operations

Att. 2

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Staff Report

Origin

In 2000/2001 the City spent approximately $430,000 to contract for Hydro Excavation equipment. Given this level of expenditure, staff have been asked to complete an analysis whereby City purchase of Hydro Excavation equipment is compared with the current practice of contracting out.

Analysis

In order to come to a recommendation of whether or not to purchase Hydro Excavation equipment, several factors need to be considered including the degree of usage, productivity of public versus privately operated equipment, financial impacts and several intangibles.

Degree of Usage

The use of Hydro Excavation equipment is required to complete several necessary City services primarily in the areas as summarized below.

- Numerous Storm activities in the cleaning and blockage removal of mainlines, inspection chambers, culverts, manholes and catch basins.
- Excavations intended to expose existing underground utilities in an un-obtrusive manner to minimize potential damage to utilities and other adjacent structures and landscaping.
- Excavations for new installations, i.e., meter boxes, lamp standards, etc.

Hydro excavation equipment has been used in this capacity over the last three years as follows:

2000	1543 hours;
2001	2799 hours;
2002	2361 hours.

Based on 2000 available work hours in a year and the 2000 to 2002 levels of usage, it appears that a City purchased Hydro Excavation truck could be employed on a full time basis.

Financial Impact

It is important to complete an in-depth financial comparison between a contracted service and City owned equipment.

City Hourly Rate

The main financial options available to the City have been summarized in the January 8, 2003 memorandum (Attachment 1) to Council and included capital purchase, lease to purchase and lease. From the recommended capital purchase option, and 2000 available hours of equipment usage in a year, the equipment hourly rate would be $52.76. With the inclusion of the hourly cost of $66.92 for two additional staff members who would have to be hired, the total City owned equipment rate would be $119.68.

However, consistent with the private sector and prudent conduct of business, the City must contribute to the equipment reserve to allow replacement of the equipment after its useful life. To achieve and sustain

such a reserve, the hourly rate should be based upon 1500 hours of usage which falls within industry standards. Under this scenario, the equipment hourly rate is $70.34 giving a total rate of $137.26 including labour.

The City rate therefore to be considered further in this report is $137.26 per hour.

Private Sector Hourly Rate

Quotations were requested from private contractors for Hydro Excavation equipment on March 21, 2002 with the lowest cost of $100 per hour received from Superior City Services.

COMPANY	DESCRIPTION	HOURLY RATE
Superior City Service	Vactor Jet Combo	$100.00
A&A Anderson	Septic/Swamper	$138.00
McRaes Septic Tank Services	Combo Truck with Swamper	$138.04

A meeting was held with Superior on June 17, 2002 to review their quotation and among other items discussed, it was noted that their equipment did not include a positive displacement pump. Although Superior noted they would upgrade their equipment to include the required pump, to date they have not advised on having completed this work and therefore their bid will not be considered further.

The next lowest bids were from A&A Anderson and McRae's at $138.00 and $138.04 respectively. Given the bids are essentially the same and the City has historically employed McRae's in the past for hydro excavation related work, the quote from McRae's will be used as the basis for comparison with City operated equipment. With GST the private sector hourly rate is therefore $147.70.

Not factored into this hourly rate calculation are the costs associated with after-hours work and breakdowns. The City's experience with the private sector is that they do not charge a premium for hours worked outside the City's normal workday. Assuming the work is unscheduled, the premium would be based upon 2.0 times the labour hourly rate and the frequency of such work is estimated at 10 times annually yielding a premium of $1.00 to the City hourly rate.

Also not factored into the rate is the event where equipment breakdowns occur. With the private sector, payment is made only for the actual hours worked whereas the City has to continue to pay for the labour associated with the equipment. While the ability exists to reassign staff to other useful work, the City would still experience idle staff time. Based upon an estimate of 12 breakdowns of this equipment per year which is similar to that experienced by similar City equipment and an estimated 4 hours crew time loss, this would amount to a premium of $1.66 per hour.

Using the capital purchase option, the equivalent hourly rates when comparing private versus public sector work is $139.92.

	CITY EQUIPMENT	CONTRACTOR (MCRAE'S)
Un-factored Rate	$137.26	$147.70
Overtime Premium	$1.00	- -
Breakdowns Idle Time	$1.66	- -
Adjusted Hourly Rate	**$139.92**	**$147.70**

Productivity of Public Versus Privately Operated Equipment

In an 8-hour day, the City's present experience with similar equipment (Vactor) is to start at 7:30 a.m., with a pre-trip inspection which takes until 8:15, takes an average of 15 minutes to reach the site and returns to the Yard by 3:30 to complete a post trip inspection/dump. Effectively, for a paid 8-hour day, the equipment provides 6.5 hours of on-site productive service.

This compares to a contracted service (McRae's) where they are paid only for the time actually performing work on the site plus a half hour for dumping. This yields 7.5 hours of actual on-site productive service in an 8-hour day. This level of productivity has been through supervision by the Drainage foreman. McRae's does not apply additional charges for pre-trip inspection, post trip inspection, fuelling, etc.

Given the City provides a level of service of 6.5 hours of productive time in an 8-hour period the contracted equipment productivity of 7.5 hours in an 8-hour period yields 13% more productive time. This difference is shown as a Productivity Factor of 1.13 as noted in the table below.

A memorandum to Council was prepared June 3, 1999 (Attachment 2) to outline the best method of cleaning catch basins. This report was predicated on a comparison of City versus private sector equipment usage. Using the figures in this report, it was found that average units per hour for the City was 9.53 where and average of the private sector was 11.5 giving the private sector a 21% higher efficiency. It is likely this difference is attributable to the equipment differences rather than staff productivity. Along this line, it is likely that if equivalent equipment were used, the productivity would likely be the same therefore a productivity factor will not be applied.

OPTION	HOURLY COST	PRODUCTIVITY FACTOR	ADJUSTED HOURLY COST
City Purchased Equipment	$139.92	1.13	$158.11
Contracted Equipment (McRae's)	$147.70	--	$147.70

From the difference of $10.41 per hour between the respective adjusted hourly rates for City and Contracted equipment, the yearly savings using a contractor would be $15,615 (for 1500 hours worked).

Completion of an in-depth financial comparison therefore yields that the use of City purchased equipment is presently not as cost effective as contracted equipment.

Intangibles

Flexibility, reliability and associated liability with operating the subject equipment are considered to be the main intangibles for comparison. A cursory review of these items follows.

- Flexibility - Both the contracting community and the City offer a 24/365 service and accordingly offer an equivalent level of flexibility in this regard. The private sector typically has a one-hour maximum response time which is comparable to the experience with City staff.

- Reliability – The contracting community as a whole offers a larger fleet of Hydro Excavation equipment as compared to the City. Additionally, for those days where unscheduled maintenance is required (estimated to be 10 days per year), replacement equipment by the contractor can readily be made available where this option is generally not available with City owned equipment other than to temporarily hire a contractor. It is recognized that City owned equipment presents the benefit of stabilizing rates.

- Liability – By contracting this service, the City eliminates the liability associated with hiring of new employees and in the event of non-performance by the contractor resulting in damage, it is presumed that the contractor would assume some if not all the liability, although the City may experience legal costs.

Conclusion

While there is clearly a need for hydro excavation equipment and it has been demonstrated that the un-factored hourly rate is less than that for the private sector, other factors such as equipment on-site time, overtime premiums and breakdown associated costs make the costs high enough such that purchase of the equipment is not warranted at this time. A review of opportunities to decrease City costs with the Union should be completed to see if improvements could be made in this regard. Cursory discussions to date have already yielded the following opportunities.

1. Start the equipment operator at 7:00 a.m., instead of 7:30 a.m. This will allow the operator time to complete the pre-trip inspection in time for the arrival of the Swamper at 7:30 a.m. At the end of the Operator's workday, the Swamper can complete the majority of the post trip inspection work.

2. As with Item 1 above, start the operator at 7:00 a.m., and pay for the ½ hour overtime. This effectively increases the level of service.

Further options to increase equipment on-site time should be developed, the merits of each option assessed, implemented and reviewed over a period of approximately 6 months. At the expiration of this review, a business case may be prepared to re-assess the merits of City purchased equipment.

Jim V. Young, P. Eng.
Manager Sewerage and Drainage

JVY:jvy

City of Richmond
Engineering & Public Works

Memorandum

To:	Andrew Nazareth	**Date:**	January 8, 2003
From:	Jim V. Young, P. Eng. Manager Sewerage and Drainage Ken Fryer Manager of Fleet Operations	**File:**	-

Re: Budget Options for Purchase of Hydro Excavation Equipment

Further to the December 23, 2002 General Purposes meeting, following are budget options and associated estimated financial impacts related to the purchase of Hydro Excavation equipment. We wish to emphasize that the figures that follow below are estimates only as the specific equipment specifications to meet operational needs have not been fully determined. The cost of the subject equipment will likely range from $430,000 to $475,000. For the purposes of this analysis, a total median price of $450,000 and a 5-year life cycle has been used.

1. Capital Purchase – Council would have to approve a one time expenditure of approximately $450,000, the funding for which would likely have to be provided via Finance. Our in-house equipment rate would likely be $70.34/hour plus labour estimated to be $66.92/hour (for two staff members). Therefore, the total rate is estimated to be $137.26 per hour which includes the contribution to the City's equipment replacement reserve.

2. Lease to Purchase – A five-year lease of the equipment would likely be arranged through a financial institution (i.e., Online Municipal Finance Authority (MFA)). The monthly cost which was quoted for budget purposes is $5,458. Our operating and maintenance costs are estimated to be $1,300 per month. Based upon these figures, the total rate would therefore be $120.98/hour (lease/maintenance rate of $54.06/hour plus the estimated labour rate of $66.92/hour). At the end of the 5-year period, the City would not own the asset and would have the option to pay an additional $225,000 plus taxes to purchase the equipment.

3. Lease – This option is similar to the "Lease to Purchase" option discussed above with the exceptions that the lease rate would be in the order of 10% higher than the budget quote received from MFA and accordingly, the new rate would be $125.35/hour. Additionally, the option to purchase the equipment at a residual value wouldn't be exercised. However, there would be no contribution to the reserve to replace the equipment and any abnormal wear/damage would be at the City's cost when the equipment is returned. At the end of the 5-year period, a new lease would be negotiated and new rates would be established.

Hydro Excavator equipment usage in 2002 to July 5 was 1315 hours which when prorated comes to 2533 hours for the year. Once the 2002 information is available a more accurate figure may be provided. Hydro Excavation equipment was contracted by the City for 2799 hours in 2001 for a total cost of $427,253 which is up from 2000 where this equipment was used for 1543 hours. Based

on 2080 available hours (5days/week, 8 hours per day), there appears to be a need for this equipment.

If the Capital Purchase option is exercised as discussed in Item 1 above, it is determined that the annual capital recovered would be $89,915/year. The return on this investment will be 5 years, and depending on the equipment condition at the end of this period, could possibly be extended up to 7 years.

Further issues that should be considered prior to equipment purchase are the productivity of the subject equipment as well as the intangibles, some of which are of flexibility, reliability and liability. It should be noted that the determination of the anticipated productivity of the new equipment remains an unknown given considerable difficulty has been experienced in collecting data in this regard.

It is anticipated that a report on the Hydro Excavation equipment with a recommendation to the Public Works and Transportation Committee will be completed by late January or early February, 2003. If it is decided that the City should acquire a Hydro Excavator, staff would recommend that the "Capital Purchase" option outlined in Item 1 be considered.

Jim V. Young, P. Eng.
Manager Sewerage and Drainage

Ken Fryer
Manager of Fleet Operations

JVY:jvy

CITY OF RICHMOND
ENGINEERING & PUBLIC WORKS DIVISION

MEMORANDUM

TO: Chuck Gale, P. Eng.
General Manager, Engineering & Public Works

DATE: June 1, 1999

FROM: Steve McClurg
Manager, Water Services

FILE: 6045-01

RE: STORM SEWER CATCH BASIN CLEANING COSTS

ORIGIN

Resulting from a request from Councillor Kumagai, a study was initiated to demonstrate if the current practice of the City's Public Works Operations crews cleaning catch basins is the best method of performing this task. The Sanitary operation is not part of this report as the type of work performed is too dissimilar to be included. This will be done as a separate report as soon as benchmark comparisons can be accomplished.

ANALYSIS

The task of demonstrating the efficiency of the current program methods of cleaning the City's catch basins is difficult, as this vehicle is used daily to perform other maintenance tasks. Only 11% of the annual total operational time is spent cleaning the catch basins. It was arranged, for the purpose of the survey, that the vehicle would concentrate on cleaning catchbasins on the days the task was measured. On separate occasions the Foremen and Manager observed the catch basin cleaning operation and confirmed the actual accomplishment measure. All costs were accessed and allocated to complete this analysis.

The table below demonstrates the typical annual distribution of the work schedule.

GUZZLER TRUCK DISTRIBUTION OF WORK			
Mainlines	18.00%	Parks Septic	15.00%
Culverts	16.00%	Parks General	1.00%
Manholes	8.00%	Water General	4.00%
Catch Basins Cleaning	**11.00%**	Roads General	2.00%
Inspection Chambers	14.00%	School Board	1.50%
Laneways	6.00%	Trades General	1.00%
Works Yard Facilities	1.50%	Customer Service	1.00%
			100.00%

The Storm Sewer "Guzzler Truck" has many uses besides the standard storm sewer applications. It cleans spills, drains water from laneways, excavates around dangerous underground utilities, planting of trees, installation of poles, meter boxes, fire hydrant repairs and is utilized to excavate for repairs when it is necessary to take extra care to minimize the disturbance to specialized landscaped areas.

The table below demonstrates accomplishment measures and costs for catch basin cleaning only.

PUBLIC WORKS OPERATION'S PRODUCTIVITY PER HOUR OF OPERATION				
	UNITS PER WORK DAY	UNITS PER HOUR	LABOUR EQUIPMENT COST PER HOUR	AVERAGE UNIT COST CB CLEANING
Foreman's Review	86	10.75	86.27	$8.02
*Manager's Review *	57	8.14	86.27	$10.59
Average for Survey	**143**	**9.53**	**86.27**	**$9.05**
***1-hour downtime not included in costs and reflected a lower work accomplishment, costs varied for cleaning CB's from $8.05 to $10.59 with an average unit rate of $9.05 with an hourly cost of $86.27.**				

Lower Mainland Group Best Practices Costs **Private Contract Prices**

BEST PRACTICE CITY COSTS $9.64	
New Westminster	Port Coquitlam
Burnaby	Coquitlam
Abbotsford	Port Moody
Delta	City of Langley
Victoria	Chilliwack
Hope	Saanich
University Lands	West Vancouver
City of North Van	Mission
Township Langley	North Vancouver
Maple Ridge	Surrey

Company	Unit Costs	Hourly Charges
A&A Anderson ***	$8.35	$115.00
Hole Cats Contracting	$9.50	$105.00
Superior City Services	$9.50	$100.00
McRae	$8.50-$9.25	$95.00
***** Plus one half hour travel time and one half hour travel time per dump**		

Comparison of costs between the Cities represented in the Lower Mainland Group Best Practices and the City of Richmond's survey, demonstrates Public Works Operation's costs are below the average cost.

Comparison Costs between private contract prices do not clearly demonstrate a cost saving in outsourcing the cleaning of the catch basins. These prices are not guaranteed and may change if an actual bid for this work tendered (GST, PST, inspection and administrative costs not included in the private bids). The hourly charge out rate for the Public Works Operation's operation is 10% lower than the lowest private bids.

Manning Levels

The cost comparison is based on the contractor supplying a truck with a driver/operator only. In the past, when we utilized a contractor's vehicle, we supplied a labourer to work with the contractor. It is possible that the cleaning of catch basins could be accomplished by one individual. However, in doing this, it would restrict the ability to respond to other situations in a quick and effective manner. During the survey it was demonstrated that the second person is essential in maintaining the level of the number of units completed. The safety of the public and the hazards to the operator working alone are a consideration with maintaining this manning level. The potential of accidents occurring in the narrow laneways with sharp turns and the numerous backing up situations would increase the chance of an incident.

Only 11% of the total work distribution is attributed to the catch basin cleaning. Any savings from removing a worker from this operation would result in a minimal decrease in costs for catch basin cleaning and the number of unit accomplishments would decrease. Additional costs would result in the other areas as there would be waiting time for moving in the second person when needed.

Ownership Versus Other Options

In June of 1998, Fleet Operations completed a study that compares ownership of vehicles to the alternatives. The conclusion of this report recommends that we continue with the most cost efficient ownership option.

Response Time

Contractors for an emergency response will commit to a 2-hour response time, while City staff must be in the Operations Yard within one half hour of being called. The contractors suggested that they should be able to respond to most emergency responses within one hour. This is not guaranteed nor has it been our experience in the past.

Vehicle Hourly Rate

The hourly rate for this vehicle was last assessed in 1997 and is based on information that is only found on the Wang accounting system. Peoplesoft accounting is not able to produce the vehicle rates at this time. Since the information is needed for this survey, the Fleet Manager and myself arranged for a private consultant who is familiar with the City's hourly vehicle rate setting process to review the data and update the hourly charge out rate. Resulting from this review the hourly rate will be increased to $35.50 per hour of operation for the 2000 budget year, an increase of $1.50 per hour. This increase does not have a significant impact on our unit rates.

FINANCIAL IMPACT

Richmond's costs were compared with 19 other Municipalities and Cities in addition to four private companies Results indicated that our operation costs are lower than the average costs demonstrated by this group.

CONCLUSION

That the Public Works Operations catch basin cleaning program is currently an effective method of providing this service and is comparable with other Cities and contractors. This will be reviewed on a continuous basis once the new maintenance management program is operational. The system would be set up to flag any activity that is not meeting established productivity levels. We look forward to working with such a system that would allow us to demonstrate our effectiveness and efficiency on a continuing basis for all work programs.

Steve McClurg
Manager, Water Services

pc: Eric G. Gilfillan, Director, Operations
John Kuznik, Manager, Fleet Operations