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CITY OF HIAWATHA
VEHICLE REPLACEMENT REQUEST FORM

Department: Road Use **Fiscal year:** FY17
(If vehicle is funded by more than one department list all departments)

Scheduled replacement fiscal year: FY18

Year, make, model, attachments and original purchase price of vehicle:

2008 Freightliner dump truck with snow plow and sander. $101,780 minus $8,812.50 trade in

Vehicle description and justification:

Unit 500, a 2008 Freightliner single axle dump truck with snow plow and sander was purchased in November of 2007. It is on a 10 year replacement cycle. This truck currently has about 40,000 miles and 4,000 hours on it. The miles on the 2008 Freightliner has fairly low miles however they are hard miles/hours. Snow plowing and in town miles are hard on vehicles. Some issues we are having with the truck include:

- The plow is getting worn out(New plow $10,000 – rebuild plow $3,000-$5,000).
- Brakes will need to be replaced soon.(2,000)
- Plow/sander controls are obsolete.($10,000 to replace controller)
- Front end alignment($200)
- Sander conveyor chain needs replaced($2,000)
- Needs front tires($1,000)

I'm not going to say that the truck is falling apart. If it were, then we wouldn't be doing our job in maintaining our fleet. We always fix problems immediately when they arise. In the last couple years, we've spent about $10,000 on repairs to this truck. These include new turbo charger, new rear tires and new deicing tanks. I just think we're at the point where the depreciation of the old truck and the cost increase of new trucks is tilting against us. It is critical that we have a dependable truck for plowing and sanding. Technology has greatly improved in these types of trucks and snow plow/sander manufacture and operations are continually making for a safer and easier way to operate such a truck.

I've included a study commissioned by the IDOT and conducted by ISU. They did a bunch of data analysis on maintenance records from IDOT plow trucks. The results of the analysis basically say that it is more cost effective to replace DOT trucks after about 7 years. I do not know what volume of mileage they put on their trucks but most of it is highway miles. Other replacement plans I've seen for dump trucks vary between 7-12 years. Those were in Utah, Minnesota and Wisconsin. So I think our 10 year cycle is pretty close.

I researched city driving vs. highway driving and couldn't find any concrete research on that topic, especially as it relates to dump trucks.

- One thing I did see was that in cars, it's about a 2-1 ratio. 2 highway miles equals 1 city mile. I would guess a snow plow truck would be closer to 3-1 and about 85% of our driving is City. This would equal about 100,000 miles.
- Idle time is also a factor. I did see that 1 hr of idle time equals 25 miles driven. Estimating about 10% idle time for loading sand, salt, dirt, rock and concrete equals about another 10,000 miles of driving.
- Adding this all up, the old truck has over 100,000 miles of wear and tear.

Based on my research and experience I do not think purchasing a used truck would be an option for us in this instance. In our fleet of 15 vehicles and equipment, the dump trucks are our most vital vehicles, especially during the winter months. Our snow plow routes are designed for 3 plow/sander trucks and we do not have any spare trucks. Having a plow truck down for repairs greatly hampers our snow plow operations. With other vehicles and equipment I'm willing to evaluate our replacement schedule and I currently do that as they come up for scheduled replacement.

I would like to replace this single axle truck with a tandem axle truck. I've been thinking about a tandem truck for several years and now is the time. The main advantage of a tandem is increased hauling capacity. Capacity will increase about 50% while cost will only be about 25% more.

Other benefits of a tandem axle:

- Like the name implies, tandem axle trucks have two sets of axles-one right behind the other. The extra tires allow the truck to handle more weight and to be more stable at higher speeds and highway conditions.
- Higher pay load capacity means more room for whatever we are planning to haul.
- Tandems get better traction.
- Our City is growing, thanks to City Council! Increased truck capacity will increase our ability to serve these new areas.
- The initial investment for a tandem is higher than the cost of a single axle model. When we resell our tandem, we will see a much better return on investment, as they hold their value better than a single axle model.

I am requesting Council approval to request bids on this truck. We have the money in the Equipment Reserve Fund. We will have about $160,000 in there in FY18. I'd like it get bids sent out and have truck here in time for next winter. It'll take 6 months or so for delivery. We will sell the old truck ourselves and possibly put it on the Alliant Energy Auction. I'm hoping we get around $30,000 for it.

Let me know if you have any questions. Thank you.

Number of vehicles requested: 1 Estimated Cost: $190,000

Estimated re-sale value: $30,000

Net cost: $160,000

Submitted by: Rod Jasa Date: 2/17/17

ISU Researchers Use Big Data to Save Big $ for DOT

Kevin Scheibe (left) and Sree Nilakanta (center) both associate professors of information systems, collaborated with David May (right) Iowa Department of Transportation fleet manager, on a project to save money on maintenance and replacement of snow plows. (Larger image) *Photo by Christopher Gannon*

AMES, Iowa – It takes a fleet of around 900 snow plow trucks for the Iowa Department of Transportation to keep the roads and highways clear once the snow starts to fly. Maintaining that fleet is costly, which is why the DOT partnered with Iowa State University's College of Business to identify potential cost savings.

Sree Nilakanta and Kevin Scheibe, both associate professors of information systems, analyzed 10 years of maintenance records for DOT snow plows – more than a million pieces of data – to identify the optimal time to replace old ones. For the two different snow plow trucks the DOT operates, ISU researchers found the best timeframe was six to seven years. That's a dramatic difference than the DOT's current 15-year replacement window, which means the DOT is paying more to repair and maintain old trucks than it would cost to replace them. Buying new trucks after six or seven years could save $2 million to $5 million annually.

To arrive at that number, Nilakanta and Scheibe created a simulation-based decision support system using maintenance records, purchase price and resale estimates in yearly increments. Basically, it's an efficient way to process big data in real time to project when it'll cost more to maintain than buy a new snow plow truck. Nilakanta and Scheibe say it's a system that any government agency or company with a large transportation fleet can utilize.

"Many DOTs have the same problem and each one is trying a different approach. The system we've created is an easier way of doing the estimations and predictions," Nilakanta said.

Word about the simulation system is spreading. Other state DOTs and private businesses have already contacted Nilakanta and Scheibe about conducting similar projects, as well as how they might use the system to analyze their own data.

Data to support decision making

In the age of big data, more and more business leaders are interested in using analytics to operate more efficiently and improve the bottom line. Scheibe says the tools and methodologies have long existed, but today the data is easier to access and process.

"We collect so much data, but we don't know what to do with it," Scheibe said. "To be able to apply different analytic methods allows us to go through massive amounts of data and create

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Immediate information needed?:
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ISU Researchers Use Big Data to Save Big $ for DOT

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a series of options that enables decision makers to make better choices."

David May, fleet manager for the Iowa DOT for nearly two decades, says the ISU research is the best case he's had to significantly change how the DOT invests in its fleet. He has long suspected they were spending more to maintain trucks, but never had the data to support that conclusion.

"This research bore out what we suspected to be true. In fact, it's the most solid evidence that we have to show that we really need to reduce the amount of time that we keep our snow plow trucks," May said.

Nilakanta and Scheibe have presented the findings to several DOT leaders. May says the DOT plans to change the length of time that it keeps plows and adjust its snow plow budget accordingly.

Growing interest from industry and at ISU

The DOT partnership is just one example of the work Iowa State researchers are conducting on behalf of businesses in Iowa and across the country. Not only do businesses see value, but so do students. Nilakanta and Scheibe say since starting the project their analytics research team has grown from one to 20 graduate students, who are part ISU's master of science in information systems, and specialize in analytics.

The team is looking at other applications and uses, such as inventory management, machine failure predictions and process improvement. Researchers say they designed the simulation system so that the DOT can modify as it collects new data. This is beneficial because as manufacturers develop new equipment technology, the optimal replacement window may change. It is important to continuously monitor maintenance records to recommend the best time to replace older equipment.

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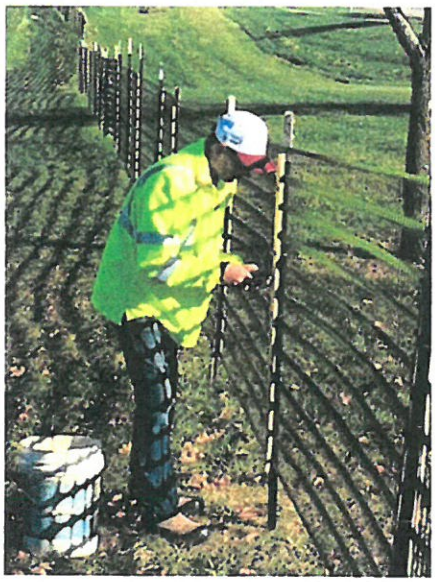
Employee Exchange Program

Submitted by Matt Dolan, West Des Moines Public Services Operations Specialist

WEST DES MOINES, Iowa—Hey, who's the new guy at West Des Moines Public Services? This was a common question asked around our shop a few weeks ago. We had the pleasure of having an Equipment Operator from the City of Lethbridge, Alberta, Canada spend a week at our City to review some our Public Services activities. This whole idea started a few years ago when the Public Works Departments of Fort Collins, CO and West Des Moines exchanged staff in an effort to review various operational practices. Next up, was an exchange with the City of Fargo, ND where an operator and supervisor were dispatched to the respective Public Works facilities for a few days during the summer work season. Even though public works departments perform many of the same type of basic work activities, it is interesting to compare the different approaches on how the respective job functions are performed. Oftentimes organizations can have the tendency to "get in a rut" and do things the same old way. Most staff don't like change, but to have the opportunity to spend time with a peer from another public works department and to learn how they do things, is both enlightening and very educational.

So what's next? The plan at this point is to send staff to Fargo, ND and Buffalo Grove, IL to review winter operations during a storm event. This was going to be conducted last winter with Fargo, but they had an extremely mild winter (yes Fargo). So while we had some delays, we



hope to complete our exchange with both of these agencies this winter to learn more about how they handle their re-

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DRAFT

RESOLUTION NO. 17-
City Council

RESOLUTION AUTHORIZING THE PUBLIC WORKS DEPARTMENT TO PROCEED WITH SOLICITATION OF PROPOSALS FOR THE REPLACEMENT OF UNIT 500

WHEREAS, the Public Works Department has determined the need for the purchase of a new tandem axle plow truck to replace Unit 500, a 2008 Freightliner dump truck with snow plow and sander, and

WHEREAS, funding for the purchase of a new tandem axle plow truck to replace Unit 500, is available in the FY 2018 Equipment Reserve Fund in the amount of $160,000, including funding received from the sale of the old Unit 500, and

WHEREAS, City Council deems the purchase of a new tandem axle plow truck to replace Unit 500, necessary in order to provide Public Works Department staff with updated equipment, and

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF HIAWATHA, IOWA, to authorize Public Works Department staff to proceed with the solicitation of proposals for a new tandem axle plow truck to replace Unit 500.

AYES:
NAYS:
ABSENT:

PASSED AND APPROVED this 1st day of March, 2017.

_____
Bill Bennett, Mayor

ATTEST:

_____
Kelly Kornegor, City Clerk