DATE       December 29, 2010
TO         Honorable Mayor and Members of the City Council
SUBJECT   Sanitation Fleet Efficiencies with Global Positioning System - Update

On Wednesday, January 5, 2011, Sanitation Services will brief the subject
topic. Attached are the briefing materials for your review.

Please let me know if you have any questions.

Ryan S. Evans
First Assistant City Manager

Attachment

C: Mary K. Suhm, City Manager
   Deborah A. Watkins, City Secretary
   Thomas P. Perkins, Jr., City Attorney
   Craig D. Kinton, City Auditor
   Judge C. Victor Lander, Administrative Judge
   Jill A. Jordan, P.E., Assistant City Manager
   A.C. Gonzalez, Assistant City Manager
   Forest E. Turner, Assistant City Manager
   Jeanne Chipperfield, Chief Financial Officer
   Frank Librio, Public Information Office
   Mary Nix, Director, Sanitation Services
   Helena Stevens-Thompson, Assistant to the City Manager

"Dallas - Together, we do it better!"
Sanitation Fleet Efficiencies
with Global Positioning System -- Update

Briefing to City Council
January 5, 2011
BRIEFING PURPOSE

• Follow up to February 18, 2009 briefing
• Provide update on GPS deployment to Sanitation’s fleet
What we said in Feb 2009

- Pilot started October 2006 with 70 units
  - DPD and DFR already utilizing GPS department-wide
- Pilot warranted expansion department wide
- Planned savings over a 3-year contract period:
  - overtime cost savings of $691,687
  - fuel cost savings of $188,824
  - improved customer service
- Council approves 3-year contract for $697,058 on Feb 18, 2009  (see Appendix A)
So, how are we doing?

- **Installation June – September 2009**
  - All 378 road vehicles equipped
  - Continue to install on any new vehicles

- **Training of 41 supervisors and managers**
  - 3-6 month effort
  - Follow-up training introduces new features

- **How are they using GPS?**
  - day-to-day verification of routes
    - Any one supervisor may have up to 16 route drivers
    - Can only field-monitor a select few each day
    - GPS gives ability to view ALL drivers at any moment
  - Better utilization of trucks and manpower
  - Weekly reports on efficiencies
Supervisor view - route time

Route at 8am

Route at 12pm
Supervisor view - route time

Route at 12pm
Supervisor view - route time

Route at 3pm
Supervisor view – review routes

- Supervisors can review multiple routes at one time
Supervisor view – review routes

- Supervisors can review entire brush crew at one time.
Supervisor view - Route fidelity

- Compare **planned** route map to **driven** GPS path

Route map – **as planned**

GPS path – **as driven**
## GPS Reports - cost analysis

<table>
<thead>
<tr>
<th>State</th>
<th>Departure Time</th>
<th>Departure Location</th>
<th>Arrival Time</th>
<th>Arrival Location</th>
<th>Travel Time</th>
<th>Distance (+ Equiv Idle Distance)</th>
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</thead>
<tbody>
<tr>
<td>Stopped</td>
<td></td>
<td>COD CENTRAL SC 5</td>
<td></td>
<td>COD CENTRAL SC 5</td>
<td></td>
<td>0.03 Miles (+ 0.03 Miles)</td>
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<tr>
<td>Tue, Sep 14</td>
<td>8:36am</td>
<td>COD CENTRAL SC 5</td>
<td>9:38am</td>
<td>COD CENTRAL SC 5</td>
<td>2 Min</td>
<td>13.22 Miles (+ 1.34 Miles)</td>
</tr>
<tr>
<td>7:30pm</td>
<td>2669 Lago St</td>
<td>Dallas, TX, 75210 - US</td>
<td>10:39am</td>
<td>3118 Swanston St</td>
<td>3 Min</td>
<td>0.30 Miles (+ 0.30 Miles)</td>
</tr>
<tr>
<td>10:30pm</td>
<td>3118 Swanston St</td>
<td>Dallas, TX, 75210 - US</td>
<td>11:41am</td>
<td>4200 York St</td>
<td>3 Min</td>
<td>18.83 Miles (+ 0.57 Miles)</td>
</tr>
<tr>
<td>11:41am</td>
<td>4200 York St</td>
<td>Dallas, TX, 75210 - US</td>
<td>12:28pm</td>
<td>4026 Marshall St</td>
<td>47 Min</td>
<td>2.78 Miles (+ 0.00 Miles)</td>
</tr>
<tr>
<td>12:28pm</td>
<td>4026 Marshall St</td>
<td>Dallas, TX, 75210 - US</td>
<td>12:59pm</td>
<td>4327 Marshall St</td>
<td>30 Min</td>
<td>2.47 Miles (+ 0.97 Miles)</td>
</tr>
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<td>1:09pm</td>
<td>4327 Marshall St</td>
<td>Dallas, TX, 75210 - US</td>
<td>1:07pm</td>
<td>2844 Lago St</td>
<td>4 Min</td>
<td>0.25 Miles (+ 0.34 Miles)</td>
</tr>
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<td>1:14pm</td>
<td>2844 Lago St</td>
<td>Dallas, TX, 75210 - US</td>
<td>1:26pm</td>
<td>2888 Morning Ave</td>
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<td>0.67 Miles (+ 0.00 Miles)</td>
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<tr>
<td>1:29pm</td>
<td>2888 Morning Ave</td>
<td>Dallas, TX, 75210 - US</td>
<td>1:56pm</td>
<td>3275 Lago St</td>
<td>28 Min</td>
<td>2.02 Miles (+ 3.06 Miles)</td>
</tr>
<tr>
<td>2:37pm</td>
<td>3275 Lago St</td>
<td>Dallas, TX, 75210 - US</td>
<td>2:47pm</td>
<td>5357 S Central Expy</td>
<td>11 Min</td>
<td>2.18 Miles (+ 0.00 Miles)</td>
</tr>
<tr>
<td>2:51pm</td>
<td>5357 S Central Expy</td>
<td>Dallas, TX, 75215 - US</td>
<td>3:15pm</td>
<td>McCOMMAS MAIN SITE</td>
<td>24 Min</td>
<td>6.93 Miles (+ 2.51 Miles)</td>
</tr>
<tr>
<td>Stopped</td>
<td>3:30pm</td>
<td>McCOMMAS MAIN SITE</td>
<td>3:53pm</td>
<td>COD CENTRAL SC 5</td>
<td>23 Min</td>
<td>9.99 Miles (+ 0.23 Miles)</td>
</tr>
</tbody>
</table>

### Summary for Vehicle - 093016

- **Trip Count:** 12
- **Travel Time:** 7 Hrs, 15 Min
- **Travel Distance:** 59.49 Miles
- **Equivalent Idling Distance:** 14.85 Miles

### Costs:

- **Fuel Cost:** $27.87
- **Vehicle Cost:** $153.52
- **Crew Cost:** $139.88
- **Total Cost:** $321.05
GPS Reports - *Exceptions* (speed)

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Road Type</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:38am</td>
<td>476 Levant Ave, Dallas, TX, 75217 - US</td>
<td>Residential</td>
<td>20 MPH</td>
</tr>
<tr>
<td>7:40am</td>
<td>432 Levant Ave, Dallas, TX, 75217 - US</td>
<td>Residential</td>
<td>1 MPH</td>
</tr>
<tr>
<td>7:41am</td>
<td>396 Levant Ave, Dallas, TX, 75217 - US</td>
<td>Residential</td>
<td>0 MPH</td>
</tr>
<tr>
<td>7:42am</td>
<td>346 Levant Ave, Dallas, TX, 75217 - US</td>
<td>Residential</td>
<td>0 MPH</td>
</tr>
<tr>
<td>7:43am</td>
<td>10418 Harvest Rd, Dallas, TX, 75217 - US</td>
<td>Residential</td>
<td>0 MPH</td>
</tr>
<tr>
<td>7:44am</td>
<td>10429 Harvest Rd, Dallas, TX, 75217 - US</td>
<td>Residential</td>
<td>0 MPH</td>
</tr>
<tr>
<td>7:45am</td>
<td>10458 Harvest Rd, Dallas, TX, 75217 - US</td>
<td>Residential</td>
<td>0 MPH</td>
</tr>
<tr>
<td>7:46am</td>
<td>10477 Harvest Rd, Dallas, TX, 75217 - US</td>
<td>Residential</td>
<td>0 MPH</td>
</tr>
<tr>
<td>7:47am</td>
<td>10583 Trail Ave, Dallas, TX, 75217 - US</td>
<td>Residential</td>
<td>13 MPH</td>
</tr>
<tr>
<td>7:48am</td>
<td>10549 Trail Ave, Dallas, TX, 75217 - US</td>
<td>Residential</td>
<td>0 MPH</td>
</tr>
<tr>
<td>7:49am</td>
<td>10495 Trail Ave, Dallas, TX, 75217 - US</td>
<td>Residential</td>
<td>0 MPH</td>
</tr>
<tr>
<td>7:51am</td>
<td>10428 Trail Ave, Dallas, TX, 75217 - US</td>
<td>Residential</td>
<td>10 MPH</td>
</tr>
<tr>
<td>7:52am</td>
<td>10366 Trail Ave, Dallas, TX, 75217 - US</td>
<td>Residential</td>
<td>5 MPH</td>
</tr>
<tr>
<td>7:53am</td>
<td>10313 Trail Ave, Dallas, TX, 75217 - US</td>
<td>Residential</td>
<td>10 MPH</td>
</tr>
<tr>
<td>7:54am</td>
<td>252 S Trego Ct, Dallas, TX, 75217 - US</td>
<td>Residential</td>
<td>0 MPH</td>
</tr>
</tbody>
</table>

- Supervisors can monitor drivers’ adherence to speed limits
## GPS Reports - Exceptions
(idling and extended stops)

### Long idle

<table>
<thead>
<tr>
<th>Status</th>
<th>Time</th>
<th>Location</th>
<th>Road Type</th>
<th>Speed</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idling</td>
<td>3:50pm</td>
<td>452 Fordham Rd, Dallas, TX, 75216 - US</td>
<td>Residential</td>
<td>0 MPH</td>
<td>32 Min</td>
</tr>
<tr>
<td>Moving</td>
<td>4:22pm</td>
<td>452 Fordham Rd, Dallas, TX, 75216 - US</td>
<td>Residential</td>
<td>0 MPH</td>
<td>--</td>
</tr>
<tr>
<td>Moving</td>
<td>4:23pm</td>
<td>644 Fordham Rd, Dallas, TX, 75216 - US</td>
<td>Residential</td>
<td>13 MPH</td>
<td>--</td>
</tr>
<tr>
<td>Moving</td>
<td>4:24pm</td>
<td>3666 S Marsalis Ave, Dallas, TX, 75216 - US</td>
<td>Secondary</td>
<td>16 MPH</td>
<td>--</td>
</tr>
</tbody>
</table>

### Extended stop

<table>
<thead>
<tr>
<th>Status</th>
<th>Time</th>
<th>Location</th>
<th>Road Type</th>
<th>Speed</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moving</td>
<td>11:31am</td>
<td>4863 Sunnyvale St, Dallas, TX, 75216 - US</td>
<td>Secondary</td>
<td>26 MPH</td>
<td>--</td>
</tr>
<tr>
<td>Moving</td>
<td>11:32am</td>
<td>2811 E Ledbetter Dr [Tx-12-Loop], Dallas, TX, 75216 - US</td>
<td>Primary</td>
<td>0 MPH</td>
<td>--</td>
</tr>
<tr>
<td>Ignition Off</td>
<td>11:33am</td>
<td>2782 E Ledbetter Dr [Tx-12-Loop], Dallas, TX, 75216 - US</td>
<td>Primary</td>
<td>0 MPH</td>
<td>42 Min</td>
</tr>
<tr>
<td>Ignition On</td>
<td>12:15pm</td>
<td>2782 E Ledbetter Dr [Tx-12-Loop], Dallas, TX, 75216 - US</td>
<td>Primary</td>
<td>0 MPH</td>
<td>--</td>
</tr>
<tr>
<td>Moving</td>
<td>12:15pm</td>
<td>2782 E Ledbetter Dr [Tx-12-Loop], Dallas, TX, 75216 - US</td>
<td>Primary</td>
<td>0 MPH</td>
<td>--</td>
</tr>
</tbody>
</table>
Feedback from supervisors

- Both Manager and Supervisors find GPS to be a helpful tool
  - Truly able to see ALL of their direct reports more fully
  - Provides excellent means for reinforcing basic principles
    - “Stick to the route”, “follow speed limits”, “check in by radio”
  - Allows for better day-to-day use of manpower and trucks
    - Pinpoint delays earlier – and re-allocate resources to fix
    - Reports offer means to compare driver efficiencies
      - Recognize the better operators
      - Re-train drivers where needed

- Want to install mobile laptops in supervisor trucks
  - Make better use of supervisors’ field time
Feedback from field staff

- **Field Employees’ Morale Team**
  - 15-person group to represent the 542 SAN employees
  - Originally skeptical of GPS
    - Anticipated punitive outcomes
    - Thought the system would make errors in reporting
  - Now:
    - “Looks like one of the better ideas we’ve seen in Sanitation.”
    - “Will have lasting value if we use savings to keep drivers aware of safety issues – and how dangerous our work is.”
      - Accident at landfill resulted in driver death – May 10, 2010
      - Safety Investigation Report advised for stronger safety policies to ensure no repeat of such a tragic accident
    - “Recognitions (i.e., pins, caps, award events) really make a difference to our guys.”
So ... Is it paying for itself?

- **Cost of system:**
  - Three-year contract for: $697,058

- **Expected savings:**
  - Overtime reduction: $691,687
  - Fuel cost reduction: $188,824
  - Projected savings: $880,511

- Payback should exceed invested cost in Year 3
So ...is it paying for itself? **YES!**

- **Cost of system:**
  - Three-year contract for: $697,058

- **Expected savings:**
  - Overtime reduction: $691,687, $507,670
  - Fuel cost reduction: $188,824, $169,636
  - Projected savings: $880,511, $677,306

- Rather than a 3-year payback, the system has nearly paid for itself in just **one year**
  - We applied these savings to storm cleanup work

*These figures reflect actual FY10 expense reductions, as of the August FTA report.*
Future?

- Continue to gather data on SAN usage of GPS – verify overall effectiveness
  - Utilize savings for employee recognition
  - Apply to Employee Safety Incentives
- Apply lessons to support route improvements
  - brush / bulk service
  - dead animal collection
  - proactive roll cart program
- Demonstrate value to other city departments
APPENDIX A

Two pertinent slides from Feb 2009 briefing
WHAT CAN WE SAVE?

- Pilot findings allow for full-fleet projections
- Non-monetary benefit
  - Better customer service – responding to calls
- Reduce Overtime cost by 5%
  - FY08 cost: $4,611,250 -- FY09 cost $3,756,343
  - Savings over a 3-year contract period: **$691,687**
- Reduce fuel consumption by 1% (with routing efficiencies)
  - FY08 cost: $6,294,140 -- FY09 cost $3,929,439
  - Savings over a 3-year contract period: **$188,824**
RETURN ON INVESTMENT

- Three-year cost of system: $697,058
- Three-year savings:
  - Overtime: $691,687
  - Fuel: $188,824

Three-Year ROI = 1.26