Strategies for improving domestic waste collection – a case study in Hampshire

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Optimising domestic collection rounds

What are the impacts of:
1. Optimising round structures
2. Allowing cross-boundary collections
3. Alternative vehicle depot locations
4. Alternate weekly bin collection (AWC/ABC)
Collections by round - Rushmoor
Large amount of data collected:

- **Vehicle rounds (in street order)**
  - 25 weekly rounds; 125 daily rounds (residual waste)
- **Number of households on rounds (130,000)**
- **Weight of residual and recyclable waste**
Data analysis / preparation

1. Street order converted to postcode order
   5,000 street names into 12,000 postcodes

2. Weigh ticket data for individual days ⇒
   - average weight on each round
   - number of loads taken to tip
Detailed round order
Basingstoke/Hart boundary

Rounds chosen close to the boundaries

25 daily rounds modelled

=1/5th of total
Modelling

- Off-the-shelf routing and scheduling software used (LogiX – DPS)

- Existing routes and round structures within each authority area were optimised prior to considering any joint working options
Optimal round structures

- Saving 7.4 miles per round = 3,800 miles/year
- Saving 2.4 miles per round = 1,100 miles/year

Basingstoke and Deane

Hart

Rushmoor
Cross-boundary collections, existing depots

- Time saving: 0.8% = 3 minutes/round
- Distance saving: 3% = 1.1 miles/round
  = 1,375 miles/year
Re allocation of rounds between depots

Time saving 1.4% = 6 minutes/round
Distance saving 5.9% = 2.1 miles/round
= 2,700 miles/year
Keeping RCVs at disposal sites

Time saving 3% = 13 minutes/round
Distance saving 13.5% = 4.8 miles/round
= 6,250 miles/year
Assuming 20% diversion from residual waste to dry recyclables, across 23,179 households:

<table>
<thead>
<tr>
<th></th>
<th>Now</th>
<th>ABC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Km’s</td>
<td>1963</td>
<td>1686</td>
</tr>
<tr>
<td>Veh days</td>
<td>46</td>
<td>37</td>
</tr>
<tr>
<td>Tip trips</td>
<td>80</td>
<td>73</td>
</tr>
<tr>
<td>hours</td>
<td>312</td>
<td>265</td>
</tr>
</tbody>
</table>
Other Operating Options

Lengthening shifts or adding additional shifts
- Day extended from 8 to 11.5 hours across 9 sub-rounds in Rushmoor
- Vehicle distance savings of 8.5% (32km) and time savings of 1.6% (1 hour)
- No. of rounds reduced from 9 to 6
- No. of trips to the disposal site down from 18-16
- Double shifting (2 seven hour shifts, 2 crews, 06:30-13:30 13:30-20:30) would reduce rounds from 9 to 6
Other Operating Options

Joint domestic/commercial collections
- Recyclate collections from SME’s as part of the domestic round
- 8 sub-rounds from the Hart and Rushmoor WCAs
- Proportions of SME waste modelled = 1.7%, 3.2%, 6.3% and 8%, 3.9, 7.4, 14.4 and 18.4 tonnes per fortnight)
- 3.9T/fortnight could be carried on existing rounds without increasing the number tip trips
- 12% increase in round distance (46km), 5% time
- Additional sub-round needed for 18.4t
Conclusions

1. WCAs may be able to gain significant benefits from route/round optimisation

2. Savings from sharing work, allowing cross-boundary collections, seem to be relatively modest
Conclusions

3. In terms of reducing RCV mileage, vehicle depots should be located close to the waste disposal sites

but staff journeys to and from work would need to be considered

4. AWC is likely to reduce vehicle mileage and time taken significantly