

This document was prepared  
by a Town resident.

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# Leaf Collection Scenarios & Costs

February 1, 2022

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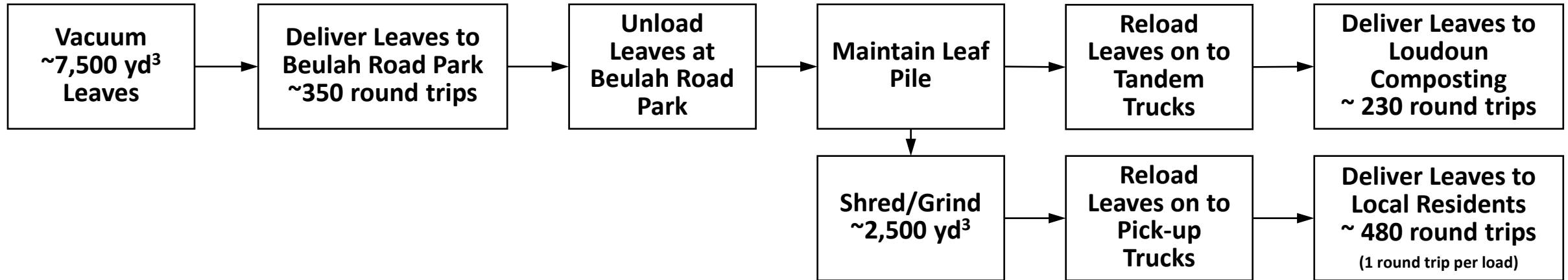
# Leaf Collection Cost Calculations

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- A cost comparison was conducted - using
  - Actual data from the 2020-2021 leaf collection season: Leaf volume, actual hours and equipment
- Compared to:
  - A Direct Long Haul program where leaves are collected and hauled directly to Loudoun Composting

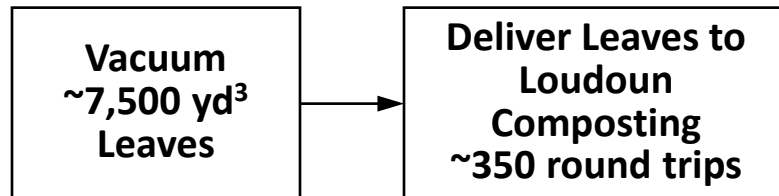
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## 2020-2021 Leaf Collection

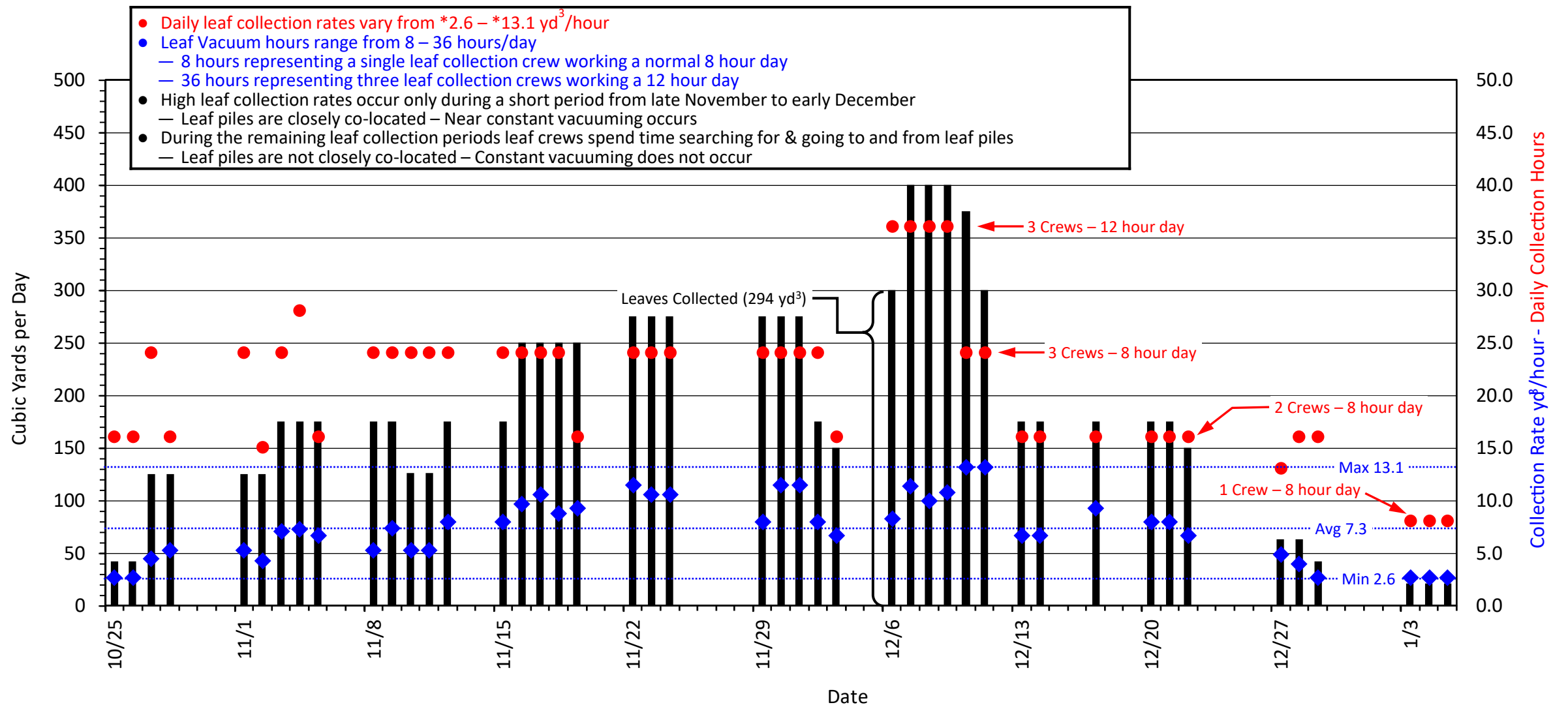


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## Direct Long Haul Leaf Collection



# 2020-21 Leaf Collection Volume, Crew Hours & Leaf Collection Rates



# Cost for 2020-21 Leaf Collection Season - 7,427 yd<sup>3</sup>

| Cost Item                                              | Item                                                                                  | 2020-21 Actuals   | Source                            |
|--------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------|-----------------------------------|
| Cost to Collect and Deliver Leaves to Beulah Road Park | Volume of leaves collected/vacuumed and delivered to Beulah Road Park                 | 7,427 cubic yards | 4/15/2021 NewGen Report Table 1-4 |
|                                                        | Employee regular hours                                                                | 3,814 hours       | 4/15/2021 NewGen Report Table 1-3 |
|                                                        | <i>Employee regular hours cost @ \$55 per hour</i>                                    | <i>\$209,770</i>  |                                   |
|                                                        | Employee overtime hours                                                               | 416 hours         | 4/15/2021 NewGen Report Table 1-3 |
|                                                        | <i>Employee overtime hours cost @ \$82.5 per hour</i>                                 | <i>\$34,320</i>   |                                   |
|                                                        | Tandem truck hours while collecting leaves                                            | 988 hours         | 4/15/2021 NewGen Report Table 1-3 |
|                                                        | Tandem truck hours delivering leaves to Beulah Road Park (7,427/21) x 0.5 hr per trip | 177 hours         | DPW Estimate based on Actual Data |
|                                                        | Supervisor pickup truck hours (45.7 shifts x 8 hours/shift x 50% utilization)         | 183 hours         | DPW Estimate based on Actual Data |
|                                                        | Leaf vacuum hours                                                                     | 988 hours         | 4/15/2021 NewGen Report Table 1-3 |
|                                                        | <i>Tandem truck maintenance costs @ \$6.49 per hour</i>                               | <i>\$7,560</i>    |                                   |
|                                                        | <i>Tandem truck fuel costs @ \$7.85 per hour</i>                                      | <i>\$9,144</i>    |                                   |
|                                                        | <i>Pickup truck maintenance costs @ \$4.32 per hour</i>                               | <i>\$790</i>      |                                   |
|                                                        | <i>Pickup truck fuel costs @ \$3 per hour</i>                                         | <i>\$548</i>      |                                   |
|                                                        | <i>Leaf vacuum maintenance costs @ \$17.48 per hour</i>                               | <i>\$17,270</i>   |                                   |
|                                                        | <i>Leaf vacuum fuel costs @ \$4.89 per hour</i>                                       | <i>\$4,831</i>    |                                   |
|                                                        | <i>Total cost to collect and deliver leaves from vacuum site to Beulah Road Park</i>  | <i>\$284,233</i>  |                                   |
| Leaf Loading and Shredding Costs                       | Volume of leaves ground/shredded                                                      | 2,500 cubic yards | Actual quantity ground in 2021    |
|                                                        | <i>Cost for contractor to grind/shred leaves</i>                                      | <i>\$10,000</i>   |                                   |
|                                                        | Employee regular hours (supervisor + operator x 8 hr/day x 3 days)                    | 48 hours          | DPW Estimate                      |
|                                                        | <i>Employee regular hours cost @ \$55 per hour</i>                                    | <i>\$2,640</i>    |                                   |
|                                                        | Equipment hours (8 hr/day x 3 days) assume same hourly costs as Tandem truck          | 24 hours          | DPW Estimate                      |
|                                                        | <i>Tandem truck maintenance costs @ \$6.49 per hour</i>                               | <i>\$156</i>      |                                   |
|                                                        | <i>Tandem truck fuel costs @ \$7.85 per hour</i>                                      | <i>\$188</i>      |                                   |
|                                                        | <i>Cost to perform leaf shredding</i>                                                 | <i>\$12,984</i>   |                                   |

| Cost Item                                             | Item                                                                                  | 2020-21 Actuals      | Source                                   |
|-------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------|------------------------------------------|
| Delivery Costs and Tipping Fees to Loudoun Composting | Cubic yards of leaves delivered to Loudoun Composting                                 | 4,900 cubic yards    | 4/15/2021 NewGen Report Table 2-1        |
|                                                       | Weight of unground leaves                                                             | 350.0 lbs/cubic yard | 4/15/2021 NewGen Report Table 1-1        |
|                                                       | Equivalent of 4900 cubic yards of leaves into tons                                    | 858 tons             |                                          |
|                                                       | Loudoun Composting fee for 1 ton of leaves                                            | \$30.00 /ton         | <b>01/2022 Cost Increase</b>             |
|                                                       | <i>Loudoun Composting Fees</i>                                                        | <i>\$25,725</i>      |                                          |
|                                                       | Tandem truck capacity                                                                 | 21 cubic yards       |                                          |
|                                                       | Number of tandem truck loads required (Round trip deliveries)                         | 233 round trips      |                                          |
|                                                       | Time to load tandem truck @ Beulah Road Park                                          | 0.25 hours           |                                          |
|                                                       | Round trip time from from Vienna to Loudoun Composting (includes unloading @ Loudoun) | 2.0 hours            |                                          |
|                                                       | <i>Tandem truck maintenance costs @ \$6.49 per hour</i>                               | <i>\$3,402</i>       |                                          |
|                                                       | <i>Tandem truck fuel costs @ \$7.85 per hour</i>                                      | <i>\$4,115</i>       |                                          |
|                                                       | Employee (truck driver) regular hours                                                 | 524 hours            |                                          |
|                                                       | Employee (loader/supervisor) Regular Hours Assume 30 min per load                     | 117 hours            |                                          |
|                                                       | <i>Employee regular hours cost @ \$55 per hour</i>                                    | <i>\$35,241</i>      |                                          |
|                                                       | <i>Total cost to bring leaves from Beulah Road Park to Loudoun Composting</i>         | <i>\$68,484</i>      |                                          |
| Delivery Costs to Vienna Residents                    | Hours delivering mulch to residents                                                   | 1,323 hours          | DPW Actual Time for 2021 leaf deliveries |
|                                                       | <i>Pickup truck maintenance costs @ \$4.32 per hour</i>                               | <i>\$5,715</i>       |                                          |
|                                                       | <i>Pickup truck fuel costs @ \$3 per hour</i>                                         | <i>\$3,969</i>       |                                          |
|                                                       | Employee (truck driver) regular hours                                                 | 1,323 hours          |                                          |
|                                                       | Employee (loader/supervisor) regular hours Assume 0.2 hour per load                   | 265 hours            |                                          |
|                                                       | <i>Employee regular hours cost @ \$55 per hour</i>                                    | <i>\$87,318</i>      |                                          |
|                                                       | <i>Total cost to deliver leaves to residents (excluding Shredding costs)</i>          | <i>\$97,002</i>      |                                          |

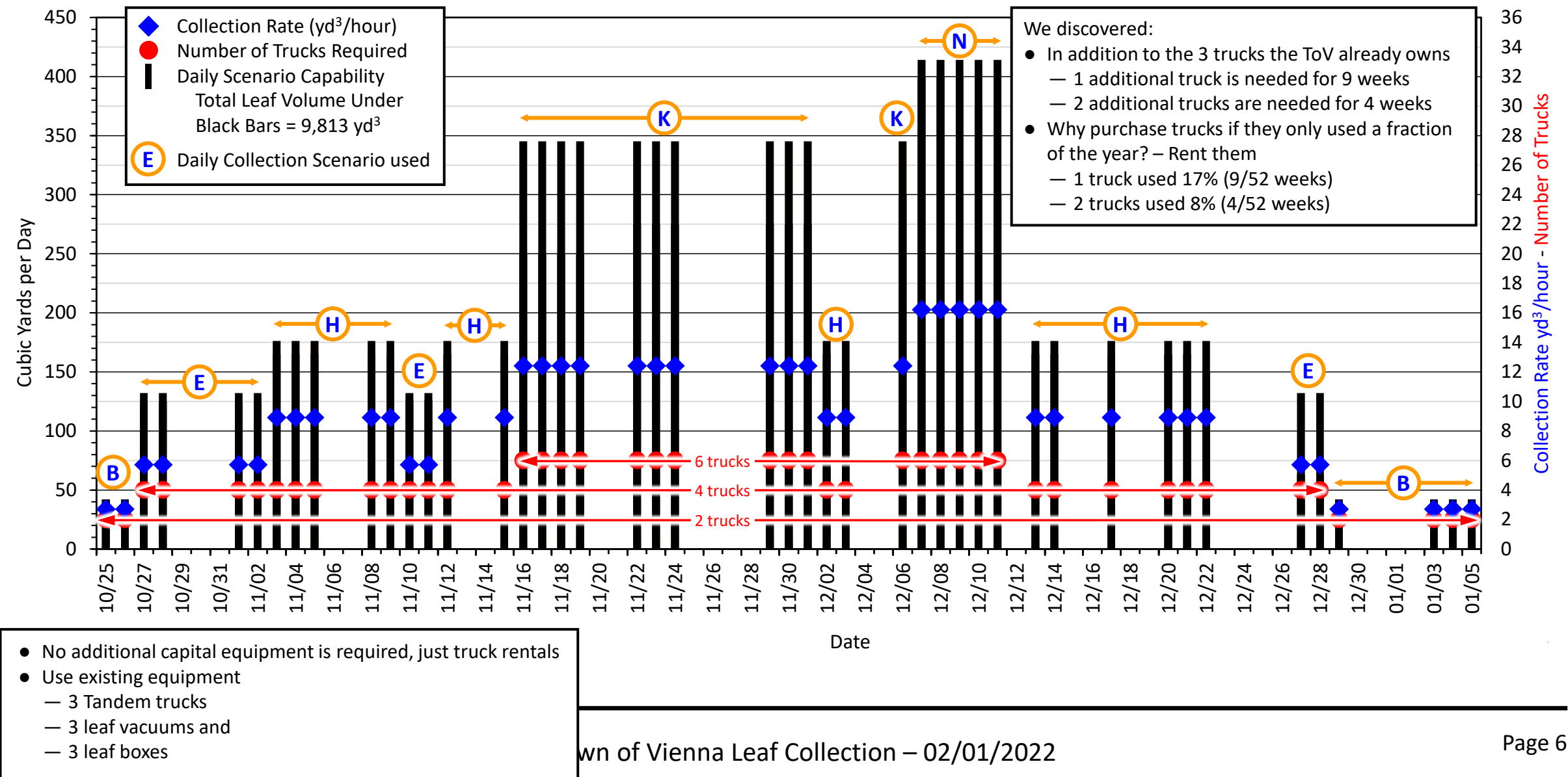
**Total cost for 2020-21 Leaf Collection Program to collect 7427 cubic yards of leaves: \$462,704**

# Modeling the Direct Long Haul Leaf Collection Scenario

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- We used the 2020-21 Leaf Collection data on the previous pages to model the Direct Long Haul Leaf Collection scenario
- We constructed 14 different daily leaf collection scenarios
  - See A through N in the back-up charts
- Each scenario varies the leaf collection rate and number of leaf collection crews
  - From this, we determine the number of trucks necessary to keep the leaf collection crews busy
  - Basically, the objective is for an empty truck to show up every time a leaf collection crew fills a truck
- Our modelling is conservative
  - For example, we allocated 30 minutes to drive to Loudoun Composting, 30 minutes to dump leaves, and 30 minutes to return to Vienna
  - We also added 30 minutes of margin on every trip to account for delays
- Our goal was to model a Direct Long Haul Leaf Collection scenario capable of ~10,000 yd<sup>3</sup>
  - We wanted to be sure to capture the maximum number of trucks needed
  - Recent year leaf collections have ranged from ~7,500 to ~9,500 yd<sup>3</sup>

# Scenarios and Equipment Used for Direct Long Haul Leaf Collection



# Cost for Direct Long Haul Leaf Collection

| Cost of Direct Long Haul Leaf Collection Program for 9,813 cubic yards |                                                                                                 |                   |                                                         |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-------------------|---------------------------------------------------------|
| Cost Item                                                              | Item                                                                                            | Value             | Source                                                  |
| Cost to Collect and Deliver Leaves to Beulah Road Park                 | Volume of leaves collected/vacuumed and delivered to Beulah Road Park                           | 9,813 cubic yards | Scenario Leaf Collection Capability                     |
|                                                                        | ToV Leaf collection crew hours                                                                  | 3,720 hours       | 3 crewmembers per leaf vacuum (3x leaf vacuum hours)    |
|                                                                        | ToV Tandem truck driver pulling leaf vacuum hours                                               | 1,240 hours       | 1 crewmember per leaf vacuum (1x leaf vacuum hours)     |
|                                                                        | ToV Tandem truck driver delivering leaves to Loudoun Composting hours                           | 531 hours         | 266 trips to Loudoun Composting x 2 hours/trip          |
|                                                                        | ToV Supervisor hours                                                                            | 360 hours         | 1 supervisor per work day                               |
|                                                                        | Total hours                                                                                     | 5,851 hours       | Sum of the above hours                                  |
|                                                                        | Total regular hours                                                                             | 5,266 hours       | 90% of total hours are regular hours                    |
|                                                                        | <i>Employee regular hours cost @ \$55 per hour</i>                                              | <i>\$289,625</i>  |                                                         |
|                                                                        | Employee overtime hours                                                                         | 585 hours         | 10% of total hours are overtime hours                   |
|                                                                        | <i>Employee overtime hours cost @ \$82.5 per hour</i>                                           | <i>\$48,271</i>   |                                                         |
|                                                                        | Tandem truck hours                                                                              | 891 hours         | Equal to Tandem truck driver hours (1240 hrs + 531 hrs) |
|                                                                        | Pickup truck hours (for Supervisor)                                                             | 360 hours         | Equal to Supervisor hours                               |
|                                                                        | Leaf vacuum hours                                                                               | 1,240 hours       | From Scenario calculation                               |
|                                                                        | <i>Tandem truck maintenance costs @ \$6.49 per hour</i>                                         | <i>\$5,783</i>    |                                                         |
|                                                                        | <i>Tandem truck fuel costs @ \$7.85 per hour</i>                                                | <i>\$6,994</i>    |                                                         |
|                                                                        | <i>Pickup truck maintenance costs @ \$4.32 per hour</i>                                         | <i>\$1,555</i>    |                                                         |
|                                                                        | <i>Pickup truck fuel costs @ \$3 per hour</i>                                                   | <i>\$1,080</i>    |                                                         |
|                                                                        | <i>Leaf vacuum maintenance costs @ \$17.48 per hour</i>                                         | <i>\$21,675</i>   |                                                         |
|                                                                        | <i>Leaf vacuum fuel costs @ \$17.48 per hour</i>                                                | <i>\$6,064</i>    |                                                         |
|                                                                        | Number of weeks one-25 cubic foot Tandem truck is needed                                        | 9 weeks           | From Scenario calculation                               |
|                                                                        | Hours per week (truck rents on a 9 hour/day shift basis)                                        | 45 hours          |                                                         |
|                                                                        | Total Hours for one-25 cubic foot Tandem truck                                                  | 405 hours         |                                                         |
|                                                                        | <i>Total Cost for one-25 cubic foot Tandem truck for 9 weeks</i>                                | <i>\$42,930</i>   |                                                         |
|                                                                        | Number of weeks two-25 cubic foot Tandem trucks are needed                                      | 4 weeks           | From Scenario calculation                               |
|                                                                        | Hours per week (truck rents on a 9 hour/day shift basis)                                        | 45 hours          |                                                         |
|                                                                        | Total Hours for two-25 cubic foot Tandem truck                                                  | 360 hours         |                                                         |
|                                                                        | <i>Total Cost for two-25 cubic foot Tandem trucks for 4 weeks</i>                               | <i>\$38,160</i>   |                                                         |
|                                                                        | <i>Total cost to collect and deliver leaves from vacuum site directly to Loudoun Composting</i> | <i>\$462,136</i>  |                                                         |

| Cost of Direct Long Haul Leaf Collection Program for 9,813 cubic yards               |                                                                              |                      |                              |
|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------|------------------------------|
| Cost Item                                                                            | Item                                                                         | Value                | Source                       |
| Leaf Loading and Shredding Costs                                                     |                                                                              |                      |                              |
|                                                                                      | <i>Cost to perform leaf shredding</i>                                        | <i>\$0</i>           |                              |
| Delivery Costs and Tipping Fees to Loudoun Composting                                | Cubic yards of leaves delivered to Loudoun Composting                        | 9,813 cubic yards    |                              |
|                                                                                      | Weight of unground leaves                                                    | 350.0 lbs/cubic yard |                              |
|                                                                                      | Equivalent of 4900 cubic yards of leaves into tons                           | 1,717 tons           |                              |
|                                                                                      | Loudoun Composting fee for 1 ton of leaves                                   | \$30.00 /ton         | <b>01/2022 Cost Increase</b> |
|                                                                                      | <i>Loudoun Composting Fees</i>                                               | <i>\$51,518</i>      |                              |
| Delivery Costs to Vienna Residents                                                   | <i>Total cost to dispose of leaves at Loudoun Composting</i>                 | <i>\$51,518</i>      |                              |
|                                                                                      |                                                                              |                      |                              |
|                                                                                      | <i>Total cost to deliver leaves to residents (excluding Shredding costs)</i> | <i>\$0</i>           |                              |
| <b>Total cost for Direct Long Haul Program to collect 9813 cubic yards of leaves</b> |                                                                              | <b>\$513,654</b>     |                              |

**Total cost for Direct Long Haul Program to collect 9813 cubic yards of leaves: \$513,654**

# Comparing Apples to Apples

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## ***From a True Cost Account Perspective***

|                                                                                      |           |
|--------------------------------------------------------------------------------------|-----------|
| Total cost for 2020-21 Leaf Collection Program to collect 7427 cubic yards of leaves | \$462,704 |
| Total cost for Direct Long Haul Program to collect 9813 cubic yards of leaves        | \$513,654 |
| Scaling by the ratio of leaves collected (7427/9813 = 76 %)                          |           |
| Total cost for Direct Long Haul Program to collect 7427 cubic yards of leaves        | \$388,761 |
| Direct Haul Yearly <u>Savings</u>                                                    | \$73,943  |

## ***From a Budgeting Perspective (Payments to External Vendors)***

|                                                                                                                                                                                                 |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Additional Costs to Rent Trucks <small>[\$42,930 + \$38,160) x 76%]</small>                                                                                                                     | \$61,628  |
| Increase in Loudoun Composting Disposal Fees for the Leaves that were Previously Shredded in Beulah Road Park <small>[2,500 yd3 x 350.0 lbs/cubic yard / 2,000 lbs/ton x \$30.00 / ton]</small> | \$13,125  |
| Elimination of Leaf Mulching/Shredding                                                                                                                                                          | -\$10,000 |
| Direct Haul Yearly <u>Additional Cost</u>                                                                                                                                                       | \$64,753  |

## ***Budget Changes Independent of Leaf Collection Method***

|                                                                                                                                                           |          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Increase in Loudoun Composting Disposal Fees from \$9 to \$30/ton <small>[7,427-2,500 yd3 x 350.0 lbs/cubic yard / 2,000 lbs/ton x \$21.00 / ton]</small> | \$18,107 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----------|



# Conclusions

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- Direct Long Haul Leaf Collection and Disposal Program Benefits
  - Saves \$74 K per year (true cost accounting)
  - Ends leaf collection program earlier
    - Long Haul program ends leaf operations in early January, current program ends in late March
    - This frees up approximately 1,500 hours of DPW labor that can be used performing other tasks
  - Enables DPW to vacate Beulah Road Park
    - Eliminates acoustic fence barrier maintenance/replacement
    - Eliminates sound studies to comply with Conditional Use Permit
    - Eliminates leaf pile maintenance (leaf pile turnover and chemicals)
  - No additional need for any Capital Equipment
- Direct Long Haul Leaf Collection and Disposal Program Drawback
  - Results in \$65K budget increase to external vendors
  - Eliminates free local delivery of leaf mulch to ~ 200-300 residents
    - 2020-2021 cost of leaf shredding and local delivery was ~ \$110 K
    - Leaf Mulch is available at the I-66 transfer facility
    - DPW can investigate methods and costs if the free leaf mulch delivery service is continued

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# Back-up Charts

Town of Vienna Leaf Collection – 02/01/2022

|  |                                                                    |
|--|--------------------------------------------------------------------|
|  | Collection Equipment In Use                                        |
|  | 3-Man Leaf Collection Crew Collecting Leaves                       |
|  | 90 Minute Round Trip Travel Time from Vienna to Loudoun Composting |
|  | 30 Minute Margin on Round Trip Time                                |
|  | Idle - Break or Lunch Time                                         |