

# WASTE MANAGEMENT TONNAGE AND COSTING MODEL

for a 25-year Planning Period

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### WHAT IF...

WE COULD KNOW
WHAT WOULD
HAPPEN IN 25
YEARS?

**STRATZER** 

### ABOUT STRATZER

- Experts at your service for more than 25 years
- Four offices in Eastern Canada (including Toronto)
- 90 professionals specialized in circular economy and waste management
- 6 departments



### **STRATZ3R**

#### INTRODUCTION

#### Niagara Region :

- 12 local area municipalities
- 472 500 residents and business owners
- 206 500 household units



#### Client's needs:

- Upgrade of the Tonnage projection model (2024 to 2051)
- New Cost projection model (2024 to 2051)





### THE MODELS NEED TO BE...



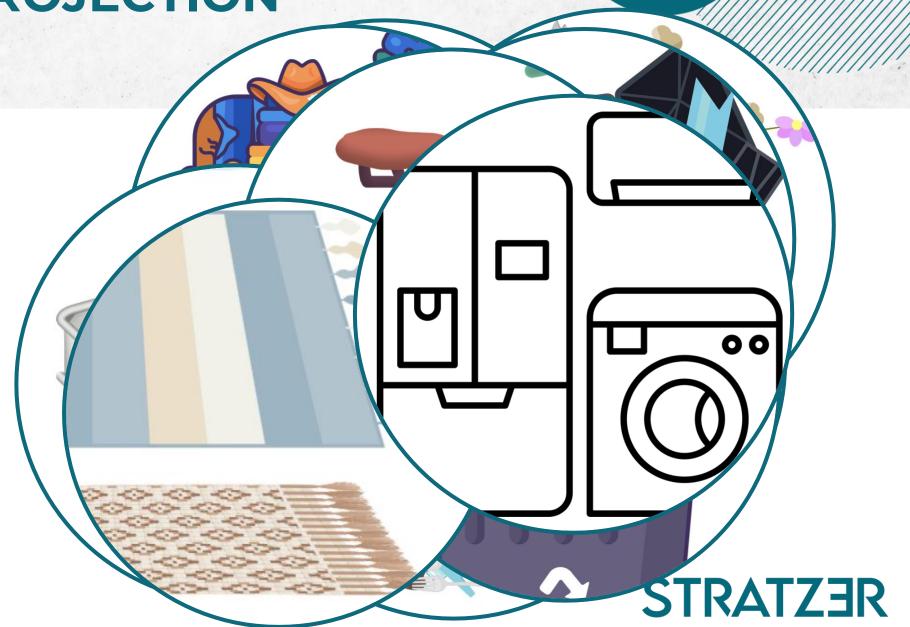
- Linked to one another
- Fully accessible and editable by Niagara Region
- **Upgradable** with new data and with new waste programs/initiatives



TONNAGE PROJECTION MODEL

#### **By STREAM**

- Landfilled
- Diverted
- Generated



# METHODOLOGY Tonnage projection model

- Use actual data (2011-2021): Multiple regression analysis
  - Identify main constants in materials generation/collection
  - Identify variables impacting generation/collection
  - Validate constants and variables
- Extrapolate data for future years using constants and variables
- Add extra parameters to allow the client to adjust data if changes in the system (e.g. improvement of Multiresidential participation in SSO collection)



#### **IDENTIFICATION OF VARIABLES**

#### Major External factors

- Demographic:
  - Population growth
  - % Single-Family Housing
  - % 2 to 5 Housing units
  - % Multi-Res > 5 units
  - ICI units
- Economic:
  - GDP
  - Inflation
  - Construction activities indicators
    - Investment in building construction
    - Value of building permits
    - Housing under construction (units)

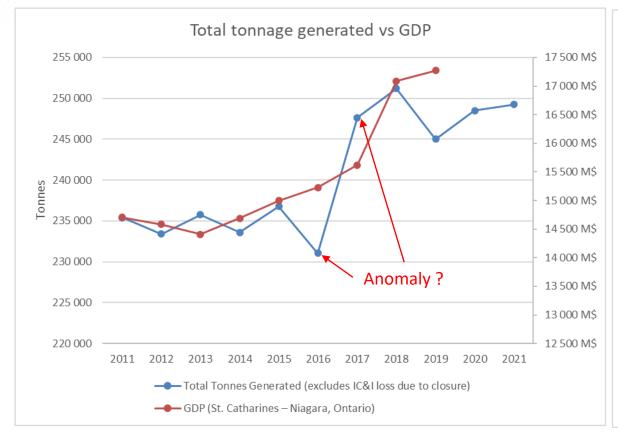
#### Major Internal factors

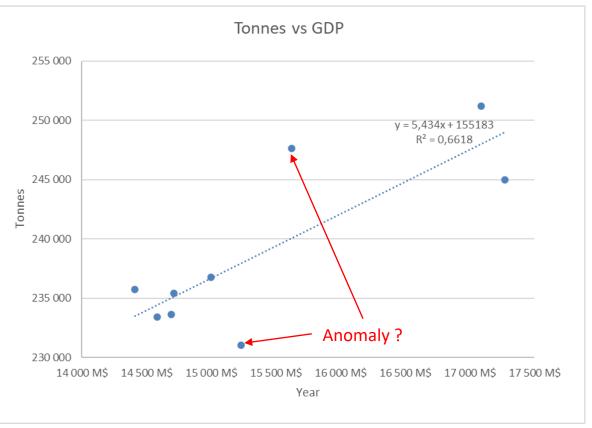
- Waste generation rate (kg/person)
  - Single-Family Housing
  - 2 to 5 Housing units
  - Multi-Res > 5 units
- Collection rate (kg/person and kg/household)
  - Garbage
  - Blue Box performance
  - SSO collection performance
- Curbside service coverage rate
  - % or Nbr of residential units and IC&I served



# **DRIVERS VALIDATION**Tonnage projection model

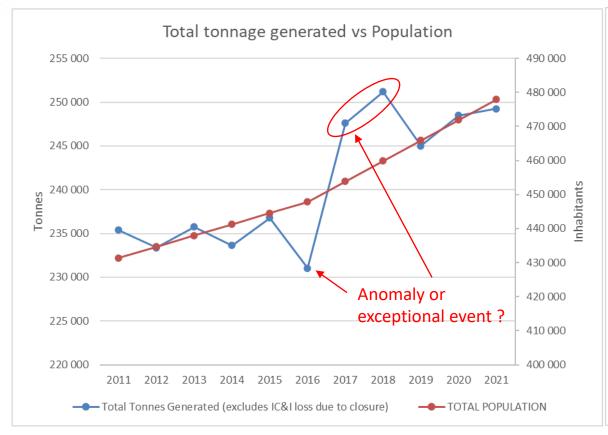
GDP vs total waste generated (highly significant)

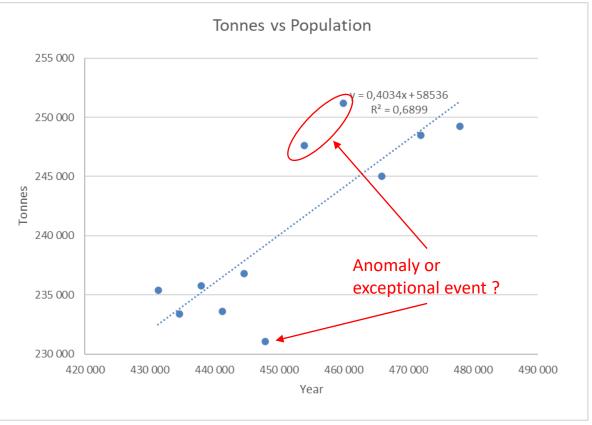




# DRIVERS VALIDATION Tonnage projection model

Population vs total waste generated (highly significant)





|  | historical                           |               |  |  |                                |                               |                             |                                 |   |                                 |                                 |                                 |                                 |      |
|--|--------------------------------------|---------------|--|--|--------------------------------|-------------------------------|-----------------------------|---------------------------------|---|---------------------------------|---------------------------------|---------------------------------|---------------------------------|------|
| w stream (Landfilled)                            | Based on recent yrs of historical    | 15,9%         | Walker - Blu   | _  |                                |                               |                             |                                 | *************************************** |                                 |                                 |                                 |                                 | 0    |
|  | nistoricai                           | 15,9%         |  | Predictive Walker - Blue Box Program Residue |                                |                               |                             |                                 |   |                                 |                                 |                                 |                                 |      |
|  |                                      | 0044          | 14/ 11   |  | ram Resid                      |                               |                             |                                 |   |                                 |                                 |                                 | 4 7                             | 71   |
| de)  |                                      | 2011          | Predictive Wal   |  | e Program R                    |                               | -0                          | 0=0                             | l .                                     |                                 |                                 |                                 |                                 |      |
| Ital Day collection ratio (kg/pers./yr)          | Based on recent yrs of historical    | 0,01 kg/pers. | VARIABLI   | ES   | Num ID                         | )                             | TONNA                       | GES                             | TOI                                     | N PER S                         | SITE                            | REC                             | GRESSI                          | ON   |
| ntial Curbside collection ratio (kg/pers./yr)    | Based on recent yrs of               |               | 0.441-4  |  |                                |                               |                             |                                 |   |                                 |                                 |                                 |                                 |      |
| (0)  | historical                           | 0,75 kg/pers. | 0,11 kg/pe   |  |                                |                               |                             |                                 |   |                                 |                                 |                                 |                                 |      |
| Residential Self-Hauled ratio (kg/pers./yr)      | Based on recent yrs of<br>historical | 0,06 kg/pers. | 0,00 kg/pers.  | 2011<br>2011                                 | 2012<br>2012                   | 2013<br>2013                  | 2014<br>2014                | 2015<br>2015                    | 2016<br>2016                            | 2017                            | 2018                            | 2019                            | 2020                            |      |
|  |                                      |               | a  | 1,2 kg/pers.                                 | 1,0 kg/pers.                   | 1,1 kg/pers.                  | 1,0 kg/pers.                | 1,1 kg/pers.                    | 0,0 kg/pers.                            | 0,0 kg/pers.                    | 0,0 kg/pers.                    | 0,0 kg/pers.                    | 0,0 kg/pers.                    | 0,0  |
| on & Demolition (C&D) Waste                      |                                      | 2011          | 2012   | 0,0 kg/pers.                                 | 0,0 kg/pers.                   | 0,0 kg/pers.                  | 0,0 kg/pers.                | 0,0 kg/pers.                    | 0,0 kg/pers.                            | 0,0 kg/pers.                    | 0,0 kg/pers.                    | 0,0 kg/pers.                    | 0,0 kg/pers.                    | 0,0  |
| Environmental Day collection ratio (kg/pers./yr) | Based on recent yrs of               |               |  | 0,4 kg/pers.                                 | 0,7 kg/pers.                   | 0,5 kg/pers.                  | 0,5 kg/pers.                | 0,6 kg/pers.                    | 2,0 kg/pers.                            | 2,3 kg/pers.                    | 2,1 kg/pers.                    | 2,5 kg/pers.                    | 2,6 kg/pers.                    | 2,6  |
|  | historical                           | 0,00 kg/pers. | 0,00 kg/pers.  | 0,0 kg/empl.                                 | 0,0 kg/empl.                   | 0,0 kg/empl.                  | 0,0 kg/empl.                | 0,0 kg/empl.                    | 0,0 kg/empl.                            | 0,0 kg/empl.                    | 0,0 kg/empl.                    | 0,0 kg/empl.                    | 0,0 kg/empl.                    | 0,0  |
| Residential Self-Hauled ratio (kg/pers./yr)      | Based on recent yrs of               |               |  | 0,0 kg/pers.                                 | 0,0 kg/pers.                   | 0,0 kg/pers.                  | 0,0 kg/pers.                | 0,0 kg/pers.                    | 0,0 kg/pers.                            | 0,0 kg/pers.                    | 0,0 kg/pers.                    | 0,0 kg/pers.                    | 0,0 kg/pers.                    | 0,0  |
| rtesideritial Geli-Hadied Tatio (kg/pers./yr)    | historical                           | 2,44 kg/pers. | 6,71 kg/pers.  | 11 0,0 kg/pers.                              | 0,0 kg/pers.                   | 0,0 kg/pers.                  | 0,0 kg/pers.                | 0,0 kg/pers.                    | 0,0 kg/pers.                            | 0,0 kg/pers.                    | 0,0 kg/pers.                    | 0,0 kg/pers.                    | 0,0 kg/pers.                    | 0,0  |
| IC&I Self-Hauled ratio (kg/employe/yr)           | Based on recent yrs of               |               |  | 15,9%  | 12,5%                          | 12,9%                         | 12,2%                       | 16,7%                           | 12,7%                                   | 11,3%                           | 12,1%                           | 11,8%                           | 11,6%                           | 1    |
|  | historical                           | 0,52 kg/empl. | 2,80 kg/empl.  | 5,1 2011                                     | 2012                           | 2013                          | 2014                        | 2015                            | 2016                                    | 2017                            | 2018                            | 2019                            | 2020                            |      |
|  |                                      |               |  | ,01 kg/pers.                                 | 0,00 kg/pers.                  | 0,00 kg/pers                  | . 0,00 kg/pers.             | 0,00 kg/pers.                   | 0,00 kg/pers.                           | 0,00 kg/pers.                   | 0,00 kg/pers.                   | 0,00 kg/pers.                   | 0,00 kg/pers.                   | 0,00 |
| Metal  |                                      | 2 011         | 2 012  | ,75 kg/pers                                  | 0,11 kg/pers.                  | 0,12 kg/pers                  | 0,09 kg/pers.               | 0,10 kg/pers.                   | 0,15 kg/pers.                           | 0,14 kg/pers.                   | 0,10 kg/pers.                   | 0,14 kg/pers.                   | 0,09 kg/pers.                   | 0,00 |
| Environmental Day collection ratio (kg/pers./yr) |                                      |               |  | ,06 kg/pers                                  | 0,00 kg/pers.                  | 0,00 kg/pers                  | 0,00 kg/pers.               | 0,00 kg/pers.                   | 0,00 kg/pers.                           | 0,00 kg/pers.                   | 0,00 kg/pers.                   | 0,00 kg/pers.                   | 0,00 kg/pers.                   | 0,00 |
|  | historical                           | 0,00 kg/pers. | 0,00 kg/pers.  | 0, 2011                                      | 2012                           | 2013                          | 2014                        | 2015                            | 2016                                    | 2017                            | 2018                            | 2019                            | 2020                            | 3    |
| Residential Self-Hauled ratio (kg/pers./yr)      | Based on recent yrs of<br>historical | 2,17 kg/pers. | 1,33 kg/pers.  | 0,00 kg/pers.<br>1 2,44 kg/pers.             | 0,00 kg/pers.<br>6,71 kg/pers. | 0,00 kg/pers<br>11,94 kg/pers | 0,00 kg/pers.               | 0,00 kg/pers.<br>11,80 kg/pers. | 0,00 kg/pers.<br>24,04 kg/pers.         | 0,00 kg/pers.<br>20,73 kg/pers. | 0,00 kg/pers.<br>15,81 kg/pers. | 0,00 kg/pers.<br>15,93 kg/pers. | 0,00 kg/pers.<br>10,45 kg/pers. | 6,06 |
| ICS I Solf Havilad matic //cm/amplaya/ym         | Based on recent yrs of               |               |  | 0,52 kg/empl.                                | 2,80 kg/empl.                  | 5,30 kg/empl                  | 3,18 kg/empl.               | 3,32 kg/empl.                   | 1,59 kg/empl.                           | 1,25 kg/empl.                   | 1,27 kg/empl.                   | 0,86 kg/empl.                   | 0,75 kg/empl.                   | 0,70 |
| IC&I Self-Hauled ratio (kg/employe/yr)           | historical                           | 0,86 kg/empl. | 1,71 kg/empl.  | 2 011  | 2 012                          | 2 013                         | 2 014                       | 2 015                           | 2 016                                   | 2 017                           | 2 018                           | 2 019                           | 2 020                           |      |
|  |                                      |               |  | 0,00 kg/pers                                 | 0,00 kg/pers.                  | 0,00 kg/pers                  | 0,00 kg/pers.               | 0,00 kg/pers.                   | 0,00 kg/pers.                           | 0,00 kg/pers.                   | 0,00 kg/pers.                   | 0,00 kg/pers.                   | 0,00 kg/pers.                   | 0,00 |
|  |                                      | 2 011         | 2 012  | 2,17 kg/pers.                                | 1,33 kg/pers.                  | 1,65 kg/pers                  | 1,90 kg/pers.               | 2,36 kg/pers.                   | 2,92 kg/pers.                           | 3,45 kg/pers.                   | 3,04 kg/pers.                   | 2,86 kg/pers.                   | 2,66 kg/pers.                   | 2,74 |
| Environmental Day collection ratio (kg/pers./yr) | Based on recent yrs of               |               |  | yrs of<br>0,86 kg/empl.                      | 1,71 kg/empl.                  | 1,10 kg/empl                  | 1,20 kg/empl.               | 1,49 kg/empl.                   | 1,80 kg/empl.                           | 1,54 kg/empl.                   | 1,71 kg/empl.                   | 1,78 kg/empl.                   | 1,31 kg/empl.                   | 1,60 |
| (31  | historical                           | 0,00 kg/pers. | 0,00 kg/pers.  | 2 011  | 2 012                          | 2 013                         | 2 014                       | 2 015                           | 2 016                                   | 2 017                           | 2 018                           | 2 019                           | 2 020                           |      |
| esidential Self-Hauled Tire ratio (kg/pers./yr)  | Based on recent yrs of               |               | recen  | nt yrs of 0,00 kg/pers                       | 0,00 kg/pers.                  | 0,01 kg/pers                  | 0,00 kg/pers.               | 0,00 kg/pers.                   | 0,00 kg/pers.                           | 0,00 kg/pers.                   | 0,00 kg/pers.                   | 0,00 kg/pers.                   | 0,00 kg/pers.                   | 0,00 |
|  | historical                           | 0,31 kg/pers. | 0,27 kg/per of on recent                               | nt yrs of                                    | 0,27 kg/pers.                  | 0,25 kg/pers                  | 0,19 kg/pers.               | 0,23 kg/pers.                   | 0,25 kg/pers.                           | 0,33 kg/pers.                   | 0,38 kg/pers.                   | 0,48 kg/pers.                   | 0,58 kg/pers.                   | 0,69 |
|  |                                      |               |  | 2011   | 2 012                          | 2 013                         | 2 014                       | 2 015                           | 2 016                                   | 2 017                           | 2 018                           | 2 019                           | 2 020                           |      |
|  |                                      | 2 011         | 2 (yr) Based on recent                                 | nt yrs of                                    | 0,01 kg/pers.                  | 0,01 kg/pers                  | 0,01 kg/pers.               | 0,01 kg/pers.                   | 0.00 kg/pers.                           | 0,00 kg/pers.                   | 0,00 kg/pers.                   | 0,00 kg/pers.                   | 0,00 kg/pers.                   | 0,00 |
| ntal Day collection ratio (kg/pers./yr)          | Based on recent yrs of               |               | g/pers./yr) Based on recen                             | nt yrs of                                    | 0,00 kg/pers.                  | 0,01 kg/pers                  | 0,00 kg/pers.               | 0,00 kg/pers.                   | 0,00 kg/pers.                           | 0,00 kg/pers.                   | 0,00 kg/pers.                   | 0,00 kg/pers.                   | 0,00 kg/pers.                   | 0.01 |
| that Day comotion take (tig/perek)./             | historical                           | 0,01 kg/pers. | Patio (kg/pers./yr) Based on recen                     | nt yrs of                                    | 1,15 kg/pers.                  | 0,90 kg/pers                  | 0,79 kg/pers.               | 0,88 kg/pers.                   | 0.87 kg/pers.                           | 0,95 kg/pers.                   | 0.90 kg/pers.                   | 0,92 kg/pers.                   | 0.88 kg/pers.                   | 0,93 |
| collection ratio (kg/pers./yr)                   | Based on recent yrs of               |               | 78300700   | ., To ng pela                                | 2 012                          | 2 013                         | 2 014                       | 2 015                           | 2 016                                   | 2017                            | 2 018                           | 2 019                           | 2 020                           | 0,83 |
|  | historical                           | 0,00 kg/pers  | collection ratio (kg/pers./yr) Based on recen          |  |                                | 0,00 kg/pers                  | 0,00 kg/pers.               | 0,00 kg/pers.                   |   |                                 | 0,00 kg/pers.                   | 3500000                         | 0,00 kg/pers.                   | 0,00 |
| d natio (kalaan ku)                              | Based on recent yrs of               |               | collection ratio (kg/pers./yr)                         |  | 0,00 kg/pers.                  |                               |                             | -                               | 0,00 kg/pers.                           | 0,00 kg/pers.                   |                                 | 0,00 kg/pers.                   |                                 |      |
| STRATZEIN (kg/pers./yr)                          | historical                           | 1             | f-Hauled ratio (kg/pers./yr)  Based on recenhistorical |  | 0,00 kg/pers.<br>0,01 kg/pers. | 0,00 kg/pers<br>0,01 kg/pers  | 0,00 kg/pers. 0,02 kg/pers. | 0,00 kg/pers.<br>0,01 kg/pers.  | 0,00 kg/pers.                           | 0,00 kg/pers.<br>0,02 kg/pers.  | 0,01 kg/pers.<br>0,02 kg/pers.  | 0,05 kg/pers.<br>0,03 kg/pers.  | 0,03 kg/pers.<br>0,02 kg/pers.  | 0,01 |
| DIKAILIK   |                                      |               |  |  |                                |                               |                             |                                 |   |                                 |                                 |                                 |                                 | 1    |

|       | Walker - Blue Box P<br>Predictive Walker - Blue | •      |          |              | 0          |
|-------|---|--------|----------|--------------|------------|
|       | Walker - Organics P                             |        |          |              | 4 771      |
| Guide | VARIABLES                                       | Num ID | TONNAGES | TON PER SITE | REGRESSION |
|       |   |        |          |              |            |

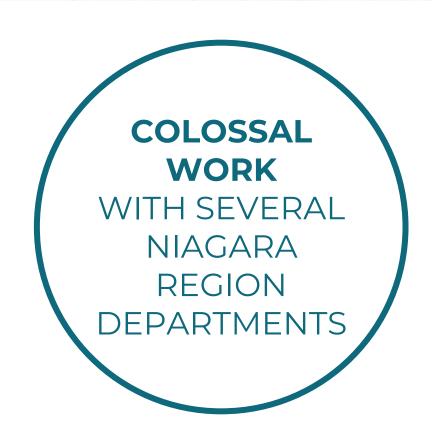
**SUMMARY PER ACTIVITY** 275 470

| SUMMART PER ACTIVITY  |   |                   |                         |                         |                  |                      |                         | 214 101                 | 2/34/0                  |                         |                         |                         |             |                   |       |
|---|---|-------------------|-------------------------|-------------------------|------------------|----------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------|-------------------|-------|
| TOTAL MANAGED   | code                                    | 280 188           | 268 120                 | 273 073                 | 269 541          | 277 833              | 273 124                 | 291 202                 | 292 146                 | 285 474                 | 286 665                 | 289 418                 | 0           | 0                 |       |
| Predictive TOTAL MANAGED  |   | 280 653           | 278 574                 | 276 097                 | 277 284          | 278 714              | 279 528                 | 280 749                 | 290 730                 | 290 278                 | 291 174                 | 292 272                 | 293 479     | 294 749           | 296 0 |
| TOTAL LANDFILLED  |   |                   |                         |                         |                  |                      |                         |                         |                         |                         |                         |                         |             |                   |       |
| 1,0 TOTAL LANDFILLED (SUMMARY)  |   | 123 839           | 119 994                 | 115 601                 | 116 004          | 121 010              | 112 354                 | 118 909                 | 123 791                 | 121 352                 | 120 990                 | 115 009                 | 0           | 0                 |       |
| Predictive TOTAL LANDFILLED (SUMMARY)   |   | 109 831           | 111 293                 | 111 187                 | 112 246          | 114 290              | 115 180                 | 116 216                 | 117 874                 | 119 008                 | 118 460                 | 120 502                 | 124 155     | 123 703           | 125 2 |
| 11000000  |   |                   |                         |                         |                  |                      |                         |                         |                         |                         |                         |                         |             |                   |       |
|   |   | 111 705           | 110 740                 | 1 10 204                | 117.044          | 1 10 040             | 1 10 000                | :== 0=0                 | 170,000                 | 170 700                 | 170 400                 | 100.005                 |             |                   |       |
| TOTAL DIVERTED (Net of Residue)   |   | 141 705           | 143 542                 | 149 864                 | 145 214          | 143 619              | 146 602                 | 158 652                 | 156 633                 | 150 782                 | 153 403                 | 160 285                 | 0           | 0                 |       |
| Predictive TOTAL DIVERTED (Net of Residue)  | 000                                     | 139 968           | 141 526                 | 142 343                 | 143 674          | 145 438              |                         | 149 015                 | 151 181                 | 153 663                 | 154 874                 |                         |             | 161 087           | 163 3 |
| 2,0 TOTAL BLUE BOX NIAGARA REGION (Net of Residue)  Predictive TOTAL BLUE BOX NIAGARA REGION (Net of Residue) |   | 83 939            | 80 419                  | 82 306                  | 76 510           | 72 693               |                         | 77 767                  | 76 455                  | 70 463                  | 66 597                  | 67 945                  | 0           | 0                 |       |
| 3,0 Organics Diverted (Net of Residue)  |   | 61 542<br>37 938  | 62 337<br><b>40 556</b> | 62 501<br><b>42 250</b> | 63 126<br>43 049 | 64 140<br>45 204     | 64 700<br><b>42 306</b> | 65 717<br><b>49 402</b> | 66 881<br><b>50 709</b> | 68 058<br><b>50 004</b> | 68 357<br><b>56 808</b> | 69 677<br><b>62 741</b> | 71 621<br>0 | 71 779            | 14    |
| Predictive Organics Diverted (Net of Residue)   |   | 50 991            | 51 535                  | <b>42 250</b> 52 000    |                  | <b>45 204</b> 53 012 |                         |                         |                         | 50 004<br>55 958        |                         |                         | 57 788      | 58 179            | 5'    |
| 4,0 MHSW Diverted (Net of Residue)  |   | 586               | 660                     | 614                     | 592              | 652                  | 787                     | 946                     | 862                     | 1 025                   | 1 073                   |                         | 0           | 0                 |       |
| Predictive MHSW Diverted (Net of Residue)   |   | 969               | 976                     | 983                     | 991              | 998                  |                         | 1 019                   | 1 033                   | 1 046                   | 1 060                   |                         | 1 087       | 1 100             | 1     |
| 5,0 White Goods Diverted (Net of Residue)  Predictive White Goods Diverted (Net of Residue)                   | 100000000000000000000000000000000000000 | 358               | 48                      | 51                      | 39               | 43                   | 69                      | 62                      | 48                      | 65                      | 44                      | 0                       | 0           | 0                 |       |
| 6.0 Construction/Demolition (C&D) (Net of Residue)  |   | 1 155             | 3 477                   | 6 248                   | 5 779            | 52<br>5 925          | 11 092                  | 9 659                   | 7 531                   | 7 599                   | 5 073                   | 3 036                   | 0           | 0                 |       |
| Predictive Construction/Demolition (C&D) (Net of Residue)   |   | 4 814             | 4 854                   | 4 884                   |                  | 4 965                |                         | 5 063                   |                         | 5 195                   | 5 250                   | 5 321                   | 5 403       | 5 458             |       |
| 7,0 Scrap Metal (Net of Residue)  |   | 1 106             | 920                     | 937                     | 1 072            | 1 356                | 1 679                   | 1 874                   | 1 752                   | 1 695                   | 1 504                   | 1 626                   | 0           | 0                 |       |
| Predictive Scrap Metal (Net of Residue)   |   | 1 491             | 1 508                   | 1 505                   |                  | 1 542                |                         | 1 562                   | 1 587                   | 1 601                   | 1 596                   |                         | 1 676       | 1 673             |       |
| 8,0 Tire (Net of Residue)   |   | 132               | 118                     | 110                     | 86               | 104                  |                         | 150                     | 173                     | 222                     | 273                     | ,                       | 0           | 0                 |       |
| Predictive Tire (Net of Residue)  9,0 Electronics Collected (Net of Residue)                                  |   | 251<br><b>634</b> | 503                     | 404                     |                  | 258<br><b>396</b>    |                         | 264<br><b>442</b>       |                         | 271<br><b>439</b>       | 274<br><b>425</b>       |                         |             | 285               |       |
| 9,0 Electronics Collected (Net of Residue)  Predictive Electronics Collected (Net of Residue)                 |   | <b>634</b>        | 503<br>403              | 404                     | ;                | 396<br>412           |                         | ,                       | ,                       | 439<br>432              | ;                       | ,,                      |             | <b>0</b><br>454   |       |
| 10,0 Textiles Diverted (Net of Residue)   |   | 6                 | 6                       | 5                       | 8                | 4                    |                         | 7                       |                         | 38                      | 24                      |                         |             | 0                 |       |
| Predictive Textiles Diverted (Net of Residue)   |   | 26                | 26                      | 27                      | 27               | 27                   | 27                      | 28                      | 28                      | 28                      | 29                      | 29                      | 29          | 30                |       |
| 11,0 Reuse Diverted (Net of Residue)  |   | 222               | 655                     | 451                     | 967              | 858                  |                         | 1 517                   | 1 142                   | 1 398                   | 1 292                   |                         | 0           | 0                 |       |
| Predictive Reuse Diverted (Net of Residue)  |   | 1 473             | 1 484                   | 1 495                   | 1 507            | 1 518                | 1 529                   | 1 550                   | 1 570                   | 1 591                   | 1 611                   |                         | 1 652       | 1 673<br><b>0</b> |       |
| 12,0 RPRA (WDO) Residential Diversion Credits  Predictive RPRA (WDO) Residential Diversion Credits            |   | 15 627            | 16 179<br>17 188        | 16 487                  | <b>16 691</b>    | 16 017               |                         | <b>16 415</b>           | 16 676                  | <b>16 768</b>           | 19 299<br>18 662        |                         | 0<br>19 137 | 0<br>19 375       |       |
| 13,0 Carpets/Underpads (Net of Residue)   |   | 0                 | 0                       | 17 318                  | 17 449           | 17 580               |                         | 0                       | 0                       | 0                       | 0                       | 0                       | 0           | 0                 |       |
| Predictive Carpets/Underpads (Net of Residue)   |   | 0                 | 0                       | 0                       | 0                | 0                    |                         | 0                       | 0                       | 0                       | 0                       | 0                       | 0           | 0                 |       |
| 14,0 Mattresses/Boxsprings (Net of Residue)   |   | 0                 | 0                       | 0                       | 43               | 153                  |                         | 0                       | 0                       | 43                      | 96                      | 1                       | 0           | 0                 |       |
| Predictive Mattresses/Boxsprings (Net of Residue)   |   | 47                | 47                      | 48                      |                  | 48                   | 1                       | 10                      |                         | 0.1                     |                         |                         |             | 53                |       |
| 15,0 Fats/Oils/Grease (Net of Residue)  |   | 0                 | 0                       | 0                       |                  | 5                    |                         |                         | 0                       |                         | 0                       |                         |             | 0                 |       |
| Predictive Fats/Oils/Grease (Net of Residue)  16,0 Mixed Plastics (Net of Residue)                            |   | 0                 | 0                       | 0                       | 0                | 89                   |                         | 386                     | 702                     | 782                     | 710                     | 762                     | -           | 0                 |       |
| Predictive Mixed Plastics (Net of Residue)  |   | 692               | 697                     | 702                     | •                | 713                  |                         | <b>386</b><br>728       |                         | 7 <b>82</b><br>747      | 710<br>755              |                         |             | 785               |       |
| 17,0 Recycled Bicycles (Net of Residue)   |   | 0                 | 0                       | 0                       | 0                | 0                    | 17                      | 21                      | 26                      | 29                      | 26                      | 100                     | 110         | 0                 |       |
| Predictive Recycled Bicycles (Net of Residue)   |   | 0                 | 0                       | 0                       | 0                | 0                    | 17                      | 21                      | 26                      | 29                      | 26                      | 28                      | 0           | 0                 |       |
| 18,0 Porcelain (Net of Residue)   |   | 0                 | 0                       | 0                       | 0                | 0                    | 0                       | 0                       | 123                     | 213                     | 159                     |                         |             | 0                 |       |
| Predictive Porcelain (Net of Residue)   |   | 166               | 168                     | 168                     | 100              | 171                  | 173                     | 174                     |                         | 179                     | 179                     |                         | 186         | 187               |       |
| 19,0 Bulky (Net of Residue)   |   | U                 | U                       | 0                       | 0                | 0                    | 0                       | 0                       | 18                      | 0                       | U                       | 0                       | U           | 0                 |       |
| Predictive Bulky (Net of Residue)   |   | U                 | 0                       | U                       | O                | U                    | U                       | U                       | U                       | O                       | O                       | 0                       | 0           | 0                 | 4     |
|   | I 1                                     |                   |                         |                         |                  |                      |                         |                         |                         |                         |                         |                         |             |                   |       |

## COST PROJECTION MODEL

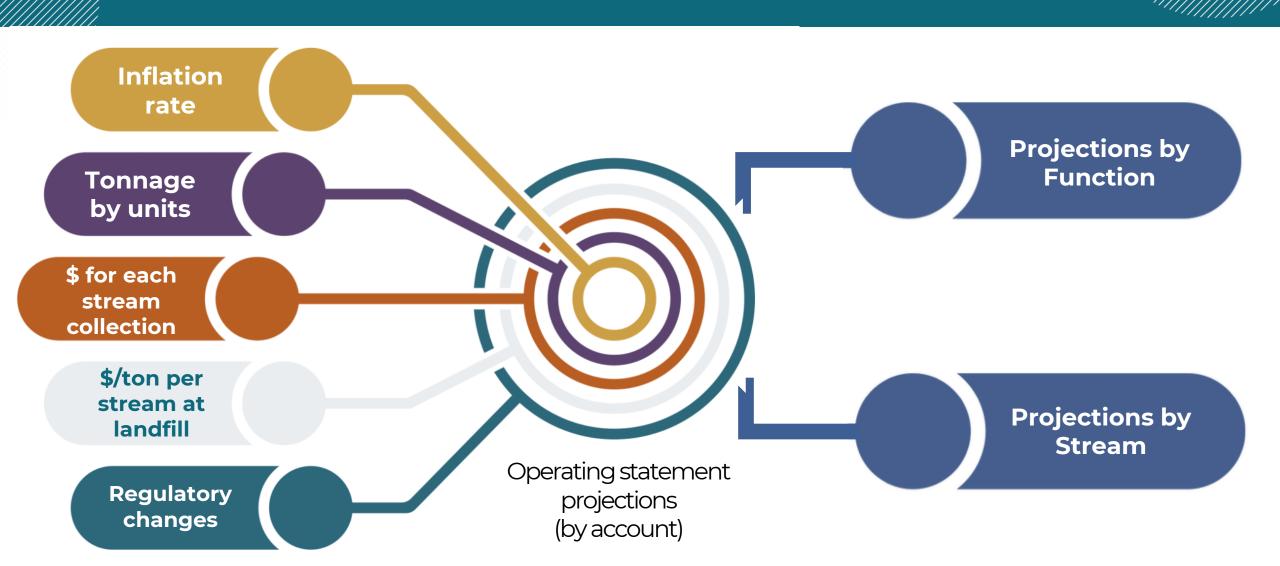
### By STREAM By FUNCTION

- Disposal
- Collections
- Compensations (salaries)
- Administration & planning
- Promotion & Education
- Processing (indirect allocation)
- Capital costs





# **STRUCTURE**Cost projection model



#### RESULTS

- Usefull to evaluate the impact on expenses/revenues and tonnage performance of Waste Management Plan actions
- Forecast landfill capacity and future closure (and cost associated)
- Usefull to estimate the **impacts** of a new diversion program

### POSSIBILITY OF PRODUCING A LESS PRECISE TOOL DEPENDING ON PLANNING NEEDS

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#### CONCLUSION

To achieve a Long-Term Strategic Waste Management Plan: it's in best practices to use the right tools.

Building a personalized projection tool requires time:

don't minimize it.

BE SURE TO PLAN THE REQUIRED TRAINING TO USE IT!



# Thank you for your attention!

Questions or comments?

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