

Waste Diversion Ontario

## **MRF Study Summary Report**

**Prepared by:**

AECOM

2 – 512 Woolwich Street  
Guelph, ON, Canada N1H 3X7  
[www.aecom.com](http://www.aecom.com)

519 763 7783 tel  
519 763 1668 fax

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## Executive Summary

A Request for Proposal (RFP) for the Study of the Capacity and Capability of Ontario Public Sector Material Recovery Facilities (MRFs) was issued by WDO on February 26, 2010 with a subsequent Addendum #1 issued on March 12, 2010. The primary objective of this study is to provide Waste Diversion Ontario (WDO), individual municipal owners, the Association of Municipalities of Ontario (AMO) and Stewardship Ontario (SO) with comprehensive independent information on the capacity, capability, condition and expansion plans of twenty-five public sector MRFs in Ontario.

The key deliverables associated with completion of this study are the following:

- Twenty-five individual MRF Capacity and Capability reports that document a detailed assessment of: facility history, program volumes, Certificate of Approval and zoning details, building and fixed assets, process details and other specific information based on the defined scope parameters.
- A supporting database that contains over 18,000 fields of metrics, documents, drawings and equipment lists.
- A summary report that documents the “portfolio level” insights gained through an aggregation and analysis of the information assembled.

This summary report is intended to provide context about the capacity and capabilities across the current network of public sector MRFs in Ontario. For comparative purposes, building component and process equipment assessment findings have been scored on a scale of 1 to 4 with the following parameters:

- 4 – As new condition/no defects.
- 3 – Minor wear/defects.
- 2 – Significant wear/defects.
- 1 – Excessive wear/defects.

Scoring on these as well as estimates of remaining useful life of equipment are based on established parameters utilized for assessment of waste management infrastructure and capital equipment as well as the experience and professional judgement of the assessment team.

The key findings documented in this summary report include the following:

- The twenty-five public sector MRFs that were assessed are operated by the following three different types of organizational entities: Municipalities (5), Public Boards (8), Private Sector Companies (12).
- Based on staffing levels, there is a wide range in operating efficiency among the twenty-five MRFs ranging from 40 to 2,260 tonnes processed per FTE/year.
- MRFs that are situated on integrated waste management sites process a significantly higher proportion of annual tonnage than stand alone MRFs, likely due to their relative scale.
- 96 % of the Blue Box tonnage processed in municipally owned MRFs is handled by facilities with an overall rating of 3 or above.
- Five of the MRFs assessed have an estimated average remaining equipment life of less than 5 years. Because of the relatively small quantities involved (5% of total Public Sector MRF tonnage), this does not represent a significant network wide volume risk in the near term.

- Most municipal operating contracts do not adequately outline contractors' maintenance requirements and responsibilities.
- Overall, the 25 MRFs assessed were operating at 59% of their practical maximum capacity. Although capacity pressures exist locally, particularly in the GTA, there appears to be sufficient available Blue Box processing capacity available.
- 21 of the 25 MRFs have capacity available for expansion.
- Many of the MRFs have the ability to increase capacity by extending their current hours of operations. Any such extension would be subject to current processing volumes; adjustments to current permitted capacity, remaining equipment life and condition, Certificate of Approval and zoning restrictions, and materials availability.
- While there is a wide range of zoning designations associated with the public sector MRFs, no zoning related issues were identified. Similarly, the majority of MRFs (85% of total annual tonnage) are compliant with their current Certificate of Approval.
- IC&I remains a relatively small percentage (7%) of total MRF tonnage processed. This is partially due to the fact that only 17 of the 25 MRFs track their IC&I volume separately from residential tonnage. There is potential for increased diversion of materials from the portion of the IC&I sector served by municipal MRFs.

The insights gained through completion of this study indicate that there are benefits of scale associated with processing Blue Box materials. While analysis of operational efficiencies was beyond the scope of this project, further study in this area would produce useful results.

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# 1. Introduction

The purpose of this Study of the Capacity and Capabilities of Ontario Public Sector Material Recovery Facilities (MRFs) is to provide Waste Diversion Ontario (WDO), individual municipal owners, the Association of Municipalities of Ontario (AMO) and Stewardship Ontario (SO) with comprehensive independent information on the capacity, capability, condition and expansion plans of twenty-five public sector MRFs in Ontario. Figure 1 illustrates the location of the public sector MRFs in the Province. For clarity, it should be stated that the Cornwall MRF was being re-built during the time of the study, so no on-site assessment activity of site land use, building and process mechanical equipment was conducted. As a result, no data for the Cornwall MRF is included in the composite metrics or total annual tonnages referenced in this Summary Report.

The study information that was gathered included verification and updating of MRF profile data fields contained in the WDO Excel file as well as pre-site visit and on-site assessment of: facility history, Certificate of Approval details, site land use, building and fixed assets, process details and other specific information based on the scope parameters outlined in the Request for Proposal (RFP) for the Study of the Capacity and Capability of Ontario Public Sector Material Recovery Facilities (MRFs) issued by WDO on February 26, 2010 and the subsequent Addendum #1 issued on March 12, 2010.

This MRF Study Summary Report was prepared as part of the required project deliverables specified in the RFP. It contains a summary and aggregation of the information assembled for twenty-five MRFs that were assessed during the course of the study. These findings are intended to provide insight about the capacity and capabilities across the current network of public sector MRFs in Ontario. The MRF-specific detail with respect site land use/approvals, approved expansion plans, building and process mechanical findings associated with the assessment of each MRF are documented in their respective MRF Capacity and Capability Assessment Report as well as the EXCEL-based project database.

With respect to the project database, key fields can be aggregated for analysis to support future assessment of regionally and provincially based diversion scenarios and development of decision support models.

If the Minister of the Environment directs that the Blue Box program move to a full Extended Producer Responsibility model, industry will require facilities capable of delivering more effective and efficient diversion most notably for printed papers and packaging. This study presents a snapshot of MRF capabilities and potentials that will set the stage for effective decision making on investments in existing municipal Blue Box infrastructure to meet these new demands.

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**Public Sector Ontario MRFs**

ID	Location	Owner
1	Alexandria *	R.A.R.E
2	Brampton	Peel, Regional Municipality of
3	Burke's Falls *	Armour-Township of
4	Dufferin	Toronto, City of
5	East Gwillimbury	York, Regional Municipality of
6	Guelph	Guelph, City of
7	Hamilton	Hamilton, City of
8	Huron Park	Bluewater Recycling Association
9	Kapuskasing *	CTWMB
10	Kingston	Kingston, City of
11	Laurentian Valley	OVVRC
12	New Liskeard *	CTWMB
13	Niagara Falls	Niagara, Regional Municipality of
14	Northumberland	Northumberland, County of
15	Peterborough	Peterborough, City of
16	Simcoe	Norfolk, County of
17	Southampton	Bruce Area Solid Waste Recycling
18	Sturgeon Falls *	West Nipissing, Municipal Environmental Services
19	Sudbury	Greater Sudbury, City of
20	Tiny Township	Simcoe, County of
21	Trenton	Quinte Waste Solutions
22	Waterloo	Waterloo, Regional Municipality of
23	Whitby	Durham, Regional Municipality of
24	Winchester *	North Dundas, Township of
25	Windsor	Essex-Windsor Solid Waste Authority
26	Cornwall	City of Cornwall

\* Denotes Small Facility with Limited Automation

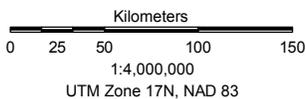
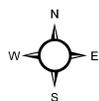


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Basemapping from Ontario Ministry of Natural Resources  
 Orthophotography:

**Legend**

- MRF's
- MRF's (Small Facility)



**Public Sector Ontario MRFs**

January 2011



Figure 1

## 2. Study Approach

The study launch meeting was conducted by AECOM and the WDO Project Steering Group on June 7, 2010. Shortly after that meeting, the on-site assessment schedule was documented. The schedule was developed in a manner to support efficient and effective completion of the on-site assessment activity at each MRF. To achieve that, the MRFs were grouped into zones across the province with the assessment activity in each zone scheduled to ensure optimized travel between MRFs. MRF representatives were contacted by telephone and email to discuss the proposed date for on-site assessment by AECOM and the schedule was confirmed with relatively minor revisions.

The first on-site assessment at the Guelph MRF on June 28, 2010 and the final one was conducted at the Simcoe MRF on November 4, 2010. In most cases, multiple follow-ups were required with each MRF to ensure complete collection of all MRF supporting documentation for high and medium priority scope items.

The MRF assessment work has been performed in three key phases. In the first phase, a preliminary data request involving a brief one page survey was emailed to each MRF contact. The on-site assessment team used this information to verify location, contacts and general information about each MRF. Review of the requested documents enabled the AECOM team to prepare to conduct the on-site assessment work in an efficient and effective manner.

The second phase of the work entailed the on-site assessment work at each MRF. AECOM team members with land use, building and process expertise visited each MRF and gathered information through visual inspection, review of on-site records and dialogue with designated staff. In the third phase, the data collected was supplemented through review of other public domain information as well as follow-ups with MRF staff for required documents and drawings.

The information contained in each MRF's Report is supplemented by a database that includes detailed assessment findings along with supporting documentation, photos, plans, drawings and process flow diagrams that fully document the information gathered by the assessment team. The portfolio level insights across the twenty-five MRFs that are documented in this summary report have been facilitated by analysis of key findings and metrics within the database.

### 3. Key Portfolio Level Assessment Findings

This section of the MRF Study Summary Report documents the insights and findings associated with analysis of aggregate data across the network of twenty-five public sector MRFs. Detailed MRF-specific information and findings are included in the individual MRF Reports as well as the project database. The findings associated with this portfolio level analysis have been grouped into the following sections that reflect summary level analyses of the capacity and capabilities of twenty-five Ontario public sector MRFs.

#### 3.1 MRF Network Throughput Profile

This section of the report provides an aggregation summary overview of the twenty-five MRFs by program, tonnage, FTEs.

##### 3.1.1 General MRF Characteristics

Six MRFs receive only single stream Blue Box materials; 11 MRFs receive only two stream materials; 6 MRFs receive four or more streams; and 2 MRFs receive both single and two stream materials.

Figure 2 illustrates the percentage of total public sector MRF tonnage being processed by number of streams. Virtually all of the public sector MRF volume in Ontario is being processed by MRFs that are two streams or less. Ninety-three percent of the total annual tonnage is processed through 19 of the 25 MRFs that were assessed.

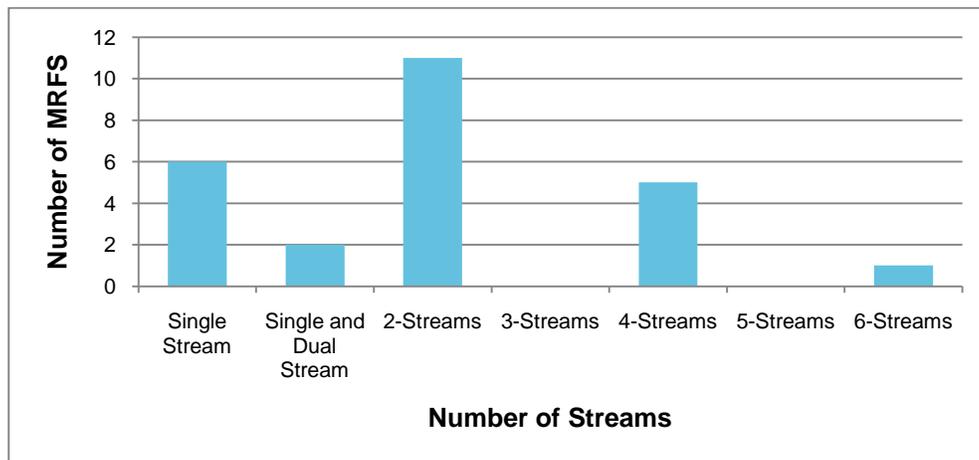
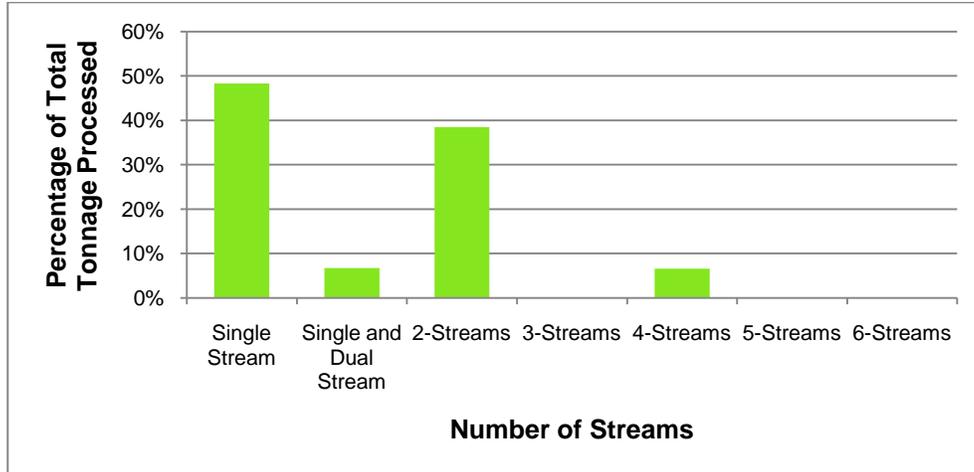


Figure 2. Distribution of MRFs by Number of Streams

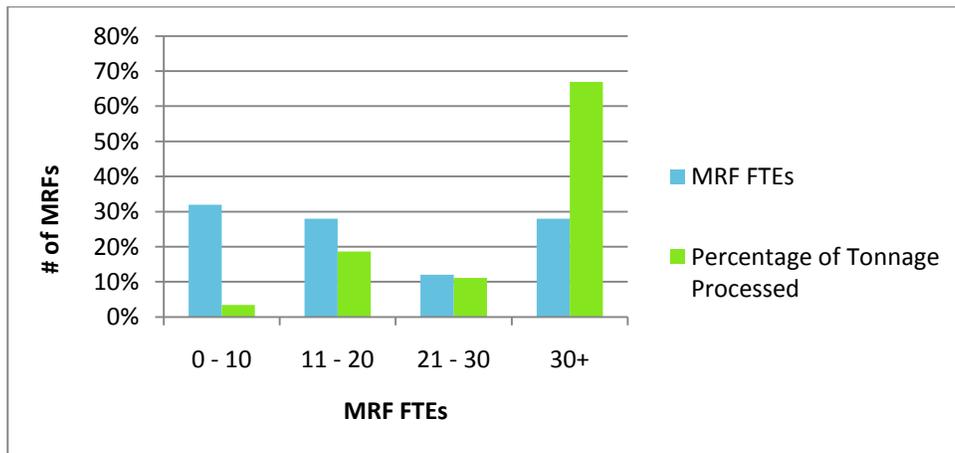
Figure 3 illustrates this tonnage breakdown by facility type. The largest proportion of the tonnage (48%) is being processed by single stream MRFs, followed by two stream MRFs (38%). The two MRFs that operate both single and dual streams account for 7% of the annual tonnage.



**Figure 3. Percentage of Total Tonnage Processed by Number of Streams**

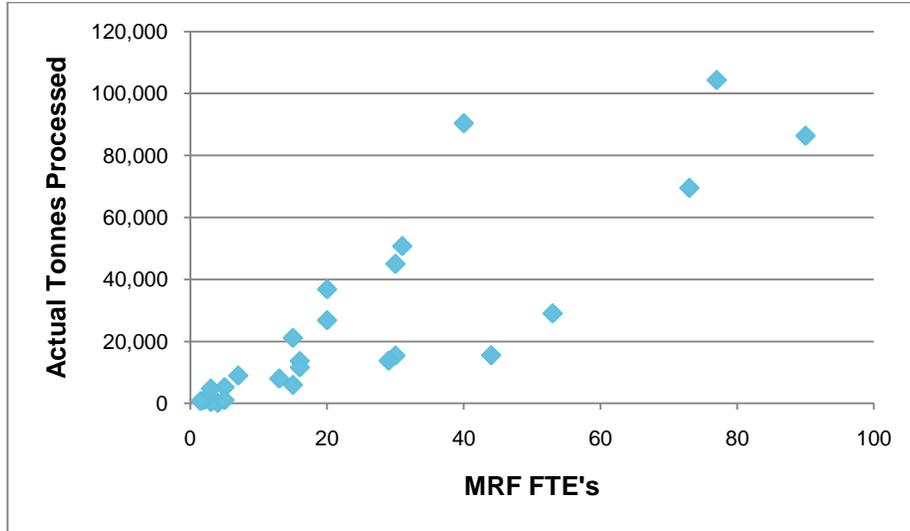
Figure 4 presents the relative number of MRFs by increments of 10 FTEs as well as the percentage of total Ontario tonnage processed by MRFs with those respective staffing levels. Clearly, there is a relationship between the number of FTEs and the total tonnage processed. The seven MRFs that have 31 or more FTEs account for 67% of the total public sector MRF tonnage processed in Ontario.

However, based on the number of MRF FTEs in all staff roles, average annual tonnes processed per FTE/year/MRF ranged from 46 tonnes to 2,260 tonnes among the MRFs assessed. There does not appear to be a strong correlation between MRF total tonnage and tonnes/FTE. This is likely due to the variability in throughput; material availability; staffing and operating configurations among the MRFs.



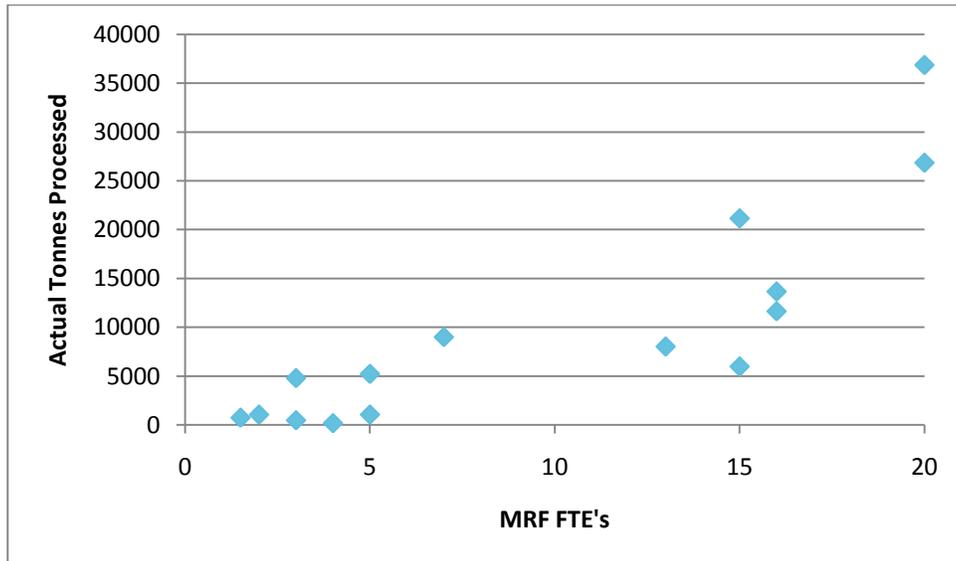
**Figure 4. Number of FTEs Employed by MRFs**

Figure 5 indicates the relative performance in terms of throughput per FTE of individual MRFs with approximately the same number of FTEs. In the group of small to medium MRFs with less than 20,000 tonnes per year, many could likely add additional volume without adding FTEs which would improve their relative performance in terms of tonnes/FTE.



**Figure 5. Relative MRF Performance in Tonnes/FTE**

In Figure 6, the relative performance of MRFs with less than 20 FTEs still shows significant annual tonnage variances among MRFs with 1- to 20 FTEs.

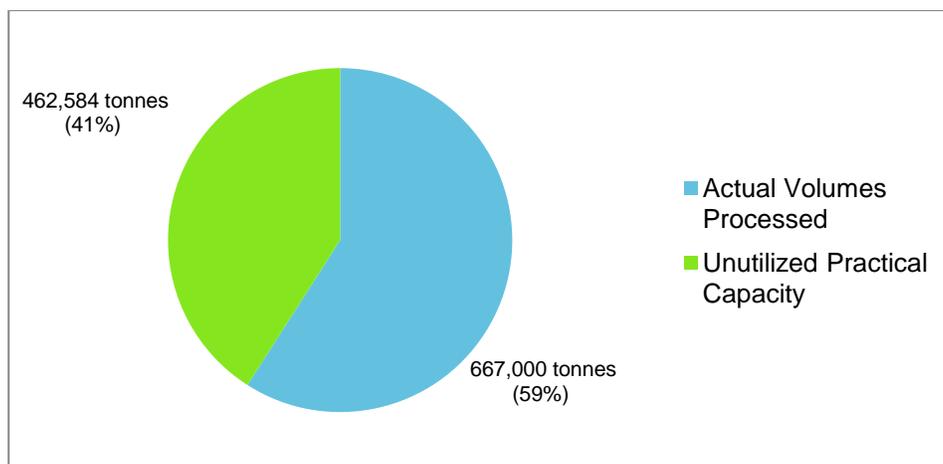


**Figure 6. Relative MRF Performance in Tonnes/FTE (<20FTEs)**

### 3.1.2 MRF Volumes Processed

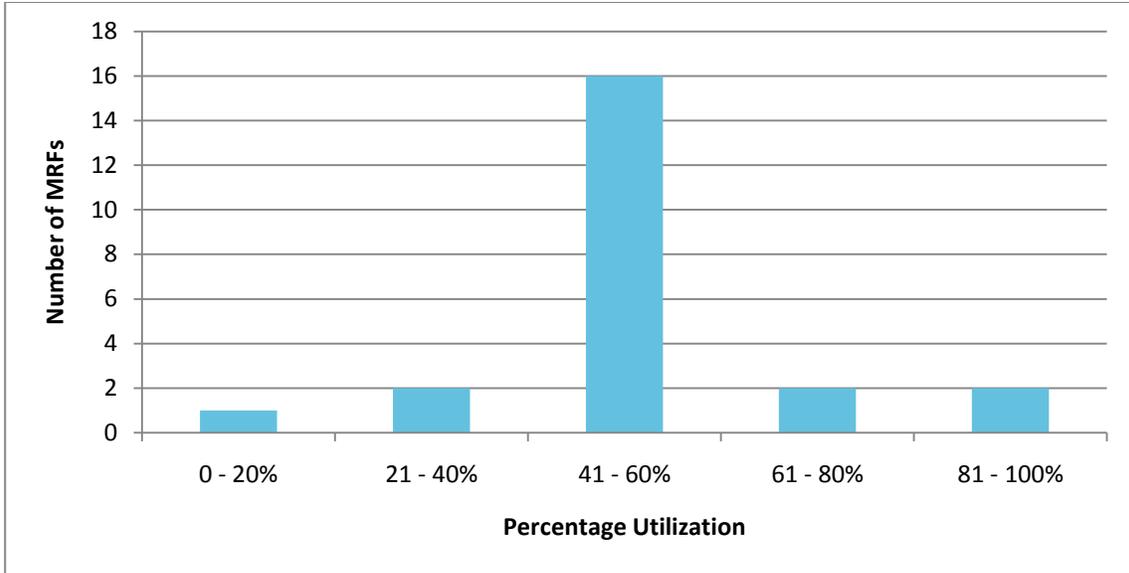
Figure 6 illustrates that MRFs receive the about 93% of their materials from residential sources and approximately 7% of from IC&I. However, many MRFs do not track receipt of IC&I materials as a separate category from residentially based volumes. For the 17 MRFs that do track some portion of their IC&I volume, the collective average was 14% of total tonnage with a range of 1% to 40% of individual MRF volume. For future tracking of additional diversion volumes from IC&I, this data gap will have to be addressed.

As part of the study, the practical maximum capacity of each MRF was determined using a formula provided by WDO that specified 4,200 annual processing hours per year (Practical Maximum Capacity is theoretical based on the following calculation: 14 hours per day, 6 days per week, 50 weeks per year = 4,200 hours per year of operation). This was applied against the average hourly throughput of each MRF to calculate its respective practical maximum capacity. Figure 7 illustrates that the twenty-five MRFs assessed are collectively operating at 59% of the practical maximum capacity for the group. Subject to individual MRF assessment findings and constraints, this suggests that there is incremental processing capacity within the existing twenty-five MRFs. Detail on the proportion of Practical Maximum Capacity actually being processed at each MRF is contained in each MRF Capacity and Capability Assessment Report.



**Figure 7. Percent of Practical Maximum Capacity Actually Processed at MRFs**

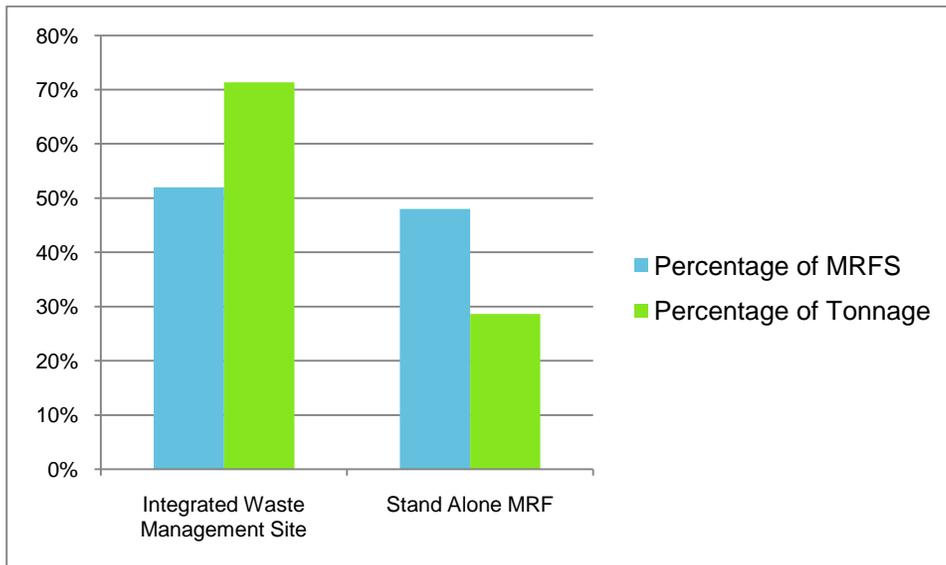
Figure 8 indicates the degree of the utilization (i.e. the proportion of Practical Maximum Capacity being processed) of the twenty-five MRFs in increments of 20%. The majority of MRFs are currently operating at a 41-60% level of utilization of their collective Practical Maximum Capacity. Detailed diversion scenario analysis would require assessing the specific utilization and tonnage levels of individual MRFs.



**Figure 8. MRF Practical Maximum Capacity Utilization**

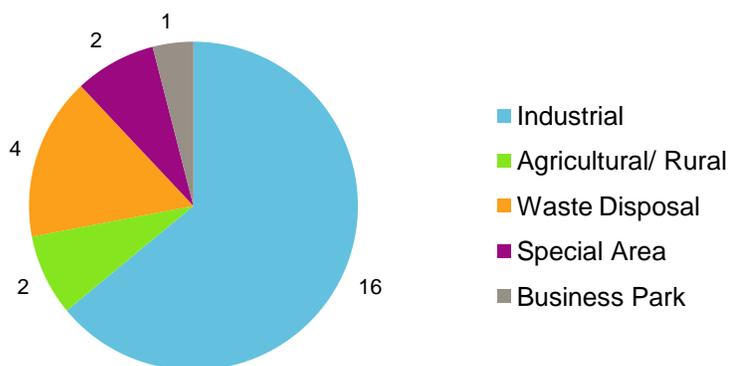
### 3.2 Site Land Use and Compliance

Fifty-two percent (13), of the MRFs assessed are part of an integrated waste management site. Those MRFs are processing 71% of the total Ontario public sector MRF volume. The remaining 48% (12 MRFs) are free standing sites that are not co-located with other waste management operations.



**Figure 9. Type of Facility**

There are a variety of zoning designations that different municipalities utilize for their MRF locations. However, all of MRFs studied are located on lands which are zoned to permit the operation of a recycling facility. Types of zoning designations used for MRF properties include industrial, agricultural / rural, waste disposal, special area and business park. Industrial is the most common designation, representing 64% of MRFs.



**Figure 10. Local Zoning**

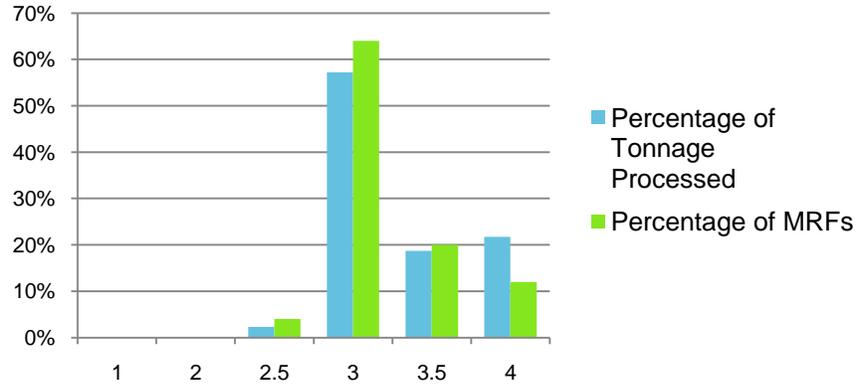
Twenty-one of the MRFs representing 85% of Ontario public sector MRF tonnage processed are compliant with their Certificates of Approval. The other four, identified in the study database, have relatively minor compliance issues due to:

- Operating outside approved hours of operation;
- Receipt and processing of non-approved materials;
- MRF not included in Landfill C of A; and
- Failure to fully comply with documentation requirements of Reg. 101/94.

From a MRF building perspective, of the 25 MRFs assessed, 21 have space for potential on-site building expansion. An assessment of potential additional tonnage from these expansions is outside of the scope of this study and would depend upon decisions relating to equipment, processes and staffing configuration for individual MRF expansions.

### 3.3 Building Assessment

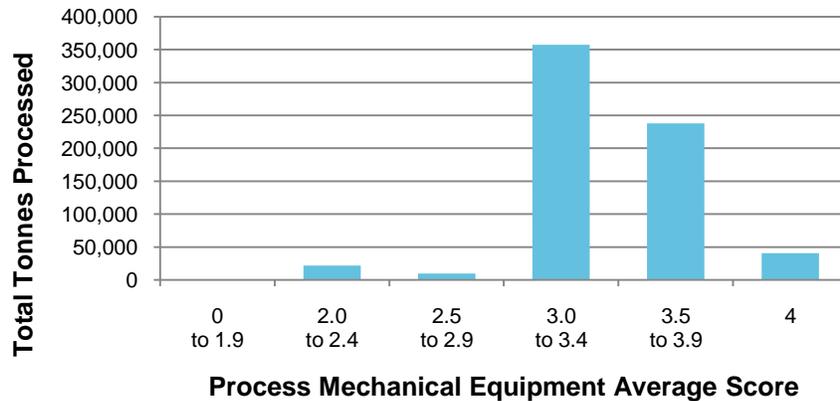
As part of the on-site assessment, several building components were assessed at each MRF and a composite score was determined based on ratings for each individual component. Figure 11 illustrates the proportion of tonnage being processed at MRFs based on their aggregate building scores. The largest proportion of Ontario public sector MRF tonnage being processed (57%) is at MRFs (16) with a composite score of 3. Ninety-eight percent of the total annual public sector tonnage processed is through MRFs with a composite building component score of 3 or greater.



**Figure 11. Building Component Assessment by Tonnes Processed**

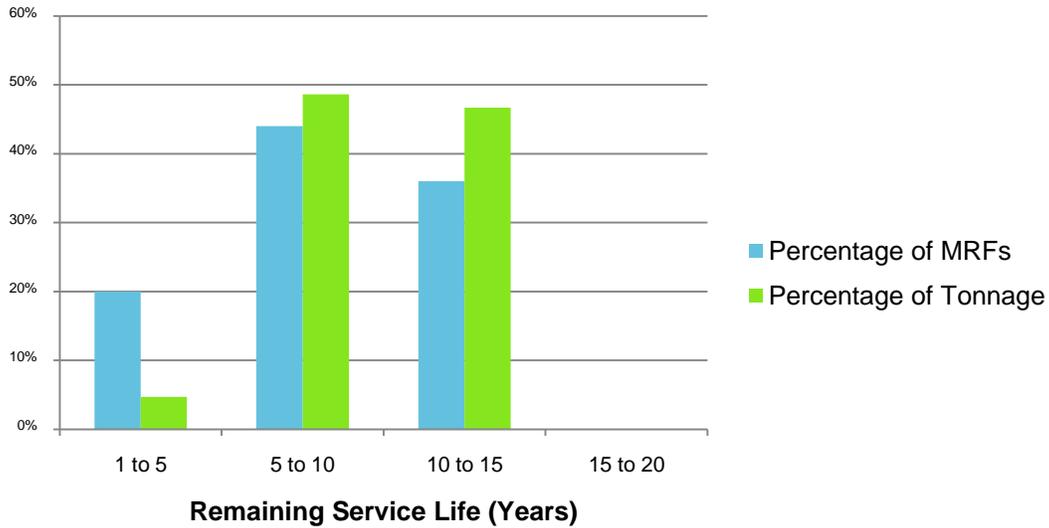
### 3.4 Process Mechanical Assessment

As part of the on-site assessment, all process mechanical equipment components were assessed at each MRF and a composite score was determined based on ratings for each individual component. Figure 12 illustrates the proportion of tonnage being processed at MRFs based on their aggregate process mechanical equipment scores. The largest proportion of Ontario public sector MRF tonnage (95%) is being processed at 20 MRFs with a composite score of 3 or greater.



**Figure 12. Process Mechanical Equipment Assessment by Tonnes Processed**

As part of the on-site assessment, the estimated remaining useful life of all process mechanical equipment components was assessed at each MRF utilizing increments of five years up to a maximum of twenty years. A composite score was then determined based on average remaining life estimates for each individual component. Figure 13 illustrates the proportion of tonnage being processed at MRFs based on their average process mechanical equipment remaining useful life scores. Of the five MRFs whose average remaining useful life is less than five years, these MRFs process only 5% of Ontario’s public sector MRF total tonnage.



**Figure 13. Process Mechanical Equipment Average Useful Remaining Life by Tonnages Processed**

## 4. Summary of Findings

The majority of public sector MRF annual tonnage (93%) is being processed by MRFs with two streams or less. The associated requirements for processing capabilities have been addressed by some MRFs through upgrades in processing technologies and equipment and by others through higher staffing levels. The wide range from 40 to 2,260 tonnes processed per FTE/year among the twenty-five MRFs underscores the variability in material availability; staffing levels and operating configurations.

MRFs that are situated as part of an integrated waste management site process a significantly higher proportion of annual tonnage than stand alone MRFs. This is largely due to their larger scale but may also be partially as a result of the integration and co-location of solid waste management processing programs.

MRF building component assessment results indicate that for the near term, the MRF buildings are in acceptable condition with 96% of the total annual tonnage processed being through MRFs with an aggregate building component score of 3 or higher. Similarly, approximately 96% of the total public sector MRF tonnage is being processed through 20 MRFs with a composite process mechanical equipment score of 3 or greater. Only 5 MRFs, collectively processing less than 5% of the total tonnage, were noted as having less than 5 years of equipment life remaining. This does not represent a significant network-wide processing capability risk, even in the near term.

While 21 of the MRFs have space for on-site MRF building expansion, unless there are significant increases in material volumes, it appears unlikely that that capacity will be required in the near term. Collectively, the total 25 MRFs are operating at 59% of the practical maximum capacity for the group. Subject to remaining equipment life and condition, Certificate of Approval and zoning restrictions, as well as materials availability, many of the MRFs may significantly increase their tonnage processed by extending their hours of operation.

IC&I remains a relatively small percentage (7%) of reported MRF tonnage processed. While this is partially due to the fact that only 17 of the 25 MRFs track their IC&I volume separately from residentially based tonnage, there is potential for increased diversion performance tracking for the portion of the IC&I sector served by municipal MRFs.

While there is a wide range of zoning designations associated with public sector MRFs, no zoning issues were noted. The majority of MRFs (85% of total annual tonnage) are fully compliant with their Certificate of Approval.

The insights gained through completion of this study indicate that there are scale benefits associated with processing volumes. However, further study is required to determine the suite of metrics and their thresholds to compare the relative operating efficiency among MRFs.