

**The Regional Municipality of Durham**



**Recycling Facility**

**MRF Processing Equipment Condition Assessment**

**CIF Project # 336**



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**Prepared for:  
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## ***Introduction***

The Regional Municipality of Durham owns a Materials Recovery Facility (MRF) located at 4600 Garrard Road in the Town of Whitby. The MRF employs a 2 stream processing system that sorts and processes recyclable materials to be sold for further processing. The operations of the facility are contracted out to Metro Municipal Recycling Services Inc. The Region has requested an assessment on all process equipment within the facility to determine its condition and an estimate on the useful life remaining.

## ***Scope of Assessment***

The assessment was carried out by Bob Marshall of HMI Consulting Services in the month of May, 2011 during operation hours of the facility. All of the process equipment was inspected to determine its mechanical and operational condition. The equipment items reviewed by HMI and the specific aspects reviewed for each piece of equipment are illustrated in the “Equipment Condition Matrix” within this report and include (as applicable to the specific equipment item):

- Equipment drives condition; assessed through hand touch temperature test (when too hot to touch this usually indicates an overheating motor).
- Drive seal condition; assessed visually (looking for fluid leakage on gear box).
- Drive oscillation; assessed visually (severe oscillation typically indicative of warped/bent shafts).
- Bearings; assessed through hand touch temperature test and audibly (overheating or excessive noise, typically indicative of a damaged bearing).
- Idlers; assessed visually for obvious issues such as misalignment, improper rotation, worn idlers, debris build-up etc.
- Head and tail shafts; assessed visually for obvious issues such as misalignment, improper rotation, etc.
- Belt condition; assessed visually for obvious issues such as excessive wear, tears, holes, etc.
- Belt splice; assessed visually for obvious issues such as improper connection, tears at the splice, etc.
- Belt tracking; assessed visually for obvious issues such as tracking to one side (Note, poor belt tracking is a common occurrence at MRFs and it is acknowledged that belts can often still convey material reasonably well even if off track. HMI limited our noting of a tracking issue to fairly severe cases where the belt was observed to be contacting and nearly contacting the side walls);
- Disc condition; assessed visually for obvious issues such as missing discs, broken segments, etc.
- Separate notes are provided in the matrix for equipment items that require different observations than noted above, such as obvious physical damage or investigation of the balers, which have quite different review aspects.

## ***Exclusions***

It was agreed with Region of Durham personnel that the scope of HMI’s investigation would not include:

- Building envelope, HVAC or site works.
- Process equipment electrical/controls works, except for equipment drives as described above. Note: In this regard, HMI recommends that the Region consider retaining a firm that specializes in controls systems investigation that can assess fault readings/history to identify equipment failure history. Equipment with ongoing, long-term problems (indicative of potential design issues) could be identified through this approach.

## ***Method of Recording Observations***

Conveyors, Screens, Baler, Compactors and Other Processing Equipment:

The equipment items reviewed by HMI and the specific aspects reviewed for each piece of equipment are shown in the Equipment Condition Matrix Excel work book included with this report. This work book is broken down into 9 pages by equipment type. For each piece of equipment the aspects reviewed were assigned indicators described on the matrix under abbreviations. Comments on the Matrix have also been provided where areas of concern were identified.

Where items are noted as “NOA” (No Access) in the matrix, they were typically not reviewed due to access issues. For example, there are some bearings, motors and other equipment components at the MRF that are inaccessible unless accessed using a scissor lift or other specialized equipment. Notwithstanding the fact that some equipment components could not be accessed and reviewed, HMI is confident that sufficient investigation was done on these pieces of equipment to establish that there were no major equipment concerns. Equipment drives, bearings and idlers (typically the items that could not always be access and reviewed) do not represent large cost items. In general, anywhere an “R” appears in the equipment condition matrix or where a comment has been provided represents an area of concern that should be resolved with Metro Municipal Recycling Services Inc.

## ***General Observations***

Based on our observations during the field work, we determined that the process equipment is in good working order and the operator is making necessary repairs to equipment when required. The biggest issue that we could find is a lack of housekeeping in areas where guards and belly pans have to be removed. Easier to access areas are being cleaned with greater regularity.

If the equipment is maintained and cleaning improved in areas mentioned above, it should be able to last for another 10 plus years with the exception of a few of the smaller transfer conveyors in the container heavy’s area. These conveyors are in an abrasive area exposed to allot of grid and sticky substances. It must be understood that there will be consumable components requiring replacement throughout the operating life of the equipment such as, conveyor belts, bearings & shafts, wear liners and other misc parts.

The following photos will illustrate some areas that require a greater frequency of clean-up or repairs required.

## *Photos*

The photos shown above illustrate some of the areas of excessive debris build-up and the wear in the Harris 2 Ram baler chamber.



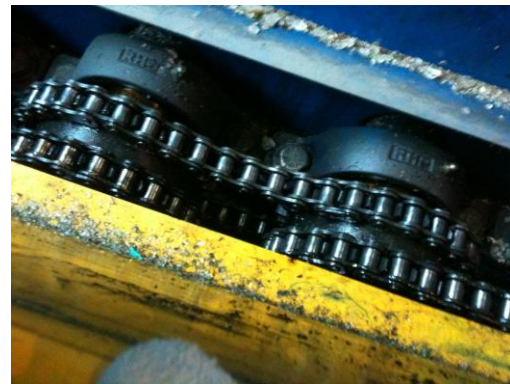
Torn rubber discharge chute from C-39 heavy's conveyor.



C-24 Residue compactor feed conveyor; bent side skirt, debris build-up, damaged belt splice and debris build-up on the return idler and sprinkler head.



Build-up on C-40 heavy's conveyor.



Broken Discs and slack drive chain on S-37 fines screen.



Debris build-up on C-35 transfer conveyor.



Debris Build-up under C-31 head shaft.





Broken mounting stud on C-51 tail shaft adjuster bracket.

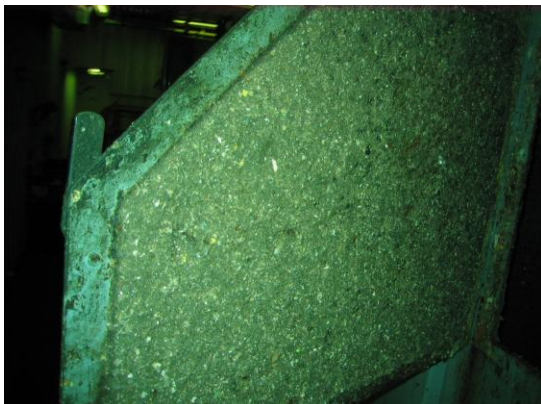


Excessive debris build-up under C-46 transfer conveyor in plastic's sorting room.



Debris build-up trapped under the fixed conveyor guards of C-48.

This is typical of the other 3 optical sorter post-sort conveyors.

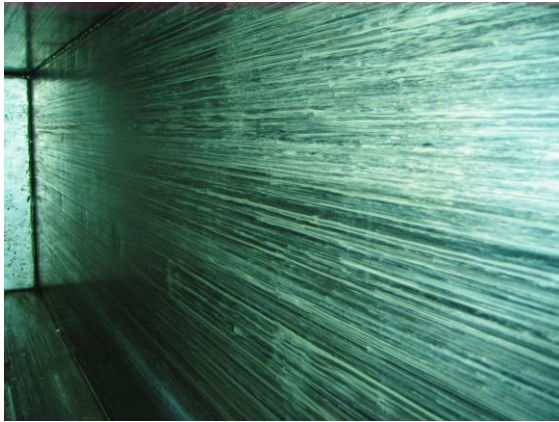


Excessive debris build-up in all areas of the optical sorters.

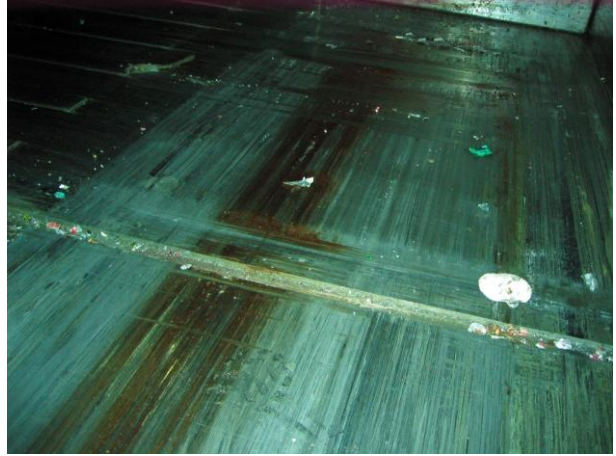
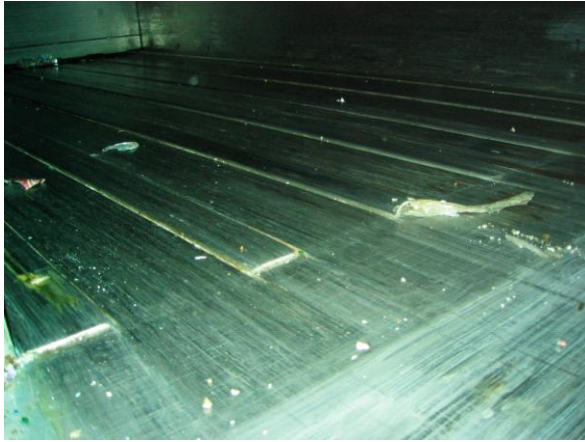




Note the possible oil leak on the hydraulic hose manifold on the 2 ram baler. Note comparison of wet & dry parts of the manifold shown above.







Normal wear inside the bale chamber on the floor and side walls.