

Private and Confidential

BC Liquor Distribution Branch  
**Beverage Container Handling Cost Study**

Date: **October 23, 2013**

# Disclaimer

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## Project Objectives

- The objective of this engagement is to estimate the current handling costs associated with processing a dozen empty beverage container returns (by container type) at BC Liquor Stores
- The study uses information collected through observation at a sample of 6 BC Liquor Stores and information collected as part of MNP's 2011 Cost Driver analysis

## Approach

1. Representatives of LDB identified 6 BC Liquor Stores to be included in the study sample
  - Sample includes:
    - 2 'A' class stores (sales greater than \$8.2 million)
      - Cardero #112
      - Collingwood #113
    - 2 'B' class stores (sales between \$3.7 and \$8.2 million)
      - Mill Bay #173
      - Champlain #194
    - 2 'C' class stores (sales less than \$3.7 million)
      - Lake Cowichan #067
      - Ambleside #072



## Approach

2. Conducted a “dry-run” of a store observation session
  - LDB representatives identified the Cardero store for the purposes of the “dry-run”
  - The purpose of the “dry-run” was to test the feasibility and effectiveness of our proposed methodology
3. Liaised with store managers to schedule on-site sessions
  - Sessions were scheduled at what were considered to be average times in terms of beverage container return activity and, where possible, during a scheduled pick-up
  - One morning visit and one afternoon visit were scheduled for each store type in the sample

# Approach

## 4. Revised approach

- Reduced number of container types from 10 to 5 as a result of similarities in handling certain container types
- Defined container categories to be:
  - Plastic Bottles (“plastic”) - bottles codes: 0931 and 0933
  - Bag-in-Box - bottle code: 0943
  - Cans - bottle code: 0011
  - Refillable Beer/Cider (“refillable”) - bottle codes: 0002 and 0004
  - Wine, Spirit and Non-refillable Beer/Cider (“non-refillable”) - bottle codes: 0911, 0913, 0921, and 0923

# Approach

## 4. Revised approach (continued)

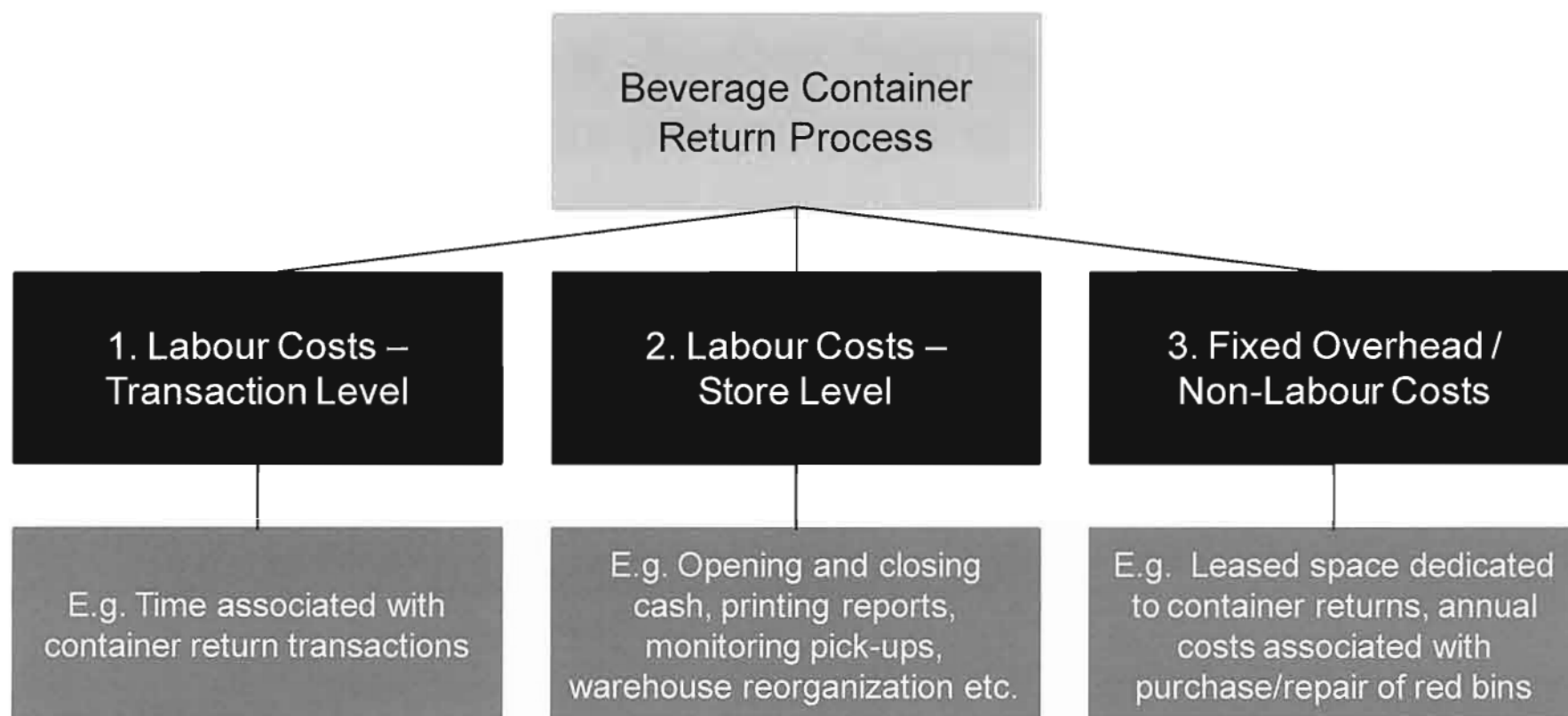
- Estimated average time per unit for each of the 5 container types by:
  - Recording total time required per transaction
  - Obtaining transaction receipt from cash register showing actual quantity by container type per transaction
  - Observed number of “throws” by container type per transaction
    - “Throw” is defined as the physical movement of dropping containers in their appropriate bin/bag/location
  - Calculated average time per “throw” based on total time per transaction
  - Based on total unit and throw by container type for each store, calculated average container unit per “throw”
  - Calculated average time per unit
  - Based on the calculated average time per unit, average hourly wage information and FY13 actual return volume, we calculated total annual costs of container returns

## In-Store Approach

- The store visits were conducted as follows:
  - Two MNP team members were on-site during store observation sessions
  - Store observation sessions lasted 2 hours
    - The first 30 minutes were spent with the store manager/appropriate staff to review the beverage container process, collect information relating to periodic activities and ensure that required reports (i.e. X-read and transaction receipts) could be generated from the cash register
    - The next 90 minutes were spent observing container return transactions
  - One team member was responsible for timing:
    1. the total time per transaction; and
    2. the idle/waiting time associated with each transaction.
  - A second team member tracked number of “throws” associated with each container type for each transaction

# Beverage Container Return Costs

The costs associated with the beverage container return process at BC Liquor Stores can be viewed as being comprised of the following:



Note: MNP's analysis relating to the beverage container return process includes only those costs occurring at the retail store level. As a result, no head office costs have been included.

# Analysis

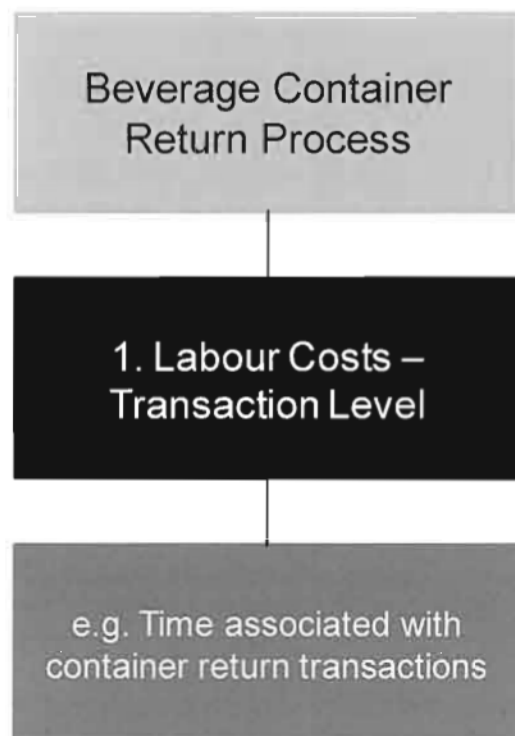
There are three components to our analysis:

1. Estimating the labour costs at transaction level (i.e. handling of returns)
2. Estimating the labour costs at store level (i.e. periodic activities related to returns)
3. Estimating the fixed overhead / non-labour costs

Reasonability test: Labour cost estimates compared to estimates based on FY13 store labour costs and information collected during the store manager's workshop conducted as part of the 2011 Cost Driver Analysis

# 1. Labour Costs at Transaction Level

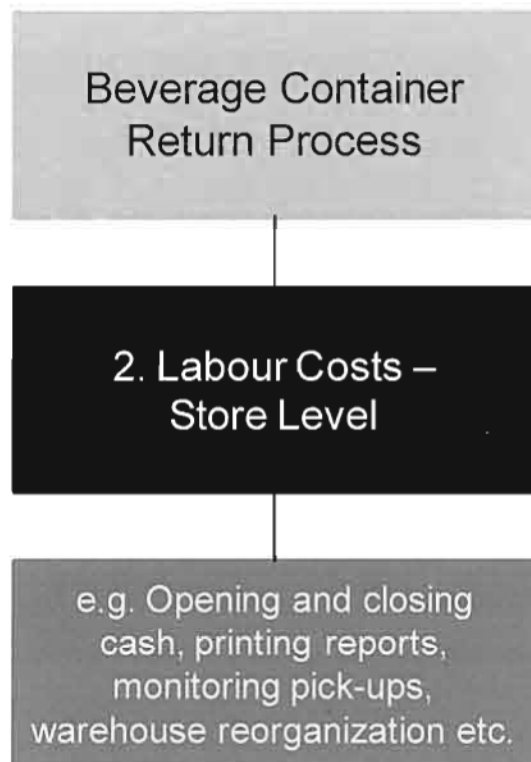
To estimate the labour costs at the transaction level, we:



- Calculated the weighted average time to handle a unit of a particular container type based on information collected at stores tested (i.e. time per transaction, number of throws per transaction and container types handled per transaction)
- Based on the weighted average (in combination with average hourly wage information and FY13 actual container return volumes) we extrapolated results to the population of stores
- Translated annual figure into a per dozen container estimate for each container type

## 2. Labour Costs at Store Level

To estimate the labour costs at the store level, we:



- Estimated annual labour costs at store level using:
  - Information gathered through interviews with store managers / appropriate staff
  - Average hourly rate information
- Translated annual figure into a per dozen container estimate using actual annual volumes

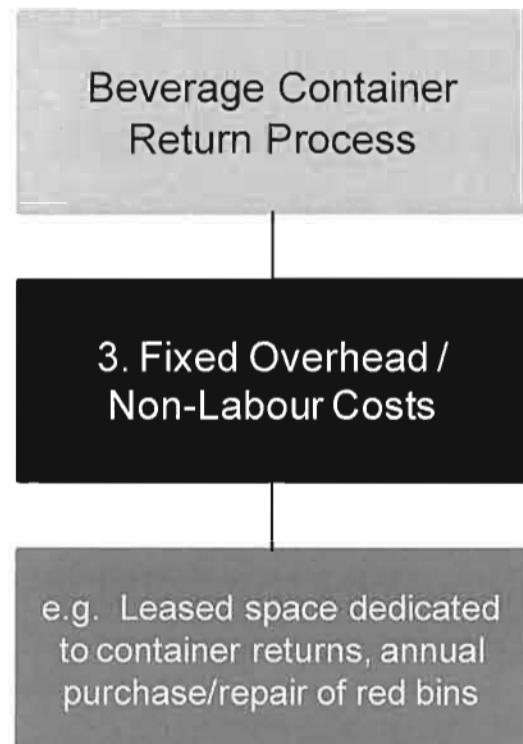


## Reasonability of Labour Costs

- To test the reasonability of MNP's estimated labour costs associated with handling empty container returns we:
  - Used information regarding estimated time spent on bottle returns and refunds collected during the store manager's workshop completed as part of the 2011 Cost Driver Analysis
  - Calculated a weighted average % of store time dedicated to handling empty container returns
  - Applied this weighted average % to FY13 BC Liquor Store labour costs to estimate annual store labour costs associated with handling empty container returns
- We then compared this estimate to the results of our labour cost analysis (i.e. analyses 1 + 2)

### 3. Fixed Overhead / Non-Labour Costs

To estimate the fixed overhead / non-labour costs, we:



- Estimated annual fixed / non-labour costs associated with handling empty container returns using:
  - Space allocation and leasing cost estimates
  - Annual costs associated with red bins
- Annual figure translated into a per dozen container figure using actual annual volumes

# Analysis Summary – Labour Costs (per dozen)

Based on our in-store observations:

- Cans have the lowest return cost of \$0.43 per dozen due to their larger numbers per transaction and ease of handling, i.e., return in flats of 24
- Bag-in-box are the most costly to handle at \$2.05 per dozen due to their smaller numbers per transaction, i.e., 1 to 2 returned per transaction

## Labour Costs - Transaction and Store Level (Cost per dozen)

Container type	Weighted Average Labour Costs - Transaction Level (Analysis 1)	Weighted Average Labour Costs - Store Level (Analysis 2)	Weighted Average Total Labour Costs (Analysis 1+2)
Refillable	\$0.48	\$0.27	\$0.75
Cans	\$0.16	\$0.27	\$0.43
Non-refillable	\$0.42	\$0.27	\$0.69
Plastic	\$0.95	\$0.27	\$1.22
Bag-in-box	\$1.78	\$0.27	\$2.05
Average	\$0.27	\$0.27	\$0.54

# Analysis Summary – Reasonability of Labour Costs (per dozen)

Container return effort estimates from the Cost Driver Analysis yield a higher cost than the labour analysis based on in-store observations. Based on our observations, this difference can be attributed to productivity lost in switching between tasks.

## Estimated Labour Cost Based on Cost Driver Analysis

Total annual labour cost (store level only)	\$100,804,300
Estimated % of department time (cost driver analysis)	7.8%
Estimated labour cost for handling return (annual)	\$7,870,449

## Labour Costs - Transaction and Store Level vs Cost Driver analysis (Cost per dozen)

Container type	Weighted Average Labour Costs - Transaction and Store Level (Analysis 1+2)	Weighted Average Labour Costs (Cost driver analysis)	Difference
Refillable	\$0.75	\$1.47	-\$0.72
Cans	\$0.43	\$0.48	-\$0.05
Non-refillable	\$0.69	\$1.30	-\$0.61
Plastic	\$1.22	\$2.92	-\$1.70
Bag-in-box	\$2.05	\$5.50	-\$3.45
Average	\$0.54	\$0.83	-\$0.29

# Analysis Summary – Fixed Overhead / Non-Labour Costs (per dozen)

Fixed overhead / non-labour increases the average container return cost by \$0.17 per dozen

## Fixed Overhead / Non Labour Cost

Space allocation (annual cost)	\$1,530,263
Red bin (annual cost)	\$57,970
Total annual cost	\$1,588,233
Dozens of container (annual volume)	9,497,268
Cost / dozen	\$0.17

## Overhead / Non-Labour Costs (Cost per dozen)

Container type	Weighted Average Overhead / Non-Labour Cost
Refillable	\$0.17
Cans	\$0.17
Non-refillable	\$0.17
Plastic	\$0.17
Bag-in-box	\$0.17
Average	\$0.17

# Analysis Summary – Total Costs (per dozen)

Adding the overhead / non-labour costs to the store labour costs increases the average container return cost from \$0.54 to \$0.71 per dozen

## Total Cost of Empty Container Returns (Cost per dozen)

Container type	Total Weighted Average Labour Costs - Transaction Level (Analysis 1)	Total Weighted Average Labour Costs - Store Level (Analysis 2)	Total Weighted Average Overhead / Non-Labour Costs (Analysis 3)	Total Weighted Average Cost (Analysis 1 + 2 + 3)	Current Container Handling Fee (Cost per dozen)
Refillable Cans	\$0.48	\$0.27	\$0.17	\$0.92	\$0.21
Non-refillable Plastic	\$0.42	\$0.27	\$0.17	\$0.86	\$0.36
Bag-in-box	\$0.95	\$0.27	\$0.17	\$1.39	\$0.36
Average	\$1.78	\$0.27	\$0.17	\$2.22	\$0.84
	\$0.27	\$0.27	\$0.17	\$0.71	

# Analysis Summary – Labour Costs (annual)

Based on our timed in-store observations:

- Cans have the highest total labour cost of \$2.6 million or approximately 51% of total labour cost.
- Cans comprise 65% of total annual return volume; however, total annual labour costs associated with handling cans is not proportionate to the volume due to the low return cost of \$0.43 per dozen

**Labour Costs - Transaction and Store Level (Annual Cost)**

Container type	Labour Costs - Transaction Level (Analysis 1)	Labour Costs - Store Level (Analysis 2)	Total Labour Costs (Analysis 1+2)
Refillable	\$527,641	\$301,399	\$829,040
Cans	\$959,109	\$1,679,945	\$2,639,054
Non-refillable	\$858,579	\$553,270	\$1,411,849
Plastic	\$155,494	\$44,676	\$200,170
Bag-in-box	\$50,943	\$7,779	\$58,722
Total	\$2,551,766	\$2,587,069	\$5,138,835

18

# Analysis Summary – Reasonability of Labour Costs (annual)

Container return effort estimates from the Cost Driver Analysis yield a higher cost than the labour analysis based on in-store observations. Based on our observations, this difference can be attributed to productivity lost in switching between tasks.

## Labour Costs - Transaction and Store Level vs Cost Driver analysis (Annual Cost)

Container type	Labour Costs - Transaction and Store Level (Analysis 1+2)	Labour Costs (Cost driver analysis)	Difference
Refillable	\$829,040	\$1,627,412	-\$798,372
Cans	\$2,639,054	\$2,958,193	-\$319,139
Non-refillable	\$1,411,849	\$2,648,127	-\$1,236,278
Plastic	\$200,170	\$479,593	-\$279,423
Bag-in-box	\$58,722	\$157,124	-\$98,402
Total	\$5,138,835	\$7,870,449	-\$2,731,614

19



# Analysis Summary – Fixed Overhead / Non-Labour Costs (annual)

Fixed overhead / non-labour increases the average container return cost by \$1.6 million

## Overhead / Non-Labour Costs (Annual Cost)

Container type	Overhead / Non-Labour Cost
Refillable	\$185,033
Cans	\$1,031,338
Non-refillable	\$339,659
Plastic	\$27,427
Bag-in-box	\$4,775
Total	\$1,588,232

# Analysis Summary – Total Costs (annual)

Adding the overhead / non-labour costs to the store labour costs increases the average container return cost from \$5.1million to \$6.7million

## Total Cost of Empty Container Returns (Annual Cost)

Container type	Labour Costs - Transaction Level (Analysis 1)	Labour Costs - Store Level (Analysis 2)	Overhead / Non- Labour Costs (Analysis 3)	Total cost (Analysis 1 + 2 + 3)
Refillable	\$527,641	\$301,399	\$185,033	\$1,014,073
Cans	\$959,109	\$1,679,945	\$1,031,338	\$3,670,392
Non-refillable	\$858,579	\$553,270	\$339,659	\$1,751,508
Plastic	\$155,494	\$44,676	\$27,427	\$227,597
Bag-in-box	\$50,943	\$7,779	\$4,775	\$63,497
Total	\$2,551,766	\$2,587,069	\$1,588,232	\$6,727,067

In FY13, the actual amount LDB received for handling container returns was just over \$2.0 million.

# Analysis Summary – Comparison of Total Cost to Cost Driver Analysis

Container return effort estimates based on information collecting during the 2011 Cost Driver Analysis yield a higher total cost (assuming the same fixed overhead / non-labour costs) than the labour analysis based on in-store observations. Based on our observations, this difference can be attributed to productivity lost in switching between tasks.

Note: Information used from the 2011 Cost Driver Analysis was based on store manager's estimates of FTEs dedicated to bottle returns and refunds.

## Total Cost of Empty Container Returns using Cost Driver Analysis (Annual Cost)

Container type	Total Cost (Analysis 1 + 2 + 3)	Total cost using Cost Driver Analysis	Difference
Refillable	\$1,014,073	\$1,997,478	\$798,372
Cans	\$3,670,392	\$5,020,869	\$319,139
Non-refillable	\$1,751,508	\$3,327,445	\$1,236,278
Plastic	\$227,597	\$534,447	\$279,423
Bag-in-box	\$63,497	\$166,674	\$98,402
Total	\$6,727,067	\$9,458,681	\$2,731,614

22

# Best Practices Observed

We observed the following to be effective and efficient practices during our observation sessions at BC Liquor Stores:

- Locating the return counter outside the store to limit disruptions to customers in the store and reduce spills / breakage of products
- Adequate counter space (preferably outside the store) for customers to organize by container type before ringing the bell for LDB staff assistance
- Requiring customers to have sorted all containers before seeking LDB staff assistance
- Provision of larger boxes for wine/spirit bottles to allow for easier handling / disposal of a greater quantity of containers per throw
- Implementing daily quantity limits on empty containers returned

In addition, we observed that strict policies on the condition of bottle returns (i.e. clean and not posing harm) have a positive effect on employee morale and safety.

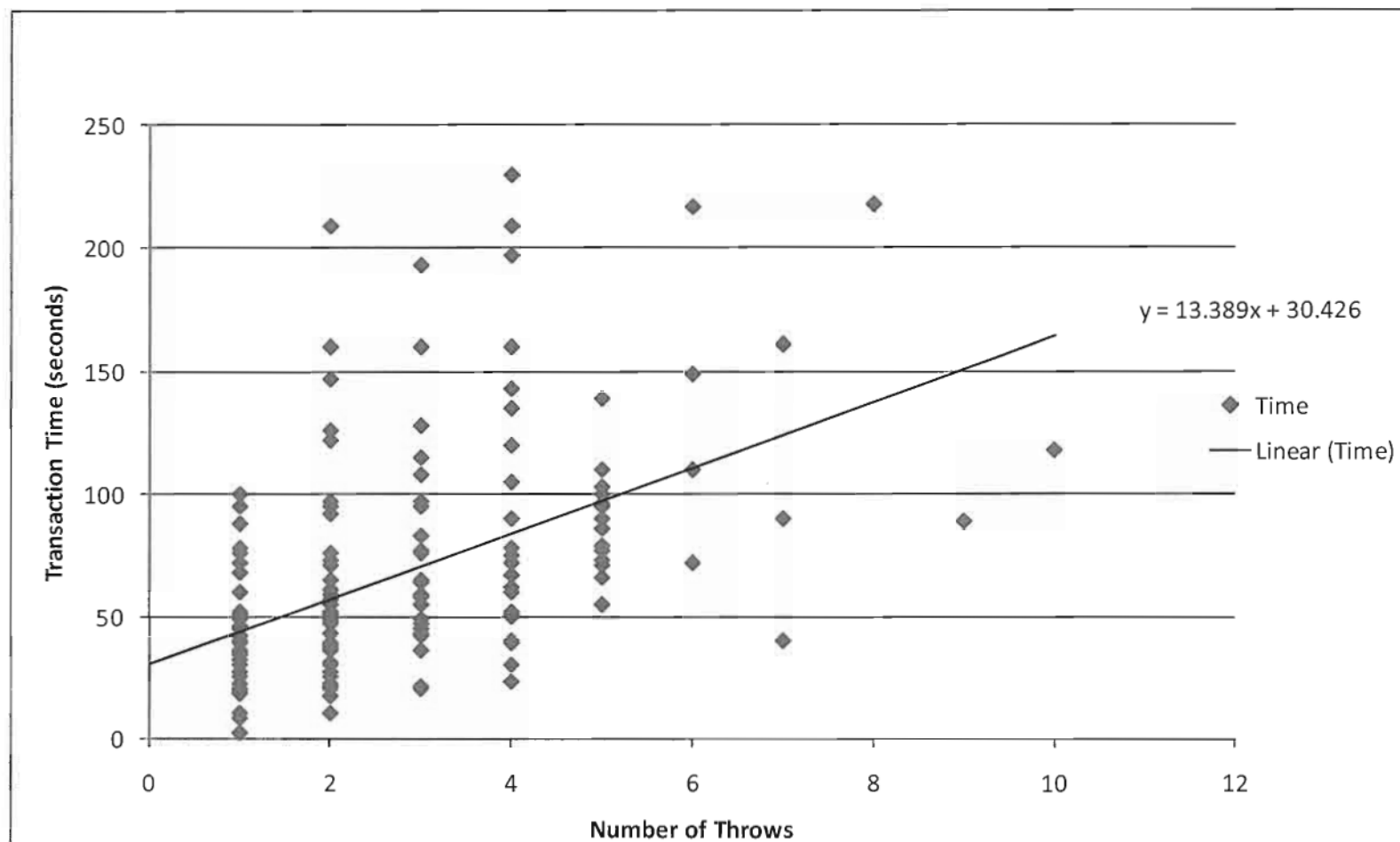
## Appendix 1 – Assumptions

- Study sample (6 retail stores selected by LDB) is representative of all BC Liquor Stores
- Time frame of study is representative of operations for the entire year
- Container type sample is representative of annual container population
- Labour costs at store level and fixed / non-labour costs are distributed evenly across all container types
- Lease space dedicated to empty container activity is the same for all 'A' stores vs. 'B' stores vs. 'C' stores
- Times identified by store managers for store observation sessions are considered "average" in terms of store business
- MNP's analysis relating to the beverage container return process includes only those costs occurring at the retail store level. As a result, no head office costs have been included.
- MNP has relied upon the completeness, accuracy and fair presentation of all information and data obtained from LDB

## Appendix 2 – Data Sources

Data	Department	Time Period
Stores selected to be included in study sample	Store Operations	Current
Average Hourly Wage for Retail Store Staff	Store Operations	Current
Total Space Dedicated to Container Handling Activities by Store Type (i.e. A, B, C)	Store Operations	Current
Annual Retail Store Employment Costs	Finance	2012-2013 Fiscal Year
Number of A, B and C stores	Finance	2012-2013 Fiscal Year
Volume of container returns handled by container type and store	Finance	2012-2013 Fiscal Year
Leasing Costs (Square Foot Basis)	Real Estate	January – December 2012
Annual Expenditures on Red Bins	Real Estate (Environmental Initiatives)	Estimated for 2012-13 Fiscal Year

# Appendix 3 – Average Transaction Time



Based on observed transactions (163 samples), on average, each transaction requires 13 seconds per throw plus an additional 30 seconds of waiting/idle time

# Appendix 4 - Transaction Summary at Store Level

Store	Type & time	# drop	Ave time / drop	Total unit	Refillable			Cans			Container type Non-Refillable			Plastic			Bag-in-Box		
					# of drop	Ave time / unit	Total unit	# of drop	Ave time / unit	Total unit	# of drop	Ave time / unit	Total unit	# of drop	Ave time / unit	Total unit	# of drop	Ave time / unit	Total unit
1	Champlain	B - am	65	34.9	28	5	5.6	293	26	3.3	85	17	8.1	23	9	12.2	8	8	22.5
2	Collingwood	A - pm	64	28.6	21	4	4.0	332	23	2.0	174	30	4.8	13	7	17.4	-	0	
3	Lake Cowichan	C - am	104	15.9	36	14	7.4	876	46	0.9	95	27	4.0	47	14	4.4	5	3	6.1
4	Mill Bay	B - pm	81	17.1	93	14	2.5	490	28	1.0	151	34	3.9	9	4	7.9	2	1	10.3
5	Ambleside	C - pm	29	39.3	18	4	5.9	122	7	2.8	121	15	5.1	3	3	23.9	-	0	
6	Cardero	A - am	108	25.2	62	17	6.8	476	35	1.9	321	37	3.1	16	12	14.0	7	7	24.6
Total / average		451	24.4	258	58	4.9	2,589	165	1.6	947	160	4.3	111	49	9.7	22	19	18.3	



Liquor Distribution Branch  
 Container Handling Fees, BDL and Encorp, Consolidated  
 01/01/2013 To 12/31/2016 by calendar year

Period/Year	2013		2014		2015		2016
Total:	\$	1,997,977.22	\$	1,880,502.42	\$	1,814,234.13	\$ 3,389,149.58