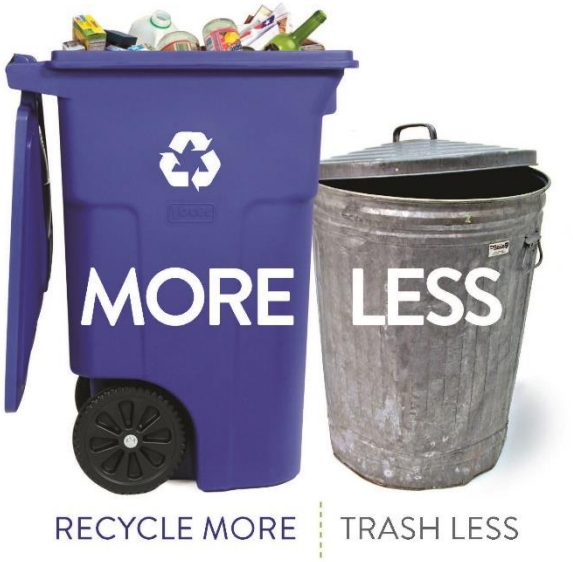

Appendix D

Phase 2: Comparative Summary of ZWMP Options

Draft Zero Waste Master Plan

City of Cambridge, MA

January 25, 2019

Appendix D: Phase 2 Comparative Summary of ZWMP Options

Statement of Purpose

This Phase 2 comparative summary of ZWMP options was originally issued to the City of Cambridge in November 2017. The purpose of this summary was to provide a general comparison of the ZWMP options that had been identified in Appendix C, looking at performance parameters like ability to reduce GHG emissions, trash reduction potential, potential to reduce vermin, potential for improvements to worker safety, and impacts on capital and operating expenses. The summary also notes the timeframes associated with implementation of the options and whether ordinance changes would be involved. Those options with more overall positive outcomes as noted in the comparison, were more strongly recommended for inclusion in the ZWMP recommendations.

This document is a supporting background document for the draft ZWMP, documenting the outcome of one component of Phase 2 of the ZWMP process. No further amendments will be made to this document based on review of the draft ZWMP.

Appendix D: Comparative Summary of ZWMP Options

	GHG Reduction Potential ($MTCO_2e$)	Trash Reduction Potential (kg/hhld/wk)	Potential to Reduce Vermin	Potential to Improve Worker Safety	Impact on Capital Expenses	Overall Impact to Operating Costs	Ordinance Change Required	Timeframe	Note
	Low (0 to -1000), Medium (-1001 to -5000), High (-5000+)	Low (<2), Medium (2.1-3), High (>3)	Low (No potential), Medium (Some Potential), High (High Potential)	Low (Little to No potential), Medium (Some Potential), High (High Potential)	High (ongoing capital costs), Medium (capital costs required to implement), Low (no capital costs).	Low (some savings or no impact), Medium (some impact), High (greater increase in costs)	Yes/No	Short (1-5), Medium (6-10), Long 10+) years	
Collection System Changes									
Organics Rollout to All Units	Medium (1742) to (1868)	High 4.1 to 4.8	High – More secure containers.	High - High potential to improve worker safety with better ergonomics and less lifting.	Medium	Medium/Low – No net change in fleet, lower trash disposal costs, ongoing cart replacement, storage, delivery. Some costs for P&E.	No	Short (1-2 years)	Program would collect currently acceptable materials (e.g. food scraps).
Provision of Standard Trash Container	High (6795) to (9057)	Medium/High 3.4 to 4.2	High – More secure containers.	High - High potential to improve worker safety with better ergonomics and less lifting.	Medium	Medium - No changes to fleet, potential to decrease trash disposal costs, ongoing cart replacement, storage, and delivery. Some costs for P&E.	Yes	Short (1-3 years)	Assume one cart per hhld. No option for overflow.
Enhancements to Current System									
PAYT (bag-based for all trash)	Medium/High (2266) to (6795)	Low/Medium 1.7 to 3.3	Low - No potential to reduce vermin with use of plastic bags.	Medium - Some potential to improve worker safety through use of bags which are easier to manage.	Low	Low/Medium - Program may lower trash disposal costs. Some costs for P&E and administration.	Yes	Short (1-3 years)	Assume all trash must be placed in bags which residents purchase.
Bi-weekly Trash Collection	High (6795) to (9057)	Medium/High 3.4 to 4.2	Medium – greater quantities of food waste collected more frequently	High - High potential to improve worker safety with better ergonomics and less lifting.	Low	Low - Program should decrease fleet, lower trash disposal costs. Some costs for P&E.	Yes	Medium/Long	Assumes current trash containers used.
Mobile Recycling Depot (depends on what materials are managed)	Low (243) - (843)	Low 1.0 to 1.2	N/A	Medium – some potential to improve safety.	Low	Medium - May require a vehicle, staff time to organize and some P&E.	No	Short	Assume replaces Recycling Center.
Modified Recycling Center			N/A	Medium - Some potential to improve worker safety with better layout and reduced interaction with public.	Low	Low - Minimal to no change to operating costs.	No	Short	Difficult to calculate as unknown what modifications would be made.
Enhanced HHW Program		Minimal (extremely small fraction of waste stream)	N/A	Medium - some potential to improve worker safety if hazardous materials are kept out of trash.	Low	Medium - Cost related to holding extra events.	No	Short/Medium	WARM model has no capacity to model this waste stream.
Collection of Small Electronics	Low (243) to (403)	Low 0.96 to 1.04	N/A	Low - No potential to improve worker safety.	Low	Low - If managed through other programs.	No	Medium	
Reduction and Reuse & Additional Programs									

	GHG Reduction Potential ($MTCO_2e$)	Trash Reduction Potential (kg/hhld/wk)	Potential to Reduce Vermin	Potential to Improve Worker Safety	Impact on Capital Expenses	Overall Impact to Operating Costs	Ordinance Change Required	Timeframe	Note
Sharing Libraries	High (1015) - (7573)	Low 1.02 to 1.1	N/A	Low - No potential to improve worker safety	Low	Low - Some staff time for P&E.	No	Short	
Food Waste Reduction	High (1093) to (1367)	Low 0.3 to 0.4	Medium - some potential to reduce vermin if less food is available.	Low - No potential to improve worker safety	Low	Low - Some staff time for P&E.	No	Short	
Support Reuse Events	High (1015) - (7573)	Low 0.6 to 0.7	N/A	Low - No potential to improve worker safety	Low	Low - Some staff time for P&E.	No	Short	
Waste Exchange	High (1015) - (7573)	Low 0.6 to 0.7	N/A	Low - No potential to improve worker safety	Low	Low - Some staff time for P&E.	No	Short	
Mattress Recycling	Low (141) to (188)	Low 0.90 to 0.91	N/A	Low - No potential to improve worker safety	Low	Medium - May require a vehicle for collection, staff time to collect and administer program.	No	Short/Medium	
Carpet Recycling	High (1634) to (1962)	Low 1.4 to 1.6	N/A	Low - No potential to improve worker safety	Low	Medium - May require a vehicle for collection, staff time to collect and administer program.	No	Long	
Textile Recycling	Medium (753) to (943)	Low 1.1 to 1.2	N/A	Low - No potential to improve worker safety	Low	Low - If outsourced, just staff time for P&E, could reduce trash disposal costs.	No	Short/Medium	
Porcelain Recycling	Low (<1)	Low 0.886 to 0.891	N/A	Low - No potential to improve worker safety	Low	Medium - Requires staff/vehicle to collect store and dispose of material. Staff time for P&E.	No	Long	

1. All GHG and waste reduction potential calculated with estimated tonnages for 2025 in order to compare the programs on a more level basis rather than comparing when programs are first implemented.
2. Note – details for operating costs - Low - fewer vehicles required, reduced trash disposal costs, minimal to no staff time required, Medium - no change in vehicles, no change to trash disposal costs, some staff time required, High - additional vehicles required, increase in trash disposal costs, significant staff time required.

Positive (e.g. high GHG emission reduction, High waste reduction potential, High potential to improve worker safety, low impact on capital or operating costs)
Neutral (e.g. medium GHG emission reduction, medium waste reduction potential, some impact to operating costs)
Negative (e.g. low GHG emission reduction potential, low potential to improve worker safety, no potential to reduce vermin, higher impact on capital or operating costs)