



State of Ohio Environmental Protection Agency

District Solid Waste Management Plan Format

(version 3.0)



**Division of Solid and Infectious Waste Management
Ohio Environmental Protection Agency**

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**District Solid Waste
Management Plan**

Format
(version 3.0)

1996

Division of Solid and Infectious Waste Management

**Ohio Environmental Protection Agency
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Columbus, Ohio 43216-1049**

Instructions

This document is the second revision of the *District Solid Waste Management Plan Format (Format)*. Version 3.0 supersedes version 2.1 completed in 1994, and the initial version completed in July 1989. This revision includes the information requested in the previous *Format*, and adds the requirements resulting from the adoption of the *1995 State Solid Waste Management Plan (State Plan)*. Major changes resulting from the *1995 State Plan* include the creation of performance standards for recycling infrastructure, and new waste reduction percentage goals for both the residential/commercial and industrial sectors. Ohio EPA has also reorganized Sections IV, V, and part of VI in an attempt to improve the logical sequence of plan preparation.

This document must be used for all plan amendments submitted to Ohio EPA.¹ Ohio Revised Code (ORC) Section 3734.53 states that "...the solid waste management plan of any county or joint solid waste management district shall be prepared in a format prescribed by the Director of Environmental Protection..." Each major section of this document is identified with the appropriate location in the ORC authorizing (or requiring) the information discussed. Consistency in the presentation or format of district solid waste management plans will facilitate Ohio EPA evaluation of plans, and will aid the use of plan data to analyze statewide solid waste management practices. (To obtain a copy of the *Format* on diskette, send a diskette with a self-addressed stamped, envelope to the address printed at the beginning of this document. The *Format* has been prepared with WordPerfect for Windows, version 6.0. If you need a *Format* copy in an earlier version of WordPerfect, please provide that information.)

Information in the district plans must be assembled in the order indicated in Sections I through IX of this *Format*, and labeling must be consistent with this document. The main function of the *Format* is as a reference document and workbook and not as a "fill-in-the-blank" form. If a district wishes to include information in the plan which has no apparent assigned location based upon the *Format*, it should be placed in an appendix. In particular, if alternate methodologies are used, the district should provide sufficient documentation in an appendix. Please note that there are also required appendices for district plans as shown below and discussed throughout this document.

Required Appendices in District Plans²

- Appendix A - Resolutions for District Formation (if the district has, or is reconfiguring since previous plan)
- Appendix B - Copies of Public Notices for Public Hearing(s) and Public Comment
- Appendix C - Copies of Resolutions and Certification Statements Documenting Ratification
- Appendix D - Identification of Consultants Retained for Plan Preparation
- Appendix E - District Map(s)
- Appendix F - Industrial Survey Results
- Appendix G - Documentation of Provision of Services and Capacity

Instructions are included throughout the *Format* for each section of the plan. Reading through the entire *Format* before beginning to compile the plan should facilitate preparation of the required information. In addition, read through the Glossary in Appendix AA in order to gain a clear understanding of the terms used in this document. Appendix BB contains a listing of resources districts may use to prepare and implement each section of the plan. The table of contents may be useful as a checklist of items that must be included in the plan. The pages in the district's plan must be numbered and a table of contents must accompany submittal of the plan.

¹Solid waste management districts (SWMDs) required by statute to begin a three- or five-year plan update before August 1, 1996 may use *Format* version 2.1. However, Ohio EPA encourages the use of version 3.0 whenever possible.

² Appendices B and C are not required for the draft amended plan submittal, but must be included for the draft ratified plan submittal.

There are nine major sections to the *Format*. The "Introduction" includes basic information about the district such as policy committee members, Board of Directors, and the district contact person. This section should also explain the circumstances for submitting the plan amendment (required update or material change in circumstances). The "Executive Summary" should be a brief narrative description of the plan's contents. The "Executive Summary" also includes tables required in later parts of the plan. The "Inventories" section should be a complete listing of all the facilities, activities, and haulers used by the district during the reference year. (The reference year is the calendar year selected by the solid waste management district (SWMD) as a basis for data collection in preparation of the district's amended plan. See the Glossary for further discussion.) It should also show open dumps and tire dumps in the district. Section IV, or "Reference Year Population, Generation, and Waste Reduction" must show the reference year population, residential/commercial waste generation, and industrial waste generation and waste reduction estimates for both sectors. Districts should also include any necessary adjustments required for generation estimates in Section IV. The section entitled "Projections for Population, Generation, and Waste Reduction" (Section V) includes estimates of waste reduction, population, and generation for each year of the planning period. Section V also includes ongoing and proposed strategies for source reduction and recycling, household hazardous wastes, and restricted waste streams.

Section VI, "Methods of Management: Facilities and Programs to be Used" must show the types of facilities which will be used by the district over the planning period. This section must demonstrate access to management capacity for the length of the planning period. If flow control is to be considered by the district, it must be authorized in this section. Finally, an implementation schedule for all new and/or expanded facilities and activities is a mandatory component of this section.

The "Measurement of Progress Toward Waste Reduction Goals" should be presented in Section VII of the plan. All calculations should be shown for both Goal #1 (performance standards) and/or Goal #2 (25 percent for residential/commercial and 50 percent for industrial sectors by the year 2000). Districts unable to meet Goal #2 are required to establish "target" waste reduction figures in this section.

The "Cost of Financing Plan Implementation" must be presented in Section VIII. The district must demonstrate availability of sufficient financial resources over the entire planning period, and estimate the amount of money collected by each revenue mechanism. Anticipated revenues collected in accordance with Sections 3734.57, 3734.572 or 3734.573 of the ORC must be allocated to one or more of the nine allowed uses identified in Section 3734.57 of the ORC.

The final section of the plan must contain information regarding rules authorized for adoption by the district. If the district does not intend to adopt rules in accordance with Section 343.01 of the ORC, this section may be omitted. Districts should include any existing rules in this section, or place them in an appendix.

Eight printed copies of the district's draft amended solid waste management plan must be submitted to Ohio EPA for review. (Double-sided copying and the use of recycled-content paper is recommended.) Ohio EPA is required to review the plan, and provide a written non-binding advisory opinion of the plan to the solid waste management district within 45 days of plan submittal. Eight copies are also required for submittal of the ratified draft amended plan. Ohio EPA is allowed 90 days to approve (or disapprove) a ratified draft amended plan.

Please note the definitions of terms used in the *Format*. As used in this document, "waste reduction" is defined as source reduction, recycling, incineration, resource recovery, and MSW composting. "Waste minimization" is not used in this document, since it is typically associated with hazardous waste management only. (See Appendix AA for definitions of waste reduction, source reduction, waste minimization, resource recovery, and MSW composting.)

Use of the word "district" in this document refers to "solid waste management district" (or SWMD) unless otherwise specified. All references to "waste generated by the district" mean waste generated by entities within the district. Likewise, "used by the district" refers to facilities or programs used by entities within the district.

A. Three (or Five) Year Updates

ORC Section 3734.56 requires districts to update their plans by submitting an amended plan to Ohio EPA. For districts that are operating under an approved plan with a planning period **less than fifteen years**, the draft update must be submitted by the **third anniversary** date of the most recent plan approval (or order to implement). For a district that is operating under an approved plan with a planning period of **fifteen years or more**, the draft update must be submitted by the **five-year** anniversary date of the most recent plan approval (or order to implement). Preparation of the required district update must begin no later than fifteen months prior to the mandatory submittal date for the draft amended plan. (See Appendix CC for a listing of the mandatory submittal dates for the next draft amended district plans.) If a district fails to obtain ratification and approval of an amended plan within eighteen (18) months after the required submittal date for draft amended plan, Ohio EPA is required to prepare an amended plan for the district.

In preparing a three- (or five) year plan update, the district must address each section in this *Format* - Sections I through IX. In addition, the three- or five-year update must include the results of surveys conducted for the reference year (see page 6) for the existing facilities inventory, recycling inventory, open dump inventory and the current industrial waste generation and recycling.

B. Other Plan Updates - Material Changes in Circumstances

District plans must also be updated "...when the board of county commissioners...or board of directors...determines that circumstances materially changed from those addressed in the approved initial or amended plan of the district..." (ORC Section 3734.56(D)). Plan updates resulting from a material change in the district must address all portions of the plan that need to be modified as a result of the material change. For example, if the material change constitutes the use of an alternative disposal facility for capacity assurance, those portions of the plan which are affected by using an alternate disposal facility must be modified. Any changes in the availability of funds for the district resulting in significant deviation in the implementation schedule of the approved plan would be considered a "material change." In addition, any update must include all the required projections, demonstrations, and strategies to manage the district's waste for the succeeding ten years (or longer planning period) beyond the approval date of the update. (Please note that the above discussion is not intended to be an exhaustive listing of examples of "material change" within the district. See page 1 in the Introduction for further explanation concerning this issue.)

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³"SWMD Checklist" may be used to ensure that all required sections are included in the district's plan.

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I. Introduction

This section must contain the information requested below presented in the manner shown.

A. Plan Approval Date, Counties in District, and Planning Period Length

1. Under current approved (or ordered to be implemented) plan:

Date of Ohio EPA approval or order to implement _____
 Counties within district _____
 Years in planning period _____

2. Plan to be implemented with approval of this document

Counties within district _____
 Years in planning period _____
 Year 1 of the planning period 19__

B. Reasons for Plan Submittal

In this section of the Introduction, choose one of the possible reasons for plan submittal listed below:

1. mandatory three- or five-year plan update; or
2. board of county commissioners or board of directors have determined that "...circumstances have materially changed from those addressed in the approved initial or amended plan of the district..." (ORC Section 3734.56(D)). Identify circumstances that have changed and provide a brief discussion.

C. Process to Determine Material Change in Circumstances

Discuss the process which will be used by the district to determine when a material change in circumstances has occurred in the district, and as a result, requires a plan amendment. The process must include at least:

- the criteria that will be used in the determination - "Has a material change occurred?";
- ongoing monitoring procedures which will be used to evaluate the criteria established;
- timetable for analyzing the determination; and
- notification procedure after reaching a determination

The criteria used to make the determination should include an assessment of changes in:

- the facility designations, flow control of waste (Please note that the addition of a facility to the designated list need not be a material change.);
- waste generation;
- capacity availability for disposal, transfer, composting, etc.;
- strategies for waste reduction and/or recycling;
- the availability of revenues for plan implementation;
- procedures to be followed for plan implementation; and
- the timetable for implementation of programs and/or activities.

D. District Formation and Certification Statement

If this plan is being submitted by a new district created from a reconfiguration of an existing district or districts, present copies of all resolutions pertaining to formation of the district in Appendix A. (Appendix A is optional for those districts which have not undergone a reconfiguration since their most recent plan approval.)

In a separate appendix (Appendix B), include all public notices as they appeared in local newspapers publicizing hearings and comments on the district plan. In Appendix C, include a certification statement signed by members of the policy committee asserting that the contents of the plan are true and accurate. (A sample certification statement can be found on page DD-2 of this document.) The certification statement must be signed by a majority of the policy committee members for the ratified draft amended plan. Appendix C must also include resolutions by the policy committee: 1) adopting the plan prior to ratification, and 2) certifying that the plan has been properly ratified. (See Appendix EE of this document for a description of the ratification process for districts.)

Also in Appendix C, list all political jurisdictions in the district which voted on ratification of the plan, the population represented by each, and the percentage population of the district as represented by the political jurisdictions which ratified the plan. (Please include one copy of all resolutions from political jurisdictions in the district with the submittal of the eight plan copies submitted to Ohio EPA for review. Appendices B and C are required for the ratified draft plan submittal only.)

E. Policy Committee Members

List all policy committee members (or a substitute body as authorized under ORC Section 3734.54) and the political jurisdictions or constituencies represented by each. Indicate the chairperson of the policy committee.

F. Board of Directors

List all members of the board of directors and the county which each represents. Indicate the chairperson of the board of directors.

G. District Address and Phone Number

Provide the name, title, address, phone number, and FAX number for the district's general contact person.

H. Technical Advisory Committee and Other Subcommittees

1. Assisting in the Planning Process

To encourage citizen involvement in the planning process, Ohio EPA recommends that districts establish viable public input through a technical advisory council (TAC) or an alternative committee. In accordance with ORC Section 3734.54, the TAC must include a representative from the solid waste hauling or disposal industry.

For each committee which assisted in the planning process, provide the following information:

- name of TAC or committee;
- names and affiliations of all members of each;
- summary of the responsibilities and recommendations of each committee;

2. Implementing the Plan

Committees or TAC's can also be helpful in implementing a district's plan. Identify all committees that have assisted in implementing the plan that the district is currently operating under, and discuss the responsibilities and effectiveness of each.

Identify all committees that will assist in implementing this amended plan. Discuss the responsibilities of each committee, the procedures each will use to perform their duties, and the members of each committee.

II. Executive Summary

The Executive Summary should be written only after all other sections of the plan have been completed. This section must be introduced with a narrative description of the status of implementation under the previously approved (or ordered to be implemented) plan. Discuss programs and activities that have worked as anticipated as well as those that have not. Provide explanation(s) or rationale for both successful and less than successful programs and activities.

Include a brief narrative description of Sections III - IX of the plan. Each section should be described in one or two short paragraphs. In addition, the executive summary must include a "plan profile" (Tables ES-1 through ES-4) which can be used as a quick reference for a quantitative description of the district and the plan. Most of the information included in these tables can be copied from other sections of the plan.

Table ES-1. General Information

INSTRUCTIONS - SPELL OUT THE COUNTIES IN THE DISTRICT NAME IN ALPHABETICAL ORDER (E.G., GEAUGA-TRUMBULL).		
District name:		
District ID #: (for OEPA use only)	Reference year:	Planning period:
Plan Status (<u>underline one</u>): D RD DR Approved (date) / / OI (date) / / DA		Reason for Plan Submittal (see I.B.):

Abbreviations: D = draft, RD = ratified draft, DR = draft revised, OI = ordered to be implemented, DA = draft amended

Table ES-2. District Coordinator/Office

INSTRUCTIONS - IF THE DISTRICT HAS NO COORDINATOR, LIST THE NAME OF THE PERSON OR OFFICE RESPONSIBLE FOR MONITORING PLAN IMPLEMENTATION.		
Name:		
Address:		
City:	State: OH	Zip:
Phone:	Fax:	

Table ES-3. Plan Data Summary

Plan Data				
		Reference Year	19__ (year 5)	20__ (year 10)
INSTRUCTIONS- FILL IN THE FOLLOWING SECTION WITH NUMBERS FROM TABLE V-1 (POPULATION), TABLE V-4 (WASTE GENERATION), TABLE V-6 (INDUSTRIAL WASTE SOURCE REDUCTION AND RECYCLING), TABLE V-5 (RESIDENTIAL/COMMERCIAL SOURCE REDUCTION AND RECYCLING), AND TABLE VI-1 (LANDFILL DISPOSAL). TONS OF WASTE REDUCTION (TWR) EQUALS INDUSTRIAL SOURCE REDUCTION + INDUSTRIAL RECYCLING + RES/COMM SOURCE REDUCTION + RES/COMM RECYCLING + MSW COMPOSTING + INCINERATION - ASH DISPOSED.) THE REFERENCE YEAR WASTE REDUCTION RATE (WRR) IS CALCULATED BY DIVIDING THE LANDFILL DISPOSAL (DL) + TWR INTO THE TWR.				
Population:				
Generation	Industrial			
	Res/Comm			
	Exempt			
	Total:			
Waste Reduction	Industrial Source Reduction			
	Industrial Recycling			
	Res/Comm Source Reduction			
	Res/Comm Recycling			
	MSW Composting			
	Incineration			
	Ash Disposed			
	WR Total:			
Disposal (DL)	LF-in-Dist			
	LF-out-of-Dist			
	Total LF			
WRR				

Abbreviations: Res/Comm - residential and commercial waste, LF-in-Dist = landfills in the district.

Table ES-4. Existing Disposal Facilities

Existing Disposal Facilities Used in the Reference Year				
INSTRUCTIONS - LIST EACH DISPOSAL FACILITY WHICH ACCEPTED DISTRICT WASTE IN THE REFERENCE YEAR. (SEE TABLES III-1 AND III-2.) ENTER THE FULL NAME OF THE FACILITY, THE COUNTY IN WHICH IT IS LOCATED, THE TONS ACCEPTED FROM THE DISTRICT IN THE REFERENCE YEAR, AND THE REMAINING CAPACITY FROM THE REFERENCE YEAR.				
Name	County	District tons	Total tons	Years left

III. Inventories [ORC Section 3734.53(A)(1)-(4)]

The purpose of the inventory section is to identify the existing waste reduction and waste services operating in the district. In addition, the measurements of the amount of waste source reduced, recycled, composted, incinerated, and disposed are critical for establishing the basis for plan projections.

The plan must first establish a "reference" year for use in all subsequent parts of the plan. (The reference year is defined as the calendar year represented by data collection efforts for new surveys conducted for the amended plan. The reference year does not replace the baseline year, however, it should update the information previously collected for the baseline year or the previous reference year.) This section must contain information for all existing solid waste disposal, recycling and transfer facilities which were **used by the district** in the reference year. Facilities listed in each table should be grouped by location (i.e., in-district, out-of-district, and out-of-state). In addition, the district must show the results of open dump and solid waste hauler inventories.

Captive landfills and captive incinerators should be included in Tables III-1 and III-2, respectively. (See the definition of "captive landfill" in the Glossary found in Appendix AA.) Only licensed solid waste facilities (or facilities that have had a license in previous years and whose current license is under appeal) receiving waste from only a facility owned by the owner of the disposal site should be considered a captive facility.

A. The Reference Year

The district must establish a reference year to be used for all subsequent projections in the plan. It is suggested that the district use the previous calendar year for the reference year. For example, if the revised plan preparation begins during 1996, calendar year 1995 should be used as the reference year. (In accordance with ORC Section 3734.56(A), a district is required to begin preparation of its draft amended plan at least 15 months prior to the mandatory submittal date for the draft amended plan.) Any other method used for selection of a reference year must be justified in the plan.

B. Existing Solid Waste Landfills

Provide the information required in Table III-1. Please note that **all** facilities used by the district in the reference year must be included: in-district, out-of-district, and out-of-state facilities. Additional data should be included for facilities that are located outside Ohio by completing Table III-7. (If data is not available from out-of-state facilities, enter "unreported" in Tables III-1 and III-7, estimate amounts disposed at those facilities, and describe the method used to make the estimates, e.g. data from haulers surveys, transfer station reports, etc.) Both publicly-available and captive facilities must be listed. Provide sample calculations and discuss all assumptions where appropriate. Indicate all sources of information for this section.

C. Existing Incinerators and Resource Recovery Facilities

Provide the information required in Table III-2. (Include the appropriate information in Table III-7 for any facilities used by the district which are located outside Ohio.) Please note that **all** facilities used by the district to process solid waste in the reference year must be included, both in-district and out-of-district facilities. (There are frequently numerous incinerators with valid air pollution control permits operating in a SWMD. These facilities should be included in the plan only if they process solid wastes.) Both publicly-available and captive facilities must be listed. Provide sample calculations and discuss all assumptions where appropriate. Indicate all sources of information for this section. If an incinerator burns solid waste and recycles materials recovered from the waste, enter that facility in both Tables III-2 and III-4.

Table III-1. Landfills Used by the District

Facility Name ¹	Type of Landfill ²	Location		Waste Received from the SWMD (TPY)			
		County	ST	Residential/Commercial ³	Industrial	Exempt	Total
In-district facilities							
Out-of-district facilities							
Out-of-state facilities							
Totals							

¹ Enter facility name as it appears on daily logs or Ohio EPA's list of "Licensed Solid Waste Facilities in Ohio." Hazardous waste facilities should be listed if they received district solid waste.

² To indicate type of landfill, enter "PA" for publicly-available or "C" for captive; enter "GO" for government-owned or "PO" for privately-owned; and "PD" for in-district facilities w/ public debt.

³ "Residential/Commercial" should include asbestos, other, and general solid waste. "Industrial Waste" means any non-hazardous residue resulting from an industrial or manufacturing process. "Exempt Waste" means materials such as construction and demolition debris and non-toxic foundry sand. (See the Glossary in Appendix AA for definitions of these terms.)

Sample Calculation:

Assumptions:

Table III-2. Solid Waste Incinerators and Waste-to-Energy Facilities Used by the District

Facility Name	Type of Facility ¹	Location		Waste Received from the SWMD (TPY)					Total Ash Produced (TPY) ⁴
		County	ST	Waste Incinerated				Bypass Waste Received (TPY) ³	
				Residential/Commercial ²	Industrial	Exempt	Total		
In-district facilities									
Out-of-district facilities									
Out-of-state facilities									
Totals									

¹ To indicate the type of incinerator, enter "PA" for publicly-available or "C" for captive; and "WTE" for a waste-to-energy facility; and "PD" for in-district facilities with outstanding public debt. (See the Glossary in Appendix A for a discussion of "public debt" as used in this document.)

² "Residential/Commercial" waste should include both asbestos, other, and general solid waste. (See the Glossary for definitions of solid waste, residential/commercial, industrial, and exempt waste.)

³ Enter the amount of "bypass waste" (typically bulky wastes which are not burned) in parenthesis for each facility.

⁴ Include the tons of additives (lime, sand, chemicals, etc.) mixed with the ash prior to disposal at a landfill. If the facility fails to provide the amount of ash produced, convert "Total Waste Received" (TWR) to "Total Ash Produced" by multiplying TWR by 0.32 to determine the tons of ash.

Sample Calculation:

Assumptions:

Source of Information:

D. Existing Transfer Facilities

Provide the information required in Table III-3. (Include additional appropriate information in Table III-7 for any facilities used by the district which are located outside Ohio.) Please note that **all** facilities used by the district or located in the district in the reference year must be included, both in-district and out-of-district facilities. Provide sample calculations and discuss all assumptions where appropriate. Indicate all sources of information for this section. If a transfer facility also performs recycling of wastes from the district (such as a Material Recovery Facility, or MRF), include this facility in Table III-3 and Table III-5.

E. Existing Recycling and Household Hazardous Waste Collection Activities

Provide the information required in Tables III-4 and III-5. Please note that **all** facilities and activities (including brokers - see Appendix AA for a definition) used by the district in the reference year must be included, both in-district and out-of-district. Provide sample calculations and discuss all assumptions where appropriate. Describe the source of information for both the recycling and household hazardous waste (HHW) data. Include all materials processed by each facility or activity, even though the same materials may be handled by more than one facility. Industrial materials reduced or recycled on-site (e.g. at a manufacturing plant) should not be included in these tables. (Adjustments for double-counting will be made in Section IV. See Appendix GG for a discussion concerning eliminating double-counting.) In addition, include transfer facilities and MRFs in both Table III-3 and Table III-5 if the facility recycles wastes from the district. Group types of recycling activities together such as recycling brokers, curbside recycling programs, and drop-off recycling facilities. Group HHW collection activities separately, and include permanent collection facilities, mobile drop-offs, one-time drop-offs, and pesticide container collections. (See Appendix FF for a sample survey form for recycling facilities.)

F. Existing Composting/Yard Waste Management Facilities

Provide the information required in Tables III-6. Please note that **all** facilities used by the district in the reference year must be included, both in-district and out-of-district facilities. Provide sample calculations and discuss all assumptions where appropriate. In addition, provide a brief discussion of each facility or type of activity, including its operation, materials received, the amount of non-compostables which must be disposed in a landfill, and the amount of compost produced. Indicate all sources of information for this section.

G. Existing Open Dumps and Waste Tire Dumps

Provide the information required in Table III-8. Please note that **all** in-district dumps identified in the reference year must be included. Provide sample calculations and discuss all assumptions where appropriate. Indicate all sources of information for this section. In the text, please discuss cleanup programs or any other activity which has led to significant changes in the number of open dumps in the SWMD since the previous approved plan. (See Appendix FF for a sample survey form for open dump inventory. Please note that the form in Appendix FF is an example only; it is not mandatory for district use.) For purposes of Section 3734.53(A) of the ORC, open dumps are areas off the road or adjacent to the road or right-of-way, on which solid wastes are deposited. Occasional debris or roadside litter should not be considered an open dump. In general, open dumps should be characterized as waste tire dumps when the predominant waste in the dump appears to be waste tires.

H. Ash, Foundry Sand, and Slag Disposal Sites

Provide the information required in Table III-9 for ash, foundry sand, and slag sites only. Please note that **all** ash, foundry sand, and slag disposal sites used by the district in the reference year must be included, both in-district and out-of-district. Include only unlicensed and unpermitted sites. (Sites with a solid waste license or permit

Table III-3. Solid Waste Transfer Facilities Used by the District

Facility Name	Type of Facility ¹	Location		Waste Received from the SWMD (TPY)				Recyclables Processed (TPY)	
		County	ST	Residential/Commercial ²	Industrial	Exempt	Total	Recovered from Waste	Total ³
Totals									

¹ To indicate the type of transfer facility, enter "PA" for publicly-available, "PUO" for private use only; and "PD" for in-district facilities with outstanding public debt.
² "Residential/Commercial" should include both asbestos, other, and general solid waste. (See the Glossary in Appendix AA for definitions of solid waste, residential/commercial, industrial, and exempt waste.)
³ Includes both the amounts recovered from mixed solid waste and source-separated recyclables.

Sample Calculation:
 Assumptions:
 Source(s) of information:

Table III-4. Residential Curbside Recycling Activities Used by the District

Curbside Recycling Name Mailing Address Phone Number ¹	Type of Curbside ²	# of Households Served ³	Frequency of Collection	Average # of HHs Participating ⁴	Service Area		Types of Materials Accepted ⁵	Recyclables Processed from the SWMD (TPY) ⁶
					County	Townships /Cities		

¹ Please include the name, mailing address, and phone number for each curbside recycling program listed.
² Enter "NS" for curbside programs paid for by a governmental entity, or non-voluntary programs in which residents are required to pay directly for the service; enter "S" for curbside programs which are paid for directly by the resident on a voluntary basis.
³ SWMDs may use population instead of number of households if this information is more readily available.
⁴ If available, provide the average number of households which participate in the curbside program during any given collection period. Population may be used instead of households.
⁵ If available, enter a separate line of information for each material accepted and processed by the activity.
⁶ Doubling-counting of materials should not be addressed in this table. List all reported amounts in this table; do not include projected or extrapolated amounts. If totals for a given facility have not been shown due to confidentiality concerns, please indicate such.

Sample Calculation:
 Assumptions:
 Source(s) of information:

Table III-5. Drop-offs, Buybacks, Hauler Collection, Other Recycling Activities, and HHW Collection Used by the District

Facility/Activity Name Mailing Address Phone Number ¹	Type of Facility or Activity ²	Types of Materials Accepted ³	Service Area			Hours Available to Public ⁴	Recyclables Processed from the SWMD (-TPY) ⁵	% of Material from Sector: Residential - R Commercial - C Industrial - I ⁶	Processing Capacity (tons)	
			County	Townships/Cities	Population Served				Daily (TPD)	Annual (TPY)
<i>Drop-off Recycling Facilities</i>										
<i>Buyback Recycling Facilities</i>										
<i>HHW Collection Programs</i>										

¹ Please include the name, mailing address, and phone number for each recycling and HHW program listed.

² To indicate the type of recycling facility or activity, enter "PA" for publicly-available, "PUO" for private use only. In addition, enter "DO" for drop-off facility, "BB" for buy-back recycling center, "BR" for recycling broker, "SY" for scrap yard, "HC" for hauler collection. Please categorize entries by type of facility and activity, and include additional facility-type designations as necessary. (See Appendix AA for a definition of a recycling broker.)

³ Enter a separate line of information for each material accepted and processed by the facility/activity.

⁴ Enter the hours available to the public per week; if the site is not open every week, enter the schedule for site.

⁵ Doubling-counting of materials should not be addressed in this table. List all reported amounts in this table; do not include projected or extrapolated amounts. If totals for a given facility have not been shown due to confidentiality concerns, please indicate such in the table.

⁶ Enter the estimated percentage of recyclables processed from the residential sector (R-__%), the commercial sector (C-__%), and the industrial sector (I-__%).

Sample Calculation:
Assumptions:
Source(s) of information:

Table III-6. Composting/Yard Waste Management Activities Used by the District

Facility Name or Activity (e.g. XYZ Composting, Land Application, etc.)	Facility Type ¹	Location		Waste Received from the SWMD ²		Processing Capacity		Non-compostables landfilled (TPY)	Compost Produced (TPY)
		County	Address	Type	Amount (TPY)	Daily (TPD)	Annual (TPY)		
			City ST Zip						
			Phone						
Totals									

¹ To indicate the type of yard waste facility or activity, enter "PA" for publicly-available, "PUO" for private use only, "DO" for drop-off facility; "CF" for compost facility, "LA" for land application, and "PD" for in-district facilities with outstanding public debt. (See Appendix A for a discussion of public debt.) Also, provide the "Class" of the facility (i.e., I, II, III, or IV) if applicable. See the glossary in Appendix AA for definitions of land application and descriptions of the classes of composting facilities.

² The types of materials composted, such as tree trimmings, grass clippings and leaves should be entered as "yard waste". All other solid waste may be entered as "other".

Sample Calculation:

Assumptions:

Source(s) of information:

Table III-7.

**Facilities Used by the District
Which Are Located Outside Ohio:
Additional Data**

Facility Name/ Type of Facility (e.g. landfill, transfer station, etc.)	Facility Mailing Address Name Address City ST Zip Phone	Facility Owner Name Address City ST Zip Phone	Facility Operator/Manager Name Address City ST Zip Phone	Daily Waste Receipt Lim- it, if known (TPD) ¹	Number of Days Facility is Open Dur- ing Year, if k- nown ²

¹ If the facility is regulated by a limit other than a daily limit, please describe the alternative mechanism and provide its current limit.

² Eight hours should be regarded as one day when determining this value. If the facility is open less than eight hours on a given day, add that amount as a fraction of eight hours in determining the total days open.

Source(s) of information:

Table III-8.

**Open Dumps and Waste Tire Dumps
Located in the District**

Site Location (Provide brief description)	Latitude (degrees, minutes, seconds)	Longitude (degrees, minutes, seconds)	Land Owner Mailing Address Name Address City ST Zip Phone	Description of Materials dumped at site	Approximate Size of Site (in acres)	Time Period Site Has Existed

should be included in "III.B. Existing Solid Waste Landfills.") Provide sample calculations and discuss all assumptions where appropriate. Indicate all sources of information for this section.

I. Map of Facilities and Sites

In Appendix E, enclose a map (or a set of maps) for each county within the district, and show the location of each facility and disposal site listed in III.B through III.H with the symbols listed below. In three of the eight plan copies submitted to Ohio EPA for review, this map (or maps) should be at the scale of one inch to one mile, and can be obtained from the Ohio Department of Transportation for under \$10. Other plan copies distributed to the public and political jurisdictions may include smaller maps. (See Appendix BB for more information regarding maps.) Districts with numerous facilities and/or open dumps may use more than one map per county to represent all facilities and sites within the SWMD.

Although not a requirement, districts are encouraged to include at least one map in Section III of the plan in order to facilitate public review of the document. These maps may be any size and scale preferred by the district. Use the following symbols to identify facilities, sites, and activities.

Symbols	Description	Symbols	Description	Symbols	Description
L	publicly-available landfill	E	waste-to-energy facility	S	slag disposal site
CL	captive landfill	I	incinerator	A	ash disposal site
CI	captive incinerator	R	recycling activity	FS	foundry sand disposal site
X	composting facility	T	transfer facility		
O	open dump site	WT	waste tire dump site		

J. Existing Collection Systems - Haulers

Provide the information required in Table III-10. Please note that **all** solid waste haulers operating in the district during the reference year must be included, both in-district and out-of-district operators. Provide sample calculations and discuss all assumptions where appropriate. Describe the methods used to compile the list of haulers. In addition, provide a discussion of the collection systems in place for managing source separated yard wastes and delivering these materials to composting facilities. Finally, please indicate whether or not local health departments require licensing of solid waste haulers within their jurisdiction. (See Appendix FF for a sample survey form for solid waste haulers.)

Table III-10. Solid Waste Haulers Operating in the District

Name of Hauling Company	Mailing Address: Street City ST Zip Phone	Description of Collection Routes (Include townships, cities, villages in the district where waste is collected.)	Type of Materials Collected ¹	Tons Collected from the District (TPY)	Name of Facili- ties Used by Haulers ²

¹ If available, please list each type of material collected on a separate line and enter the amount collected in the adjacent column to the left. Show the amount of source-separated yard waste, general solid waste, and separated recyclables.

² List all facilities (landfills, transfer stations, etc.) used by the haulers.

IV. Reference Year Population, Waste Generation, and Waste Reduction [ORC Section 3734.53(A)(5)-(6)]

This section of the plan must contain population, waste generation, and waste reduction estimates for the reference year. Also, the district must make any necessary adjustments to waste generation estimates based upon historical trends or alternative estimation methodologies in this section. All assumptions and sources of information used in developing the analysis must be included.

A. Reference Year Population and Residential/Commercial Waste Generation

Enter the reference year population and waste generation estimates in Table IV-1 for the district. It is suggested that districts use the latest population projections from the Ohio Department of Development, Office of Statistical Research (OSR) for this table. (See Appendix HH for OSR population data issued in March 1996.) Note that Ohio law requires the entire population of municipalities and villages located in more than one solid waste district to be added only to the district containing the largest portion of the jurisdiction's population. Show all of these adjustments to the district population. (Districts wishing to use population projections from a local planning commission or some other source must provide narrative justifying the use of these alternative projections instead of the ODOD estimates.)

Population is generally considered to be a reasonably good predictor of residential/commercial waste generation. As a result, the *Characterization of Municipal Solid Wastes in the United States: 1994 Update (1994 Update)* prepared by Franklin Associates for the U.S. Environmental Protection Agency provides national average waste generation estimates per capita for 1993 and 2000. Using the per capita estimates for these two years and straight-line projections for 1994-1999 results in the values shown in the box above and to the right. (Ohio EPA determined values for years 2001 through 2012 by assuming that the rate of decrease in yard waste generation is one-half the rate of decrease for 1993 through 2000.)

Franklin Associates suggests that source reduction of yard waste is the primary factor leading to a decrease in the generation rate from 1993 to 2000. Programs such as "Don't Bag It" could have a similar effect in Ohio. Since considerable variation could exist among the effectiveness of yard waste reduction programs across the state, some SWMDs may find that a more accurate residential/commercial waste generation estimate is developed by first using generation rates which exclude yard waste. The district would then add this estimate to the amount of yard waste received at composting facilities and land application sites to determine the total residential/commercial waste generation. Waste generation rates which exclude yard waste (based upon estimates from the *1994 Update*) are shown in the box on the previous page.

Residential/Commercial Waste Generation Rates			
Year	Pounds /Capita /Day	Year	Pounds /Capita /Day
1993	4.39	2003	4.34
1994	4.38	2004	4.36
1995	4.37	2005	4.37
1996	4.36	2006	4.37
1997	4.35	2007	4.38
1998	4.34	2008	4.39
1999	4.33	2009	4.39
2000	4.32	2010	4.40
2001	4.33	2011	4.42

Residential/Commercial Waste Generation Rates Excluding Yard Wastes			
Year	Pounds /Capita /Day	Year	Pounds /Capita /Day
1993	3.69	2003	3.96
1994	3.72	2004	3.99
1995	3.74	2005	4.02
1996	3.77	2006	4.04
1997	3.80	2007	4.07
1998	3.83	2008	4.10
1999	3.85	2009	4.12
2000	3.88	2010	4.15
2001	3.91	2011	4.18

Ohio EPA determined the values for 2001 through 2012 by assuming that the rate of increase from 1993 through 2000 would continue.

(Districts may want to analyze residential waste separately from commercial waste instead of combining these two sectors. Local generation rates may also vary considerably from national averages.) If another U.S. EPA update is released prior to preparation of the revised or amended district plan, values from the most recent update should be used to determine appropriate generation rates.

Districts can also use the sum of the amounts disposed, reduced/recycled, and some estimate of open dumping to determine residential/commercial waste generation. This approach can be reasonably accurate, except when the SWMD does not get good cooperation from entities which are surveyed, such as out-of-state landfills, or recyclers. (This is not intended to be a comprehensive discussion of all possible generation methodologies.)

Complete Table IV-1, entering the population, generation rate, and total tons generated for the reference year. Include a description and justification of the methodology used by the district to determine the generation rate.

Table IV-1. Reference Year Population and Residential/Commercial Generation

County Name ¹	Population		Generation Rate (lbs./person/day)	Total District Res/Com Generation (TPY)
	Before Adjustment	After Adjustment		
A-				
Adjustment 1 ²				
Adjustment 2				
B-				
Adjustment 1 ²				
Adjustment 2				
C-				
Adjustment 1 ²				
Adjustment 2				
Totals				

¹ The name of each county within the SWMD should replace the letters "A" - "C" (add letters as needed).

"A" -

"B" -

"C" -

² The population of the district should be adjusted for those political jurisdictions having populations in more than one SWMD. For example, suppose a majority of a city's population is in an adjacent SWMD. The district's population should be adjusted by subtracting that portion of the city residing within the district. Enter the name of the political jurisdiction for the appropriate number "1" and "2", the amount of the adjustment for the reference year and the type of adjustment with a plus (+) or minus (-) sign. (See Appendix BB for sources of information for this data.)

"1" -

"2" -

Sample Calculation:

Assumptions:

Source of information:

Table II-1 in Appendix II shows acceptable conversions factors for some waste streams which may be used to convert cubic yards to tons. The use of other conversion factors should be documented and justified.

B. Industrial Waste Generation

Industrial solid waste, as used in district plans should include all manufacturing process wastes and packaging materials used to ship items incorporated into the manufacturing process. Districts should consider all solid waste produced by industry as industrial waste. All industrial waste disposed in a facility classified as a solid waste landfill should be included in the total industrial waste. Process wastes disposed in solid waste captive landfills must be included in the total.

For purposes of the planning process, districts should not classify certain waste streams as industrial solid wastes (or residential/commercial solid wastes). These waste streams include:

- C train boxcars;
- C metals from demolition activities; and
- C ferrous metals resulting from salvage operations conducted by licensed motor vehicle salvage dealers.

Districts should eliminate these waste streams from both waste generation and waste reduction estimates. Excluding these materials from the planning process replaces the pre-1985 industrial waste reduction policy¹ found in the previous version of the *Format*.

Ohio EPA encourages SWMDs to conduct a waste survey of industries in the district for the reference year for all statutorily-required plan revisions or amendments (every three years for 10-year plans or every five years for 15-year or more plans). A sample survey form is shown in Appendix FF. (Please note that an industrial survey is no longer a mandatory element of a district's plan. However, the district must provide industrial sector information based upon some alternative approach, which is discussed on the following page.)

1. Districts Conducting an Industrial Survey for the Plan Update

The district should gather as much information as possible about the types of wastes generated in order to facilitate planning for capacity needs, and waste reduction potential. If the district conducts a survey, it should identify:

- the Standard Industrial Classification (SIC) category for each industry;
- the amounts of each type of waste generated by each industry;
- the management methods used and amount managed by each method, including on-site and off-site disposal, recycling, and source reduction;
- total number of employees within each SIC category;
- number of industries in the district (SIC categories 20 and 22-39);
- number of industries surveyed by the district within each SIC category;
- number of industries within each SIC category responding to the survey with surveys judged to be reliable;
- number of employees in responding industries within each SIC category; and
- the type and amount of each waste reported generated by responding industries within each SIC category.

¹The pre-1985 industrial waste reduction policy stated that all materials recycled or reduced by programs which were initiated prior to 1985 could not be counted toward the waste reduction goal. The policy intended to eliminate materials from waste reduction credit which were never (or rarely) disposed in landfills.

SWMDs must make every effort to obtain usable surveys from all industries within each SIC category, especially industries with large employment or generating large amounts of waste. However, Ohio EPA recognizes that it may not be feasible nor improve data reliability to survey all industries in SWMDs with very large industrial sectors. In this case, the district should develop a methodology for random sampling of industries within each SIC category, and calculation of statistics in order to determine the variability of estimates. This methodology should be submitted to Ohio EPA for review and comment prior to its use.

The district must include industrial survey results in Appendix F in the district plan. At a minimum, this appendix must include the total amounts of waste generated, recycled, source reduced, and the other information listed above for each type of waste within each two-digit SIC category.

Even if all industries are sent a survey, very rarely do all respond by returning the completed survey form. As a result, the district must utilize a methodology to estimate the waste generated by non-responding industries. Multiplying the number of employees in each two-digit SIC category by an average generation rate per employee is one common method of estimating generation from non-responding industries. Employment projections as well as historical employment data can be obtained from a number of sources, including the Ohio Bureau of Employment Services (OBES), Labor Market Information Division. (The *Harris Ohio Industrial Directory* also provides employment numbers for each industry.) For employment projections, OBES divides the state into 31 service delivery areas, and provides projections for each area by type of occupation. (See Appendix JJ for additional discussion regarding estimation of solid waste for industrial generators.)

2. *Districts Not Conducting an Industrial Survey for the Plan Update*

If the district does not conduct an industrial survey for the plan update or amendment, the plan must still include the information discussed above, such as number of industries in each SIC category, waste generation and number of employees by industry category, and waste reduction estimates. The plan must also include a thorough explanation of the method(s) used to develop these estimates. Acceptable methods of estimating industrial waste generation and waste reduction without the benefit of reference year survey data could include:

- C the use of earlier surveys updated with more recent information on the number of employees and the number of companies (appropriate use of earlier surveys is discussed in more detail on page 27);
- C survey results from recyclers and recycling brokers;
- C summing industrial disposal and waste reduction estimates to approximate industrial generation;
- C the use of various secondary² data sources such as the *Harris Ohio Industrial Directory* and the Ohio Bureau of Employment Services;
- C a limited industrial survey which is more focused on the industries likely to generate the most waste and/or have the highest potential for existing and future waste reduction; and
- C any combination of these approaches.

In Table IV-3, enter the reference year amount of solid waste generated from each SIC category for amounts based upon survey respondents, and then amounts based upon secondary data. For districts which have estimated industrial waste generation without conducting any surveys, all estimates in Table IV-3 should be entered under "Amounts Based Upon Secondary Data." (Conversion factors from the previous section should be used, or alternatives identified and justified.) Enter the totals in the column entitled "Total Waste Generated". Provide a narrative justifying all assumptions and explaining the methodology used for all surveys and estimating waste generated from those non-reporting entities.

²Secondary data sources include the *Harris Ohio Industrial Directory*, the publications from the Ohio Bureau of Employment Services, and Appendix JJ in this *Format*. Primary data sources refers to actual results from surveys conducted by the district.

Table IV-3. Industrial Waste Generation Survey Respondents vs. Unreported

Standard Industrial Classification Category (SIC)	Survey Respondents				Amounts Based Upon Secondary Data (Unreported)				Total Industrial Waste Generated (Tons)
	# of Industries	# of Employees	Tons of Waste Generated	Generation Rate ¹	# of Industries	# of Employees	Tons of Waste Generated	Generation Rate ¹	
20									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
Totals (tons)									

¹ "Generation Rate" means the generation rate in tons per employee per year. In the text, please include the source of the information for generation rates for non-reporting entities.
 Sample Calculations:

C. Exempt Waste

This category should include all exempt waste disposed in publicly-available solid waste landfills, which is not characterized as solid waste. For example, construction and demolition debris is not solid waste, but is frequently disposed in solid waste landfills. In addition, non-toxic foundry sand is not characterized as solid waste but is also frequently disposed in a publicly-available solid waste landfill.

In Table IV-4, enter the estimated amount of "exempt waste" disposed in publicly-available solid waste landfills for the reference year. Include a narrative to explain all assumptions made to determine estimates, define all waste stream types in this category, and provide at least one sample calculation.

Table IV-4. Exempt Waste Generated in the District and Disposed in Publicly-Available Landfills

Type of Waste Stream ¹	Generation Rate (lbs./person/day)	Total Exempt Waste Generation (TPY)
A		
B		
C		
D		
Totals		

¹ Replace each letter ("A" through "D") with the name of the exempt waste stream and enter the tons disposed each year in the appropriate column. Include additional rows as necessary for more waste streams.

Sample Calculation:

Assumptions:

D. Total Waste Generation

Enter the amounts for residential/commercial, industrial, and exempt waste in Table IV-5.

Table IV-5. Reference Year Total Waste Generation for the District

Type of Waste	Generation Rate (lbs./person/day)	Tons/Year
Residential/Commercial		
Industrial		
Exempt ¹		
Total Waste Generation		

¹ "Exempt Waste" should include only materials which are exempted from the definition of solid waste, such as construction and demolition debris, but are processed at solid waste facilities such as landfills. (See the Glossary in Appendix A for a definition of solid waste.) List the wastes which are included as "Exempt" in a narrative discussion.

E. Reference Year Waste Reduction

This section must provide waste reduction estimates which are based upon existing waste reduction strategies or programs within the district. Note that waste reduction as used in this document means source reduction, recycling, yard waste composting, documented yard waste land application, MSW composting, resource recovery, and incineration.

Source reduction is preferred to recycling since the former eliminates the generation of waste materials. As a result, the residential/commercial and/or industrial sectors save the expense and effort of recovering, handling, and marketing recyclables. Processing facilities can be designed for lower capacities if the waste will no longer be generated. The resources that would be used to recycle materials can be devoted to other uses.

However, one of the most difficult problems associated with source reduction activities is measuring the impact of these programs. Assuming that a decrease in residential/commercial waste generation is due to source reduction efforts in the district may be entirely inaccurate. Other variables may affect waste generation, such as decreased economic activity, less disposable income, changes in lifestyles unrelated to source reduction strategies, etc. Quantifying source reduction efforts in the industrial sector may be equally difficult.

For purposes of this *Format*, districts may estimate source reduction amounts and add to the waste reduction totals for the reference year only when the data is obtained through case studies or industrial survey data specific to the district (or could be readily applied to the district). If thoroughly documented through case studies and/or survey data, these reductions should be reflected in lower waste generation estimates. (See Appendix LL for guidelines that districts must follow in order to credit source reduction efforts through a case study.) For example, suppose that a district uses disposal records, recycling surveys, and estimates of open dumping as an approximation for residential/commercial waste generation, but can document through a detailed case study that community "A" implemented a very successful educational program resulting in residents purchasing items containing less packaging which reduced packaging waste in this community in the reference year by 50 percent, or 5,000 tons compared to historical data. The amount of waste reduction for the residential/commercial sector would then be increased by 5,000 tons.

However, it would not be acceptable to use this information and generalize that the entire district reduced the generation of packaging waste by 50 percent in the reference year. Furthermore, it would be unacceptable to project this success rate onto other communities in the district for future years in the planning period unless the plan can demonstrate that characteristics between community "A" and other communities are very similar with regard to waste generation.

In order to credit industrial source reduction in the reference year, these efforts must be documented with a specific case study or survey data collected from individual industries in the district. Projections of source reduction for future years of the planning period must be based upon actual interviews, plans, and/or survey data from industries.

1. Residential/Commercial Sector

Identify the amount of source reduction, recycling, incineration, composting, and documented land application of yard waste³ occurring in the reference year in the residential/commercial sector. Enter all requested information in Table IV-6 and explain all assumptions and provide at least one sample calculation, if applicable.

³Districts may include the amount of yard waste which is land applied to agricultural land towards the waste reduction totals if the tonnage can be accurately estimated.

The estimate must include only "reported" rather than "estimated" or "extrapolated" quantities, unless the district follows the methodology discussed in Appendix GG. If entities used by the district responded to an earlier survey, but not the survey conducted for the reference year, data from the earlier survey may be utilized in Table IV-6. Include any waste reduction resulting from incineration, resource recovery, MSW composting, yard waste composting, or land application of yard waste in Table IV-6, and identify it as one of these categories.

Double-counting (the same materials processed by more than one facility or activity) must be addressed in developing this table. Include a discussion of the methods used to eliminate double-counting of recyclables. (See Appendix GG for a discussion of eliminating double-counting, extrapolating recycling, and using data from previous surveys.)

After completing the table, discuss the existing waste reduction activities in the district, and assess the strengths and weaknesses of the existing programs. Also, provide the following information for each program and strategy:

- Ⓒ entity responsible for maintaining the program;
- Ⓒ service area which benefits;
- Ⓒ amount and type of material reduced and/or recycled, if applicable; and
- Ⓒ discuss all assumptions associated with future projection of quantities recovered or reduced.

Table IV-6. Reference Year Residential/Commercial Waste Reduction in the District

Type of Waste Source Reduced ¹	TPY	Type of Waste Recycled ¹	TPY	Incineration, Composting, Resource Recovery ²		
				Total Waste Received	Residual Landfilled	Net Waste Processed
				Incineration	Ash	Net Inciner.
				Composting	Residuals	Net Compost
				Resource Rc	Ash	Net RR
Subtotals						
Grand Total³						

¹ Use data from Tables III-4 and III-5 to complete the first four columns of this table. Add rows to this table as necessary. Eliminate all double-counting of recycled amounts before entering values in this table. (See Appendix GG for a discussion of double-counting.)

² Use data from Table III-2 for incineration and resource recovery; use Table III-6 for composting. The column entitled "Total Waste Received" should reflect the total tons of district waste received. "Residual Landfilled" indicates the amount of ash produced for incineration and resource recovery, and the amount of non-compostables which must be landfilled from composting. "Net Waste Processed" should show the amount processed by the facility(ies) after subtracting the residual amount landfilled.

³ The "Grand Total" should include all source reduction, recycling, incineration, composting, and resource recovery. All incineration, composting, and resource recovery amounts added to the Grand Total should come from the "Net Waste Processed" column.

Sample Calculation:

Assumptions:

2. Industrial Sector

Identify the amount of source reduction, recycling, incineration, and composting which occurred in the reference year in the industrial sector. Enter all requested information in Table IV-7, explain all assumptions (including conversion factors), and provide at least one sample calculation, if applicable. The amount of waste reduction shown for the reference year must include only reported quantities from industries responding to a district survey, unless the district follows the methodology described in Appendix GG. If a given industry responded to an earlier survey, but not the survey conducted for the reference year, data from the earlier survey may be utilized in Table V-2, provided the earlier survey results are updated from some other source. Double-counting (the same materials processed by more than one facility or activity) must be addressed in developing this table. Include a discussion of the methods used to eliminate double-counting of recyclables. (See Appendix GG for a discussion of eliminating double-counting, extrapolating recycling, and using data from previous surveys.)

The plan should also discuss the nature of existing industrial source reduction, recycling, incineration, and composting activities in the district, and assess the strengths and weaknesses of the existing programs. Also, provide the following information for each existing program and strategy:

- C entity responsible for maintaining the program;
- C service area or industries which benefit;
- C amount and type of material reduced and/or recycled, if applicable; and
- C discuss all assumptions associated with future projection of quantities recovered or reduced.

Table IV-7. Reference Year Industrial Waste Reduction in the District

Type of Waste Source Reduced ¹	TPY	Type of Waste Recycled ¹	TPY	Incineration, Composting, Resource Recovery ²		
				Total Waste Received	Residual Landfilled	Net Waste Processed
				Incineration	Ash	Net Inciner.
				Composting	Residuals	Net Compost
				Resource Rc	Ash	Net RR
Subtotals						
Grand Total³						

¹ Use data from Tables III-4, III-5, and the analysis of the industrial sector as discussed in Section IV.B. to complete the first four columns of this table. Add rows to this table as necessary. Eliminate all double-counting of recycled amounts before entering values in this table. (See Appendix GG for a discussion of double-counting.)

² Use data from Tables III-2, III-6, and the analysis of the industrial sector as discussed in Section IV.B. The column entitled "Total Waste Received" should reflect the total tons of district waste received. "Residual Landfilled" indicates the amount of ash produced for incineration and resource recovery, and the amount of non-compostables which must be landfilled from composting. "Net Waste Processed" should show the amount processed by the facility(ies) after subtracting the residual amount landfilled.

³ The "Grand Total" should include all source reduction, recycling, incineration, composting, and resource recovery. All incineration, composting, and resource recovery amounts added to the Grand Total should come from the "Net Waste Processed" column.

Sample Calculation:

Assumptions:

In Appendix F, the plan should contain estimated amounts of waste reduction categorized by type of waste stream for each industry responding to the survey, and a total amount of waste reduction for each waste stream. If an industrial survey was not conducted for the reference year, discuss the methodology used to determine the waste reduction estimates.

F. Total Waste Generation: Historical Trends of Disposal Plus Waste Reduction

Depending upon the method used to estimate waste generation, it is very possible that the actual amounts of disposal and waste reduction (as reported by solid waste facilities, recycling facilities, and recycling brokers) will not be consistent with the amount of waste generation as calculated for Table IV-5. In many cases, calculating waste generation based upon national averages and/or industrial surveys results in higher amounts than the actual reported quantities according to solid waste facilities and recyclers. (The reverse may be true, also.) Many factors contribute to this differential, including the following:

- C inaccurate or inappropriate conversion factors (cubic yards to tons);
- C inaccurate or inappropriate compaction factors for hauling vehicles and landfill waste placement;
- C illegal or open dumping;
- C reporting errors on surveys conducted by the district;
- C average generation rates used are not appropriate for local circumstances;
- C mis-characterization of the type waste at solid waste facilities;
- C non-response by some entities surveyed by the district; and
- C difficulty in accurately tracking all district waste flows, especially those to adjacent states, or those which are processed through an out-of-district transfer station en route to a landfill.

In Table IV-8, enter the amounts reduced, recycled, composted, land applied, incinerated, and landfilled. Use reported amounts from the initial district plan, district surveys, and the annual district reports. Other pertinent information considered by the district may include population changes, industrial growth, and/or availability of additional or alternative solid waste facilities.

In some cases, the reported estimates for disposal and/or recycling may not be accurate. For instance, several transfer facilities in Ohio receive waste from outside the SWMD where they are located. However, when the waste from this facility is delivered to a landfill, all of the waste may be characterized as having come from the SWMD where the transfer facility is located. In addition, SWMDs exporting waste to non-reporting out-of-state landfills will not be using complete disposal estimates if disposal is based only upon Ohio facilities. To the extent possible, districts should adjust the estimates in Table IV-8 for these kind of discrepancies, and include all assumptions and calculations used to make the adjustments.

Table IV-8. Total Waste Generation Based Upon Disposal Plus Waste Reduction

Year ¹	Management Method Used in TPY ²						Total Waste
	Source Reduction & Recycling	Yard Waste Composting	YW Land Appl.	Incineration	MSW Composting	Landfill Disposal	
1989							
1990							
1991							
1992							
1993							
1994							
Reference							

¹ Insert additional years between "1994" and "Reference" if necessary.

² The amounts for each management method for the reference year should be copied from Tables III-1, III-7, IV-5, and IV-6. Data for the years prior to the reference year should be reported values from the previous district plan, district surveys, and/or annual district reports. Enter the "net waste" processed by incineration and composting operations; the ash produced from incineration and non-compostable residuals from composting should be reflected in the landfill disposal estimates.

Sample Calculation:

Assumptions:

G. Reconciliation of Waste Generation

Compare and contrast the waste generation estimates in Tables IV-5 and IV-8. The district may conclude that estimates are different due to one or more of the explanations listed above. In some cases, source reduction efforts may not have been included in Table IV-5, since this is waste which is no longer generated. However, for planning purposes, districts should include source reduction amounts in waste generation estimates in order to get waste reduction credit for source reduction.

Discuss reasons for differences between these two tables, and determine which waste generation estimates the district considers to be more accurate. In addition, compare the current waste generation rates with the those from the previous approved plan and discuss any differences. Enter the adjusted waste generation figures in Table IV-9, explaining all adjustments that are made. **The district will then use these adjusted waste generation estimates throughout the remainder of the plan, to predict waste composition, to make projections for each year of the planning period, and to determine management capacity processing needs.**

Table IV-9. Adjusted Reference Year Total Waste Generation for the District

Type of Waste	Generation Rate (lbs/person/day)	Tons/Year
Residential/Commercial		
Industrial		
Exempt ¹		
Total Waste Generation		

¹ "Exempt Waste" should include only materials which are exempted from the definition of solid waste, such as construction and demolition debris, but are processed at solid waste facilities such as landfills. (See the Glossary in Appendix A for a definition of solid waste.) List the wastes which are included as "Exempt" in a narrative discussion.

Sample Calculation:

Assumptions:

H. Waste Composition

Determining the content of the waste is important for estimating the quantity of materials that are available for recovery or recycling, and for designing the appropriate size of any processing, recycling, or recovery facilities. A waste composition analysis is a mandatory part of the district plan, in accordance with Section 3734.53(A)(1) of the ORC. The following sections discuss methods of analyzing the waste composition.

1. Residential/Commercial Sectors

Waste composition for the residential/commercial sectors can be estimated by using national averages in the *1994 Update*, using case studies, surveys, and waste sorts. Waste streams in the *1994 Update* are grouped into the following categories: durable goods, non-durable goods, containers and packaging, and other wastes. Table KK-1 in Appendix KK shows waste streams as a percentage of the 1990 total U.S. estimated waste generation, grouped by residential and commercial sectors. (Table KK-2 shows the percent of each waste stream listed in Table KK-1 which can be attributed to the residential sector versus the commercial sector.) Residential/commercial waste composition for a district can be approximated by multiplying each of these percentages by the total residential/commercial waste generated for the district.

Residential/commercial waste composition can also be estimated by a complete survey of recycling activities in the district, a representative open dump survey, and a representative waste sort(s) at disposal facilities used by the district. All of these sources together can provide a reasonably good estimate of waste stream composition.

Waste sorts will be most accurate if conducted during more than one season of the year. Some waste streams tend to vary a great deal from winter to fall, and the total amount of waste may vary considerably from one season to the next in areas with popular recreational activities. Waste generation also tends to increase around holidays, especially those at the end of the year. It is also very important to ensure that the waste sorted is representative of the district population. Cities (or even parts of the same city) may have very different waste generation characteristics. As a result, using trash for a waste sort which has been collected in only one specific location may skew the analysis.

In Table IV-10, enter the amount generated for each type of waste for the reference year. Include a narrative describing and justifying the procedures used to estimate composition. In addition, the plan should include all assumptions and show at least one sample calculation.

Table IV-10. Estimated Residential/Commercial Waste Stream Composition for the District for the Reference Year¹

Waste Stream Type ²	Volume (in cubic yds.) ³	Conversion Factor	Tons
yard waste			
scrap tires			
lead-acid batteries			
office paper			
newspaper			
aluminum			
ferrous metals			
glass			
plastics			
cardboard			
other			
Totals			

- ¹ Districts estimating residential and commercial waste separately should present composition for both sectors.
- ² Additional categories of waste streams should be included as necessary to represent the entire residential/commercial waste generation.
- ³ These columns - "Volume" and "Conversion Factor" should be completed only in the event that materials have been initially measured in cubic yards instead of tons. See Appendix II for a listing of conversion factors.
- ⁴ The total in tons should equal the total residential/commercial waste generation found in Table IV-9.

Sample Calculation:

Assumptions:

2. Industrial Waste Sector

Knowledge of the types of waste generated by industry is also important for designing strategies and projections for future industrial recycling and source reduction. On a district-wide level, a survey is the best mechanism to obtain information on waste composition. (A waste audit, or pollution prevention assessment would be the preferred data source for waste composition for an individual company.) However, response rates lower than 100 percent result in an incomplete picture of the district's waste composition. Amounts of each type of waste generated by survey non-respondents can be estimated by examining information from other companies in the same SIC category. Appendix JJ presents information on industrial waste composition by SIC category from 8 solid waste management districts. Although not a highly reliable predictor for all industries, this information can be used to develop rough estimates of the amounts and types of waste for each non-respondent.

In Appendix F, show both the reported and estimated amounts of industrial waste generated by type of waste stream. Include a description of the method used to estimate composition of industrial generation for survey non-respondents.

In Table IV-11 enter the total amounts generated for each type of waste. Describe and justify the methodology used to determine industrial waste composition. Identify all assumptions and show at least one sample calculation. (The district should include the quantities of each type of waste stream generated by each SIC category in Appendix F. Detailed information regarding wastes generated may facilitate source reduction and recycling.)

Table IV-11. Estimated Industrial Waste Composition for the Reference Year in the District

Waste Stream Type ¹	TPY	Waste Stream Type ¹	TPY	Waste Stream Type ¹	TPY
aluminum		litho/photo film		refractories	
ash		metal dust		rubber	
bark		metals, ferrous		sawdust	
batteries		metals, non-ferrous		silica/alumina	
cardboard		mixed waste		slag	
concrete		paper, office		sludge	
drums		paper, misc		stone/clay/sand	
dust collector fines		paper, newsprint		scrap wood	
fabric/textiles		plaster		pallets	
food wastes		plastics			
glass					
Su bto tal		Subtotal		Subtotal	
Grand Total²					

¹ Include additional waste stream types as necessary to represent all industrial activity in the district.

² The "Grand Total" should equal the total industrial waste generation as shown in Table IV-9.

Sample Calculation:

Assumptions:

V. Planning Period Projections and Strategies [ORC Section 3734.53(A)(5)-(6)]

This section of the plan must contain projections for each year of the planning period for population and waste generation. All assumptions and sources of information used in developing the analysis should be included. In addition, this section must provide detailed waste reduction strategies which will be implemented by the district. Using the proposed strategies, the district will project the amount of solid waste which will be recycled, source reduced, composted, and incinerated, if applicable, for each year of the planning period. The district will also estimate the amount of yard waste, scrap tires, lead-acid batteries and household hazardous waste generated in the district, and then determine if existing programs are sufficient to manage these waste streams. (Districts estimating generation for residential and commercial sectors separately, should also present separate waste reduction estimates for each sector.) Note that waste reduction as used in this document means source reduction, recycling, composting, documented land application of yard waste, resource recovery, and incineration.

A. Planning Period

Ohio law requires solid waste management plans to develop projections for population, waste generation, and waste reduction, a minimum of ten years into the future, and provide strategies to meet waste management needs for those ten years. Districts must establish a planning period which begins the calendar year following the draft plan due date for the district. For example, suppose the district establishes 1994 as the reference year, and its draft amended plan is due during June, 1996. The beginning of the planning period would be January 1, 1997. (SWMDs using an alternative procedure to establish a planning period should contact the Solid Waste Management Planning Section at Ohio EPA.)

B. Population Projections

Enter the population estimates in Table V-1 for: (1) the reference year, (2) each year of the planning period, and (3) the year(s) in between "1" and "2".⁴ (Use the estimates from Table IV-1 for the reference year.) It is suggested that districts use the latest population projections from the Ohio Department of Development, Office of Statistical Research (OSR) for this table. (See Appendix HH for OSR population data issued in January 1993.) In addition, include a sample calculation for any projections which must be adjusted and a narrative description comparing the district population projections for the revised or amended plan with projections from the previously approved plan.

Districts wishing to use population projections from a local planning commission or some other source must provide a narrative justifying the use of these alternative projections instead of the ODOD estimates.

⁴If the district intends to demonstrate compliance with Goal #1 of the *1995 State Solid Waste Management Plan*, and defines services areas smaller than a county, population projections should be provided in an appendix for those service areas.

Table V-1. District Population Projections

Year	County Populations ¹						Adjustments to Pop. ²			Total District Population
	A	B	C	D	E	F	1	2	3	
Reference										
19__										

¹ The name of each county within the SWMD should replace the letters "A" - "F", and the projected population given below for each year of the planning period.
 "A" - "D" -
 "B" - "E" -
 "C" - "F" -

² The population of the district should be adjusted for those political jurisdictions having populations in more than one SWMD. For example, suppose a majority of a city's population is in an adjacent SWMD. The district's population should be adjusted by subtracting that portion of the city residing within the district. Enter the name of the political jurisdiction for the appropriate number "1" through "3", the amount of the adjustment for each year of the planning period, and the type of adjustment with a plus (+) or minus (-) sign. (See Appendix BB for sources of information for this data.)
 "1" -
 "2" -
 "3" -

Sample Calculation:
 Assumptions:
 Source of information:

C. Waste Generation Projections

1. Residential/Commercial Sector

In Table V-2, enter the year, the district population total, the per capita generation estimate, and the total projected residential/commercial waste generation for: (1) the reference year, (2) each year of the planning period, and (3) the year(s) between "1" and "2". Show a sample calculation for at least one year of the planning period. If the district does not use national averages to predict waste generation, the plan must describe the assumptions and methodology used to determine any changes in the generation rate for the years beyond the reference year.

Table V-2. District Residential/Commercial Waste Generation (TPY)

Year	District Population	Per Capita Generation Rate ¹	Total Residential/ Commercial Generation (TPY)
Reference ²			
19__			

¹ Provide the source of information for the generation rate.
² Entries for the reference year should be copied from Table IV-1 for population and Table IV-9 for residential/commercial waste generation.

2. Industrial Sector

Enter projections for industrial waste generation in Table V-3 for each year of the planning period. The estimates entered for the reference year should be copied from the data entered for Section IV. Describe the methodology used to determine the changes in generation of industrial waste in those years beyond the reference year.

Table V-3. Projected Industrial Waste Generation

SIC Category	Year										
	Refer- ence	19__									
20											
22											
23											
24											
25											
26											
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
37											
38											
39											
Totals (TPY)											

Sample Calculation:
Assumptions:

3. Total Waste Generation

Copy the residential/commercial and industrial waste generation estimates from Tables V-2 and Table V-3, respectively, into Table V-4. Copy the exempt waste estimate for the reference year from Table IV-4. Explain the methodology used to predict exempt waste generation for years beyond the reference year.

Table V-4. Total Waste Generation for the District During the Planning Period (in TPY)

Year	Residential- /Commercial	Industrial	Exempt ¹	Total Waste Generation	Generation Rate (lbs/ person/day) ²
Reference					
19__					

- ¹ "Exempt Waste" should include only materials which are exempted from the definition of solid waste, such as construction and demolition debris, but are processed at solid waste facilities such as landfills. (See the Glossary in Appendix A for a definition of solid waste.) List the wastes which are included as "Exempt" in a narrative discussion.
- ² Calculate this column by multiplying the adjacent column ("Total Waste Generation") by 2,000 pounds and dividing by the district population and 365 days.

Sample Calculation:
Assumptions:

D. Projections for Waste Stream Composition

If the relative composition of the waste stream is expected to change significantly over the planning period, districts should provide projections of those changes. If yard waste generation is expected to decrease by a large amount due to programs designed to discourage collection of grass clippings, yard waste generation should be projected for the entire planning period. In addition, if a new industry is expected to begin operations during the planning period, waste composition percentages could be changed quite significantly. (See the *1994 Update* for waste stream composition projections for residential-commercial waste.)

E. Waste Reduction Strategies through the Planning Period

The *1995 State Plan* requires SWMDs to propose implementation (or continue) waste reduction strategies which will enable the district to meet the goals established in the *1995 State Plan*. In general, these goals are as follows:

- C Goal#1 - ensure the availability of reduction and recycling opportunities/programs for residential/commercial waste

- C Goal #2 - reduce and/or recycle at least 50 percent of the total waste generation by the year 2000
- C Goal #3 - provide informational and technical assistance on source reduction
- C Goal #4 - provide informational and technical assistance on recycling, reuse, and composting opportunities
- C Goal #5 - develop strategies managing scrap tires and household hazardous wastes (HHW)
- C Goal #7 - prepare a market development strategy (optional)⁵

Waste reduction strategies may encompass a wide variety of activities in the district in order to address these goals. Expanded drop-off recycling centers and localized industrial waste exchange opportunities may all contribute tangible amounts towards the goal of reducing waste and recycling of recovered materials. Other examples of waste reduction include incineration, MSW composting, and land application of yard waste. In addition, educational efforts should increase the waste reduction rate for existing programs.

Many districts rely upon local governmental entities and/or the private sector to implement (or continue) waste reduction programs. The district should list the local government and private sector entities who intend to continue existing programs, or intend to implement a new or expanding waste reduction strategy.

Provide quantitative data only for those strategies in which the effect on waste reduction can be measured directly, or through some measured variables demonstrated to have a very high correlation with amount of waste reduced. For instance, the amount of materials recovered in a new curbside recycling program implemented by the district can be determined directly. (See Appendix MM for a brief discussion of average material capture rates and participation rates for curbside recycling activities.) In contrast, the effect of a district-wide educational program cannot be measured so easily; its success can only be measured indirectly by making some assumptions about changes in the overall district waste reduction rate.

In general, Ohio EPA recommends the following sequence to determine projections for amounts reduced and recycled: 1) develop waste reduction strategies based upon the amount and types of waste generated; 2) estimate future amounts of waste reduction based upon these strategies; and 3) revise and/or add to the strategies if the total source reduced and recycled fails to meet the required goals. For the residential/commercial and then the industrial sector, describe each new waste reduction strategy that will be implemented by the district during the planning period, and provide the following information:

- date when the strategy or activity will be implemented;
- who will implement the strategy;
- who will benefit from the strategy;
- amount and type of material source reduced and/or recycled by each strategy during the planning period, and/or goals for the strategy;
- discuss all assumptions associated with projection of quantities recovered or reduced; and
- discuss and develop mechanisms which will allow both qualitative and quantitative measurement of the success of a strategy or activity.

Next, include each existing strategy or program which is expected to continue during the planning period, and discuss any changes which will take place during the planning period. (Existing strategies which are continued unchanged do not need to be described in this section since a full explanation would be included in Section IV.)

Under each goal established for the residential/commercial and industrial sectors, provide a detailed description of the strategies which the district (or entities within the district) will continue or implement in order to meet that particular goal. (See the *1995 State Plan* for a complete discussion of each goal.) Some strategies will likely

⁵Ohio EPA encourages SWMDs to include a market development strategy in the district's plan. However, this strategy is not required. Goal #6 requires districts to prepare an annual report for Ohio EPA, and as a result, is not a requirement for the district plan.

help to meet more than one goal. In these cases, fully describe the strategy under the first goal in which it appears, then list the strategy only by name in all other appropriate goals and refer to the initial description. (Ohio EPA strongly encourages districts to use exactly the same terms throughout the plan to refer to a given strategy in order to minimize confusion.) Districts must also provide strategies to manage waste streams restricted from landfill and incinerator disposal (yard waste, scrap tires, and lead acid batteries).

After describing each strategy for the residential/commercial sector, complete Table V-5 showing the estimated amounts of waste reduction for each strategy. Follow the same process for the industrial sector. Please note that this section is considered a part of the implementation schedule required in accordance with ORC Section 3734.53(A)(12).

Residential/Commercial Waste Reduction Strategies

Goal #1 and Goal #2 - Districts must develop strategies to meet Goal #1 or Goal #2. However, Ohio EPA encourages districts to meet both of these goals. Section VII of this *Format* contains a full discussion of Goals #1 and #2, and explains the methods for determining compliance with these goals.

Goal #3 - As discussed in the box to the right, Goal #3 of the *1995 State Plan* requires SWMDs to provide information and technical assistance on source reduction. Please note that source reduction strategies must be included (and labelled as such) for both residential/commercial and industrial sectors, and must be consistent with the discussion presented in Section IV.D. In addition, projections of source reduction for years beyond the reference year must be based upon actual interviews, plans, and/or survey data.

Goal #3 - 1995 State Plan

The *1995 State Plan* requires SWMDs to "...provide informational and technical assistance on source reduction...." (Goal #3). Examples of strategies designed to promote source reduction for the residential sector include encouraging local communities to adopt volume-based collection rates, and providing information on reducing waste through revised purchasing practices. Commercial and industrial generators may greatly benefit from pollution prevention efforts, waste audits, or waste

Goal #4 - Districts must develop strategies to provide information and technical assistance for recycling, reuse, and composting opportunities. Informational assistance can include public awareness efforts such

as brochures or fliers on the types of recyclable materials accepted and hours of operation for donation or drop-off locations. Technical assistance activities may include waste audits for local businesses, assistance to local communities in setting up recycling or yard waste composting programs, or marketing collected materials.

Goal #5 - Districts must include strategies for the proper management of both scrap tires and household hazardous wastes. The plan must contain annual generation and recycling estimates for scrap tires within the district and strategies for managing these tires. Districts must also provide an inventory of scrap tire dumps in the district, and are encouraged to develop an educational strategy to address the proper management of scrap tires and maintain a list of legal scrap tire recycling and disposal opportunities. Ohio EPA encourages districts to clean up existing scrap tire dumps if district funds are available. However, in order to do so using district funds, scrap tire cleanup must be included in the district's implementation schedule of the approved plan.

SWMDs are required to include a set of strategies for the proper management of HHW. Ohio EPA encourages districts to assess the waste stream in order to determine which materials should be addressed by HHW strategies. (See the Glossary for the definition of HHW.) These strategies may include educational programs for adults and school-age children, a telephone hotline to answer questions, exchange programs for paints and pesticides, and collection events.

Goal #7 - Although Goal #7 is optional for SWMDs, Ohio EPA encourages districts to develop strategies to promote markets for recyclables. Strategies may include educational efforts to encourage the use and/or purchase of recycled-content materials, implementing pilot projects demonstrating the use of a recycled-content product, providing limited financial incentives for using recycled-content products, and coordinating cooperative buying and marketing programs for local entities within the district.

Waste Streams Restricted from Landfill and Incinerator Disposal - The 1989 State Solid Waste Management Plan established restrictions on the disposal of yard waste, lead-acid batteries, and scrap tires in landfills and incinerators. Districts must implement strategies to manage these waste stream amounts which are no longer disposed in landfills or incinerators.

Estimating tons of waste reduction - Complete Table V-5 below, including each strategy discussed above. Include both on-going existing strategies and new strategies to be implemented during the planning period. Strategies focused on source reduction should be listed separately from those using recycling. Please note that SWMDs should not anticipate including yard waste source reduction in estimates used to calculate the percentage waste reduction rate due to the difficulty in measuring source reduction of yard waste. Expand the table as necessary to include additional strategies. If a given strategy reduces or recycles more than one material, list all materials together and combine the tons reduced/recycled. Enter zeroes ("0") for those years prior to the anticipated implementation of a given strategy. Use data from Table IV-5 for the reference year.

Table V-5. Residential/Commercial Waste Reduction Strategies¹

Strategy ²	Type of Material Reduced and/or Recycled	Tons of Waste Reduction										
		Reference	19									
<i>Source Reduction Strategies</i>												
<i>Subtotals</i>	----- -											
<i>Recycling Strategies</i>												
Yard waste -												
Scrap tires -												
Lead-acid batteries -												
HHW Recycled -												
<i>Subtotals</i>	----- -											
<i>Other Waste Reduction Strategies</i>												
Incineration -												
MSW composting -												
<i>Subtotals</i>	-----											
Grand Totals	-----											

¹ This table is a part of the implementation schedule required in accordance with ORC Section 3734.53(A)(12).
 Sample Calculation: Assumptions:

Industrial Waste Reduction Strategies

Describe each strategy for the industrial sector under the appropriate State Plan goal. Descriptions should include the elements identified previously. Strategies used to meet the requirements of more than one goal must be described only once.

Goal #2 - Districts must include strategies designed to reduce/recycle at least 50 percent of the industrial waste generation. If the district determines that Goal #2 is not achievable, and designs programs to meet Goal #1, the district must:

- C document the composition of the waste stream generated by industries and explain the difficulty in reducing and recycling these materials in greater quantity; and
- C establish a target for industrial waste reduction and establish strategies to meet that target by the year 2000. The target established by the district must be higher than the district's most recent reference year industrial waste reduction rate.

Goal #3 - Districts must design strategies to provide informational and technical assistance on source reduction to the industrial sector.

Goal #4 - SWMDs must provide informational and technical assistance on recycling, reuse and composting for the industrial sector.

Estimating tons of waste reduction - Complete Table V-6 on the next page, providing estimates of waste reduction for each strategy described for the industrial sector.

Table V-6. Industrial Waste Reduction Strategies¹

Strategy ²	Type of Material Reduced and/or Recycled ³	Tons of Source Reduction/Recycling ⁴										
		Reference	19__									
<i>Source Reduction</i>												
<i>Subtotals</i>	-----											
<i>Recycling</i>												
<i>Subtotals</i>	-----											
<i>Other Waste Reduction Strategies</i>												
<i>Subtotals</i>	-----											
Grand Totals	-----											

¹ This table is a part of the implementation schedule required in accordance with ORC Section 3734.53(A)(12).
² Include both on-going existing strategies and new strategies to be implemented during the planning period. Source reduction strategies should be listed separately from recycling. Expand the table as necessary to include additional strategies. Please note that strategies addressing restricted waste streams should not be included in this table. Instead, put such strategies in Table V-6.
³ If a given strategy reduces or recycles more than one material, list all materials together and combine the tons reduced/recycled.
⁴ Enter zeroes ("0") for those years prior to the anticipated implementation of a given strategy. Use data from Table V-2 for the reference year.
 Sample Calculation:
 Assumptions:

VI. Methods of Management: Facilities and Programs to be Used [ORC Section 3734.53(A)(7)-(12)]

This section must show the total amount of waste to be managed by each method (e.g. landfilling, incineration, recycling, etc.) and names of all facilities which will be used. The district must provide contracts, letters of intent, or signed agreements with all facilities used to demonstrate access to sufficient capacity.

A. District Methods for Management of Solid Waste

1. Calculation of Capacity Needs

Complete Table VI-1 by entering the total amount of waste generated in each year of the planning period, then indicating the amounts of waste expected to be managed by each method. Amounts for the reference year should be based primarily upon Table IV-8. The amount to be landfilled during the planning period should be initially calculated by subtracting the tons managed by all other other methods (Recycling, Yard Waste Composting, etc.) from the "Net Tons to be Managed by SWMD." The district should then examine these initial landfill projections to ensure that they are reasonable. For example, the amount landfilled during the planning period would not be expected to decrease by a factor of two, if recycling or waste reduction strategies were not projected to remove substantial materials from the waste stream, or no large commercial or industrial generators were projected to close. If the landfilled amounts are adjusted after the initial calculation, include all assumptions and describe the changes in detail.

After completing this table for the total waste generated, develop the same table for the residential/commercial (Table VI-2) and industrial sectors (Table VI-3).

The information provided for the reference year must be based upon reported quantities, unless the district uses the methodology described in Appendix GG. For each year of the planning period (beyond the reference year), the amounts estimated for each management method should be calculated based upon subtracting the amount of waste source reduced from the projected waste generation. For example, the amount of landfill capacity needs would be determined by subtracting all waste reduction and recycled amounts from the estimated waste generation for that given year. In preparing Tables VI-1, VI-2, and V-3, districts should use the waste generation and waste reduction estimates from Section V of this *Format*.

Table VI-1. Waste Management Methods Used and Processing Capacity Needed for Each Year of the Planning Period

Year	Tons of SW Generated ¹	Tons Source Reduced ²	Net Tons to be Managed by SWMD ³	Management Method Used and Processing Capacity Required in TPD and TPY ⁴						
				Recycling	Transfer	Yard Waste Composting	YW Land Application	Incineration	MSW Composting	Landfilling
Reference										
19__										

¹ This amount should be consistent with the "Total Waste Generation" found in Table V-4.
² The "Tons Source Reduced" should be the sum of Tables V-5 and V-6.
³ The "Net Tons to be Managed by SWMD" should be the difference between the "Tons of SW Generated" and the "Tons Source Reduced." Please note that the "Tons of SW Generated" should not have been already decreased by subtracting the "Tons Source Reduced".
⁴ The sum of the tons shown under each management method for a given year will not necessarily be equal to the "Net Tons to be Managed by SWMD". For example, a major portion of the waste going through a transfer station will also be added to the total for landfill capacity needs. In addition, each management method should show the total processing capacity needed for **receipt** of wastes. In order to understand the development of this table, it is very important to show all calculations. The management categories shown should be revised, if necessary, to reflect those which are used by the district. ("YW Land Application" is yard waste land application, "MSW Composting" is municipal solid waste composting.)

Sample Calculations:
 Assumptions:

Table VI-2. Summary for Residential/Commercial Waste Management Methods

Year	Tons Generated ¹	Management Method in TPY ²				
		Source Reduction & Recycling ³	Incineration ⁴	Composting ⁴	Landfilling	Ash Disposal ⁵
Reference						
19__						

¹ Use the values as shown in Table V-4.
² The sum of the tons shown under each management method for a given year will not necessarily be equal to the "Tons Generated." For example, a portion of the waste processed at an incinerator will also be included as ash in the "Ash Disposal" column.
³ Use the values as shown in Table V-5.
⁴ Use the values developed in Table V-5.
⁵ Make sure that the amounts entered for "Ash Disposal" are not included under "Landfilling".
 Sample Calculation:
 Assumptions:

Table VI-3. Summary for Industrial Waste Management Methods

Year	Tons Generated ¹	Management Method in TPY ²				
		Source Reduction & Recycling ³	Incineration ⁴	MSW Composting ⁴	Landfilling	Ash Disposal ⁵
Reference						
19__						

¹ Use the values as shown in Table V-4.
² The sum of the tons shown under each management method for a given year will not necessarily be equal to the "Tons Generated." For example, a portion of the waste processed at an incinerator will also be included as ash in the "Ash Disposal" column.
³ Use the values as shown in Table V-6.
⁴ Use the values developed in Table V-6.
⁵ Make sure that the amounts entered for "Ash Disposal" are not included under "Landfilling".
 Sample Calculation:
 Assumptions:

B. Demonstration of Access to Capacity

For each management method to be used by the district, provide the names of the facilities, the processing capacity, and the amount of waste from the district to be accepted for each year of the planning period. Enter the appropriate information in Table VI-4, and expand the lines of the table as necessary. Please note that the anticipated "Tons of SW Managed..." must be continued in the second half of the table for each facility. Copy this table and provide the applicable information for each management method used by the district - landfilling, recycling, transfer, composting, incineration, and/or resource recovery. In Appendix G, provide copies of contracts, letters of intent, or signed agreements for each licensed solid waste facility that the district uses to demonstrate access to capacity. (Contracts, letters of intent, or agreements are not necessary for activities such as unlicensed recycling operations and registered composting sites.) These documents must include the amount of district waste which will be received by each facility and the time period when the waste will be accepted.

Table VI-4. Waste Management Method: _____

Facilities Used by District: Name and Location (county and state)	AM- DWRL ¹	Remaining Capacity:				Tons of SW Managed by Each Facility		
		Years	Data Source ²	Airspace (cubic yards) ³		19__		
				Gross	Net			
1.								
2.								
3.								
4.								
5.								
Totals								

Table VI-4. (continued) Waste Management Method: _____

Facilities Used by District: Name and Location (county and state)	Tons of SW Managed by Each Facility							
	Year (- cont.)							
1.								
2.								
3.								
4.								
5.								
Totals								

¹ "AMDWRL" means the authorized maximum daily waste receipt limit.

² For "Data Source", indicate the source of the information used for "Remaining Capacity" and the date when capacity was estimated.

"Gross Airspace" means the total cubic yards of volume remaining at the landfill which has been permitted for solid waste placement, daily and intermediate cover material. "Net Airspace" means the gross airspace minus volume requirements for cover materials, or the volume available for solid waste placement only.

C. Schedule for Facilities and Programs: New, Expansions, Closures, Continuations

In Table VI-5, indicate the schedules for new facilities, expansions, and closures for all facilities to be used by the district. When referencing a particular facility or program, use the same language throughout the plan in order to minimize confusion. In addition, list the schedules for all programs to be implemented by the district, or on behalf of the district. If applicable, include the anticipated dates for the beginning and end of operations. Please note that this section is considered a part of the implementation schedule required in accordance with ORC Section 3734.53(A)(12).

Table VI-5. Implementation Schedule for Facilities, Strategies, Programs, and Activities: Dates and Description

Name of Facility, Strategy, Program or Activity	Location (SWMD, County, City/Township)	Description of Program/Facility ¹	Approx. Date When the Following Will Take Place:	
			Operations Begin	Operations Cease

¹ Describe the type of program or facility to be implemented. For example, if a facility is to be constructed, indicate whether this is a landfill, incinerator, yard waste composting facility, etc. If it is a program to be implemented, indicate if it is an education, drop-off recycling, household hazardous waste program, etc. Include those strategies which are shown in Tables V-5 and V-6.
 Note: This table is considered a part of the implementation schedule required in accordance with ORC Section 3734.53(A)(12).

D. Identification of Facilities

In accordance with ORC Section 3734.53(A)(12)(a), "...when applicable...", the district plan shall contain "...an identification of the solid waste disposal, transfer, and resource recovery facilities and recycling activities contained in the plan where solid wastes generated within or transported into the district will be taken for disposal, transfer, resource recovery, or recycling..." Identification should be incorporated into Table VI-6. This table should also list any facilities currently designated. Whereas delivery of district-generated wastes to identified facilities is not enforceable by the SWMD, Ohio law gives districts the authority to mandate locations where waste will be taken through the designation process. In order to use designation authority, the approved plan must contain a statement allowing designation (see Section VI.E. on page 51), and the district must hold a series of public hearings, and comments periods, and adopt the appropriate resolutions after plan approval. (Provide copies of resolutions which have led to the current designation of any facility in an appendix.) Please note that this section is considered a part of the implementation schedule required in accordance with ORC Section 3734.53(A)(12).

Table VI-6. Facilities Identified and Current Designations

Facilities Identified		Facilities Currently Designated	
Facility Name	Location (SWMD, State)	Facility Name	Location (SWMD, State)

E. Authorization Statement to Designate

The plan must "...contain a clear statement as to whether the Board of County Commissioners or directors is authorized to or precluded from establishing facility designations under Section 343.014 of the Revised Code..." (Section 3734.53(E)(1) of the ORC). Designation of facilities functions as flow control of solid waste for the SWMD. Because of uncertainty resulting from recent Court decisions in flow control cases, districts are strongly advised to consult with their legal counsel before establishing facility designations. Districts intending to control the flow of waste to a specific set of facilities and/or activities must include the following statement (or a statement with the same meaning):

"The Board of Directors of the _____ SWMD is hereby authorized to establish facility designations in accordance with Section 343.014 of the ORC after this plan has been approved by the Director of the Ohio Environmental Protection Agency."

SWMDs that do not intend to designate facilities must include the following statement in the plan:

"The Board of Directors of the _____ SWMD is hereby precluded from establishing facility designations in accordance with Section 343.014 of the ORC."

F. Waiver Process for Undesignated Facilities

If the district includes a statement in the plan which authorizes designation of facilities, the district should also develop procedures for issuing a waiver to allow solid waste to flow to undesignated facilities. These procedures should be developed in accordance with Section 343.01(I)(2) of the ORC. The district must act on a waiver request within 90 days after receipt, and must establish steps to evaluate the impact of issuance of the waiver upon:

- projections contained in the district's approved (or ordered to be implemented) plan under Section 3734.53(A)(6) and (A)(7); and
- implementation and financing of the district's approved plan.

Only after evaluating the waiver request and finding that: 1) it is not inconsistent with plan projections, and 2) it will not adversely impact plan implementation and financing, may the district issue a waiver allowing solid waste to be taken to an undesignated facility.

G. Siting Strategy for Facilities

For those new and expanded facilities listed in Section VI.C as providing needed capacity, the district must provide a detailed explanation of a siting strategy for facilities to be owned by the district, or constructed and owned by another entity which is acting under contract with the district. A siting strategy is not required for facilities not being used to meet capacity needs of the district, or if no new or expanded facilities are proposed in the plan. (If the plan includes capacity for new or expanded facilities as a contingency, Ohio EPA recommends writing the plan so that the siting strategy will be applied when the capacity contingency is implemented. Districts should carefully monitor the capacity available to the SWMD in order to determine when the contingency and associated siting strategy should be implemented.) Ohio EPA recommends establishment of a district siting committee to conduct at least portions of the siting study. The siting strategy should:

- identify individuals or groups responsible for each step of the process;
- provide the estimated time required for each step; and
- be well-defined so the process can be easily followed.

SWMDs should regard the siting strategy as an environmental assessment of potential facility sites that result in minimizing negative impacts. In order to complement the siting strategy, SWMDs may adopt rules in accordance with ORC 343.01(G)(2) to address siting issues. These SWMD rules must be consistent with Ohio's solid waste siting criteria, and must not include design standards.

Ohio EPA recommends that districts incorporate the following elements into their siting strategy.

Preliminary Site Survey

1. Obtain a current copy of Ohio's solid waste regulations (Ohio Administrative Code 3745-27, 3745-30, and 3745-37) and other available siting criteria guidance from the appropriate Ohio EPA District Office. SWMDs should be aware that the Ohio EPA Director can exempt proposed facilities from selected Ohio solid waste siting criteria if he determines that granting the exemption will not result in negative environmental and/or public health impacts.
2. Obtain county or regional information for the general location where the facility is to be located. Information may be obtained from the Geographic Information System (GIS) coordinators for Ohio EPA, or the Ohio Department of Natural Resources, to determine political jurisdictions, rivers and streams, possible location of wetlands, soil associations, drainage patterns (watershed boundaries), floodplains, public water systems, wellhead protection areas, endangered and threatened species, active and abandoned mines, aquifer boundaries, seismic impact zones, airport locations, glacial drift thickness, and other land use data.
3. Other considerations in the search for potential sites should include:

<ul style="list-style-type: none"> - visual inspection of the designated area - zoning restrictions - location of population centers - hauling distances and economics - transportation routes and emergency services - local land acquisition 	<ul style="list-style-type: none"> - location of historical or archaeological sites - conservancy districts - parks, state and national forests, nature preserves, wildlife areas, scenic rivers
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4. Compile data obtained in items two and three for the general site location. The easiest way to visualize the information is to record it on a general map of the area being studied. Specific sections of the map which will not meet Ohio's siting criteria should be eliminated during initial examination.
5. Once potential sites have been located, the SWMD may contact the appropriate Ohio EPA District Office. Ohio EPA will conduct a preliminary site investigation, if time permits. The preliminary site investigation focuses on superficial features of the site and regional geology. Site specific geologic considerations cannot be addressed until a hydrogeologic site investigation is performed and the results evaluated.
6. If the SWMD plans to construct a facility, the policy committee should schedule a pre-application meeting with the appropriate Ohio EPA district office geologist and solid waste engineer to discuss best available technology requirements and specific PTI application requirements. The SWMD should decide whether or not to proceed with engineering detail plans and specifications based upon meetings and discussions with Ohio EPA technical staff.

Ranking Scheme

In order to facilitate evaluation and selection of a facility site, the SWMD should consider developing a ranking scheme. The ranking scheme should allow districts to compare potential sites quickly and as objectively as possible.

Resolving Site Impasses Through Mediation

Siting a solid waste facility usually involves controversy. Increased public involvement and technical advisory council recommendations early in the siting process help to identify potential sites and reduce controversy. Nevertheless, siting conflicts are still likely to occur. The district siting strategy should include a method to deal with impasses associated with facility siting.

Mediation is a technique widely used by government, industry, labor, and management to resolve impasses. This approach is generally formal, and brings together a limited number of representatives of opposing positions to work with a mediator (or a team of mediators) toward resolution of conflicts. The mediator is neutral and serves to:

- act as a "go-between" for the opposing parties, fostering communication and cooperation;
- clarify issues and promote better understanding of opposing positions; and
- offer constructive suggestions and possible solutions.

H. Contingencies for Capacity Assurance and District Program Implementation

The SWMD should provide at least one contingency for capacity assurance if there is a medium to high level of uncertainty associated with the demonstration of access to capacity (demonstration) or program implementation in the district's plan. Some examples of situations requiring a contingent demonstration include a SWMD whose demonstration relies upon:

- a proposed facility expected to be utilized for the first three or four years of the planning period;
- an existing facility that is under orders to close, or is likely to close in the near future because of a license or permit denial; or
- other unforeseen circumstances.

In addition, if there is a medium to high level of uncertainty associated with programs to be implemented by the district or by other entities, the district should include contingencies for those programs. The plan should include criteria which will be used by the district to determine when a contingency should be implemented. Note that this section is considered a part of the implementation schedule required in accordance with ORC Section 3734.53(A)(12).

VII. Measurement of Progress Toward Waste Reduction Goals [ORC Section 3734.53(A)]

Districts must use this section of the *Format* to determine progress towards Goal #1 and Goal #2 established in the 1995 State Plan. Although Ohio encourages districts to implement programs which will enable compliance with both of these goals, compliance with only one goal is required. This section requires a district to identify which goal(s) it will meet, then develop the analysis to demonstrate compliance. Calculation of the waste reduction rate uses disposal plus waste reduction as the estimate for waste generation, unless this sum is not a reasonable estimate of waste generation.

Please note that for purposes of this document, the term waste reduction means source reduction, recycling, composting, resource recovery, and incineration. In order to be consistent with an Agency-wide effort to standardize the definitions of terms, "waste minimization" has been replaced with "source reduction."

A. District Will Comply with Goal(s) Identified

The district must clearly state that this plan will demonstrate compliance with "1", "2", or "3" below:

1. Goal #1 - Program standards for SWMDs: ensure the availability of reduction, recycling, and other waste reduction methods that are alternatives to landfilling for residential/commercial solid waste by the year 2000.
2. Goal #2 - By the year 2000, a) 25 percent waste reduction rate for residential/commercial sector, and 2) 50 percent waste reduction rate for the industrial sector.
3. Both Goal #1 and Goal #2.

B. Demonstration of Compliance with Goal #1

According to the *1995 State Plan*, solid waste management districts (SWMDs):

"...must demonstrate that the waste reduction, recycling, or minimization programs or activities in existence or scheduled to be implemented will be available by the year 2000 for a minimum of seven of eleven materials..."⁶

The demonstration must also show that:

- C each sector of waste generators (residential and commercial/institutional) has access to recycling or other alternative management methods for at least four of the minimum seven materials designated by the SWMD;
- C generators' participation in recycling and waste reduction programs is encouraged through district educational efforts and financial incentives to promote participation are in place, or the district will investigate the feasibility of implementing financial incentives; and
- C SWMDs relying on incineration and/or solid waste composting must show that a minimum of three of seven materials used to demonstrate access are non-compostable and non-combustible (e.g. steel, aluminum, or glass food and beverage containers, and lead-acid batteries).

⁶ In evaluating compliance with Goal #1 of the *1995 State Solid Waste Management Plan*, Ohio EPA will also take into consideration local conditions that affect a district's ability to meet the access and participation standards, such as the cost of programs, the availability of markets for recyclables, and transportation distances.

The eleven materials listed in Table VII-1 have been selected because they are highly amenable to recycling and recovery programs. The district must designate seven materials from this list which will be used to demonstrate compliance with Goal #1. In addition, four of these seven materials must be identified and used to demonstrate compliance for the residential sector, and four materials for the commercial/institutional sector. The district may select only one material which is common to both the residential and commercial/institutional lists.

Complete Table VII-1, indicating with an "x" those materials which will be used to demonstrate compliance with Goal #1.

Table VII-1. Materials Designated to Demonstrate Compliance with Goal #1

Eleven Materials Highly Amenable to Recycling, etc.	Four Materials Designated for the Residential Sector	Four Materials Designated for the Commercial/Institutional Sector	Number of Times Materials is Designated
Corrugated cardboard			
Office paper			
Newspaper			
Glass containers ¹			
Steel containers ¹			
Aluminum containers ¹			
Plastic containers			
Wood packaging & pallets			
Lead-acid batteries			
Major appliances			
Yard wastes			
Totals	4	4	> or = 7

¹ Includes food and beverage containers only.

Compliance with the residential sector will be discussed first.

1. Residential

Meeting the residential performance standard for Goal #1 consists of several steps which will be discussed in sequence. Solid waste management districts (SWMDs) should evaluate circumstances within their district in the order presented - determine the service area(s), evaluate access, and then participation. The SWMD should meet the access standards prior to determining participation.

a. Service Area

The SWMD should be divided into service areas. Each county in the district will be a separate service area, which will include all the incorporated and unincorporated areas in the county. Districts may establish smaller service areas if desired, so long as the entire SWMD is included in a service area.

If the service area is not a county, please identify each city, village, and township that comprises the each service area.

Include the service area(s) for the SWMD and the population(s).

b. Access

Access is defined as the presence of waste reduction/recycling services or opportunities and other alternative management programs. Opportunities may be defined as drop-off recycling, non-subscription curbside, subscription curbside, centralized MRF service, or a combination of any of these. Districts must demonstrate access for each service area for:

- C a minimum of **90** percent of the population of the service area; and
- C the four materials designated as being recycled or reduced in Table VII-1.

Determining the percentage of the population which has access to services depends upon the type of service or opportunity being provided. The population which can be "credited" for each type of opportunity is discussed below.

Non-subscription Curbside Defined as curbside programs which are contracted and paid for by a political jurisdiction, or programs in which the resident does not pay separately for curbside collection; assume all households provided service within political jurisdiction under contract has access.

Drop-offs

Full-service

Drop-offs

Assume **2,500** persons served (or have access) in a rural area and **5,000** persons served in a urban area per drop-off. In order to be considered a full-service drop-off, the site must be open to the public at least **40** hours per week and must handle the four materials designated to meet the access standard.

Rural area is defined as any municipality or township less than 5,000 in population. Urban area is therefore any municipality or township equal to or greater than 5,000 in population. A full-service drop-off located in an urban area would be given access credit of 5,000 persons, while the same drop-off located in a rural area would result in access credit of 2,500 persons. (Note: Districts may take credit for a higher number served per drop-off if it can be demonstrated that more people use the drop-off based upon tons recovered. See Appendix NN in this *Format* for the recommended methodology to make this determination.)

Part-time Drop-offs

For drop-offs that are not available at least 40 hours per week, assume **2,500** persons served (or have access) per drop-off, if the following conditions are met:

- C the four materials designated to demonstrate access are handled; and
- C the drop-off is available to the public at a regularly-scheduled time, at least once a month.

The district may combine sites which handle less than the designated four materials to get credit for one part-time drop-off. For example,

if two part-time drop-offs in a service area handled plastics and glass, and a third drop-off handled newspaper and aluminum cans, these three part-time drop-offs would give the district credit for 2,500 persons towards the access standard. Yard waste drop-offs or composting sites can contribute towards one part-time drop-off if it is available to the public at regularly scheduled times. (Buybacks, "golden goats", and other types of recycling opportunities could all be considered full-service or part-time drop-offs, depending upon the hours available, and materials handled.)

For drop-offs which are exclusively available for (or used by) residents of a specific city, village or township, access credit should be: 1) the population of the jurisdiction, or 2) the appropriate default value above, whichever value is lower.

Material Recovery Facility	Assume that each person whose mixed waste is taken to a MRF has access, provided that: 1) the MRF has an overall recovery rate of at least 15 percent, and 2) the four materials being used to demonstrate access are recovered by the MRF. Access would be reduced proportionately for situations in which the MRF is recovering less than 15 percent. For example, if the recovery rate at the MRF is 10 percent, 67 percent of the population whose waste is taken to this facility has access (10 percent/ 15 percent).
Subscription Curbside	Access for subscription curbside is determined by the number the residents who have the opportunity to subscribe to the curbside collection (based upon existing haulers in the service area) multiplied by 25 percent. (If the district can demonstrate greater access through the actual number of subscriptions, participation, or tons of recyclables recovered, the access contribution from these curbside programs may be increased, accordingly. Ohio EPA will also consider the results of district survey efforts which attempt to estimate the number of subscribers as an alternative measure of access.)

It is possible that access may be calculated well over 100 percent in some situations. If the access provided by the combination of programs results in an access number greater than the population of the service area, the district should make the total access estimate equal to the population. By making this adjustment, the final access percentage should never exceed 100 percent.

An example is provided to help clarify determination of access for the SWMD's population. Assume a single county SWMD has the following features:

- C SWMD population is 200,000;
- C district designates glass, newspaper, steel cans, and aluminum cans as the four materials used to demonstrate access for the residential sector;
- C non-subscription curbside is available to 40,000 households, or 104,000 in population;
- C participation rate for non-subscription curbside is 60 percent;
- C a MRF which recovers the four recyclables being used to demonstrate access from mixed waste, and receives the mixed waste from 30,000 district residents. The MRF has a recovery rate of 10 percent;
- C 5,000 households use haulers who offer subscription curbside collection;

- C 4 full-service drop-offs are available in the county. Two of these drop-offs are located in urban areas and two are located in rural areas; and
- C 5 part-time drop-off sites, open on Saturday only, two sites handling four materials (one of these available only for residents of a small village, population 1500), two drop-offs handling newspaper and aluminum cans only, and another handling steel cans and glass only.

Access would be available in the SWMD for the following population:

- 104,000 (non-subscription curbside)
- 20,000 (population served by the MRF x (10 percent/15 percent), since the MRF operates at a 10 percent recovery rate)
- 3,250 (subscription curbside credit)
- 15,000 (four full-service drop-offs, two serving 5,000 people each, and two serving 2,500 people each)
- 6,500 (one part-time drop-off site x 2,500 residents per drop-off + one part-time drop-off site providing 1,500 village residents access credit + one part-time drop-off credited based upon two sites handling two materials each.)

148,750 total residents with access (results in 74 percent access level for this district). As a result, this district must plan for additional programs to increase the access level to at least 90 percent.

Please note that districts should use 2.6 persons per household for all calculations unless documentation is provided in the plan showing a more appropriate number.

Complete Table VII-2 for each service area in the district, listing all waste reduction opportunities which fall into one of the categories described above. Include the population with access to each opportunity for both the reference year and the year 2000. For any programs which must be added prior to 2000 in order to meet the 90 percent access minimum, enter "0" access for the reference year. Describe all assumptions made, and show calculations.

Table VII-2. Calculation of Access for Residential Sector: _____ Service Area

Program ¹	Reference Year		Year 2000	
	Number of Households w/ Access ²	Population w/ Access	Number of Households w/Access ²	Population w/Access
<i>Non-Subscription Curbside</i>				
<i>Subscription Curbside</i>				

<i>Full Service Drop-off (urban area)</i>				
<i>Full-Service Drop-off (rural areas)</i>				
<i>Part-time Drop-offs³</i>				
<i>Material Recovery Facilities(MRF)</i>				
Totals				
Service Area Population		Access Percentage (total population with access/Service Area population)		

¹ Use the information in Tables III-4, III-5, and V-5 to complete the names of existing and planned programs. Use the same names to describe programs listed in this table as used in all previous references. Add more lines to the table as necessary.
² Complete this column only if converting from households with access to population.
³ For multiple sites combined to make one part-time drop-off, list each site in the "Program Name" column.

c. Participation

Districts must demonstrate meeting the participation standard by: 1) developing and implementing an adequate education and awareness program, and 2) evaluating the feasibility of education programs for promotion of financial incentives to encourage increased recycling and/or waste reduction.

Education and Awareness

The district must demonstrate that education/awareness strategies are in place for each program used to meet the access and participation standards. These strategies must provide information including, but not limited to:

- C target audiences
- C method of information delivery, including but limited to, a description of how the solid waste management district will ensure residents are provided:

- instructions for using recycling opportunities, including preparation of materials, schedule for the availability of sites/curbside pickup, and the location of drop-off sites
- an inventory of all recycling opportunities available in the solid waste management district that is updated annually and communicated to residents regularly
- C entity who will implement each strategy
- C measurement method to be used for tracking success of education efforts
- C mechanism(s) used to reinforce the educational message (the first exposure to a new idea does not generally result in a change of behavior)
- C an inventory of all recycling opportunities available in the district which is updated annually and communicated to residents on a regular basis

If one or more of the strategies in Section V meets the requirements listed above for the participation standard, the strategies do not need to be repeated in this section.

Financial Incentives

If SWMDs do not have financial incentives in place to promote greater participation, they should evaluate the feasibility of implementing such programs. Financial incentives should be designed to increase participation in the recycling programs which are used to demonstrate access. Options for financial incentives may include mechanisms which increase the relative cost of disposal (e.g. volume-based collection rates), or reduce the cost of recycling (e.g. drop-offs closer to residents, curbside recycling replacing drop-off service, or rebates to residents who recycle). Alternatively, using subsidies or grants to enlarge the size of a recycling center or purchase additional equipment may not lead to increases in the participation rate of residents, unless it results in reducing residents' cost to recycle. If financial incentive programs are not already in place, districts must evaluate the feasibility of implementing programs to educate:

- a) residents and political jurisdictions regarding the advantages of such programs, and the steps for implementation; and
- b) haulers in implementing the program.

Please describe the strategies which will be implemented (or continued) to meet the financial incentives component of the participation standard.

2. Commercial/Institutional

This sector includes all retail and wholesale businesses, schools, banks, government office buildings, and prisons. (Please note that this list is not intended to be comprehensive.)

a. Service Area

Each county within the district is defined as the service area. Districts may define the service area as smaller geographical units if desired.

b. Access

Methods of providing access for commercial/institutional (CI) entities include hauler pickup, drop-off (or buyback) availability, and a MRF recovering recyclables from mixed waste. (Other methods used should be described by the SWMD.) In order to meet the access standard, districts must demonstrate

that four of the seven materials used to meet the overall goal are recycled by entities which service this sector. In addition, districts must demonstrate at least one of the following collection options for each service area:

- C at least one drop-off available or buyback available;
- C haulers which will pickup recyclables for a fee or at no charge; or
- C at least one MRF receiving CI waste and recovering recyclables from waste received.

For each service area, list the facility or activity which satisfies the collection option requirement. Any collection option listed in this section should also be found in the plan inventory, Section III.

c. Participation

Education and Awareness

The district must demonstrate that education/awareness strategies, developed and targeted at the commercial/institutional sector, are in place for each program used to meet the access and participation standards. These strategies must provide information including, but not limited to:

- C target audiences
- C method of information delivery
- C instructions for using recycling opportunities, including preparation of materials, sites for drop-offs and buybacks, etc.
- C entity who will implement each strategy
- C measurement method to be used for tracking success of education efforts
- C mechanism(s) used to reinforce the educational message (the first exposure to a new idea does not generally result in a change of behavior)
- C an inventory of all recycling opportunities available in the district which is updated annually and communicated to entities on a regular basis

If one or more of the strategies in Section V meets the requirements listed above for the participation standard, the strategies do not need to be repeated in this section.

3. Targets for Reduction and Recycling

a. Residential/Commercial

Districts that have chosen to demonstrate compliance with Goal # 1 must complete the calculations in Table VII-3 for the reference year. If the district determines that it will be unable to reduce and recycle at least twenty-five percent of its municipal solid waste stream by the year 2000, even after demonstrating compliance with the access and participation standards in section B.1. and B.2., the district must set a target reduction and recycling percentage rate that it intends to reach by the year 2000. The target established by the district must be higher than the reference year reduction and recycling percentage rate. This target must be clearly stated in the narrative of this section.

The strategies identified in Section V.E. must allow the district to meet this target.

b. Industrial

Districts that have chosen to demonstrate compliance with Goal # 1 must complete the calculations in Table VII-4 for the reference year. If the district determines that it will be unable to reduce and recycle at least fifty percent of its industrial waste stream by the year 2000, the district must document, in Table IV-11, the composition of the waste stream generated by industries and explain in the narrative in this section the difficulty in reducing and recycling these materials in greater quantity.

The district must also set a target reduction and recycling percentage that it intends to reach by the year 2000. The target established by the district must be higher than the reference year reduction and recycling percentage rate. This target must be clearly stated in the narrative of this section.

The strategies identified in Section V.E. must allow the district to meet this target.

C. Calculating Goal #2, the Waste Reduction Rate (WRR)

Goal #2 of the *1995 State Plan* states that Ohio should "...reduce and/or recycle at least 50 percent of the total generation of solid waste statewide by the year 2000..." In order to implement this goal, the Solid Waste Advisory Council established two objectives:

- C Objective #1 - SWMDs must reduce or recycle at least 25 percent of the residential/commercial waste generated by the year 2000; and
- C Objective #2 - SWMDs must reduce or recycle at least 50 percent of the industrial waste generated by the year 2000.

The calculation of the percent waste reduction for each sector is somewhat different than it was under the previous *Format* version. These differences are explained below as the calculations are discussed in detail. Please note that the use of reported disposal plus waste reduction may not accurately reflect waste generation in all cases, such as a SWMD exporting waste to out-of-state landfills which do not provide disposal amounts to the district.

In these instances, the district should use the adjusted waste generation estimates in Table V-4 to calculate the waste reduction rates.

The formula below should be used to calculate the tons of waste reduction (TWR) for the district:

$$\mathbf{TWR}_i = \mathbf{R}_i + (\mathbf{C}_i - \mathbf{NC}_i) + (\mathbf{I}_i - \mathbf{A}_i) + \mathbf{RA}_i \quad (1)$$

where:

\mathbf{TWR}_i	=	the Tons of Waste Reduction for year i
\mathbf{R}_i	=	tons of waste source reduced and Recycled in year i
\mathbf{C}_i	=	tons of waste Composted in year i
\mathbf{NC}_i	=	tons of Non-Compostables delivered for composting, separated for landfilling in year i
\mathbf{I}_i	=	tons of waste Incinerated in year i
\mathbf{A}_i	=	tons of incinerator Ash plus bypass waste in year i
\mathbf{RA}_i	=	tons of Recycled incinerator Ash in year i

The following formula should be used to estimate generation based upon disposal and waste reduction amounts:

$$\mathbf{EGDWR}_i = \mathbf{TWR}_i + \mathbf{DL}_i, \quad (2)$$

where:

\mathbf{EGDWR}_i	=	Estimated Generation based upon Disposal plus Waste Reduction in year i
\mathbf{DL}_i	=	tons of waste Disposed in sanitary Landfills in year i

The waste reduction rate can be calculated by dividing the sum from equation 1 by sum of equation 2:

$$\mathbf{WRR}_i = \frac{\mathbf{TWR}_i}{\mathbf{EGDWR}_i} \times 100, \quad (3)$$

where:

\mathbf{WRR}_i	=	the Waste Reduction Rate in year i as a percent
------------------	---	--

The amount of waste reduction per capita per day is calculated as follows:

$$\mathbf{PCWR}_i = \frac{\mathbf{TWR}_i \times 2000 \text{ lbs.}}{\mathbf{P}_i \times 365 \text{ days}} \quad (4)$$

where:

\mathbf{PCWR}_i	=	the Per Capita Waste Reduction rate in pounds per person per day in year i .
\mathbf{P}_i	=	the Population of the district in year i

Each of these categories is further explained in the sections below.

1. Tons of Source Reduction and Recycling - R

The tons of waste source reduced and recycled, as shown in Section V for reference year and projected amounts should be used for **R** in equation 1. For purposes of calculating this amount for industrial waste, **R** must not include train boxcars, ferrous metals from motor vehicle salvage operations conducted by licensed motor

vehicle salvage dealers, or metals from demolition activities. (The exclusion of these materials from industrial waste reduction amounts replaces the policy in the previous Format version which excluded industrial materials which were reduced/recycled through programs initiated prior to January 1, 1985.) In addition, waste tires, lead-acid batteries, used motor oil collected for recycling from "do-it-yourselfers", and household hazardous wastes that are recycled can all be counted towards the waste reduction goal.

2. Tons of Waste Composted - C

The tons of waste composted should be found in the inventory section of the plan, and Section V. The waste **received** at all composting facilities used by the district should be summed to determine this value. Please note also that alternative management options for yard waste such as centralized composting can be counted towards the waste reduction goals if the quantity of yard waste can be documented.

3. Tons of Non-compostable Waste - NC

NC means the tons of non-compostable waste recovered from activities such as de-bagging and screening.

4. Tons of Waste Incinerated - I

The tons of solid waste received at all incinerators used by the district - both publicly-available and captive incinerators - should be summed to determine **I**. Districts should obtain the value of **I** from Table VI-1, VI-2, or VI-3.

5. Tons of Incinerator Ash Produced - A

The tons of incinerator ash produced from facilities burning solid waste should be summed to estimate **A**. Any bypass waste received at incinerators should be added to the value for ash produced. Please note that ash produced from facilities such as coal-burning power plants should not be included in this estimate.

6. Tons of Incinerator Ash Recycled - RA

The tons of incinerator ash recycled from district waste should be summed to determine **RA**, only if this amount has not already been included in **R**. Enter the value of **RA**, show all calculations, and explain all assumptions, if necessary.

7. Tons Waste Disposed in Landfills - DL

The tons of district waste disposed in solid waste landfills used by the districts should be summed to estimate **DL**. This value may need to be adjusted with the amount of "exempt waste." The total amount of district waste disposed in landfills should exclude any exempt waste such as construction and demolition materials received from the district. Please note that all solid waste disposed in licensed solid waste facilities, including waste received at captive landfills should be incorporated into the value of **DL**. Districts should use the values of **DL** as shown in Table VI-1, VI-2, or VI-3. (Districts unable to determine reasonably accurate disposal amounts due to non-responding facilities should contact Ohio EPA for guidance.)

Using the equations and guidance above, calculate the **WRR** and **PCWR** for the reference year and each year of the planning period, and enter the appropriate information into Tables VII-3, VII-4, and VII-5 for the residential/commercial waste, industrial waste, and total waste, respectively. If the SWMD has decided to demonstrate compliance with Goal #1, but not Goal #2, the waste reduction percentage must meet the target set by the district.

**Table VII-3. Annual Rate of Waste Reduction:
Residential/Commercial Waste**

Year	R ¹	C ²	NC ³	I ⁴	A ⁵	RA ⁶	DL ⁷	TWR ⁸	P ⁹	WRR ¹⁰	PCWR ¹¹
19__											

- ¹ Tons of residential/commercial waste source reduced and recycled as shown in Table VI-2.
- ² Tons of residential/commercial waste composted as shown in Table VI-2.
- ³ Tons of non-compostable residential/commercial waste.
- ⁴ Tons of residential/commercial waste incinerated as shown in Table VI-2.
- ⁵ Tons of residential/commercial incinerator ash and bypass waste produced.
- ⁶ Tons of residential/commercial incinerator ash recycled.
- ⁷ Tons of residential/commercial waste disposed in landfills as shown in Table VI-2.
- ⁸ Tons of residential/commercial waste reduction.
- ⁹ District population as shown in Table IV-1.
- ¹⁰ Residential/commercial waste reduction rate as a percentage.
- ¹¹ Residential/commercial waste reduction per capita in pounds per person per day.

Sample Calculation:
Assumptions:

Table VII-4.

**Annual Rate of Waste Reduction:
Industrial Waste**

Year	R ¹	C ²	NC ³	I ⁴	A ⁵	RA ⁶	DL ⁷	TWR ⁸	P or E ⁹	WRR ¹⁰	PCWR ¹¹
19__											

- ¹ Tons of industrial waste source reduced and recycled as shown in Table VI-3.
- ² Tons of industrial waste composted as shown in Table VI-3.
- ³ Tons of non-compostable industrial waste.
- ⁴ Tons of industrial waste incinerated as shown in Table VI-3.
- ⁵ Tons of industrial incinerator ash and bypass waste produced.
- ⁶ Tons of industrial incinerator ash recycled.
- ⁷ Tons of industrial waste disposed in landfills as shown in Table VI-3.
- ⁸ Tons of industrial waste reduction.
- ⁹ District population as shown in Table IV-1, or industrial employment as shown in Table IV-3.
- ¹⁰ Industrial waste reduction rate as a percentage.
- ¹¹ Industrial waste reduction per capita in pounds per person (or employee) per day.

Sample Calculation:
Assumptions:

**Table VII-5. Annual Rate of Waste Reduction:
Total District Solid Waste**

Year	R ¹	C ²	NC ³	I ⁴	A ⁵	RA ⁶	DL ⁷	TWR ⁸	P ⁹	WRR ¹⁰	PCWR ¹¹
19__											

- ¹ Total tons of waste source reduced and recycled as shown in Table VI-1.
- ² Total tons of waste composted as shown in Table VI-1.
- ³ Total tons of non-compostable waste.
- ⁴ Total tons of waste incinerated as shown in Table VI-1.
- ⁵ Total tons of incinerator ash and bypass waste produced.
- ⁶ Total tons of incinerator ash recycled.
- ⁷ Total tons of waste disposed in landfills as shown in Table VI-1.
- ⁸ Total tons of waste reduction.
- ⁹ District population as shown in Table IV-1.
- ¹⁰ Total waste reduction rate as a percentage.
- ¹¹ Per capita waste reduction in pounds per person per day.

Sample Calculation:
Assumptions:

VIII. Cost and Financing of Plan Implementation [ORC Section 3734.53(A)(9),(12) and (B)]

This section must include the costs for all district-sponsored programs and activities, facilities constructed and the funding mechanism(s) used to meet the district's budget. In addition, include the current tipping fees at all facilities used by the district. Please note that portions of this section are considered a part of the implementation schedule required in accordance with ORC Section 3734.53 (A)(12).

A. Funding Mechanisms and Amount of Money Generated

In this section, all of the funding mechanisms expected to be used by the district should be discussed. In addition, anticipated revenues from each source should be projected for each year of the planning period.

1. District Disposal Fees (ORC Section 3734.57(B))

If the district collects (or intends to collect) revenues in accordance with Section 3734.57(B) of the ORC, complete Table VIII-1. Please note that the in-district fee must be greater than (or equal to) \$1.00 per ton and less than (or equal to) \$2.00 per ton. The out-of-state fee must be equal to the in-district fee. The out-of-district fee must be greater than (or equal to) \$2.00 per ton and less than (or equal to) \$4.00 per ton. If the district is proposing to impose or change the tiered disposal fee with ratification of the district plan, discussion of the fee change(s) must be included in all public notices associated with plan ratification.

2. Generation Fee (ORC Section 3734.573)

If the district collects (or intends to collect) revenues in accordance with Section 3734.573 of the ORC, complete

Table VIII-1. District Disposal Fee Schedule and Revenues Generated

Year	Fee Schedule (\$/ton)			Tons Disposed in the District			Total District Fee Revenue
	In-district	Out-of-district	Out-of-state	In-district	Out-of-district	Out-of-state	
19__							
Totals	----	----	----				

Table VIII-2. Generation Fee Schedule and Revenues

Year	Generation Fee ¹	Amount of District Waste to be Disposed (in tons) ²	Total Generation Fee Revenue
19__			

¹ The generation fees as established under Division (A) of Section 3734.573 of the ORC.
² Use the amounts as shown in Table VI-1 for this column.

Table VIII-2. Please note that the "generation fee" can be no greater than \$5.00 per ton, unless the fee is approved by political jurisdictions in the district representing at least 75 percent of the total district population.

3. Summary of District Revenues

In Table VIII-3, include all funding mechanisms used and the total amount of revenue generated by each method for each year of the planning period. If the district anticipates collecting district disposal fees and/or generation fees, enter the totals in Table VIII-3. Provide an explanation describing the funding mechanisms used and include all assumptions and at least one sample calculation, if applicable. If the district anticipates securing loans or grants to facilitate plan implementation, the amounts and sources of these loans and grants should be included in Table VIII-4.

Table VIII-3.

**Summary of Revenue Generated
and Mechanisms Used**

Year	Type of Revenue Mechanism and Amount Generated ¹						Total Revenue Generated
	District Disposal Fees	Generation Fee	50 cents/ton ²	A	B	C	
19							

¹ Please expand or modify this table as necessary to include additional funding sources, and define each funding mechanism below:
 A -
 B -
 C -

² For SWMDs that do not have publicly-available landfills in-district, up to fifty-cents per ton may be collected at Ohio landfills where the district's waste is disposed. (See Section 3734.572 of the ORC.) Districts collecting a generation fee cannot collect this fee.

Table VIII-4. Anticipated Loans Secured by the District¹

Year	Loans Obtained by the District		Interest Rate	Length of Loan	Annual Debt Service
	Lending Institution	Loan Amount			
19__					

¹ Please expand this table as necessary to include additional loans secured in a given year.

Sample Calculation:

Assumptions:

B. Costs of Plan Implementation

For each facility and program (or activity) which will be implemented or financed by the district, provide cost estimates for the following categories which are applicable:

construction	equipment	planning	site selection	engineering
legal expenses	labor	maintenance	license fee	permit fee
closure costs	utilities	insurance	post-closure	supplies/materials
office expenses	publications	other		

Prepare a table (Table VIII-5) for all facilities and programs, and calculate an estimated annual cost using the cost information associated with the categories listed above. Please note that Table VIII-5 should provide more detailed information about each facility, program, and/or strategy than Table VIII-8. (Separate tables for some facilities and/or programs may be necessary in order to show sufficient detail.) Include any loans anticipated, the length of the loan, and the expected interest rate used to determine annual debt service. Provide a narrative description of the costs, indicating all assumptions made and inflation rates used. (A three or four percent inflation rate would be reasonable.)

C. Funds Allocated from ORC 3734.57(B), ORC 3734.572 and ORC 3734.573

If the district collects revenue from fees authorized under ORC Section 3734.57(B), Section 3734.572 and/or Section 3734.573, allocations of this money must be made in accordance with the requirements of ORC Section 3734.57(G). In Table VIII-6, show the amount of money to be allocated in each category for each year of the planning period. Provide allocations by type of program, activity, and/or facility. Please note that monies collected under these sections of the ORC cannot be allocated to local boards of health for enforcement of the solid waste program if the local board has not been approved for this function by Ohio EPA.

Table VIII-6. Revenues and Allocations in Accordance With ORC 3734.57, ORC 3734.572 and ORC 3734.573

Year	Revenue ¹	Allocations of ORC 3734.57 and ORC 3734.573 Revenue for the following Purposes: ²									Cumulative Balance ³	
		1	2	3	4	5	6	7	8	9		
											Beginning Balance	
19												

¹ The amount in this column should be consistent with the amounts shown in Table VIII-3 under "District Disposal Fees", "Generation Fees" and "50 cents/ton" fees.

² The allowable purposes for expenditure of revenue shown in the second column of this table are as follows:
 "1" - preparation and monitoring of plan implementation;
 "2" - implementation of approved plan;
 "3" - financial assistance to boards of health for SW enforcement;
 "4" - financial assistance to counties within the district to defray the costs of maintaining roads and other public services related to the location or operation of solid waste facilities;
 "5" - contracts with boards of health for collecting and analyzing samples from water wells adjacent to solid waste facilities;
 "6" - out-of-state waste inspection program;
 "7" - financial assistance to local boards of health to enforce ORC 3734.03 or to local law enforcement agencies having jurisdiction within the district for anti-littering;
 "8" - financial assistance to boards of health for employees to participate in Ohio EPA's training and certification program for solid waste operators and facility inspectors;
 "9" - financial assistance to local municipalities and townships to defray the added cost of roads and services related to the operation of solid waste facilities.

³ The "Cumulative Balance" should be the difference between the revenues and the total allocations for a given year, plus the remaining balance from the previous year.

Sample Calculation:
 Assumptions:

D. Contingent Funding or Financing

For any funding and/or financing mechanism listed in VIII.A. at the beginning of this section which has a moderate to high degree of uncertainty, the district must provide a contingent source of funding or financing. Examples of funding sources requiring a contingency includes:

- district fees collected from a grandfathered site landfill (began operations prior to 1968) which has received a draft permit denial;
- state or federal legislative action which is anticipated and depended upon by the SWMD;
- district fees (or tipping fees for a district-owned facility) collected for a facility that has not yet received a permit.

If applicable, complete Table VIII-7 by providing the type of contingent funding and amount of revenue expected each year of the planning period. Provide a detailed process that the district board of directors will use to determine when the contingent funding mechanism(s) will be implemented. This process and Table VIII-7 below will be considered a part of the plan implementation schedule required in accordance with ORC Section 3734.53(A)(12). Please note that the use of disposal fees, generation fees, or export fees as a contingent funding source will require a separate ratification, unless:

- C the public notice for plan ratification and all other written notices regarding the plan, and the plan itself clearly state that the plan establishes the contingent fee;
- C the district can comply with the notification requirements⁷ for collection of the fee as specified in Section 3734.57 of the ORC; and
- C the amount of the fee is established in the plan.

Please note that other contingent funding mechanisms such as contract fees are not subject to the conditions cited above.

⁷ The ORC requires districts to notify owner/operators of each solid waste facility required to collect the fee 14 days after the fee is ratified (or if fee is being ratified with a plan amendment, after Ohio EPA approves the plan). Collection of the fee is required to begin on the first day of the second month after the month in which notification took place. (See ORC Section 3734.57(B).)

Table VIII-7. Contingent Funding Sources

Year	Amounts of Contingent Funding for Each Source: ¹				Totals
	A	B	C	D	
19__					

¹ Identify the source of each contingent funding for columns A - D. (Include additional contingent funding sources as necessary):
 "A" - "C" -
 "B" - "D" -
 Sample Calculation:
 Assumptions:

E. Summary of Costs and Revenues

In Table VIII-8, enter the expected annual revenues followed by the annual costs for each facility, program, and activity for each year of the planning period. Determine the annual net revenues for each year. Provide a narrative of the district's budget and explain all assumptions not previously discussed. Please note that this section is considered a part of the implementation schedule required in accordance with ORC Section 3734.53 (A)(12).

Table VIII-8. Summary of District Revenues and Expenditures

Strategy, Facility, Activity, or Program	Total Annual District Revenues and Expenditures (by year):									
	19__									
Revenues¹										
Expenditures²										
1)										
2)										
3)										
4)										
5)										
6)										
7)										
8)										
9)										
10)										
Total Expenditures										
Cumulative Balance										

¹ Revenues should be equal to the amounts in the column labelled "Total Revenue Generated" in Table VIII-3.
² Include additional expenditure categories and sub-categories below as necessary. All strategies and programs should be referred to in this table using the same language as used in Sections IV and V.

IX. District Rules [ORC Section 3734.53(C)]

A. Existing Rules

Identify each provision in ORC Section 343.01(G) in which the district is currently authorized to adopt rules:

- prohibiting or limiting the receipt of waste generated outside the district;
- governing the maintenance, protection, and use of solid waste collection, transfer, disposal, recycling, or resource recovery facilities;
- governing a program to inspect of out-of-state waste; and
- exempting an owner or operator of a solid waste facility from compliance with local zoning requirements.

In an appendix, include the actual language of each district rule that is currently in effect within the district, when the rules were adopted and describe how these rules have complemented the district strategies and programs.

B. Proposed Rules

List all of the areas in ORC Section 3734.53(C) for which the district authorizes adoption of rules during the period covered by this plan. In addition, include proposed rules to be adopted after plan approval and an explanation of the impact on plan implementation of each of these rules. Please note that areas authorized in the approved district plan for rule-making activity do not put rules into effect in the district. Once Ohio EPA approves the amended plan, the district must proceed with formal rule-making procedures at the local level (which usually includes a public hearing, public comment period, and a resolution adopted by the board of directors) in order for a new rule to go into effect.

Appendix AA

Glossary

Appendix AA: Glossary

Access - For purposes of this document, access is associated with the availability of waste reduction and recycling services to waste generators within a district. In most cases, access is used as the presence or absence of waste reduction and/or recycling opportunities, and as a component of measuring compliance with Goal #1 of the *1995 State Solid Waste Management Plan*.

Broker - For purposes of this document, a business which accepts recyclables from collection or processing activities, sometimes pays a fee for the materials, and then finds an end-user or another processor to purchase the materials. A broker can also be a processor of solid waste recyclables. ("Broker/processor" is used interchangeably with "broker" in this document.)

Bypass Waste - This term is generally defined as large, bulky wastes such as mattresses, appliances, etc. which are typically diverted from the combustion process at incinerators, and instead, sent directly to a landfill for disposal.

Captive Facility - A privately-owned solid waste facility which accepts only wastes generated by the owner. For purposes of solid waste planning, all captive facilities processing or disposing solid waste should be included in the inventory (Section III), in waste projections (Section IV), and in waste reduction/recycling projections, if applicable. In addition, the solid waste disposed in captive facilities should be included in Section VI, management methods.

Captive Landfill - See captive facility.

Commercial Wastes - Solid waste resulting from businesses and institutional activities. This category includes shopping centers, stores, banks, theaters, gas stations, medical facilities, business offices, motels, and similar service establishments. Institutional activities include government and non-profit offices, schools, prisons, religious facilities, parks, and a variety of other activities that is not residential or industrial.

Composting - The controlled biological decomposition of organic solid wastes which stabilizes the organic fraction of a material.

Construction & Demolition Debris - Those materials resulting from the alteration, construction, destruction, rehabilitation, or repair of manmade physical structure, including houses, buildings, or roadways. Construction and demolition debris does not include solid wastes or hazardous wastes, materials from mining operations, non-toxic fly ash, spent non-toxic foundry sand or slag.

Daily Processing Capacity - This should be the amount of materials or waste which can be processed during a normal operating day for a facility or activity. If the facility normally operates eight hours per day, the daily processing capacity would be based upon eight hours. If the facility normally operates ten hours per day, the daily process capacity should be based upon ten hours.

Don't Bag It - A educational program originally developed by the Texas Cooperative Extension Service to discourage individuals from collecting the clippings from lawn mowing activities by promoting proper lawn care.

Energy Recovery - A form of resource recovery in which the organic fraction of waste is converted to some form of usable energy.

Exempt Waste - Material excluded from the definition of solid waste in ORC 3734.01(E) including slag, uncontaminated earth, non-toxic fly ash, spent non-toxic foundry sand, and material from mining, construction or demolition operations. Please note that non-toxic fly ash and non-toxic foundry sand means fly ash and spent foundry sand determined to be non-toxic in accordance with Ohio EPA Division of Surface Water Policy 0400.007.

Fee Exempt Waste - This term refers to all waste which is exempt from the fees authorized in accordance with Sections 3734.57, 3734.572, and 3734.573 of the ORC. All exempt waste, as defined above, is also fee exempt waste. In addition, fee exempt waste also includes solid waste which is disposed in captive landfills as defined above.

Ground Water - Any water below the surface of the earth in a zone of saturation including the saturated zone of an aquifer.

Household Hazardous Waste (HHW) - Materials used in the home/apartment such as cleaners, paints, solvents, pesticides, used oil, batteries, and other automotive products that potentially can cause injuries to refuse workers, damage to equipment, and/or harm to the environment if disposed in the solid waste stream. HHW typically exhibits one or more characteristics of hazardous wastes, but is exempted from regulation as a hazardous waste because of generation by households.

Incineration - The controlled process by which solid wastes are burned and changed into gases and ash.

Industrial process waste - Waste generated directly as a result of the raw materials used in the manufacturing process.

Industrial solid waste - Includes any non-hazardous solid waste which results from, or is the residue of an industrial process. Some examples are industrial sludges, paint, petrochemicals, fly ash, bottom ash, slag, and foundry sand. Waste streams such as fly ash, bottom ash, slag and foundry sand are characterized as solid waste in accordance with Ohio EPA Division of Surface Water policy 0400.007. Industrial solid waste includes both industrial process wastes such as sludges, trimmings, and filter cake, and industrial non-process wastes such as cafeteria and packaging wastes. For purposes of this document, industrial wastes are generated by industries in Standard Industrial Classification (SIC) category 20 and 22 through 39.

MRF (Materials Recovery Facility) - Any type of facility used for separating, sorting or processing waste in order to segregate materials with value (e.g. aluminum, glass, plastics). The type of processing conducted at a MRF can range widely from buildings in which recyclables are sorted primarily by hand, to mechanical facilities that attempt to recover recyclables from mixed solid waste (sometimes called a "dirty MRF"). Note that MRF's as such are not regulated as a solid waste facility in Ohio, unless the facility accepts mixed waste and total recovery of recyclables is less than 60 percent of total receipts in weight. Any facility recovering less than 60 percent is regulated as a solid waste transfer station.

Material Capture Rate - The amount of a targeted material recovered divided by the total amount of the targeted material available for recovery (or generation). A capture rate may represent all materials targeted for recovery, but is more commonly used to describe individual categories of materials. In reporting a capture rate, it is important to define the targeted material(s) and the method of estimating the quantity(ies) of targeted materials available.

Non-ferrous - Metals not including iron or its alloys or compounds.

Ohio Administrative Code (OAC) - A compilation of the rules governing the actions of all state agencies. The OAC is based upon the authority granted in the Ohio Revised Code.

Ohio Revised Code (ORC) - All statutes of the State of Ohio as revised and consolidated into general provisions, chapters and sections.

Open dumping - The deposit of solid wastes into a body or stream of water or onto the surface of the ground at a site that is not licensed as a solid waste facility under Section 3734.05 of the ORC. For the purposes of the solid waste management plan, open dumps should be considered areas off the road or adjacent to the road or right-of-way on which solid wastes are dumped. Occasional debris or litter found in road right-of-ways should not be considered open dumps.

Other Waste - This term, as used in the *1989 Format* referred to materials disposed in sanitary landfills which were not classified as solid wastes. In this document, the term "exempt wastes" is used to refer to these materials disposed in sanitary landfills which are not classified as solid wastes.

Participation Rate - As defined by the National Recycling Coalition, a participation rate is the number of households that separate out materials for recycling, divided by the total number of households serviced by the recycling program at least once over an established time period or number of collection events. In the case of a curbside recycling program, the participation rate is commonly measured by tracking whether a particular household (by address), sets out materials during the time period examined. In contrast, the set-out rate is defined as a count of the "set-outs" on the observed collection day, as a percent of the total number of households or entities serviced.

Permit-to-Install (PTI) - An application which must be submitted to Ohio EPA prior to establishment of a new solid waste facility or modification of an existing solid waste facility, and which is subject to approval by the Director of Ohio EPA (ORC 3734.05).

Pollution Prevention - This term refers to the use of source reduction techniques in order to reduce risk to public health, safety, welfare, and the environment, and as a second preference, the use of environmentally sound recycling to achieve these same goals. Pollution prevention avoids cross-media transfers of wastes and/or pollutants and is multi-media in scope. It addresses all types of waste and environmental releases to the air, water, and land.

Processing Capacity - For purposes of this document, processing capacity refers to the design capacity of the facility (or the maximum amount of materials which could be processed), and not the actual amount of materials processed during a given time period.

Public Debt - For purposes of this document, public debt is defined as debt which has been issued under Chapter 133., 343., or 6123. of the Ohio Revised Code.

Reclaim - Reclaim means to regenerate a material, or to process or recover a usable product from as material.

Recycling - The systematic collection, sorting, decontaminating and returning of waste materials to commerce as commodities for use or exchange. Recycling also means to use, reuse or reclaim a material. It does not include incineration. (Please note that reuse is included in recycling.)

Recycling Broker - See Broker.

Reference Year - The calendar year selected by the SWMD as a basis for data collection in preparation of the district's amended plan. For example, a district beginning to prepare an amended plan in 1996 would typically use calendar year 1995 as the reference year. All facilities used by the district in 1995, and all industries and haulers operating in the district during 1995 would be surveyed to collect data for 1995. Data from the reference year would then be used to adjust the projections in the previous plan, and make any other changes necessary resulting from this new information.

Residential Wastes - Solid wastes resulting from residential dwellings such as single-family homes, apartment buildings, condominiums, cooperatives, and mobile homes. Domiciles such as nursing homes, campgrounds, and other types of group quarters and institutions should be considered generating commercial waste.

Reuse - The reuse of waste means the re-utilization of a material in an environmentally sound manner, that will not result in a hazard to human health or the environment. From a manufacturing perspective, a material is reused if it is either: 1) employed as an ingredient, including use as an intermediate in an industrial production process, or 2) used in a particular function or application as an effective substitute for a commercial product.

Resource Recovery - This term refers to the conversion of solid waste into energy, or some material which can be used to create energy at any stage before ultimate disposal. As used in this document, resource recovery does not include the recovery of materials through mechanical and advanced technology methods.

Set-out Rate - The National Recycling Coalition defines a set-out rate as the number of households that set out materials on their assigned collection day, divided by the total number of households served. A set-out rate is a measurement commonly used in assessing curbside collection programs.

SIC - Standard Industrial Classification used to categorize industries, institutions, and businesses according to the product manufactured or services offered.

SWMD - Solid Waste Management District

Solid Waste - Unwanted residual solid or semi-solid materials resulting from industrial, commercial, agricultural, and community operations, but excluding earth or material from construction, mining, or demolition operations, or other waste materials of the type that would normally be included in demolition debris, non-toxic foundry sand, slag, and other substances that are not harmful to public health. It includes, but is not limited to, garbage, tires, combustible and non-combustible material, street dirt, and debris. Solid waste does not include any material that is an infectious waste or a hazardous waste.

Source Reduction - Source reduction means any effort to reduce, at the source, the quantity of waste generated, toxic chemical use, or any release to the environment. Source reduction in generation of commercial or industrial wastes could result from process modifications, improvement in feedstock purity, better operating and management practices, and increases in the efficiency of machinery. It includes reducing the amount of materials entering the waste stream by voluntary or mandatory programs to eliminate the initial generation of waste.

TPD - Tons Per Day.

TPY - Tons Per Year.

Transfer Station (Transfer Facility) - A facility which receives deliveries of solid waste by local collection vehicles and provides for transfer to larger vehicles which deliver wastes more economically to resource recovery or landfill facilities.

Volume Reduction - Activities such as incineration which reduce the volume of waste to be disposed.

Waste Generation - This term refers to the amount (weight, volume, or percentage of the overall waste stream) of materials and products as they enter the waste stream and before materials recovery, composting, or combustion takes place.

Waste Minimization - Any effort to reduce or recycle the quantity of hazardous waste generated, and where feasible, to reduce or eliminate toxicity. Treatment of hazardous waste is not waste minimization, unless such treatment is part of a recycling process. (Please note that the definition of this term as used in this document does not include solid wastes.)

Waste Reduction - As used in this document, this term means source reduction, recycling, MSW composting, incineration, and resource recovery.

Waste Stream - The amount of materials that are destined for disposal. The waste stream may refer to a specific, homogeneous material or numerous materials mixed together.

Waste-to-Energy - For purposes of this document, a resource recovery facility which incinerates waste and produces electricity, steam, or some other useful energy product.

White Goods - Discarded kitchen and other large appliances (washing machines, clothes dryers, etc.). May include fencing, swing sets, buckets, television sets, and furniture.

Appendix BB

Resource List for Plan Preparation and Implementation

Appendix BB. Resource List for Plan Preparation and Implementation

This appendix contains suggestions that districts may use for sources of information necessary for plan preparation. There is also limited information which may assist districts in plan implementation. This is not intended to be an exhaustive listing of all possible data sources, nor is it required that districts use the sources listed in this appendix. Providing reliable, accurate information in the district plan should be the focus of the district, regardless of the source of the information. Suggestions for sources of information are listed for Sections III, IV, V, VII, and VIII as they appear in the *Format*. A listing of Ohio EPA offices is included at the end of this appendix.

Section III - Inventories

Licensed Solid Waste Facilities

Several sources of information may be used for this section. All facilities which are required to obtain an annual solid waste license are discussed in the *Ohio Solid Waste Facility Data Report (FDR)* published every year. This report contains information regarding the amounts and types of solid waste received by each licensed facility in Ohio, and the origin of waste. It also provides remaining capacity data for solid waste landfills. More detailed information for each facility may be obtained by examining individual survey forms in Ohio EPA offices in Columbus. Information regarding compliance history may be obtained by examining records in the appropriate Ohio EPA district office and/or the local health department.

Composting Facilities

Class III and Class IV (yard waste only) composting facilities are not required to obtain an annual license, but they are required to submit a registration to Ohio EPA. This listing of registered compost facilities is available from Ohio EPA's Division of Solid and Infectious Waste Management (DSIWM) upon request, and may be included in the *FDR* in the future. Information regarding compliance history may be obtained by examining records in the appropriate Ohio EPA district office and/or the local health department.

On-site Solid Waste Incinerators

The solid waste incinerators located on the site of a business, industry, or institution are not required to obtain a solid waste license, and consequently, are not included in the *FDR*. However, each of these facilities is required to obtain a permit to operate from Ohio EPA's Division of Air Pollution Control (DAPC), Computer Automation Unit. Each permit to operate must be renewed every three years. For a listing of the facilities with air pollution permits which also burn solid waste, contact the DAPC. (As of April 1996, DSIWM was arranging to have listings of on-site incinerators provided to DSIWM from DAPC. DSIWM hopes to be able to send these listings to SWMDs each year.)

Recycling Facilities/Activities

Recycling facilities (e.g. drop-off centers, buybacks, etc.) and activities (e.g. curbside collection, etc.) can be identified by contacting the Ohio Department of Natural Resources, Division of Litter Prevention and Recycling (ODNR-DLPR). The ODNR-DLPR also maintains regional district offices in the state, and has provided grant money for operation of county-level recycling and litter prevention programs as well. All of these offices would be good sources for identifying recycling activities in the SWMD. In addition, most recycling buyback centers can be found in the local telephone yellow pages.

Haulers

Since many local health departments require an annual license from haulers operating within their jurisdiction, a list of haulers can often be obtained from their offices. Telephone yellow pages and municipalities in the SWMD may provide additional information regarding haulers.

Open Dumps/Tire Dumps

Local health departments and local litter prevention and recycling offices should be contacted for information regarding open dumps and tire dumps. The appropriate Ohio EPA district office is another source of data for this information.

Maps

The Ohio Department of Transportation (ODOT) produces maps of each county in the state. ODOT county maps are available from the Map Sales Unit in various scales, including one inch to one mile, one inch to two miles, one inch to four miles, and one inch to six miles. For information on ordering, contact Map Sales at (614) 466-3778.

Section IV - Reference Year Population, Waste Generation, Waste Reduction

Population

The Ohio Department of Development, Office of Strategic Research (OSR) maintains statewide information on population for Ohio. Data from OSR includes population by township, city, village, and county for 1970, 1980, and 1990. OSR also publishes population projections for years in-between the each ten-year census. Names of publications which may be useful to SWMDs are listed as follows:

Name of Publication	Frequency of Updates	Description of Publication
Population Projections, 1990-2015: County Totals (PA2)	2 to 3 times every 10 years; next update in 1995	1985 projection series of total population by county at five year intervals through 2015.
Ohio Population by Race & Governmental Unit: 1970, 1980, 1990 (PA7)	every year	Population and percent change by race for counties, townships and places covering 1970, 1980 and 1990.
Ohio Population Growth Patterns (PB1)	every 3 years	Population growth patterns for Ohio, counties, places & townships between 1980 and 1988.
Ohio Population and Housing Characteristics by Governmental Unit: 1990 (PB2)	no update between each 10 year census	Population by persons and housing characteristics of owner-/renter-occupied housing units by county, city, and governmental unit.

Local planning agencies may also be a source of information for population projections. (If the district uses data from a local planning agency or some other local source, the plan should justify the use of these projections, and include a summary of the local study(ies) in an appendix.)

Waste Generation

Residential/commercial waste generation can be approximated by using the estimates in the *Characterization of Municipal Solid Wastes in the United States: 1994 Update (1994 Update)*, a publication prepared for the U.S. Environmental Protection Agency. This document also contains national averages for waste composition, and provides separate estimates for

residential and commercial sectors waste composition. These waste projections show changes in waste composition through the year 2000. This document is generally updated periodically.

Industrial waste generation can be estimated for non-respondents to surveys by using the number of employees in each industry within the SWMD. The *Harris Ohio Industrial Directory* is a source of information for each industry operating within a SWMD, and shows the type of industry, total employment, and type of product manufactured. The *Harris Ohio Industrial Directory* can be found in most libraries, and is also available from Harris Publishing at 1-800-888-5900. (For those districts wishing to survey the commercial sector, the Harris Publishing Company also sells customized lists of commercial entities.)

The Ohio Bureau of Employment Services (OBES) is also a source of information regarding the number of employees in each type of business in a given region of the state. OBES also provides projections for employment by sector of the economy and region of the state.

Section V - Planning Period Projections and Strategies

The *FDR* and ODNR-DRLP offices can provide limited information regarding the amount of recycling occurring at facilities in the SWMD.

Ohio EPA's Office of Pollution Prevention

Ohio EPA's Office of Pollution Prevention (OPP) is another source of assistance for SWMDs for both plan preparation and implementation. This office is responsible for coordinating pollution prevention activities for all divisions at Ohio EPA. The office is comprised of the Technical Assistance Unit and the Program Management and Evaluation Unit. Both units are responsible for developing criteria for measuring pollution prevention progress, supporting activities relating to the preparation and implementation of the pollution prevention strategy for Ohio. OPP has a total of 15 permanent staff positions. Additional part time staff form a Pollution Prevention Intern Program.

The goal of OPP is to develop and implement pollution prevention initiatives that effectively reduce pollutants and conserve natural resources in Ohio by emphasizing source reduction and environmentally sound recycling. In addition to legislative initiatives and publicizing information related to pollution prevention, the OPP provides on-site or over the phone technical assistance; provides literature search information; prepares program and industry specific fact sheets; and makes public presentations regarding pollution prevention. OPP maintains a library containing more than 1400 pollution prevention documents such as case studies, fact sheets, manuals, guides, videotapes and more. OPP has access to several databases and information from other agencies. In addition, SWMDs and other interested parties can request copies of approximately 75 publications via an information request form.

Edison Technology Centers

Ohio's Edison Technology Centers are independent not-for-profit organizations funded in part by the Ohio Department of Development and in part by industry. By offering pollution prevention technical assistance to waste generators, these Centers can offer a wealth of good information geared toward cost-effective benefits to businesses which help improve manufacturing bottom lines and protect the environment.

Cleveland Advanced Manufacturing Program (CAMP), northeastern Ohio's Edison Technology Center, plays an active role in helping manufacturers adopt new technologies, integrate new management techniques, and streamline operations to increase productivity. A new goal is to encourage businesses to think in terms of pollution prevention and total quality management. CAMP now offers several environmental services, including pollution prevention assistance. CAMP provides waste reduction assessments and counselling. Technology application engineers develop options, estimate cost savings and project the impact of suggested changes.

The Center for Applied Environmental Technologies (CAET) within the Institute of Advanced Manufacturing Sciences (IAMS) in Cincinnati offers technical assistance in pollution prevention (Ohio Pollution Prevention Technical Assistance, OPPTA), assists companies in applying "clean" technologies, and serves as an information clearinghouse for pollution prevention methods and technologies. CAET offers industry on-site pollution prevention assessments to quantify wastes, suggest process changes, and identify potential savings. Following an assessment, CAET is available to work with companies to develop and initiate pollution prevention programs. Literature searches and telephone assistance are available as well as training programs and networking opportunities. CAET is also working to help industry reduce solid waste and to develop markets for recycled products.

Ohio Department of Natural Resources (ODNR)

ODNR's Division of Recycling and Litter Prevention is very active in public awareness activities concerning recycling through the "Keep Ohio Beautiful" program and through several grant programs to enhance recycling activities in the State. ODNR works with the Association of Ohio Recyclers and the National Recycling Coalition to promote recycling on both state and national levels.

Green Lights Program

Green Lights is a voluntary, non-regulatory program that encourages the widespread use of energy-efficient lighting and the reduction of pollution generated by energy consumption. Green Lights participants agree to survey their facilities and over five years upgrade 90 percent of their square footage. The upgrade must be profitable and the lighting quality must be maintained or enhanced. As of July 1993, over 1000 organizations have joined the program. In addition to saving energy, participants receive positive public recognition.

On July 8, 1993, the State of Ohio officially became a Green Lights Partner. Ohio is the first state in U.S. EPA's Region V to join the program. The Ohio Department of Administrative Services is coordinating all state related projects. Ohio is also promoting Green Lights to other businesses in Ohio through the Ohio EPA, Office of Pollution Prevention.

Waste Exchanges

A waste exchange is a specialized service which provides a network for linking wastes (industrial and municipal) with those who may be able to use the wastes or recycle them. A waste exchange is a medium for finding uses for wastes which otherwise would be discarded. A waste exchange is like a specialized classified advertising system where a third party (the waste exchange) maintains confidentiality of the parties listing available waste or wanting to use recyclable material. Waste exchanges provide information on reuse and recycling opportunities which is not readily available otherwise and typically reach thousands of specialists in waste management with information. Several waste exchange services are listed at the end of this appendix.

Section VII - Calculation of Goals

All of the data used in this section should be found in other parts of the plan.

Section VIII - Cost of Financing Plan Implementation

The Ohio Water Development Authority (OWDA) was created by the Ohio General Assembly in 1968 to provide financing to Ohio communities for the planning and construction of drinking water, waste water, and solid waste facilities. OWDA also issues private activity bonds for solid waste facilities, facilities which furnish potable water, and facilities for the disposal of hazardous waste. Additionally, OWDA administers a Research and Development Grant Program which provides

grants to communities seeking innovative solutions to environmental problems dealing with solid waste, water, waste water, and energy resource development.

The Ohio Environmental Education Fund (OEEF) is a possible source of funding for solid waste district education efforts. In general, grants are awarded for six different categories, including the provision of educational seminars for concerned members of the public regarding the scientific and technical aspects of environmental issues, and for persons regulated by Ohio EPA regarding pollution prevention activities. The address and phone number for the OEEF is shown at the end of this appendix.

The Ohio Department of Development initiated a program during 1994 to provide financial assistance to facilities that recycle or recover energy from scrap tires. In addition, between 1995 and the year 2000, Ohio EPA will have funding to contract for the abatement of existing piles of scrap tires if the person responsible for the pile accumulation cannot be made to pay for the clean-up. Both programs are funded by new legislation passed by the Ohio General Assembly in 1993.

Important Offices and Telephone Numbers

Mailing address for all Ohio EPA Central Office Divisions and Offices:

Ohio EPA
{Division of _____}
P.O. Box 1049
Columbus, Ohio 43216-1049

(street address)
Division of Air Pollution Control
Ohio EPA Central Office
Computer Automation Unit
1600 Watermark Drive
Columbus, Ohio 43266
Voice (614) 644-2270

(street address)
Division of Solid and Infectious Waste Management
Ohio EPA
2305 Westbrooke Drive, Building C
Columbus, Ohio 43228-9644
Voice (614) 644-2621
FAX (614) 728-5315

(street address)
Office of Pollution Prevention
Ohio EPA
1800 WaterMark Drive
Columbus, OH 43215-1099
Voice (614) 644-3469
FAX (614) 728-1245

Ohio EPA Central District Office
3232 Alum Creek Drive
Columbus, Ohio 43207-3461
Voice (614) 728-3778
Voice (800) 728-3797
FAX (614) 728-3898

Ohio EPA Northeast District Office
2110 East Aurora Road
Twinsburg, Ohio 44087
Voice (216) 425-9171
Voice (800) 686-6330
FAX (216) 487-0769

Ohio EPA Northwest District Office
347 North Dunbridge Road
Bowling Green, Ohio 43402
Voice (419) 352-8461
Voice (800) 686-6930
FAX (419) 352-8468

Ohio EPA Southeast District Office
2195 Front Street
Logan, Ohio 43138
Voice (614) 385-8501
Voice (800) 686-7330
FAX (614) 385-6490

Ohio EPA Southwest District Office
401 East Fifth Street
Dayton, Ohio 45402-2911
Voice (513) 285-6357
Voice (800) 686-8930
FAX (513) 285-6249

Ohio Department of Natural Resources
Division of Recycling and Litter Prevention
Building F-2, Fountain Square
Columbus, Ohio 43224-1387
Voice (614) 265-6333
FAX (614) 262-9387

Ohio Department of Natural Resources
Division of Recycling and Litter Prevention
District I
Building F-2, Fountain Square
Columbus, Ohio 43224
Voice (614) 265-6375

Ohio Department of Natural Resources
Division of Recycling and Litter Prevention
District II
P.O. Box 349
1319 Third Street, N.W.
New Philadelphia, Ohio 44663
Voice (216) 343-6748

Ohio Department of Natural Resources
Division of Litter Prevention and Recycling
District III
952 Lima Avenue, Box F
Findlay, Ohio 45840
Voice (419) 423-1850

Ohio Department of Natural Resources
Division of Litter Prevention and Recycling
District IV
8570 East St. Rte. 73
Waynesville, Ohio 45068
Voice (513) 897-0812

Institute of Advanced Manufacturing
Sciences, Inc.
1111 Edison Drive
Cincinnati, OH 45216-2265
In Cincinnati (513) 948-2000
Outside of Cincinnati (800) 345-4482
FAX (513) 948-2109

Cleveland Advanced Manufacturing
Program (CAMP)
4600 Prospect Avenue
Cleveland, OH 44103
Voice (216) 432-5300
Outside Cleveland (800) 927-0436
FAX (216) 362-2900

Ohio Department of Development
Office of Strategic Research
P.O. Box 1001
Columbus, Ohio 43266-0101
Voice (614) 466-2115

U.S. Environmental Protection Agency
RCRA/Superfund Hotline (800) 424-9346

National Technical Information Service (NTIS)
Voice (703) 487-4650

Ohio Bureau of Employment Services
Labor Market Information Division
Statistical Services
P.O. Box 1618
Columbus, Ohio 43266-1618
Voice (614) 644-2689
FAX (614) 466-5025

Ohio Department of Transportation
Map Sales Unit
25 South Front Street
Columbus, Ohio 43215
Voice (614) 466-3778

Harris Publishing
Custom Lists
2057 Aurora Road
Twinsburg, Ohio 44087
Voice (800) 888-5900

Ohio Water Development Authority
88 E. Broad Street, Suite 1300
Columbus, OH 43215-3516
Voice (614) 466-5822

Green Lights Program
U.S. EPA
401 M Street, SW
(6202J)
Washington, DC 20460
Voice (202) 775-6650
FAX (202) 775-6680

Ohio Green Lights Office
Department of Administrative Services
35th Floor, State Office Tower
30 East Broad Street
Columbus, OH 43266
Voice (614) 644-5901

National Materials Exchange Network
modem access line (800) 858-6625
Voice (509) 325-0551

Northeast Industrial Waste Exchange
620 Erie Boulevard West, Suite 211
Syracuse, New York 13204
Voice (315) 422-6572
FAX (315) 422-4005

Canadian Waste Materials Exchange
ORTECH
Sheridan Park Research Community
2395 Speakman Drive
Mississauga, Ontario, Canada L5K 1B3
Voice (416) 822-4111 Ext. 265
FAX 416/823-1446

The Indiana Waste Exchange
c/o RTN
P.O. Box 454
Carmel, IN 46032
Voice (317) 574-6505
FAX (317) 844-8765

Industrial Material Exchange Service
P.O. Box 19276
2200 Churchill Road, #24
Springfield, Illinois 62794-0276
Voice (217) 782-0450
FAX (217) 782-9142

Kentucky Waste Options
Room 312, Ernst Hall
University of Louisville
Louisville, KY 40292
Voice (502) 588-7260

RENEW, Office of Pollution Prevention
P.O. Box 13087
Austin, Texas 78711-3087
Voice (512) 463-7773
FAX (512) 463-8317

Southeast Waste Exchange
Urban Institute
Department of Civil Engineering
Univ. of North Carolina at Charlotte
Charlotte, North Carolina 28223
Voice (704) 547-2307

Gene Jones
Southern Waste Information Exchange
P.O. Box 960
Tallahassee, Florida 32302
Voice (800) 441-SWIX
FAX (904) 574-6704

Merit Environmental Management
781 Beta Drive, Suite G
Cleveland, Ohio 44143
Voice (216) 461-7760
FAX (216) 461-2873

Tencon/Wastelink
P.O. Box 12
Terrace Park, Ohio 45174-0012
Voice (513) 248-0012

Ohio Environmental Education Fund
Ohio EPA
1600 Watermark Drive
Columbus, Ohio 43215-1034
Voice (614) 644-2873

Appendix CC

Schedule for Next Plan Amendment

Required for Each District

Appendix CC-1: Schedules for Amended Plan Submittals

District	Date of Most Recent Plan Approval	Next Statutorily-Required Amended Plan			
		Begin Preparation by:	Draft Plan Submittal Due Date:	Draft Plan Submitted on:	Ratified Draft Approval Required by:
Adams-Clermont	11/92	8/94	11/95	-	5/97
ACHMSU ¹	5/94	2/96	5/97	-	11/98
Ashland	6/92	3/94	6/95	9/95	12/96
Ashtabula	12/93	9/95	12/96	-	6/98
Athens-Hocking	12/93	9/95	12/96	-	6/98
Auglaize	6/92	3/94	6/95	6/95	12/96
Belmont-Jefferson	8/93	5/95	8/96	-	2/98
Brown	12/95	9/99	12/00		6/02
Butler*	2/94	11/97	2/99	-	8/00
CCH ²	10/92	7/94	10/95	3/95	4/97
Clark	2/92	11/93	2/95	2/96	8/96
Clinton	12/93	9/95	12/96	-	6/98
CFLP ^{3*}	11/92	8/96	11/97	-	5/99
Crawford*	9/91	6/95	9/96	-	3/98
Cuyahoga	7/94	4/96	7/97	-	1/99
Darke	3/96	12/99	3/01		9/02
DFPW ⁴	8/92	5/94	8/95	9/95	2/97
DKMM ⁵	11/92	8/94	11/95	-	5/97
Erie	12/93	9/95	12/96	-	6/98
FHPR ⁶	1/96	10/98	1/99		7/00
Franklin*	5/93	2/97	5/98	-	11/99
GJMV ⁷	12/93	9/95	12/96	-	6/98
Geauga-Trumbull	12/93	9/95	12/96	-	6/98
Greene*	5/92	2/96	5/97	10/95	11/98
GMMMNW ⁸	8/92	5/94	8/95	8/95	2/97
Hamilton*	7/93	4/97	7/98	-	1/00
Hancock	3/96	12/99	3/01		9/02
Henry*	12/91	9/95	12/96	-	6/98

District	Date of Most Recent Plan Approval	Next Statutorily-Required Amended Plan			
		Begin Preparation by:	Draft Plan Submittal Due Date:	Draft Plan Submitted on:	Ratified Draft Approval Required by:
Holmes	6/92	3/94	6/95	-	12/96
Huron	12/93	9/95	12/96	-	6/98
Lake	9/92	6/94	9/95	11/95	3/97
Lawrence-Scioto	9/95	6/97	9/98	-	3/00
Logan	12/91	9/93	12/94	11/95	6/96
Lorain*	1/93	10/96	1/98	-	7/99
Lucas	9/95	6/97	9/98	-	3/00
Mahoning*	3/93	12/96	3/98	-	9/99
Medina	6/91	3/93	6/94	9/95	12/95
Mercer	10/92	7/94	10/95	-	4/97
Miami	6/92	3/94	6/95	12/95	12/96
Montgomery	12/93	9/95	12/96	-	6/98
OSS ⁹	8/92	5/94	8/95	2/95	2/97
Pike	11/91	8/93	11/94	3/95	5/96
Portage*	1/93	10/96	1/98	-	7/99
Preble	2/92	11/93	2/95	8/95	8/96
Putnam	12/92	9/94	12/95	11/95	6/97
Richland	2/92	11/93	2/95	12/94	8/96
STW ^{10*}	2/93	11/96	2/98	-	8/99
Summit	12/93	9/95	12/96	-	6/98
Van Wert	8/92	5/94	8/95	9/95	2/97
Warren	12/93	9/95	12/96	-	6/98
Wood*	12/91	9/95	12/96	-	6/98
Wyandot	7/92	4/94	7/95	2/96	1/97

¹ Allen-Champaign-Hardin-Madison-Shelby-Union

² Carroll-Columbiana-Harrison

³ Coshocton-Fairfield-Licking-Perry

⁴ Defiance-Fulton-Paulding-Williams

⁵ Delaware-Knox-Marion-Morrow

⁶ Fayette-Highland-Pickaway-Ross

⁷ Gallia-Jackson-Meigs-Vinton

⁸ Guernsey-Monroe-Morgan-Muskingum-Noble-Washington

⁹ Ottawa-Sandusky-Seneca

¹⁰ Stark-Tuscarawas-Wayne

* This SWMD has a planning period of fifteen years or longer.

Appendix DD

Sample Plan Certification Statement and Resolutions for Plan Adoption and Ratification

Documents/Resolutions Required to be Present in Appendix C

Requirements for the draft plan

1. *Certification Statement for the Draft Plan*—This is a statement signed by the District's Policy Committee that states that the information presented in the plan submitted to Ohio EPA is accurate and in compliance with the *Format*. This document should be signed and dated prior to submitting the draft plan to Ohio EPA for review. A template for this document can be found on page DD-3 of this Appendix.

Requirements for the ratified draft plan

1. *Resolution Adopting the Solid Waste Management Plan*—This is a resolution signed by the Policy Committee adopting the plan prior to sending it out to the District's political jurisdictions for ratification. By stating that the information presented in the plan submitted to Ohio EPA is accurate and in compliance with the *Format*, this resolution also serves as the certification statement for the ratified draft plan. This document should be executed after consideration of the comments received during the public hearing/comment period and prior to being sent out for plan ratification by the political jurisdictions. A template for this resolution is on pages DD-4 and DD-5 of this Appendix.
2. *Resolution Certifying Ratification of the Solid Waste Management Plan*—This is a resolution signed by the Policy Committee stating that the plan has been properly ratified by the political jurisdictions within the District. A template for this resolution can be found on pages DD-6 and DD-7 of this Appendix.

Resolution Adopting the Solid Waste Management Plan

Resolution _____

A resolution declaring that the amended solid waste management Plan for the _____ Solid Waste Management District has been adopted.

WHEREAS, the district completed the draft amended solid waste management Plan and submitted it to the Ohio Environmental Protection Agency for review and comment on _____, 19____, and the Ohio Environmental Protection Agency provided comments in a non-binding advisory opinion on _____, 19____;

WHEREAS, this solid waste management district policy committee has reviewed the non-binding advisory opinion received from the Ohio Environmental Protection Agency and taken into consideration these comments, incorporating changes into the amended Plan where necessary;

WHEREAS, the solid waste management district has conducted a 30-day public comment period, and a public hearing held on _____, 19____, to provide the public an opportunity to have input in this Plan;

NOW, THEREFORE, BE IT RESOLVED that the Solid Waste Management Policy Committee of the _____ Solid Waste Management District:

1. adopts the amended Plan for the _____ Solid Waste Management District; and
2. certifies that, to the best of our knowledge and belief, the statements, demonstrations and all accompanying materials that comprise the district's Plan, and the availability of and access to sufficient solid waste management facility capacity to meet the solid waste management needs of the district for the ____ - year period covered by the Plan, are accurate and are in compliance with the requirements of the *District Solid Waste Management Plan Format*, revision 3.0.

This resolution shall be in effect immediately upon its adoption.

Voting for the resolution:

Voting against the resolution:

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This is to certify that the foregoing is a true and correct copy of the resolution passed by the _____
Solid Waste Management District Policy Committee on the ____ day of _____, 199_, and recorded in the Journal
of said Policy Committee in _____, under the date of _____.

Date

District Secretary for the Policy Committee

**Resolution Certifying Ratification
of the Solid Waste Management Plan**

Resolution _____

A resolution declaring that the amended solid waste management Plan for the _____ Solid Waste Management District has been ratified in accordance with Section 3734.55 of the Ohio Revised Code.

WHEREAS, the district held a public hearing on _____, 19____, and the solid waste management district policy committee adopted the amended solid waste management Plan on _____, 19____;

WHEREAS, this solid waste management district policy committee has received copies of resolutions and ordinances approving the amended Plan from the boards of county commissioners, the legislative bodies of the largest municipality in each county within the district, and from legislative jurisdictions representing at least 60 percent of the population within the district;

NOW, THEREFORE, BE IT RESOLVED that the Solid Waste Management Policy Committee of the _____ Solid Waste Management District declares the amended Plan for the _____ Solid Waste Management District to be ratified in accordance with Section 3734.55 of the Ohio Revised Code, and shall cause the amended Plan to be submitted to the Director of the Ohio Environmental Protection Agency for review.

This resolution shall be in effect immediately upon its adoption.

Voting for the resolution:

Voting against the resolution:

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This is to certify that the foregoing is a true and correct copy of the resolution passed by the _____
 Solid Waste Management District Policy Committee on the ____ day of _____, 199_, and recorded in the Journal
 of said Policy Committee in _____, under the date of _____.

 Date

 District Secretary for the Policy Committee

Appendix EE

Description of Plan Ratification Process

Appendix EE. Description of Plan Ratification Process

The plan ratification process for district plans is described in Section 3734.55 of the ORC. This appendix shows the step by step procedures in the required order which districts must follow, including submittal of the draft plan for Ohio EPA review. All references to time periods are **bolded** in the following text. Please note that this appendix is not intended to be a replacement for the Ohio Revised Code; instead, it is intended to facilitate understanding of the ORC. District officials should read the ORC even though they are familiar with this appendix.

Amended Draft Plan Submittal

All amended draft plans must be submitted to Ohio EPA for a non-binding advisory opinion prior to obtaining local approval, except amendments associated with Divisions (B) or (E) of Section 3734.53 of the ORC. (Districts seeking a change in composition in accordance with uncodified Section 5 of Amended Substitute House Bill 723 were also not required to submit a draft plan to Ohio EPA for comments.) If the amendments are prepared in order to fulfill the required **three-year** (or five-year) plan update, the draft amended plan must be submitted to Ohio EPA within three years (or five years) after the previous plan was approved for the district. (See Appendix CC for the schedule of required plan amendment submittals for each district.)

After reviewing the draft amended plan, Ohio EPA is required to return a non-binding advisory opinion to the district within **45 days** regarding the plan and any recommended changes to it.

Public Comment Period

After receiving Ohio EPA's comments and making any changes considered necessary, the policy committee must establish a public comment period. The public comment period must be publicized in at least one newspaper of general circulation within the district. The public notice must:

- describe the draft plan, including the proposed disposal and/or generation fees, and the statement authorizing (or precluding) the district to designate facilities.
- identify locations where the plan is available for review; and
- establish a period of **30 days** when the plan can be reviewed.

The policy committee must also send written notice of the draft plan availability and locations where it can be reviewed to all adjacent solid waste management districts. The district must also send written notices to Ohio EPA and the 50 largest industrial, commercial, or institutional generators of solid wastes in the district. Notices to Ohio EPA and the 50 largest generators must include:

- the date, time and location of the public hearing to be held for the plan;
- dates when the comment period begins and ends;
- a description of the plan that includes the proposed disposal and/or generation fees, and the statement authorizing (or precluding) the district to designate facilities.

Although not specified in the ORC, it is generally advisable to make the draft plan available for review at several locations in each county within the SWMD. Public libraries are usually a good choice because of the accessibility for most people.

Public Hearing

After the end of the public comment period, the district must hold at least one public hearing for the draft plan. At least **15 days** prior to the public hearing, the district must publish a notice in at least one newspaper of general circulation in the district, advising readers of the time and place of the hearing, and locations where the draft plan can be reviewed. In addition, the public hearing must be held within **15 days** after the end of the comment period for the plan.

Policy Committee Adoption

After the public hearing, the policy committee may modify the plan based upon public comments received. At this point in the approval process, modifications to the plan should not be made unless they can be associated with the public comments received by the district. The next step is for the policy committee to vote on the adoption of the plan. (See Appendix DD for a sample plan adoption resolution by a policy committee.) If a majority on the policy committee vote to adopt the plan, a copy of the resolution must be placed in Appendix C of the district's plan.

Within **30 days** after adoption by the policy committee, a copy of the draft amended plan must be delivered to:

- the board of county commissioners of each county forming the district;
- the legislative authority of each municipal corporation under the jurisdiction of the district; and
- the legislative authority of each township within the district.

Local Approval

The policy committee can choose to deliver copies of the plan by certified mail, hand-delivery by district officials, or by some other method. The important issue of plan deliveries is to determine when all entities (county commissioners, cities, and townships) receive their copy. The ratification period of **90 days** should not begin until all entities required to vote on the plan have received their copy. All plan copies should be accompanied by a cover letter (or some other document) identifying the dates when the ratification period begins and ends.

Each political jurisdiction required to vote on the plan must do so by means of a resolution or ordinance. After being acted upon, copies of the resolution or ordinance must be delivered to the district. (As of April 1996, jurisdictions failing to vote on the plan within the 90 day period must be counted as "disapproving" the plan.)

Several questions have arisen regarding the 90 day ratification period. Some local jurisdictions have wanted to attach conditions to their resolutions approving the plan. Ohio EPA does not consider such conditions to have any legal effect. In other words, a resolution approving the plan with conditions should be counted as "approving" the plan, and the attached conditions should be ignored.

Another issue involves extending the 90 day ratification period in order to allow additional time to consider the plan, or to change the plan contents. Instead of extending the 90 day period, Ohio EPA recommends starting the ratification process over, beginning with the public comment period and the public hearing. Ohio EPA believes it is inconsistent with the ORC to change the plan contents once the 90 day period has begun.

Some local municipal city councils have voted to approve the plan, followed by a veto from the mayor. In such instances, the final "vote" of the city is dependent upon the procedures specified in the city's charter.

Certification of Ratification

The policy committee should monitor the local approval process, and at the end of the 90 day period, determine if the minimum requirements for ratification have been met. (The policy committee may declare the plan to be ratified before the end of the 90 day period.) In order to achieve ratification, the plan must be approved by:

- each board of county commissioners (a majority of boards of county commissioners in a district with four or more counties);
- the legislative authority of the largest municipality in each county in the district (a majority of largest municipalities in each county in districts with four or more counties);
- the legislative authorities of townships and municipalities representing at least 60 percent of the total district population.

When the policy committee determines that the minimum criteria have been met, it must certify that ratification has been achieved by passing a resolution. A copy of the resolution should be placed in Appendix C of the ratified plan. (Appendix DD of this document contains a sample certification statement for ratification.)

Ohio EPA Review

After the policy committee certifies that the plan has been ratified, it is submitted to Ohio EPA for approval (or disapproval). The ORC gives Ohio EPA **90 days** to evaluate the plan and issue an approval or disapproval.

Time Period for Entire Process

The ORC gives districts a total of **18 months** from the due date of their draft amended plan until the ratified plan is approved by Ohio EPA. Using the time periods discussed above, approximately **eight and one half months** could be consumed by the public comment period, local ratification, and the draft and final plan Ohio EPA review (comment period + 30 days, local ratification + 90 days, draft plan Ohio EPA review + 45 days, final plan Ohio EPA review + 90 days = 8 1/2 months). As a result, districts have a total of **9 1/2 months** to make changes to the plan, explain the plan to the public, hold a public hearing, and make copies of the plan for distribution.

Appendix FF

Sample Survey Forms for: Recycling Activities, Haulers, Industrial Generators, and Waste Tire and Open Dumps

Appendix FF. Sample Survey Forms for: Recycling Activities, Haulers, Industrial Generators, and Waste Tire and Open Dumps

This Appendix discusses the collection and reporting of information that is required to complete the solid waste management plan and contains sample questionnaires for industrial facilities, waste haulers, recycling materials processors and brokers, and an example of a method to identify and to assess open dump sites. The questionnaires shown in this appendix are examples only; SWMDs are not required to use these forms when collecting information from entities within their district. Instead, SWMDs are expected to use questionnaires which the district believes will result in the best possible response rate and data from the surveyed entities.

In addition, Ohio EPA recognizes that the Level Two Investigation for the Open Dump/Waste Tire Dump Survey will likely be undertaken by very few SWMDs due to the in-depth analysis, high degree of expertise required, and the potential liability issues associated with this type of assessment.

Collection of Data Required by the *Format*

Solid waste management districts are required to identify all solid waste management facilities and activities utilized by entities within the district during the reference year. (See Appendix BB for other sources of information which may be useful in completing the inventory section of the plan.)

The sample survey forms provided in this appendix were designed to gather the information required either in the inventory sections of the plan or needed to determine the amount of waste generated, collected, reduced, recycled or disposed by entities in various sectors of the waste management system. SWMDs designing their own forms or reporting mechanisms should request all of the information required by the *Format*.

A particular survey design consideration illustrated in the sample forms is collecting information necessary to eliminate the double-counting of recycled materials that are handled during collection, processing, and marketing stages. A SWMD that surveys entities at more than one point in the flow of recycled materials needs to collect information on the origin and destination of recycled materials that are collected and/or processed and sent on to another entity that is surveyed. Questions regarding the origin and/or destination of recycled materials are included in the sample survey forms for recyclers, waste haulers and industrial facilities.

In many instances, a SWMD will not have a 100 percent response rate, nor will each survey form contain complete information on the origin and destination of recyclable materials. Under these circumstances, in order to compile a reliable estimate of the recycling occurring in the district, a SWMD may need to carefully cross reference the information on recycling quantities gathered from its surveys and other sources, and compare these amounts to waste generation and disposal information. (See Appendix GG for a more complete discussion of double-counting and the crediting of recycled materials toward the waste reduction goals.)

Minimum Requirements for Data Presented in the District Plan

Recyclers and Waste Haulers

In some cases, in order to collect more complete and accurate data from recyclers, waste haulers, and industrial facilities, districts may have to ensure the entity being surveyed that specific information concerning their operation will not be presented in the district's plan. In instances where the SWMD desires to offer confidentiality to the survey respondents, the cover letter accompanying the survey form should state exactly how the results of the survey will be reported. Moreover,

SWMDs should also keep in mind the following minimum data reporting requirements necessary for plan submittal and review:

- For each group of solid waste management facilities and activities listed in the inventory, all of the inventory information must be included with the exception of the data on quantities of materials recycled by a recycler, or waste collected by a hauler. For example, each hauler and recycler must be identified in the inventory by name, location, general service area, and types of materials handled, but the specific quantities of materials reported by the individual recycler or hauler need not be reported. These quantities may be reported in summary form.

In addition, the plan must report the number of entities sampled (the number of entities sent questionnaires), and the number of respondents. In most instances, the number of entities sampled should equal the total number of entities in that sector servicing the district.

- For the amount of materials processed by recyclers and recycling activities, the plan must report the sum of recycling quantities by the type of material (newspaper, aluminum cans, metals, etc.) from all programs. The totals for each material should be categorized by the collection method used (e.g. buyback, curbside, commercial collection program, broker, etc.). The table below is provided as a sample of how the information may be presented.

Summary of Quantities of Recycled Materials by Collection Method for Facilities and Activities identified in Tables III-4 and III-5.						
Material	Total Tons Recycled ¹	Tons Processed by Collection Method				
		Buy Back "BB"	Drop-Off "DO"	Curbside "CS"	Commercial Collection "CC"	Broker "BR"

¹ Enter the values in this column only after eliminating all double-counting of recyclables.

- For solid waste haulers, the plan should report the total amount of waste reported collected from the district broken down by residential/commercial and industrial sectors. If the waste haulers also collect recyclable materials such as cardboard or office papers, these quantities should be reported with the recycling activities.

Summary of the Tons of Waste Reported Collected by Waste Haulers identified in Table III-10		
Residential/Commercial	Industrial	Total

If cubic yards are converted to tons please identify the conversion factor used and the quantity of cubic yards converted to tons.

Industrial Survey

The results of the District's survey of industrial facilities should be included in Appendix F of the plan. The information to be gathered through the questionnaires and reported in Appendix F is discussed in Part E of Section IV of the *Format*. Estimating the waste generation for non-responding industrial facilities is also discussed in Part E of Section IV, and in Appendix JJ.

References on Conducting Surveys and on Questionnaire Design

The follow references were consulted as part of a review of the sample questionnaires.

Designing and Conducting Survey Research: A Comprehensive Guide. Louis M Rea and Richard A. Parker, Jossey-Bass Inc. Publishers, 1992.

Handbook of Survey Research. Edited by Peter Rossi, James D. Wright, and Andy B. Anderson, Academic Press, 1983.

Mail and Telephone Surveys: The Total Design Method. Don A. Dillman, J.A. Chrisenson, E.H. Carpenter, and R.M. Brooks, Wiley-Interscience, 1978.

Recycling Activities Survey Cover Letter

<date>
Name
Address

Dear :

The **{District's Name}** (District) is conducting a survey of active recycling organizations that may be providing recycling services in **{County Name}**. The survey is intended to identify the recyclable materials collection and processing services available in the District, the types of materials collected, and the amount of recyclable materials collected in **{Year}** that originated from **{County Name}**.

The District is conducting the survey in order to update our solid waste management plan. Ohio Law requires the District to periodically update its solid waste plan in order to demonstrate to the Ohio Environmental Protection Agency that the District is meeting statewide requirements for solid waste reduction and recycling. In order to make the required demonstration, we need a complete and accurate inventory of existing recycling opportunities servicing our District. Your completion of this survey is crucial to this effort.

The information that you and many other recyclers provide in this survey may also be used to determine whether new or expanded recycling opportunities are necessary, and how much solid waste disposal capacity may be needed for the District over the next 10 years. Also, the information provided will be used to inform residents and commercial entities in the District of existing recycling opportunities.

If you have any questions regarding this survey, please contact [Name of Contact Person] at [phone].

Your cooperation and continued recycling efforts are appreciated!

Sincerely,

{District Name}
Recycling Facility Survey

Please provide the requested information and return the survey form by {month, day} in the enclosed envelope. Questions regarding this survey can be directed to {contact person} at {phone #}

Part I. General Information

Name of Facility: _____

Mailing Address: _____

Phone: _____

Contact Person: _____

1) Does your organization handle recyclables which are generated within the {name of county or counties in the SWMD}?

____ yes ____ no

- a. If no, you may stop at this point and mail in the survey in the envelope provided.
- b. If yes, please complete the remaining sections of the survey for all facilities and recycling services handling materials generated within {name of county(ies)}.

Part II. Recycling Activities and Services

2) Please place a check next to the statement that best describes the types of recycling services offered by your organization. Please check all that apply.

- _____ A. Buyback/Drop-off location for source-separated materials
- _____ B. On-site collection of source-separated recyclable materials (collecting materials from the generator using containers separate from waste dumpsters.)
- _____ C. Materials Recovery Facility (extracting recyclable materials from a mixed solid waste stream)
- _____ D. Broker of recyclable materials (an individual or organization acting as an agent or intermediary between the processors and end-users of recyclable materials.)
- _____ E. Other (please describe) _____

3) If your operations include a BUYBACK OR DROP-OFF SITE for source-separated recyclable materials, please complete questions 3a and 3b. If not, please proceed to question 4.

a) Using the table below, please indicate the location of each drop-off or buyback site, (if different than the address presented in Part I) and the days of the week and hours during the day that the sites are open to the public.

Please provide the number, street name, and the city, village or township where the buyback/drop-off site is located.	Days of the Week Open to the Public	Hours Open to the Public

b) Please check the box next to each type of customer who may bring materials to the site:

<input type="checkbox"/>	Residents/homeowner
<input type="checkbox"/>	Businesses/Institutions
<input type="checkbox"/>	Industries/Manufacturers
<input type="checkbox"/>	Other, please describe:

4) If your operations include ON-SITE COLLECTION OF SOURCE-SEPARATED MATERIALS from the generator, please complete question 4a. If not, please proceed to question 5.

a) Please check the box next to each type of customer that would be provided on-site collection of recyclable materials:

<input type="checkbox"/>	Residents/homeowners (for example, curb-side collection services)
<input type="checkbox"/>	Businesses/Institutions
<input type="checkbox"/>	Industries/Manufacturers
<input type="checkbox"/>	Other, please describe:

5) If your operations include a MATERIALS RECOVERY FACILITY, please answer questions 5a - 5d. If they do not, please proceed to question 6.

a) Using the space provided, please indicate or estimate the percentage of total waste processed that originated from the following sources in {Year}.

	Residents/homeowners
	Businesses/Institutions
	Industries/Manufacturers
	Other, please describe:

b) What is the annual waste processing capacity of the facility in tons per year? _____

c) At what annual capacity (tons per year) is your facility currently operating? _____

d) What percentage of incoming solid waste is recovered for recycling or composting? _____

6) Please use the space below to briefly describe any special features of the recyclable collection, processing or brokering services provided.

example

Question 7. Types and Quantities of Materials Handled by Your Operation

Instructions:

Please complete this Table by providing the following information in the indicated column:

- 1) place a check in the box to the left of each material your organization handles;
- 2) use the blank rows to include materials that are not listed;
- 3) indicate the amount (or the percentage) of the material that originated from residential, commercial/institutional or industrial generators.
- 4) please provide the total amount of each material handled from the District during [Year];

Please identify the measurement units by using the abbreviations listed below.

"T" - tons "G" - gallons "CY" - cubic yards "lbs." - pounds

	Materials Recycled	Amount Recycled Residential (include units)	Amount Recycle Comm./Inst. (include units)	Amount Recycled Industrial (include units)	Amount Recycled Total (include units)
	Paper				
	Mixed Waste Papers				
	Cardboard				
	Newsprint				
	Office Papers				
	Other Papers				
	Wood				
	Sawdust, bark				
	Wooden Boardends				
	Wood Pallets				
	Other wood				
	Metals				
	Aluminum beverage and food containers				
	Aluminum scrap				
	Steel/tin food cans				
	Ferrous				
	Copper				
	Major Appliances				
	Other Metals (specify)				

	Materials Recycled	Amount Recy- cled Residential (include units)	Amount Recycle Comm./Inst. (include units)	Amount Recycled Industrial (include units)	Amount Recy- cled Total (include units)
	Plastics				
	PETE (#1)				
	HDPE (#2)				
	LDPE/PVC (#s 3 & 4)				
	Polypropylene (#5)				
	Polystyrene (#6)				
	Other (specify - #7)				
	Glass Beverage and Food Containers				
	Other glass				
	Rubber				
	Stone/Clay/Sand				
	Concrete				
	Foundry Sand/Slag				
	Ash				
	Sludge				
	Food				
	Non-haz. Chemicals				
	Composites				
	Other materials				
	Total				

8) These questions pertain to the Destination of the Recyclable materials collected and/or processed. Information concerning the destination of materials is used to eliminate double counting of materials that may be exchanged between parties within the district.

a) Are any of the recyclable materials handled at your facility sold/donated to another recycling facility or end-user in {county name}?

_____ yes _____ no

b. If yes, identify those facilities below and list the recyclables sold/donated as well as the quantity of each material in tons. This information is needed to avoid double counting of materials that have been recycled from the district.

Name of Facility: _____

Type of Recyclable: _____ Quantity: _____

Name of Facility: _____

Type of Recyclable: _____ Quantity: _____

Name of Facility: _____

Type of Recyclable: _____ Quantity: _____

Name of Facility: _____

Type of Recyclable: _____ Quantity: _____

Name of Facility: _____

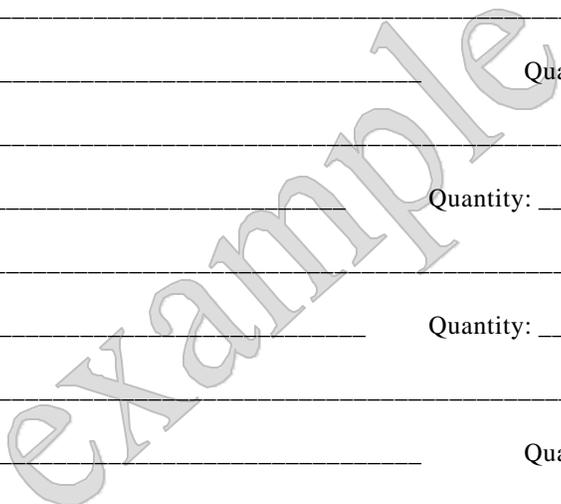
Type of Recyclable: _____ Quantity: _____

Name of Facility: _____

Type of Recyclable: _____ Quantity: _____

Name of Facility: _____

Type of Recyclable: _____ Quantity: _____



Hauler Survey Cover Letter

<date>
Contact
Company
Address

Dear:

The _____ Solid Waste Management District is in the process of updating its 10-year solid waste management plan. This update is required by law, and must include information regarding solid waste collection and hauling within the SWMD.

The requested information is critical to the mandated planning process. Collection and hauling information will be used to assess the adequacy of solid waste management services in the SWMD and to cross-check waste generation information.

Please return the survey in the enclosed envelope before _____, 199 _____. If you have questions, please contact _____ at (____)____-_____.

Sincerely,

_____ Solid Waste Management District

Example

Waste Haulers Survey

Please review the contents of this survey, and complete if any part of your company's service area includes the _____ Solid Waste Management District (SWMD). Please complete the survey to the best of your ability and return it by _____, 199__ in the enclosed envelope. If you have questions, please call {contact name} at {Telephone} (____) ____-_____

Key Terms:

Recycling: The systematic collection, sorting, decontaminating and returning of waste materials to commerce as commodities for use or exchange. Recycling also means to use, reuse or reclaim a material. It does not include incineration.

Solid Waste: Unwanted residual solid or semi-solid materials resulting from industrial, commercial, agricultural, and community operations, but excluding earth or material from construction, mining, or demolition operations, or other waste materials of the type that would normally be included in demolition debris, non-toxic foundry sand, slag, and other substances that are not harmful to public health. It includes, but is not limited to, garbage, tires, combustible and non-combustible material, street dirt, and debris. Solid waste does not include any material that is an infectious waste or a hazardous waste.

Residential: Solid wastes resulting from residential dwellings such as single-family homes, apartment buildings, condominiums, cooperatives, and mobile homes. Domiciles such as nursing homes, campgrounds, and other types of group quarters and institutions should be considered generating commercial waste.

Commercial: Solid waste resulting from businesses and institutional activities. This category includes shopping centers, stores, banks, theaters, gas stations, medical facilities, business offices, motels, and similar service establishments. Institutional activities include government and non-profit offices, schools, prisons, religious facilities, parks, and a variety of other activities that is not residential or industrial.

Industrial: Solid wastes resulting from operations of businesses principally engaged in the manufacture of goods.

A. General

Name of Company _____ Phone _____

Street Address _____ City _____ Zip _____

Person Completing Form _____ Title _____

B. Residential Waste and Recyclable Collection Services

1. Please check each service provided to residential customers.

- ___ Collection of household wastes
- ___ Pickup of bulk items (furniture, appliances, etc.)
- ___ Separate pickup of yard wastes
- ___ Curbside collection of residential recyclable materials by individual subscription
- ___ Curbside recyclables collection provided to residents under contract with local government
- ___ Drop-off boxes for residential recyclables

2. Please describe briefly any special features of the services provided, if applicable.

3. Please check each recyclable material that your operations will collect in a curbside collection program or with drop-off collection boxes.

<input type="checkbox"/> Aluminum cans	<input type="checkbox"/> computer paper
<input type="checkbox"/> Bi-metal food and beverage cans	<input type="checkbox"/> office papers
<input type="checkbox"/> Plastic #1 PETE	<input type="checkbox"/> Corrugated Cardboard
<input type="checkbox"/> Plastics #2 Natural HDPE	<input type="checkbox"/> Glass beverage and food containers
<input type="checkbox"/> Plastic #2 Colored HDPE	<input type="checkbox"/> Other please specify
<input type="checkbox"/> Plastic #3	<input type="checkbox"/> Yard Wastes
<input type="checkbox"/> Plastic #4	_____
<input type="checkbox"/> Plastic #5	_____
<input type="checkbox"/> Plastic #6	_____
<input type="checkbox"/> Plastic #7 other	_____
<input type="checkbox"/> Newspaper	_____

C. Commercial, Institutional and Industrial Waste and Recyclables Collection Services

1. Please check each service provided to Commercial, Institutional, or Industrial customers.

Collection of general refuse
 Collection of bulky or industrial wastes (collection of wastes not normally placed in the dumpster)
 Separate pickup of yard wastes
 Collection of source-separated recyclable materials

2. Please describe briefly any special features of the services provided, if applicable.

3. Please check each recyclable material that your operations will collect on-site from commercial, institutional or industrial customers.

<input type="checkbox"/> Aluminum cans	<input type="checkbox"/> corrugated cardboard
<input type="checkbox"/> Bi-metal food and beverage cans	<input type="checkbox"/> glass beverage and food containers
<input type="checkbox"/> Plastic #1 PETE	<input type="checkbox"/> Ferrous metal scrap
<input type="checkbox"/> Plastics #2 Natural HDPE	<input type="checkbox"/> Aluminum scrap
<input type="checkbox"/> Plastic #2 Colored HDPE	<input type="checkbox"/> Non-ferrous scrap metals
<input type="checkbox"/> Plastic #3	<input type="checkbox"/> Others: please specify
<input type="checkbox"/> Plastic #4	<input type="checkbox"/> Yard Wastes
<input type="checkbox"/> Plastic #5	_____
<input type="checkbox"/> Plastic #6	_____
<input type="checkbox"/> Plastic #7 other	_____
<input type="checkbox"/> Newspaper	_____
<input type="checkbox"/> computer paper	_____
<input type="checkbox"/> office papers	_____

D. Service Areas for Waste and Recyclables Collection

Please place a **Check** to indicate the refuse and recyclable collection services provided to each community during {reference year}. If your organization provides the identical services county-wide, then complete the row labeled {county name} only.

Service Areas for Refuse and Recyclables Collection						
Service Areas	Refuse Collection			Recyclables Collection		
	Residential	Commercial/ Institutional	Industrial	Residential	Commercial/ Institutional	Industrial
{County Name}						
{City Names}						
{Village Names}						
{Township Names}						

E. Amount of Waste and Recyclables collected from {county name}

Please place the volume or weight of refuse and recyclables collected from each community during {reference year}.
 If a breakdown of the amount of waste collected and recycled by community is not possible, please provide a total for the county.

Refuse and Recyclables Collection						
Service Areas	Refuse Collection (please indicate units: tons or cubic yards.)			Recyclables Collection (please indicate units: tons or cubic yards.)		
Community	Residential	Commercial/ Institutional	Industrial	Recyclables	Source- Separated Yard Waste	Total Waste, Recyclables and Yard Waste
{County Name(s)}						
Please provide the amount by community.						
{City Names}						
{Village Names}						
{Township Names}						

Industrial Survey

<date>

Dear Business Representative:

The _____ Solid Waste Management District (District) is in the process of preparing an update to our solid waste management plan. The District is required by law to update our plan every _____ years. The plan is required to provide a comprehensive inventory of the solid wastes generated, reduced, recycled, and disposed from industries in the District. This information will then be used to determine appropriate waste reduction and recycling activities and facilities in order to meet: 1) future solid waste management needs of the District, and 2) state goals for waste reduction and recycling. One of the overall objectives of the planning process is to facilitate waste reduction and recycling activities for industries, commercial businesses, and residents of the District.

The information requested in the attached survey form is critical to the mandated district-wide planning process. Accurate survey data and its timely return will help to ensure development of an effective, implementable solid waste management plan. We would appreciate your personal attention to the completion of the attached survey.

Please return the survey to us before the deadline printed on the survey form. If you should have questions, or need assistance, please contact _____ at _____.

Sincerely,

example

Industrial Solid Waste Survey

Instructions

Please complete the fill-in-blank and multiple choice questions to the best of your ability. Definitions of key terms are contained throughout the survey. Please complete the survey by _____, and send it to {District Name}.

If you have any questions regarding the completion of this survey, please call:

_____ Solid Waste Management District
Telephone: (____) ____-_____

A. General

1. Name of Company _____
2. Address _____ Township _____
3. City _____ Zip _____ County _____
4. Contact Person _____ Phone (____) _____
5. Primary SIC Category (4-digit) _____
6. Confidentiality

The _____ Solid Waste Management District will use the remaining information in this survey for summary purposes only, to identify those SIC categories and types of wastes which may be further reduced or recycled. If you have concerns about the confidentiality of the information you are asked to provide, please call _____.

After reading the above paragraph, do you wish the contents of this survey to remain confidential?
____ yes ____ no

7. Briefly describe the nature of your business (e.g. raw materials used, production process, products manufactured)

8. Number of employees _____
9. Days in operation per year _____
10. Hours in operation per day _____
11. During the next ten years, what change do you expect to experience in facility production?
____ increase ____ decrease ____ no change

If you expect an increase or decrease, estimate the percent change _____

B. Solid Waste Generation

In this section, include all solid waste generated by your company. Please complete the table on the following page if at all possible. If you complete Table 1, questions 2 and 3 in this section may be skipped.

If you do not have sufficient information to fill out the table, provide the information requested in questions 2 and 3.

Solid Waste means unwanted residual solid or semi-solid materials resulting from industrial, commercial, agricultural, and community operations, but excluding earth or material from construction, mining, or demolition operations, or other waste materials of the type that would normally be included in demolition debris, non-toxic fly-ash, spent non-toxic foundry sand, slag, and other substances that are not harmful to public health. It includes, but is not limited to, garbage, tires, combustible and non-combustible material, street dirt, and debris. Solid waste does not include any material that is an infectious waste or a hazardous waste.

Recycling means the systematic collection, sorting, decontaminating, and returning of waste materials to commerce as commodities for use or exchange. Recycling also means to use, reuse or reclaim a material. It does not include incineration. (Please note that reuse is included in recycling.)

1. In the table on the following page, please estimate the quantities of each type of solid waste generated by your company. (The amount of solid waste generated includes recycled amounts.) Complete the columns showing "% of Total Volume" of waste only if you are unable to estimate the cubic yards of waste generated for each waste stream; then make sure that you enter the total cubic yards at the end of the table.) If your company did not recycle a particular waste stream in 199__, enter "0" in columns F. Please note that exempted wastes (e.g. waste sludges which are permitted to be disposed in lagoons regulated by Ohio EPA's Division of Surface Water) should not be included in this table.

2. Please indicate the following dumpster information:

Dumpster Size (cubic yards)	# of Dumpsters	Frequency of Pickup	% Full When Picked Up
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Complete questions "2" and "3" only if you are unable to provide data to complete

3. Is your waste compacted prior to pickup? ____ (yes or no) If "yes," what percent of the original waste volume is the compacted volume?

___ 0 to 20% ___ 20 to 40% ___ 40 to 60% ___ 60 to 80% ___ 80 to 100%

4. What trend do you anticipate in the quantity of solid waste generated by your company from 199__ through the year 200__?

___ increase ___ decrease ___ no change

5. If you expect an increase or a decrease, estimate the percent change over the ten years. _____

Table 1. Solid Waste Generated for Calendar Year _____

Complete Column B or C

Column A Column B Column C Column D Column E Column F

Waste Stream Type	Total Solid Waste Generated		Amount Disposed in tons		Amount Recycled (in tons)
	Cubic Yds. ¹	% of Total Volume	Off-site	On-site ²	Total
Paper					
Cardboard					
Newsprint					
Office					
Other (specify)					
Fabrics & Cloth					
Wood					
Sawdust, bark					
Boardends					
Pallets					
Metals					
Aluminum					
Ferrous					
Copper					
Other (specify)					
Glass					
Plastics					
Polyethylene					
HDPE					
PVC					
Polypropylene					
Polystyrene					
Other (specify)					
Rubber					

Table 1. Solid Waste Generated for Calendar Year _____

Complete Column B or C

Column A Column B Column C Column D Column E Column F

Waste Stream Type	Total Solid Waste Generated		Amount Disposed in tons		Amount Recycled (in tons)
	Cubic Yds. ¹	% of Total Volume	Off-site	On-site ²	Total
Stone/Clay/Sand					
Concrete					
Non-Exempted Foundry Sand/Slag					
Ash					
Sludge ³					
Food					
Non-hazardous Chemicals					
Composites					
Other (specify)					
Totals:		100%			

¹ Enter generation amounts in tons if more convenient or if available.

² "Disposed on-site" refers only to disposal at licensed solid waste captive landfills and/or captive incinerators.

³ "Sludge" should include only those wastes which are classified as a solid waste, and should not include sludges disposed in a lagoon.

Open Dump Survey Inventory

Two levels of investigation for the open dump inventory are presented in this section. (This survey form can also be used for the waste tire dump inventory as well.) For inventory purposes, sites receiving solid wastes which are not permitted as solid waste disposal facilities or resource recovery facilities by the Ohio Environmental Protection Agency (OEPA) should be considered open dumps. An active or abandoned unpermitted solid waste disposal site should be inventoried as a dump including: 1) relatively well known sites such as township dumps; and 2) less conspicuous sites such as roadside dumps, household dumps, shoreland dumps, or abandoned dumps covered with soil and/or vegetation. Licensed scrapyards are not considered solid waste disposal sites, but the solid waste management district (SWMD) may choose to inventory these sites separately.

Caution: Landfills and dumps may contain hazardous materials. Only personnel properly trained in Occupational Safety and Health Administration (OSHA) safety procedures should enter a dump, or handle waste materials.

Possible sources of information for the open dump inventory:

- 1) County, local and state agencies, or local units of government
 - a. Solid waste management district files
 - b. County Soil and Water Conservation District
 - c. County courthouse or city hall records
 - d. Current and former county, SWMD, health department, city, and township officials and staff
 - e. City and county health department records
 - f. Other agencies (see references)
- 2) Historical records: USGS topographic maps, aerial photographs, etc.
 - Dumps may be recognizable features on recent aerial photographs.
 - Abandoned dumps which are presently covered by soil and/or vegetation may be recognizable on old aerial photographs of the county.
 - New and old topographic maps may include dump locations.
 - Topographic maps may help identify possible waste disposal sites such as ravines, sinkholes, etc., prior to on-site visits.
- 3) Survey of residents

Possibilities for the survey include direct mailing of an open dump questionnaire to county residents or placement of an advertisement in the newspaper requesting information on active and abandoned dumps.
- 4) Ground or aerial reconnaissance for dumps.

Level One Investigation

The goal of the Level 1 investigation should be the inventory of all open dumps in the SWMD. The SWMD can obtain a basic dump inventory by compiling information available from state, county and local agencies, or local units of government (See 1 above). However, the SWMD may wish to conduct a more inclusive investigation to obtain information on unknown dumps (See 2-4 above). The county should collect the following basic information for the Level 1 investigation:

1. Name of site (use a unique naming or number system so that site can later be reidentified; be sure to use the same identification on all inventory documents, including the locational information documents) _____
2. Who is doing the inventory (name & title)? _____

3. What was the source(s) of site information? _____

5. Date of completion of inventory (or update)? _____
6. What is the site? (Check one or more)

<input type="checkbox"/> construction and demolition site	<input type="checkbox"/> Roadside dump
<input type="checkbox"/> Township dump	<input type="checkbox"/> Buried dump
<input type="checkbox"/> Municipal dump	<input type="checkbox"/> Household dump
<input type="checkbox"/> Farm Dump	<input type="checkbox"/> Waste tire dump
<input type="checkbox"/> Industrial/commercial dump	
<input type="checkbox"/> Other (explain) _____	

Description of dump:

7. What are the dimensions of the dump (in feet)? _____

8. What is the approximate volume of solid waste in the dump (in cubic yards)?

9. When was the site receiving waste? ____ (year) to ____ (year).
10. Does the dump appear to be active or abandoned? _____

If abandoned, has the dump been covered with soil or grown over by vegetation? _____

The SWMD is also urged to collect any and all additional information on each site.

Level Two Investigation

A Level 2 investigation will provide site-specific information that could be used for an **elementary** assessment of the potential for environmental damage and/or human health risks associated with each identified dump. If you physically visit each site during the course of your inventory, please observe from the perimeter of the landfill or dump. **Only personnel properly trained in Occupational Safety and Health Administration (OSHA) safety and health procedures should enter an open dump, or handle waste materials.** The SWMD should collect the following information for the Level 2 investigation and may choose to photograph inventoried sites for descriptive purposes:

1. What are the contents of the dump? (Check one or more) **(Please view contents from a distance, DO NOT handle waste)**

- Drums, buckets or other containers* Demolition waste
- Agricultural chemicals* Appliances
- Household Waste Scrap Metal
- Tires Abandoned Vehicles
- Large volume of food waste Industrial Waste
- Evidence of liquid or sludge disposal Burned Material
- Trees, brush or yard waste
- Other (explain) _____

* Are there any labels or markings which indicate containers may have contained hazardous material (e.g., words such as flammable, poison, caution, etc.)? **View labels from a distance. Binoculars can be helpful.**

Description of dump contents: _____

2. Draw a rough map of the site and surrounding area. Some of the following questions will require you to add further details to this map.

3. What is the surrounding land use? Include land use information on the map.

4. Is the dump located on or near any of the environmentally sensitive areas listed below? Include these on the map.

- Rock quarry, sand or gravel pit Agricultural tile lines
- Surface water/Wetland Sinkhole
- Porous soils Bedrock at or near surface
- Water table near land surface Parks, recreation areas, or wildlife reserves
- Other (explain) _____

(Note: Maps depicting geology, hydrology, soils, and land use may be available.)

Description of environmentally sensitive area and distance to the area from the dump:

5. Are any of the following visible at the site?

- Dead or dying vegetation
- Dead Animals (e.g., fish kills)
- Erosion
- Liquid seeping from dump area
- Odors (**Do not attempt to smell specific materials**)
- Surface water sheen or discoloration
- Other (explain) _____

Describe: _____

6. Are there any water wells within a mile of the dump? If so, add them to the sketch map.

- a. What kinds of wells are they (e.g., drinking water, irrigation, monitoring)? _____
- b. Are there water quality data for any of these wells?

- c. Are any of these wells known to be abandoned and not properly sealed?

7. Is there vehicle access to the dump? If so, add these features to the map. _____
8. Is there a fence, gate, or other barrier limiting public access to the site? If so, describe it. _____

9. Can the person or entity responsible for the dump be determined? _____

Evaluation of Inventory Information

Evaluation is the critical link between inventory activities and the planning and implementation of programs to control water quality impacts from dumps. Evaluation may be directed at a specific site, or at the inventory information obtained for a region, county, or a SWMD. The goal may be to determine whether a specific site should be given priority for additional information gathering, cleanup, closure, monitoring, or security activities. In another case, a SWMD may wish to determine the total number of dumps in a specific watershed or other defined region. As with the inventory, the SWMD may desire to involve all available resources in order to conduct the evaluation.

There are a wide range of tools available to assist in the evaluation of inventory information. A computerized "spread sheet" may be useful for storing, categorizing, or displaying dump information. Maps depicting geology, land use, soils, and hydrology could help identify areas where ground and/or surface water contamination is most probable. Water well records may indicate whether some wells are at greater risk for contamination than others. Models have been developed for determining surface and ground water flow. Studies also exist in such topics as the leaching of pollutants from solid waste material.

Regardless of the magnitude and depth of the dump evaluation, there would seem to be a few variables which an evaluator would always want to consider. These are listed and described below.

Type of Waste

A site containing significant quantities of hazardous waste should warrant some cleanup activity. Such a site would be handled differently, and almost certainly given priority over, a demolition debris dump where the material is inert and could possibly be covered in place. Evidence of hazardous waste in a dump might point toward further investigative work, such as reviewing the records of local industries generating hazardous materials. Such a site should also be reported to the appropriate Ohio EPA district office. A site containing household or municipal waste that could attract rodents would be handled differently than a tire dump which would be a fire hazard. As an example of an evaluation based on a specific geographic area, if the majority of sites in that area are shown to contain yard waste, a program to improve public awareness of the local yard waste composting facility might be appropriate.

Site Location

Location of an open dump is especially critical in relation to water quality. As an example, contaminants from waste in an unlined limestone quarry may leach into ground water quite rapidly. Likewise, waste located in a floodplain could contaminate surface water quite easily. These types of sites might be given cleanup priority over a dump underlain by clay soils. Depending on other variables, proximity to drinking water wells would be another important locational consideration. While not necessarily related to water quality, a site located near a residential area might warrant some security if it is being used as a play site for neighborhood children.

In terms of underground or surface water protection, it could be argued that type of waste and location are the two most important variables. However, two other variables which should also be considered are described below.

Site Operation

The "operational" status of an open dump will factor into evaluations. Ongoing illegal dumping at a site should probably be brought under control as quickly as possible. Prompt application of cover material over solid waste can reduce water infiltration and leachate generation. Long abandoned or buried sites might require significant effort to clean up. Depending on other variables such as type of material and location, however, such a site might simply be covered or left alone. Open burning may indicate ongoing disposal activity, or an attempt to cover up the type of waste being disposed of at the site.

Site Size

The size of a site, both in terms of surface area and volume of waste material, is crucial information for evaluating potential water quality impacts. In general, the greater the surface area of exposed waste, the greater the volume of precipitation moving through the material. In very large volumes, even relatively inert materials have the potential to degrade water quality.

Finally, it would seem to be the case that small sites which can be cleaned up safely by the responsible party, or by available personnel at the local level, should be cleaned up as soon as possible. The presence of solid waste at an open dump site usually leads to more dumping.

Updating

Developing a complete and useful open dump inventory is an ongoing process. The ongoing process is a result of the identification of previously undiscovered dump sites or newly created dump sites, or changes in the size or hazardous nature of an existing site. These all are evidence of the dynamic nature of dumps.

The capacity to update open dump inventories is a crucial component of the complete solid waste management plan process. SWMDs maintaining updated inventories by regularly (at least annually) incorporating changes in the size, location, hazardous nature, and priority for cleanup can use current information in developing strategies to address open dump problems. Updates also provide baseline data to demonstrate progress in reducing or eliminating the problem dumps in an area.

Accurate updating relies heavily upon the accumulation of accurate information in the original inventory. Updates should include an accurate description of site location and contain some on-site content identification. Updates should be completed at a comparable level of detail to the original inventory.

As with the original inventory, however, much of the information will have to be accumulated on-site and as always, there are potential health risks associated with on-site assessments. As with the initial inventory, **only personnel properly trained in OSHA safety procedures should enter a dump, or handle the contents.**

Note: This open dump survey has been adapted from the *Dump and Landfill Inventory Guidebook*, prepared by the Minnesota Board of Water and Soil Resources, June 1991.

Example

Appendix GG

Recycled Materials Creditable Towards Waste Reduction Rate in Reference Year

Appendix GG. Recycled Materials Creditable Towards Waste Reduction Rate in Reference Year

The purpose of this appendix is to discuss specific issues with regard to the estimate of recycling occurring within a solid waste management district (SWMD). This appendix also offers guidance concerning allowable credits of quantities to the district's measurement of its waste reduction rate. In order to obtain the most accurate measurement of recycling, a district must address several issues that may complicate this objective. Some of the key issues include:

- the potential for multiple-counting of a recycled material toward the recycling rate;
- identifying the district of origin for recycled materials that cross solid waste district boundaries;
- using previous surveys to document generation, disposal, and/or recycling amounts for non-respondents to the most recent survey effort;
- identifying the quantity of industrial materials recycled by activities initiated prior to 1985, and subtracting these quantities (the pre-1985 industrial recycling policy); and
- gross under-estimates of the level of recycling as a result of low response to the surveys or other reporting mechanisms utilized by the district to measure recycling.

Eliminating Multiple-Counting (or double-counting)

In order to measure the recycling occurring within the district, a SWMD should survey all recyclers and recyclable material collection programs that handle material generated within the district. Figure GG-1 illustrates several routes a particular material may take to arrive at an end market, and several points at which a SWMD may measure the level of recycling occurring. Recyclable materials flow from generators (A), to recyclables collectors (B), to processing (C), to market (E), or from generator (A), to mixed waste recovery (D), to processing (C), and end market (E).

In instances where a SWMD receives reports by more than one entity handling the same material, the possibility exists for the recycled material to be counted twice, or several times. For example, a municipal curbside recycling program collecting 100 tons of newspaper and reporting this quantity to the district, may deliver the newspaper to a materials broker that has also reported to the district the quantity of newspaper it handles. The broker's quantity includes the quantity collected by the curbside program. Therefore, adding the amounts in these two reports overstates the recycling of newspaper by 100 tons.

SWMDs must attempt to identify multiple-reporting of the same material and adjust recycling estimates to eliminate any multiple-counting. A SWMD may accomplish this by requesting information in its survey of recyclers regarding the types and quantities of materials recycled, and the origin of materials (in the case of recyclers, brokers, processors, and end users) or the destination for the material, (in the case of industrial facilities, collection programs, and recycling material processors). In addition, the type of recycler should be identified, such as scrap yard, broker, end-user, or community drop-off and curbside collection program. (See Appendix FF for sample survey forms for recycler and industrial entities.) If it is found that one responding entity reports delivering materials to another responding entity, the double-counted amount should then be subtracted from the total.

In most cases, a SWMD is not likely to obtain complete information on the flow of recyclable materials, thereby complicating the process of eliminating multiple-counting. An option for a SWMD under these circumstances may be to use the reported quantities for a material from a point in the recycling process for which reasonably complete data was collected, and the

potential for double-counting is low. For example, if the SWMD determines that all (or the vast majority) of the newspaper being recovered in the district is recovered through drop-off and curbside collection programs that have responded to surveys, then it may simply choose to use this reported figure for newspaper recycling. The most reliable and/or complete reports will necessarily be compiled by material type, based on knowledge of the available collection, processing and marketing options for that material.

Multiple-counting of recycling quantities can also occur when a regional recycling processor or broker handles materials generated from several SWMDs. If the recycler does not track (or does not report) quantities received by district of origin, the quantity of materials reported recycled may be claimed by several SWMDs. In these cases, the SWMD should limit its recycling credits to reports from district entities indicating materials sent to the regional recycler, or examine the generation, collection, or processing existing within its district to determine a reasonable fraction of the quantity reported by the regional recycler that may have originated from their SWMD.

A SWMD may test the reliability of the reports received and adjustments to eliminate double-counting by calculating a "capture rate" for each recycled material. The capture rate is defined as the quantity of the material recovered for recycling as a percent of the generation of that material. (See Appendix MM for discussion of capture rates.) Determining a capture rate allows the SWMD to determine whether the preliminary recycling estimates are realistic. For example, if survey responses from recyclers report 110 percent of the generation of the material, this may indicate that:

- materials are being double-counted;
- reports include materials originating from other solid waste districts;
- the reported quantities for that material includes amounts that are not part of the waste stream, such as scrap cars being counted towards ferrous metal recycling; or
- some other discrepancy exists.

The district may then investigate its recycling reports or other potential sources of the discrepancy.

The capture rate, in conjunction with a waste sort, may also improve the accuracy of recycling estimates. For example, suppose recycling reports show that 100 percent of cardboard generated in the district is recycled. However, a waste sort at the landfill indicates that a significant amount of cardboard is being disposed. This suggests that the recycling estimates are probably too high. This information can also assist a SWMD in identifying recyclable materials still in the waste stream that may be targeted for additional recovery efforts.

Using Previous Surveys

If an industry, recycler, or broker/processor does not respond to district surveys for the reference year, districts may use data for this entity obtained through earlier survey efforts. Prior to using data from earlier surveys, a district should determine that:

- the entity and amount recycled is not represented by surveys obtained by the district for the reference year;
- the entity continued to do business during the reference year; and
- the amount recycled is not double-counted.

If all of the above conditions are satisfied, the district may assume that the generation, disposal, and/or recycling amounts for this entity have remained constant since the last survey response. The plan must document the reported amounts which are based upon surveys conducted for years prior to the reference year.

Estimating Recycling for Survey Non-respondents

Solid waste management districts with low return rates on both their industrial and recycling surveys may have difficulty in determining a reasonable estimate of recycling. Under these circumstances, a SWMD may estimate the amount of a material recycled by non-respondent recyclers or recycling activities. **Please note, SWMDs are not required to estimate recovery that may be taking place by survey non-respondents, and Ohio EPA does not encourage it because of the high likelihood of introducing substantial error.** After adjusting for double-counting, a SWMD may credit reported quantities and indicate that the reported figures represent a subset of the recycling activities occurring in the district. (See Appendix FF for reporting of recycler survey results.)

SWMDs that desire to estimate recycling quantities for non-responding recyclers or recycling activities must list reported quantities of recycled materials separately from the estimated or extrapolated amounts. (See the tables illustrated below.) Please also note that in no instance should a SWMD rely on estimates as the sole mechanism to determine the quantities of materials being recycled during the reference year.

Three general guidelines for reference year estimates of recycling are as follows:

- 1) Estimates must be specific to a targeted recyclable material and the type of non-responding recycler. For example, the program, facility or activity that is collecting or processing recyclable materials must be identified in the inventory section of the plan. The inventory section is to include the universe of facilities and activities that handle recyclable materials from the SWMD. If the SWMD can demonstrate that a recycler handles recyclables generated within the district, but does not respond to a district survey, the SWMD may estimate the quantity by material the facility or activity captures from the waste stream.
- 2) For any material for which recovery is estimated, the district must demonstrate that the quantity estimated as recovered does not exceed the quantity of the material available as indicated by generation and disposal data for that material. (See the explanation of capture rate above.) In instances where disposal data is not available, the district should justify its recovery estimate as much as possible given the existing recycling efforts or opportunities for recovering the material. The District should present the results of its estimates and demonstration of available materials in Table GG-1.
- 3) The District should list all assumptions and sources of data, and present sample calculations for estimates of quantities recycled by non-respondents. SWMDs estimating recovery for non-respondents must also separately show both the quantities of materials estimated recovered by non-respondents and the quantities reported by respondents. Examples are provided demonstrating how the quantities should be reported in the plan in Section IV. Tables GG-1 and GG-2 should be used as replacements for Tables IV-6 and IV-7, respectively, in Section IV of the *Format*, if the district estimates recycling for non-respondent recyclers.

Table G-1. Reference Year Residential/Commercial Waste Reduction in the District

Type of Waste Source Reduced ¹	TPY	Type of Waste Recycled ¹	TPY	Incineration, Composting, Resource Recovery ²		
				Total Waste Received	Residual Landfilled	Net Waste Processed
Reported Reduction/Recycling						
				Incineration	Ash	Net Inciner.
				Composting	Residuals	Net Compost
				Resource Rc	Ash	Net RR
Subtotals						
Estimated Reduction/Recycling						
Subtotals						
Grand Total³						

¹ Use data from Tables III-4, III-5, and the analysis of the residential-commercial sector as discussed in Section IV to complete the first four columns of this table. Add rows to this table as necessary. Eliminate all double-counting of recycled amounts before entering values in this table. (See Appendix GG for a discussion of double-counting.)

² Use data from Tables III-2, III-6, and the analysis of the residential-commercial sector as discussed in Section IV. The column entitled "Total Waste Received" should reflect the total tons of district waste received. "Residual Landfilled" indicates the amount of ash produced for incineration and resource recovery, and the amount of non-compostables which must be landfilled from composting. "Net Waste Processed" should show the amount processed by the facility(ies) after subtracting the residual amount landfilled.

³ The "Grand Total" should include all source reduction, recycling, incineration, composting, and resource recovery. All incineration, composting, and resource recovery amounts added to the Grand Total should come from the "Net Waste Processed" column.

Sample Calculation:

Assumptions:

Please note that source reduction amounts may not be estimated for non-respondents for the reference year.

Table G-2. Reference Year Industrial Waste Reduction in the District

Type of Waste Source Reduced ¹	TPY	Type of Waste Recycled ¹	TPY	Incineration, Composting, Resource Recovery ²		
				Total Waste Received	Residual Landfilled	Net Waste Processed
Reported Reduction/Recycling						
				Incineration	Ash	Net Inciner.
				Composting	Residuals	Net Compost
				Resource Rc	Ash	Net RR
Subtotals						
Estimated Reduction/Recycling						
Subtotals						
				Grand Total³		

¹ Use data from Tables III-4, III-5, and the analysis of the industrial sector as discussed in Section IV.B. to complete the first four columns of this table. Add rows to this table as necessary. Eliminate all double-counting of recycled amounts before entering values in this table. (See Appendix GG for a discussion of double-counting.)

² Use data from Tables III-2, III-6, and the analysis of the industrial sector as discussed in Section IV.B. The column entitled "Total Waste Received" should reflect the total tons of district waste received. "Residual Landfilled" indicates the amount of ash produced for incineration and resource recovery, and the amount of non-compostables which must be landfilled from composting. "Net Waste Processed" should show the amount processed by the facility(ies) after subtracting the residual amount landfilled.

³ The "Grand Total" should include all source reduction, recycling, incineration, composting, and resource recovery. All incineration, composting, and resource recovery amounts added to the Grand Total should come from the "Net Waste Processed" column.

Sample Calculation:

Assumptions:

Please note that source reduction amounts may not be estimated for non-respondents for the reference year.

Sample Scenario for Estimating Recycling for Non-Respondents

Presented below is a numerical example illustrating an acceptable methodology for estimation of materials recovery for non-responding recyclers. Assume that a solid waste management district has compiled the following information and figures for two recyclable materials:

- Generation of cardboard is estimated at 200,000 tons, and wood wastes at 300,000 tons.
- Disposal records and disposal site waste sorts indicate that approximately 80,000 tons of cardboard and 200,000 tons of wood wastes are being disposed.
- Industrial facility survey respondents that did not identify the destination of their materials report 30,000 tons of cardboard recycling and 10,000 tons of wood waste recycling (50% response rate to the industrial survey).
- Industrial facility survey respondents that identified the broker or processor used reported 10,000 tons of cardboard and 10,000 tons of wood waste recycling.
- Industrial facility survey respondents that identified a recycler, yet the recycler identified did not respond to the district survey, report 20,000 tons of cardboard and 10,000 tons of wood recycling.
- Recycler survey results indicate:
 - scrap yards (2 of 4 facilities responded) recycled 10,000 tons of cardboard and 10,000 tons of wood;
 - broker/processors (3 of 5 responded) processed 75,000 tons of cardboard and 42,000 tons of wood;
 - recycling centers and residential collection programs (10 of 10 responded) did not collect either material.

Recovery of targeted materials (cardboard and wood waste) by non-respondents is assumed to be equal to the average reported amounts of the responding recyclers of the same type. The district has determined through a partial response or from a source other than the survey, that: 1) one of the two non-responding scrap yards accepts cardboard, 2) neither scrap yard processes wood, and 3) all of the non-responding broker/processors handle both materials.

Using the previous assumptions and information, the average amount of materials recycled by responding recyclers is reported to be:

Material	-Average Annual Quantity Handled-	
	Scrap Yard	Broker/Processor
cardboard	5,000 tons	25,000 tons
wood	5,000 tons	14,000 tons

Using these averages, cardboard recovery for non-respondent recyclers is estimated as follows:

$$\begin{aligned}
 &1 \text{ scrap yard} \times 5,000 \text{ tons handled per scrap yard} &&= 5,000 \text{ tons} \\
 &\underline{2 \text{ broker/processors} \times 25,000 \text{ tons handled per broker-processor}} &&= \underline{50,000 \text{ tons}} \\
 &\text{Total estimated cardboard recovery by non-respondents} &&= 55,000 \text{ tons}
 \end{aligned}$$

Using the averages for wood processing, wood recovery for non-respondent recyclers is estimated as follows:

$$2 \text{ broker/processors} \times 14,000 \text{ tons handled per broker/processor} = 28,000 \text{ tons}$$

The figures derived from the reported and estimates of recycling by non-respondents have been incorporated into Table GG-3 in order to determine an acceptable recovery total for each material. Column B contains the estimate for generation of the targeted material and Column C contains the estimate for the quantity in the waste stream that is being disposed at a landfill. **The quantities of material potentially available for recovery is the difference between generation and disposal, and is presented in Column D.** For cardboard, this figure is 120,000 tons, for wood it is 100,000 tons.

In this example, using the data collected from the surveys, the amount of reported cardboard recycling, excluding double-counting is 105,000 tons. (See Column E, Table GG-3.) This figure includes: 1) 85,000 tons of cardboard reported from

recyclers, and 2) 20,000 tons of cardboard reported by industrial facilities that identified a broker/processor who did not respond to the district's survey. The surveys also show an additional 30,000 tons of cardboard reported recycled by industrial facilities, but the destination of this material (respondent or non-respondent recyclers) is not known. As a result, cardboard recycling could be in the range between 105,000 tons (assuming all of the 30,000 tons were delivered to responding recyclers) and 135,000 tons (assuming all of the 30,000 tons were delivered to non-responding recyclers).

For wood waste recycling, the total amount of material reported excluding double-counting is 62,000 tons, which includes the 52,000 tons reported from recyclers and the 10,000 tons from industrial facilities that identified a recycler that did not respond to the district's survey. The quantity of reported wood waste recycling that is potentially double-counted is 10,000 tons.

Column F is the amount of the targeted material that is potentially available to the non-responding recyclers. These figures are derived by subtracting the quantity reported recovered from the amount potentially available for recovery. For cardboard, the amount available to non-responding recyclers is 15,000 tons, and for wood waste it is 38,000 tons.

Column G contains the estimates for the recovery of each material by non-respondent recyclers. As shown above, the estimate for cardboard recycling is 55,000 tons, and for wood the estimate is 28,000 tons. These figures are then compared to the quantity potentially available for recovery by non-respondents. The estimate for total recovery for each targeted materials is made by comparing the quantity available for recycling to the quantity estimated recovered by non-respondents.

The total quantity of cardboard credited towards recycling rate in Column H is 120,000 tons. This figure is derived from the quantity reported recycled, 105,000 tons, and the quantity still available for recovery by non-respondents, 15,000 tons. The figure for recovery by non-respondents exceeded the amount potentially available for recovery, therefore, the amount creditable towards the recycling rate is 120,000 tons, as opposed to 160,000 tons that would result from adding reported to estimated quantities. The lower figure is consistent with the requirement that the district demonstrate that the quantity recovered does not exceed the quantity of the material potentially available for recovery.

For wood wastes, the estimate of recovery by non-respondents (28,000 tons) is less than the quantity potentially available for recovery (38,000 tons). The total quantity credited towards the recycling rate is the sum of the reported quantity and the estimated quantity. This sum does not exceed the amount of the material potentially available for recovery, therefore the entire sum is creditable. The district cannot credit the entire quantity potentially available for recovery because the district has not identified a recycling mechanism or opportunity (non-respondent recycler) that could potentially handle this additional material. Adding the unaccounted for quantity onto the estimates made for the other non-respondents would violate the assumptions used to estimate recovery by non-respondents. In summary, the estimate of recycling for non-respondent recyclers must be based on a specific targeted material and recycling entity or activity, and the estimated quantities credited towards the recycling rate cannot exceed the amount of material that is potentially available for recovery.

The district is also required to calculate a capture rate for each material targeted for recovery and include this figure in Column I. The capture rate is a percentage calculated by dividing the quantity of the targeted material recovered by the quantity generated. The capture rate is an indication of the success of efforts to recover the targeted material from the waste stream.

Table GG-3. Crediting Quantities of Estimated Recovery to the Reference Year Recycling Rate

A	B	C	D	E	F	G	H	I
Material	Generation (tons)	Disposal tons	Amount Potentially Available for Recycling (tons)	Amount Reported Recycled by Respondents (tons) ¹	Amount Potentially available to Non-respondents (tons)	Estimate of recycling by non-respondents (tons)	Total Recycling (tons) ²	Capture Rate
cardboard	200,000	80,000	120,000	105,000	15,000	55,000	120,000	60 %
wood	300,000	200,000	100,000	62,000	38,000	28,000	90,000	30%
1) This figure used in this column should be adjusted to eliminate double-counting of reported quantities. 2) The figure for cardboard recycling equals the sum of the reported quantity (105,000 tons, Column E) and the quantity of material potentially available for recovery presented in Column F. The figure for wood recycling equals the sum of the quantity reported recycled (62,000 tons, Column E) and the quantity estimated as recovered by non-respondents (28,000 tons, Column G).								

Appendix HH

Population Projections from the Ohio Department of Development

Population Projections

The population projections shown on the following pages are taken from *Ohio Metropolitan Areas and County Populations: Census Counts and Intercensal Estimates (1970, 1980, 1981-89, 1990, 1991-95)*, March, 1996. Beginning in 1997, Ohio EPA will send updates of these projections to each SWMD when available each year.

Population estimates for smaller political subdivisions can be found in the publication *1994 Estimates of Ohio's Population: Cities and Villages, Counties, and State (Comparative Tables 1990-1994)*, October 1995.

The documents referenced above can be obtained by contacting:

Office of Strategic Research
Ohio Department of Development
P.O. Box 1001
Columbus, Ohio 43266-0101

Telephone: (614) 466-2116

(See Appendix BB for additional information regarding publications available from the Office of Strategic Research.)

Population Estimates: State and County, 1970, 1980, 1990-1995 (Time Series Alphabetically Sorted)

COUNTY	CENSUS 1970		CENSUS 1980		CENSUS 1990		EST 1990		EST 1991		EST 1992		EST 1993		EST 1994		EST 1995		CHANGE 90-95	% CHANGE 90-95
	CENSUS	EST	CENSUS	EST	CENSUS	EST	EST	EST	EST	EST	EST	EST	EST	EST	EST	EST	EST			
OHIO	10,657,423	10,797,604	10,847,115	10,862,279	10,930,786	11,002,315	11,061,351	11,104,005	11,150,506	303,391	2.8									
ADAMS	18,957	24,328	25,371	25,442	25,905	26,363	26,766	27,205	27,670	22,999	9.1									
ALLEN	111,144	112,241	109,755	109,798	109,764	109,957	109,892	109,749	109,399	-356	-0.3									
ASHLAND	43,303	46,178	47,507	47,561	48,072	48,670	49,806	50,594	51,240	3733	7.9									
ASHTABULA	89,237	104,215	99,821	99,950	100,239	101,788	101,304	101,916	102,360	2539	2.5									
ATHENS	55,747	56,399	59,549	59,527	59,476	59,688	60,147	60,409	60,687	1138	1.9									
AUGLAIZE	38,602	42,554	44,585	44,688	45,323	45,920	46,295	46,599	46,877	2292	5.1									
BELMONT	80,917	82,569	71,074	70,863	70,751	70,815	70,779	70,593	70,379	-695	-1.0									
BROWN	26,635	31,920	34,966	35,138	35,639	36,376	37,178	38,267	38,850	3884	11.1									
BUTLER	226,207	258,787	291,479	292,984	298,817	303,663	308,765	311,857	315,601	24122	8.3									
CARROLL	21,579	25,598	26,521	26,557	26,955	27,164	27,518	27,812	28,142	1621	6.1									
CHAMPAIGN	30,491	33,649	36,019	36,108	36,412	36,644	37,053	37,400	37,686	1667	4.6									
CLARK	157,115	150,236	147,548	147,595	147,756	147,617	147,454	147,544	147,731	183	0.1									
CLEMONT	95,372	128,483	150,167	151,054	154,467	157,785	161,269	164,100	166,941	38,019	23.3									
CLINTON	31,464	34,603	35,417	35,571	36,064	36,629	37,034	37,694	38,019	16774	46									
COLUMBIANA	108,310	113,572	108,276	108,483	109,351	110,288	110,943	111,465	111,853	3577	3.3									
COSHOCTON	33,486	36,024	35,427	35,435	35,552	35,649	35,872	35,975	36,244	817	2.3									
CRAWFORD	50,364	50,075	47,870	47,818	47,736	47,632	47,561	47,556	47,733	-137	-0.3									
CUYAHOGA	1,720,835	1,498,400	1,412,140	1,411,735	1,411,178	1,410,269	1,408,218	1,402,546	1,398,169	-13971	-1.0									
DARKE	49,141	55,096	53,619	53,639	53,707	53,793	53,945	54,119	54,318	699	1.3									
DELANWARE	36,949	39,987	39,350	39,383	39,538	39,472	39,615	39,660	40,115	765	1.9									
DELAWARE	42,908	53,840	66,929	67,451	69,592	71,201	73,466	76,590	78,956	12027	18.0									
ERIE	75,909	79,655	76,779	76,867	77,019	77,350	77,735	78,046	78,805	2026	2.6									
FAIRFIELD	73,301	93,678	103,472	103,952	106,274	109,279	112,128	114,638	117,556	14084	13.6									
FAYETTE	25,461	27,467	27,466	27,494	27,781	27,855	28,106	28,297	28,431	965	3.5									
FRANKLIN	833,249	869,126	961,437	964,803	977,634	989,478	999,350	1,005,599	1,011,019	49582	5.2									
FULTON	33,071	37,751	38,498	38,607	39,015	39,657	39,920	40,159	40,846	2348	6.3									
GALLIA	25,239	30,098	30,954	31,003	31,267	32,384	32,582	32,582	32,582	2348	9.3									
GEAUGA	62,977	74,474	81,129	81,366	82,223	83,167	82,246	83,143	84,260	3131	5.3									
GREENE	125,057	129,769	136,731	137,192	138,608	139,397	139,688	140,112	141,181	4450	3.3									
GUERNSEY	37,665	42,024	39,024	38,986	39,187	39,376	39,446	39,864	40,246	1222	3.1									
HAMILTON	925,944	873,204	868,228	868,522	869,230	870,811	871,339	867,926	863,908	-2320	-0.3									
HANCOCK	61,217	64,581	65,538	65,552	66,131	66,815	67,277	67,773	68,239	2703	4.1									
HARDIN	30,813	32,719	31,111	31,112	31,222	31,329	31,416	31,416	31,558	447	1.4									
HARRISON	17,013	18,152	16,085	16,041	16,007	15,975	16,079	15,997	16,100	15	0.1									
HENRY	27,058	28,383	29,108	29,132	29,269	29,480	29,504	29,611	29,814	706	2.4									
HIGHLAND	28,996	33,477	35,728	35,844	36,486	37,199	37,870	38,544	39,245	3517	9.8									
HOCKING	20,322	24,304	25,533	25,624	26,022	26,669	27,106	27,479	27,997	2464	9.7									
HOLMES	23,024	29,416	32,849	32,924	33,376	33,783	34,434	35,253	36,160	3311	10.1									
HURON	49,587	54,608	56,240	56,407	57,112	57,494	57,709	58,016	58,613	2373	4.2									
JACKSON	27,174	30,592	30,230	30,237	30,735	31,267	31,590	31,879	31,927	1697	5.6									
JEFFERSON	96,193	91,564	80,298	80,095	79,852	79,384	79,095	78,716	78,262	-2036	-2.5									
KNOX	41,795	46,304	47,473	47,631	47,885	48,663	49,287	50,108	51,009	3536	7.4									
LAKE	197,200	212,801	215,499	215,911	217,829	219,663	220,838	221,512	223,003	7504	3.5									

Population Estimates: State and County, 1970, 1980, 1990-1995 (Time Series Alphabetically Sorted)

COUNTY	CENSUS	CENSUS	CENSUS	EST	EST	EST	EST	EST	EST	EST	EST	EST	EST	EST	CHANGE	% CHANGE
	1970	1980	1990	1990	1991	1992	1993	1994	1995	90-95	90-95	90-95	90-95	90-95		
LAWRENCE	56,868	63,649	61,834	61,922	62,323	62,924	63,580	63,932	64,206	2372	3.8					
LICKING	107,799	120,981	128,300	128,825	130,513	131,791	133,510	135,053	136,593	8293	6.5					
LOGAN	35,072	39,155	42,310	42,434	43,137	43,746	44,366	44,637	45,204	2894	6.8					
LORAIN	256,843	274,909	271,126	271,669	273,810	276,028	277,626	279,767	281,447	10321	3.8					
LUCAS	483,551	471,741	462,361	462,390	461,312	460,898	458,933	457,546	455,018	-7343	-1.6					
MADISON	28,318	33,004	37,068	37,124	37,867	38,855	39,557	40,365	40,878	3810	10.3					
MAHONING	304,545	289,487	264,806	264,968	264,631	265,256	265,013	263,937	262,338	-2468	-0.9					
MARION	64,724	67,974	64,274	64,285	64,144	64,395	64,953	65,272	65,781	1507	2.3					
MEDINA	82,717	113,150	122,354	122,901	125,342	128,151	130,659	133,103	135,735	13381	10.9					
MEIGS	19,799	23,641	22,987	23,025	23,205	23,446	23,625	23,842	24,066	1079	4.7					
MERCER	35,558	38,334	39,443	39,577	39,724	39,923	40,133	40,479	40,906	1463	3.7					
MIAMI	84,342	90,381	93,182	93,294	94,076	94,842	95,754	96,499	97,010	3828	4.1					
MONROE	15,739	17,382	15,497	15,496	15,404	15,276	15,333	15,309	15,388	-109	-0.7					
MONTGOMERY	608,413	571,697	573,809	574,009	575,468	576,836	576,305	572,532	570,490	-3319	-0.6					
MORGAN	12,375	14,241	14,194	14,184	14,157	14,292	14,338	14,453	14,602	408	2.9					
MORROW	21,348	26,480	27,749	27,803	28,103	28,543	29,130	29,608	30,136	2387	8.6					
MUSKINGUM	77,826	83,340	82,068	82,148	82,175	82,589	83,166	83,685	84,169	2101	2.6					
NOBLE	10,428	11,310	11,336	11,340	11,574	11,630	11,773	11,830	12,096	760	6.7					
OTTAWA	37,099	40,076	40,029	40,054	40,092	40,095	40,272	40,330	40,591	562	1.4					
PAULDING	19,329	21,302	20,488	20,466	20,317	20,142	20,284	20,289	20,443	-45	-0.2					
PERRY	27,434	31,032	31,557	31,602	31,760	32,277	32,699	33,285	33,550	1993	6.3					
PICKAWAY	40,071	43,662	48,244	48,259	48,866	51,091	51,749	51,749	52,510	4266	8.8					
PIKE	19,114	22,802	24,249	24,362	24,665	25,251	25,677	26,086	26,775	2526	10.4					
PORTAGE	125,868	135,858	142,585	142,771	144,134	145,852	146,149	147,197	148,699	6114	4.3					
PREBLE	34,719	38,223	40,113	40,169	40,448	40,892	41,156	41,577	42,174	2061	5.1					
PUTNAM	31,134	32,991	33,819	33,856	34,191	34,446	34,529	34,827	35,089	1270	3.8					
RICHLAND	129,997	131,205	126,137	126,197	127,036	127,431	127,718	128,254	128,421	2284	1.8					
ROSS	61,211	65,004	69,330	69,442	70,574	71,419	72,555	73,250	73,941	4811	6.7					
SAUNDISKY	60,983	63,267	61,963	61,951	62,470	62,639	62,578	62,738	62,997	1034	1.7					
SCIO	76,951	84,545	80,327	80,385	80,199	80,951	80,723	81,113	81,414	1087	1.4					
SENECA	60,696	61,901	59,733	59,845	59,706	59,801	60,094	60,391	60,369	636	1.1					
SHELBY	37,748	43,089	44,915	45,048	45,629	45,903	46,335	46,648	47,079	2164	4.8					
STARK	372,210	378,823	367,585	367,917	369,642	371,534	373,571	374,733	375,553	7968	2.2					
SUMMIT	553,371	524,472	514,990	515,823	519,349	522,044	525,143	527,715	530,135	15145	2.9					
TUSCARAWAS	232,579	241,863	227,813	227,853	228,731	229,403	229,625	229,032	228,417	604	0.3					
UNION	77,211	84,614	84,090	84,137	84,853	85,441	85,859	86,585	87,323	3233	3.8					
VAN WERT	23,786	29,536	31,969	32,026	32,709	33,633	34,430	35,433	36,528	4559	14.3					
WARREN	29,194	30,458	30,464	30,464	30,349	30,278	30,316	30,397	30,463	-1	-0.0					
WASHINGTON	9,420	11,584	11,098	11,089	11,233	11,409	11,648	11,818	12,072	974	8.8					
WAYNE	85,505	99,276	113,927	114,476	116,959	119,424	123,526	127,345	131,295	17368	15.2					
WILLIAMSON	57,160	64,266	62,254	62,245	62,214	62,760	63,278	63,688	63,836	1582	2.5					
WILLIAMS	87,123	97,408	101,461	101,723	102,526	103,710	104,996	106,176	107,526	6065	6.0					
WOOD	33,659	36,389	36,936	37,020	37,044	37,284	37,337	37,505	37,846	890	2.4					
WOODBOND	89,722	107,372	113,259	113,400	113,347	113,627	114,521	115,450	116,934	3665	3.2					
WYANDOT	21,826	22,651	22,254	22,254	22,260	22,297	22,498	22,641	22,732	478	2.1					

Data Source: Population Estimates Branch, Bureau of the Census

Prepared by: the Office of Strategic Research, Ohio Department of Development

Appendix II

Solid Waste Conversion Factors:

Volume to Weight

**Table II-1. Selected Conversions Factors
from Cubic Yards to Pounds**

Material	Volume	Weight (in lbs.)
Newsprint, Loose	1 cubic yard	360 - 800
Newsprint, compacted	1 cubic yard	720 - 1,000
Glass, whole bottles	1 cubic yard	600 - 1,000
Glass, semi-crushed	1 cubic yard	1,000 - 1,800
Glass, crushed mechanically	1 cubic yard	800 - 2,700
PETE, soda bottles, whole, loose	1 cubic yard	30 - 40
PETE, soda bottles, baled	30" x 62"	500
plastic film, baled	30" x 42" x 48"	1,100
HDPE, (dairy only), whole, loose	1 cubic yard	24
HDPE, (dairy only), baled	32" x 60"	400 - 500
HDPE, (mixed), baled	32" x 60"	900
Mixed PETE and dairy, whole, loose	1 cubic yard	32
Mixed PETE, dairy, and other rigid, whole, loose	1 cubic yard	38
Mixed rigid, no film, or dairy, whole, loose	1 cubic yard	49
Mixed rigid, and film, densified by mixed plastic mold technology	1 cubic yard	1620
Aluminum cans, whole	1 cubic yard	50 - 74
Aluminum cans, flattened	1 cubic yard	250
Ferrous cans, whole	1 cubic yard	150
Ferrous cans, flattened	1 cubic yard	850
Corrugated cardboard, loose	1 cubic yard	300
Corrugated cardboard, baled	1 cubic yard	1,000 - 1,200

Source: Ohio Administrative Code 3745-27-03.

Appendix JJ

Industrial Waste Generation: Estimation and Composition

Appendix JJ. Industrial Waste Generation: Estimation and Composition

This appendix presents information which can be used by a solid waste management district (SWMD) to estimate waste generation for industries who have not responded to district surveys. The information in this appendix should be used only after a solid waste management district (SWMD) has made every effort to survey all industries within the district (or has conducted a statistically reliable sampling effort).

Classification of Industries

The industrial sector is defined as those manufacturers who fall within the Standard Industrial Classification (SIC) categories of 20 and 22-39. (See Table JJ-1). The SIC system of classification was developed by the federal government for use in classifying establishments by the type of activity in which they were engaged, specifically,

**Table JJ-1
Description of the Major Industry Groups in each SIC category**

SIC	Major Industry Group
20	Food and Kindred Products
22	Textile Mill Products
23	Apparel and Textile Products Made From Fabrics
24	Lumber and Wood Products Excluding Furniture
25	Furniture and Fixtures
26	Paper and Allied Products
27	Printing, Publishing and Allied Industries
28	Chemicals and Allied Products
29	Petroleum Refining and Related Industries
30	Rubber and Miscellaneous Plastics Products
31	Leather and Leather Products
32	Stone, Clay, Glass and Concrete Products
33	Primary Metal Industries
34	Fabricated Metal Products, Except Machinery and Transportation Equipment
35	Machinery, Except Electrical
36	Electrical and Electronic Machinery, Equipment and Supplies
37	Transportation Equipment
38	Measuring, Analyzing and Controlling Instruments
39	Miscellaneous Manufacturing Industries

the goods produced or services provided. The general economic divisions include: agricultural services, mining, construction, manufacturing, transportation, public utilities, wholesale trade, retail trade, finance, insurance, real estate, and services. This system promotes uniformity and comparability in the preparation of statistical information on the U.S. economy. Employers are assigned an industry classification code by the Social Security Administration on the basis of the nature of business information supplied on Treasury Form SS-4 (Application for Employer Identification Number). These classifications are updated by the U.S. Department of Commerce, Bureau of the Census based upon information supplied on business tax returns, businesses canvassed in the economic censuses, and annual surveys. Companies are assigned to a primary four-digit SIC category, and may be assigned to several secondary four-digit SIC categories, depending upon the nature of the business.

District Plan Methods to Estimate Waste Generation

The *District Solid Waste Management Plan Format* (1989) required each SWMD to conduct an industrial waste generation survey of all industries in the district. All districts conducted such a survey; however, very few districts received a usable response from all industries.

The most common method used by districts to project industrial generation for survey non-respondents involved the calculation of a tons/employee generation rate for each SIC category based upon the total tonnages and employees reported by industries in that SIC category. This generation rate was multiplied by the actual number of employees in industries in that SIC category for a projected estimate of total waste generated. As of February 1993, seventeen districts out of 48 had utilized this method.

A more detailed variation of this method involves calculating a per employee generation rate for each waste stream in each SIC category. However, even though some districts presented this detailed information, the per employee generation rate for the SIC category was used to project waste generation, rather than the individual generation rate for each waste stream in each SIC category. Eight districts presented generation rates broken out by waste stream and by SIC category in their plans.

The second most common method involved the calculation of a tons/employee generation rate for each county in the solid waste management district. Thus, data was pooled across SIC categories, and one generation rate per county was used to estimate waste generation for that county. Fifteen districts utilized this method. Included in this group is a two-county district that calculated one generation rate for the entire district to estimate the waste generated.

Eight districts did not use their surveys to estimate waste generated by industries. According to these districts, the survey data did not provide a reliable estimate of waste generation. These districts only utilized the recycling information from the survey, and estimated waste generation from landfill and incinerator reports, in addition to the recycling reports. Of these eight districts, one district used hauler reports to estimate industrial waste generation.

Finally, one district achieved 100% participation in its survey. Therefore, this district did not require any waste generation projections for non-respondents.

Ohio EPA Recommendations

Ohio EPA recommends that SWMDs calculate a waste generation rate per employee for each SIC category based upon the survey responses received. Then, these rates should be multiplied by the number of employees in the non-responding industries and added to the reported generation to determine the total waste generated in each SIC category. If the number of responding industries is less than 20 for a given SIC category, if the largest facilities have not responded to the survey, or if the number of facilities in the district for a particular SIC category is very small, the district should consider using the values presented in Table JJ-2 in this appendix. Sample sizes less than 20 may introduce considerable variability in the estimation and less reliable results. This is particularly true if the largest facilities within a particular SIC category do not respond to the survey.

The values in Table JJ-2 are based upon the survey results of 19 SWMDs, and in general, greater than 20 industries within each SIC category (except for SIC categories 22 and 31). An examination of the percent of employees represented by the surveys in Table JJ-2 shows that the response rates range from 22 percent of total employment in the state for a particular SIC category, to 47 percent, with 22 percent and 37 percent represented by SIC categories 22 and 31, respectively. In summary, the results of the surveys of these 19 districts represent 35 percent of the total employment in the state, and at a minimum, 21 percent of the facilities.

Several sources of information are available for determining the number of employees from industry not responding to the district survey. Countywide employment trends are published by:

- U.S. Department of Commerce, Bureau of the Census (e.g., *County Business Patterns, 1990*);
- Ohio Statistical Research Center (e.g., *Ohio County Profiles: 1990*); and
- Ohio Bureau of Employment Services (e.g., *Trends in Employment, Payroll and Earnings Covered Under the Ohio Unemployment Compensation Law*).

Information specific to individual establishments in the manufacturing sector in Ohio is published annually by the Harris Publishing Company in cooperation with the Ohio Department of Development. The *Harris Ohio Industrial Directory* provides statistical information regarding the number of manufacturers and number of employees by county, as well as geographical, alphabetic, SIC category, and product listings of manufacturers. Finally, on the local level, planning commissions, chambers of commerce and yellow pages publications can provide information regarding the location of individual manufacturers.

Table JJ-2 presents average generation rates in tons per employee for each industrial SIC category. These averages are based upon the following SWMD plans (for some districts, the draft plan was used):

Athens-Gallia-Hocking-Jackson-Meigs-Vinton	Henry
Clark	Lorain
Crawford	Lucas
Cuyahoga	Mahoning
Darke	Miami
Franklin (Solid Waste Authority of Central Ohio)	Ottawa-Sandusky-Seneca
Guernsey-Monroe-Morgan-Muskingum-Noble-Washington	Portage
Hamilton	Putnam
Stark-Tuscarwas-Wayne	Hancock
Summit	

Table JJ-2.
Ohio Industrial Waste Generation Rates by SIC Category (data as of
2/23/93)

SIC	Generation Rate (tons/employee)
20	13.92
22	9.99
23	2.80
24	51.62
25	1.79
26	17.50
27	6.70
28	12.43
29	7.33
30	7.29
31	3.41
32	10.55
33	36.93
34	11.16
35	5.72
36	2.98
37	3.21
38	1.74
39	4.62

Composition of Waste Generated by Industry

Eight SWMDs presented waste composition data from the industrial surveys in their solid waste management plans. Types of waste were given for each SIC category represented by survey respondents. It was apparent in reviewing the survey results that various categories were used by districts in identifying the types of waste generated. For example, some surveys listed a category of "GSW" or general solid waste. Other surveys included a category called "mixed waste". The following list includes all terms that were standardized or combined for purposes of this document:

term used in this document

aluminum
cardboard
fabric/textiles
metal, ferrous
metal, non-ferrous
mixed waste
non-specified
paper, misc.
paper, newsprint

terms that appeared in surveys

aluminum plates
corrugated
fabric, textiles
ferrous
other metal
composites, GSW, general trash
other, misc. other types waste compositions
paper
newsprint

paper, office
slag
wood

white paper
cupola slag
boardends

Table JJ-3 lists the amounts and generation rates for each type of waste in each SIC category. This data was based on information compiled from survey results presented by the Athens-Gallia-Hocking-Jackson-Meigs-Vinton, Crawford, Hamilton, Henry, Portage, Putnam, Stark-Tuscarawas-Wayne and Summit Districts. Ohio EPA recommends that SWMDs use the information in Table JJ-3 to develop generation estimates for each waste stream by SIC category if the district has fewer than 20 industries for a given SIC category which responded to their survey and provided this type of information. Estimation of the types of waste generated by industries in particular SIC categories will aid the district in developing various recycling and waste reduction programs that target particular waste streams. Caution should be exercised, however, in utilizing the waste stream generation figures presented in Table JJ-3, because these values are based upon a much smaller sample size than the waste generation figures calculated for SIC categories presented in Table JJ-2. The waste stream data represents from three to 29 percent of the total employment for various SIC categories. For example, the waste generation rate for SIC category 24 (based upon survey responses representing 24 percent of the employees for that SIC category in the state) is 51.62 tons/employee in Table JJ-2. The generation rate for this same SIC category (based upon the subset of districts that presented waste type information, which represent eight percent of the respondent employment) is 124.86 tons per employee in Table JJ-3. The reason for this large discrepancy is that a particular facility in SIC category 24 reported generating over 200,000 tons of bark and sawdust, and this amount becomes weighted more heavily the less the number of total employees in the sample size. Such discrepancies indicate the preferability of conducting such an analysis on the four-digit SIC category level rather than the two-digit level.

Table JJ-3.

**Types of Industrial Wastes Generated For Each SIC Category
and Generation Rate (Tons/Employee) for Each Type**

Waste Stream	SIC Category							
	20		22		23		24	
	Total tons	tons/emp.	Total tons	tons/emp.	Total tons	tons/emp.	Total tons	tons/emp.
aluminum	793.13	0.0503	7.92	0.0219	9.08	0.0058	16.04	0.0076
ash	16,000.00	1.0143					818.00	0.3879
bark							104,000.00	49.3125
batteries								
cardboard	29,330.13	1.8593	341.14	0.9450	3,874.98	2.4650	950.11	0.4505
concrete	3,530.00	0.2238						
dirty powder								
drums								
dust collector fines								
fabric/textiles	101.65	0.0064	424.80	1.1767	1,039.25	0.6611	5.65	0.0027
food wastes	92,295.40	5.8507			520.70	0.3312	168.42	0.0799
glass	4,086.85	0.2591	36.00	0.0997	727.20	0.4626	177.11	0.0840
ink								
litho/photo film								
lubricants								
metal dust								
metal, ferrous	14,081.64	0.8927			2.70	0.0017	37.61	0.0178
metal, non-ferrous	3,080.30	0.1953			24.00	0.0153	1,497.43	0.7100
mixed waste	7,585.57	0.4809	480.00	1.3296	172.40	0.1097	203.90	0.0967
non-haz. chemicals	430.00	0.0273	18.35	0.0508				
non-specified	7,928.49	0.5026	241.60	0.6693	0.60	0.0004	211.92	0.1005
oil	494.90	0.0314					2.10	0.0010
paper, office	2,262.98	0.1435	8.30	0.0230	115.21	0.0733	391.76	0.1858
paper, misc.	6,739.30	0.4272	291.24	0.8068	704.34	0.4481	64.96	0.0308
paper, newsprint						0.58	0.0003	
plaster	783.60	0.0497						
plastics	4,689.31	0.2973	681.27	1.8872	258.61	0.1645	43.92	0.0208
refractories								
rubber	3,209.53	0.2035					0.13	0.0001
sawdust							109,385.00	51.8658
silica/alumina								
slag								
sludge	26,878.80	1.7039						
stone/clay/sand	4,039.50	0.2561					120.00	0.0569
wood	4,364.37	0.2767	73.30	0.2030	166.95	0.1062	45,232.01	21.4471
yard wastes	256.90	0.0163			25.60	0.0163		
Total	232,962.35	14.7678	2,603.92	7.2131	7,641.62	4.8611	263,326.65	124.8585

Table JJ-3. (continued)

**Types of Industrial Wastes Generated For Each SIC Category
and Generation Rate (Tons/Employee) for Each Type**

Waste Stream	SIC Category							
	25 Total tons	tons/emp.	26 Total tons	tons/emp.	27 Total tons	tons/emp.	28 Total tons	tons/emp.
aluminum	0.50	0.0005	2,007.48	0.4186	231.51	0.0325	303.02	0.0156
ash	3.00	0.0033	36,716.00	7.6555			72,916.30	3.7656
bark								
batteries								
cardboard	898.03	0.9858	23,817.65	4.9661	2,658.44	0.3731	19,363.50	1.0000
concrete							4,350.35	0.2247
dirty powder								
drums								
dust collector fines								
fabric/textiles	140.10	0.1538			1.18	0.0002	49.62	0.0026
food wastes	78.35	0.0860	487.10	0.1016	682.48	0.0958	2,307.34	0.1192
glass	0.10	0.0001	29.70	0.0062	104.13	0.0146	2,492.80	0.1287
ink					3.00	0.0004		
litho/photo film					1.70	0.0002		
lubricants								
metal dust								
metal, ferrous	288.40	0.3166	522.79	0.1090	98.53	0.0138	10,580.24	0.5464
metal, non-ferrous	14.16	0.0155	246.20	0.0513	78.95	0.0111	165.65	0.0086
mixed waste	1.30	0.0014	4,666.84	0.9731	4,945.76	0.6940	40,050.86	2.0683
non-haz. chemicals			35.92	0.0075	6.93	0.0010	3,630.12	0.1875
non-specified	196.20	0.2154	6,211.31	1.2951	8,956.49	1.2569	34,343.87	1.7736
oil			10.70	0.0022	7.70	0.0011	137.80	0.0071
paper, office	961.43	1.0554	14,171.93	2.9549	12,960.60	1.8188	3,751.66	0.1937
paper, misc.	200.60	0.2202	3,265.36	0.6809	20,873.48	2.9292	5,753.82	0.2971
paper, newsprint	2.02	0.0022			282.50	0.0396	3.00	0.0002
plaster								
plastics	346.08	0.3799	2,931.05	0.6111	840.29	0.1179	9,062.86	0.4680
refractories								
rubber	0.02	0.0000	23.45	0.0049	329.25	0.0462	1,668.00	0.0861
sawdust								
silica/alumina								
slag								
sludge	45.00	0.0494	8,090.50	1.6869			41,493.00	2.1428
stone/clay/sand	12.20	0.0134			4.70	0.0007	9,581.45	0.4948
wood	800.93	0.8792	2,315.38	0.4828	1,096.57	0.1539	6,6	81.50
yard wastes	0.3450							
	45.40	0.0498	9.00	0.0019	127.30	0.0179	661.70	0.0342
Total	4,033.82	4.4279	105,558.36	22.0097	54,291.49	7.6188	269,3	
	48.46	13.9098						

Table JJ-3. (continued)

Types of Industrial Wastes Generated For Each SIC Category
and Generation Rate (Tons/Employee) For Each Type

Waste Stream	SIC Category							
	29 Total tons	tons/emp.	30 Total tons	tons/emp.	31 Total tons	tons/emp.	32 Total tons	tons/emp.
aluminum	12.90	0.0140	142.76	0.0064	81.80	0.0902	1.52	0.0005
ash			1,250.80	0.0561			332.75	0.1165
bark								
batteries								
cardboard	612.51	0.6629	21,426.80	0.9612	200.70	0.2213	1,201.38	0.4207
concrete	1,766.20	1.9115	213.15	0.0096			1,311.35	0.4592
dirty powder								
drums			9.00	0.0004				
dust collector fines								
fabric/textiles	2.00	0.0022	622.42	0.0279	240.70	0.2654	1,989.30	0.6965
food wastes	35.05	0.0379	1,224.85	0.0549	491.60	0.5420	19.25	0.0067
glass	67.80	0.0734	375.32	0.0168	60.00	0.0662	30.45	0.0107
ink								
litho/photo film								
lubricants								
metal dust								
metal, ferrous	325.30	0.3521	4,870.80	0.2185	10.00	0.0110	386.85	0.1355
metal, non-ferrous	34.60	0.0374	197.11	0.0088	10.00	0.0110	4.48	0.0016
mixed waste	1,473.00	1.5942	8,237.77	0.3696			4,460.10	1.5617
non-haz. chemicals	4.55	0.0049	1,002.18	0.0450			49.89	0.0175
non-specified	359.62	0.3892	45,501.81	2.0413			1,193.10	0.4178
oil	48.80	0.0528	49.60	0.0022				
paper, office	37.80	0.0409	5,182.17	0.2325			650.15	0.2276
paper, misc.	419.10	0.4536	1,748.18	0.0784	595.50	0.6566	268.14	0.0939
paper, newsprint	2.15	0.0023	148.41	0.0067			5.80	0.0020
plaster							37.50	0.0131
plastics	106.87	0.1157	24,021.45	1.0776	76.60	0.0845	486.72	0.1704
refractories								
rubber	5.05	0.0055	11,036.36	0.4951			18.53	0.0065
sawdust								
silica/alumina								
slag								
sludge	7,000.00	7.5758	585.29	0.0263			7,534.00	2.6380
stone/clay/sand	13,208.20	14.2946	1,237.55	0.0555			48,726.50	17.0611
wood	302.90	0.3278	6,007.66	0.2695	117.70	0.1298	416.71	0.1459
yard wastes	16.50	0.0179	3.30	0.0001			65.00	0.0228
Total	25,840.90	27.9663	135,094.74	6.0605	1,884.60	2.0778	69,189.47	24.2260

Table JJ-3. (continued)

**Types of Industrial Wastes Generated For Each SIC Category
and Generation Rate (Tons/Employee) For Each Type**

Waste Stream	SIC Category							
	33		34		35		36	
	Total tons	tons/emp.	Total tons	tons/emp.	Total tons	tons/emp.	Total tons	tons/emp.
aluminum	356,124.42	38.0475	3,434.56	0.1762	587.14	0.0327	237.41	0.0176
ash	61.00	0.0065	359.57	0.0184	2,436.55	0.1357		
bark								
batteries			0.60	0.0000	0.04	0.0000		
cardboard	2,270.53	0.2426	5,349.57	0.2744	5,022.85	0.2798	7,207.55	0.5342
concrete	100.00	0.0107	3,463.90	0.1777	542.80	0.0302	227.30	0.0168
dirty powder	20.00	0.0021						
drums					1.20	0.0001		
dust collector fines	2,888.00	0.3085						
fabric/textiles	1.20	0.0001	246.24	0.0126	11.95	0.0007	523.07	0.0388
food wastes	369.48	0.0395	1,605.92	0.0824	1,299.77	0.0724	735.05	0.0545
glass	594.80	0.0635	1,389.05	0.0713	1,004.18	0.0559	5,711.12	0.4233
ink								
litho/photo film							1.00	0.0001
lubricants			2.10	0.0001				
metal dust			0.60	0.0000				
metal, ferrous	179,555.17	19.1832	66,928.43	3.4336	17,439.66	0.9714	1,929.37	0.1430
metal, non-ferrous	546.89	0.0584	4,005.82	0.2055	956.18	0.0533	4,600.98	0.3410
mixed waste	9,918.28	1.0596	11,841.39	0.6075	4,376.90	0.2438	4,656.67	0.3452
non-haz. chemicals	249.70	0.0267	132.93	0.0068	503.73	0.0281	2.40	0.0002
non-specified	37,303.56	3.9854	1,127.72	0.0579	4,103.49	0.2286	334.65	0.0248
oil	5.40	0.0006	44.10	0.0023	232.60	0.0130	9.80	0.0007
paper, office	1,617.83	0.1728	3,943.46	0.2023	2,743.25	0.1528	1,548.92	0.1148
paper, misc.	957.60	0.1023	1,478.52	0.0759	4,307.80	0.2399	2,749.40	0.2038
paper, newsprint			4.75	0.0002	34.59	0.0019		
plaster								
plastics	84.03	0.0090	435.75	0.0224	651.16	0.0363	421.29	0.0312
refractories	598.70	0.0640						
rubber	117.30	0.0125	451.32	0.0232	205.42	0.0114	453.34	0.0336
sawdust								
silica/alumina					1,635.52	0.0911		
slag	15,592.82	1.6659						
sludge	65,488.00	6.9966	2,314.90	0.1188	4,191.75	0.2335	160.58	0.0119
stone/clay/sand	85,436.30	9.1278	1,640.43	0.0842	1,116.50	0.0622	1,407.60	0.1043
wood	5,595.53	0.5978	5,431.42	0.2786	2,488.57	0.1386	1,756.98	0.1302
yard wastes	66.30	0.0071	33.20	0.0017	437.00	0.0243	25.30	0.0019
Total	765,562.84	81.7909	115,666.25	5.9340	56,330.60	3.1375	34,699.78	2.5721

Table JJ-3. (continued)

Types of Industrial Wastes Generated For Each SIC Category
and Generation Rate (Tons/Employee) For Each Type

Waste Stream	SIC Category					
	37		38		39	
	Total tons	tons/emp.	Total tons	tons/emp.	Total tons	tons/emp.
aluminum	3,399.40	0.1209	24.20	0.0077	45.93	0.0294
ash	1,957.45	0.0696				
bark						
batteries						
cardboard	19,161.12	0.6817	1,116.82	0.3534	4,120.55	2.6346
concrete	6,000.13	0.2135			25.00	0.0160
dirty powder	56.00	0.0020				
drums						
dust collector fines						
fabric/textiles	454.55	0.0162	288.00	0.0911	168.38	0.1077
food wastes	7,998.90	0.2846	215.38	0.0682	357.14	0.2284
glass	1,165.00	0.0414	97.10	0.0307	265.10	0.1695
ink						
litho/photo film						
lubricants						
metal dust						
metal, ferrous	19,622.80	0.6981	206.72	0.0654	492.40	0.3148
metal, non-ferrous	3,229.53	0.1149	19.00	0.0060	114.02	0.0729
mixed waste	4,407.83	0.1568	162.89	0.0515	146.62	0.0937
non-haz. chemicals	61.39	0.0022			7.96	0.0051
non-specified	4,046.50	0.1440	86.21	0.0273	11.90	0.0076
oil	1,956.00	0.0696			1.00	0.0006
paper, office	1,980.33	0.0705	482.19	0.1526	521.61	0.3335
paper, misc.	10,473.58	0.3726	261.05	0.0826	1,124.40	0.7189
paper, newsprint						
plaster						
plastics	2,751.30	0.0979	145.66	0.0461	101.66	0.0650
refractories						
rubber	7,977.68	0.2838	0.60	0.0002	55.23	0.0353
sawdust						
silica/alumina						
slag						
sludge	3,130.00	0.1114	1.00	0.0003	0.30	0.0002
stone/clay/sand	10,025.80	0.3567			96.20	0.0615
wood	9,997.52	0.3557	552.63	0.1749	536.65	0.3431
yard wastes	749.50	0.0267	2.50	0.0008	14.40	0.0092
Total	120,602.31	4.2907	3,661.95	1.1588	8,206.45	5.2471

Note:

The figures used in this table are based upon information from eight SWMDs: Athens-Gallia-Hocking-Jackson-Meigs-Vinton, Crawford, Hamilton, Henry, Portage, Putnam, Stark-Tuscarawas-Wayne, and Summit.

Generation Rates by Waste Stream at the Four-digit SIC Category Level

The optimum level for calculating generation rates may be at the four-digit SIC category, due to an increase in homogeneity among industries. The major drawback in calculating at this level, however, is the large industrial base and the extensive calculations required. Several districts provided sufficient raw data in their plans to allow calculation of generation rates by types of waste generated for industries categorized at the four-digit SIC level.

If you would like additional information regarding estimation of industrial solid waste using four-digit SIC categories, please contact the Division of Solid and Infectious Waste Management at the address or phone number provided in Appendix BB of this document.

Appendix KK

National Average Composition of Municipal Solid Waste: Residential and Commercial Fractions

Appendix KK. National Average Composition of Municipal Solid Wastes: Residential and Commercial Fractions

Table KK-1 presents the percent composition of products, packaging and other materials found in the municipal solid waste (MSW) stream, as estimated by Franklin Associates, Inc. and reported in the U.S. EPA document titled *Characterization of Municipal Solid Wastes in the United States: 1994 Update* (or the *1994 Update*). This report presents a characterization of the waste stream of the nation as a whole. Numerous factors may cause a local waste stream to differ in quantity and composition from the national averages presented in Table KK-1. Therefore, SWMDs are encouraged to gather information on the characteristics of their local municipal solid waste stream in order make the best application of local and/or national waste characterization information.

Presented below are definitions used in the *1994 Update* on MSW generation and composition. These definitions are intended to help clarify how the characterization study was conducted, and aid in application of the results to local waste streams.

Municipal Solid Waste (MSW) as defined in the *1994 Update*, includes wastes such as durable goods, nondurable goods, containers and packaging, food scraps, yard trimmings, and miscellaneous inorganic wastes from residential, commercial, institutional and industrial sources. MSW does not include waste from other sources such as construction and demolition wastes, municipal wastewater treatment plant sludge, combustion ash from industrial incinerators, and industrial process wastes that might also be disposed of in sanitary landfills or solid waste incinerators.

Generation refers to the amount of materials and products as they enter the waste stream and before materials recovery, composting, or combustion takes place.

Recovery refers to materials removed from the waste stream for the purpose of recycling or composting.

Discards refers to the MSW remaining after recovery for recycling and composting. Discards are usually combusted or disposed in landfills, however, some MSW is littered or dumped illegally, or disposed of on-site.

A **Materials Flow Methodology** was used to estimate the amount and composition of the municipal solid wastes generated for the nation. This methodology is based on production data for the materials and products in the waste stream with adjustments for imports, exports and product lifetimes.

The generation rates presented in Sections IV and V of the *Format* are intended to project generation as defined above. Estimated generation should exceed the amount of waste arriving at disposal facilities in all cases except where open dumping and materials recovery are minimal to non-existent.

**Table KK-1.
Percent of Total Generation of Products, Packaging and
Other Materials Comprising the Municipal Solid Waste Stream**

The figures below are based on Tables 28, 29, 30 and 31 in the U.S. EPA report, <i>Characterization of Municipal Solid Waste in the United States: 1994 Update</i> .		
Material	Percent of Total Generation	
	1993	2000
Major Appliances	1.7	1.7
Small Appliances	0.3	0.3
Furniture and Furnishings	3.4	3.7
Carpets and Rugs	1	1.1
Rubber Tires	1.6	1.8
Batteries, Lead-Acid	0.8	0.9
Miscellaneous Durables	6.6	7.1
Newspapers	6.3	6.6
Books	0.5	0.5
Magazines	1.2	1.4
Office Papers	3.4	3.9
Telephone Books	0.4	0.4
Third Class Mail	1.9	2.2
Other Commercial Printing	2.6	2.9
Tissue Paper and Towels	1.5	1.6
Paper Plates and Cups	0.4	0.4
Plastic Plates and Cups	0.2	0.2
Trash Bags	0.4	0.5
Disposable Diapers	1.3	1.3
Other Nonpackaging Paper	2.3	2.5
Clothing and Footwear	2.1	2.2
Towels, Sheets, & Pillowcases	0.3	0.4
Other Miscellaneous Nondurables	1.7	1.9
Glass Beer and Soft Drink Bottles	2.6	2.5
Glass Wine and Liquor Bottles	0.9	0.9
Glass Food and Other Bottles & Jars	2.4	2.3
Steel Beer and Soft Drink Cans*	0	0

**Table KK-1.
Percent of Total Generation of Products, Packaging and
Other Materials Comprising the Municipal Solid Waste Stream**

The figures below are based on Tables 28, 29, 30 and 31 in the U.S. EPA report, <i>Characterization of Municipal Solid Waste in the United States: 1994 Update</i> .		
Material	Percent of Total Generation	
	1993	2000
Steel Food and Other Cans	1.3	1.3
Other Steel Packaging	0.1	0.1
Aluminum Beer and Soft Drink Cans	0.8	0.8
Aluminum Foil and Closures	0.2	0.2
Paper Corrugated Boxes	12.7	14.2
Paper Milk Cartons	0.2	0.2
Paper Folding Cartons	2.4	2.5
Other Paperboard Packaging	0.1	0.1
Paper Bags and Sacks	1.1	1
Wrapping Papers*	0	0
Other Paper Packaging	0.5	0.5
Plastic Soft Drink Bottles	0.3	0.3
Plastic Milk Bottles	0.3	0.3
Other Plastic Containers	0.9	1.5
Plastic Bags and Sacks	0.5	0.6
Plastic Wraps	0.9	0.8
Other Plastic Packaging	1.1	1
Wood Packaging	4.6	5.1
Other Miscellaneous Packaging	0.1	0.1
Food Wastes	6.7	6.4
Yard Trimmings	15.9	10.2
Miscellaneous Inorganic Wastes	1.5	1.5
Total	100.00	99.90

* Quantity generated comprises less than 0.1 percent of the total waste stream.

The *1994 Update* includes estimates of the fraction of MSW generation contributed by the residential and commercial sectors for each material identified in the municipal solid waste stream. These estimates are presented in Table KK-2. As noted in the *1994 Update*, there is substantial uncertainty associated with the estimates of the individual fractions by source for each waste component. The fraction of total MSW comprised of residential waste is estimated to be in the range of 55 to 65 percent. The classification of MSW generation into residential and commercial fractions for each product and material was made on a "best judgement" basis, then aggregated for the total. It should also be noted that the estimates are based on the waste stream of the nation as a whole, and therefore, may not be representative of a particular local waste stream.

As an example in using the information in this appendix, the figures in Tables KK-1 and KK-2 can be used to determine rough estimates of the tons of major appliances expected to be found in the waste stream from residential sources:

- assume a community has a MSW generation estimate of 100,000 per year;

- the fraction of MSW comprised by major appliances from Table KK-1 is 1.7 percent:

$$100,000 \text{ tons of MSW generation} \times 0.017 = 1,700 \text{ tons of major appliances}$$

- residential sector generation of major appliances from Table KK-2 is 10 percent:

$$1,700 \text{ tons of appliances} \times 0.1 = 170 \text{ tons of appliances from the residential sector in the MSW waste stream.}$$

**Table KK-2.
Residential vs. Commercial Fractions
of the Municipal Solid Waste Stream**

<i>Product or Material</i>	<i>Residential</i>	<i>Commercial</i>
	<i>Percent</i>	<i>Percent</i>
<i>Durable Goods</i>		
Major Appliances	10	90
Small Appliances	95	5
Furniture	80	20
Carpets and Rugs	80	20
Rubber Tires	5	95
Lead Acid Batteries	5	95
Miscellaneous Durables	80	20
<i>Nondurable Goods</i>		
Newspapers	85	15
Books	80	20
Magazines	65	35
Office Papers	25	75
Telephone Books	60	40
Third Class Mail	65	35
Other Commercial Printing	65	35
Tissue Paper & Towels	60	40
Paper Plates & Cups	20	80
Plastic Plates & Cups	20	80
Trash Bags	95	5
Disposable Diapers	90	10
Other Nonpackaging Paper	50	50
Clothing & Footwear	60	40
Towels, Sheets, etc.	90	10
Other Miscellaneous Nondurables	50	50
<i>Containers & Packaging</i>		
<i>Glass Packaging</i>		
Beer & Soft Drink Bottles	80	20
Wine & Liquor Bottles	80	20
Food & Other Bottles & Jars	85	15
<i>Steel Packaging</i>		
Beer & Soft Drink Cans	80	20

**Table KK-2.
Residential vs. Commercial Fractions
of the Municipal Solid Waste Stream**

<i>Product or Material</i>	<i>Residential</i>	<i>Commercial</i>
	<i>Percent</i>	<i>Percent</i>
Food & Other Cans	85	15
Other Steel Packaging	5	95
Aluminum Packaging		
Beer & Soft Drink Cans	80	20
Other Cans	50	50
Foil & Closures	90	10
Paper and Paperboard Packaging		
Corrugated Boxes	10	90
Milk Cartons	50	50
Folding Cartons	60	40
Other Paperboard Packaging	50	50
Bags & Sacks	90	10
Wrapping Papers	90	10
Other Paper Packaging	70	30
Plastics Packaging		
Soft Drink Bottles	80	20
Milk Bottles	95	5
Other Containers	80	20
Bags & Sacks	90	10
Wraps	80	20
Other Plastics Packaging	80	20
Wood Packaging	0	100
Other Miscellaneous Packaging	70	30
<i>Food Wastes</i>	50	50
<i>Yard Trimmings</i>	90	10
<i>Miscellaneous Inorganic Wastes</i>	50	50
<i>Total MSW</i>	59	41
<i>Range</i>	55 - 65	35 - 45
Source: Table C-1, "Worksheet for Estimates of Residential/Commercial Fractions of MSW, 1993," <i>Characterization of Municipal Solid Wastes in the United States: 1994 Update</i> , U.S. EPA.		

Appendix LL

Case Study Guidelines for Crediting Source Reduction Efforts

Appendix LL. Case Study Guidelines For Crediting Source Reduction

As indicated in Section IV of this document, source reduction efforts should not be extrapolated to determine amounts for the reference year. In order to receive credit for source reduction within a solid waste management district, documentation must be provided by a specific case study or collected survey data. Historically, reduction information has been collected primarily for the industrial waste stream only, in the form of industrial surveys. Unfortunately, districts may experience a very low rate of return on these surveys, and districts should count only the reductions indicated on returned surveys. Returned surveys cannot be used to estimate or extrapolate source reductions from entities which did not return their surveys. As a result, districts wanting to take credit for source reduction activities will need to initiate case studies in order to determine the amount of source reduction which has occurred within their borders during the reference year.

A case study is a detailed analysis of an existing program, industry, or facility. The purpose of the study in this context is to determine what, if any, source reduction is occurring and at what quantity or rate it is occurring.

One of the inherent problems with any source reduction study is the difficulty in measuring the results. It is important to start out with an accurate account of the waste stream you are targeting and the amount(s) of waste being disposed. This will require good generator and/or hauler information. Industrial, commercial, and institutional waste streams are much easier to qualify and quantify than residential, but may still be difficult to measure. Before beginning your study, make sure that you have an accurate method to measure your results. If possible, try to collect your data in more than one method in order to compare results. For example, compare waste generation information provided by the generator to hauler records for that generator.

Another problem of source reduction studies is making sure that the reported reductions are due to the implemented strategy and not some other factor(s) such as decreased productivity, less disposable income, etc. To avoid false interpretations of this kind, examine as many of these types of factors as possible both before and after the reduction strategy is implemented.

Lastly, keep in mind that case studies are rarely short and uncomplicated. They require a great deal of planning and need to cover a time period long enough to produce valuable data by exposing any seasonal or production-related trends that a shorter study would miss.

This document has been prepared to provide solid waste management districts with a guideline for preparing and reporting their case studies used to estimate source reduction efforts during the reference year. (All case studies prepared in conjunction with the district's plan should be included in Appendix H, labelled "Source Reduction Case Studies.") The minimum requirements of a case study are discussed on the following pages, including "verified" documentation of source reduction. This appendix also describes how the study should be reported. The case study requirements have been divided into two categories: industrial/commercial/institutional and residential.

Source Reduction - Industrial/Commercial/Institutional Entities

The following is a list of the minimum requirements a case study must include to be considered applicable for source reduction.

1. Type and amount of waste(s) targeted for reduction, including industry, factory or institution name.
2. Method or strategy that was used to reduce targeted waste stream(s).
3. Amount of waste generated, reduced, and recycled in the year prior to implementation of the strategy.
4. Amount of waste generated and reduced in the reference year and in the year the strategy was implemented (if different than the reference year).

5. Evidence that reported reduction is not due wholly (or in part) to factors other than the implemented strategy, such as: decreased economic activity, lower net revenues, decreased production, decreased efficiency, and conversion or measurement anomalies.
6. The gains and losses brought about by implementation of the strategy (for instance, money saved on disposal, increased employee interest, cost of program implementation, etc.). Changes in costs due to the source reduction program should be converted to an annualized value, if possible. Compare the entity's waste generation before and after implementation of the source reduction strategy. Discuss the entity's production (or service level) before and after implementation of the source reduction strategy, and any other factor which might impact waste generation.

Example of an Industrial Source Reduction Case Study

1. A company wishes to reduce their wood wastes. They currently dispose of 20,000 tons of wood pallets per year.
2. They switch from disposable wood pallets to returnable pallets.
3. During the first year of using returnable pallets, zero tons of wood waste was disposed. In addition, generation of all other wastes remained constant.
4. All economic and production factors during the implementation year remained constant with previous years, therefore, it was determined that the reduction in wood waste was a direct result of using the returnable pallets.
5. The company saved over \$500,000 in disposal costs but are spending more money for the pallets. In addition, the employees have formed work groups to identify other areas to target for source reduction.
6. The solid waste management district has determined that the company has continued to use the returnable pallets through the reference year. As a result, the amount of 20,000 tons can be added to the district's total for waste reduction and recycling during the reference year.

Although this is a very simplified example, it provides an idea of what will be required in case studies. Keep in mind that when actually reporting the study, more detail and explanation will need to be included; this will be discussed later in this appendix.

Source Reduction - Residential

The next page lists the minimum requirements a residential case study must include to be considered applicable for source reduction credits.

1. Residential area defined for the case study.
2. Type and amount of waste(s) targeted for reduction.
3. Method or strategy that was used to reduce the residential waste stream.
4. Amount of waste reduced in the target year. This would mean that the sum of amount recycled and amount disposed in the target year would need to be less than the sum of amount recycled and amount disposed in the year before the study began, with no decrease in population.
5. Amount and types of waste generated by target area.
6. Population of target area.
7. Evidence that the reported reduction is not due (wholly or in part) to any factors other than the implemented strategy. The study should also determine that generation of non-targeted waste streams have not increased. For instance, a program designed to reduce the amount of plastic bags generated as waste should not be counted as source reduction if it results in greater generation of paper bags.
8. The gains or losses brought about by the implementation of the strategy and its resulting waste reduction. For instance, a reduction in needed disposal capacity, reduction in disposal costs, increased residential activity in other waste reduction activities, etc.

Please note that national average generation rates per capita cannot be used to determine source reduction amounts.

Example of a Residential Sector Source Reduction Program

1. A small suburban subdivision consisting of 150 homes (480 people), primarily middle-class income and single family occupancy has an existing curbside recycling program.
2. The district wants to reduce the amount of recyclable paper and plastic waste generated. Local haulers reported the following information for 1992: an average of 27 tons of non-separated waste and an average of 2 tons of separated recyclable paper and plastic were picked up each month. The district's MRF, which receives all the non-separated waste from this area, reported that an additional 4 tons of recyclable paper and plastics were removed from the waste stream monthly. Therefore, the subdivision generated a total of 6 tons of recyclable paper and plastic monthly in 1992. A total of 276 tons of waste were disposed at the landfill in 1992.
3. The district sent a source reduction "tool kit" to each household in the beginning of 1993. The kit consisted of a canvas bag and educational literature discussing how to reduce residential paper and plastic waste generation. The district also completed monthly waste sorts at its MRF during both 1992 and 1993 to determine total waste stream composition and any changes which could be attributed to the source reduction program.
4. Hauler and MRF data for 1993 indicated the following: on average 1.3 tons of recyclable paper and plastic were collected by the curbside program and 3.0 tons of recyclable paper and plastic were pulled out of the waste stream at the MRF each month in 1993. The MRF received an average of 25 tons per month in 1993, or a total of 300 tons.
5. Based upon monthly waste sorts at the MRF during 1992 and 1993, the district determined average percent composition for ten major waste stream categories. These percentages were then multiplied by the total waste received at the MRF to determine the estimated tons in each waste stream category for 1992 and 1993. (See the comparison below.) The estimated amount of mixed waste received at the MRF during 1993 decreased in each waste stream except the yard waste and other categories.

Materials in Waste Stream	1992 Tons	1993 Tons	
paper and paperboard	126.0		117.0
glass	22.5	20.7	
metals	27.9	25.5	
plastics	27.9	24.4	
rubber and leather	8.0	8.1	
textiles	9.7	8.1	
wood	21.2	18.9	
food wastes	22.5	19.8	
yard wastes	52.9	50.4	
other	<u>5.4</u>	<u>7.1</u>	
total	336.0		300.0

6. The subdivisions 1993 population was 485.
7. All local economic factors remained constant in 1993, as did the non-recyclable waste stream.
8. The determination of the amount of source reduction achieved due to the district program should be based upon conservative assumptions. The district assumes that the decrease in the amount of recyclable paper and plastic from both the curbside recycling program and the sorting efforts at the MRF are due to the source reduction program. The amount collected from curbside decreased from 2 tons to 1.3 tons month, or an annual reduction of 8.4 tons. The amount recoverable at the MRF decreased from 4 tons per month to 3 tons, for a total annual decrease of 12 tons. The waste sort information confirms that there has been a decrease in the paper and plastics received at the MRF in the amount of approximately 12 tons. However, the waste sort reveals that the "other" waste stream category has increased from 5.4 to 7.1 tons, or 1.7 tons. Since the increase in this category may be due to a decrease in generation of paper and plastics, the district subtracted 1.7 tons from the total impact

of the source reduction "tool kit" program, resulting in 18.7 tons which can be credited to the source reduction/recycling amount for the district in the reference year.

Case Study Reporting Guidelines

All case study write-ups should have a least these three basic sections: an introduction, data collection, and discussion. There are also many optional sections or sub-categories that can be used in addition to these. The following is a description of the more commonly used optional sections and the three basic sections used when preparing and reporting solid waste case studies.

Summary

This may also be referred to as an abstract. If used, a summary should be the first section of the report. It is a brief description of the findings. Summaries are very helpful when information is being shared between several groups with a common interest, such as solid waste management districts. Summaries allow another district or group to decide if information from the case study can be applied or generalized to other circumstances.

Introduction

The introduction states the purpose of the study, any background information, and any assumptions that existed before the study began. The introduction also identifies the variables or parameters to measure, the methods that were used to obtain the data, and describes the methods used to analyze the data. When preparing an introduction, it should be concise and clear enough that someone else could repeat the "experiment" exactly.

Data

This section is where all the data you collected is summarized. It may be in one or several forms: text, tables, charts, etc. You may also decide to include your actual calculations and/or statistics here if they are necessary for your reader's understanding. Try not to discuss or analyze the data in this section - just list it. Segregating the data in this way allows both the reader and the researcher to examine the data without biases.

Discussion

Indicate all the trends and other findings identified from the study. Discuss how the study's findings will affect programs and waste management in the district. Note any changes which may be made to the district's plan or program because of this study and why. Also, indicate shortcomings or deficiencies in the study and how the study would be modified if it were repeated. Mention any other previous studies completed in this area, or if the district intends to conduct any more studies as a result of the findings. Compare the district's study to similar studies done by others, if available. Were the district's results the same or different? (Any references used in the study should be listed at the end of the report.)

Keep in mind that some case studies require different data and methods in order to obtain the needed information. However, the guidelines above provide a flexible, understandable format that should be used when reporting solid waste district case studies. The intent of this format is to standardize such information so that it can be easily reviewed and used by Ohio EPA and solid waste management districts.

Appendix MM

Estimating Materials Recovery for Residential Recycling Programs

Appendix MM. Estimating Materials Recovery for Residential Recycling Programs

Section V of the *Format* requires SWMDs to estimate the amount of recyclable materials recovered from the waste stream through the duration of the planning period. Estimations of the amount of materials recovered should be based on existing and planned recycling programs. In addition, a SWMD must identify the type of materials to be collected through the program, and estimate the total quantity of materials to be collected. Ideally, the total amount anticipated for recovery from a given program should be determined by analyzing the potential recovery of each waste stream (such as aluminum cans) which is recovered by the program.

To assist SWMDs in estimating recovery from residential recycling programs, this appendix includes data from various curbside recycling programs throughout the country. It also describes two sample methodologies to estimate the amount of materials a curbside program may collect from the waste stream. **A SWMD may utilize the information and methodologies described in this appendix, or use other sources and methods. In either case, the SWMD must describe its assumptions and sources of data, and show a sample calculation for the projections included in the plan.**

Recovery based on Collection Rates of Other Recycling Programs

Table MM-1 presents data gathered from several curbside recycling programs operating in several states, as reported in the July 1990 issue of *BioCycle*⁸. This table includes figures for the each community's population, number of households serviced, the annual amount of each material collected, participation on a monthly basis, and the collection day set-out rate (the number of households setting out materials on collection day as a percent of total households serviced). Table MM-2 presents the range and average weight in pounds per household per collection day (average material collection rate) for several materials collected by curbside programs, as reported in *BioCycle*.

The data presented in Tables MM-1 and MM-2 may be used to estimate the amount of materials recovered by a new program or through the expansion of an existing program. For example, an estimate of the annual amount of a targeted material collected by a program may be estimated by multiplying the number of households that set out materials per collection day, by a material collection rate (i.e., the average weight of the material collected per household, per collection day). The product of this multiplication is the amount of the material collected from one collection day. This figure is then multiplied by the number of collection days per year, resulting in the annual weight of the material collected by that program.

Even though Ohio EPA is not aware of any comparable data available for drop-off programs, such information could be collected through case studies. The district could measure the number of vehicles visiting a drop-off site in a given time period (hours or days), and the average weight of each material brought to the drop-off site per vehicle, and the average number of hours or days the drop-off site operates during a year. This information could be used to estimate the annual amount of materials collected by a drop-off site. (A discussion of estimating recycling occurring at materials processors, or by recycling material brokers is included in Appendix GG.)

Table MM-1 also includes a column indicating the participation rate for several of the weekly curbside programs measured over the course of four collection events (monthly). As the table shows, the participation rates for the programs are higher than the set-out rates, since it is common for only a fraction of participating households to set out materials on every collection day. The set-out rate is a measurement based on counting the set-outs per collection day (set-out rate = number

⁸Glenn, Jim, "Curbside Recycling Reaches 40 Million," *BioCycle*, Volume 31, No. 7, July 1990, page 30.

of set-outs on collection day / total number of households served⁹). In contrast, a participation rate measurement is usually based upon several consecutive collection days during a two or three week period, or a month. When using these terms, the most critical element is knowing the number of collections and frequency of collection of the programs used to determine the values. (See the Glossary for further discussion of participation rate and set-out rate.)

Recovery Estimates for a Hypothetical Recycling Program

A community of 1,000 households intends to implement a weekly curbside recycling program collecting newspaper, glass and aluminum. According to Table MM-1, the average set-out rate based upon weekly collection is 52 percent. According to Table MM-2, the average weights of materials at each household each collection day is 9.9 pounds of newspaper, 3.7 pounds of glass, and 0.8 pounds of aluminum. The number of collection days per year is 52.

The total tons collected from this curbside program is calculated as follows:

- Average # of Households (HHs) setting out materials per week	(1,000 HHs) x (52 % set-out rate) = 520 households
- Tons of materials collected per year	
Newspaper	(520 HHs x 9.9 pounds/HHs/collection day) x (52 collection days/year) = 267,696 pounds = 134 tons/year
Glass	(520 HHs x 3.7 pounds/HHs/collection day) x (52 collection days/year) = 100,048 pounds = 50 tons/year
Aluminum	(520 HHs x 0.8 pounds/HHs/collection day) x (52 collection days/year) = 21,632 pounds = 11 tons/year
Total	= 195 tons/year

When estimating the amount of materials to be collected by a recycling program, the set out rate used must be based upon the same type of collection program as the material collection rate used. For example, if the set-out rate is expressed in households per collection day per week for a weekly collection program, the material collection rate should represent the expected amount of pounds collected per household per collection day for a weekly program. Alternatively, if the set-out rate is based upon collection only offered once per month, then the material collection rate must also reflect the materials collected per household in programs having once per month collection.

For existing programs, in instances where the material collection rate is known, but the set-out rate is not, the set-out rate may be estimated by the using a ratio of the set-out rate to the participation rate, measured from a sample area or from a similar program. For example, the average participation rate in Table MM.1 is 74 percent, the average set-out rate is 52 percent, and the set-out rate to participation rate ratio is 52/74 or 0.703. Applying this ratio to an existing program with a 42 percent participation rate would result in an estimated set-out rate of 30 percent (42 x 0.703 = 30). Again, both the material collection rate and the calculated set-out rate must be based upon the same type of collection program in terms of frequency of collection.

⁹National Recycling Coalition, "The National Recycling Coalition Measurement Standards and Reporting Guidelines," 1989.

**Table MM-1
Annual Recovery, Range and Average Participation for Curbside Recycling Programs**

Community	Population ¹	Households served	Set-out rate ² (%)	Participation ³ (%)	News paper	Glass	Alum.	Steel/Tin Cans	HDPE	PET	OCC	Mixed paper	Total
<i>Weekly Collection</i>													
Barrington, IL	10,000	3,500	85	92	612	228	20						860
Blaine, MN	40,000	9,134	45-50	70	1,250	308	154						1,712
Boulder, CO	85,000	22,000	34	50-60	2,615	863	35	36					3,549
Champaign, IL	59,000	15,750	20	?	768	263	74		9				1,114
E. Greenwich, RI	12,000	4,000	65	90	971								971
E. Providence, RI	53,000	15,470	70	85	3,600								3,600
Irvine, CA	103,000	26,000	50	71	6,267	828	143		8				7,246
Ithaca, NY	28,000	6,000	50	80-85	460	297					283		1,040
Jersey City, NJ	230,000	84,000	36	?		1,947						7,025	8,972
Lafayette, LA	89,500	27,600	?	60	1,203	585	42		28				1,858
Olympia, WA	28,500	10,400	53	77	690	540	30	83				595	1,938
Saint Louis Park, MN	43,000	12,000	60-65	82	2,130	528	137		8				2,785
Seattle, WA North	213,000	69,000	50	?	7,526	5,300	321	688		22		9,109	22,944
Average Set-Out and Participation Rate			52	74									
Range of Set-Out and Participation Rates			20-85	50-92									
<i>Monthly Collection</i>													
Seattle, WA South	248,000	79,500	monthly	58	6,647	3,988	240	646	18	73	1772	4394	17,787
Franklin, PA	8,600	2,800	monthly	60	113	98	4	18					233
¹ Population refers to the entire population of the community and does not necessarily reflect the population serviced by the program. ² Set-out rate refers to the average percentage of households served that set out materials per collection day. ³ Participation rate refers to the percentage of households serviced that set-out at least one per month in a weekly collection program. Source: Glenn Jim, "Curbside Recycling Reaches 40 Million," <i>BioCycle</i> , July 1990.													

Table MM-2. Average Material Collection Rates¹ for Curbside Programs (pounds/week)

Community	Stops/week	Weight/Stop (pounds)								
		News	Glass	Aluminum	Tin	HDPE	PET	OCC	Mixed	Total
<i>Weekly Collection</i>										
Barrington, IL	2975	7.9	2.9	.3						11.1
Blaine, MN	4,500	11.7	2.9	1.4						16
Boulder, Co	7,500	13.4	4.4	.2	.2					18.2
Champaign, IL	3,200	9.2	3.2	.9		.1				13.4
East Greenwich, RI	2,600									14.4
East Providence, RI	10,830									12.8
Irvine, CA	13,000	18.6	2.4	.4						21.4
Ithaca, NY	3,000	5.9	3.8					3.6		13.3
Jersey City, NJ	30,000	9			2.5					11.5
Olympia, WA	5,500	4.8	3.8	.2	.6				4.2	13.6
Ontario, CA	5,000	9.3	5.1	2.8	.7		.7			9.3
Saint Louis Park, MN	7,800	10.5	2.6	.7						13.7
Seattle, WA (North)	34,000	8.5	6	.4	.8				10.3	25.9
***Averages ¹		9.9	3.7	0.8	.5				7.25	
***Ranges		4.8-18.6	2.4-6	.2-2.8	.2-.8	.1		3.6	4.2-10.3	
<i>Monthly Collection</i>										
Seattle, WA South (monthly)	46,150	24	14.4	.9	2.3	.06	.26	6.4	15.9	64.2
Franklin, PA (monthly)	1,600	11.7	10.2	.4	1.9					24.2
¹	The material collection rate is defined as the amount of the material collected per household per collection day.									
²	The average pounds per household is calculated using only those programs that reported a specific quantity for the material.									

Estimating Recovery of Materials based on Capture Rates

A material capture rate is defined as the amount of a target material recovered as a fraction of the targeted material available². Estimating the quantity of a material recovered by a recycling program based on the amount of material captured by the program entails establishing the amount of material available to the program, then quantifying the amount of the material that will be captured at each step in the collection or recycling process³.

Sample formulas for determining the quantity captured and the material capture rates are below:

$$\text{Net Capture}^{10} \text{ NC} = \text{TA} \times \text{PS} \times \text{PR} \times \text{PE}$$

TA = Theoretical quantity available

PS = physical separation rate, (the rigor with which the material is separated out for recycling)

PR = probable participation rate in the materials collection program

PE = processing efficiency (associated with a materials recovery facility or other processing of the material(s))

$$\text{Capture Rate} = (\text{NC}/\text{TA}) \text{ quantity of targeted material(s) recovered} / \text{total quantity of targeted material(s) available}^2$$

Estimates of Recovery for a Hypothetical Recycling Program

The formulas described above are applied to a hypothetical community for which the following factors have been determined: The community generates 1,000 tons of newspaper and 500 tons glass. The separation rates at the household are 95 percent for newspaper and 90 percent for glass (PS); the number of households setting out materials is 50 percent (PR) for both materials. The efficiency factor for the materials recovery facility that processes the commingled recyclables is 90 percent for both materials. The quantities recovered (NC) and the capture rates (CR) for each material are calculated below.

$$\text{NC newspaper} = 1,000 (\text{TA}) \times .95 (\text{PS}) \times .5 (\text{PR}) \times .95 (\text{PE}) = 451.25 \text{ tons}$$

$$\text{NC glass} = 500 (\text{TA}) \times .90 (\text{PS}) \times .5 (\text{PR}) \times .95 (\text{PE}) = 213.75 \text{ tons}$$

$$\text{CR newspaper} = 451/1,000 = .45 \times 100 = 45 \text{ percent}$$

$$\text{CR glass} = 213/500 = .43 \times 100 = 43 \text{ percent}$$

All of the figures described in this example are hypothetical. SWMDs using this methodology should present a source for any participation, efficiency or other factor used to estimate recovery.

¹⁰Kuniholm, Peter F. "Accurate Estimates for Recycling Capture Rates" *BioCycle*, July 1990.

Appendix NN

Calculating Access Credit for Residential Recycling Opportunities: An Alternative Methodology

Appendix NN. Calculating Access Credit for Residential Recycling Opportunities: An Alternative Methodology

The methodology described in this appendix may be used by a solid waste management district (SWMD) to estimate the population in a service area that is using a recycling opportunity or combination of opportunities. SWMDs may choose to use the population estimate calculated by this method, or the default population credit listed in Section VII (B), when calculating the percentage of the population in a service area that has access to recycling opportunities.

Using the formula below, a known quantity of material(s) recovered and a known or assumed generation rate is used to calculate the participating population.¹¹

$$\text{Population participating} = \frac{\text{Recovery of the material}}{\text{Per capita generation rate of the material}}$$

Table 1 presents national per person per year generation rates for the eleven materials highly amenable to alternative management in the *1995 State Solid Waste Management Plan*. The per capita generation rates and the percentage of the material generated by the residential sector were derived from the report, *"Characterization of Municipal Solid Waste in the United States, 1994 Update," Franklin Associates for U.S. EPA*. (Franklin Associates report).

The estimation methodology may be used to:

- 1) determine whether a recycling opportunity provides access to a population greater than the default population for that type of recycling opportunity.
(See Table NN-6 for default population credits.)
- 2) estimate the population participating in a single activity in a service area. The SWMD may still use default values for the other activities in the service area.
- 3) combine the known recovery quantities for the minimum number of materials from several programs, and use the resulting population estimates to figure the percentage of the population with access to recycling.
A SWMD may substitute the population estimate for the combined programs for the default values of the individual programs. (Also, see Example 3.)

In using this alternative estimation method, several complicating circumstances may arise. Examples of these circumstances include:

- 1) *A recycling service reports its total recovery without reporting the amount of each material.* If all of the materials that comprise the total are known, then a population estimate can be made by using an aggregate generation rate based on the sum of the generation rates of the identified materials. (See discussion on Example 1.)
- 2) *A recycling activity collects from both the residential and commercial generators and cannot distinguish the amount recovered from each sector of generators.* Under these circumstances the SWMD may apply the percentage estimates for the residential sector from the Franklin Associates report. For example, the Franklin Associates report for USEPA estimates that 85 percent of newspaper in the waste stream originates from the

¹¹

Recycling efficiency of participants is assumed to be 100 percent. This means that if household is participating in a recycling program, it is assumed that 100 percent of the generation of the targeted material is captured for recycling.

residential sector. Therefore, if 100 tons of newspaper were collected from both residential and commercial sources, then 100 tons is multiplied by .85, and 85 tons may be used as the recovery from residential sources. (See Example 3 for additional discussion.)

- 3) *The national average material generation rate may not be an appropriate estimate for the generation of the material in a particular service area.* The generation of a particular waste material in a community may vary widely from the national average estimate. If the national generation rate is too low, the estimate of the population participating may greatly exceed the total population of the area being served. If the national rate is too high, the result will significantly underestimate the population using the service. Under these circumstances, a SWMD may substitute a material per capita generation rate that is based on a local waste stream study or a study done for another similar community. However, the SWMD must demonstrate through demographic or other relevant factors that the substitute generation rate is appropriate for the service area. (For additional discussion, see Example 2.)

Table NN-1 Calculation of Per Person Residential Generation Rates					
Material	1993 Tons of Residential/ Commercial Generated¹ (Thousands of Tons)	Percent Residential Generation²	Tons Residential	1993 Population	Pounds per person per year of Residential Generation
Corrugated Cardboard	26,350,000	10	2,635,000	257,908,000	20
Office papers	7,120,000	25	1,780,000	257,908,000	14
Newspaper	12,940,000	85	10,999,000	257,908,000	85
Glass containers	12,230,000	82	10,031,000	257,908,000	78
Steel Containers	2,790,000	85	2,368,000	257,908,000	18
Aluminum cans	1,610,000	80	1,288,000	257,908,000	10
Plastic soft drink bottles	560,000	80	448,000	257,908,000	3
Plastic Milk bottles	550,000	95	523,000	257,908,000	4
Other plastic containers	1,930,000	80	1,544,000	257,908,000	12
lead acid batteries	1,670,000	5	84,000	257,908,000	1
Major Appliances	3,430,000	10	343,000	257,908,000	3
Wood Packaging	9,460,000	0	0	257,908,000	0
Yard Wastes	32,800,000	90	29,520,000	257,908,000	229
Sample Calculations: Office paper: 7,120,000 tons (.25) = 1,780,000 tons (1,780,000 tons/year) x (1 ton/2,000 lbs.) x (1 / 257,908,000 persons) = 14 lbs./person/year A generation rate for each of the eleven materials provides the flexibility to estimate the participating population for recycling activities ranging from those that collect only one material, to a combination of programs that collect four or more of the access standard materials.					
Sources: 1) <i>"Characterization of Municipal Solid Waste in United States, 1994 Update," Franklin Associates for U.S. EPA.</i> 2) Appendix C, <i>"Characterization of Municipal Solid Waste in United States, 1994 Update," Franklin Associates for U.S. EPA.</i>					

Examples 1-3 show how population estimates are calculated using the material per capita generation rates in Table NN-1.

Example (1)

A SWMD wants to determine whether its full time drop-off center is providing access to a population greater than the default credit. The service area has a population of 3,065 and has one full time drop-off opportunity that accepts six of the 11 targeted materials. The types of materials and quantities recovered from the drop-off site are shown in columns #1 and #2 in Figure 1.

Using the sum of the quantities recovered, and the sum of the generation rates for each of the materials recovered by the drop off site, results in an estimate of 388 persons participating, or a participation percentage of approximately 12.7 percent. Combining the four materials with the highest individual population estimates (bolded materials in Table NN-2) results in 569 persons or 18 percent of the population participating. Both of these figures are within the range of participation rates reported for drop-off programs.¹² The SWMD may use the highest population estimate, so long as at least the four materials used to demonstrate access are included. (See the sample calculations in Table NN-2.)

However, based on the results shown in Table NN-2, the SWMD would be better off using the default credit for access. The default value for a full service drop-off site in a rural area (less than 5,000 persons) is 2,500.

In instances where the specific quantities of each material are not known, but the total quantity and the types of materials accepted are known, the population participating may be calculated using the reported quantity of the materials recovered, divided by the sum of the generation rates for all of the materials accepted by the program. In this example, the result could be obtained by dividing 76,889 pounds (total recovery at the site) by 198 pounds per person per year (sum of the generation rates).

The recovery figures for the drop-off site used in this example are based on quantities reported to the Ohio Department of Natural Resources by a community of 3,065 persons.

Table NN-2.			
Calculation of Participating Population by Material, for Example 1			
Materials Collected (reported from the recycling activity)	Reported Recovery in Pounds (reported from the recycling activity)	Generation rate in pounds per person per year (from Table 2)	Estimate of population participating (reported recovery ÷ generation rate)
aluminum cans	848	10	85
glass	13,450	78	172
newspaper (ONP)	52,505	85	618
PET	2,033	3	678
HDPE	3,943	4	986

¹²

"The Role of Recycling in Integrated Solid Waste Management to the Year 2000." Frankli Associates for Keep America Beautiful. 1994.

Table NN-2. Calculation of Participating Population by Material, for Example 1			
Materials Collected (reported from the re- cycling activity)	Reported Recovery in Pounds (reported from the recycling activity)	Generation rate in pounds per person per year (from Table 2)	Estimate of population participat- ing (reported recovery ÷ generation rate)
steel containers	4110	18	228
All Materials	76,889	198	388
Four materials for the standard (Bolded)	62,591	110	569
<p>Sample Calculation: PET: (2,033 lbs./ year) x [(1 person / (3 lbs./year)] = 678 persons Combination of four materials: sum of the quantities recovered 62,591 = 52,505 (news) + 2,033 (PET) + 3,943 (HDPE) + 4,110 (steel cans) sum of the generation rates 110 = 85 (news) + 3 (PET) + 4 (HDPE) + 18 (steel containers) (62,591 lbs./year) x (1 person/110 lbs./year/person) = 569 persons</p>			

Example (2)

The SWMD is estimating the participating population for a curbside recycling program in a suburban city with a population of 16,000. The materials collected and pounds reported recovered are listed in columns #1 and #2 in Table NN-3.

Combining all six materials results in approximately 80 percent participation for the service area. The four materials with the highest estimates for population participating, when combined, result in an estimate of 14,433 persons, or approximately 90 percent of the city's population. A SWMD could use the 90 percent figure for access to recycling, if the curbside program was a subscription program under the access definition.

The estimates for participating population in Table NN-3 illustrate a potential problem with use of the national average material generation rates. The participating population figures for newspaper and plastics are greater than the total population of the city. This indicates that the generation estimates for these materials are too low for this community. Because the material generation rates are average per capita rates based on the generation of the material nationwide, they may not be characteristic of any specific community.

As seen in this example, the national average generation rate for a material may significantly over- or under-estimate its generation in a service area. As a result, the participating population estimate will be either significantly higher than 100 percent, or uncharacteristically low for a given program or set of programs. Should this occur, the SWMD may substitute generation rates based on local waste stream analysis or other studies. However, the SWMD must demonstrate that the substitute rates are more appropriate than the national average rates.

Table NN-3			
Calculation of Participating Population by Material, for Example 2			
Materials Collected (reported from the recycling activity)	Reported Recovery in Pounds (reported from the recycling activity)	Generation rate in pounds per person per year (from Table 2)	Estimate of population participating (reported recovery ÷ generation rate)
aluminum cans	23,885	10	2,389
glass	416,542	78	5,340
newspaper (ONP)	1,899,700	85	22,349
PET	68,698	3	22,899
HDPE	68,692	4	17,173
steel cans	84,602	18	4,700
Total	2,562,119	198	12,940
Combination of four materials (bolded)	2,453,632	170	14,433
<p>Sample calculation for the four materials:</p> <p>416,542 lbs. (glass) + 1,899,700 lbs. (newspaper) + 68,698 (PET) + 68,692 lbs. (HDPE) = 2,453,632 lbs.</p> <p>Generation rate for the four materials = 78 lbs./person/year (glass) + 85 lbs./person/year (newspaper) + 3 lbs./person/year (PET) + 4 lbs./person/year (HDPE) = 170 lbs./person/year.</p> <p>(2,453,632 lbs.) x (1 person/ 170 lbs./year) = 14,433 persons.</p>			

Example 3

In this example, a service area of 10,000 has several recycling opportunities present. These opportunities may be combined to demonstrate whether the opportunities provide sufficient access. The type of recycling opportunities and reported recovery from each recycling activity is listed in Table NN-4 (the quantities are hypothetical, and not from actual programs). In Table NN-5, the reported recovery for each material from the various recycling activities is summed, and a participating population estimate was made for each material, for all the materials, and for a combination of four materials. Combining four materials with the highest individual population estimates results in an overall estimate of approximately 94 percent of the population of the city. (See sample calculation in Table NN-5.)

The access standard under this scenario could be met by using either the default values, or by demonstrating sufficient participation in existing programs. In this example, the buyback center accepts from residential and commercial sources and cannot provide the amounts accepted from each sector.

In instances where the amount each sector contributed to the total is not known, the SWMD must estimate the residential fraction of the materials collected. This can be done using the estimates for residential fractions listed in Table NN-1. The calculations for the buyback center in Table NN-4 illustrate how to apply the residential fractions.

Table NN-4			
Types of Recycling Programs, materials, and amounts collected for Example 3			
Curbside Recycling (subscription)			
Materials Accepted	Reported Recovery		
aluminum cans	43,620 lbs.		
glass	234,050		
newspaper (ONP)	440,830		
PET	17,440		
HDPE	22,060		
steel cans	31,531		
2 full service Drop-off sites (residents only)			
Materials Accepted	Reported quantities from the two sites		
aluminum cans	14,576 lbs.		
glass	67,882		
newspaper (ONP)	123,071		
PET	4,046		
HDPE	6,099		
steel cans	12,293		
OCC (corrugated)	33,575		
Buyback Center			
Materials Accepted	Reported Recovery	Residential Percentage	Estimate of the Residential Generation
aluminum cans	14,697 lbs.	80%	= 11,758 lbs.
glass	77,882	82%	= 63,863
newspaper (ONP)	323,071	85%	= 274,610
PET	3,046	80%	= 2,437
HDPE	2,099	95%	= 1,994
OCC (corrugated)	533,575	10%	= 53,358
The sum of materials recovered from each program in the service area are used to calculate the participating population. (See Table 5.)			
aluminum cans	43,620 + 14,576 + 11,758		= 69,954
glass	234,050 + 67,882 + 63,863		= 365,795
newspaper	440,830 + 123,071 + 274,610		= 838,511
PET	17,440 + 4,046 + 2,437		= 23,923
HDPE	22,060 + 6,099 + 1,994		= 30,193
Steel Containers	31,531 + 12,293		= 43,824
OCC (corrugated)	33,575 + 53,358		= 86,933

Table NN-5 Calculation of Participating Population by Material, for Example 3			
Materials Collected (reported from the recycling activity)	Reported Recovery in Pounds (reported from the recycling activity)	Generation rate in pounds per person per year (from Table 2)	Estimate of population participating (reported recovery ÷ generation rate)
aluminum cans	69,954	10	6,995
glass	365,795	78	4,690
newspaper (ONP)	838,511	85	9,865
PET	23,923	3	7,974
HDPE	30,193	4	7,548
steel cans	43,824	18	2,435
OCC	86,933	20	4,347
Total	1,459,133	218	6,693
Four Materials	962,581	102	9,437
<p>Sample Calculation:</p> <p>Four materials for the access standard: Aluminum cans, newspaper, PET, and HDPE. Participating population = sum of reported recovery ÷ sum of the material generation rates. 69,954 (Al) + 838,511 (news) + 23,923 (PET) + 30,193 (HDPE) = 962,581 lbs. (962,581 lbs/year) x (1 person/102 lbs./year) = 9,437 persons (9,437 persons) ÷ (10,000 total population) = .9437 x 100 = 94.37 percent.</p>			

<p align="center">Table NN-6. Default Population Credits Toward the Access Standard for Recycling Opportunities</p>		
Type of Program	Access Credit	Program Definition
Non-subscription Curbside	assume all households have access. total population of the households provided the service can be credited	Curbside programs which are contracted for by a political jurisdiction, or programs in which the resident does not pay separately for curbside collection.
Full Service Drop-offs	2,500 persons per site (rural) 5,000 persons per site (urban)	A full service drop-off must be open to the public at least 40 hours per week and must handle the four materials used to meet the access standard. A rural area is defined as any municipality or township with a population less than 5,000. An urban area is any municipality or township with a population of 5,000 or more.
Part-time Drop-offs	2,500 persons per single site with four materials or per each set of sites combined to meet the minimum four materials.	Drop-offs that are available less than 40 hours per week if the following conditions are met: * the four materials used to demonstrate access are handled; and * the drop-off site is available to the public at a regularly scheduled time, at least once per month. The district may combine sites which handle less than the designated four materials to get credit for one part-time drop-off.
Drop-off Sites which are exclusively available to residents of a specific municipality or township.	population of the jurisdiction or the appropriate default value for a full or parttime, urban or rural area drop-off; whichever value is lower.	

<p align="center">Table NN-6. Default Population Credits Toward the Access Standard for Recycling Opportunities</p>		
<p>Material Recovery Facility (MRF)</p>	<p>Each person whose waste is delivered to MRF provided that the facility has an overall recovery rate of at least 15 percent. Access credits would be reduced proportionately for facilities recovering less than 15 percent. For example, if the recovery rate at the MRF is 10 percent, then 67 percent of the population sending waste to the facility is considered to have access. (10/15= .67)</p>	<p>Material Recovery Facilities recover recyclable materials from mixed waste stream.</p>
<p>Subscription Curbside</p>	<p>25 percent of the population that has the opportunity to subscribe to the program.</p>	<p>Curbside collection of recyclables provided at an additional cost, and by choice of the resident. If the district can demonstrate greater access through the actual number of subscriptions, participation, or tons of recyclable materials recovered, the access contribution may be increased accordingly.</p>