

**Final Research Committee Report
For the Sonoma County/City Solid Waste
Advisory Group**



Date: May 11, 2011

Acknowledgements

The Sonoma/City Solid Waste Advisory Group - Research Committee membership consists of:

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SWAG City Representative: Santa Rosa City Councilman Gary Wysocky

City Managers Association Rep.: Jack Griffin, Sebastopol City Manager

County Government Rep.: Phillip Demery, Director of Transportation and Public Works

Sonoma County Waste Management Agency Rep.: Henry Mikus, Executive Director

Business Sector Reps.: Marlene Soiland and Bill Henrich

Environmental Community Rep.: Brant Arthur, Climate Protection Campaign

AB 939 Local Task Force Rep.: Ken Wells

Regulatory Agency Rep.: Christine Sosko, Local Enforcement Agency

The Research Committee would like to thank the following members of the Committee and the public for their active participation, technical input and involvement on Subcommittees that worked diligently on development and preparation of this Final Report:

Councilman John Sawyer	Jack Griffin	Susan Klassen	Ken Wells
Pam Davis	Will Bakx	Phillip Demery	Trish Pisenti
Steve McCaffrey	Rick Downey	Christine Sosko	Lee Pierce
David Ortiz	Ernie Carpenter	Dane Woods	Judy James
J. David Erickson	Tim Smith, former Councilmember		

Special Thanks goes to the following individuals who volunteered to do much of the writing that went into this final report.

Stu Clark – for heading up the Transfer/Processing Subcommittee

Henry Mikus - for heading up the Education, Legislation and Enforcement Subcommittee

Brant Arthur – for heading up the Waste Reduction Subcommittee

EXECUTIVE SUMMARY

The SWAG Research Committee was formed by action of the Sonoma County/City Solid Waste Advisory Group (SWAG) on November 15, 2010. The duties or objectives outlined for the Research Committee (RC) have been stated as:

“To recommend a short list of regional solid waste system options for SWAG consideration which can feasibly meet SWAG's objectives for increased diversion, economic efficiency and local control.”

Sonoma County has done a great job of implementing recycling and waste diversion programs that have contributed to recovering almost two thirds of the waste stream for beneficial use. The RC's recommendations focus on options to reduce, recycle and/or process the remaining one third of the waste stream that is still being disposed in local and regional landfills.

The RC at their initial meeting had a discussion and reached consensus that the research and recommended options should focus on the following activity areas; Waste Reduction, Waste Diversion, Education, Legislation, Enforcement, and Transfer/Processing Infrastructure.

The following report provides an overview of the work of the RC along with our findings, recommendations and estimated costs relating to waste reduction, education, legislative, enforcement and facility infrastructure policy options that the RC believes can feasibly meet SWAG's objectives for increased diversion, economic efficiency and local control.

The RC wishes the reader to note that it was not within the scope of the RC's work to develop strategies for the system funding structure. The RC was also not charged with quantifying the impact that implementation of these recommendations may have on reducing other system costs and meeting climate protection goals. The RC acknowledges that all of these items are significant and will be addressed in future more detailed analysis which will be accomplished by a third party consultant. The RC stands ready to assist with this process.

Project Approach

The subcommittees' consensus included a goal of building our recommendations on a foundation of reliable data that was either existing, or readily developable within a short time frame. We also agreed that it would be most appropriate to maximize the utilization of Sonoma County's existing capacity for diversion before recommending the development of new infrastructure.

The RC also incorporated the valuable work of others. Our initial steps included review of a number of reports including the *Organic Disposal Alternatives in Sonoma County* report created by the AB 939 Local Task Force, (LTF), the *Sonoma County Waste Management Agency Waste Characterization Study* prepared by Cascadia Consulting Group as well as the then current draft version of the *Planning for Zero Waste in Sonoma County Discussion Paper* prepared by the LTF.

From this basis the subcommittees outlined our work plan and implemented the following general scope of work:

- Defined current disposal volumes and recent trends

- Identified existing processing capacity in the County
- Evaluated waste characterization & divertibility analysis
- Reviewed existing capacity vs. needs – gap analysis
- Developed program and infrastructure options both traditional & emerging technologies that maximize the use of existing programs and infrastructure and then address the remaining gaps in capacity
- Developed findings and recommendations

Presented in this Executive Summary is an overview of the research, analysis and project approach that has led the RC to develop our specific recommendations for SWAG's consideration.

Findings and Recommendations:

Our recommendations are offered as a phased approach and include suggested points in the process where the results from initial actions can be assessed and subsequent steps can build upon actual results from the previous accomplishments. It is important to allow for some flexibility in the planning process, especially for the longer-term objectives to accommodate changes in the waste stream and the evolution of emerging technologies. Our detailed recommendations can be summarized within the four following broad areas:

- Maximize the use of existing diversion facilities in the County
- Diligently pursue additional composting capacity for the organic fraction of the waste stream including food waste using current technology of aerobic aerated static pile composting.
- Develop new mixed waste processing capability, (resource recovery facility).
- Consider the development of emerging technologies, such as anaerobic digestion and/or thermal conversion facilities, based on future analysis.

Existing Diversion Capacity

Finding 1: The inventory of existing permitted solid waste processing facilities, (listed in Table 2 within the main body of the report), demonstrates that the County as a whole has a significant amount of underutilized diversion process capacity. The categories of facilities that have the ability to handle additional volumes of material include:

- Transfer Processing
- Construction and Demolition Debris
- Source Separated Processing facilities

In addition, the waste disposed of currently in landfills, still has a significant amount of divertible materials that can be recovered through these types of existing facilities. The combination of the composition of the waste stream matching with the capabilities of the existing facilities in the County offers the most cost effective first opportunity to achieve additional diversion with little or no new capital investment.

Recommendation 1: Maximize Existing Capacity

As part of SWAG’s work to accomplish the stated objectives of increased diversion, economic efficiency and local control, the RC recommends the consideration of policy which emphasizes the benefits of maximizing the use of the existing diversion infrastructure in Sonoma County. This policy should focus on both waste reduction and diversion. The implementation of this policy may include action by the SWAG or individual jurisdictions and should include further study of the following options:

- 1A: Increase education efforts on waste reduction and diversion by funding one full-time position with equipment and supplies for outreach materials – specifically focused on door-to-door outreach with Commercial and C & D waste generators.**
- 1B: Increase education efforts for schools and institutions on waste reduction and diversion by funding one half-time position with equipment and supplies.**
- 1C: Adopt a Model Countywide Mandatory Commercial Recycling Ordinance**
- 1D: Adopt a Model Countywide C & D Recycling Ordinance**

Additional Compost Capacity & Food Waste

Finding 2: Organics is the largest fraction, (36%), of Sonoma County’s waste stream that is still being disposed in landfills. Food waste is part of the organics component and represents the biggest volume of any single material at 21 percent of the total waste stream. Translating this to tonnage equates to a possible range of 315 – 435 tons per day of Organics being disposed. While this represents a good opportunity for targeted diversion, current capacity does not exist to handle this volume. The County’s composting facility only has 36 tons per day of remaining capacity. It is also important to understand that the existing method of “wind row” composting has limited capacity for food waste.

The Sonoma County Waste Management Agency, (SCWMA), is in the process of working towards the development of a new composting operation that will have additional capacity in terms of volume and possibly the ability to incorporate larger volumes and types of food waste along with the current green waste material. New regulations relating to air impacts from composting will necessitate a change in the method for composting in the County. While this may present some new challenges it also represents an opportunity to incorporate a facility design which can accommodate the beneficial reuse of food waste, the single largest component currently going to landfill disposal.

Many communities in California are looking to address the beneficial use of food waste as a diversion strategy. As our recycling programs have removed a significant percentage of other material, food waste continues to become a larger and larger component of what is left in the disposal stream. Santa Rosa’s Laguna Wastewater Treatment Plant and its biosolids management infrastructure may have the capability to play a role in the beneficial reuse of food waste here in Sonoma County. The concept of adding a percentage of food waste in the digesters at wastewater treatment facilities is being considered by a number of communities.

Recommendation 2: Additional Compost Capacity

The RC recommends the following options be studied further to support increased diversion of organics:

- 2A: Support the efforts of the SCWMA to develop new composting capacity in Sonoma County and specifically encourage that the new facility design incorporate the ability to include food waste as part of the acceptable feedstock for the composting process.**
- 2B: Determine the feasibility of the Santa Rosa Laguna Wastewater Treatment Plant in playing a role in the beneficial reuse of food waste in Sonoma County.**
- 2C: Once a full food waste diversion system is available, establish a one-time focused educational outreach effort to inform commercial and residential generators to ensure maximum use of the food waste and composting programs.**

New and Mixed Waste Processing Facility

Finding 3: Even with effective efforts in the areas of maximizing the use of the existing processing infrastructure and developing additional composting capacity in the County, new types of facilities will need to be developed in order to meet the longer term 90% diversion goal identified by SWAG. For example, while source separated recycling programs have been very successful for single-family residents there have been some challenges to replicate the same level of success for the multi-family and some of the commercial waste sector customers. Factors such as the high turn-over at multifamily facilities have had an impact on customer education and participation rates and space constraints for additional bins have inhibited recycling opportunities for certain sectors of the business community. One of the effective ways to recover this material can be through the development of a mixed waste processing facility.

By using a combination of human sorting and mechanical separation techniques based on size, weight, magnetic separation etc. operators have looked to segregate the various components of the waste stream for recyclables, organics and possible refuse derived fuel resources. Through the evolution of these efforts the current sorting equipment technology has advanced significantly. Mixed waste processing facilities can, and should be, designed for specific applications. This is not a situation where “one size fits all”. For Sonoma County, it will be important to assess the specific needs for material recovery prior to design and implementation of a mixed waste processing facility. This is an instance where it will be prudent to analyze the results of the prior diversion efforts of the community before moving forward with a significant capital investment. It will be critical to design a facility based on what is left in the waste stream along with a clear understanding of the type of “feedstock” the facility will be expected to produce from the waste material input.

With the understanding that the specific design will need to be developed based on the future results of the next phase of diversion efforts in the County, it is the consensus of the RC that a mixed waste processing facility will be a feasible component of an integrated plan to achieve SWAG’s diversion goals.

Recommendation 3: Mixed Waste Processing Facility

The RC recommends that the SWAG’s policy and planning efforts include the development of a mixed waste processing facility as a feasible option for further feasibility study and development. Additionally, the further analysis should include designing flexibility in the facility for it to support future emerging technologies.

3A: Develop Mixed Waste Facility that targets Multi-Family Commercial Waste Stream

3B: Design Flexibility for Emerging Technologies

Emerging Technology

Finding 4: As the County moves towards higher levels of diversion the remaining waste stream will be comprised of materials that have been identified in the Cascadia Report using terms such as; “Remainder/Composite”, “Mixed Residue” and “Other”. These materials by their nature will not lend themselves to recovery through the traditional programs for recycling and composting. Some of these materials can be separated through the specific design of a mixed waste processing facility as described previously. The current thinking in the industry related to the remainder of the waste stream is to focus on separation of material into groups based on organics and energy recovery potential.

The organic fraction of the remaining material can be considered for both energy recovery and soil amendment applications through anaerobic digestion. Other constituents like mixed non-recyclable plastic and paper can be utilized as a high BTU feedstock for renewable energy recovery through a variety of thermal conversion processes. The design of these emerging thermal processes differs from traditional waste to energy combustion and has been promoted as having low emissions and significant carbon reduction potential. These types of processes have been developed primarily in other countries or through smaller scale projects here in the United States. While commercial scale projects don’t have a long track record in this country, the scientific theory behind many of these emerging technologies is well founded and worth future study and consideration as part of an integrated approach to accomplishing the higher levels of diversion identified through the SWAG objectives.

Recommendation 4: Emerging Technologies

We recommend that the SWAG’s policy and planning efforts include the consideration of emerging technologies, such as anaerobic digestion and low emission thermal conversion, as part a comprehensive and integrated approach to achieving the stated diversion goal objectives. Our recommendation includes the future study of these technologies however, because of the potential high cost of these technologies, prior to implementation a study should be completed to measure the success. Our research identified that there are already smaller scale innovative technologies being proposed within the region to address specific waste streams, the RC recommends a policy to support those efforts within the community.

4A: Implement Further Analysis

4B. Adopt a policy to support emerging technologies within the community.

Conclusions:

This report is offered to SWAG with great appreciation for the effort that is being put forth on the part of the City and County elected representatives to come together and develop a consensus for solid waste and diversion policy and planning measures on behalf of the Sonoma County Community. The RC developed their recommendations with the input of a diverse range of knowledgeable individuals representing just about every solid waste and recycling stakeholder interest in the county. We have worked diligently to find the common ground that we all can agree on. We have endeavored to offer sound public policy options regarding diversion processing and facility development strategies for SWAG's consideration.

Beyond the written report, the work of the RC has included extensive discussion and healthy debate of each of the presented areas. While we have suggested the need for additional study in certain areas, we have provided SWAG with the specific recommendations for further detailed study for which we have a high degree of confidence will represent cost effective solutions to meet the stated objectives for diversion, economic efficiency and local control. To that end, included in the full report is a summary table which attempts to quantify the range of potential cost/rate impacts and potential additional diversion that could be achieved through implementation of the various options.

The RC has estimated based upon our research that Recommendations #1-3 should all be able to be implemented for less than an additional \$2.00/month impact to a typical residential collection bill. It should be noted that this table estimates rate impacts to residential customers to implement these waste reduction and diversion efforts, as if they are full add-ons to the existing system costs. However, should diversion goals be achieved there will be a significant reduction in remaining tonnage going to landfill disposal, which should result in offsetting savings. We expect that when the consultant study is performed which takes into account all system costs, that these potential offsetting savings will be analyzed.

Glossary of Recycling and Solid Waste Terms

AB 939 – In 1989 AB 939 established waste diversion mandates- Jurisdictions were required to meet diversion goals of 25% by 1995 and 50% by the year 2000. A disposal reporting system was established with CalRecycle oversight.

AB 939 Local Task Force (LTF) – The LTF is the solid waste management and resource recovery committee appointed by the Sonoma County Board of Supervisors. The duties of the committee are to develop goals, policies, and procedures which are consistent with guidelines and regulations adopted by the Board, to guide the development of the Siting Element of the Countywide Integrated Waste Management Plan (CoIWMP).

Anaerobic digestion – a method of composting that does not require oxygen. This composting method produces methane.

Construction and demolition debris (C&D) – Waste generated by construction and demolition of building such as bricks, concrete, drywall, lumber, miscellaneous metal parts, packaging materials, etc.

Countywide Integrated Waste Management Plan or CoIWMP (planning documents) - The complete package of planning documents prepared by a county or regional agency in conjunction with all cities within its boundaries.

Diversion Rate – Is a measure of the amount of waste being diverted from the municipal solid waste stream either through recycling or composting.

Emerging Technologies – Emerging technologies are contemporary advances and innovations in various fields of technology. As it relates to waste processing emerging technologies typically refer to digestion or thermal conversion technologies.

Extended Producer Responsibility (EPR) – EPR is a strategy designed to promote the integration of environmental costs associated with goods throughout their life cycles into the market price of the products.

Household Hazardous Waste (HHW) – Hazardous waste materials discarded, typically in small quantities, by households. Typical HHW includes used motor oil and oil filters, antifreeze vehicle fluids, paints, pesticides and cleaning supplies.

Material Recovery Facility (MRF) – A facility that sorts and processes collected recyclables for end users.

Organics – Materials that are or were recently living such as leaves, grass, agriculture crop residue or food scraps.

Renewable energy – Energy resources that can be replenished, such as sunlight, water, geothermal heat and biomass.

Self-haul sector – Waste that is hauled to a transfer, processing or disposal facility by someone other than a franchised waste hauler, typically small businesses, or residents who are either doing clean-up projects or do not subscribe to curbside collection service.

Sonoma County Waste Management Agency (SCWMA) - The SCWMA is a joint powers authority whose mission is to implement waste diversion programs as required by State law AB939. It's their job to inform local residents and businesses of ways they can, reduce, reuse and recycle their solid waste and properly dispose of hazardous materials.

Source separation – Setting aside compostable and recyclable materials from the waste stream before they are collected with other solid waste.

Thermal conversion – A process using heat that converts the carbon-based portion of the MSW waste stream into a synthetic gas which is subsequently used to produce products such as electricity, chemicals or green fuels.

Tons per day (TPD) – Used as a measurement of the solid waste disposal rate at a landfill or material recovery facility.

Vermicomposting – The production of compost using worms to digest organic waste.

Waste Characterization – The act of determining the types and amounts of materials in the disposed waste stream.

Waste Reduction – an important waste management strategy that encourages people to generate less trash through practices such as reuse, recycling and buying products with less packaging.

Zero Waste – In nature, all systems are cyclical. Biodegradability is the norm and there is no waste. Zero Waste, is defined as the application of that model, which ensures that products are made to be reused, repaired, remanufactured or recycled into the market place or nature.

I. Background and Objectives

The SWAG Research Committee was formed by action of the Sonoma County/City Solid Waste Advisory Group (SWAG) on November 15, 2010. The duties or objectives outlined for the Research Committee (RC) have been stated as:

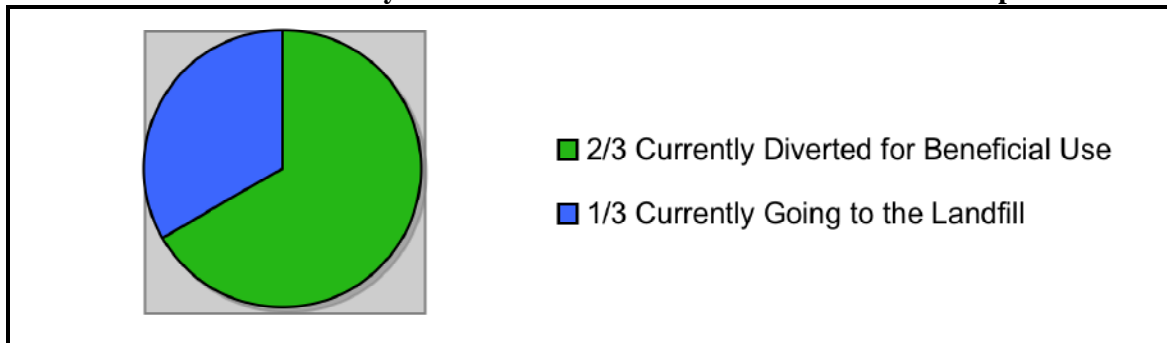
“To recommend a short list of regional solid waste system options for SWAG consideration which can feasibly meet SWAG’s objectives for increased diversion, economic efficiency and local control.”

The RC at their initial meeting had a discussion and reached consensus that system options and research should focus on the following activity areas; Waste Reduction, Waste Diversion, Education, Legislation, Enforcement, and Transfer/Processing Infrastructure. The RC formed three subcommittees to develop options for consideration relating to solid waste, recycling and organics processing and facility infrastructure needs in Sonoma County. The subcommittees are 1) Waste Reduction, 2) Education, Legislation and Enforcement, and 3) Transfer/Processing Facilities. The makeup of the subcommittees includes members of the full RC as well as a number of volunteers from the community representing a diverse range of stakeholder groups with a broad base of knowledge relating to waste industry issues.

The subcommittees have held numerous work sessions to date along with many hours of individual contributions between meetings to perform research and develop the data and documentation needed to accomplish the work and deliverable objectives of this RC. We would describe our work and analysis as being broad in nature and that subsequent, more detailed review and study will be needed in some of the areas we cover in this report in order to determine specific project component feasibility.

Our focus has been on identifying and recommending options for SWAG consideration that can assist in providing diversion opportunities for the material that is yet to be recovered from the waste stream in Sonoma County. The chart below demonstrates that Sonoma County has done a great job of implementing recycling and waste diversion programs that have contributed to recovering almost two thirds of the waste stream for beneficial use. This report is written to address the remaining one third of the waste stream that is still being disposed in local and regional landfills.

Sonoma County Current Waste Stream – 2/3 Diversion • 1/3 Disposal



This report provides an overview of the work of the subcommittees along with our findings and recommendations relating to waste reduction, education, legislative, enforcement and facility infrastructure options that the group believes can feasibly meet SWAG's objectives for increased diversion, economic efficiency and local control.

The RC wishes the reader to note that it was not within the scope of the RC's work to develop strategies for the system funding structure. The RC was also not charged with quantifying the impact that implementation of these recommendations may have on reducing other system costs and meeting climate protection goals. The RC acknowledges that all of these items are significant and will be addressed in future more detailed analysis which will be accomplished by a third party consultant. The RC stands ready to assist with this process.

II. Project Approach

The subcommittees' consensus included a goal of building our recommendations on a foundation of reliable data that was either existing, or readily developable within a short time frame. We also agreed that it would be most appropriate to maximize the utilization of Sonoma County's existing capacity for diversion before recommending the development of new infrastructure. We have concurred as a group that framing our discussions and findings in reference to tons per day will be most beneficial to offering technical guidance to the SWAG. In other words, when working towards a goal of 90% diversion, the subcommittees have recommended that this be expressed in its' per ton equivalent. This means to reach 90% diversion we need to limit our total county disposal to about 200 tons per day. Identifying needs on a per ton basis makes the defining of specific program and facility solutions a simpler and more intuitive process.

The subcommittees also incorporated the valuable work of others. Our initial steps included review of a number of reports including the *Organic Disposal Alternatives in Sonoma County* report created by the AB 939 Local Task Force, (LTF), the *Sonoma County Waste Management Agency Waste Characterization Study* prepared by Cascadia Consulting Group as well as the then current draft version of the *Planning for Zero Waste in Sonoma County Discussion Paper* prepared by the LTF.

From this basis the subcommittees outlined our work plan and implemented the following general scope of work:

- Defined current disposal volumes and recent trends
- Identified existing processing capacity in the County
- Evaluated waste characterization & divertibility analysis
- Reviewed existing capacity vs. needs – gap analysis
- Developed program and infrastructure options both traditional & emerging technologies that maximize the use of existing programs and infrastructure and then address the remaining gaps in capacity
- Developed findings and recommendations

Presented in this section is an overview of the research, analysis and project approach that has led the RC to develop our specific recommendations for SWAG’s consideration.

1. Current Disposal Volumes and Recent Trends

To understand the magnitude of the programs and processing and facility infrastructure needed to accomplish the diversion goals of SWAG, and the community as a whole, it is important to know just how much waste is still going to landfill disposal. It is equally important to understand the trends in volume and composition of the waste stream. As can be seen in Table 1, on the following page, there has been a dramatic decrease in disposal volume in the last few years. This situation is not unique to Sonoma County. While increased diversion has played a role, the primary contributor to the decrease in volume has been widely attributed to the economic downturn. Decreases of similar proportions have been experienced throughout California.

**Sonoma County Disposal Volumes
Comparison – 2006 vs. 2010**

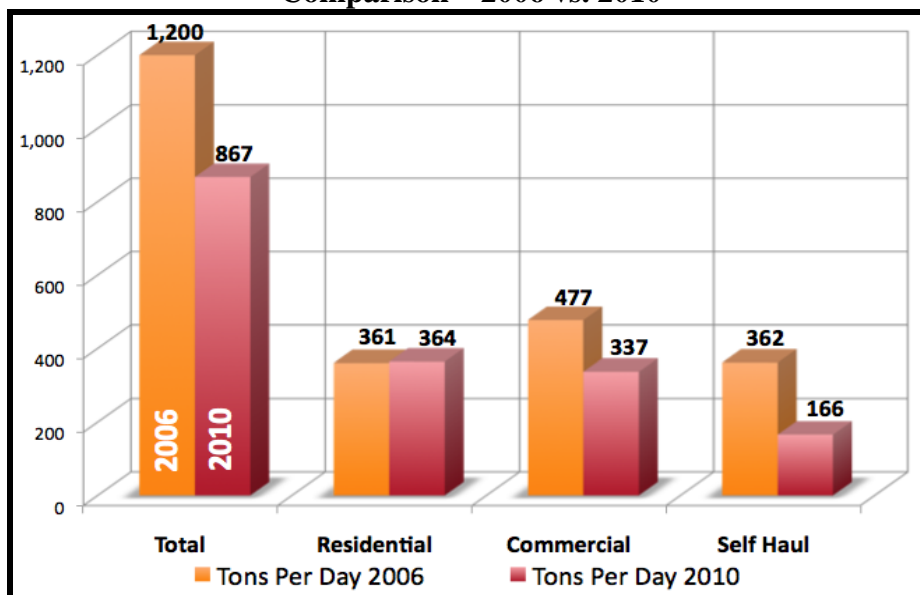


Table 1

As we analyze what will be needed in terms of program and processing capacity it is important to consider both the current volume and to plan for the likely increase in material generation when the economy improves. The overall volume in the County has decreased from approximately 1,200 tons per day at the beginning of 2007 to an average of 867 tons per day during 2010. As the economy improves it is prudent to plan for the identification and/or the development of diversion capacity which anticipates the higher historic volumes.

In addition to understanding the changes in volume as a whole it is essential to consider which waste generating sectors have been most impacted by the economic recession. Table 1 is provided as a tool to aid in this understanding. As can be seen, both the Commercial and Self Haul waste generators have seen large decreases in volumes where as the residential sector has remained relatively constant. It is logical that the commercial sector would be directly affected by the economy and with a little deductive reasoning, equally logical for self-haul.

The single largest component of the self-haul stream prior to the downturn was comprised of construction and demolition debris. With less money available in households for renovation projects it is possible to conclude that the economy was a major contributor to the reduction of waste in this sector as well. In contrast to self-haul, organic material was the single largest component, (over 50%), of the residential waste stream prior to the economic downturn. To oversimplify the analysis, even in an economic downturn people still eat and plants still grow, making it possible to understand why the residential waste stream has been less volatile during this economic decline.

While this analysis is anecdotal and far from scientific, we believe, for the propose of this report, it can be helpful in understanding which sectors of the waste stream will likely increase the most as we enter a period of economic recovery.

The RC is recommending that for policy and planning purposes that the SWAG should take into consideration both the current volume of disposal for short term planning and the likely need to have adequate processing and facility capacity to manage and divert the higher tonnage levels as experienced at the beginning of 2007.

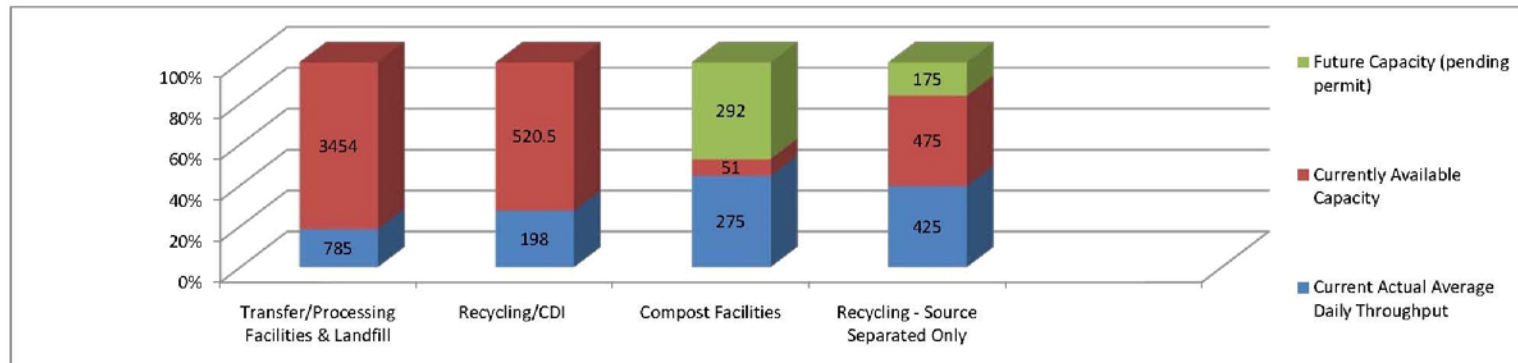
2. Inventory of Existing Facilities

In addition to knowing how much material is still being disposed, it is important to be aware of our current diversion infrastructure. As a tool to help understand the existing capacity to manage solid waste, recyclables and organic material here in Sonoma County, we have developed an inventory of permitted solid waste facilities. (The inventory is provided as Table 2 on the following page).

This inventory identifies the name and location of each site along with the types of material they are allowed to receive, their current permitted capacity in tons per day, the actual average tons each facility is currently receiving and their excess capacity to accept additional material. Also identified is potential future capacity for those facilities that have begun the process to secure permits for additional diversion activities.

TABLE 2
Sonoma County
Solid Waste Facility Inventory

SWIS ID #	Facility Name and Address	Waste Types Permitted	Permitted Capacity (TPD)	Actual Average Daily Tonnage (TPD)	Permitted Capacity Available (TPD)	Future Potential Facilities (TPD)	Future Additional Capacity (TPD)
Transfer/Processing Facility and Landfill							
49-AA-0001	Central Transfer Station/Landfill, 500 Mecham Rd	Solid Waste including Recyclables, Green and CDI	2500	483	2017		
49-AA-0245	Healdsburg Transfer Station, 166 Alexander Valley Rd	Solid Waste including Recyclables, Green and CDI	720	154	566		
49-AA-0144	Sonoma Transfer Station, 4376 Stage Gulch Rd	Solid Waste including Recyclables, Green and CDI	760	98	662		
49-AA-0139	Guemerville Transfer Station, 13450 Pocket Dr	Solid Waste including Recyclables, Green and CDI	160	39	121		
49-AA-0364	Annapolis Transfer Station, 33551 Annapolis Rd	Solid Waste including Recyclables, Green and CDI	99	11	88		
		Total	4239	785	3454		
Transfer/Processing Facilities - Construction Demolition, Green and Recyclables							
49-AA-0390	Global Materials Recovery Services, 3899 Santa Rosa Ave	Comingled and Source Separated Recyclables, Green Waste, Construction & Demolition Debris	*543.5	135	408.5		
49-AA-0398	M & M Services Inc., 590 Caletti Road	Construct/Demolition/Inert Debris	175	63	112		
		Total	718.5	198	520.5		
**Recycling Operations - Source Separated only							
N/A	Novato Disposal, Petaluma Blvd. South	Source Separated Recyclables	0	0	0	175	175
N/A	Northbay Disposal, 3400 Standish Avenue	Source Separated Recyclables	***400	150	250		
N/A	Northbay Disposal, 3417 Standish Avenue	Source Separated Recyclables	***500	275	225		
		Total	0	425	475	175	175
Composting Facilities							
49-AA-0260	Central Composting Facility, 500 Mecham Road	Green, Agricultural, Vegetative Food	****301	265	36	557	292
49-AA-0405	Sonoma Vermiculture, 3900 Hwy 37, Petaluma, CA 94954	Food Wastes/Manure	15	10	15	N/A	N/A
		Total	316	275	51	557	292



* 543.5 TPD is limited to 400TPD Construction & Demolition/Inert Debris, 124.5 TPD Recyclables and 19 TPD Green Waste

**Recycling Operations are required to meet the the 3-Part Test (Source Separated, < 1% Putrescible Waste and < 10% Residual)

***Permitted Capacity for Recycling Operations was based upon estimated throughput.

****Permitted Capacity for Composting Facility was based upon CEQA and Use Permit limitations.

In most cases, the capacity of a facility on the list is reported based on its daily permitted limitation. The exceptions to this are the source separated recycling facilities, which are not specifically regulated on a tons per day basis. The reported capacity for these facilities is based on the operator's projection of the practical ability of the facility to accept and process additional material. These facilities are allowed to operate under a simpler permit structure than other solid waste activities as long as they meet what is known as the "3-Part Test"; 1) They must receive only source separated material, 2) The material must contain less than 1% putrecible waste and 3) the process must result in less than 10% residual waste.

The inventory table identifies a considerable amount of available capacity in the category of Transfer/Processing and Landfill. It is important to note that in this case, there is a significant difference between permitted capacity and actual processing capability. In general terms, infrastructure for diversion has not been built into the transfer facilities. Historically the transfer stations have performed limited amounts of recovery activities. While there may need to be some capital investment to add processing capability, or the modification of operating practices, the permitted status of the transfer operations should be considered an asset as part of an integrated approach to diversion opportunities in the future. For example, there are pilot activities taking place at the Sonoma and Healdsburg transfer facilities to determine the potential for diverting material from selected C&D loads. Based on the findings of this activity, it is likely that additional diversion operations at the transfer stations can be developed and implemented with little modification to existing permits.

A key finding made clear from reviewing Table 2, is the fact that the County only has 36 tons per day of additional permitted capacity for composting activities. This reinforces, what has been advocated by a broad base of stakeholders, the importance of moving forward with the efforts to secure expanded permitted capacity for composting in the County. As will be discussed further in this report, organic material makes up a substantial portion of the waste that is still directed to landfills and its' recovery from disposal will play a key role in accomplishing the SWAG's diversion goals. While we will reiterate this point later in the Findings and Recommendations section, we believe it is also worthy of mention early in this discussion.

3. Waste Composition & Divertibility Analysis

A reasonable next step in determining the diversion facility and processing needs in the County is to understand the composition of the material still being disposed. Identifying the specific material types still in the waste stream can provide a strong indication of the types of processing facilities and infrastructure that will likely be required to accomplish SWAG's stated diversion goals.

In 2007, the Sonoma County Waste Management Agency contracted with Cascadia Consulting Group to characterize the municipal solid waste disposed by residential, commercial and self-hauled sources. The findings of this effort have been published in a report entitled, *Sonoma County Waste Management Agency Waste Characterization Study, Final Report, November 2007*, (Cascadia Report). The subcommittees have found this report to be a valuable tool in performing our research and developing our recommendations.

It is important to point out that because the data in the characterization study is from a few years ago, changes in both the volume and composition of the waste stream compared to the current

situation should be expected. For example, we know that there has been a significant decline in overall volume of disposal due largely to the economic downturn. It is also logical to assume, for example, that if the study were performed today we would likely find a significant decline in construction and demolition waste materials attributable to the general reduction of development in the County.

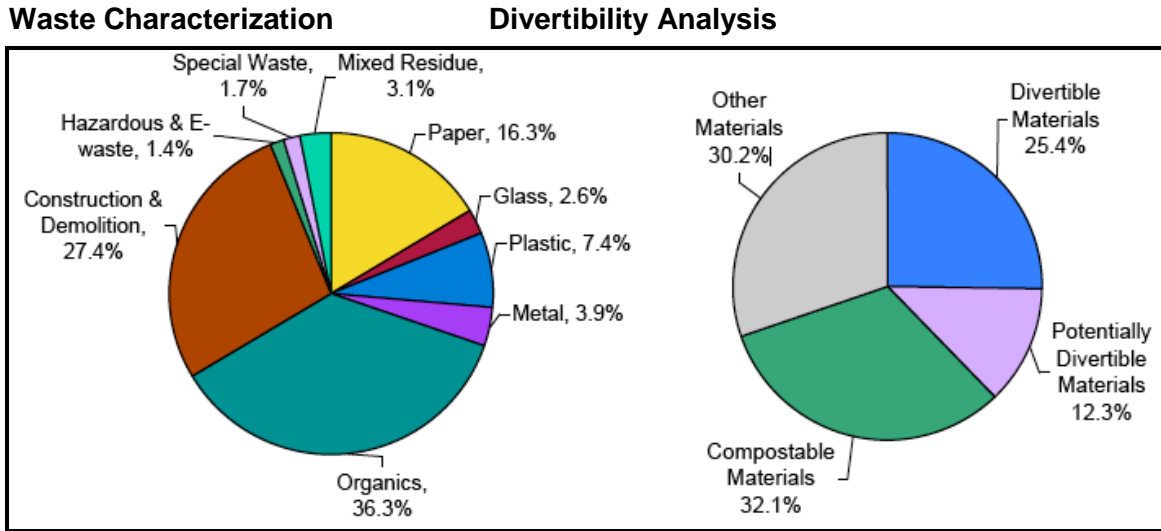
A positive aspect of this “dated data” is that as the economy improves it is likely that this information will be fairly representative of the volume and types of material that should be expected and accounted for in the policy and planning efforts for future diversion infrastructure development.

With these qualifications in mind, the subcommittees have relied on the data and information in this report to assist us in the development of our findings and recommendations for SWAG. We have included relevant excerpts from the Cascadia Report in this document to help provide a good picture of what is remaining in the waste stream. (The full report can be found at www.recyclenow.org).

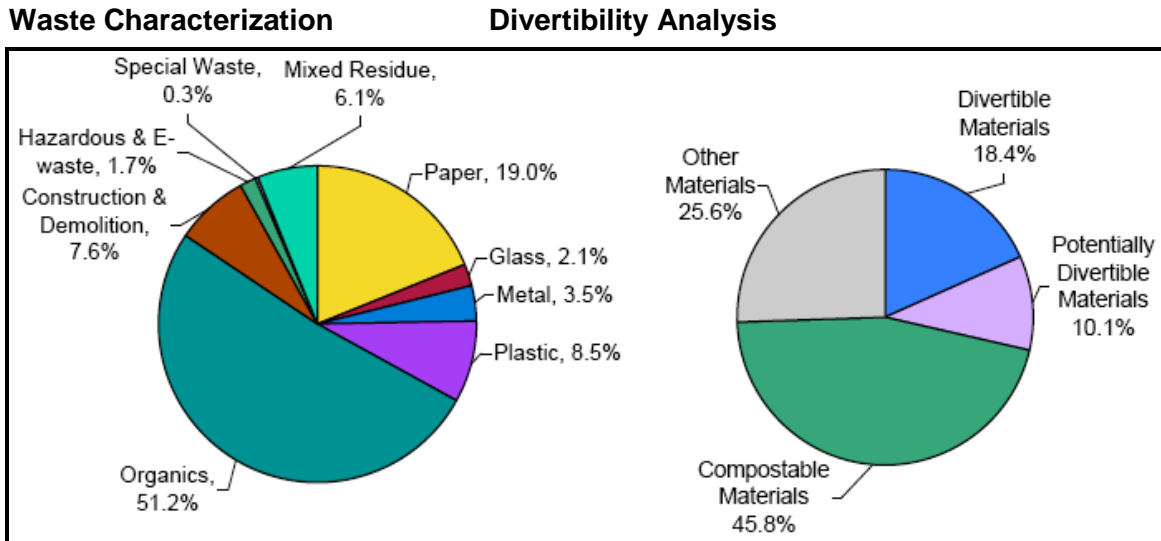
In addition to the identification of the different constituents of the waste stream still being disposed, the Cascadia Report also provided a “Divertibility Analysis” that further categorized the components of the waste stream into the following four groups:

- **Divertible Materials:** This includes materials for which source reduction programs or methods, collection programs, and/or recycling infrastructure exist, either broadly or in "forefront communities."
- **Compostable Materials:** This includes organic materials that are appropriate for municipal composting programs.
- **Potentially Divertible:** This includes materials for which methods and/or technology exist for recycling, reuse, or other beneficial uses, although programs to collect and process the materials are rare or nonexistent in the Sonoma area.
- **Other Materials:** This includes materials that do not fit any of the definitions above and that are not easily diverted from disposal. Some examples are ash, bulky items, durable plastics, non-recyclable film, industrial sludge, other HHW, remainder/composite (C&D, glass, metals, mixed residue, organics, paper, plastics), treated medical waste and treated wood waste.

This information was compiled for the overall County waste stream as well as individually for the Residential, Commercial and Self-Haul generator sectors. The following four charts illustrate the findings from the Cascadia Report:



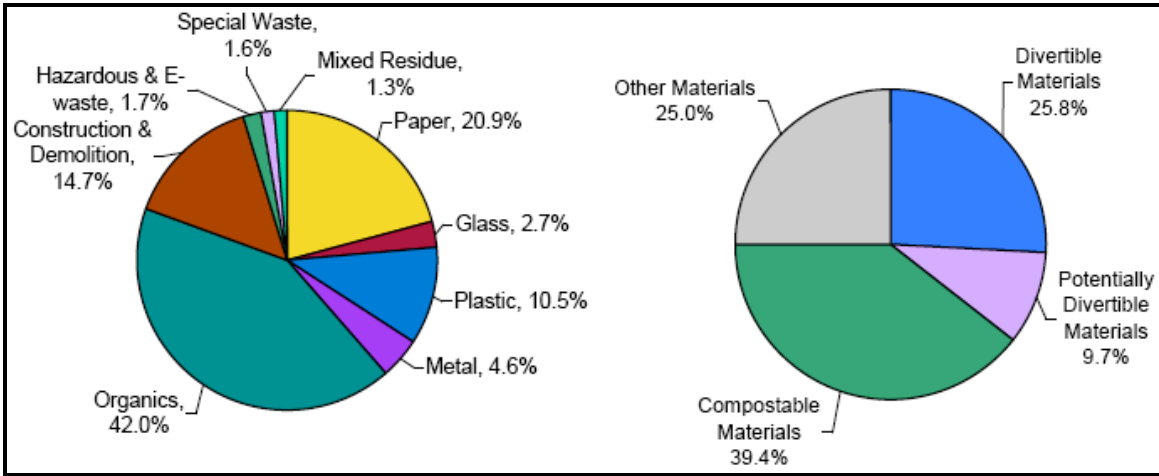
Overall County Waste Stream – Chart 1



Residential Waste Stream – Chart 2

Waste Characterization

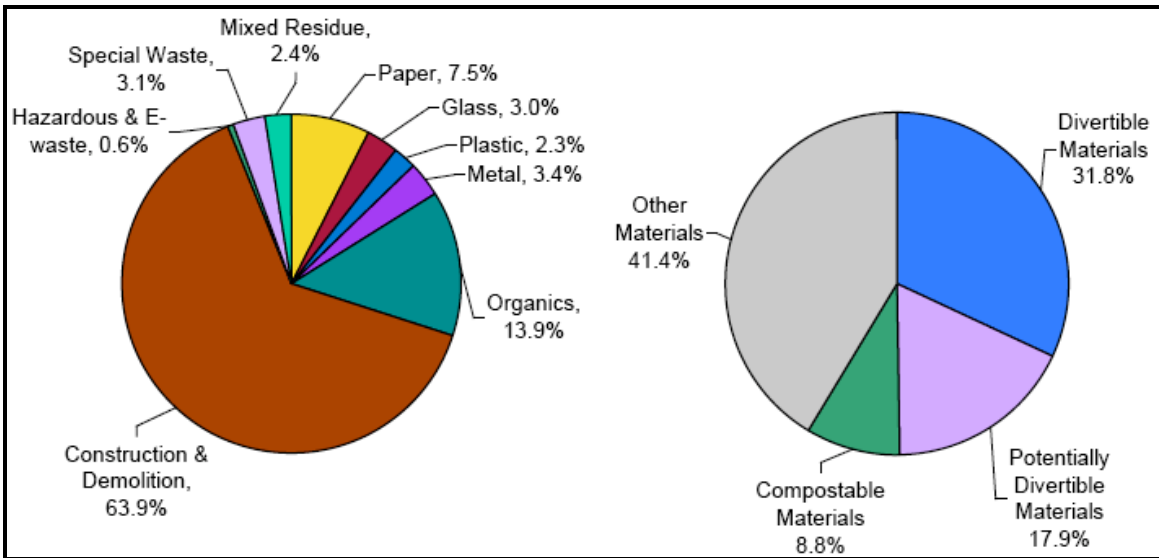
Divertibility Analysis



Commercial Waste Stream – Chart 3

Waste Characterization

Divertibility Analysis



Self-Haul Waste Stream – Chart 4

The key finding that is illustrated by the four charts above is that there is still a significant amount of material being disposed that falls into the categories of Divertible, Compostable and Potentially Divertible. The 2007 Cascadia Report identified nearly 70 percent of the overall County landfilled tons falling into these three groups.

The subcommittees have taken an additional step in the analysis for the purpose of our work to develop recommendations to SWAG. We have taken the percentage information provided in the Cascadia Report and converted it to tons per day of material being disposed for each of the four groups. We have made this calculation for the tonnage levels from 2006 and extrapolated the

same information for 2010. While it should be expected that the composition of the waste stream today is different from 2006, this approach can provide general information which is appropriate for SWAG’s policy and planning efforts at this phase of the analysis. Additional detailed analysis will likely be needed at subsequent phases of facility development.

As discussed previously, when possible this report refers to generation, disposal and diversion activities in terms of tons per day. While SWAG’s diversion goals are stated as a percentage of the waste stream, ultimately this needs to be translated into tons per day due to the fact that the development of facilities to process material are designed, permitted and regulated on this same basis. This approach also simplifies our ability to quantify the size and types of the current and future facilities that will be needed to meet the diversion goals.

Presented below is a graph which converts the Divertibility percentages from the Cascadia Report into their tons per day equivalents for both 2006 and 2010:

Disposal Divertibility Analysis Comparison – 2006 vs. 2010

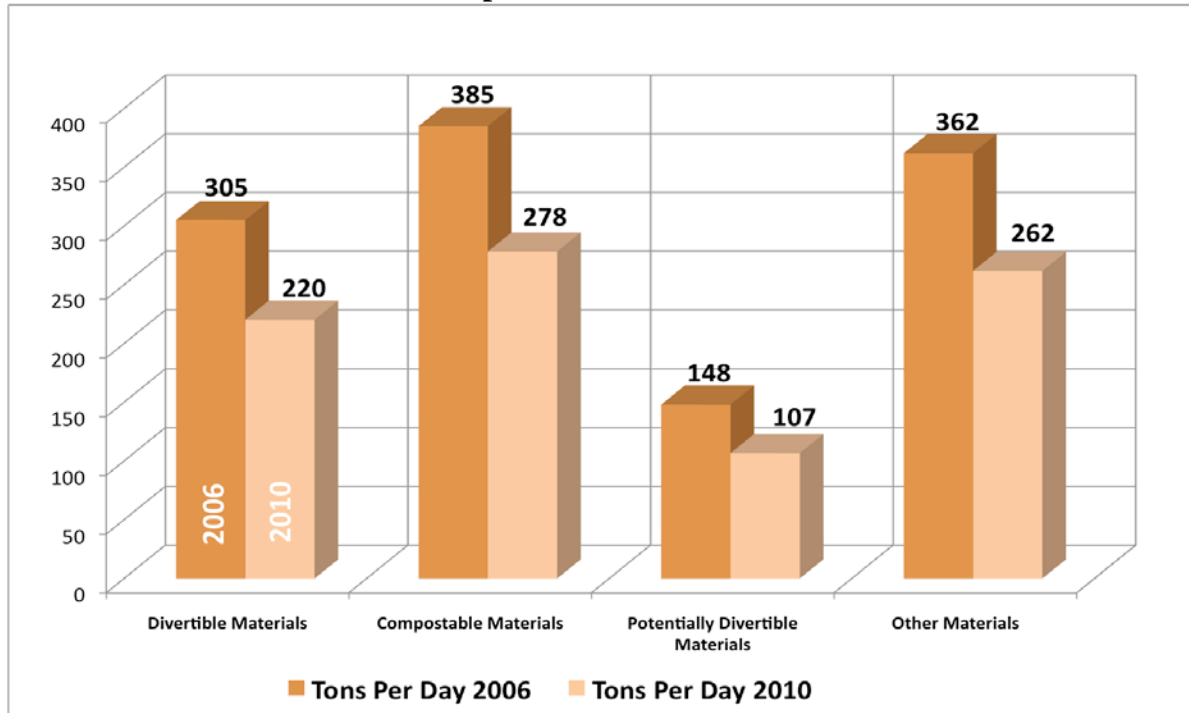


Table 3

Table 3 presents both the current volumes and the higher historical levels from 2006 in order to illustrate the range and categories of material tonnages that will require some type of recovery processing to maintain our current status and meet our increased diversion goals in the future.

The information in Table 3 can be utilized to help find the right match between targeted materials and various types of existing or future diversion programs and facilities. Table 3 identifies that the volume of material in the Divertible Materials group ranges from 220 – 305 tons per day. It is important to understand that some, but not all, of the types of material identified in this group could be managed by the current collection and processing infrastructure in the County. This would need to be accomplished through waste reduction efforts and/or

increased customer participation in existing programs. Increased customer participation is the focus of the subcommittee on education, legislation and enforcement and will be discussed later in this report together with waste reduction findings and recommendations.

Other constituents found in this category will require new types of diversion facilities. For waste generating sectors where source separation is not practical or has been historically less successful, such as in the multi-family sector, a mixed waste processing facility will likely be an appropriate future development for consideration by SWAG. We are using the term “Mixed Waste Processing Facility” to refer to what is sometimes called a dirty MRF. Mixed waste processing facilities can be developed for a variety of applications as well as be designed to target specific waste streams such as commercial, residential or construction and demolition. The topic of mixed waste processing is covered further in the Findings and Recommendations section later in this report.

Table 3 also identifies that the single largest opportunity for diversion comes from within the Compostable Materials group highlighting a range of 278 – 385 tons per day. As we have mentioned earlier in this report, when you combine this data with the information on our existing remaining capacity at the compost facility of only 36 tons per day, it makes quite clear the importance of pursuing additional composting capacity for Sonoma County.

Another important finding that can be derived from this information is the fact that the two remaining groups of Potentially Divertible and Other Materials contain some of the most challenging parts of the waste stream from a diversion facility standpoint. Combined, these two groups range from 369 - 510 tons per day.

The subcommittee has presented in this section, some of the highlights of the divertibility information that has been reviewed as part of this process. Our approach to developing the information contained in the remaining sections of this report has been to incorporate the statistical information review along with the knowledge and direct experience of the diverse committee membership to formulate needs assessments, findings and recommendations.

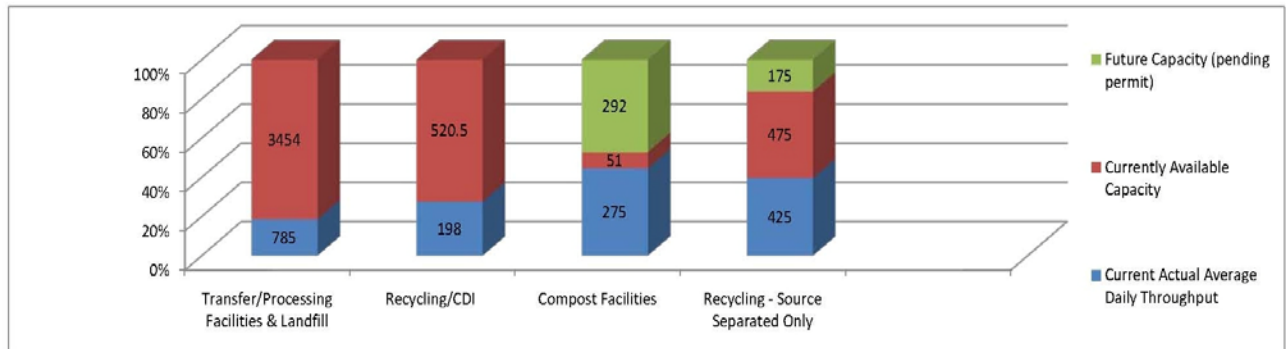
4. Maximizing Existing Capacity

The transfer/processing infrastructure subcommittee developed the Solid Waste Inventory and Facility Capacity chart, (Table 2) as a tool for assisting in the identification of the types of diversion processing capabilities that currently exist here in the County. Further, the inventory also identifies those types of facilities that have underutilized capacity and those that are at or near their permitted limitations. Table 2 has grouped the facilities in the County into the following four categories:

- Transfer/Processing Facilities & Landfill
- Commingled Recycling/ Construction, Demolition & Inert Debris
- Compost Facilities
- Source Separated Recycling Only

For the purpose of maximizing existing capacity for diversion, it is important to understand the difference between permitted capacity and operational capacity. The graph from Table 2, (provided below), represents a combination of both types of capacity.

Table 2 – Existing Capacity Graph (excerpt)
Tons per day



* 543.5 TPD is limited to 400TPD Construction & Demolition/Inert Debris, 124.5 TPD Recyclables and 19 TPD Green Waste
 **Recycling Operations are required to meet the 3-Part Test (Source Separated, < 1% Putrescible Waste and < 10% Residual)
 ***Permitted Capacity for Recycling Operations was based upon estimated throughput.
 ****Permitted Capacity for Composting Facility was based upon CEQA and Use Permit limitations.

For example, the graph identifies over 3,000 tons per day of available permitted capacity in the first category of Transfer/Processing Facilities & Landfill. This permitted amount, however, represents significantly more than the current operational diversion capabilities of the transfer facilities in the County. The transfer facilities lack sorting equipment and have limited space to recover material from the waste stream. This limits the practical ability to take advantage of the total permitted capacity.

To better understand the practical capacity for diversion opportunities at the transfer facilities, the County, through its contractor, has begun manual sorting pilot activities at the Sonoma and Healdsburg transfer stations. Selected construction and demolition loads are being floor-sorted for recovery of divertible materials. Beyond the recovery of material for recycling, the pilot will also be used to gather data on the effectiveness of this fairly low-tech approach to diversion. Based on the findings, this approach may be able to be expanded to other facilities and/or waste sectors as well. This project is one example of many activities that can be developed to maximize the available diversion capacity of our current infrastructure.

In addition to capacity at the transfer facilities, the graph above identifies over 500 tons per day of excess permitted capacity in the category of Commingled Recycling/Construction, Demolition & Inert Debris facilities. In contrast to the transfer facilities, for this category the permitted and operational capacities are considered to be approximately the same. It is the focus of the education, legislation and enforcement subcommittee’s findings and recommendations to define the possible strategies to ensure that the appropriate portions of the waste stream be directed to these types of facilities, this volume of remaining capacity should be able to handle a significant percentage of the construction and demolition portion of the waste stream here in Sonoma County.

A similar situation exists in the category of Source Separated Recycling facilities. Over 400 tons per day of remaining operational capacity has been identified for additional diversion for source-

separated materials. This capacity is designed to accommodate both commercial and residential sources.

The ability to take advantage of this excess processing capacity will be primarily dependant on increasing customer participation in both the residential, (blue can) and the commercial source-separated recycling services offered currently throughout the County. Decreasing waste generation and increasing participation will likely involve the implementation of an integrated program of education, enforcement and possible legislative tools to aid in raising public awareness and motivating behavior modification. The RC suggests that an integrated approach of implementation with consideration for each of these areas will likely be needed to accomplish the highest levels of diversion in an economically efficient manner.

The fundamental finding in the area of existing diversion capacity is that there are good opportunities for additional diversion within the current infrastructure in the County. The existing capacity is available now and can be utilized as part of the SWAG's longer-term goals as well. As will be highlighted further in the report, new processing facilities will be recommended as part of the options to be considered by SWAG to accomplish the highest levels of diversion. It is also quite apparent that prior to engaging in new development, a lot can be done with what we have. To say it simply, it just makes sense to maximize the use of our existing infrastructure, especially in these economically challenging times.

5. Identify Future Needs – Capacity Gap Analysis

In addition to effectively maximizing our existing processing capacity in the County, new types of facilities will need to be developed in order to meet the longer term 90% diversion goal identified by SWAG. In this section we are providing some additional details related to the composition of what's left in the waste stream to help understand what types of new facilities may be needed to "Fill the Gap" between our existing system and our long term diversion goals.

We have again found the information contained in the Cascadia Report to be quite helpful with this study. Beyond the four broad groups identified in its Divertibility Analysis, the Cascadia Report also provided additional detailed waste composition information. By reviewing this more detailed information some logical options for new facility development can be identified.

Since the information in the report was primarily provided as percentage figures, Table 4 on the following page has been developed to provide an illustration of the tons per day equivalents for the waste characterization percentage figures presented in the Cascadia Report.

We have made this calculation for the tonnage levels from 2006 and extrapolated the same information for 2010. While it should be expected that the composition of the waste stream today is different from 2006, this approach can provide general information which is appropriate for SWAG's policy and planning efforts at this phase of the analysis. Additional detailed analysis will likely be needed at subsequent phases of facility development.

The first factor that is reinforced by reviewing Table 4 is that the biggest opportunity for increased diversion is in the Organics category. As discussed previously, the County has only approximately 36 tons per day of remaining permitted capacity at its composting facility. It should also be pointed out that food waste, a subset of Organics, is the most common individual material disposed at approximately 21% of the total waste stream. This means that there may be

a range of as much as 182 -252 tons per day of food waste that could be diverted for composting if the appropriate processing and facility infrastructure were in place in Sonoma County. This is one area where there is a clear and definable “Gap” in our existing capacity.

Waste Characterization – County Overall
Tonnage Range Comparison – 2010 vs. 2006

Material Type	Percent	Tonnage Range – Tons per Day
Organics	36.3 %	315 – 435
C & D	27.4 %	237 – 329
Paper	16.3 %	141 – 195
Plastic	7.4 %	64 – 89
Metal	3.9 %	34 – 47
Mixed Residue	3.1 %	27 – 37
Glass	2.6 %	22 – 31
Special Waste	1.7 %	15 – 20
Hazardous & E-Waste	1.4 %	12 – 17
Total Waste Stream	100 %	867 – 1200

Table 4

The next biggest category of waste identified in Table 4 is Construction and Demolition material. The identified range of material is from 237 – 329 tons per day. While the existing sorting capacity in Sonoma County appears to be sufficient to handle this volume, it is important to understand that a portion of this material currently has underdeveloped end use markets. Materials such as treated wood and composite C&D materials would fall into this group. The potential “Gap” for this category will likely fall into the need for the development of beneficial end use markets for the hard to manage material types that may be recovered from our existing C&D sorting capabilities.

The remaining waste categories combined represent a range of between 315 – 436 tons of material per day. Some of this material can be diverted to existing source separation programs through increased customer participation. The remaining material falls into categories that will likely be best suited for recovery at a mixed waste processing facility. The mixed waste processing facility can be designed to sort traditional recyclables as well as produce a “feedstock” for new emerging technologies such as anaerobic digestion or thermal conversion for renewable energy recovery. This waste category represents an example of where the “Gap” will likely include both sorting capabilities as well as beneficial end use markets for material separated from the disposal stream.

This section has provided a general overview of the “Gap Analysis” factors that have been considered by the transfer/processing infrastructure subcommittee as part of the work to develop our findings and recommendations found later in this report.

6. Waste Reduction Options

Recycling is not enough. We must also reduce the quantity of materials discarded. It's in our best financial and environmental interest to prevent the creation of waste in the first place. Waste Reduction will avoid the need to use scarce resources to transport and manage these materials, as well as help to reduce or eliminate the need for costly new waste handling infrastructure.

When addressing waste reduction, or 'prevention', it quickly becomes clear that prevention is a more efficient approach that consumes fewer materials for the services used in our economy. CalRecycle makes it clear that this shift will also save us money in a variety of ways¹:

Waste is materials and supplies that are paid for, and subsequently rendered useless. Before those materials and supplies are rendered useless, they are housed in expensive office or warehouse space. After they are rendered useless, money is paid to haul them away.

The initial research found in this paper indicates that Sonoma County could make quick progress to prevent waste by launching an outreach program for commercial and residential waste generators. It would make economic sense to coordinate this outreach with efforts to increase waste diversion. While anecdotal evidence indicates waste prevention programs would be cost effective components of any waste reduction effort, further analysis will be needed to estimate the actual amount of waste that could be prevented in Sonoma County.

A. Short vs. Long-term

To address waste prevention, our approaches will need to shift over time as immediate challenges are met and we move on to more complex problems. In the short term we should focus on preventing waste that currently has no way to be economically diverted or recycled. Examples include polystyrene and other take-out food containers, as well as expanded polystyrene protective packaging, and other single-use products and packaging.

In the long-term we must shift to the use of durable products and reusable packaging. There are existing models for these programs, which can be promoted through existing outreach programs. These efforts to prevent waste will also need to focus on state and national legislation in order to continue our progress. For the most part, this legislation will use policy tools like producer responsibility, financial incentives and in some cases bans.

B. Outreach (short-term)

To achieve our short-term goal of maximizing existing waste prevention programs, we'll need to address behavior change through increased outreach. Waste prevention strategies can be spread in tandem with outreach programs aimed at increasing recycling activities.

Commercial: The main focus should begin with the commercial sector – roughly 1/3 of our waste stream. By addressing waste prevention at the commercial level, we will also prevent waste at the residential level (for example, through reduced packaging). It needs to be made clear that commercial producers of waste can save money through waste prevention. In order

¹ <http://www.calrecycle.ca.gov/ReduceWaste/Business/>

to make this case and provide the best tools, an outreach plan for individual waste-generating industries needs to be developed.

In Sonoma County, the goal should be to contact most businesses at least once per year. There are roughly 5,000 businesses that would benefit the most from such outreach. The annual cost could be around \$75,000, including direct contacts, articles in trade media, on the web and ads in print media.

Tactics for sharing this are mainly social marketing techniques:

- Prompts
- Peer pressure
- Social or community norms
- Pledges
- Positive recognition
- Identifying low performers

It should be noted that outreach to the commercial sector on ‘waste prevention’ would be most effective if coordinated with stakeholder organizations such as Chambers of Commerce, Better Business Bureaus and industry-specific trade organizations such as the North Coast Builders Exchange. Large organizations, such as SSU and Agilent, should also be targets for outreach.

For the most part, outreach content has already been established. CalRecycle has developed a list of targeted industries, along with specific strategies for each industry to reduce waste². The strategies are summarized on the following page:

² <http://www.calrecycle.ca.gov/ReduceWaste/Business/FactSheets/>

<p>Hotels</p> <ul style="list-style-type: none"> - Replace disposable room amenities with refillable or reusable substitutes. - Donate soap and toiletries to local shelters. - Donate un-served food to local food banks. "Good Samaritan" law protects from liability. Produce scraps can be composted on site, or donated to local farms. - Donate old furniture and equipment to institutions or charity. - Ask vendors and suppliers to provide supplies that are not over-packaged. - Change lighting to long-lasting fluorescents. 	<p>Landscapers</p> <ul style="list-style-type: none"> - Look for landscaping supplies available with minimal or reusable packaging. - Certain trees/shrubs are slow growing and need little or no pruning. - Proper design and use of irrigation can reduce unnecessary growth, maintenance requirements, and subsequent waste. - Use of drip irrigation places water next to plants, minimizing weed growth. - Prunings and clippings can be mulched at the job site using a chipper.
<p>Meetings and Conferences</p> <ul style="list-style-type: none"> - Select a location that practices waste reduction and recycling. - Inform participants about transit alternatives. - Select hotels on public transportation routes. - Don't prestuff conference packets, let participants take handouts they want. - Print or copy on both sides of pages. - Remove duplicate names mailing lists. - Post agendas or program information. - Select nametags that can be reused. 	<p>Offices</p> <ul style="list-style-type: none"> - Eliminate or reduce size of forms and reports. - Print or copy on both sides. - Set up PCs to automatically print two-sided. - Use lightweight paper. - Take steps to reduce unsolicited mail. - Design mailers that avoid the use of envelopes (fold and staple the paper). - Collect paper that has been used on one side and reuse as draft paper - Use outdated letterhead for in-house memos.
<p>Printing</p> <ul style="list-style-type: none"> - Put more words on a page by using smaller fonts and margins. - Choose a thin cover stock or eliminate cover. - Double-side documents. - Order only what you need. Volume discounts may make it economical to order more, but can you really use 1000 or 5000? - Request vegetable-based ink - helps prevent air and water pollution. 	<p>Property Management</p> <ul style="list-style-type: none"> - Purchase durable and repairable equipment. - Keep buildings in good repair; avoid deferred maintenance. - Request that deliveries be shipped in returnable and reusable containers. - Purchase concentrated cleaning supplies. - Use washable rags. - Eliminate trash bag liners in waste cans where no wet trash is disposed of. - Encourages biological pest controls.
<p>Restaurants (especially Fast-food)</p> <ul style="list-style-type: none"> - Minimize the use of unnecessary extra packaging of take-out foods. - Adjust the size of meal portions. - Offer customers a discount if they bring their own mugs, containers, or bags. - Use production charts to minimize over prepping and unnecessary waste. - Whenever possible, prepare foods to order. - Use reusable table linen and dinnerware. - Implement a monthly cleaning and maintenance program for all your equipment. - Make incentives for staff to reduce breakage. - Serve straws from health department-approved dispensers rather than pre-wrapped. 	<p>Retailers (especially Big Box)</p> <ul style="list-style-type: none"> - Work with suppliers and ask them to provide items without excess packaging. - Offer the choice of having purchases bagged and offer a discount to those with own bags. - Ask suppliers to provide packaging materials that are either refillable or reusable. - Use packaging that is recyclable and is made with recycled materials. - Donate old and outdated merchandise to charities rather than throwing it in the trash. - Mall property managers and anchor stores can provide leadership by coordinating waste prevention, recycling, and purchasing programs at multitenant complexes.

Residential: In order to encourage behavior change at the residential level, door-to-door outreach will be required. A canvass could attempt to reach all Sonoma County residents in three years (about 50,000 contacts per year if we pursue an aggressive schedule). A budget of roughly \$250,000 per year should be sufficient.

Another outreach strategy would involve working with school children who would carry the message home to parents - further spreading waste reduction concepts in the classroom. This could change behavior in the short-term while also laying the groundwork for additional behavior change in the future.

C. Bans, Fees and EPR (long-term)

While many bans and take-back programs are only possible or effective at the state and federal level, there are several effective actions that could be taken in Sonoma County. These include:

- Single use bag bans
- Polystyrene bans (such as take-out containers)
- Polystyrene take-back ordinances (for packing material on goods produced elsewhere)
- Fees on take-out cups to encourage reusable cups (fees kept by merchant)
- Comprehensive single-use fees

The Strategies listed above require state, federal or local legislation which is discussed in more detail later in this report

D. Timeframe

Short-term efforts to maximize our existing capacity and to prevent waste could begin within a year. Sonoma County should be able to see results fairly soon, especially if the sponsor or implementer is the Sonoma County Waste Management Agency (SCWMA).

2011-2012:

Nearly all of the waste prevention outreach could be done as a part of waste diversion outreach efforts for no additional cost. Funding could be amended into the FY '11/12 budget with an RFP for a consultant going out in June. Selection of a contractor could occur in July 2011 with a contract to SCWMA in August (on the street by September). This would be a relatively fast schedule. Results could begin within a month or so of the contract being signed, with some leveling off or diminishing of performance after an initial increase from the outreach. Annual monitoring and evaluation will be required to maintain gains and adapt the program. The budget for this would be roughly \$10,000 per year.

2012-2020:

Longer-term efforts to impose producer responsibility regulations, bans and fees on single-use items could take much longer and would be subject to political shifts at all levels of government. It's unlikely that Sonoma County could benefit from comprehensive bans and fees at the state and national level within the next few years.

E. Costs:

Costs for outreach to share best practices for preventing waste can be easily calculated based on numbers of generators to be contacted, an example is shown below, however, cost benefit needs further research and any outreach should be dual purpose and address waste reduction as well as diversion through re-use and recycling.

\$5 per contact

5,000 targeted businesses in Sonoma County (20,000 total)

165,000 housing units in Sonoma County

Total: \$335,000 per year (including marketing and monitoring)

Around \$1.20-\$1.50 on the tipping fee for SCWMA

F. Best Practices

In Sonoma County, Rohnert Park is an example of waste prevention and diversion programs being included in the franchise agreement. Their franchise agreement directs North Bay to conduct 100 commercial visits per year with another 100 multifamily visits per year. Financial incentives come from decreased solid waste costs, with an increase in recycling and a decrease in solid waste service. Elsewhere in the county, Windsor requires 40 multifamily visits per year and 40 commercial visits per year, while Cotati requires 40 commercial and multifamily visits per year.

Looking beyond Sonoma County, few communities have developed comprehensive waste prevention measures, but certain jurisdictions can be studied for particular efforts:

- San Francisco (2007) – Plastic bag and polystyrene ban
- Malibu, CA – Plastic bag ban
- Palo Alto, CA – Plastic bag ban
- Fairfax, CA – Plastic bag ban
- Portland, OR – Plastic bag ban
- San Luis Obispo County - Retailer take-back ordinances for fluorescent lamps and all household batteries.

Bans on All Polystyrene food-ware were found to exist in 7 cities in California including the cities of Richmond and San Bruno in the Bay Area.

Bans on Expanded Polystyrene Food-Ware were found to exist in at least 20 City and County jurisdictions throughout California including the Counties of Marin Santa Cruz and San Francisco in Northern California.

7. Education, Legislation and Enforcement Options

At its initial meeting the SWAG Research Committee began listing many methods for future waste diversion activities. These were further categorized, including items that fell into the related subjects of education, enforcement, and legislation. As a result, a subcommittee of the RC was formed, and tasked to further study these particular topics. The subcommittee was tasked with formulating a brief report outlining its research, with a suggested focus on actions that had been found to be successful.

Education is actually a premier enforcement activity because the customer/user is offered the opportunity to adopt appropriate and correct behaviors. Enforcement, on the other hand, has the disadvantage of being expensive, divisive and time-consuming. Legislation is a supportive tool, enhancing local efforts that have been designed specifically for the population, service providers, and to meet the diversionary goals for Sonoma County.

All education efforts should have a dual purpose message of waste reduction and waste diversion.

A. Education:

Current education and outreach efforts are managed primarily by the Sonoma County Waste Management Agency (SCWMA), a JPA with representation from the County of Sonoma and each of the 9 cities. Specific activities are defined in the Countywide Integrated Waste Management Plan (CoIWMP) and the SCWMA annual work plan. The SCWMA is also responsible for reporting to CalRecycle (formerly the California Integrated Waste Management Board) annually on the status of the SCWMA's education programs. It is worth noting that the AB 939 reporting is also the vehicle for quantifying the waste diversion rate for Sonoma County and its cities. SCWMA efforts include an informational web site (www.recyclenow.org), a telephone "hot-line" (the Eco-Desk), distribution of printed materials (particularly a countywide 'Recycling Guide'), and outreach at numerous local fairs and community events. In addition as discussed previously, the franchise haulers contracted with the cities and County also perform education and outreach activities. The extent of education by franchise haulers varies by franchise agreement. The scope of outreach usually includes customer service related needs, schools outreach, customer newsletters and events.

Education Options:

1. Multiple local government jurisdictions, in describing the success of their education efforts, stressed the importance of quantifying efforts, then sharing feedback with all stakeholders. It was particularly important to use data to show programs' progress. One avenue would be to tap into models from other jurisdictions (such as San Diego) conducting successful programs and replicate their processes for enforcement and reporting. A valuable activity would be the development of a comprehensive reporting system, whose goals would be to avoid data gaps, remove any impediments to fair competition among service providers, and organize the information in a way that would allow wide-spread usage. Such reporting among service providers would need to have a level playing field", including the ability to identify and systemize a reporting population of the businesses involved, such as the franchise haulers, self-haul folks and the independent haulers.
2. Programs that target youth are effective. Educating the youngest future consumers in a manner that establishes long-term behavior patterns of waste reduction, environmentally sustainable purchasing, re-use and recycling has been found to result in sustaining participation in waste reduction and diversion efforts. While the measurement of immediate results would be difficult, it is still clear youth programs would have the benefit in the long term. Successful activities have included presentations at schools (especially if they are part of environmental studies or science classes), facility tours (such as landfills and MRFs), or interactions with youth groups such as scouts, or 4H programs.

3. All communication and education efforts must be multi-lingual with respect to the language needs of the audience. Otherwise portions of the population will be under risk of being neglected or missed.
4. Recognition programs for successful households, multi-family facilities and businesses provide positive reinforcement. There would need to be a prioritization of level of service for businesses and multi-family facilities in order to have fair and equitable recognition. Level of service, by definition, is the minimum required ratio of recycling to trash containers. Using this parameter for any award would require planning ahead, educating all participants and establishing well defined and defensible goals. Annual awards for notable participation or substantial increased diversion actions were cited as effective examples.
5. As our waste diversion programs keep growing, education efforts will need to focus on the portion of our population that has had no interest in seeking information or improving their personal diversion efforts. In order to effectively approach this population, they must first be identified, possibly through the reporting process. Personal contact, such as via speaking opportunities with civic organizations or any group of individuals, will provide avenues to reach such people. In addition to current programs, which rely to a great extent on individuals' motivation to seek information, a new focus for education will have to be outward to capture the attention of this segment of waste generators This means door to door contact in many cases.
6. Because collection crews are the initial contact with many waste generators, feedback from these crews regarding what they have observed as they perform pickups is a great resource to identify targets for education on improving waste diversion.

Since the program is an on-going, evolving effort, it should be noted that education, in addition to monitoring and reporting, is a focus of CalRecycle's Mandatory Commercial Recycling Measure, which is discussed further under the "Legislation" heading below.

B. Enforcement:

There are no local formal enforcement programs currently in-place for examining actions or compelling conformance by solid waste program users with in-place guidelines or regulations. However, AB 1688, made part of the 2006 California statutes, authorizes "...local governments to appoint illegal dumping officers and would grant the officers limited law enforcement authority." If "illegal dumping" is defined in the future to mean non-conformance with waste recycling, reuse, or reduction laws, it is possible a mechanism exists for local government to pursue enforcement actions. The RC did recognize, as countywide diversion efforts continued and grew, enforcement activities would become necessary particularly to address the small segment of our population that had no interest or self-motivation in voluntary efforts towards waste diversion.

The issue of recycling enforcement is an issue that many local governments grapple with. There are a number of ways in which enforcement can be carried out, but in the end, a recycling program will not ultimately be successful due to enforcement activities. Education and convenience are the keys to successful programs. There are essentially two ways to provide enforcement activities with respect to recycling. The first method is to employ inspectors at the very local level whose job it is to spot inspect trash and recycling bins that are placed curbside. Typically, these inspectors, upon finding either recyclable materials in

the trash bin or non-recyclable materials in the recycling bin leave some kind of tag or notice, usually on the trash can with a brief description of the “violation”. These violations are then logged into a database and the inspectors revisit the property over the next month to determine whether the resident, or business where commercial recycling is available, had changed their waste disposal practices. If so, a “thank you” tag can be left so that the person knows that their bins were rechecked. If not, then the local jurisdiction, based upon their ordinance and general local police powers can actually issue a citation that could carry some level of fine. While there is very limited documentation available as to how often local jurisdictions actually proceed to the fining step, it is clear that most local jurisdictions will often issue several warnings in the hope of avoiding the citation step.

While this enforcement methodology can be highly effective in that it provides the opportunity for one on one contact and a direct educational opportunity, its ability to widely canvas any community is highly problematic. Local agencies tend to fund their enforcement activities solely from franchise fees placed on haulers and grants they receive or a combination of both. It appears very uncommon to find a local jurisdiction that funds its recycling enforcement activities from its general tax revenues. Given the downward pressure on all budgets, it is highly unlikely that any local jurisdiction would be in a position to utilize any of its general tax revenues for such a program.

The second typical method of enforcement does not happen at the curbside but at the landfill or trash disposal gate. Inspectors determine if a truckload is over the limit on restricted materials or contains any amount of banned materials. These programs are called “load check” and the County already has staff dedicated at least part-time to load check activities. These types of issues then relate back to the source community of the truck rather than an individual or business in the community. In terms of penalties, the trucks can be refused access to the disposal facility, charged some kind of surcharge or fine or the source community can be charged a surcharge or fine. In this example, since either the hauler or source community has to bear the burden, they would logically have to develop an enforcement program that occurs curbside in an attempt to reduce violating trucks from arriving at the disposal site. This brings in all of the issues discussed above with the first option and will cause local jurisdictions to calculate whether the cost of the surcharge and/or fines are significant enough to warrant the expense of a local enforcement program.

Regardless of which program or combination of programs is employed, in the end, an enforcement program will ultimately only be successful against chronic violators. This is the case of most non-criminal ordinance violators. As stated above, the key to successfully implementing and operating a recycling program is education and, perhaps most importantly, convenience. An inconvenient or burdensome program will cause people to not participate, view the program negatively and undermine the effort to move society as a whole closer to a zero waste situation. Bringing a hammer from the enforcement side if the program is inconvenient or burdensome is a recipe for failure.

Lastly, in thinking about enforcement, we have to be mindful that people will also have concerns about others looking through their trash. Not everyone shreds personal documents and while not suggesting that problems have ever occurred, there will be people who will be concerned or object to having what they might consider their private property inspected.

Enforcement Options:

1. The Sacramento Regional Solid Waste Authority uses employees of the Sacramento County's Environmental Management Department to enforce SWA ordinances. Particularly in their commercial recycling program enforcement this has been an effective tool in latter steps towards 100% compliance. Recently some of their nearby cities have joined these Sacramento Authority efforts.
2. Contractor /Collectors efforts, particularly because of their role in waste stream pickup, are recognized as very effective in both initial low-key counseling/warnings to non-diversion participants, then subsequently in providing information to enforcement and inspection officials so they can effectively focus efforts.
3. Establishing a "clear-bag" program for visual inspection of waste disposed in curbside containers enables efficient enforcement inspections by allowing visual access without needing to open refuse bags. Canada's Green Municipal Fund cited successful "clear bag" programs which were mandated by municipal solid waste program requirements. This program has many logistic issues that need to be looked at more closely for feasibility.
4. Determine the legal and operational requirements for the local area with the aim of standardizing local enforcement efforts countywide to establish consistency for business.

C. Legislation:

Clearly, California, and the Bay Area in particular, continue to be at the forefront in efforts to enhance waste diversion efforts. Recently, through CalRecycle and Air Resources Board efforts to implement AB 32, mandatory commercial recycling programs will be required, with a target date of July 2012. The regulations are expected to be finalized by the Air Resources Board (ARB) in spring 2011. Monitoring by CalRecycle, using existing AB 939, will begin in 2013. Penalties for a jurisdiction's non-compliance (as enforced by CalRecycle) are to be \$10,000 per day until a jurisdiction implements its program. Some Local governments have already begun efforts to comply by implementing mandatory commercial recycling programs through passages of ordinances.

Unfortunately, on a State-wide level, efforts at the most recent legislative session to approve waste reduction legislation regarding single-use carryout bags were unsuccessful. In a broad sense, establishing regional priorities for prospective legislation and development of future initiatives, then building a regional, consistent voice would clearly improve the success of legislative actions.

Legislative Options:

1. Due to the failure of statewide legislation, some local governments have enacted their own single-use bag bans. Legal challenges have occurred, with some situations still ongoing. Other problem items like unrecyclable, non-compostable takeout containers, or other single-use, disposable items should be studied for Local bans as well.
2. In the absence of national or statewide Extended Producer Responsibility (EPR) or take back laws, adopt local EPR ordinances for problematic products and packaging.
3. Ban organic material generated in Sonoma County from landfill disposal. Sonoma County currently bans yard debris and wood waste from landfill disposal; San Francisco bans all organics, including food materials. The recent Waste characterization Study identified this material as an effective target for waste diversion improvement. To this

end, a permit amendment is already in-process to raise limits on amounts of such materials that can be processed by the composting operation at Central.

4. Adopt a countywide construction, demolition, and deconstruction ordinance. Several Bay Area jurisdictions have adopted programs, varying from deposit systems (refundable on proof of material diversion), to certifying facilities for minimum diversion levels and requiring materials be delivered to qualifying facilities. The Agency or the individual jurisdictions could implement the C and D Ordinance already drafted by SCWMA.
5. Zero Waste initiatives are providing a great boost to increase diversion. The “AB 939 Local Task Force” (LTF) recently adopted a Zero-Waste document that they intend to present to the Sonoma County Board of Supervisors and the Sonoma County Waste Management Agency.
6. Early implementation of Mandatory Commercial Recycling Ordinance(s) within Sonoma County, including business and multi-family generators.

Additional information concerning order of magnitude costs and performance data would be vital in further evaluation of all the above-listed options. Efforts to collect this information are ongoing.

The RC requested that the subcommittee attempt to put some costs to the various education, enforcement and legislation options. The following information is an attempt to address this request, but all programs would need greater research as to their cost benefit.

Education Options Costs:

1. Results quantification and dissemination: Based on annual expense to the Sonoma County Waste Management Agency (SCWMA) to prepare AB 939 reports (which are similar in scope), an initial first-year staff cost to meet with affected parties, collect data, then prepare a report would be \$7,500. It would be reasonable that in subsequent years this activity could be included as part of the regular AB 939 reporting tasks for nominal added expense (maybe \$1,000). Regarding sharing the results with the community, advertisements in the local newspaper run between \$300 and \$400 per day.
2. Youth Education: Presentations at schools would have expense for labor and travel, and would cost between \$250 and \$500 per event depending on duration, travel distance, and number of speakers. Educational materials for distribution would encompass a wide range of expenses depending on what was utilized.
3. SCWMA experience has been that making programs, materials, and presentations bi-lingual requires added financial investment of 30 to 35%.
4. Speaking opportunities: Presentations to any groups would have similar costs to those done at schools as listed in item 2 above, between \$250 and \$500 per event.
5. Collection crew feedback: If this were made part of a crew’s routine, with a simple form available to document observed issues, cost would be minimal. Collecting and reviewing data forms would also not be difficult or expensive. We would need input from the collectors as to the feasibility and costs to individual jurisdictions as to costs.

Enforcement Options Costs:

The costs for the enforcement options described above are hard to estimate as the amount of “inspections” either at the disposal site or at the curb are directly related to the cost. The ultimate cost of the program is directly related to the level of effort assigned to labor for

inspection and whether significant fines will be collected and therefore will vary from jurisdiction to jurisdiction.

Legislation Option Costs:

- Ban Single-Use Bags other Single Use, Non-Compostable Packaging i.e. polystyrene take-out containers etc.
- Implement Construction and Demolition Debris Ordinance(s)
- Adopt Landfill Ban on Organic Material and potentially other Landfill bans
- Mandatory Commercial and Multi-Family Recycling Ordinance
- Local EPR/Take-Back Ordinance

If the State or Federal government approves legislation, the cost at the local level directly associated with the legislation itself is negligible. Therefore for this section the costs presented assumes that options will be implemented at the local level. Local legislative projects fall into three categories of implementation methods as follows:

- 1) Development of a model ordinance for each individual jurisdiction (9 cities and the County) to adopt
- 2) Development of a single countywide ordinance adopted by the JPA which overlays all jurisdictions
- 3) Development of and Amendment to Chapter 22 of the County Code to ban materials from the landfill

Note: For the purposes of this report we are covering the costs to take these activities to the point where an ordinance or ban has been adopted. Each time something like this is done, there needs to be an education/public outreach to stakeholders afterward to implement and then, depending on the ordinance, there may be enforcement costs which are discussed above.

The costs presented are based upon experience and talking to Agency and legal staff that have been involved in similar projects. Specifically, the Waste Management Agency recently developed a model C and D ordinance for jurisdictions to adopt and the County recently modified Chapter 22 of the County Code.

- 1) Development of Model Ordinance for individual jurisdictions to adopt.
 - a. Consultant – to work with jurisdictions and stakeholders and develop draft model ordinance - \$20,000
 - b. Staff time to develop and administer contract, work with consultant – 40 hours @ \$50 including benefits = \$ 2,000
 - c. Legal Review – 8 hours @ \$200/hr = \$1,600
 - d. Staff presentation and adoption of Ordinance to Jurisdictions- assume staff will attend up to two meetings to present draft model and to be available when it is adopted – 10 jurisdictions 4 hours per jurisdiction (aver. 2 hours per mtg) \$50/hour = \$ 2,000

Total Cost per Ordinance: \$25,600

Note: Each Jurisdiction will have internal costs for their staff to prepare and present agenda items which is not included in this estimate

- 2) Development of a single countywide ordinance adopted by the JPA which overlays all jurisdictions.
 - a. Consultant – to work with jurisdictions and stakeholders and develop draft model ordinance - \$20,000
 - b. Staff time to develop and administer contract, work with consultant – 40 hours @ \$50 including benefits = \$ 2,000
 - c. Legal, Drafting/Review and Opinion for JPA – 80 hours @ \$200/hr = \$16,000
 - d. Staff report and presentation and adoption of Ordinance by JPA - 20 hours @ \$50 = \$1,000
 - e. Legal Notice(s) - \$1,000

Total Cost per Ordinance: \$40,000

- 3) Development and Amendment to Chapter 22 of the County Code to ban materials from the landfill
 - a. Staff time develop text of Chapter 22 Changes, meetings with Stakeholders, etc. – 40 hours @ \$50 = \$2,000
 - b. County Counsel staff time to write Ordinance – 10 hours @ \$210/hour = \$2,100
 - c. Staff time to process Ordinance through Board - \$ 1,500
 - d. Publishing for Legal Notice(s) - \$1,000

Total Cost per Amendment to Chapter 22: \$ 6,600

These costs do not address CEQA compliance which has become a big factor in the plastic bag bans debate. However, it is presumed that it may not be a factor in many local ordinances.

8. Processing and Facility Options

This section identifies the broad range of solid waste, recycling and organics processing facilities that are currently in operation or could be considered as an emerging technology. This listing of facilities is offered to provide an overview to SWAG members of the possible types of processes and facilities that are being used or considered by communities in general. We are providing our “Short List” of options that we believe are appropriate for SWAG consideration for Sonoma County in the following section of this report entitled “Findings and Recommendations”.

We have divided the diversion facilities and processes we outline in this section into two broad categories; material sorting operations and end use processes. For example, a single stream material recovery facility would fall into the category of sorting facility because this type of process simply sorts and prepares the commingled material placed in the residential “Blue Can” into their various components like paper, plastic, aluminum cans, etc in order to ship them to an end use market. On the other hand we would categorize the Sonoma Compost facility as an end use market in that it uses yard waste as a feedstock to actually produce an end product for wholesale and retail consumers.

The following list identifies a representative sample of the range of possible diversion processes and facility options that could be considered as part of an integrated approach to maximizing material recovery in the community.

Sorting Facilities	End-Use Facilities
. Single-Stream Material Recovery Facility (MRF)	. Aerobic Wind Row Composting Facility
. C&D Sorting Facility	. Aerobic Aerated Static Pile Composting Facility
. Transfer Processing Facility	. Anaerobic Digestion – Dry Fermentation
. Mixed Waste Processing Facility	. Anaerobic Digestion – Wet-Waste Water Treatment
. Recycling Buy Back Centers	. Thermal Conversion of Biomass materials
. Household Hazardous Waste Collection Facility	. Vermiculture Composting– Worms
. Inert Material Processing – Concrete/Asphalt etc.	. Cellulosic Ethanol Facility
. Reuse Drop-off Centers–Landfills and Transfer Stations	. Plastic Lumber Production Facility
	. Biosolids Composting
	. Agricultural Land Application of Organics
	. Renewable Electricity & Fuel from Landfill Methane
	. Material Exchange Programs

III. Findings and Recommendations

As an introduction to this section we want to take the opportunity to point out that one of the first and fundamental findings of our group is that the jurisdictions and the stakeholders involved in integrated waste management over the years here in Sonoma County deserve positive and significant acknowledgement for their collective accomplishments in developing and maintaining pioneering and innovative waste diversion programs that have been models for many communities throughout the country. Sonoma County’s diversion rate of 64 percent is an asset to build upon. Our recommendations don’t come from a frame of what’s needed to “fix a problem” but come from the perspective of how do we take the next natural steps in the evolution of recycling, environmental enhancement and resource recovery.

This section is organized by highlighting key findings from our research and the multitude of options presented for waste reduction, waste diversion and waste processing, followed by the RC relevant recommendation(s). We are recommending both short and long-term options for SWAG’s consideration. Our focus relates to the types of programs and processing capabilities and facilities that will be needed to support the diversion goals of the SWAG

Our recommendations are offered as a phased approach and include suggested points in the process where the results from initial actions can be assessed and subsequent steps can build upon actual results from the previous accomplishments. It is important to allow for some flexibility in the planning process, especially for the longer-term objectives to accommodate changes in the waste stream and the evolution of emerging technologies.

Our detailed recommendations can be summarized within the four following broad areas:

- Maximize the use of existing diversion facilities in the County

- Diligently pursue additional composting capacity for the organic fraction of the waste stream including food waste using current technology of aerobic aerated static pile composting.
- Develop new mixed waste processing capability (resource recovery facility).
- Consider the development of emerging technologies, such as anaerobic digestion and/or thermal conversion facilities, based on future analysis.

Our discussion below addresses these four broad categories as well as offers other findings and recommendations that our group believes are relevant to SWAG’s considerations.

1. Existing Diversion Capacity

Finding: The inventory of permitted solid waste processing facilities (listed in Table 2) demonstrates that the County as a whole has a significant amount of underutilized diversion process capacity. The categories of facilities that have the ability to handle additional volumes of material include:

- Transfer Processing
- Construction and Demolition Debris
- Source Separated processing facilities

In addition, the waste disposed of currently in landfills still has a significant amount of divertible materials that can be recovered through these types of existing facilities. The combination of the composition of the waste stream matching with the capabilities of the existing facilities in the County offers the most cost effective opportunity to achieve additional diversion with little or no new capital investment.

Recommendation 1: As part of SWAG’s work to accomplish the stated objectives of increased diversion, economic efficiency and local control, the RC recommends the consideration of a policy which emphasizes the benefits of maximizing the use of the existing diversion infrastructure in Sonoma County. This policy should focus on both waste reduction and diversion. The implementation of this policy may include action by the SWAG or individual jurisdictions and should include further study of the following options:

- 1A. Increase education efforts on waste reduction and diversion by funding one full-time position with equipment and supplies for outreach materials – specifically focused on door-to-door outreach with Commercial and C & D waste generators.
- 1B. Increase education efforts for schools and institutions on waste reduction and diversion by funding one half-time position with equipment and supplies.
- 1C. Adopt a Model Countywide Mandatory Commercial Recycling Ordinance
- 1D. Adopt a Model Countywide C & D Recycling Ordinance.

There are many opportunities to maximize the existing diversion capacity here in Sonoma County and we recommend that the SWAG take a leadership role in adopting and promoting this policy on a broad basis.

2. Additional Compost Capacity & Food Waste

Finding: Organics is the largest fraction, (36%), of Sonoma County’s waste stream that is still being disposed in landfills. Food waste is part of the organics component and represents the biggest volume of any single material at 21 percent of the total waste stream. Translating this to tonnage equates to a possible range of 315 – 435 tons per day of Organics being disposed. While this represents a good opportunity for targeted diversion, current capacity does not exist to handle this volume. As is illustrated on Table 2 the County’s composting facility only has 36 tons per day of remaining capacity. It is also important to understand that the existing method of “wind row” composting has limited capacity for food waste.

The Sonoma County Waste Management Agency, (SCWMA), is in the process of working towards the development of a new composting operation that will have additional capacity in terms of volume and possibly the ability to incorporate larger volumes and types of food waste along with the current green waste material. New regulations relating to air impacts from composting will necessitate a change in the method for composting in the County. While this may present some new challenges it also represents an opportunity to incorporate a facility design which can accommodate the beneficial reuse of food waste, the single largest component currently going to landfill disposal.

Many communities in California are looking to address the beneficial use of food waste as a diversion strategy. As our recycling programs have removed a significant percentage of other material, food waste continues to become a larger and larger component of what is left in the disposal stream. Santa Rosa’s Laguna Wastewater Treatment Plant and its biosolids management infrastructure may have the capability to play a role in the beneficial reuse of food waste here in Sonoma County. The concept of adding a percentage of food waste in the digesters at wastewater treatment facilities is being considered by a number of communities.

“In Oakland, California, EBMUD’s main wastewater treatment plant was the first sewage treatment facility in the nation to convert post-consumer food scraps to energy via anaerobic digestion. Waste haulers collect post-consumer food waste from local restaurants and markets and take it to EBMUD. In an anaerobic digester, bacteria break down the food waste and release methane as a byproduct. EBMUD then captures the methane and uses it as a renewable source of energy to power the treatment plant. After the digestion process, the leftover material can be composted and used as a natural fertilizer.”³

The results of an EPA funded study of the EBMUD food waste project indicate that food waste is more readily digestible and has approximately three times the methane production potential of wastewater solids.

Recommendation 2: The RC recommends the following options be studied further to support increased diversion of organics:

- 2A: Support the efforts of the SCWMA to develop new composting capacity in Sonoma County and specifically encourage that the new facility design incorporate the ability to include food waste as part of the acceptable feedstock

³ Quote from the EPA Region 9 website highlighting the EBMUD food waste project.
<http://www.epa.gov/region9/waste/features/foodtoenergy/index.html>

for the composting process.

- 2B: Determine the feasibility of the Santa Rosa Laguna Wastewater Treatment Plant in playing a role in the beneficial reuse of food waste in Sonoma County.
- 2C: Once a full food waste diversion system is available establish a one-time focused educational outreach effort to inform commercial and residential generators to ensure maximum use of the food waste and composting programs.

3. New Mixed Waste Processing Facility

Finding: Even with effective efforts in the areas of maximizing the use of the existing processing infrastructure and developing additional composting capacity in the County, new types of facilities will need to be developed in order to meet the longer term 90% diversion goal identified by SWAG. For example, while source separated recycling programs have been very successful for single-family residents there have been some challenges to replicate the same level of success for the multi-family and some of the commercial waste sector customers. Factors such as the high turn-over at multifamily facilities have had an impact on customer education and participation rates and space constraints for additional bins have inhibited recycling opportunities for certain sectors of the business community.

We support the continued efforts for providing the opportunity for customers to recycle at the source and expect that participation and diversion in these programs will grow over time. It is also reasonable to project that with our best efforts in this area that the waste stream from these and other sectors will continue to have significant volumes of recoverable material. One of the effective ways to recover this material can be through the development of a mixed waste processing facility.

Historically, the processing of mixed municipal waste for the recovery of material for beneficial use has not been broad; however, it has been practiced in different forms throughout the last few decades. By using a combination of human sorting and mechanical separation techniques based on size, weight, magnetic separation etc. operators have looked to segregate the various components of the waste stream for recyclables, organics and possible refuse derived fuel resources. Through the evolution of these efforts the current sorting equipment technology has advanced significantly.

Modern components of a mixed waste processing system incorporate the historical techniques described above and also include new advances in optical sorting, air classification and eddy current separation for non-ferrous metals like aluminum. Mixed waste processing facilities can, and should be, designed for specific applications. This is not a situation where “one size fits all”. It is also important to note that the improvement in system design is occurring rapidly as more facilities come on line and incorporate lessons learned from the most recent previous projects.

The design elements of a mixed waste processing facility are evolving from simply a way to separate recyclables from the waste stream to include the production of specific feedstocks designed to supply emerging technologies like anaerobic digestion and/or thermal renewable energy recovery facilities. For Sonoma County, it will be important to assess the specific needs for material recovery prior to design and implementation of a mixed waste processing facility. This is an instance where it will be prudent to analyze the results of the prior diversion efforts of the community before moving forward with a significant capital investment. It will be critical to

design a facility based on what is left in the waste stream along with a clear understanding of the type of “feedstock” the facility will be expected to produce from the waste material input.

With the understanding that the specific design will need to be developed based on the future results of the next phase of diversion efforts in the County, it is the consensus of the RC that a mixed waste processing facility will be a feasible component of an integrated plan to achieve SWAG’s diversion goals.

Recommendation 3: The RC recommends that the SWAG’s policy and planning efforts include:

- 3A: Develop Mixed Waste Facility that targets Multi-Family Commercial Waste Stream
- 3B: Design Flexibility for Emerging Technologies

4. Emerging Technologies

Finding: As the County moves towards higher levels of diversion the remaining waste stream will be comprised of materials that have been identified in the Cascadia Report using terms such as; “Remainder/Composite”, “Mixed Residue” and “Other”. These materials by their nature will not lend themselves to recovery through the traditional programs for recycling and composting. Some of these materials can be separated through the specific design of a mixed waste processing facility as described previously. The current thinking in the industry related to the remainder of the waste stream is to focus on separation of material into groups based on organics and energy recovery potential.

The organic fraction of the remaining material can be considered for both energy recovery and soil amendment applications through anaerobic digestion. Other constituents like mixed non-recyclable plastic and paper can be utilized as a high BTU feedstock for renewable energy recovery through a variety of thermal conversion processes. The design of these emerging thermal processes differ from traditional waste to energy combustion and have been promoted as having low emissions and significant carbon reduction potential. These types of processes have been developed primarily in other countries or through smaller scale projects here in the United States. While commercial scale projects don’t have a long track record in this country, the scientific theory behind many of these emerging technologies is well founded and worth future study and consideration as part of an integrated approach to accomplishing the higher levels of diversion identified through the SWAG objectives.

Recommendation 4: SWAG consider policy and planning efforts to include:

- 4A: Implement Further Analysis
- 4B. Adopt a policy to support emerging technologies within the community.

5. Waste Stream Volume Consideration

Finding: Currently Sonoma County as a whole disposes of an average of 867 tons per day of solid waste to local and regional landfills. At the beginning of 2007 the County’s disposal volume was significantly higher at an average of 1,200 tons per day. This decrease in volume is

largely attributable to the general economic downturn. It is reasonable to expect that as the economy improves that the volume of material available for recovery will also increase.

Recommendation 5: As the SWAG considers the size and throughput capacities of processing and facility options it will be important to take into account both the current volume of waste as well as some potential increased capacity to accommodate higher volumes which may result from an economic recovery. While the exact amount of future waste generation is unknown we are recommending for general planning purposes to consider a range between 867 and 1,200 tons per day.

IV. Conclusion

This report is offered to SWAG with great appreciation for the effort that is being put forth on the part of the City and County elected representatives to come together and develop a consensus for solid waste and diversion policy and planning measures on behalf of the Sonoma County Community. Our volunteer group is made up of a diverse range of knowledgeable individuals representing just about every solid waste and recycling stakeholder interest in the county. We have worked diligently to find the common ground that we all can agree on. We have endeavored to offer sound public policy options regarding diversion processing and facility development strategies for SWAG's consideration.

Beyond the written report, the work of our group has included extensive discussion and healthy debate of each of the presented areas. While we have suggested the need for additional study in certain areas, we have provided SWAG with the specific recommendations for further detailed study for which we have a high degree of confidence will represent cost effective solutions to meet the stated objectives for diversion, economic efficiency and local control. To that end included below is a table which attempts to quantify the range of potential cost/rate impacts and potential additional diversion that could be achieved through implementation of the various options.

Summary of Recommendations and Cost and Diversion Impacts

Recommendation	Action Steps	Estimated Monthly Residential Rate Impact	Additional Potential Diversion
1. Maximize Existing Capacity	A. Increased Education For Commercial, C&D, Schools & Institutions B. C&D Ordinance C. Mandatory Commercial Recycling	\$0.06	3%-6%
2. Additional Compost Capacity	A. Support Existing Site Selection & Permitting Processes B. Determine Feasibility of Food-Waste at LTP C. Education for Food Waste	\$0.16	6%-10%
3. Mixed Waste Processing Facility	A. Develop Mixed-Waste Facility Targeting Multi-Family Commercial Waste Stream B. Design Flexibility for Emerging Technologies	\$1.50	4%-6%
4. Emerging Technologies	A. Implement Further Analysis	tbd	4%-6%
Total Estimated Residential Monthly Rate Impact		\$1.72	
Total Potential for Additional Diversion			17%-28%
Current Diversion Rate			64%
Future Potential Total Diversion			81%-92%

It should be noted that this table estimates rate impacts to residential customers to implement these waste reduction and diversion efforts, as if they are full add-ons to the existing system costs. However, should diversion goals be achieved there will be a significant reduction in remaining tonnage going to landfill disposal, which should result in offsetting savings. We expect that when the consultant study is performed which takes into account all system costs, that these savings will be reflected. Additionally, we have not attempted to estimate the greenhouse gas reductions that will be achieved through achievement of diversion goals.

We would again like to acknowledge the great work of the Sonoma County community in developing a wide array of successful environmental programs which have created a solid foundation to support the collaborative effort created by the formation of SWAG.