6.0 Household Hazardous Waste and Electronic Waste

6.1 Introduction

Used household products exhibiting corrosive, reactive, toxic, or ignitable properties are considered "household hazardous waste" (HHW), as defined by the EPA. These products, including but not limited to automotive fluids, paints, oils, cleaners, pesticides, poisons, and batteries require special handling, transport, and disposal or recycling methods. These types of wastes present special risks and disposal in landfills or via the sanitary sewer system is not permitted.

Electronic waste (e-waste) consists of any broken electronic devices, or unwanted electronic products, at or nearing the end of their useful life. Computers, VCRs, copiers, stereo equipment, televisions, cell phones, and monitors are examples of common electronic wastes. Similar to household hazardous waste, many e-wastes, such as cathode ray tubes (CRTs) from televisions and monitors, include components that are toxic and should be restricted from the landfill.

This section describes the current status of the household hazardous waste and e-waste collection and disposal system within Hawai`i County, identifies current issues and concerns, and presents options for achieving the County's HHW and e-waste goals.

6.2 Background

Household hazardous wastes are typically generated in small quantities, and as a result, are exempt from federal and state hazardous waste regulations, per the Code of Federal Regulations (40 [*Code of Federal Regulations*] *CFR* 261.4) and the State of Hawai`i Administrative Rules (HAR 11-261-4). State and local governments often hold collection events during the year or have permanent facilities established where residents can drop off their used hazardous products for proper disposal.

Limited Federal regulations exist regarding electronic wastes; the EPA has regulations for the management of universal waste, which includes batteries used in electronics. The majority of e-waste regulation is established at the state and/or local municipality level. Some states and counties have introduced legislation to ban e-waste from landfills, imposed a fee to consumers at time of product purchase, or mandated electronics manufacturers to take back used electronics.

6.2.1 Review of 2002 IRSWMP

The 2002 IRSWMP issued recommendations for household hazardous waste including to increase one day collection events to four per year at four different locations, and to establish a collection facility for HHW, batteries, tires, or other problem wastes as part of a

Recycling and Reuse Center. The current 2008 HHW collection frequency includes six collections per year at four locations on the island. As described below in Chapter 6.5, the County has established collection centers at four of the existing recycling and transfer stations. There were no recommendations issued in the 2002 IRSWMP for e-waste collection.

6.3 Existing Conditions

Household hazardous waste in Hawai`i County is collected periodically on specified collection dates at select recycling and transfer stations during the year. E-waste is collected at two permanent locations in Hilo and Kona.

Hawai`i County provides public awareness and educates residents on household hazardous waste and e-waste programs through Recycle Hawai`i, a tax-exempt, educational organization. Recycle Hawai`i promotes HHW collection events and a county contractor collects the hazardous products which are then shipped to the mainland for proper disposal or treatment.

6.3.1 Household Hazardous Waste

The current 2008 county diversion rate for household hazardous waste is 24.5 percent, as depicted in Section 4.0, Recycling, Bioconversion, and Marketing. HHW collection rates have steadily increased during the past five years and the County of Hawai`i has increased the number of collection events in response. Exhibit 6-1 displays the type and quantities of HHW collected from FY 06 through FY 08.

EXHIBIT 6-1
Household Hazardous Waste Collection, Hawai`i County
(all data in pounds unless otherwise noted)

Material Collected	FY 06	FY 07	FY 08
Batteries (Automotive & Industrial)	172,430	146,150	113,120
Aerosol Cans	510	915	1,160
Poisons	4,900	13,100	12,300
Acids	600	230	1,350
Bases	165	70	240
Paints & Solvents (Oil Based)	12,500	19,910	24,020
Batteries (Household)	2,400	4,000	3,200
Polychlorinated Biphenyls	10	22	-
Oil & Solvents (Halogenated)	-	-	400
Mercury	75	40	45
Fluorescent Lamps/Bulbs/Ballasts	-	380	1,220
Compressed Gas Cylinders	-	-	360
Misc.	1,175	100	200
Oxidizing Material	240	195	155
Oil (gallons)	3,105	5,310	5,860

Source: Hawai`i County Department of Environmental Management, Solid Waste Division. 2008.

Until 2008, collection points for HHW were provided at the Hilo and Kealakehe recycling and transfer stations only. HHW collection points were established at the Pahoa and Waimea transfer stations in 2008. Currently, residents are allowed to drop off HHW on the following specific dates at these four stations:

- Hilo Recycling and Transfer Station – 1st Saturday of June and December
- Kealakehe (Kailua) Recycling and Transfer Station – 2nd Saturday of June and December
- Pahoa Recycling and Transfer Station – 1st Sunday of March
- Waimea Recycling and Transfer Station – 1st Saturday of March

The HHW program is free for Hawai`i County residents, and is advertised via signage at the recycling and transfer stations. Commercial entities may contact private contractors for hazardous waste storage, recycling and/or disposal.

6.3.2 Electronic Waste

E-waste is accepted at two permanent dropoff sites in Hilo and Kona. Both locations are open Monday through Friday from 10:00 a.m. to 2:00 p.m. and allow residents to recycle their e-waste for free. Common e-waste includes entertainment electronics (TVs, VCRs, DVD players, radios, and so forth), computers, computer monitors & peripherals, cell phones, telephones, microwaves, fax machines, copiers, digital cameras, printers, and laptops. Commercial entities may also recycle e-waste at both locations; however, businesses are charged a fee of $0.55 per pound to recycle e-waste.

Recycle Hawai`i collects e-waste from the dropoff sites in Hilo and Kona, then repairs, reuses and recycles the material. Recycle Hawai`i recycles the e-waste under a partnering agreement with Bayside Computer Shop. Some e-waste manufacturers offer various other support programs for e-waste collection, recycling, and disposal. E-waste is shipped to the U.S. mainland, and recycled by certified facilities. The mainland recyclers segregate the e-waste into glass, plastics, and metals components which are sold to waste management entities. Exhibit 6-2 presents the total quantity of e-waste collected during the 2004 to 2008 fiscal years.

EXHIBIT 6-2
Electronic Waste Collected, Hawai`i County

Fiscal Year (July 1 through June 31)	Quantity Collected (Tons)
2005	78
2006	87
2007	165
2008	77[a]

[a]The decline shown in FY 08 resulted from contracting delays. E-waste collections have increased considerably in the latter months of 2008.

Source: Hawai`i County Department of Environmental Management, Solid Waste Division. 2008.

At the Kea`au recycling and transfer station, a product exchange and re-use center has been established by the County that allows residents to drop off unwanted but still useful electronic appliances. Residents can then purchase the appliances for a nominal fee at the center.

In addition to services provided by the County, during 2008 the University of Hawai`i in conjunction with Apple Corporation sponsored the Hawai`i Education and Government eDisposal Day, during which residents were allowed to dispose of their personal e-waste during a single day event at locations in Hilo and Kona. It is estimated that approximately one million pounds of e-waste was collected state-wide during this event.

6.4 Issues and Concerns

6.4.1 Household Hazardous Waste

Household hazardous waste presents unique hazards to humans and the environment. Storage, handling, transport, and disposal of hazardous waste require special procedures and equipment. Currently there are a limited number of locations for residents and businesses to dispose of HHW. The distance to collection sites, and challenges associated with storage, handling, and transporting HHW may be a disincentive for residents or businesses in rural areas to properly dispose of their waste.

If County or landfill staff identify HHW, they take steps to manage it appropriately and keep it out of the landfill. County staff also respond to occasional reports of HHW discarded in remote areas of the county. However, once in a garbage bag or bin, it is very difficult (and expensive) to identify HHW in the garbage stream. In spite of the County's current efforts to keep household hazardous waste out of its landfills, the 2008 County of Hawai'i Waste Composition Study estimated that 527 tons of household hazardous waste was disposed of in County landfills in FY 08. Thus, additional education and more convenient opportunities to properly manage HHW would be beneficial. Potential opportunities for improving the existing system are presented below. The County spent about $130,000 on its HHW program in FY 08.

6.4.2 Electronic Waste

Recycle Hawai`i estimates that a container of e-waste currently costs approximately $2,250 for shipment to the mainland plus $675 for ground transport to selected recyclers. The County pays for the residential e-waste program through property taxes; however there is no similar program to address e-waste generated by businesses, schools, or government entities such as the military branches. The cost of e-waste disposal is a disincentive for private businesses to recycle e-waste, and results in much of the business e-waste being sent to the landfills. A lack of staff assigned to monitoring and enforcement at recycling and transfer stations and landfills contributes to e-waste entering the landfills. Under current Hawai`i Department of Health guidance e-waste is considered hazardous and is not allowed to be disposed of in landfills. Stronger legislation may be required in order to deter residents or businesses from disposing of e-waste in ways that result in the waste entering landfills.

The ultimate final disposition of e-waste is an important factor to consider with e-waste recycling or disposal. Disposal or recycling of e-waste by uncertified companies can

potentially result in discarded e-waste being shipped to third world countries where less desirable practices are implemented. Use of certified recyclers can increase costs of recycling or disposal. The County's current program (implemented through Recycle Hawai`i) uses recyclers that provide certificates of destruction. The average cost charged by recyclers to provide certified destruction is $0.10 per pound. The County spent about $70,000 on its e-waste recycling program in FY 08.

The design of collection facilities for e-waste and HHW must take into account special conditions within the County, including invasive species concerns, and operating conditions in areas where the facilities are established. Dangerous conditions (wet and slippery surfaces in high rain areas) and the potential for export of invasive species (such as African tree snails or coqui frogs) must be evaluated during design.

6.5 Options

An overview of various options that could be implemented to improve the management of household hazardous waste and e-waste follows. These options were developed based on successful initiatives implemented in other jurisdictions that may be applicable and appropriate for Hawai`i County.

Advocating for Extended Producer Responsibility (EPR) was an option discussed in the Source Reduction and Recycling, Bioconversion, and Markets sections. Hawai`i State legislation enacted during 2008 will require development of take back programs by manufacturers of certain types of e-waste.

Note, the following options assume that the two permanent dropoff sites for e-waste continue beyond the end of 2008 (when the contract expires). The County has published a request for proposals to continue these services in 2009.

6.5.1 Install Fixed (Permanent) Collection Facilities at Recycling and Transfer Stations

Additional, permanent collection facilities located at recycling and transfer stations would provide more opportunity for residents to properly dispose of HHW, e-waste, and some special wastes. The facilities could be incorporated into the standard layout design at selected stations. The County is currently planning to build a special waste collection facility at the Pahoa recycling and transfer station during its pending upgrade. Guidelines could be developed for both residential and business use of the facilities.

In areas with higher rainfall, facilities should be designed with safe work practices in mind for operation of equipment such as forklifts or trailers. Operational plans must be established to minimize the risk of injury to workers. Facility design should include covered or enclosed areas that incorporate measures to prevent invasive species from entering waste storage areas, or being transported off-site with waste.

Having fixed facilities would potentially reduce the amount of illegal dumping that is occurring, and would allow the County to set up a safer and more efficient system for storage, handling, transport, and eventual disposal of the wastes.

Estimated Cost: Fixed facilities for HHW can range significantly in costs depending upon their design and function. Facilities to serve West and East Hawai`i could range in cost from $500,000 to $1.5 million each. If multiple facilities are developed at recycling and transfer stations, the facilities could be smaller and would cost at the lower end of that range.

Annual operating costs would depend on how often the facilities are open and on the extent to which the programs are successful in attracting materials. Based on information provided in a recent survey of HHW programs[1], the estimated cost of operating two fixed facilities (including recycling and appropriate disposal of materials collected) would be approximately $750,000 per year. Adding household hazardous waste facilities at additional locations would not increase operating costs proportionally (that is, if two facilities cost $750,000 per year to operate, the third might cost an additional $100 to $200,000 per year).

6.5.2 Implement Additional Collection Events

Additional one-day collection events, combined with promotional campaigns could potentially increase diversion of HHW, e-waste, and special waste from the landfills. Events could be designed to target a single or multiple types of waste. Similar to the currently scheduled events, the County could sponsor events that are implemented on an island-wide basis, or community-specific events that are rotated through various geographic areas. The County could conduct such events at fixed locations, or conduct a mobile event utilizing trucks or trailers set up to transport specific types of waste. The County could also set up events that are specific to either residents, agricultural businesses, or commercial and industrial businesses.

For e-waste only, collection events could be accomplished using a trailer or container that would rotate among various recycling and transfer stations. A schedule could be published that documented the days that the service would be provided at a particular location. As an example, a trailer could get to 12 locations each year if it spent a set week every third month at a different station (that is, 2nd week of January, April, July).

Estimated Cost. Costs for conducting such events would include cost of temporary facilities to store wastes dropped off during the events, Cost for promoting the events, and additional training costs for staff who would manage the events and the storage and handling of the waste. Additional expenses would include the cost of any subcontracted waste hauling or disposal firms utilized to transport and dispose of the waste collected.

Each additional event would probably cost the County about $30 to $40,000. A single e-waste trailer or container that rotated between various recycling and transfer stations could be installed for about $100,000 per year.

6.5.3 Establish E-Waste Take Back Programs with Manufacturers or Sellers

In 2008 the State of Hawai`i passed legislation (Senate Bill 2843) that will require manufacturers of certain types of electronic equipment (primarily non-medical, stand-alone equipment containing cathode ray tubes, liquid crystal, or plasma display screens) to establish, conduct, and manage a program for the collection, transportation, and recycling of

[1] Cascadia Consulting Group, prepared for Portland Metro, Oregon. 2005. *Comparison of Household Hazardous Waste Programs.*

covered electronic devices sold in the State. Manufacturers must develop plans to implement such programs by June 1, 2009, and by January 1, 2010, must make available to their customers information on collection services in the State. The State Department of Health will also maintain a Web site and toll-free phone number with current information on where covered electronic devices can be returned for recycling.

Electronic products manufacturers such as Apple®, Dell®, Hewlett Packard®, and others have established e-waste take back programs. Consumers in Hawai`i County could potentially take advantage of these established programs if the County provided additional information, and some type of incentive to return products to manufacturers. In many cases the manufacturers will accept used electronic equipment they originally manufactured at no charge, and many manufacturers will accept other brands of equipment for a small fee. Residents may have to pay for shipping the item back to the manufacturer if they elect to recycle their own equipment. The County could evaluate requesting grants from manufacturers or sellers that could be used to offset the costs of handling and shipment of e-waste back to manufacturers. Used electronics that are still functional are also being redistributed using the power of the internet. For example, Intel® and other manufacturers have collaborated with EBay to establish a network (Rethink Initiative) that allows consumers to sell or donate their used equipment to others.

Some of the larger electronics sellers, such as Best Buy®, have established programs allowing customers to periodically drop off unwanted electronic equipment for recycling. Often these e-waste stewardship initiatives are undertaken as one day or weekend events, and in some cases store credit is given to consumers as an incentive in exchange for donating unwanted equipment that is only lightly used and still functional. Best Buy and other sellers have also established grant programs that communities may apply for in order to fund such events. The County could potentially apply for such grants, or work directly with sellers to establish collection events.

Estimated Cost. The County could potentially incorporate information about these types of programs into their educational materials, and work in conjunction with either sellers or manufacturers to establish take back programs. It would require additional costs for the County to provide staff to initiate and manage such programs. Some costs could potentially be offset by grants provided by the manufacturers or sellers.

6.5.4 Implement Advanced Disposal Fee for E-Waste

The County could implement requirements to collect advance disposal fees on certain types of e-waste. The fee would be collected at the point of sale and would be earmarked to support the management and eventual disposal when the electronic equipment reaches the end of its useful life. Currently only California has implemented legislation requiring consumers to pay a fee upon purchase of electronic equipment. The California law applies to purchases of specific types of electronic items known to contain materials that are considered hazardous upon disposal (primarily televisions, computers, and other types of equipment that use cathode ray tubes, liquid crystal displays or plasma screens). The fee, which ranges from $6 to $10 per device, only applies when purchasing new equipment, and is utilized to recycle the types of products covered under the law. Retailers are required to implement the fee system, and are allowed to capture 3 percent of the fee to cover the costs of implementing the program.

Estimated Cost. Implementation of this type of system would require the County to invest labor costs to draft legislation supporting the requirements, and to implement a program to manage money collected. It is anticipated that implementation of such a program could potentially result in revenue that would partially offset costs the County would eventually spend to manage disposal of e-waste generated at recycling and transfer stations or during collection events. Costs would be incurred by local retailers and manufacturers to establish and administer the program. Consumers would ultimately pay any added cost associated with the fee at the point of purchase.

6.5.5 Add E-Waste Product Exchange and Re-Use Centers at Recycling and Transfer Stations

A product exchange and reuse center is currently established at the Kea`au recycling and transfer station, where residents can drop off electronic appliances that are no longer wanted, but still functional. The County is in the process of establishing additional exchange centers at selected recycling and transfer stations, which will create more opportunities for residents to drop off unwanted electronic appliances, and thus increase diversion of this waste stream from landfills.

Estimated Cost. Construction of such centers could be incorporated into the design of permanent drop off locations for e-waste at recycling and transfer stations. Construction of exchange and re-use centers is not expected to significantly increase the cost of constructing permanent drop off locations for e-waste at recycling and transfer stations. However, additional labor costs would be incurred to staff and operate such centers, including the cost of bundling and transporting materials. Each center would likely cost between $20,000 and $100,000 per year to operate, depending on how the program is operated and the extent to which products could be re-used versus transported and recycled.

6.5.6 Explore Public-Private Partnership for Local E-scrap campaign (anything with a plug)

The zero waste implementation study discussed the concept of hand dismantling electronic components (E-scrap) to segregate high-grade metals and segregate working parts rather than shipping materials off-island. Currently, e-waste collected on the island is shipped, primarily unsorted, to the U.S. Mainland for proper disposal. An E-scrap campaign would present a potential opportunity to create value-added products, jobs, and tax revenues in the County rather than shipping E-scrap off-island to benefit another jurisdiction.

There are several ways to initiate hand dismantling of E-scrap:

- Provide financial incentives for local dismantling to a company that is currently shipping bulk E-scrap off of the island.
- Encourage a joint venture with this company or companies that have established hand dismantling or designed their own equipment and seek joint ventures with non-profits and for-profits.
- Apply for a grant to promote green infrastructure jobs from the new federal administration.

In this option, the County would conduct a study of different models for promoting local dismantling of electronics and convene a meeting of interested parties to determine the level of interest and what help might be needed to move forward. The County could assist them to proceed on their own (perhaps with some initial funding support), or issue a request for proposals to develop new services as needed.

Estimated Cost. The cost of an E-scrap campaign could vary widely depending on the extent to which the program would require County funding to initiate and sustain. The cost of an initial study and meetings to investigate opportunities would be about $30,000.

6.6 Recommendations

On the basis of the analysis presented above, the results of the zero waste implementation study, and the preferences of SWAC, DEM staff, and other stakeholders, this Plan recommends the following actions to improve the management of HHW and e-Ewaste. Proposed funding and the timing of implementation for each program is shown in Section 10 (Exhibit 10-6).

In addition to the recommendations presented below, as noted in Section 3.0 and Chapter 6.5.5, the County is in the process of establishing more reuse centers at selected recycling and transfer stations, which will also create more opportunities for diversion of e-waste from landfills.

1. **Hire a Household Hazardous Waste/Electronics Waste Specialist**. The current County staffing level is a limiting factor for the implementation of new waste management programs. Whether new programs are implemented solely by County staff or involve subcontractors, additional staff will be necessary to successfully initiate and manage new programs. To expand the HHW and e-waste programs, it is recommended that the County create and staff one full-time HHW/E-Waste specialist position.

2. **Implement HHW and e-waste public outreach and education programs**. As a component of the additional HHW and e-waste programs, advertising will need to be increased to make the public aware of the events and to encourage participation. The County should expand the existing marketing programs through:

   - Event-specific announcements or advertisements.
   - Additional signage at recycling and transfer stations.
   - Expansion of outreach programs by conducting community-based educational events at schools or other public institutions.

3. **Explore e-waste take back programs with State and manufacturers/sellers**. Take back programs by manufacturers and sellers of electronic products are a cost-effective method to divert e-waste from landfills. Such programs can reduce costs of proper disposal for consumers, make it more convenient for consumers to discard their e-waste, and ultimately, provide an incentive for manufacturers to design less toxic and easy to recycle products. It is recommended that County staff:

- Conduct research to assess what legislation may be required to mandate and manage take back programs for specific types of e-waste.
- Evaluate the elements of successful similar programs implemented in other jurisdictions during the planning process.
- Coordinate with other Counties and the State to develop and implement e-waste take back programs.
- Coordinate with local retail businesses to facilitate implementation of take back programs for e-waste.
- Assess what legislative actions may be necessary to facilitate storage and handling of e-waste at various types of collection locations.
- Incorporate information about existing and new e-waste take back programs in the community outreach and education effort.

4. **Conduct additional household hazardous waste collection events**. During the development of the IRSWMP plan update, a consensus was expressed by both members of the public and the SWAC that periodic HHW collection events were successful and offered the best opportunity for proper disposal of HHW and diversion of these wastes from landfills. One of the most prevalent comments was that the number and locations of collection events should be expanded to create additional opportunities for proper HHW disposal. It is recommended that the County establish ten to twelve additional HHW collection events per year.
5. **Explore legislative actions for hazardous products and packaging take back programs.** Take back programs by manufacturers and sellers of hazardous products are a cost-effective method to divert these types of waste from landfills. It is recommended that County staff:
   - Conduct research to assess what legislation may be required to mandate and manage take back programs for specific types of hazardous waste or packaging.
   - Coordinate with local retail businesses to develop and implement take back programs for hazardous products and packaging.
   - Assess what legislative actions may be necessary to facilitate storage and handling of hazardous products and packaging at various types of collection locations.
   - Incorporate information about existing and new hazardous materials and packaging take back programs in the community outreach and education effort.
6. **Explore public-private partnership for local E-scrap campaign.** It is recommended that the County initiate a study of different models for promoting local dismantling of electronics and convene a meeting of interested parties to determine the level of interest and what help might be needed to move forward with developing an E-scrap program. Depending on the economics of on-island dismantling, the County would then evaluate the extent to which it would provide funding to support implementation of a public-private partnership E-scrap program.