Fort Belvoir, Virginia

Integrated Solid Waste Management Plan

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ACRONYMS AND ABBREVIATIONS

AAFES	Army and Air Force Exchange Service
ACSIM	U.S. Army Assistant Chief of Staff for Installation Management
AR	Army Regulation
AST	Aboveground Storage Tank
C&D	Construction and Demolition
CFR	Code of Federal Regulations
COR	Contracting Officer Representative
DA	Department of the Army
DeCA	Defense Commissary Agency
DFAC	Dining Facility
DLA	Defense Logistics Agency
DoD	Department of Defense
DPW	Director(ate) of Public Works
ENRD	Environmental and Natural Resources Division
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EQCC	Environmental Quality Control Committee
FY	Fiscal Year
ISWM	Integrated Solid Waste Management
ISWMP	Integrated Solid Waste Management Plan
LRC	Logistics Readiness Center
MILCON	Military Construction
P2	Pollution Prevention

PII	Personally Identifiable Information
PL	Public Law
PX	Post Exchange
QRP	Qualified Recycling Program
RCRA	Resource Conservation and Recovery Act
SWANA	Solid Waste Association of North America
SWARWeb	Solid Waste Annual Report, Web-based
SOP	Standard Operating Procedure
USDA	United States Department of Agriculture
VIB	Virginia Institute of the Blind
WTE	Waste-to-Energy

INTEGRATED SOLID WASTE MANAGEMENT PLAN
U.S. Army Garrison Fort Belvoir

1.0 PURPOSE AND SCOPE

The purpose of this Integrated Solid Waste Management Plan (ISWMP) is to document current solid waste management practices, provide strategies for maximizing waste diversion, and set forth goals to improve solid waste management practices at U.S. Army Garrison Fort Belvoir.

The scope of this plan includes all facilities covered by the Fort Belvoir Directorate of Public Works (DPW) Environmental and Natural Resources Division's (ENRD) solid waste management program. This includes garrison activities and tenant organizations. Family housing areas are not within the scope of this plan.

2.0 INTRODUCTION

This plan meets the Department of Army (DA) requirement to develop and update an ISWMP (DA, 2007). This ISWMP reflects the U.S. Environmental Protection Agency (EPA) pollution prevention (P2) hierarchy, which emphasizes source reduction and recycling to reduce the solid waste stream. Appendix A lists references used in preparing this plan.

The Army Net Zero Waste strategy expands on the P2 hierarchy, and identifies five elements of waste management in order of preference: source reduction, repurposing, recycling/composting, energy recovery, and disposal (see Appendix B). This is similar to the P2 hierarchy in that emphasis is placed on reducing waste at the source, followed by ways to transform wastes into new products or recover energy. An Army Directive issued in January 2014 sets policy and assigns responsibilities to strive toward Net Zero at all Army installations (SECARMY, 2014).

This ISWMP reflects the sustainability strategies of the EPA and Army Net Zero, identifies the responsibilities of Fort Belvoir personnel, and lists action items for future consideration. Solid waste generation and characterization are discussed in this ISWMP to provide the framework for the solid waste management system at Fort Belvoir. Those sections are followed by elements in the P2 hierarchy in order of preference.

3.0 OBJECTIVES

The objectives of the solid waste management program for Fort Belvoir are to:

- Minimize the generation of solid waste through source reduction.
- Repurpose, recycle, or transform elements of the solid waste stream to the maximum extent practicable, by taking advantage of established diversion programs.

- Divert construction and demolition (C&D) waste to the maximum extent practicable towards the goal of 60 percent diversion [Department of Defense (DoD) Strategic Sustainability Performance Plan] (OUSDATL, 2010).
- Divert at least 50 percent of nonhazardous solid waste (excluding C&D waste) annually, including food and compostable materials (EO 13693, 2015).
- Comply with all applicable Federal, Commonwealth of Virginia, and local solid waste management regulations, as well as all applicable Executive Orders (EOs).
- Effectively manage solid waste in a manner protective of human health and the environment.

4.0 BACKGROUND

4.1 Location, Population, and Mission

Fort Belvoir is located in Fairfax County, Virginia, approximately 15 miles south of Washington D.C. Interstate 95 is located a few miles to the west, U.S. Route 1 bisects the installation from east to west creating a north and south post, and the Potomac River borders the southern peninsula of the installation. Fort Belvoir has a population of approximately 8,498 active-duty military personnel and 38,994 employees (including civilians and contractors). In total, Fort Belvoir supports a total population of 67,277 (including family members and retirees).

Fort Belvoir is primarily an administrative installation and is home to more than 140 tenant organizations, including two Army major command headquarters, as well as 10 different Army major commands, 19 different DA agencies, 8 elements of the U.S. Army Reserve and the Army National Guard, 26 DoD agencies, a U.S. Navy construction battalion, a Marine Corps detachment, a U.S. Air Force activity, and a Department of the Treasury agency.

4.2 Regulatory Drivers

Installation-level solid waste management practices are based on legislation enacted by the U.S. Congress, EOs signed by the President, and directives and instructions issued by the DOD and the Army. Army installations are also subject to state legislation in which the installation is located. Appendix C provides a summary of relevant laws, EOs, and policies.

5.0 SOLID WASTE MANAGEMENT OVERSIGHT AND RESPONSIBILITIES

5.1 Garrison Commander

The Garrison Commander of Fort Belvoir directs all functional operations and is responsible for administration, security, facilities, infrastructure, and logistical support for all assigned and attached individuals, activities, and units. Responsibilities of the Garrison Commander include the following:

- Ensure that Base Support activities support military training and readiness operations, enhance mission accomplishment, and are conducted in a manner conducive to environmental stewardship.
- Comply with applicable Federal, Commonwealth, and local environmental laws, regulations, internal directives and goals, and EOs.
- Ensure that QRP revenues are disbursed in accordance with the *Military Construction and Codification Act* (PL 97-214, 1982) and the installation's recycling policy.
- Chair the Environmental Quality Control Committee (EQCC).
- Support recycling/reuse programs and sustainable procurement policies.

5.2 Director of Public Works

The Director of Public Works (DPW) has the overall responsibility for solid waste management at the installation. AR 420-1 (DA, 2012) requires that Integrated Solid Waste Management (ISWM) principles be used in planning and executing the solid waste program, to include source reduction and recycling programs. Responsibilities of the DPW include the following:

- Ensure that that solid waste operations (storage, collection, transportation, and disposal) are conducted in accordance with Federal, State, local, DoD, and Army regulations and are aligned with all applicable waste reduction/diversion goals.
- Advise the Garrison Commander on the most cost-effective and efficient means of storing, treating, and disposing waste, and modifying equipment or procedures if needed. Recommend changes in policies or procedures to improve program management when necessary.
- Program, budget, and support resource requirements to manage the solid waste program, including funds for personnel, equipment, contracts, studies, operation and maintenance, treatment, storage, disposal, waste minimization measures, promotion, and training.
- Ensure waste reduction and diversion are maximized to meet EO and DOD diversion goals.
- Participate in the EQCC or other installation forums that address solid waste management and recycling.
- Ensure that renovation and construction contracts contain specifications and deliverable requirements for submittal of a C&D waste management plan and achievement of a 60% waste diversion rate. The contract should also require reporting of quantities of waste generated, waste diverted through reuse or recycling, and waste disposed by landfill or incineration.
- Develop/provide input to installation contract specifications, performance work statements, and other contract requirements to ensure waste management associated with the contract is conducted in compliance with applicable regulations and maximizes diversion.
- Track solid waste data and report using the Solid Waste Annual Report, Web-based (SWARWeb), or the successor module in the new enterprise business system, the Headquarters Army Environmental System.

- Ensure that contractor reports are provided to the manager of the SWARWeb database for inclusion in the installation's solid waste diversion data.
- Include the contractors' environmental performance as a selection factor in evaluating bids.

5.3 Environmental and Natural Resources Division

The Environmental and Natural Resources Division (ENRD) within DPW is responsible for the day-to-day management of the solid waste program as it relates to compliance with environmental requirements; maximizing diversion to meet Federal, Army, and DoD goals; and ensuring environmental stewardship and mission sustainability. Responsibilities of the ENRD include the following:

- Advise the DPW on the status of solid waste management and progress of recycling programs, and of changes in Federal, State, local, DoD, and Army requirements for managing solid waste and for recycling/diversion.
- Communicate with the DPW and Garrison Commander to identify the most cost-effective and efficient means of source reduction, recycling, and waste management in order to meet EO and DOD diversion goals and minimum recycling requirements for Federal facilities.
- Support and emphasize the practices of waste reduction, reuse/repurposing of materials, and participation in recycling programs.
- Assign a solid waste and a QRP manager to oversee the installation's solid waste and recycling programs.
- Periodically review renovation and construction contracts for appropriate specifications and deliverable requirements concerning C&D waste management plans, waste diversion, and reporting.
- Develop/provide input to installation contract specifications, performance work statements, and other contract requirements to ensure waste management is conducted in compliance with applicable regulations and maximizes diversion.
- Initiate educational and promotional programs related to waste reduction and recycling.
- Maintain liaison and coordinate as necessary with State solid waste regulators.

5.4 Solid Waste/Qualified Recycling Program Manager

One staff member from the ENRD currently serves as the Solid Waste and Qualified Recycling Program (QRP) Manager. The following are responsibilities of the Solid Waste/QRP Manager.

- Oversee all operations associated with the QRP.
- Develop, implement, maintain, and disseminate procedures for the operation of the QRP, to include a list of materials accepted, and procedures for separating, preparing, storing, and collecting recyclables.

- Provide input to and periodically review solid waste management/recycling contracts for overall effectiveness and compliance with applicable regulations, including reporting requirements.
- Serve as the installation point of contact for questions, complaints, or other notification regarding solid waste management and recycling.
- Authorize expenses for operational and overhead costs of the QRP, to include purchase of equipment, maintenance, program operation and expansion, labor costs, training, and publicity.
- Establish contracts and/or agreements with recyclables collectors, brokers, or dealers to conduct direct sales of recyclable materials.
- Arrange turn-in of appropriate materials to the Defense Logistics Agency (DLA) Disposition Services.
- Maintain and manage an accounting procedure to track materials processed/sold, and a financial accounting system for receipts, disbursements of funds, and calculating cost avoidance.
- Ensure excluded materials are not processed through the QRP.
- Use recycling revenues in accordance with Federal regulations (see section 8.2) and according to the Garrison Commander's direction.

5.5 Construction and Demolition Contracting Officer's Representatives

- Include contract performance requirements for a 60 percent diversion of C&D waste, by weight, from landfill disposal in all construction, renovation, and demolition projects.
- Require all C&D contractors to submit an environmental protection plan, C&D waste management plan, and quarterly C&D waste diversion and disposal data.
- Forward reports containing the quantities of C&D waste diverted from the waste stream and the quantity of C&D waste landfilled to the QRP Manager.

5.6 Logistics Readiness Center (LRC)

- Coordinate the turn-in of excess property including office equipment (e.g, furniture and electronics) to the DLA Disposition Services at Fort Meade.
- Support the installation's recycling program by transporting used toner cartridges to the Recycling Center for recycling and reusing cardboard boxes to the maximum extent possible.

5.7 Resource Management Office

- Establish and maintain a clearing account for the proceeds from the sale of recyclables and ensure that all deposits are accumulated in that account.
- Provide the QRP Manager with a quarterly report showing deposits and withdrawals from the clearing account for the previous three months.

5.8 All Organizations, Units, and Tenant Activities

- Participate in and support the installation's recycling program.

- Reduce the quantity of solid waste generated by procuring products made with recycled materials content and/or less or reusable packaging, buying only the amounts of product needed, seeking and implementing new recycling and reuse procedures, and altering operations to reduce wastes.

6.0 GENERATION, PROCESSING, AND DIVERSION OF WASTE AT FORT BELVOIR FACILITIES

Solid waste, as defined in the Resource Conservation and Recovery Act (RCRA), is any garbage, refuse, sludge, or other discarded material resulting from industrial, commercial, institutional, and residential activity. Discarded materials include those disposed, abandoned, recycled, or inherently waste-like. Residential waste generated by Fort Belvoir family housing is not covered by this plan since family housing has been privatized and is managed by another entity. Hazardous waste, which is not addressed in this plan, is solid waste that meets specific RCRA criteria involving hazardous characteristics or the presence of constituents listed by the EPA.

6.1 Generation of Solid Waste

Fort Belvoir has a multitude of activities that generate solid waste. Solid waste types may be categorized based on the operation generating the waste, similar to the RCRA-defined categories described above.

6.1.1 Commercial Operations

Commercial and retail operations at Fort Belvoir include the Defense Commissary Agency (DeCA), the post exchange (PX), shopettes, dining facilities (DFACs), and the Army Air Force Exchange Service (AAFES) service stations. These facilities may generate food wastes, oil and grease, paper, cardboard, steel and aluminum cans, plastic and glass beverage containers, plastic, films, packaging, textiles, pallets, and batteries.

6.1.2 Administrative and Institutional Operations

Support operations are facilities on the installation to support soldiers, civilian employees, and families. These include the hospital and other medical, dental, and veterinary facilities; the education center; schools and child development centers; barracks; and a multitude of administration facilities. These activities may be large generators of paper, cardboard, plastics, food-related wastes, and other special waste categories such as regulated medical waste.

6.1.3 Recreational Activities

Fort Belvoir provides several facilities for recreational activities, including the Fort Belvoir Golf Club, picnic areas, fitness centers, indoor and outdoor swimming pools, bowling alley, horse stable, and the community and outdoor recreation centers. These facilities generate paper; cardboard; food wastes; plastic, aluminum, and glass beverage containers; miscellaneous plastics; wood; and textiles.

6.2 Waste Characterization

In 1993, a private consulting firm, CDM, conducted a solid waste characterization study for Fort Belvoir. A total of 56 samples were characterized. Samples were collected installation-wide from residential, administrative, commercial, and institutional facilities. The samples were collected from waste containers so the waste composition information did not include materials that were diverted for recycling. Appendix D provides the summary data from this waste characterization study.

6.3 Solid Waste Generation and Diversion Data

The solid waste and recycling contractor provides Fort Belvoir with disposal and diversion data on a monthly basis. The contractor weighs all solid waste and recyclables using the truck scale located at the Recycling Center. Refuse collection trucks are weighed after collecting waste from the installation and prior to transporting the waste to the Fairfax County Waste-to-Energy (WTE) facility, and recyclable materials are weighed prior to sale.

The nonhazardous solid waste diversion rate, expressed as a percentage, is the rate at which nonhazardous solid waste is diverted from entering a disposal facility. Methods of diversion include reuse, repurposing, donation, recycling, and composting.

The diversion rate equals:

$$(R/(R+L))*100$$

Where:

R = amount (in tons) of nonhazardous waste diverted, and
L = amount (in tons) of solid waste disposed

Waste disposal and diversion quantities for the past 5 years were obtained from SWARWeb and are provided in Table 1. These diversion rates exceed the 50 percent solid waste diversion rate and the 50 percent C&D diversion rate goals stated in EO 13693 (EO 13693, 2015). The C&D diversion rate also exceeds the 60 percent diversion goal in DOD's Strategic Sustainability Performance Plan (OUSDATL, 2014).

To ensure that the C&D diversion rates are not artificially inflated, the QRP Manager will continue to coordinate with contracting officer's representatives (CORs) to ensure that contractors report all disposal data, as well as all diversion data.

Table 1. Fort Belvoir Solid Waste Disposal and Diversion Data (FY 11 – FY 15).

Waste Type	Disposal & Diversion Data	FY 15	FY 14	FY 13	FY 12	FY 11
Non-C&D Waste	Waste Disposed (tons)	3,892.8	4,471.6	4,887.9	5,443.1	6,333.9
	Waste Diverted (tons)	4,953.40	4,052.7	4,221.2	13,000.7	3,605.5
	Diversion Rate	56.0%	47.5%	46.3%	70.5%	36.3%
C&D Waste	Waste Disposed (tons)	2,654.16	1,418.8	1,164.9	398.2	31.1
	Waste Diverted (tons)	10,116.45	5,973.2	18,025.1	6011.4	2,903.8
	Diversion Rate	79.2%	80.8	93.9%	93.8%	98.9%
Total Waste	Waste Disposed (tons)	6,547.0	5,890.4	6,052.8	5,841.2	6,364.9
	Waste Diverted (tons)	15,069.85	10,025.9	22,246.2	19,012.1	6,509.3
	Diversion Rate	69.7%	63.0%	78.6%	76.5%	50.6%

6.4 Increasing Solid Waste Diversion

With a reported non-hazardous solid waste diversion rate of 56%, Fort Belvoir exceeds the current diversion goal. However, Army Net Zero policy directs installations to continue to increase diversion in pursuit of Net Zero Waste. The QRP Evaluation published concurrently with this plan provides an analysis for additional diversion opportunities. Opportunities discussed include food waste composting and improved recycling at the hospital including blue wrap recycling.

6.5 Onpost Solid Waste and Recycling Facilities

Fort Belvoir has a Combined Solid Waste and Recycling Services contract with a local company to provide solid waste and recycling services. The solid waste and recycling contractor transports solid waste directly from the installation to the Fairfax County WTE Facility. Recyclables are processed and/or stored at one of the following four solid waste management facilities located on the installation. The solid waste and recycling contractor operates three of facilities and DPW operates the remaining facility.

6.5.1 Recycling Center

Fort Belvoir has a contractor-operated Recycling Center located at Building 1089 at 6010 Pohick Road that is open Monday through Friday from 7 am until 4 pm. The contractor collects recyclables from installation buildings and transports them to the Recycling Center for sorting, baling, and storage until sale. The Recycling Center equipment includes a multipurpose baler, bobcat, forklift, truck scale, industrial paper shredder, roll-off containers, a roll-off collection truck, vertical loading packer truck, and multiple storage bins. The contractor provides all of this equipment, with the exception of the truck scale. The Recycling Center handles the following materials: cardboard, paper, plastics, aluminum and steel cans, glass, scrap metal, toner cartridges, lead-acid batteries, and used oil. There is also a drop-off area located in the parking lot of the Recycling Center where family housing residents or military retirees can drop off their recyclable materials.

6.5.2 Composting Facility

Fort Belvoir runs its composting operation through its Combined Solid Waste and Recycling Services contract. The contractor-operated Composting Facility is located behind the Recycling Center. Equipment at the composting facility includes a tub grinder, which the contractor provides. Yard waste, primarily leaves and wood waste from tree removal and trimming activities are passively composted onsite in windrows. Wood waste is chipped and is processed into mulch and the leaf waste is processed into compost. The mulch and compost are used onsite by DPW Roads and Grounds.

6.5.3 21st Street Construction Debris Recycling Facility

The contractor-operated construction debris recycling facility is located near Building 607 on 21st Street. This facility is the collection point for scrap metal, C&D materials, and tires. There are two 30-cubic yard roll-off containers for scrap metal, three 30-cubic yard roll-off containers for C&D debris, and a tractor trailer for used tires. Scrap metal is sold and the proceeds are retained by the Fort Belvoir QRP. C&D materials are crushed, placed in the roll-off containers, and transported to the local C&D landfill.[1] Used tires are sent to DLA Disposition Services for disposal.

[1] The C&D landfill charges by volume, as opposed to weight.

6.5.4 DPW Coal Yard

The DPW operates the Coal Yard, which is an outdoor area used for processing and storing concrete and asphalt for reuse. DPW and contractor personnel are permitted to store materials in this area until they are needed for reuse.

7.0 SOURCE REDUCTION

Source reduction, or creating less waste at the source, is the preferred method of managing the solid waste stream and minimizing waste. The EPA calls for source reduction as the primary tool in the waste management hierarchy. Similarly, the Army Net Zero waste strategy places source reduction as the top priority. Key components of source reduction include Sustainable Procurement, repurposing and reuse of materials, and management practices that create less waste.

7.1 Sustainable Procurement

7.1.1 Sustainable Procurement Overview

Sustainable Procurement, also known as Green Procurement, is the purchase of environmentally beneficial products and services associated with one or more of the established Federal procurement preference programs. Sustainable Procurement has many environmental benefits, including creating markets for recycled and biobased materials, conserving resources, saving energy, saving landfill space, and reducing pollution. These programs help to reduce solid waste by favoring products with less packaging, buying in bulk when feasible, choosing products with a longer lifespan, and substituting products that may be recycled or composted for those that end up in the waste stream. Appendix B addresses Sustainable Procurement as part of the Army's overall Net Zero Waste strategy.

Federal Agencies (including DOD and its facilities) are required to establish procurement preference to meet the requirements of the EPA "Buy Recycled" Program and the U.S. Department of Agriculture (USDA) "Bio Preferred" Program. DOD has a procurement policy that establishes a goal of 100 percent compliance with Federal laws and EOs requiring the procurement of sustainable products and services (OUSDATL, 2008). According to EO 13693, sustainable purchases (including contracts) will include the following categories: recovered materials (recycled content), biobased, energy/water-efficient, environmentally preferable, and fuel-efficient products and services that are SmartWay Transport partners and products, non-ozone depleting substances, and Safer Choice labelled products (EO13693, 2015).

Fort Belvoir does not have an active Sustainable Procurement program. At Fort Belvoir, many administrative/office purchases are made through the Virginia Institute of the Blind (VIB) store on the installation, which offers a varied selection of sustainable office supplies in the store. The VIB catalog offers a wider selection of sustainable supplies.

7.1.2 Sustainable Contracting

EO 13693 promotes sustainable acquisition and procurement by ensuring that environmental performance and sustainability factors are included to the maximum extent practicable for all applicable procurements in the planning, award, and execution phases of the acquisition. This EO also introduces a specific goal of meeting USDA BioPreferred requirements for 95% of procurements. For a contract to be considered sustainable, it should contain both performance criteria and provisions/clauses that emphasize the government's preference for green products and services.

Fort Belvoir contracts for facilities operation and maintenance, major renovations, and construction. Sustainable Procurement applies to many contracts in that the service or products provided have alternatives that could save energy, reduce water use, or decrease waste generation. Contracts should state the government's preference for designated recycled content and biobased products, energy- and water-efficient products, and waste reduction in all aspects of the contract execution. Contractors should be required to provide green designated products where specified (subject to the allowed exceptions of price, performance, and availability). Examples of services contracts include janitorial, grounds keeping, construction, and renovation. Examples of sustainable products include nontoxic/biobased cleaning products, recycled-content paper products, energy efficient electronics, WaterSense fixtures, and green building materials.

7.2 Reuse and Repurposing

7.2.1 Overview

'Reuse' is using an item for its original intended purpose, such as collecting items for clothing drives, or collecting packing materials to be used in future shipments. Repurposing is an old concept, but one that is being revisited as organizations struggle to achieve Net Zero Waste and find new diversion methods for waste streams. Repurposing differs from recycling, although the terms are often used interchangeably. Whereas recycling involves physical/chemical manufacturing or processing to change one product into another, repurposing entails using a product in a different way or for a different application while retaining its basic structure/appearance. For example, Fort Belvoir repurposes asphalt and concrete from building demolition and uses it for road paving projects.

Many installations use informal means to reuse products and equipment that are no longer needed by one organization, but may be useful to another. The Fort Belvoir LRC reuses packaging materials and pallets and will keep furniture for approximately a week to see if other activities on the installation can use it prior to turning it in to DLA for reuse. The Commissary participates in a food donation program, and donates more than 800 pounds of food per month to the Capital Region Food Bank. Appendix B further addresses reuse and repurposing as part of the Army's overall Net Zero Waste strategy.

7.2.2 Excess Property

The DLA Disposition Services (formerly the Defense Reutilization and Marketing Office) is DoD's agent for the reuse, transfer, donation, or sale of excess government property. The LRC on Fort Belvoir collects excess government property and coordinates with the DLA Disposition Services on Fort Meade for the processing of this property. The DLA Disposition Service's mission is to find outlets for excess property, including furniture, vehicles, heavy equipment, excess products, computers and other electronics, and other miscellaneous materials. Units and activities are responsible for transporting surplus items to the LRC with the accompanying turn-in documents. DLA Disposition Services makes the surplus government property available for reuse by other units and activities. Remaining reusable materials are transferred to other government organizations, donated to eligible charities, or offered for sale to the public. Items that cannot be transferred, sold, or donated are disposed.

7.3 Best Management Practices

Fort Belvoir personnel should follow basic management practices to minimize the generation of solid waste. These should be publicized and periodically reinforced to personnel and include the following:

- Purchasing materials that are recyclable
- Purchasing materials in bulk or concentrates to eliminate packaging
- Eliminating the stockpiling of materials (particularly chemical materials with expiration dates)
- Making double-sided copies, setting the default on printers to print double-sided
- Returning toner cartridges for remanufacturing
- Providing proper maintenance for copiers and printers
- Using electronic document management (using the intranet or drive sharing to transmit non-sensitive information, saving emails messages and documents instead of printing them, conducting document reviews electronically)
- Sending internal mail in reusable envelopes [first remove Personally Identifiable Information (PII)]
- Reusing file folders by using stick-on labels (first remove PII)
- Encouraging use of "print view" features to reduce printing mistakes
- Reusing plastic and paperboard binders
- Using washable coffee mugs and utensils instead of disposable supplies

8.0 RECYCLING AND COMPOSTING

Following source reduction and reuse/repurposing, recycling is next in the EPA P2 Hierarchy and Net Zero Waste strategy. The Army and DoD have established requirements for installations to have or participate in a recycling program. DoD and Army policies require that installations establish a recycling program to reduce the waste stream volume, enhance pollution control, and conserve natural resources when such programs are life cycle cost effective.

8.1 Recycling Policy

Fort Belvoir maintains an installation-wide recycling policy that is signed by the Garrison Commander. The most recent policy memo was signed in June 2014 and is enclosed as Appendix E. The policy memo mandates all installation activities to participate in the installation's QRP, lists the materials that will be recycled, and establishes that recycling proceeds generated from the sale of recyclable materials shall first be used to cover the cost of running the recycling program.

8.2 Program Structure

The Fort Belvoir DPW operates a QRP with direct sales authority that was formally established in 1997. A QRP is defined in AR 420-1 as a program for which the Garrison Commander has established:

- Procedures for segregating, collecting, and selling specific authorized materials intended to be recycled; and
- Methods for maintaining fiscal accountability of funds received from the sale of recycled materials and the disbursal of these funds; and
- A process to review all projects and activities funded from the proceeds of the sale of recycled materials.

The QRP commodities include scrap metal, cardboard, white paper, mixed paper, newspaper and magazines, aluminum and bi-meal cans, plastics, toner cartridges, lead-acid batteries, and used oil. The QRP is run through the ENRD by the QRP Manager, who manages the collection and sale of recyclable materials.

The funds generated from QRP sales are placed into a specific QRP suspense account established for the purpose of collecting reimbursements from the sale of property. It captures money paid to the government from private entities in a government general budget clearing account that does not expire over fiscal years. It is important that if any recyclable items are turned in to DLA Disposition Services for recycling, they are accompanied by turn-in documents (DD 1348-1A) with the QRP account number (fund cite) on them. An installation QRP account will always begin with the numbers 21 (Army service code) followed by F3875 (indicating a suspense account).

The QRP account allows both deposits and withdrawals to be made. However, in accordance with the *Military Construction and Codification Act* (PL 97-214, 1982), withdrawals must be made under specific circumstances and according to this hierarchy:

- Funds must be used to cover the costs of the QRP (including operations, maintenance, overhead, equipment, staffing).
- Up to 50 percent of any remaining balance may be used to pay for certain other environmental programs (pollution abatement, energy conservation, and

occupational safety and health activities).
- The remaining balance may be used for any morale or welfare activity.

The Army QRP Handbook (ACSIM, 2010) recommends that installations establish a QRP Oversight Committee to evaluate proposed projects, with the Garrison Commander having the final decision and approval authority.

The QRP manager tracks the sale of recyclable materials. Fort Belvoir generates approximately $150,000 in sales annually. As of November 2015, the QRP account contained more than $1,000,000. The Garrison Commander must ensure that QRP revenues are disbursed in accordance with the regulations outlined above and the installation's recycling policy.

8.3 Segregation, Storage and Collection Procedures

8.3.1 QRP Recycling Activities

The QRP Manager manages the Fort Belvoir Program and a private contractor performs the day-to-day operations of the program, including collection, storage, and processing of the recyclables. A brief summary of how each recyclable material is handled is provided below. The Fort Belvoir QRP SOP (Appendix F) provides additional details on how each material is processed and sold. Table 2 shows the quantities of materials recycled at Fort Belvoir for the past 5 years. The data shown in Table 2 were gathered from SWARWeb reports.

8.3.1.1 *Scrap Metal.* Scrap metal generators transport their metals to the 21st Street Construction Debris Recycling Facility. Metals are placed into a roll-off and are sold through the QRP. There is also a bin for scrap metal at the Recycling Center drop-off site.

8.3.1.2 *Cardboard.* Currently there are 55 cardboard dumpsters located throughout the installation. Personnel are responsible for transporting their flattened cardboard to the dumpster. The solid waste and recycling contractor collects the cardboard from the dumpsters, transports it to the Recycling Center, removes contaminants from the cardboard, bales the cardboard, and stores it in a tractor trailer until sale. The Commissary and the PX bale their own cardboard and retain the profit from sale of the cardboard; however the quantity of cardboard recycled is forwarded to the QRP Manager for inclusion in the installation's diversion rate.

8.3.1.3 Paper. Fort Belvoir provides its employees with desktop collection containers for recyclables. Employees are responsible for placing their recyclable paper in centralized collection containers located within each building. The solid waste and recycling contractor collects the paper from the centralized collection containers, transports it to the Recycling Center, separates the white paper from the mixed paper, bales the paper, and stores it in a tractor trailer until sale.

8.3.1.4 *Plastics.* Fort Belvoir provides its employees with desktop collection containers for recyclables. Employees are responsible for placing their plastic in centralized

collection containers located within each building. The solid waste and recycling contractor collects the plastic from the centralized collection containers, transports it to the Recycling Center, separates the #1 and #2 plastics from other recyclable plastics, and stores each type of plastic in a tractor trailer until sale. The #1 and #2 plastics are baled and sold. Other recyclables plastics are recycled but no proceeds are generated.

Table 2. Quantities of Materials Recycled (FY 11 – FY 15)

Recyclable Material	Tons				
	2015	2014	2013	2012	2011
Aluminum cans[1]	2.81	5.06	3.64	2.97	0.00
Batteries (lead-acid)[1]	11.47	5.56	14.25	14.20	3.60
Batteries (lithium ion)	0.00	3.19	3.12	0.00	0.00
Bimetal cans[1]	5.39	3.01	2.31	0.88	0.00
Cardboard[1,2]	1,611.98	1,516.2	1,989.07	11,256.58	682.11
C&D Debris[1,2]	178.07	1,165.33	17,323.89	547.27	2,350.61
Electronics	1.97	15.06	0.00	0.00	0.00
Glass	10.82	19.98	20.31	24.00	2.25
Metals[1,2]	1,781.27	1,179.15	398.72	474.30	450.20
Mixed recyclables	109.3	98.36	141.36	157.26	2,043.06
Pallets	472.00	637.20	78.50	28.74	0.00
Paper (other) [1,2]	223.73	156.24	112.83	143.03	326.38
Paper (white) [1,2]	78.09	148.25	196.35	193.35	55.77
Plastics (#1 & #2) [2]	20.01	28.16	25.05	2.59	3.30
Plastics (#3 - #7)	0.98	0.00	0.00	0.00	0.00
Plastics (other) [1,2]	19.29	6.79	35.49	41.27	20.4
Sewage sludge	155.52	142.05	183.62	62.59	0.00
Textiles	59.06	83.80	0.00	0.00	0.00
Tires	17.81	8.80	25.03	17.80	10.97
Toner cartridges[1]	32.56	21.81	25.39	19.20	5.49
Top soil/land clearing debris	240.00	391.50	4.69	27.00	0.00
Used motor oil	71.08	32.22	0.00	0.00	0.00
Wood	4.01	0.00	0.00	0.00	0.00
Yard Waste	606.32	649.06	966.10	854.44	0.00
Total	**15,069.84**	**10,025.85**	**22,246.12**	**19,012.07**	**6,509.33**

[1] These materials are recycled and sold through the QRP.

[2] Not all of the material recycled was sold through the QRP. Some tenants recycle materials through other venues but report the quantities recycled to the DPW.

8.3.1.5 Toner Cartridges. Fort Belvoir recycles toner cartridges. Employees either place toner cartridges near the centralized collection containers in each building and they are collected by the solid waste and recycling contractor or turn them in to LRC who transports them to the Recycling Center. Toner cartridges are stored at the Recycling Center until they are sold.

8.3.1.6 Lead-acid Batteries. Activities that generate lead-acid batteries drop them off

at the Recycling Center for recycling. The Recycling Center only accepts intact batteries; those that are broken or leaking must be managed as hazardous waste. Proceeds are generated from the sale of intact batteries.

8.3.2 Non-QRP Recycling Activities

Fort Belvoir recycles additional materials for which it does not receive any proceeds.

8.3.2.1 Used Oil. The Fort Belvoir Recycling Center has a 500-gallon aboveground storage tank (AST) at the Recycling Center for residents to drop off used motor oil. Motor pools throughout the installation also have ASTs for the collection of used oil. A private company collects the used oil free of charge.

8.3.2.2 Tires. Fort Belvoir recycles its tires through DLA Disposition Services. Generators drop the tires off at the 21st Street Construction Debris Site or to LRC. Currently only the tires recycled from the 21st Street Construction Debris site are included in the diversion rate.

8.3.2.3 Electronic Waste. The Fort Belvoir Recycling Center accepts personal electronics for recycling. The same company that purchases used toner cartridges also accepts personal electronic waste free of charge. This waste is tracked and included in the installation's diversion rate. The LRC accepts government-owned electronics for reuse or disposal through DLA Disposition Services. The quantity of electronics recycled or reused through DLA Disposition Services is not tracked or included in the installation's recycling rate.

8.3.2.4 Kitchen Grease. Most of the food service facilities on Fort Belvoir have a contract with Valley Proteins to collect their used kitchen grease for recycling/reuse. The quantity of kitchen grease diverted from the waste stream is not currently reported to the DPW for inclusion in the installation's diversion rate.

8.3.2.5 Yard Waste. Fort Belvoir operates a composting facility for yard waste generated onsite. Roads and Grounds personnel transport the yard waste to the composting facility, which is operated by the solid waste and recycling contractor. Compost is used onsite.

8.3.2.6 Glass. The Fort Belvoir Recycling Center collects glass at its drop-off facility. The vendor that purchases other recyclable materials (e.g., paper, aluminum) accepts the glass free of charge for recycling, but provides no payment for the material.

9.0 SOLID WASTE DISPOSAL

Fort Belvoir has a contract with a private firm to provide solid waste and recycling services. Solid wastes generated at Fort Belvoir are collected in more than 335 dumpsters at approximately 225 locations throughout the installation. The solid waste contract contains a complete inventory of dumpsters and the accompanying building locations. The contractor collects waste from the dumpsters, weighs the quantity of waste collected, and transports it to the Fairfax County WTE facility for disposal.

The contract cost is based on the number of pickups, which is set according to the collection frequency and the number of dumpsters on the route. The contract cost does include the tipping fee at the WTE facility; however, it does not fluctuate based on how much waste is collected. The current refuse contract does not provide any incentive for the waste generator (or the contractor) to reduce waste or increase diversion, unless a dumpster or scheduled pickup can be eliminated and the contract cost modified.

10.0 CONSTRUCTION AND DEMOLITION WASTE

C&D and bulk wastes generated at Fort Belvoir are either transported by the generating activity to the 21st Street Construction Debris Facility or, in the case of larger construction and renovation projects, the construction/demolition contractor collects the waste on-site and transports it to the off-post C&D landfill for disposal.

Recognizing that the C&D waste management responsibilities lie with the contractor, the Army issued regulations (DA, 2012) requiring that all military construction, renovation, and demolition projects include performance requirements for a 50 percent minimum diversion of C&D waste, by weight, from landfill disposal. This policy applies to all construction, renovation, and demolition projects carried out under the Military Construction (MILCON) Army, Army Family Housing Construction, Facilities Reduction, and installation Operations and Maintenance programs. Specifications must include submission of a contractor's C&D Waste Management Plan prior to the start of work. Subsequently, DOD established a C&D diversion rate goal of 60% in the FY2010 Strategic Sustainability Performance Plan (OUSDATL, 2010).

Fort Belvoir has consistently reported more than 60% diversion of its C&D waste for the past 5 years. The QRP Manager will continue to coordinate with the CORs for construction and renovation projects to ensure all diversion and disposal data are incorporated into SWARWeb.

11.0 RECORDKEEPING AND REPORTING.

The Solid Waste/QRP Manager will ensure that the recordkeeping and reporting system captures all disposal and recycling activities that occur at Fort Belvoir. This will enable the installation to accurately provide required annual reports to the Army via SWARWeb.

The solid waste and recycling contractor submits monthly reports detailing the quantities of waste collected for disposal and diversion. These quantities of waste collected for disposal and diversion are weighed on the truck scale located at the Recycling Center. Other tenants and activities that dispose of recycling and/or refuse are responsible for reporting the quantities of materials diverted and/or disposed. These activities and tenants include, but are not limited to the AAFES, the Commissary, LRC, and the horse stables.

Contractors shall provide C&D waste disposal and diversion rates, or other approved quantifiable data, to the COR as required by contract, and the COR will provide this data to the Solid Waste/QRP Manager. Reporting requirements should be included in

the Base Operations Contract, as well as all major construction, renovation, and demolition contracts. The quantities of C&D waste disposed and diverted on an annual basis are reported via SWARWeb.

In addition, the QRP Manager will coordinate with tenant activities to ensure all materials currently being recycled are reported and included in the installation's solid waste diversion rate. The following recycling activities were identified during the preparation of this plan, but were not being reported:

- Food donation – The Fort Belvoir Commissary donates more than 800 pounds of food per month (close to 5 tons per year) to the Capital Area Food Bank.
- Cooking oil – Valley Proteins collects used cooking oil from most of the food service facilities on Fort Belvoir.
- Shredded paper – The Fort Belvoir Community Hospital has shredding procedures in place. The QRP Manager will confirm that the shredded paper is being recycled and will ensure that quantities of paper recycled are reported to the ENRD. It is likely that other tenant organizations have contracted shredding operations to place too and the QRP Manager should investigate to determine how much shredded paper is being recycled.
- Tires – Ensure that all tires sent to DLA Disposition Services for recycling are reported to the QRP Manager.

12.0 PROGRAM PROMOTION, OUTREACH AND TRAINING

12.1 Program Promotion

Command emphasis is vital to the sustained success of a recycling program. The Fort Belvoir Garrison Commander has signed a recycling policy for the installation. This policy will be made available to all installation personnel and will be provided in welcome packets to new employees and students.

Fort Belvoir promotes the recycling program on a regular basis using its Facebook page (https://www.facebook.com/pages/Fort-Belvoir-Recycling-Program/41232051221360). To ensure continued recycling awareness and increase program participation, it is necessary to continually promote the recycling program through a variety of venues. Promotion of the recycling program is the responsibility of the QRP manager. The QRP manager will work with the Public Affairs Office and provide technical input for promotional materials. Promotional materials can include posters, fact sheets, email messages, the new employee orientation program, articles in the Belvoir Eagle, and other community promotional events. Publishing the progress of the program is a strong promotional method. The diversion rate and the associated cost savings for refuse disposal will be a measure of the increased participation in the recycling program and will be published annually.

12.2 Outreach

At the time of the site visit, the QRP Manager was in the process of developing a point of contact list for the buildings serviced with solid waste and recycling collection. An

accurate and up-to-date list of POCs at each building would help the QRP Manager gather information about recyclables generated (e.g., shredded paper) and also to disseminate new information or procedural changes regarding recycling collection on the installation.

12.3 Training

Timely and relevant training is integral to the success and safety of solid waste management operations and recycling programs. Training programs may be in the form of formal training courses, on-line courses, hands-on applications, subscriptions to appropriate professional journals, or attendance at seminars and conferences. Appendix G contains suggested training courses, conferences, and information sources. Personnel with solid waste responsibilities listed in this plan may find these resources beneficial.

13.0 ACTION ITEMS

The following action items will ensure that Fort Belvoir continues to operate its solid waste disposal and recycling activities in a manner protective of human health and the environment and in compliance with applicable regulations. These action items have been placed in one of two categories: implementing or improving processes or increasing knowledge and awareness.

13.1 Implementing or Improving Processes

13.1.1 The installation will update the solid waste and recycling collection contract so the collection, transportation, and disposal costs are separate line items. Since Fort Belvoir weighs its waste onsite, they have the ability to structure the contract so that they are should be paying a disposal fee based on the actual quantity of waste disposed, which provides a monetary incentive to increase recycling and decrease the amount of waste disposed.

13.1.2 The QRP Manager will ensure all materials that are recycled are ultimately captured in the installation's diversion rate. Waste streams that are currently being recycled and not tracked include donated food, used cooking oil, shredded paper, and tires brought to LRC for recycling.

13.1.3 The DPW CORs will require C&D contractors to submit C&D waste management plans, and enforce the requirement in C&D contracts for contractors to report C&D waste disposed and diverted.

13.1.4 Fort Belvoir will investigate additional recycling opportunities periodically. One major waste stream that is not currently being recycled is food waste; however, Fort Belvoir has included food waste collection and composting in the revised Combined Solid Waste and Recycling Service contract taking effect in FY 17. Other opportunities identified when this plan was being prepared included improving existing collection of recyclables at the hospital and recycling blue wrap at the hospital.

13.1.5 The DPW will review and update the ISWMP every 5 years or as needed in response to mission, solid waste program, or regulatory changes. This review will include an evaluation of the overall effectiveness of the solid waste management program.

13.2 Increasing Knowledge and Awareness

Update the point of contact list for the buildings serviced with solid waste and recycling collection. An accurate and up-to-date list of POCs at each building will help the QRP Manager gather information about recyclables generated (e.g., shredded paper) and also to disseminate new information or procedural changes regarding recycling collection on the installation.

14.0 TECHNICAL POINT OF CONTACT

This plan was prepared by Ms. Nicole Lundquist, Waste Management Program, U.S. Army Public Health Center (Provisional). She can be contacted at commercial 410-436-8551, DSN 584-8551, or via e-mail at nicole.m.lundquist.civ@mail.mil.

APPENDIX A
REFERENCES

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OUSDATL, 2008 - Memorandum, DoD, Office of the Under Secretary of Defense for Acquisition, Technology and Logistics, subject: *Updated Green Procurement Program Strategy,* 2 December 2008.

OUSDATL, 2014 - *Department of Defense Strategic Sustainability Performance Plan.* Washington, DC: Office of the Under Secretary of Defense for Acquisition, Technology and Logistics, June 2014.

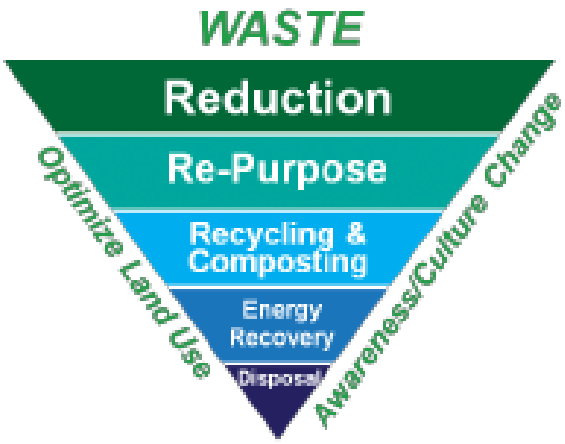
PL 97-214, 1982 - Public Law 97-214, Military Construction Codification Act, 10 USC 2577, *Disposal of Recyclable Materials*, Washington, DC, 12 July 1982.

PL 101-508, 1990 - Public Law 101-508, 1990, *Pollution Prevention Act*, 5 November 1990.

SECARMY, 2014 - Memorandum, Secretary of the Army, subject: *Army Directive 2014-02 (Net Zero Installations Policy)*, 28 January 2014.

APPENDIX B

NET ZERO CONSIDERATIONS IN SOLID WASTE MANAGEMENT PLANNING



Introduction

According to the Office of the Assistant Secretary of the Army (Installations, Energy & Environment), Net Zero is a force multiplier. Net Zero has evolved from the Army's commitment to environmental stewardship and to managing resources to afford soldiers, families, and civilians a sustainable future. In the current environment of shrinking budgets and resource scarcity, there has been a recognition that we have to do more with less. Nowhere is this concept more evident than in the current decision-making regarding waste, water, and energy.

Once regarded as an unavoidable aspect, waste management is now recognized as a challenge the Army has to overcome to remain viable and sustainable. It affects all facets of life, including mission sustainability, health and well-being, resource conservation, land preservation, and relationships with our communities. The Army designated eight pilot installations for Net Zero Waste in 2011, and has set them as the test beds for new ideas and technologies towards sustainable waste management. A Net Zero Waste installation reduces, reuses, and recovers waste streams, converting them to resource values with zero solid waste going to landfills over the course of a year.

The tenets of Net Zero Waste are relatively simple. The components include reducing the amount of waste generated, repurposing waste, maximizing recycling of the waste stream to reclaim recyclable and compostable materials, recovery to generate energy as a by-product of waste reduction, with disposal being minimal and a last resort. The key to Net Zero, however, is to integrate decisions regarding waste management with the goals for reducing energy and water. This is accomplished by incorporating Net Zero goals into facility long-term planning (including the master plan and sustainability plans), while evaluating the associated benefits and costs.

Army Net Zero Waste Strategies

The Army Net Zero approach is made up of five interrelated steps: Reduction, Repurposing, Recycling and Composting, Energy Recovery, and Disposal. Each step must be evaluated with the associated energy/water risks, benefits, and costs.

Reduction

Reduction includes eliminating generation of unnecessary waste, preferably proactively or at the source. While reducing the waste stream, related considerations include maximizing energy efficiency in existing facilities and implementing water conservation practices. At times, benefit to one aspect (reducing waste) will have a cost to another. An example is the use of reusable food containers and utensils. Reducing the purchase and use of disposable tableware in favor of washable, reusable items will lead to higher energy and water use to run the dishwashers.

Reduction may include process or procedural changes that eliminate a waste stream. Photographic chemicals and fixers are a waste stream that has largely been eliminated through the use of digital photo processing. Procedures that have been ingrained in Army activities, such as stockpiling items in anticipation of reduced funding, must be evaluated and changed to purchasing on an as-needed basis. This eliminates the accumulation of excess or expired items in stockrooms and warehouses.

Another important aspect of waste reduction lies with Sustainable Procurement. While much of Sustainable Procurement revolves around the environmental benefits of products (such as recycled /biobased content, or energy efficiency), purchasing these products can also reduce waste. Buying energy-efficient lighting, for example, may reduce the need to replace the light as often. There are other ways to reduce wastes through conscious purchasing decisions. One way is to show preference to products that, at the end of the useful life, can be recycled or composted. Choosing a compostable food container that can be sent to an industrial compost facility is a way to eliminate that product from the waste stream. Similarly, purchasing items of commonly recycled plastics (such as those labeled #1 and #2) has benefits over using plastics that must be thrown away. In addition, choosing products with less packaging or a longer life span helps reduce materials in the waste stream. Eliminating expanded polystyrene foam from products and packaging also helps reduce a problematic waste with few recycling options.

Repurposing

Repurposing involves diverting waste to a secondary purpose with limited processing. Repurposing is often confused with recycling, which involves physical/chemical manufacturing or processing to change one product into a new (and possibly different) product. Repurposing involves using a product in a different way or for a different application while retaining its basic structure/appearance. Examples of repurposing include using used tires as protective bumpers for boat piers, or for playground tire

swings. On the contrary, used tires that are made into retread tires, or made into crumb rubber for playground material, would be considered recycled.

Repurposing has been somewhat institutionalized in the use of Defense Logistics Agency for turning in used items for future disposition. Much of what the DLA does is considered reuse (using the product for the original intended purpose). "Free issue" or waste exchange activities are often in place for reusing items within a facility, and may include pallets, furniture, electronics, and other supplies.

The key to repurposing a product is that much of it is done on a small scale, and is conceived and accomplished by the user. Getting people to think "outside the box" and be less consumed with convenient, disposable products is integral to repurposing programs. Something every office worker can do is save scrap paper that has a blank side, and reuse it for notes or lists. Cardboard paper towel rolls are often used in craft projects for children. Scrap wood can be used in framing or craft shops for art projects. The material from used surgical blue wrap has been sewn into tote bags. Used linens can be cut up and made into cleaning rags.

Donation is also an element of repurposing, for it takes used items and provides them to a new user. Clean, used hospital scrubs can be donated or sold/exchanged through a swap system. Used furniture and building materials can be donated to organizations that provide services to the homeless. Medical equipment and supplies can be donated to third world countries or learning institutions.

Recycling and Composting

Recycling and composting are considered together in the Net Zero equation because both processes involve maximizing diversion of waste materials from the solid waste stream by transforming them into new products. Recycling has associated benefits (beyond waste reduction) in that it is often an energy saver. Recycling an aluminum beverage can into a new can saves 95% of the energy used to manufacture the can using new materials.

The keys to successful recycling and composting programs are to be vigilant about assessing market values, identify facilities that accept materials, and work with vendors and brokers to maximize diversion rates and revenues. It is also important to make collection and segregation of these items easy and convenient for generators. Recycling and composting will save money when the facility pays for waste based on the weight or volume generated, or when the value of recyclables is factored into the contract as a credit or rebate. In some cases, compost and mulch are provided back to the generating facility for free or at a reduced cost, which may result in minimal savings. When refuse contracts are fixed price, there is little monetary benefit to recycling and composting programs.

To maximize the success of recycling and composting programs, waste materials must be collected and segregated at the source. This can be followed by additional sorting at a collection or processing center to maximize diversion.

Energy Recovery

Energy recovery can occur from converting unusable waste to energy, which the EPA has termed biomass conversion. In the Net Zero Waste equation, solid waste that cannot be repurposed or recycled should be transformed for energy recovery before considering ultimate disposal. Energy derived from waste is considered a renewable energy source. In the U.S. there are currently 86 facilities that combust waste for energy recovery, accounting for 12 percent of municipal solid waste.

All wastes containing organic materials can be used as the basis for waste-to-energy (WTE) systems. Organic materials can be converted to electric or heat energy through various processes, including gasification (heating waste to a gas in an oxygen-starved environment) or direct-fired incineration (combustion). Biomass conversion of wastes may take several forms, such as a system designed to produce heat and/or steam, one that uses an external combustion engine and generator to produce electricity, a specialized waste disposal system (e.g., plasma arc) that also produces heat as a byproduct, or in a dedicated waste-to-energy system that uses pyrolysis to produce fuel.

The benefits of energy recovery from waste include reduction of the waste volume (around 90% reduction is expected) and generation of energy. These facilities do, however, require energy to operate, have associated air pollutants, and may be difficult to site and build. While most Army installations do not have the investment resources or space to host a WTE plant, many privately-owned and municipal facilities are being constructed in the U.S. as a way to save landfill space and manage growing waste streams.

Disposal

Disposal is the final step and last resort after all waste reduction and transformation strategies have been fully explored. Traditional disposal methods include incineration (without energy recovery) and landfilling. The benefits of local alternatives must be weighed, factoring in the transportation costs and tipping fees associated with these facilities. Today's modern municipal solid waste landfills (MSWLFs) require protective measures and engineered solutions to protect the environment, such as location restrictions, composite liners, leachate collection and removal systems, and groundwater monitoring. Many new MSWLFs collect potentially harmful landfill gas (methane) and convert it into energy, making this a better alternative than landfills that emit methane into the atmosphere.

In 2011, the U.S. disposed of less than 54 percent of municipal solid waste in landfills, and it has been decreasing. The number of landfills in the U.S. has been steadily decreasing also, although the average landfill size has increased. Due to the regulatory requirements, siting restrictions, and public opinion, it is becoming more difficult to open new MSWLFs.

Decision-makers should communicate with local waste authorities and planners on waste disposal options and participate in the planning process.

APPENDIX C
RELEVANT SOLID WASTE REGULATIONS AND POLICIES

Document Citation and Location	Content
Federal Regulations	
Public Law 94-580, Resource Conservation and Recovery Act, 21 October 1976 http://ecfr.gpoaccess.gov	RCRA established standards and guidelines for the management of hazardous and nonhazardous solid wastes. RCRA was promulgated to encourage waste minimization through source reduction and use of nonhazardous substances, recycling, affirmative procurement, and conversion of waste-to-energy. RCRA also established the legislative language governing solid and hazardous waste storage, transportation, and disposal. RCRA Section 6002 requires the Federal Government to promote standards and practices for the procurement of products made from recycled materials. RCRA regulations are contained in Title 40, Code of Federal Regulations (CFR), Parts 239 to 282. RCRA Subtitle C (40 CFR 260-279) contains the hazardous waste regulations, and RCRA Subtitle D (40 CFR 239-259) contains the regulations for solid waste. Some significant sections of Subtitle D are summarized below. Part 243 (Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste). Part 243 establishes requirements and recommended practices for the storage, collection, and management of solid waste and for the operation of vehicles used in collection, transport, and handling of waste. Part 246 (Source Separation for Materials Recovery Guidance). Part 246 contains recycling requirements for the recovery of paper, corrugated containers, and other consumer goods. Part 247 (Guidelines for the Procurement of Products that Contain Recycled Material). Part 247 contains requirements regarding “buy recycled” practices that will stimulate the recovered materials market.

Public Law 101-508, Pollution Prevention Act of 1990, 5 November 1990. http://www.epa.gov/p2/pubs/p2policy/act1990.htm	The Pollution Prevention Act established a national policy to prevent or reduce waste generation through reduction, reuse, recycling, and treatment. The act established the P2 hierarchy, which is the cornerstone of integrated solid waste management.
32 Code of Federal Regulations (CFR) 172 – Disposition of Proceeds from DOD Sales of Surplus Personal Property https://www.gpo.gov/fdsys/granule/CFR-2011-title32-vol1/CFR-2011-title32-vol1-part172	Title 32 (National Defense) of the CFR contains DoD contracting rules, to include requirements for the disposition of proceeds from the sale of recyclables at DoD facilities. This regulation requires the establishment of QRPs for the disposal of surplus personal property sold as recyclables. It defines recyclable materials as those that "would otherwise be sold as scrap or discarded as waste, but are capable of being reused after undergoing some type of physical or chemical processing." Part 172 also lists materials that are not considered QRP-eligible, such as precious metal-bearing scrap; unopened containers; vehicles; ships, planes or weapons that require demilitarization; scrap from industrial fund operations; and bones, fat and meat trimmings generated by commissaries.
Title 10 U.S. Code (USC) 2577, Military Construction and Codification Act http://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title10-section2577&num=0&edition=prelim	The *Military Construction and Codification Act* (10 USC 2577) contains the requirements for managing QRP accounts and disbursing funds received for the sale of recyclables. It establishes a suspense account that captures money paid to the government from private entities, and does not expire over fiscal years. Under this Act, withdrawals from the account may be made under specific circumstances and according to this hierarchy: • Funds must be used to cover the costs of the QRP (including operations, maintenance, overhead, equipment, staffing; • *Up to 50 percent of any remaining balance* may be used to pay for certain other environmental programs (pollution abatement, energy conservation, and occupational safety and health activities); and • The remaining balance may be used for any morale or welfare activity.

Executive Orders	
EO 13693, *Planning for Federal Sustainability in the Next Decade*, 19 March 2015. http://www.gpo.gov/fdsys/pkg/FR-2015-03-25/pdf/2015-07016.pdf	EO 13693 expands and updates Federal environmental performance goals with a clear overarching objective of reducing greenhouse gas emissions across Federal operations and supply chains. This EO promotes sustainable acquisition and procurement by ensuring that environmental performance and sustainability factors are included to the maximum extent practicable for all applicable procurements in the planning, award, and execution phases of the acquisition. The environmental performance and sustainability factors include mandatory preference program requirements (recycled content, biobased, water-efficient, and energy-efficient products such as FEMP-designated and Energy Star products), and sustainable products and services identified by EPA (including alternatives to ozone-depleting substances, products identified by WaterSense, Safer Choice labeled products, and fuel-efficient products and services that are SmartWay Transport partners and products). The EO also requires the purchase of environmentally preferable products not identified above that meet or exceed EPA specifications or standards, or meet voluntary consensus standards performance criteria. The EO introduces a specific goal of meeting USDA BioPreferred requirements for 95% of procurements. This EO also requires Federal agencies to divert at least 50% of non-hazardous solid waste and to pursue opportunities for net-zero waste or other additional diversion opportunities.
Virginia Regulations	
Virginia Administrative Code (VAC), Title 9, Environment, Chapter 81, Solid Waste Management Regulations.	Virginia's Solid Waste Management Regulations establish standards and procedures pertaining to the management of solid wastes by providing the requirements for siting, design, construction, operation, maintenance, closure, and post closure care of solid waste management facilities in the Commonwealth in order to protect the public health,

http://lis.virginia.gov/000/lst/h2525896.HTM	public safety the environment, and our natural resources. These regulations also contain the permit by rule requirements for composting facilities.
Local Regulations	
Fairfax County Code of Ordinances, Chapter 109.11 (Solid Waste Code) http://www.fairfaxcounty.gov/dpwes/recycling/chpt109-swm.pdf	The Fairfax County Solid Waste Code addresses solid waste and recycling. Included in this chapter are requirements for non-residential facilities, which include the following: • Source separate cardboard and mixed paper. • Refuse collection containers with a capacity of 2 cubic yards or more must be accompanied with one or more recycling containers with volume equal to are greater than 25 percent of the refuse container. • Collection containers must be clearly labeled with regards to what materials are accepted for recycling. • Report waste generation and recycling data to the County of an annual basis (only if the County specifically requests the information). This chapter also specifically addresses C&D waste and mandates that: • C&D contractors should must source separate and recycle cardboard. • C&D debris cannot be collect in the same container with municipal solid waste or recyclables.
Department of Defense Policies	
Department of Defense Instruction 4715.4, Pollution Prevention, 18 June 1996.	DOD Instruction 4715.4 establishes the DOD requirement for installation QRPs, develops an accounting and control system for recycling programs, obligates contractors to participate in installation recycling programs, authorizes direct

http://www.dtic.mil/whs/directives/corres/ pdf/471504p.pdf	sales of recyclables, and calls for green procurement.
Memorandum, Assistant Deputy Under Secretary of Defense (Environment), 22 April 2003, subject: Qualified Recycling Program Guidance.	This memorandum supplements DoD Instruction 4715.4 and gives direction on conducting and reconciling sales and financial records, using net proceeds from the sale of recyclables, handling costs associated with recycling programs, and considering outsourcing opportunities.
Memorandum, Acting Deputy Under Secretary of Defense (Installations and Environment), 1 February 2008, subject: DOD Integrated (Non-Hazardous) Solid Waste Management Policy https://www.fbo.gov/download/e6c/e6c08a02d788a52aa92cd5645e0b7cd7/DoD_ISWM_Policy,_dated_1 Feb_08.pdf	This memorandum implements the solid waste and recycling requirements of EO 13423 by requiring all facilities to maintain waste prevention and recycling programs in the most cost-effective manner possible and setting solid waste diversion goals. The diversion goal for nonhazardous solid waste without C&D waste is 40 percent and the goal for C&D waste is 50 percent. The memorandum states that these goals should be achieved by 2010. The memorandum also includes some guidelines for implementing integrated solid waste management. These guidelines recommend an initial solid waste characterization study to define the basis for diversion goals and an annual review of the status of solid waste generation from all sources. The guidelines also state that complying with green procurement practices will have a positive effect on source reduction.
Army Requirements and Policies	
Qualified Recycling Handbook, Assistant Chief of Staff for Installation Management, 2010. https://acc.dau.mil/CommunityBrowser.aspx?id=706168&lang=en-US	The Army *Qualified Recycling Program Handbook* provides information on recycling and startup and operation of a QRP in accordance with the Military Construction Codification Act, DoD Instruction 4715.4, and Army policies. It provides details on QRP operations in addition to responsibilities of installation personnel.

Memorandum, Assistant Chief of Staff for Installation Management, 6 February 2006, subject: Sustainable Management of Waste in Military Construction, Renovation, and Demolition Activities. http://www.sustainability.army.mil/resources/libdocs_deconstruction/CD_memo_06_Feb_06.pdf	The memorandum requires all military construction, renovation, and demolition projects to divert a minimum of 50 percent of C&D waste by weight from landfill disposal and requires contract specifications to include submission of a contractor's C&D waste management plan. (Note that the DoD Strategic Sustainability Performance Plan increased the diversion goal for C&D waste from DoD facilities to 60 percent by the end of FY 2015.)
Army Regulation 200-1, Environmental Protection and Enhancement, Chapter 10-2, Solid Waste, 13 December 2007. http://armypubs.army.mil/epubs/pdf/R200_1.pdf	AR 200-1 issues the Army's policy on solid waste management, to include emphasis on ISWM, pollution prevention, and individual participation to achieve compliance; minimization of solid waste generation and maximization of recovery, recycling, and re-use; use of sound design of solid waste facilities to prevent releases to the environment; and authorizes direct sale of recyclables.
Army Regulation 420-1, Army Facilities Management, Chapter 23, Utility Services, Section III, 12 February 2008. http://armypubs.army.mil/epubs/pdf/r420_1.pdf	AR 420-1 requires implementation of integrated solid waste management, development of the ISWMP, implementation of source reduction programs for the solid waste stream, implementation of a QRP when cost effective, a 50 percent diversion of C&D waste from disposal, and a green waste management program. (Note that the DoD Strategic Sustainability Performance Plan increased the diversion goal for C&D waste from DoD facilities to 60 percent by the end of FY 2015.)

APPENDIX D
HISTORICAL WASTE CHARACTERIZATION DATA

Waste Category	Percent by Weight (%)		
	Winter	Spring	Combined
Paper			
Newsprint	4.0	4.5	4.3
High grade paper	5.7	7.6	6.7
Magazines	3.1	3.1	3.1
Corrugated/kraft	10.5	7.7	9.0
Other	22.8	25.2	24.0
Food waste	14.6	15.9	15.3
Diapers	4.0	2.2	3.1
Grass clippings	0.1	3.4	1.8
Other yard waste	0.2	2.1	1.2
Plastic			
PET bottles	0.2	0.2	0.2
HDPE bottles	0.5	0.4	0.4
Polystyrene	1.3	1.8	1.6
Polyethylene film	1.9	1.6	1.7
Other plastic	7.0	6.3	6.6
Textile/leather/plastic	3.5	1.3	2.3
Wood	3.8	2.3	3.0
Other organics	0.8	1.0	0.9
Metals			
Tin and bi-metal cans	1.0	1.1	1.1
Other ferrous metals	1.1	1.0	1.1
Aluminum cans	1.1	0.6	0.8
Other aluminum	0.4	0.4	0.4
Other nonferrous metals	2.0	0.8	1.4
Glass containers	4.2	3.9	4.0
Other inorganics	2.4	1.4	1.9
Household batteries	0.1	0.04	0.1
Electrical devices	1.1	0.5	0.8
Household hazardous waste	0.03	0.1	0.1
Fines (e.g., dirt, very small debris not elsewhere classified)	2.8	3.5	3.2
TOTAL	100	100	100

APPENDIX E
FORT BELVOIR RECYCLING POLICY

APPENDIX F
FORT BELVOR QRP SOP

Contents

STANDARD OPERATING PROCEDURES
FORT BELVOIR QUALIFIED RECYCLING PROGRAM
(REV. JANUARY 2016)

1.0 RECYCLING PROGRAM HISTORY AND OVERVIEW.

Fort Belvoir began its formal recycling program in 1978, before recycling programs were commonplace, with the collection of corrugated cardboard at its recycling center. In 1982, Fort Belvoir implemented a mandatory curbside collection program for newspaper, which was expanded in 1990 to include glass, aluminum, #1 and #2 plastics and magazines. In the early 1990s, Fort Belvoir also began collecting white paper, newspaper, aluminum and bi-metal cans from office buildings post-wide. Fort Belvoir was among the first in the region to collect and recycle plastics. In 1997, Fort Belvoir renovated the Recycling Center and initiated its Direct Sales Program.

Today, Fort Belvoir has a multi-faceted recycling and waste minimization program that includes office recycling; a drop-off area accessible 24 hours a day, and yard waste composting. White paper; mixed paper; newspaper; aluminum, steel, and bi-metal cans; plastic bottles and containers; glass; and toner cartridges are picked up in more than 200 administrative and industrial buildings installation-wide. Additionally, the Recycling Center is a drop-off center for other commodities such as cardboard, scrap metal, lead-acid batteries, and used motor oil.

As of November 2015, Fort Belvoir has recycling collection points in approximately 215 non-residential buildings, five food service facilities, and ten recreational facilities. Fort Belvoir achieved a 48% diversion rate from the waste stream in FY 05. Annual revenue from direct sales is estimated at $300,000 and annual cost avoidance is estimated at $646,010. Revenue is accrued through direct sales of collected recyclable commodities including: corrugated cardboard, newspaper, white paper, mixed paper, aluminum and bi-metal cans, plastic bottles, and toner cartridges. Glass is also collected and recycled but there is no direct sales agreement in place for this commodity because there is no demand for it

2.0 QUALIFIED RECYCLING PROGRAM. Fort Belvoir's Recycling Program is a qualified recycling program per Army Regulation 200-49 and Executive Order 13101. Corresponding laws governing such a program are Title 10 Section 2577 (Disposal of Recyclable Materials) of the United States Code and Title 32 Part 172 (Disposition of Proceeds from DoD Sales of Surplus Personal Property) of the US Code of Federal Regulations.

Fort Belvoir has a policy letter, which dictates that recycling is mandatory for military, civilian, and tenant organizations on post. This letter is renewed annually and is distribted to all organizations and tenants of Fort Belvoir.

3.0 MANAGEMENT Technical support for the Installation's recycling operation is administered by the Directorate of Public Works, Environmental and Natural Resource

Division. Technical support is provided to four major elements of the recycling program. These elements include: Recycling Operations, Recycling Database Maintenance, Recycling Inventory, Recycling Operations, and Outreach and Education.

3.1 Contract Manager. The QRP Manager serves as the COR for the solid waste and recycling contract and ensures that the contractor fulfils all obligations set forth in the contract. The COR also serves as the customer point of contact for questions or complaints regarding solid waste and recycling services.

3.2 Database Maintenance. Database maintenance includes tracking recycling generation rates and entering them into the current fiscal year database, proceeds from sales of recyclables, and providing monthly Recycling Program Progress Reports to the Environmental and Natural Resource Division.

3.3 Recycling Operations. Recycling Operations include preparing scopes of work and other contract documents, processing invoices and work orders, and preparing cost estimates for recycling program operations. This task also entails researching opportunities to expand the Installation recycling program to new markets, maintaining a written log of incoming calls, and developing the Fort Belvoir Recycling Center Standard Operating Procedure. The QRP Manager also maintains the inventory of recycling containers (i.e., desktop containers and toters) that are stored and distributed from the Recycling Center.

3.4 Outreach and Education. Outreach and Education includes attending the monthly Newcomers' Briefing and updating outreach materials as appropriate. Additionally, the recycling coordinator organizes and executes two recycling educational programs/projects a year and produces a semi-annual Recycling Newsletter. A semi-annual newsletter is produced and distributed electronically via email and notice placed in the *Belvoir Eagle*. Also, the Recycling Coordinator attends monthly Newcomers' Briefings at Sosa Community Center in order to educate the Fort Belvoir workforce regarding the installation recycling policy and Fort Belvoir residents about the Recycling Center.

4.0 POST-WIDE PICK UP. This task is performed under contract and the following is extracted from the collection contract to describe the tasks necessary to provide post-wide pick up services.

The contractor provides all necessary personnel, materials, and equipment for collection of recyclable material from non-residential buildings, recreational facilities, and food service facilities on Fort Belvoir. All structures are located on Fort Belvoir, Humphrey's Engineer Center, or Davison Army Airfield. The Recycling Coordinator provides the contractor with an up to date pick up schedule each month that contains central storage/collection points within the specified buildings.

The contractor performs Post-Wide Pick Up on a daily basis according to this schedule and records volume of each category of recyclable collected (white paper, mixed paper, newspaper, shredded paper, aluminum/bi-metal cans, plastic bottles, glass, and cardboard). The contractor collects recyclables also on an incidental basis for buildings that have requested such. All pickups occur between 0700 and 1700 hours Monday through Friday,

excepting Government holidays. On such weeks where a Government holiday occurs, the contractor must complete all normal pickups.

The Recycling Coordinator will notify the contractor of missed pickups by phone and email to ensure that collection occurs at missed pickup locations. Missed pickups must be addressed and completed within two (2) days of notification by the Recycling Coordinator. If this is not completed, the Contractor is subject to the provisions of the Technical Exhibit in the contract.

Once the contractor has removed recyclable materials from collection points listed in the schedule, materials are transported to the Recycling Center (Building 1089) and placed in the proper commodity storage area/bin/container.

The contractor must operate vehicles according to all relevant state, Army, and Fort Belvoir regulations. The vehicles must be registered with the Provost Marshall's Office and provide appropriate documentation. The contractor must comply with US Army Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, the Occupational Safety and Health Act (OSHA), and all other relevant manuals/regulations stated within the Contract.

5.0 OPERATION OF THE RECYCLING CENTER. These functions are performed by the Base Operations Contractor and the following is taken from the contract in order to describe the requirements for operating the Recycling Center.

The contractor operates the Recycling Center in order to encourage and facilitate the recycling of all recyclable paper, cardboard, glass, metal, plastic, etc. The contractor provides all supplies and services to the Recycling Center. Work includes equipment maintenance, inspecting and separating recyclable materials, baling commodities, operating the flattener/blower, collecting and unloading collection containers, loading storage trailers, and weekly operator clean-up of the Recycling Center building and surrounding grounds. This section can be referenced in the Base Operations Contract in C.5.14.1-2.

5.1 Hours and Personnel. The contractor shall operate the Fort Belvoir Recycling Center located at Building 1089 and collect and process materials. The contractor processes recyclable materials received from Government sites on and off Fort Belvoir.

5.2 Personnel. A minimum of two qualified personnel are be provided on site for Recycling Center operations Monday through Friday 0730 to 1600. In addition, the contractor operates the truck scales. Personnel assigned for duty at the Fort Belvoir Recycling Center shall be trained in operation, daily maintenance and use of all equipment, including the use of Government-furnished truck scales. The contractor provides Government-approved uniforms for all personnel. The uniforms consist of, as a minimum, shirt, pants, shoes, and nametags. The wording on the shirt shall be "Fort Belvoir Recycling Program."

5.3 Equipment, Supplies and Property.

5.3.1 Contractor Furnished The Recycling Center Contractor shall furnish and maintain the following items:

- Multipurpose baler
- Bobcat
- Forklift (if the Bobcat does not have sufficient accessories for lifting)
- Metal can separator/aluminum can flattener blower
- Truck capable of picking up and dropping off 20 and 30-cubic yard roll-off containers
- Vertical loading packer truck specifically designed for collecting recycled cardboard
- Wire required for baling newspaper, high-grade white paper, plastic, and cardboard
- All supplies and equipment necessary to maintain and operate the Recycling Center and collect and process corrugated cardboard, newspaper, and high grade white paper and other commodities in a clean, efficient, professional manner

All items supplied by contractor shall be kept in excellent working order. Contractor equipment down for maintenance or repairs exceeding one week shall be replaced by the contractor with rental equipment until contractor-owned equipment is functional. If such equipment failure causes operation of Recycling Center to cease, contractor shall transport unprocessed material to a Government-approved vendor at no cost to the Government. The contractor shall also bear the costs incurred by down time including, but not limited to, loss of revenue, disposal costs, and increased transportation costs.

Vehicles and equipment must meet or exceed accepted industry standards for recycling operation and must enhance recycling image to the public or they will be rejected by the Government. The contractor shall provide the Government with the make, model, and date of manufacture of all contractor-furnished equipment.

5.3.2 Government Furnished. The Government furnishes roll-off recycle containers and trailers at the Recycling Center for the transfer of collected material from the Installation by separate Government contracts. The government furnishes tipits, toters, and carts for use by volunteers in delivering recyclables to the recycling center. Any costs incurred due to damage to the Government-furnished property caused by the operators are the sole responsibility of the contractor.

5.4 Recycling Center Appearance. The contractor takes all necessary measures to ensure that the recycling center equipment, building, and grounds shall be maintained at all times to present a clean, orderly, and safe environment for workers and the public.

5.5 Policing of the Grounds. The contractor cleans up all spills involving any commodity or trash for any tipit, trash dumpster, trash compactor, tractor-trailer, or roll-off located at the Recycling Center. This includes the building, concrete pads, two loading docks, roll-off areas, tipit areas, and landscape areas. The contractor monitors the grassy areas north and west of the Recycling Center for wind blown debris from the Recycling

Center. The contractor inspects the grounds throughout the day, and again at 1500 and ascertains that the grounds are clean prior to closing the Recycling Center.

The contractor rinses the front and rear concrete pad areas once a week with a high pressure hose. All oil, paper, and cardboard debris shall be removed and properly disposed. The contractor dry sweeps the paved areas at the Recycling Center once a week to remove all broken glass, leaves, paper, and all other trash. In summer months, tipits are rinsed weekly, to preclude bees and other insects around volunteer drop-off areas from becoming a deterrent to the public.

5.6 Processing of Recyclable Materials

5.6.1 Cardboard Processing. The contractor collects and receives loads of corrugated cardboard from the Commissary, the various sites on Fort Belvoir, and other military facilities on and off Fort Belvoir. The contractor instructs corrugated cardboard generators where to place the cardboard.

The contractor inspects the cardboard and discards all contaminants. Contaminants include all waxed cardboard and wet or soiled corrugated cardboard. The Recycling Center operator(s) notify the COR telephonically within 2 hours, when food waste is commingled with the cardboard.

The contractor bales cardboard such that the minimum cardboard bale size shall be 60”x 48”x36” and weigh a minimum of 900lbs. Baled cardboard are loaded into the Government-furnished trailer with a forklift. The contractor calls the Recycling Coordinator when the cardboard trailer is ¾ full, for switch out.

The contractor keeps an accurate data sheet on loads of cardboard received from the generating facility and number of bales produced each day. The contractor provides the report to the COR with the previous month’s data sheet within the first five working days of each successive month.

5.6.2 Newspaper Processing. The contractor collects newspapers in the government-furnished containers located at the Recycling Center.

The contractor dumps the full roll-offs of newspaper on the floor of the recycling center and prepare the newspaper for baling. The contractor inspects the newspaper and discards all contaminants. The contractor is responsible for keeping all collected newspapers dry.

The contractor bales the newspaper ensuring that the minimum bale size is 60”x 48”x36” and weighs a minimum of 800lbs. The contractor places the baled newspapers onto the appropriate Government-furnished trailer with a forklift. The contractor calls the Recycling Coordinator when the newspaper trailer is ¾ full for switch out.

The contractor keeps an accurate data sheet on bales of newspaper produced each day. The contractor provides the report to the COR with the previous month’s data sheet within the first five working days of each successive month.

5.6.3 Plastics Processing. The contractor ensures that PET-1 and HDPE-2 are separated from other mixed plastics (#3 - #7). PET-1 and HDPE-2 plastics are sold; whereas #3 through #7 are recycled but not proceeds are received. The contractor empties the tipit into the appropriate roll-off when ¾ full. The contractor calls the Recycling Coordinator when the plastics trailer is ¾ full for switch out. The Government may require baling plastics in the future and the baler may need to be modified for this purpose.

5.6.4 Glass Processing. The contractor removes all contaminants from the volunteer drop-off tipits and roll-off containers. The contractor places green, clear, and brown glass in the appropriate tipit. The contractor empties the tipit into the appropriate roll-off with ¾ full. The contractor calls the Recycling Coordinator when the glass trailers are ¾ full for switch out.

5.6.5 Aluminum/bi-metal Can Processing. The contractor removes all contaminants from the volunteer drop-off tipits and roll-off containers. The contractor places aluminum/bi-metal cans in the appropriate tipit.

The contractor separates the aluminum cans from the bi-metal cans by use of the contractor-furnished aluminum/bi-metal can separator/flattener blower. The aluminum cans are then further processed by flattening and blowing into a Government-furnished trailer. Metal cans are placed in the appropriate trailer. The contractor calls the Recycling Coordinator when the aluminum trailer is ¾ full for switch out.

5.6.6 High Grade Office Paper and Mixed Waste Paper Processing. Paper toters are delivered to the recycling center for processing. Toters are not left outside the recycling building after business hours.

The contractor bales all incoming high-grade office paper and mixed waste paper and place on the Government-furnished trailer. The bales are a minimum of 60”x48”x36” and weigh no less than 800lbs. The contractor places the baled paper onto the appropriate Government-furnished trailer with a forklift. The contractor calls the Recycling Coordinator with the receptacles are full for switch out.

5.6.7 Scrap Metal. The contractor empties tipits of scrap metal into the appropriate roll-off when the tipit is ¾ full. The contractor notifies the Recycling Coordinator when the roll-off is full for switch out.

5.6.8 Oil Recycling. The contractor opens the fill port at 0700 for volunteer use and locks the fill port prior to closing the recycling center at 1600. The contractor empties containers left by volunteers into the Government provided oil recycling tank. The contractor disposes of the volunteer recycling containers in the municipal solid waste six-cubic-yard dumpster. The contractors monitors the tank level and contact the Recycling Coordinator when the tank is ¾ full for removal.

5.6.9 Lead Acid Batteries. The contractor accepts and store lead acid batteries that are dropped off at the Recycling Center. The contractor segregates broken lead acid batteries and other types of batteries for transport to the Hazardous Waste Storage

Building by the Post's Hazardous Waste Manager. Intact lead acid batteries suitable for recycling are stored on government provided spill pallets. When the storage pallets become full, the contractor notifies the COR and prepare lead acid batteries for shipment by palletizing and banding according to the COR's direction.

5.6.10 Toner Cartridges. The contractor accepts and provides storage for toner cartridges suitable for recycling through a separate contract. Suitable storage may include cubic card boxes, pallets, or any method approved by the COR.

5.6.11 Household Hazardous Waste (HHW). The Recycling Center does not accept household hazardous waste. The contractor coordinates with the operator of the Hazardous Waste Storage Building to pick up materials on an as-needed basis.

5.6.12 Volunteer Drop-offs.

The contractor empties volunteer tipits into the roll-offs provided by the Government in the rear of the Recycling Center when they are ¾ full and every Friday at 1500 and every Monday by 0830.

The contractor assists, answers questions, and distributes literature to the volunteers dropping off commodities. The Recycling Coordinator provides training in the type of commodities (recyclables) the Recycling Center accepts and literature to be distributed.

The contractor empties plastic bags of telephone books, shredded paper, or loose paper delivered to the Recycling Center and place in the appropriate Government-furnished containers provided. Palletized mixed waste paper are stored inside the Recycling Center until pick-up of waste mixed paper by the recycling vendor. The contractor loads all receptacles and/or pallets of mixed waste paper into the separate Government-contracted recycling vendor's vehicle. The contractor notifies the Recycling Coordinator when the receptacles are full for switch out.

The contractor stores the Government-furnished receptacles inside the Recycling Center each night. The contractor places one receptacle outside, each morning for volunteer mixed waste paper generators. In the event of inclement weather, the receptacles shall remain inside the Recycling Center.

The contractor places shredded paper along with mixed scrap paper in the receptacles. Shredded white paper is included with high-grade white office paper and shredded mixed paper can be placed with mixed paper.

5.7 Record Keeping and Deliverables. The contractor will provide the following pertinent solid waste and recycling records to the QRP Manager on a monthly basis:

- Solid Waste Generation Monthly Report.
- Recycling Center Monthly Report.
- Composting Yard Monthly Report.
- 21st Street Recycling Report.

- Office Waste Recycling Report.

In addition, the contractor must notify the COR, if for any reasons, equipment at the Recycling Center fails. The contractor must also submit an Equipment Failure Report. This report will record all down time of the Recycling Center due to equipment failure. Downtime must not exceed five percent of the scheduled monthly operating hours.

6.0 DIRECT SALES. All recyclable commodities removed from the Recycling Center are sold through direct sales agreements as authorized by the QRP. Invitations for bids are sent to any qualified company who expresses interest in bidding on a particular commodity. All market contacts are used to identify these qualified companies who wish to purchase commodities. The Chief of ENRD is certified to oversee and amend these direct sales and spot bids.

Various stipulations are included in all direct sales agreements including the requirement for commodities to be sold and used only as scrap. Also, specific details regarding each solicitation concerning inspection of materials, allowable contamination, transportation requirements, etc. are included in each bid package and must be accepted by the bidders as a condition of a winning bid.

6.1 White and Mixed Paper. Office white and mixed paper are combined into a single direct sales agreement. Fort Belvoir generates approximately 25 tons of white paper a month and 10 tons of mixed paper a month (+ / - 30%). White paper is collected by the Post Wide Pick-Up contractor as well as at the Recycling Center and consolidated into large Government-provided toters. The direct sales contractor places a bid on this commodity based on a percentage of the fair market price per ton, defined as high price published for sorted white ledger (Grade 40) and for mixed paper (Grade 1) in the industry journal Official Board Markets for the Southeast region, on the first publication date of the month in which the paper is picked up.

White paper includes computer paper, laser printer, and copier paper, stationary, shredded paper, and white ledger (post consumer) with a minimal amount of foreign material including staples, paper clips and rubber bands. Impurities are allowed, up to 5%. Mixed paper includes magazines, books, telephone books, colored paper, manuals, mail envelopes, file folders, and records, etc. with a minimal amount of foreign material including adhesives, staples, paper clips, and rubber bands. Material may be loose or boxed and palletized. Impurities are allowable up to 10%.

The direct sales contractor provides all equipment necessary to load and remove material. Government will provide access to loading dock or facility as needed. Weights are taken on the truck scales located at the Recycling Center and printed weight tickets provided. In the event that the scales are not operational, contractor is required to provide certified weight tickets for shipments including gross, net, and tare weights. White paper material is collected and stored in 95-gallon wheeled trash cans and stored indoors at Building 1089. Mixed paper is collected and stored indoors at Building 1089. Material will be stored in contractor-provided containers which are exchanged upon each pick up

date. Palletized, shrink-wrapped material is also stored inside the building. Pallet weight is included in weight and price of sale.

This section may be referenced in Commodity Contract FBRP 05-001 White/Mixed Paper.

6.1.1 Use of Storage Containers. Storage containers (95-gallon wheeled trash cans, commonly referred to as Toters) provided by the Government used in the pick up of recyclable materials remain the property of the Recycling Program (Government) and are not to be removed from the premises unless an equivalent replacement is provided. If a one-for-one toter switch out method is used for picking up material, the contractor cannot allow toters owned by Fort Belvoir to be used by any other customer. The contractor must only replace full toters at the Recycling Center with empty toters owned by either Fort Belvoir or the contractor. The contractor agrees, upon termination of the contract, that all toters owned by Fort Belvoir will be returned to Fort Belvoir within 30 days in exchange for any toters belonging to the contractor. Fort Belvoir agrees to settle, on a case-by-case basis, the cost to fix or replace containers damaged during any phase of collection, storage, or transportation at Fort Belvoir, the contractor's facility, or en-route to or from either locations. The contractor agrees to factor in the weight of the empty totes, when necessary, to gain an accurate weight of the product being removed. For collection of mixed paper, contractor may provide alternative storage containers (i.e. postal carts) with the approval of the Recycling Program Coordinator.

6.1.2 Deliveries and Performance. Material will be loaded by the contractor at contractor expense. Purchaser will be notified by the Contracting Officer or the Recycling Coordinator when removal is required, unless both parties have agreed upon a schedule. Property must be removed within two (2) working days of verbal or written notification. Delays in removal of material that exceed four (4) hours from the requested removal date and time shall be noted with written deficiency reports, and repeated occurrences of delays shall be grounds for termination of the direct sales agreement. Upon award, pick up of the white paper shall commence on a twice per week schedule established by the Contracting Officer and/or the Recycling Program Coordinator and the contractor. Changes to the schedule may only be made with the written agreement of the Recycling Program Coordinator and the contractor.

6.2 Corrugated Cardboard. Fort Belvoir generates approximately 150 tons of old corrugated containers (OCC) per month (+ / - 25%). Cardboard is collected by a separate contractor from both compactors and dumpsters and brought to the Recycling Center for processing and shipment. The price bid upon is expressed as a percentage of the fair market price per ton, defined as that price published for OCC (Grade 11) in the industry journal Official Board Markets for the Southeast region, on the first publication date of the month in which the paper is picked up. The price paid for term contracts is adjusted on a monthly basis from the first day of the month publication of the journal from which prices are set.

Grade 11 OCC, baled includes cardboard and paperboard collected from the Post Commissary, PX, Class VI store, customer drop-off, moving/packing containers, and

cardboard dumpsters with a minimal amount of foreign material including waxed cardboard, other paper, and plastic. Impurities are acceptable up to 5% of each load.

The contractor must provide a road-worthy covered trailer in which to load material. Contractor provides an empty trailer at the same time the full trailer is picked up. Government provides access to loading dock or facility as needed.

Weights are taken on the truck scales located at the Recycling Center and printed weight tickets provided. In the event these scales are not operational, contractor must provide certified weight tickets for shipments including gross, net, and tare weights.

Material is collected post-wide and baled at the Recycling Center. Approximate bale size is 60”x48”x36” and average weight is 1000 lbs.

6.2.1 Use of Storage Containers. Storage containers provided by the Recycling Program used in the pick-up of recyclable materials shall remain the property of the Recycling Program and shall not be removed from the premises. The contractor will be responsible for payment to the Recycling Program for containers that are damaged during collection of the material.

6.2.2 Deliveries and Performance. Material is loaded by the Government at Government expense. The Contracting Officer or the Recycling Coordinator will notify the purchaser when removal is required. Property must be removed within two (2) working days of verbal or written notification.

6.3 Newspaper. Fort Belvoir generates approximately 80 tons of newspaper a year (+ / - 35%). Newspaper is collected through office recycling pick up and at the Recycling Center in a large container and is later dumped for staging and baling. The bid price is based upon a percentage of the fair market price per ton, defined as the high price published for grade 8 news in the industry journal Official Board Markets for the Southeast region on the first publication date of the month in which the paper is picked up. Material includes newspaper including packing paper and glossy inserts. Bales are approximately 60”x48”x36” and weigh a minimum of 800 lbs. Occasional impurities are allowable up to 10% of each tractor trailer load.

The contractor provides a covered trailer to load and remove material. The contractor removes full trailer and replaces with an empty one within 48 hours of notification. The Government provides access to loading dock and facility as needed. Weights are taken on the truck scales located at the Recycling Center and printed weight tickets provided. In the event these scales are not operational, contractor must provide certified weight tickets for shipments including gross, net, and tare weights. Material is collected in 20- and 30-cubic-yard roll-off containers and stored as Building 1089.

6.3.1 Deliveries and Performance. Material is picked up by the contractor at the contractor’s expense. Pick-ups are scheduled during operating hours of the Recycling Center (0700-1530).

6.4 Toner Cartridges. Bid prices are expressed as price per pound. Fort Belvoir generates approximately 4000 lbs of toner cartridges per year and quantities available to the contractor may vary by 35% over or under the estimated amount specified in the bid.

Materials include used toner cartridges, various manufacturers, most stored in original cardboard boxes, which are included in weight and sale. Manufactures include Hewlett Packard, Canon, Xerox, Lexmark, and others. Cartridges may be loose, boxed, or shrink-wrapped and stored on pallets, included in sale but not in weight. Estimated pallet weight of 50 lbs per pallet is deducted at time of delivery. Impurities acceptable up to 15% of each load. Contractor may, at time of material pickup, sort inventory of cartridges and dispose non-recyclable cartridges in government refuse containers located on site at Fort Belvoir Recycling Center.

The contractor provides all equipment to load and remove material and the Government provides access to loading dock and facility as needed. Weights are taken on the truck scales located at the Recycling Center and printed weight tickets provided. In the event these scales are not operational, contractor must provide certified weight tickets for shipments including gross, net, and tare weights. Material is collected and stored indoors at Building 1089.

6.5 Glass.

Glass is collected in tipits at the Recycling Center and by office pick up contractor and are stored in open-top roll-off containers. These roll-off containers are transported to the Waste Management facility for recycling. Most of the glass collected consists of empty food and beverage containers. Fort Belvoir recycles approximately 2 tons of glass annually and does not generate any revenue from this commodity.

6.6 Steel/Bi-Metal Cans. Bi-metal cans are primarily steel cans separated from aluminum cans, which are sold separately. They are loose, not compacted or crushed.

The contractor, if outside the 25-mile delivery limit, provides all equipment to store and transport material. Government provides access to loading dock and facility as needed. Contractor removes all materials and replaces containers within 24 hours of telephonic notification. Government provides container and delivers commodity to contractor's facility within a 25-mile radius of Fort Belvoir.

6.7 Plastic Bottles. Plastics, #1 (PET) and #2 (HDPE), are sold loose. Other plastics (#3 - #7) are collected, recycled, but no proceeds are generated. Contamination is acceptable up to 20% of each load.

The contractor, if outside the 25-mile delivery limit, provides all equipment to store and transport material. Government provides access to loading dock and facility as needed. Contractor removes all materials and replaces containers within 24 hours of telephonic notification. Government provides container and delivers commodity to contractor's facility within a 25-mile radius of Fort Belvoir.

6.8 Aluminum Cans. The price paid is expressed as the fair marked price per pound, plus or minus the Purchaser's margin as bid below, defined as that price published for aluminum used beverage cans (UBCs) in the industry journal American Metal Market for the **Philadelphia** region on the date when the material is picked up. Fort Belvoir produces approximately 1200 lbs per month of UBCs with an allowable variance of 35%. Material includes used aluminum beverage cans, separated, crushed and blown into a trailer by the Government, using Government-provided equipment. Impurities allowable up to 5% of each load.

The contractor provides an enclosed trailer with an opening or door for the can blower and places it at the loading dock. Contractor removes the trailer as requested and returns it empty for re-use or delivers a similar one.

7.0 MISCELLANEOUS. Various other components make up the remainder of the Recycling Program at Fort Belvoir. These components are not directly managed or directed by the Recycling Coordinator but information is included in Solid Waste Annual Reports (SWARs) and therefore pertinent to the relative success of the Recycling Program.

7.1 SWARs. SWARs data is collected on a quarterly basis and entered into a web-based database. Currently, the Recycling Coordinator is responsible for this reporting. At the end of the fiscal year, once all data is entered into the database, the Environmental Compliance Director (Government employee) shall log into the database and submit the information for the Fiscal Year. This data is used to determine how much waste is generated, and diverted, from the solid waste stream on Post each quarter.

7.2 21st Street Collection Point. Bulk waste is collected at the 21st street facility and separated. The Base Operations Contractor manages this facility and subsequently sends solid waste to appropriate off-post facilities in order to dispose of the waste properly. All non-reusable, non-vegetative solid waste goes to this facility for processing before being removed from the Installation.

7.3 Scrap Metal. Scrap metal is transported off-post by Base Operations Contractor and sold to a Direct Sales Contractor. No weight ticket is required in current Base Operations Contract, but in future contracts, the Base Operations Contractor may be required to provide certified weight ticket from the Recycling Center truck scale. Scrap metal is collected in roll-off containers at the 21st Street facility, the Volunteer Recycling Center, and the R&D center.

7.4 Yard Waste Compost. Compost is created from collected leaves and wood chips from post maintenance activities by the Base Operations Contractor. This compost and mulch is used by the Base Operations Contractor in landscaping on Post (flower beds, tree rings, etc.). Data is collected by the Base Operations Contractor and submitted on a quarterly basis for SWARs which makes it allowable for inclusion in data collected to determine material diverted from the solid waste stream on Fort Belvoir.

7.5 Grass Clippings. The tonnage of mowed grass clippings left in place per year is included in SWARs as data to determine material diverted from the solid waste stream. This volume is based on a diversion rate of 5.55 tons of grass clippings per acre per year (which was determined by dividing the approximately 4,000 tons/year grass clippings left by the 720 acreage of grass originally mowed on Fort Belvoir before RCI/Pinnacle took over maintenance of residential areas in 2003). As of 2005, 520 acres of grass were mowed annually on Fort Belvoir and a total of 2,888.88 tons of grass clippings were left on the ground and thereby diverted from the solid waste stream (520acres x 5.55 tons/acre/year = 2,888.88 acres/year) which is 72.2% of the original tonnage diverted.

If, in the future, the Garrison includes mowing of Davison Airfield, this will add 112 acres to result in mowing 642 acres per year (88.3% of the original tonnage) and the tonnage will equal **3,532 tons** of grass clippings per year.

First week after end of quarter, request SWARs data from Dyncorp/CSC (Steve Davenport or Kelly Brown) and DLA (LeeAnn Bell).

Around the 3rd week after end of quarter, enter data into SWARweb:

Gather internal data:

- Recycling data (quarterly memorized report in QuickBooks)
- Compost data (Kevin)
- Charlie & Son invoices – always late
- Webb's invoices
- Any lead-acid battery or tire shipments

~ hit "Recycling Transactions" – list date as last day of quarter (i.e. – Q4 date is 9/30)

grass clippings – 3000 tons – listed at end of fiscal year

~ Program Costs

1. 1089 Operations = "Recycling Processing"
2. WM dumpster pickups = "Collection"
3. Compost Facility (~$100,000/year)
4. Webb's = "Recycling Transportation/Collection"
5. Charlie & Sons = "Transportation"

~ Disposal Transactions

I-95 incinerator/landfill – Main Post

(Dyncorp/WM data)

DC Transfer Station/landfill – DLA

Compost Facility – Main Post (Dyncorp)

When all data entered for Fiscal Year, inform Environmental Compliance Branch Chief and they will enter the site with their account information and submit the information.

PROCEDURES FOR WORKING WITH RECYCLING DATABASES

Entering Data into QuickBooks

Materials needed

- Monthly “Yellow Sheet” (OBM)
- Monthly weight tickets – from 1089
- Cash Vouchers/copies of checks/invoice summaries

****ENTER ONLY ONE MONTH AT A TIME (commodity prices change)****

1. Organize weight tickets as below
   - Cardboard
   - White Paper
   - Mixed Paper
   - Newspaper
   - Everything Else
2. Change Commodity Values
   - Go To “Items & Services”
   - Click on “Commodity”
   - Change Sales Information & Price and Calculate Price per pound
3. Enter Weight Tickets
   - Go To “Invoices”
   - Enter Information from weight ticket / job, etc.
   - Hit “next” to enter next weight ticket
4. Enter “Cash Collection Vouchers” into “Received Payments” section
   - Date = date on collection voucher
   - Check Number = voucher # (CYC-XX-XX)
   - Apply credits to outstanding invoices
   - For SCRAP METAL (Davis) and PLASTIC/GLASS invoices, the weights listed on the invoice summary (attached to check copy and collection voucher) must be entered since there are no weight tickets from 1089 for these items.

Monthly/Quarterly Sales Report

-For getting quantities of commodities for quarter

- Under “reports” select “sales”
- Click on “by item detail”
- Under “dates” select “Last Fiscal Quarter”
- Configure to fit onto pages for printout (landscape, font changes, etc. whatever works)
- Print report
- Separate monthly commodities with a pencil line
- Total quantities by hand/calculator per month
- Total quantities per quarter
- Total all materials for entire quarter and convert to TONS
- Get composting data for quarter from Kevin and add to recycle total…This is the amount of solid waste diverted and will be used for the IMAP slides.
- Use data for slides, SWARS, and whatever else.

VQM help

- Go To “Date Assigned” page on weekly VQM
- Sort by facility #
- Hide unnecessary columns
- View – Zoom to 100%
- Adjust calculated stats at the bottom of page if VQM has altered data
- Update monthly after every complete month

APPENDIX G
SOLID WASTE AND RECYCLING RESOURCES

1. Training Courses

The DoD Combined Services Solid Waste/Recycling Work Group sponsors a QRP Manager's Course at the U.S. Air Force Civil Engineer and Services School at the Air Force Institute of Technology (AFIT), at Wright-Patterson Air Force Base in Ohio. Information is available on the AFIT website at http://www.afit.edu/ENER/.

The U.S. Army Corps of Engineers (USACE) Learning Center (courses are listed in the course catalog called "The Purple Book" [http://ulc.usace.army.mil/downloads/purplebook2016.pdf) provides several courses to assist planners and engineers in meeting environmental requirements. Courses include:

- Sustainable Military Building Design and Construction
- Environmental Laws and Regulations
- Environmental Regulations Practical Applications

2. Conferences and Webinars

Solid waste management alternatives and new technologies are constantly evolving. Recommended conferences for current information are the National Recycling Coalition (NRC) regional conferences, the Solid Waste Association of North America (SWANA) annual conference (WasteCon), and the Waste Expo (www.wasteexpo.com).

The SWANA Training Center offers a variety of courses on solid waste management and recycling at https://swana.org/Education.aspx. The NRC also offers courses and webinars on waste reduction and recycling at http://nrcrecycles.org/get-involved#webinars.

3. Other Resources.

The Assistant Secretary of the Army for Installations, Energy and Environment maintains a web site (http://www.asaie.army.mil/Public/ES/netzero/index.html) and holds workshops on the subject of Net Zero. Major Commands host monthly collaboration calls on Net Zero in which the designated Army Net Zero pilot installations provide updates on their progress in achieving Net Zero goals.

Waste360 provides information and education to professionals in the solid waste field and provide free newsletters upon request (http://waste360.com/).