

CHAPTER 3

DEBRIS MANAGEMENT PROGRAMS

Background:

The decision whether to establish a debris diversion program is made at the outset of the disaster response and in the wake of extreme pressure to first restore public services and ensure the public health and safety.

Diversion programs may not seem a priority in comparison to the initial life saving operations that a jurisdiction must undertake. However, with some planning and forethought, these programs can be implemented and significant savings realized in reduced labor, transportation, and disposal costs, and preservation of landfill capacity.

What's in this chapter

Overview:

This chapter presents common issues and potential barriers to the diversion programs discussed in the Plan.

The pre-disaster, or planning, activities are discussed in Chapters 1 and 2, Government Coordination and Pre-disaster Assessment respectively. By developing the checklists discussed in these chapters, a jurisdiction can evaluate its level of preparedness to handle disaster debris and focus on those areas that need to be developed.

Following is a summary of steps integral to developing a debris management strategy and establishing diversion programs. The 21 steps highlight the issues common to debris management programs in general.

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☐ **STEP 1: MAKE DIVERSION PROGRAMS A PRIORITY**

Make it happen:

It is imperative that top management give high priority to debris diversion programs at the outset and provide the necessary support and resources for the programs. Without leadership and dedicated support from those directing the disaster recovery, recycling and diversion programs become secondary in importance, thus losing opportunities to establish such programs.

Local policies:

Pre-planning is the most effective way to ensure diversion activities are carried out after a disaster. Jurisdictions can identify and establish in advance local policies for diversion programs in the event of a disaster.

Another method is for local governing body to pass a resolution stating that in the event of a disaster, the jurisdiction will implement debris management programs, primarily diversion programs.

By having local policies in place to require that recycling or other diversion programs be implemented after a disaster, or routinely, can lend critical support to a jurisdiction's request to receive FEMA reimbursement for recycling and other diversion programs.

Authority to act:

The following are examples of how City staff responsible for implementing the programs and executing contracts for those programs were given the direct authority to do so by their governing body.

This flexibility allowed staff to concentrate on managing the disaster response by expending less time on administrative processes to obtain approvals to carry out the response.

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Example:

City of Santa Clarita

The City of Santa Clarita City Council delegated responsibility to the City Manager to handle all phases of the disaster response and recovery. The City Manager in turn delegated responsibility for the development of the debris management strategy and programs to the Solid Waste Division, which consisted of a staff of three. Even so, the City's earthquake program realized a 97% diversion rate based on recycling more than 250,000 tons of debris over an 11-month period.

City of Oakland:

The Oakland City Manager was authorized by emergency ordinance to take action for the protection of life and property in a disaster. As a result, during the 1991 Firestorm, the City Manager was authorized to take those actions necessary to carry out the disaster recovery, which included executing contracts for debris removal, recycling, and/or disposal. Having such an ordinance in place before a disaster saved the City considerable time in initiating its disaster recovery operations.

☐ **STEP 2: BECOME FAMILIAR WITH FEDERAL DEBRIS
REMOVAL CRITERIA AND GUIDELINES**

Become familiar: Upon the Presidential declaration of a major disaster or emergency, Federal assistance is available. FEMA designates the area eligible for assistance and the types of assistance available. FEMA may grant assistance for:

- ◆ debris removal,
- ◆ emergency protective measures, and
- ◆ the permanent restoration of facilities.

To increase your jurisdiction's preparedness, become familiar with the type of state and federal assistance that is available because this will likely determine the type and scope of debris removal and diversion programs to be established during the recovery phase.

Attachment: For more detail on the federal debris removal criteria and guidelines, refer to Attachment A of this chapter.

☐ **STEP 3: DEVELOP A DEBRIS REMOVAL STRATEGY¹**

Two phases:

In its pilot Debris Management Course, FEMA recommends developing a debris removal strategy for large-scale debris removal operations by dividing the operation into two phases.

In addition, based upon the experience of California jurisdictions in their recovery operations, it is recommended that diversion program activities be incorporated into the Phase II operation, as reflected below.

Phase I - removing debris that hinders the immediate life saving actions that pose an immediate threat to public health and safety; and

Phase II - removing and disposing of debris that hinders the orderly recovery of the community and poses less immediate threats to health and safety.

Diversion - include development of debris management strategies, including establishment of programs for recycling and reuse of the disaster debris, as well as monitoring of removal and diversion activities to include the tasks in the table below.

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Phases description: Activities carried out in each phase are described in the table below:

Debris Removal Phases	Actions to be taken
Phase I: Emergency Roadway Debris Removal	<p>Clearing emergency access routes. Roadway debris is moved to the side of the road to open access routes into devastated areas.</p> <p>No attempt is made to remove or dispose of the debris, only to clear key access routes to allow for the following:</p> <ul style="list-style-type: none"> ◆ movement of emergency vehicles, ◆ law enforcement, ◆ resumption of critical services, and ◆ damage assessment of critical public facilities and utilities.
Phase II: Public Rights-of-Way Debris Removal	<p>During the emergency opening of key routes, mixed debris is pushed to the shoulders of the roadway, along the public right-of-way. The initial road side piles of debris can become the dumping locations for additional yard waste, personal property, construction material, trash, etc.</p> <p>"The debris manager and staff must now coordinate the removal of this debris, and should be prepared to take the following actions:</p> <ul style="list-style-type: none"> ◆ "develop a reliable initial assessment of the disaster's magnitude; ◆ coordinate through local agencies to establish a contracted work force capable of expeditions removal of the debris; ◆ coordinate with local and state Department of Transportation and law enforcement authorities to ensure that traffic control measures expedite debris removal activities; ◆ evaluate damaged utility systems, structurally unstable buildings, and other heavily damaged public facilities and determine if they should be repaired, deactivated, barricaded, or removed;"²
Diversion programs development	Develop a debris diversion strategy for establishment of diversion (recycling and reuse) programs that includes the following:

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Debris Removal Phases	Actions to be taken
	<ul style="list-style-type: none">◆ projected types and amounts of materials likely to be generated;◆ available processing facilities and potential end-use markets for the collected debris;◆ list of haulers and processors;◆ labor and processing equipment needs;◆ temporary storage areas; contracts and franchise agreements;◆ public information program methods; and◆ funding options. <p>Monitor the removal and diversion activities to:</p> <ul style="list-style-type: none">◆ develop a tracking and documentation system to account for the types and amounts of debris collected;◆ develop contingency plan to handle debris immediately after disaster;◆ develop diversion incentives;◆ develop monitoring and enforcement program;◆ set up records retention system and archives; and◆ prepare final report on program activities and results.

☐ **STEP 4: IDENTIFY PROJECT SCOPE³**

Project scope: Identifying the project scope is critical to setting the parameters for recovery operations (Phases II and III). Take the following steps:

- ◆ define the project area;
- ◆ determine if jurisdiction will remove debris from private property;
- ◆ develop an estimate of the types and quantities of debris to be removed (see Chapter 4);
- ◆ select temporary storage, recycling, and disposal sites; and (see Chapter 4); and
- ◆ determine need for processing facilities and whether existing disposal capacity is sufficient for expected volumes of debris.

Private property demolition and debris removal

Who is responsible: The need for private property debris clearance is the first critical determination that has to be made in defining the specific area or areas to be contracted.

Debris removal on private property is the primary responsibility of the individual property owner aided by insurance settlements and assistance from voluntary agencies.

Insurance coverage: Most homeowner, fire, and extended coverage insurance policies have specific coverage for debris removal from private property and for demolition of heavily damaged structures. Flood insurance policies do not provide coverage for debris removal.

The standard practice is that the individual property owners are responsible for moving debris to the curb for pick up by city or county work forces.

Public agency In those cases where the individual property owners are

responsibility: unable to remove the debris from their property, the jurisdiction may determine that it is in the public interest to remove the debris for them.

Use the following criteria to make this decision:

- ◆ the debris is an immediate health and safety threat to the general public, or
- ◆ the debris is of such a magnitude that the economic recovery of the community would be threatened.

Example: No-cost demolition

In establishing its building demolition program after the Northridge earthquake, the City of Los Angeles determined that most of the affected residents did not have earthquake insurance. As a result, the City assumed responsibility for the demolition of private structures that threatened the public health and safety.

To help residents rebuild, the City offered demolition services at no cost if the building had suffered greater than 50% damage or had greater than 35% of its structural system compromised.

Release form: A standard release form from individual property owners is required to hold and save the government free of liabilities when government forces or contractors perform work on private property. (A copy of a typical release form can be found in Attachment B).

Map project area: Clearly define the limits of the project area by delineating the boundaries of the project area on a map.

This map will identify to contractors the area or areas to be included in the contract.

Additionally, in a debris removal project where many contractors may be working, this can help ensure that the contractors remain in their assigned work area. Establishing the work area is also important to identify key items such as:

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- ◆ ingress and egress routes to the project area;
- ◆ location of utilities; and
- ◆ distance to recycling, storage, and disposal sites.



STEP 5: SELECT A DEBRIS MANAGEMENT PROGRAM

Criteria for selection:

Once a jurisdiction has undertaken an assessment of its probable waste stream, facilities, temporary storage areas, and markets for the collected materials, it can then determine the program(s) to be implemented.

For the specific assessment, refer to Chapter 2, Pre-disaster Assessment. This will indicate the types of materials that could be generated during different kinds of disasters. Based on the amount and types of debris to be handled, jurisdictions can plan for diversion programs accordingly.

Assessment factors:

The selected program should be best suited to the jurisdiction based on an assessment of the following:

- ◆ materials generated,
- ◆ facilities available,
- ◆ need for temporary storage areas,
- ◆ haulers/processors/brokers,
- ◆ processing requirements/barriers,
- ◆ end-uses for collected materials,
- ◆ markets, and
- ◆ local conditions.

Most often used programs:

Programs most often used include those in the table on the following pages. For each major program type, there will be source separated recycling programs to handle a particular waste type. Examples include mulching and chipping operations for wood, smelting for metals, and concrete crushing. Issues associated with each of the diversion programs are also included for consideration as they could impact the program's effectiveness.

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Program	Description	Materials generated	Source separated recycling programs	Issues
Curbside	Residents place their disaster debris at the curbside for city crews or contractors to pick up.	household furniture, wallboard, wood, metals, concrete, bricks, HHW (see below)	wood chipping, mulching, concrete crushing	<p>Source separation is key to avoiding contamination and increasing product marketability. Consider requiring source separation as part of the program and advertise program requirements to residents and contractors. Source separation on site can decrease costs for labor, transportation, processing, and disposal.</p> <p>One approach is to offer free debris pick-up if materials are separated at the curb and charge a high fee for the pick-up of mixed debris.</p>
Building Demolition	Buildings damaged beyond repair or those representing a safety hazard are torn down.	wood, concrete, metals, bricks, drywall	wood chipping, mulching, scrap metal	<p>Hand salvaging will yield more recyclable materials, although time required to do so may be more than traditional demolition. For building demolition in general, Increased savings in disposal and transportation costs, with likely increase in labor costs.</p> <p>Depending on the age of the building, asbestos and lead paint abatement may be a concern.</p>
HHW	Residents take their HHW to a collection event, mobile collection vehicle, or to a	paint, pesticides, household cleaners, oil	oil filter recycling material exchange hazardous	<p>Residents must be informed to keep HHW separate from the rest of the disaster debris. This will reduce contamination of the</p>

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Program	Description	Materials generated	Source separated recycling programs	Issues
	permanent collection center.		waste disposal	materials and will help to ensure that collected materials are not designated as hazardous and disposed of as such.
Drop-off	Residents place debris in bins located throughout the community. Separate bins can be designated for specific materials or all materials can be placed in one bin and separated later.	same as curbside	same as curbside	This may be more convenient for remote or rural areas where curbside collection is not available or practical or in areas where the topography precludes curbside collection. Contamination of materials is a concern as is security at the collection sites. Placement of the equipment may pose problems, depending on the area's topography .
Fencing	This program was specific to the City of Los Angeles and instituted because the City had an ordinance requiring that all swimming pools be fenced.	cinder block		The City assumed responsibility for fencing pools on private property in the interest of public health and safety.
Ghost Town	Abandoned private property was boarded up for public health and safety reasons.	N/A	N/A	Liability issues and crime prevention are the most pressing issues.

Other programs

- Ghost town program:** Does a city/county assume liability for private property that has been abandoned by the property owner if the property poses a public health or safety threat? This may be an issue facing your jurisdiction for which you will need to develop a policy.
- Abandoned property can lower the surrounding property values or create a public nuisance. The City of Los Angeles responded by assuming liability for the abandoned properties and executed a *Ghost Town* contract whereby the City boarded up, cleaned, and fenced the abandoned properties.
- Condominiums:** In the case of condominiums, FEMA will authorize demolition work only if all owners of the condominiums participate in the demolition program. Consider how to handle a situation where not all residents want to participate in the city or county-sponsored program, thus eliminating the other residents' ability to have their homes demolished.
- Drop-off program:** A drop-off program may be more useful for remote communities, those where residents do not have curbside pickup, or areas that are sparsely populated. Issues to consider are contamination of materials and security needs at the site.
- Example:** The City of Santa Clarita considered setting up a program using roll-off bins, but instituted a curbside collection program instead based on the following considerations:
- ◆ In order to achieve a high level of service, it would require a roll-off box on every corner. It is doubtful that any company could supply this.
 - ◆ Roll-off container use would increase the amount of mixed waste deposited in them. This in turn, would reduce the recycling rate.
 - ◆ Removing waste from the bins presented the potential for extra equipment since loaders are needed to get debris to dumping level.

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- ◆ Roll-off bins represented a potential increased liability.
- ◆ The bins also posed a potentially greater traffic hazard via blind spots from roll-offs at every corner versus occasional piles of debris at the curbside.
- ◆ The cost for roll-off is potentially more than curbside pickups programs. Beyond the initial capital outlay, the City had to consider that FEMA will only reimburse low-cost bid.

☐ **STEP 6: IDENTIFY PROGRAM BARRIERS**

Identify barriers:

Identify potential barriers to a debris management program and develop contingency plans to avoid problems. This will assist in proposing solutions to those barriers in advance. Such barriers can include:

- ◆ blockage of major transportation corridors;
- ◆ closure of recycling or disposal facilities;
- ◆ lack of funding;
- ◆ lack of temporary storage areas (see Chp. 4);
- ◆ illegal dumping at temporary storage areas (see Chp 4);
- ◆ limited markets for targeted waste types;
- ◆ limited contractors available;
- ◆ residents, businesses, and other governmental agencies cleaning up independently of the city/county-sponsored program; and
- ◆ insurance company requirements.

Liability:

Be aware of the liability issues associated with debris management and develop procedures to handle the following:

- ◆ wrong building demolished;
- ◆ city workers or volunteers entering and damaging private property City/county worker/contractor injured;
- ◆ "debris" collected from private property which should not have been removed;
- ◆ ghost towns (abandoned property); and
- ◆ demolishing a unit in a condominium complex.

Rebuilding: Rebuilding also generates debris. Although rebuilding activity is a result the disaster, the waste generated is not considered disaster debris. For this reason, FEMA reimbursement may not be available. Check with your OES Regional Office to determine the rebuilding activity's funding eligibility.

A jurisdiction, however, can take advantage of diversion programs already established to handle the disaster debris and capture the rebuilding wastestream.

To avoid confusion, keep the two wastestreams separate so FEMA reimbursement for the disaster debris program will not be affected. However, this was not possible in Los Angeles since many victims were still removing earthquake debris while neighbors were rebuilding. There was no clear end to one activity before beginning the other.

Greenwaste: In addition, this is the time residents may work on landscaping their yards and generate large amounts of greenwaste. Again, this is not debris generated as a direct result of the disaster, and is not eligible for FEMA reimbursement.

Jurisdictions should take note if this occurs and notify homeowners that the debris must be kept separate from the earthquake-related debris (that is, do not place this material at the curbside or place in bins designated for disaster debris, etc.)

Source separation: Source separate materials and leave them at the curb. In this way, they can be sent directly to processing facilities. If you place all debris together at the curb, it is more likely that the materials will be sent to a mixed waste facility, which can be significantly more costly than a recycling facility.

Realize that there will be extra labor costs for separating the collected materials before they go to a recycling facility. This equates to more time and expense. This can also be the key to realizing a successful diversion program.

Mixed waste Because many jurisdictions may not have mixed waste

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facilities: facilities nearby, this will limit the diversion potential. In the case of the City of Los Angeles, one of the City's goals was to establish mixed waste facilities not only to handle the disaster debris but also to become part of the infrastructure and be available after the disaster debris was gone.

CalTrans: The State Department of Transportation (CalTrans) maintains jurisdiction over any state or federal road. Consequently, when these roads/freeways are repaired, demolished, or rebuilt, CalTrans is responsible for the cleanup of the resulting debris.

Although the city or county may have established a diversion program for these materials collected in a city/county cleanup, it will be necessary to discuss the diversion of these materials with CalTrans individually. CalTrans can specify in the cleanup contract that the contractor will divert or recycle the materials.

☐ **STEP 7: SET PROGRAM GOALS**

Background:

It is important at the outset to set program goals for the recycling and diversion programs undertaken. Program goals will help determine the program's success in meeting diversion goals, ensure the program's cost-effectiveness, and help evaluate whether changes are needed during implementation or whether other programs need to be established.

Example:

After the Northridge earthquake in 1994, the City of Los Angeles established goals for their pilot debris removal program which consisted of two components:

1. collection of earthquake debris placed at curbside by City residents, and
2. demolition of buildings damaged by the earthquake.

Program goals:

The program goals for the pilot program were to:⁴

- ◆ determine maximum recycling rates;
- ◆ determine facility needs for a massive diversion effort;
- ◆ gain knowledge about the costs associated with a diversion program run at maximum efficiency;
- ◆ increase, through private investment, the capacity of private sector facilities which can process mixed earthquake (and C&D) debris for recovery of recyclables at high rates; and
- ◆ save landfill space.

DSR for recycling: Based on the success of the pilot program, FEMA approved a Damage Survey Report (DSR) for the City's debris removal and recycling program which was then expanded citywide. (See Attachment D for a copy of the DSR).

DSRs:

Damage assessments and Damage Survey Reports or DSRs are the foundation for FEMA/OES reimbursement after a disaster. The DSRs provide a description of the damage, set forth the scope work, and give a cost estimate of the work to be performed. Based upon the damage assessment conducted by the federal/state/local inspection

teams, a DSR is written. (Refer to Chapter 16 for more information on damage assessments and damage survey reports).

Example:

Similarly, the City of Santa Clarita, in establishing their diversion programs after the Northridge earthquake, set up the following program features. The City identified the following five features as ones that would maximize recovery and diversion while maintaining an effective collection effort.

- ◆ No tipping fees. This would discourage illegal dumping.
- ◆ Enforcement of illegal dumping ordinances or regulations.
- ◆ Provide debris diversion information to haulers and residents.
- ◆ Provide security assurance against hazardous materials or contaminated inerts being dumped.
- ◆ City will assume ownership of material product to ensure reuse.

Contractor responsibility:

Although this was one of the City's goals, the City later changed its position and assigned ownership of the materials to the contractor, who was responsible for collecting and marketing the materials. The City did this in an effort to avoid conflict with FEMA over reimbursement for its diversion programs. Had the City retained ownership of the collected materials and received revenues from their sale, FEMA could have reduced the City's reimbursement for the diversion program since there was no compelling local program or plan.

☐ **STEP 8: IDENTIFY LABOR NEEDS**

Estimate staffing:

An estimate of staffing becomes one of the most important aspects of disaster debris management as the recovery begins. It is likely that the jurisdiction's staffing resources will be overwhelmed in responding to the disaster.

Staff will be needed to manage the recovery programs as well as field staff to implement the programs. There are several resources available that can help a jurisdiction in its emergency response.

- ◆ Mutual Aid Agreement;
- ◆ Emergency Managers Mutual Aid;
- ◆ California Conservation Corps (CCC);
- ◆ Employment Development Department (EDD);
- ◆ City/county staff available from other agencies; and
- ◆ volunteer and non-profit agencies.

Determine staffing needs in light of the diversion program needs. Based upon the selected program, identify staff resources needed, including number and classification of staff. Identify staff available within the agency and those who may be needed from other agencies.

Do not underestimate the staffing needed to develop and maintain a tracking system to monitor the debris recycled and disposed and the facilities used. The system is critical to verifying weight tickets when used as payment, determining the program's recycling and disposal rates, and monitoring facility usage. The City of Los Angeles employed six full-time staff.

For more information, refer to the City of Los Angeles' *Northridge Earthquake Response Effort, Final Report*, Issue No. 7, 9/15/95.

For assistance:

To request mutual aid from neighboring cities or counties, follow the Standardized Emergency Management System Mutual Aid procedures (see Chapter 13 for more information on SEMS).

Staff functions: Keep in mind that staff will be needed for diversion program implementation as well as for the administrative functions that will serve the overall recovery operations. A listing of the staff functions that will be needed in recovery operations is contained in the table, "Departments and Functions Represented in Recovery Process" on pages 7-9 of Chapter 1.

Employment Development Department

Assistance provided: The **Employment Development Department** (EDD) can provide workers through the Job Training Partnership Act (JTPA) contract (funds provided by FEMA and administered by the State EDD).

Plan for workers: Be aware that the city/county is dependent upon EDD preparing a plan to use the workers, which FEMA must approve before workers can be hired. In the case of Northridge, six months elapsed before EDD had completed the plan, although the City of Los Angeles needed the workers immediately.

Job descriptions: In addition, the JTPA (EDD) contract targeted workers from the disaster area who had lost their jobs or had otherwise been displaced by the disaster. However, before EDD can submit a plan to FEMA to use the workers, the jurisdiction must write job descriptions and determine job classifications for these workers.

Consult unions: Be sure to consult with the unions for city and county workers to ensure that this outside labor does not affect union agreements. In the case of the City of Los Angeles, the unions did not object to the contract.

☐ **STEP 9: IDENTIFY EQUIPMENT AND PROCESSING REQUIREMENTS**

Equipment types: Make equipment selections based upon the type of activity to be carried out and the materials involved. The table below groups construction and demolition (C&D) processing equipment into three main types:

- ◆ conveying,
- ◆ crushing/reducing, and
- ◆ screening/separating.

	EQUIPMENT	MATERIALS HANDLED
Conveying Equipment	Conveyors transfer materials from one location to another. The most common type of conveying equipment used to process C&D is a belt conveyor which consists of a strip of belting material that is looped around a shaft on each end.	All types of C&D
Crushing/Reducing Equipment	Size reduction is the unit operation in which waste materials are mechanically reduced in size. The objective is to obtain a product that is reasonably uniform and considerably reduced in size in comparison with its original form.	
1. Hydraulic breaker or jackhammer	A pneumatic impact tool is used for breaking oversized material into pieces small enough to be processed by the next crusher/reduction unit in the process.	Concrete pavement, foundations.
2. Jaw Crusher	Designed to crush large chunks of concrete, asphalt, etc.	Concrete, asphalt, pipes, steel, rebar, manhole lids, etc. Compressible materials such as wood and plastics tend to jam up the jaws and severely reduce throughput.
3. Hopper	Receives the chunks and feeds them to the cone, or impactor.	Can choose either cone or impactor, or both.
4. Cone	Crushes concrete and asphalt to aggregate size	Can choose either cone or

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	EQUIPMENT	MATERIALS HANDLED
		impactor, or both.
5. Impactor	Crushes concrete and asphalt to aggregate size	
Hammermill	Also known as wood hogs, can process a variety of wood materials. Reduction occurs as the heavy hammers, attached to a rotating element, impact the material as it enters and eventually force the shredded material through the discharge of the unit.	Wood
Stump Grinder	Large machines, often trailer-mounted and top-loaded by on-board knuckleboom loaders. The machine is more expensive than a wood hog but can handle large bulky materials.	Wood, stumps
Rotary Shear Shredders	Low-speed, high-torque machines that rip and tear material apart.	Ideal for primary reduction of bulky wood material, such as pallets, crates and stumps, up to 3" to 4" in diameter. Large units can also reduce concrete, steel drums, white goods and furniture.
Screw Shredders	Shredding is done by two parallel screws with opposing threads.	bulky wood material, including tree stumps, brush, logs, scrap lumber, clean wood, pallets, trees, yard trimmings.
Screening/ Separating Equipment	Screening is a unit operation used to separate mixtures of materials of different sizes into two or more size fractions by means of one or more screening surfaces.	
Grizzly Screen	Vibrating grizzly feeders are ideal for feeding rubble and mixed C&D material to the primary crusher.	rubble and mixed C&D material
Vibrating Screen	Vibrating screens can be designed to vibrate from side to side, vertically, or lengthwise.	
Trommel Screen	An inclined rotating cylindrical screen where material to be separated tumbles and contacts the screen several times as it travels down the length of the screen.	

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	EQUIPMENT	MATERIALS HANDLED
Disc Screen	Disc screens consist of parallel horizontal shafts equipped with interlocking lobed (or star-shaped) discs that run perpendicular to the flow of infeed material.	Wood
Air Classifiers	A separator which uses an air stream to separate materials based on the weight difference of the material.	Commingled waste (plastic, glass, paper, metal)
Flotation	A unit operation which employs water to separate wood from rubble-based material.	separate wood from rubble-based material
Magnetic & Electric Field Separation	Uses the electrical and magnetic properties of waste materials to separate them.	
Magnetic Separation	Designed to remove ferrous metals from a moving bed of material.	ferrous materials
Electrostatic Separation	High-voltage electrostatic fields can be used to separate nonconductors of electricity, such as glass, plastic, and paper, from conductors such as metals.	nonconductors such as glass, plastic, and paper
Eddy Current Separation	Separates non-ferrous metal (usually aluminum cans) from the waste stream by passing a current through the materials. These systems can be expensive.	
Manual Picking Station	An elevated platform with a conveyor and a catwalk along both sides of the conveyor. Manual sorting is done by removing specified items from the conveyor and dumping` them in the appropriate chute provided.	

Processing techniques - wood, concrete, and asphalt⁵

Table: The table below describes various processing techniques for wood, concrete, and asphalt.

Wood Processing	
Wood	<p>C&D wood waste can be processed according to the intended end use. Options can include:</p> <ul style="list-style-type: none"> ◆ chipping with a mobile chipper or grinder at the site where the waste is produced; ◆ hauling to a processing facility that accepts and processes wood waste only; or, ◆ delivering to a full-service processing facility where multiple types of C&D wastes are processed.
Non-wood waste:	<p>Non-wood wastes are first separated from the waste. If not source-separated, some facilities use flotation tanks to separate wood from non-wood material.</p>
Concrete and asphalt processing	
Concrete	<p>Portland cement concrete (PCC) is commonly called "concrete." Concrete is mostly made of aggregate; the cement serves to bind the aggregate together. Concrete can be crushed on-site and used immediately for aggregate base, or hauled to a crushing plant.</p>
Asphalt concrete processing	<p>Asphalt concrete (AC) pavement is commonly called "asphalt." Asphalt is mostly made of aggregate (94%); the asphalt binder serves to bind the aggregate together. Asphalt can be crushed on-site, mixed with crushed concrete, and used immediately for aggregate base, or hauled to crushing plant.</p>

☐ **STEP 10: CHOOSE A METHOD OF OPERATION**

Method: Choose a method of operation for the selected program.
Decide the following in advance:

- ◆ who will implement the program;
- ◆ will the material be source separated at the curbside, placed in bins, roll-off containers;
- ◆ how will collection routes be established;
- ◆ who will collect the materials; and
- ◆ how will materials be identified for collection (GIS, pick-up crews drive through neighborhoods, hotline).

Who implements: Determine who will implement the diversion programs: city or county staff or contractors.

Example: Special Engineering Organization.

After the 1994 Northridge Earthquake, the Mayor and City Council decided that City forces could handle the recovery operations at a cost savings as compared to contracting out for the recovery work. In response, the City of Los Angeles' Department of Public Works implemented an earthquake debris removal program. The program was led by the Bureau of Engineering, with support from the Bureau of Contract Administration, which provided field monitoring of contractors, and the Bureau of Sanitation, Integrated Solid Waste Management Office, which directed the recycling efforts.

Engineering organization: Within the Bureau of Engineering, the Northridge Earthquake Recovery Division was created. Staff from various Divisions within the Bureau were assigned to the new ad hoc division and assumed responsibilities for different aspects of the earthquake recovery. After the work was completed, the Division was subsequently disbanded.

Advantages: Establishing this Division aided in the City coordinating all earthquake-related activities and simplified FEMA billing for disaster-related costs. In this way, the City could document that all activities performed by this Division were earthquake related and therefore reimbursable by FEMA.

Example

Alternatively, the City of Oakland let a master contract for **master contract:**debris removal and recycling. Such a contract can expedite clean-up and allows for traffic control and coordinated restoration of utilities. The latter keeps utilities from being continually re-damaged by heavy loads of debris. Wear and tear on roads is also eligible to be reimbursed as part of the master contract.

Critical issues need to be resolved if a master contract is used:⁶

- ◆ who pays - insurance, local government, property owner, state or federal?
- ◆ who assumes liability?
- ◆ what if property owners don't want to participate?

City of Los Angeles:

The City of Los Angeles adopted the following operational approach to maximize recycling of curbside debris:⁷

- ◆ **Contract language.** To achieve recycling goals, collection contracts included language indicating that the City required recycling, and that contractors were expected to utilize recycling facilities under City contracts in a particular order of preference.

The inspectors listed the facilities in an order which required that contractors use recycling facilities first. Contractors were permitted to utilize disposal facilities only when recycling facilities were closed, temporarily over capacity, or had waiting times which would have inhibited efficiency of collection operations.

- ◆ **Authorization letters.** Authorization letters to utilize facilities under City contract were distributed to contractors and included the recycling preference. Carbon copies were returned to the site inspector allowing immediate load tracking capability (see Attachment E for copy of letter).

The City developed authorization letters that the haulers used in lieu of paying the tipping fee at disposal and recycling facilities. The authorization letter allowed the facility to bill the City directly and benefited the hauler who did not have to pay the fee and wait for reimbursement from the City. It also ensured that the contractors would use recycling facilities, since there was no cost to them.

- ◆ **Recycling plans.** Contractors selected for contract awards were required to submit recycling plans at the time of contract signing. They were trained at the time of contract signing and provided with training booklets for their field staff regarding program guidelines and facility requirements before starting work (*Northridge Earthquake Recycling Requirements for Contractors*).

- ◆ **Performance criteria.** Performance criteria were used to rate contractors on their good faith efforts to recycle and their actual recycling rates. Points were given to the contractor if:

- ◆ they dedicated trucks for recycling,
- ◆ their field supervisors were trained regarding City recycling requirements, and
- ◆ the contractor's supervisors scouted for concentrations of recyclables each day.

Recycling rates in the form of percentage of loads to recycling facilities were tabulated from the inspectors' daily status reports.

- ◆ **Monitoring and enforcement.** Field inspectors monitored the contractor's work and enforced recycling requirements in the field to maximize recycling without impeding efficiency of operations.
- ◆ **Valid permit.** Recycling facilities had to maintain a valid solid waste facilities permit and agree to City monitoring and evaluation guidelines to participate in the program.



STEP 11: ADAPT PROGRAM LENGTH

Set a limit:

Depending on the extent and severity of the disaster event, a jurisdiction will have set an estimated completion time for the diversion program to be implemented. In large part, this will be dependent on the program funding, particularly from FEMA, and on the volume of work to be performed.

Factors:

Several factors will influence the length of time the diversion program is needed. Consider these:

1. the extent and severity of the disaster;
2. program funding from FEMA;
3. the time between the disaster and when homeowners receive their FEMA insurance, or Small Business Assistance checks; and
4. if the disaster is a regional one, the ability of contractors to keep up with the heavy demand for their services.

Example:

In the case of the City of Los Angeles, the disaster debris was being picked up from households for 1-1/2 years after the Northridge earthquake. The City of Santa Clarita's curbside program lasted a year; it was initially thought the program would end after six months.

Peaks of waste generated:

From past disasters, it appears there will be three peaks where disaster debris is generated.

1. The first will be a large influx of debris immediately after the disaster event consisting of household debris and putrescibles as people begin the initial cleanup of their homes and businesses.
2. The second peak will occur approximately six to nine months after the disaster when homeowners begin to receive their FEMA assistance, insurance, or Small Business Assistance checks. This is when the debris is removed and rebuilding begins. Expect an influx of debris at this time.

3. The third peak will occur during the rebuilding phase, again when homeowners and businesses receive FEMA, insurance, or Small Business Assistance checks or when contractors become available. After these three peaks it appears that the collection of disaster debris levels out and that the disaster wastestream will become steady and last upwards of 1-2 years, depending on the severity of the disaster.

FEMA deadlines:

Keep in mind that FEMA sets a completion deadline of six months on debris removal projects. If a jurisdiction needs a time extension, it must apply for one through the Office of Emergency Services. (Refer to Chapter 16, Federal Assistance Program, for additional information).

Suggestion:

To ensure that program funding from FEMA continues uninterrupted, review your program progress after four months to determine if a time extension or additional funding is needed. If more time or funds is needed, this will give you two months' lead time to process the request so that funding is not cut off before the program ends.

Local criteria:

Develop local criteria to determine if your jurisdiction needs to request a time extension to complete the work and to request additional funding from FEMA. The criteria can include such items as:

- ◆ daily loads
- ◆ tonnages;
- ◆ number of demands for debris pickup from the public; and
- ◆ number of requests for earthquake-related building permits.
 - ◆ to differentiate between earthquake-related work and regular construction activity, the City of Los Angeles instituted a tracking system whereby a different numbering system was used for earthquake-related building permits.

☐ **STEP 12: DEVELOP FUNDING OPTIONS**

Reimbursement: To initiate its recovery efforts, a jurisdiction must be knowledgeable about the state and federal reimbursement programs and the process for requesting funding.

Because Federal Emergency Management Agency (FEMA) typically reimburses program costs, not advances them, a jurisdiction will need to identify funds to start-up programs until federal funding becomes available.

Small projects: FEMA will advance funding for "small projects " as contained in individual Damage Survey Reports. For "large projects," funding occurs as a reimbursement. Consult with OES regarding the dollar amount associated with each category type as it is tied to the Consumer Price Index.

Actions to take: This following actions will assist in identifying funding sources to start-up diversion and/or recovery programs.

- ◆ Identify local or private funds that can be used to start program until receive FEMA reimbursement.
 - ◆ determine ability to use General Fund;
 - ◆ evaluate possibility of acquiring a loan; and
 - ◆ explore use of private funds.
- ◆ Prepare documentation re local policy for diversion/recycling.
- ◆ **NOTE: FEMA may/will not reimburse for donated monies or services.**

Documentation: Research documentation for FEMA regarding existing local policy for recycling or diversion.

FEMA's policy to date has been to reimburse for the "least cost" programs, and reimburse for diversion programs if they are in keeping with an existing policy of the jurisdiction.

However, the jurisdiction must document such policies, provide adequate documentation to FEMA, and receive their approval prior to implementing the diversion program in order to receive reimbursement.

Do in advance:

Compiling this information in advance can save valuable time in receiving approval to proceed with the diversion programs and to begin the recovery process.

STEP 13: ESTABLISH A PUBLIC INFORMATION PROGRAM

Background:

A diversion program can only be effective if it is supported by good public information or outreach program. An effective public information program will realize two goals: provide adequate advertisement of the debris collection program as well as educate the residents and contractors involved in carrying out the program.

Unless this program is taken seriously and resources applied to implement it, plans to recycle and otherwise divert the disaster debris may go unrealized.

Steps to take:

Based on the experiences of other local jurisdictions that have undertaken disaster recovery programs, following are some suggestions in establishing your public information and outreach program.

- ◆ Coordinate with the city/county public information officer (PIO) in development of a public awareness campaign for the debris management programs.

This can include Public Service Announcements (PSAs) on the radio and TV, printed materials such as doorhangers and newsletters, to advertise locations of drop-off centers, conditions of curbside collection, hours, materials accepted, collection method, etc.

- ◆ Structure a public information campaign so that messages reach target groups at home, at work, and at leisure.
- ◆ Establish a public information or media center to handle debris management questions from the public.
 - ◆ cleanup instructions;
 - ◆ status of cleanup;
 - ◆ respond to public inquiries;
 - ◆ locations of drop-off or collection sites;
 - ◆ how to source separate;
 - ◆ enforce provisions against illegal dumping; and

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- ◆ complaints re debris piles or illegal dumping via a geographic information system (GIS).
- ◆ Develop contact list for the media: television, radio, cable access, ham operators, newspapers, neighborhood newsletters.
- ◆ Set up a hotline for the public to call regarding debris management programs and/or for debris pickup.
- ◆ The Public Information Officer (PIO) may be responsible for hosting the media and visitors at the disaster area.
- ◆ Identify all target groups, particularly those non-English speaking groups, and the geographical areas where they reside. OES can provide maps of the areas where different languages are spoken and the approximate number of speakers of each language.
- ◆ Determine need for interpreters and translators based upon above.
- ◆ Provide fact sheets to the public in English and predominant non-English languages in the area.
- ◆ Develop a Public Information Plan or Public Information Mutual Aid Agreement. Contact your nearest OES Regional Office for more information..
- ◆ Consider setting up a mobile information center.

Example:

Take into account that changes in policies and programs may well affect your diversion program. The City of Los Angeles used the Good Year Blimp in January 1995 to advertise to City residents that the earthquake pickup program had ended.

This was an innovative approach to getting the word out to the public; however, FEMA subsequently extended the debris program for six months. Another idea could include

renting a small plane with a banner to advertise the programs.

Regional cooperation:

Costs for advertising in the media can be prohibitive, yet using the media can be the best way to notify as many residents as possible about the diversion programs and how to participate in them. The City of Los Angeles was quoted a price of \$16,000 for a one-day 1/4 page ad in the *Los Angeles Times* to advertise their curbside pickup program.

The City of Santa Clarita was also implementing a curbside pickup program at the same time. A problem developed when Santa Clarita residents assumed the instructions in the *Times* for the City of Los Angeles programs applied to their local program. To avoid confusion, the City of Santa Clarita changed a number of its program guidelines to be consistent with those of the City of Los Angeles.

Had the cities been able to combine their efforts by establishing similar program guidelines and advertising their programs jointly, not only could they have saved money, but there would have been less confusion about the two curbside programs.

☐ **STEP 14: DEVELOP A MONITORING AND ENFORCEMENT PROGRAM**

It's a must:

Monitoring is the key to achieving success in any diversion or recycling program. Monitoring will help a jurisdiction evaluate and enhance recycling facility capacity, assess the effectiveness of contractor training, improve enforcement by inspectors, and manage program costs. Following is a list of actions that will support a successful diversion program.

- ◆ garner the support and cooperation of those in authority to institute the monitoring program;
- ◆ dedicate sufficient resources to ensure program success;
- ◆ develop methods to monitor and enforce recycling/diversion guidelines;
- ◆ establish guidelines for compliance and incorporate as part of contract; and
- ◆ develop tracking system to verify amounts and types of materials diverted and disposed to document FEMA reimbursement and to calculate recycling rates.

Inspection and Control System

Inspection system:

Local jurisdictions should maintain an inspection and control system under its own supervision to ensure that the work being performed complies with the terms of the contract.

Factors to consider:

In addition to load ticketing, consider the following factors in the inspection and control process:

- ◆ bond requirements;
- ◆ insurance requirements;
- ◆ rights-of-way and indemnification;
- ◆ mobilization of proper equipment;
- ◆ posting of permits;
- ◆ contractor personnel safety standards;
- ◆ general public safety standards;

- ◆ completion schedules;
- ◆ clearance procedures; and
- ◆ demobilization procedures.

Progress reports:

It is important that the contract requires submission of reports and payment estimates, in order to aid in the evaluation of the contractor's work progress.

In lieu of progress reports, frequent visits to the job sites can be a productive method of monitoring performance.

Incentives:

Inspectors, or incentive programs, are needed to ensure that full loads are taken to the processing facilities rather than half empty trucks. Consider an incentive for a hauler to completely fill a truck before going to the disposal/recovery facility (i.e., pay by weight), rather than paying haulers per trip. However, paying by trip may be necessary in order to offer an incentive to haul low density materials such as wood and insulation.

Oversight:

In addition, continual oversight by inspectors is needed to ensure that the hauler goes to the preferred facility (e.g. recycling) and that the crews loading the debris use material separation techniques.

Contractor

The City of Los Angeles experienced significant increases **performance:** in the overall recycling rate in 7/94 due to the introduction of a contractor performance rating system. This gave contractors an incentive to take loads to source separated facilities. The introduction of this system increased source separated facility usage by 191% and significantly decreased recycling tipping fee costs. (Refer to Step 8, method of operation, for additional detail on the performance rating system).



STEP 15: DEVELOP A CONTINGENCY PLAN

Roadways or

In the event that major roadways are closed or landfills and **facilities impacted:** recycling facilities are closed or damaged, develop a contingency plan to deal with the disaster debris until such time as the roads and facilities are open.

- ◆ Develop a procedure for temporary storage of the collected materials (refer to Chapter 4, Temporary Storage Sites, for more information).
- ◆ Develop a policy to deal with putrescibles and with waste from the public until a diversion program is implemented. Because this will likely be the responsibility of the local sanitation department, coordinate closely with that department.
- ◆ If the landfills you use are closed, make arrangements with neighboring jurisdictions or, if applicable, private landfill owners to use their facilities. Do this before a disaster strikes since it may take valuable time to negotiate the agreement and receive approvals, particularly from the local government governing body.
- ◆ Develop alternate transportation routes.
- ◆ Decide in advance how to fund programs initially, since FEMA operates on a reimbursement system.
- ◆ Fewer contractors/haulers may be available if a disaster hits a large geographic area or very populous area. Some options can be to:
 - ◆ identify contractors in the area who have the abilities and equipment to handle the work;
 - ◆ of those contractors identified above, identify those who can respond in an emergency; and

- ◆ pre-qualify contractors to expedite the contracting process and disaster response from within and outside the area;
 - ◆ When developing a list of pre-approved contractors, update the list every six to 12 months. At the same time, check to see that the contractors are holding the appropriate licenses and that those licenses are valid.
 - ◆ **Note:** Contractors will have to show proof of worker's compensation and liability insurance before entering into a contract. The local jurisdiction's risk manager will have to determine the minimum levels of coverage. **Verify with OES/FEMA that insurance premiums are reimbursable.**
- ◆ negotiate with your franchise hauler to handle the influx of disaster debris; or
- ◆ require, through a disaster clause in the franchise agreement, that the franchise hauler make all necessary arrangements to handle the waste, giving priority to waste diversion.
- ◆ Develop guidelines for residents and businesses who are cleaning up their property independently of the city/county-sponsored program, e.g., permits needed, how to choose a contractor, dealing with asbestos, etc.
- ◆ Consider including a provision in debris removal contracts requiring the contractor to develop markets for recycling and reuse for collected materials. While the jurisdiction relinquishes ownership of the materials to the contractor as well as any revenues realized from the sale of the materials, the responsibility for

finding markets for the materials will be that of the contractor.

- ◆ Develop a method to keep disaster-related debris separate from disaster debris. Commingling the two wastestreams may compromise the jurisdiction's ability to receive reimbursement for the diversion program. As an alternative, set up separate contracts for disaster debris and non-disaster debris and keep separate records for each.
- ◆ This was not possible in the City of Los Angeles' Northridge earthquake program. Many victims were still removing earthquake debris while others were rebuilding. There was often no clear end to one activity before beginning the other.

☐ **STEP 16: PURSUE REGIONAL COORDINATION**

Coordinate with neighbors:

Consider developing a debris management program in concert with neighboring jurisdictions to direct a coordinated disaster response, to save time and resources, and to provide services to all affected residents. This will necessitate coordination with the OES and FEMA to correctly allocate program costs and reimbursement to the appropriate jurisdiction, but a more efficient program can be achieved.

Program crosses boundaries:

Particularly in urban developments, debris management programs can cross jurisdictional boundaries. Instead of each city establishing a separate, and perhaps conflicting, program for its residents, it would benefit all if they pooled their resources and established a single response (program) that would meet the needs of all affected residents.

Example:

Problems arise when not all cities in a geographic area affected by the disaster establish a debris collection program. For example, City X had a successful curbside pickup program which was achieving a high degree of diversion. A neighboring city, however, did not implement a diversion or collection program for its residents. As a result, residents of the neighboring city would haul their disaster debris to the city with the collection program and place it on the curb.

Problems encountered:

This subsequently became a significant problem for City X. Residents of the neighboring city were not adhering to the program guidelines of source separation at the curbside and collection of designated materials. As a result, the contamination of curbside materials increased significantly and reduced the diversion potential of the materials.

Example:

It is also a good idea to coordinate programs with neighboring communities, particularly in densely populated urban areas. For example, residents of the City of Santa Clarita participated in their city curbside collection program, but began following the instructions for the City of L.A. program as advertised in the *L.A. Times*, assuming that it applied to them. As a result, to reduce confusion, the City of Santa Clarita changed a number of their program components to be consistent with those of the City of L.A.

☐ **STEP 17: DEVELOP INCENTIVES FOR DIVERSION**

Incentive: The method that the City of Los Angeles found to have the most potential for success in ensuring that the high priority facilities (recycling) were visited first, involved some sort of incentive program.

If the drivers received a perk for adhering to the criteria, more material would be recycled and a great deal of money would be saved in the form of reduced tipping fees and reduced staff time dedicated towards policing cleanup crews and haulers.

Encourage diversion: Develop methods to encourage diversion. These can include the following ideas:

Methods to encourage diversion	
◆	No tipping fee, or reduced tipping fee, for recycling/reuse
◆	Penalties for disposing of disaster debris: Hauler, Landfill, Processor
◆	Local ordinances that would require applicants for permits for new construction and demolition to submit a waste management plan showing materials to be diverted or salvaged.
◆	Issuance of new construction and demolition permits with list of recycling facilities attached.
◆	Priority to siting new recycling facilities over permitting new disposal facilities.
◆	Ban on landfilling of, or adding surcharge to, reusable or recyclable materials (provided that facilities and markets are established).
◆	Provide local fee and tax credits for businesses that deal in salvaged and recycled building materials.

Example: After the Loma Prieta earthquake in 1989, the City of Santa Cruz waived the tip fee for materials taken to the landfill to encourage residents to recycle their disaster debris.

Example:

Noncompliance fees are also an effective incentive for diversion.

Prior to the City of Los Angeles instituting a non-compliance fee in their curbside hauling contract, two thirds of the contractors did not go to recycling facilities. After the noncompliance fee of \$400 a load was added to the curbside contract, the City reported that 29 of 30 contractors surveyed did use the recycling facilities. On average, the City employed 55 contractors for this work at any given time. A total of 361 contractors were used.



STEP 18: COMPILE DOCUMENTATION AND DEVELOP TRACKING SYSTEM⁸

FEMA

Ensure that adequate documentation is maintained to support funding requests to the state and federal governments. Refer to the following document for guidelines on the kinds of documentation needed, which may in turn affect the tracking system used and the information collected. For more information on documentation, see Chapter 5, Contracts.

- ◆ Guidelines for Documenting Disaster Costs for Federal and State Public Assistance Programs (contained in Public Assistance Subgrantee Disaster Assistance Resource Manual, OES).

The tracking system can be used to:

- ◆ verify payment to haulers, facilities;
- ◆ document recycling rates;
- ◆ satisfy state and federal reporting requirements; and establish an audit trail.

Example:

For the City of Los Angeles, one of the conditions FEMA required when approving the City's proposal to implement a recycling program was the development of a system to document the level and effectiveness of recycling.

The City developed a database system to track the amount and type of tonnage delivered to each facility, facility cost, and truck type to deliver the debris.

The system included tonnage reconciliation and material composition information for each facility that processed mixed debris.

The system was based on data entered from each facility's daily load tickets.

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Note: because of the significant number of tickets (200,000 total) and diversity of facility types, the system required six staff to maintain the database.

The load tickets from each recycling facility were collected daily. Information reported included tonnage, cost, truck type, and material data.

Recycling rate:

Once materials were processed at mixed recycling facilities, the materials shipped for recycling and residual trash tonnages hauled to landfills were compared with tonnage input from load tickets. This "reconciliation" served as the basis for development of recycling rates.

☐ **STEP 19: DEVELOP TRAINING PROGRAM**

Training guide:

It is a good idea to provide training to contractors and haulers to ensure they understand the diversion program and will implement it. It is just as important to train inspectors and field personnel in diversion program components.

The City of Los Angeles developed a training guide entitled *Northridge Earthquake Recycling Requirements for C-21 Contractors* which lists the City's requirements, materials specifications, and recycling and disposal facilities. All haulers were given the manual and trained on program guidelines.

Educate haulers:

One of the most difficult aspects of the program may be educating the haulers on the preferable sites to haul the material to and then ensuring that they followed through on the instructions.

As an example, the City of Los Angeles placed recycling facilities in higher preference to mixed disposal facilities. However, the recycling facilities may not have been the most preferable facility in the hauler's mind. The hauler may have chosen a facility based on distance, familiarity, or absence of truck scales on route rather than recyclability of material or disposal cost since the City bore the brunt of these costs.

Prepare guidelines for private haulers on recycling and diversion of C&D materials, facilities to use, and methods to reduce contamination of materials. One way to distribute this information is to do so when building permits are issued.

☐ **STEP 20: SET UP A RECORDS RETENTION SYSTEM AND ARCHIVES**

Set up system:

It is important to establish a records retention system for the disaster debris program. At the conclusion of the City of Los Angeles' Northridge earthquake recycling programs, the City had more than 200 archive boxes of contracts, invoices, recycling data, and other administrative records. The City stored these records in preparation for a FEMA audit. Further, a computer database was developed to track the location of the archive boxes and their contents.

Guidelines:

The City of Los Angeles suggested that a records retention system include the following:

- ◆ A filing system to assure that records are organized from program inception to completion.
- ◆ Guidelines for which agency will have long-term custody of the records, who will manage the filing system and records retention database, and who will arrange access to the records for future auditors and program staff after program completion.
- ◆ Guidelines for the types of records that will be retained and those that can be recycled at program completion.
- ◆ Space requirements are identified and plans for long-term storage of archives.
- ◆ A computerized records retention system to track location of materials for future audits.

☐ **STEP 21: PREPARE A FINAL REPORT**

Why needed:

A final report of program activities and results may be required for FEMA reimbursement for diversion programs implemented. This report allows jurisdictions to evaluate program success and areas for improvement and is crucial for future disaster debris planning purposes.

Example:

The City of Los Angeles prepared a Final Report, based primarily on its curbside collection program, entitled *Northridge Earthquake Response Effort: Recycling Activities for City Sponsored Earthquake Debris Removal Program, Final Report, 9/15/95.*

The Final Report's major topic areas are presented below as an example of the types of program information that should be collected.

- ◆ program goals;
- ◆ operational approach;
- ◆ facilities used;
- ◆ program monitoring;
- ◆ recycling rates achieved for both source separated recycling and mixed debris recycling;
- ◆ program costs for tipping fees: recycling and disposal facilities; contractors (C-21 for debris removal/loading, and trucking;
- ◆ landfill space savings;
- ◆ tonnage and % of materials sent to source separated and mixed facilities;
- ◆ tonnage and % of materials recycled and disposed of;
- ◆ recycling rates by material type;
- ◆ program costs by ton - recycling compared to disposal;
- ◆ demonstrated program effectiveness, and
- ◆ lessons learned and areas for improvement.

ATTACHMENTS

- A. Federal Debris Removal Criteria.
- B. Right of Entry Agreement; Waiver of Liability.
- C. City of Los Angeles Damage Survey Report for Recycling Program.
- D. City of Los Angeles Authorization Letter.
- E. CIWMB Fact Sheets.

REFERENCES

- ◆ Northridge Earthquake Response Effort, Final Report, pp. 5-6, Issue No. 7, City of Los Angeles, 9/15/95.
- ◆ Northridge Earthquake Recycling Requirements for C-21 Contractors, City of Los Angeles, Environmental Affairs Department.
- ◆ Debris Management Course, Reference Manual, Emergency Management Institute, FEMA.
- ◆ *Resource Recycling*, August 1993.
- ◆ *Integrated Solid Waste Management*, George Tchobanoglous, et al., 1993.

ENDNOTES

1. Debris Management Course, Reference Manual, Emergency Management Institute, FEMA, pp. 15-18.
2. Debris Management Course, Reference Material, Emergency Management Institute, FEMA, pages 17-18.
3. Debris Removal Guidelines for State and Local Officials, FEMA
4. *Northridge Earthquake Response Effort, Final Report*, City of Los Angeles, Integrated Solid Waste Management Office, Issue No. 7 (9/15/95), pg. 5.
5. Ibid.
6. Earthquake Recovery Manual, OES, Chp. 14, page 219
7. Northridge Earthquake Response Effort, pages 5-6, Issue No. 6, 7/11/95
8. City of Los Angeles Northridge Earthquake Response Effort, Final Report, Issue No. 7, 9/15/95.

CHECKLIST

CHAPTER 3 DEBRIS MANAGEMENT PROGRAMS

- ☐ **STEP 1: Make diversion programs a priority**
 - ◆ Provide management support and resources.
 - ◆ Give management and staff authority to act to in a disaster/emergency.

- ☐ **STEP 2: Become familiar with federal debris removal criteria and guidelines.**
 - ◆ To increase your jurisdiction's preparedness.
 - ◆ Will likely determine the type and scope of debris removal and diversion programs to be established during the recovery phase.

- ☐ **STEP 3: Develop a debris removal strategy.**
 - ◆ Divide debris removal operation into two phases:
 - ◆ Phase I - emergency roadway debris removal
 - ◆ Phase II - public right-of-way debris removal and diversion program strategies
 - ◆ Coordinate removal of debris
 - ◆ develop initial assessment of disaster;
 - ◆ establish contracted work force for expeditious debris removal;
 - ◆ coordinate with transportation agencies to ensure traffic control measures expedite debris removal activities;
 - ◆ evaluate damaged utility systems, buildings, public facilities.
 - ◆ Develop debris management strategies
 - ◆ establishment of programs for recycling and reuse of the disaster debris; and
 - ◆ monitoring of removal and diversion activities.

☐ **STEP 4: Identify project scope.**

- ◆ Define project area.
- ◆ Determine if jurisdiction will remove debris from private property.
- ◆ Develop an estimate of the types and quantities of debris to be removed.
- ◆ Select temporary storage, recycling, and disposal sites.
- ◆ Determine need for processing facilities.
- ◆ Determine whether existing processing and disposal capacity is sufficient for expected volumes of debris.

☐ **STEP 5: Select debris management program(s)**

- ◆ Select programs based on assessment factors
 - ◆ materials generated;
 - ◆ facilities available;
 - ◆ temporary storage areas;
 - ◆ haulers/processors, brokers;
 - ◆ processing requirements and barriers;
 - ◆ end-uses and markets for collected materials; and
 - ◆ local conditions.
- ◆ Consider most frequently implemented programs
 - ◆ curbside;
 - ◆ building demolition; and
 - ◆ household hazardous waste.

☐ **STEP 6: Set program goals.**

- ◆ Determine recycling rate.
- ◆ Determine facility needs.
- ◆ Estimate costs for diversion.
- ◆ Increase private investment.
- ◆ Save landfill space.
- ◆ Do not charge tip fees.
- ◆ Enforce illegal dumping ordinances or regulations.

☐ **STEP 7: Identify labor needs**

- ◆ Estimate staffing requirements for diversion programs as part of staffing needed for overall recovery programs.
- ◆ List all possible sources for obtaining additional staffing
 - ◆ city/county staff from other agencies;
 - ◆ Human services agencies and non-profit organizations; and
 - ◆ volunteers.
- ◆ Enter into mutual aid agreements before disaster for staffing assistance.

☐ **STEP 8: Identify processing equipment needs**

- ◆ Compile a list of processing equipment needed to support selected diversion programs.
- ◆ Survey the following to identify the equipment available in the event of a disaster:
 - ◆ agency/department;
 - ◆ franchise hauler;
 - ◆ private sector; and
 - ◆ neighboring jurisdictions.
- ◆ List equipment needed in addition to what will be available.

☐ **STEP 9: Determine method of operation**

- ◆ Who will implement program:
 - ◆ city/county staff;
 - ◆ special engineering organization (city/county);
 - ◆ contractor.
- ◆ How will materials be collected:
 - ◆ curbside;
 - ◆ drop-off;
 - ◆ source separated;
 - ◆ bins;
 - ◆ roll-offs.
- ◆ Determine how collection routes will be established.
- ◆ Determine how materials will be identified:
 - ◆ geographic information system;
 - ◆ pick-up crews drive through neighborhood;
 - ◆ hotline for public.

- ◆ Possible approaches:
 - ◆ contract language;
 - ◆ authorization letter;
 - ◆ recycling plans;
 - ◆ performance criteria;
 - ◆ monitoring and enforcement;
 - ◆ valid solid waste facilities permit.

☐ **STEP 10: Adapt program length**

- ◆ Consider factors influencing program length:
 - ◆ FEMA timelines for completion of debris removal projects;
 - ◆ FEMA funding for programs in six month increments;
 - ◆ extent and severity of disaster;
 - ◆ time when residents/business receive insurance, FEMA and Small Business Assistance checks;
 - ◆ ability of contractors to keep up with demand for services;
 - ◆ delays in insurance, loan checks;
 - ◆ delays in repairs; and
 - ◆ extent of rebuilding.
- ◆ Develop local criteria to determine if time extension or additional funding is needed based on:
 - ◆ daily loads;
 - ◆ tonnages;
 - ◆ number of demands for debris pickup from the public; and
 - ◆ number of requests for disaster-related building permits.

☐ **STEP 11: Review funding options.**

- ◆ Identify local or private funds that can be used to start program until receive FEMA reimbursement.
 - ◆ Determine ability to use General Fund.
 - ◆ Evaluate possibility of acquiring a loan.
 - ◆ Explore use of private funds.
- ◆ Prepare documentation re local policy for diversion/recycling.
 - ◆ City Council//Board of Supervisors resolution;
 - ◆ debris management plan;
 - ◆ ordinance.

☐ **STEP 12: Establish public information program.**

- ◆ Set goals
 - ◆ advertise debris management programs to public;
 - ◆ educate residents and contractors about diversion programs.
- ◆ Coordinate with city/county public information officer to develop awareness campaign:
 - ◆ newspaper ads;
 - ◆ doorhangers;
 - ◆ neighborhood newspapers;
 - ◆ TV/radio;
 - ◆ Good Year Blimp.
- ◆ Establish public information or media center to handle debris questions from the public (mobile center).
- ◆ Develop contact list for the media
- ◆ Set up hotline for debris pickup and to answer questions about diversion programs.
- ◆ Identify all target groups and where they reside.
- ◆ Get maps from OES of geographic areas and languages spoken.
- ◆ Determine need for interpreters and translators.
- ◆ Check into sharing costs with neighboring jurisdictions for advertising diversion programs.
- ◆ Develop Public Information Mutual Aid Agreement.

☐ **STEP 13: Develop monitoring and enforcement program.**

- ◆ Garner the support and cooperation of those in authority to institute the monitoring program.
- ◆ Dedicate sufficient resources to ensure program success.
- ◆ Develop methods to monitor and enforce recycling and diversion guidelines.
- ◆ Establish guidelines for compliance and incorporate as part of contract.
- ◆ Develop tracking system to verify amounts and types of materials diverted and disposed to document FEMA reimbursement and to calculate recycling rates.
- ◆ Special monitoring issues:
 - ◆ site delays;
 - ◆ overweight trucks;

- ◆ excessively wet debris; and
- ◆ excessive dirt.

☐ **STEP 14: Identify program barriers.**

- ◆ blockage of major transportation corridors;
- ◆ closure of recycling or disposal facilities;
- ◆ lack of funding;
- ◆ lack of temporary storage areas (see Chp. 4);
- ◆ illegal dumping at temporary storage areas (see Chp 4);
- ◆ limited markets for targeted waste types;
- ◆ limited contractors available;
- ◆ residents, businesses, and other governmental; agencies cleaning up independently of the city/county-sponsored program;
- ◆ liability in carrying out program;
- ◆ waste generated as a result of rebuilding ;
- ◆ non-disaster waste;
- ◆ source separation vs. commingled waste;
- ◆ lack of mixed waste facilities; and
- ◆ coordination with CalTrans.

☐ **STEP 15: Develop a contingency plan.**

- ◆ Provide temporary storage of the collected materials.
- ◆ Develop policy to deal with putrescibles and with waste from the public until a diversion program is implemented.
- ◆ Make arrangements with neighboring jurisdictions or, if applicable, private landfill owners to use their facilities.
- ◆ Develop alternate transportation routes.
- ◆ Develop policy on how to fund programs initially until state and federal funding becomes available.
- ◆ Prepare list of contractors in the area who have the abilities and equipment to handle the work and can respond in an emergency.
- ◆ Prepare list of pre-qualified contractors to expedite the contracting process.
- ◆ Develop agreement with franchise hauler to handle the influx of disaster debris.
- ◆ Write disaster clause into the franchise agreement.

- ◆ Add provision in debris removal contracts requiring the contractor to develop markets for recycling and reuse for collected materials.

☐ **STEP 16: Pursue regional coordination.**

- ◆ Coordinate diversion programs with neighboring jurisdictions.
- ◆ Share costs in implementing diversion and public information programs.
- ◆ If coordinating program with neighboring jurisdiction(s), check with FEMA and OES to determine how program will be reimbursed.

☐ **STEP 17: Develop incentives for diversion.**

- ◆ No tipping fee, or reduced tipping fee, for recycling/reuse.
- ◆ Non-compliance fee for disposing of disaster debris: hauler, landfill, processor.
- ◆ Local ordinances requiring applicants for permits for new construction and demolition to submit a waste management plan showing materials to be diverted or salvaged.
- ◆ Issuance of new construction and demolition permits with list of recycling facilities attached.
- ◆ Establish priority of siting new recycling facilities over permitting new disposal facilities.
- ◆ Institute ban on landfilling of, or adding surcharge to, reusable or recyclable materials.

☐ **STEP 18: Set up accounting/tracking system for debris programs.**

- ◆ Verify payment to haulers, facilities.
- ◆ Document recycling rates.
- ◆ Satisfy state and federal reporting requirements and establish an audit trail.
- ◆ Prepare program documentation - evaluate recycling rate and operational issues.

☐ **STEP 19: Develop a training program.**

- ◆ Write program guidelines.

- ◆ Train contractors and haulers re diversion program guidelines.
- ◆ Develop guidelines for private haulers.

☐ **STEP 20: Set up records retention system and archives.**

- ◆ Include the following in a records retention system:
 - ◆ A filing system organizing records from program inception to completion.
- ◆ Guidelines for:
 - ◆ agency to have long-term custody of records,
 - ◆ who will manage the filing system and records retention database, and
 - ◆ who will arrange access to the records for future auditors and program staff after program completion.
- ◆ Guidelines for the types of records that will be retained and those that can be recycled at program completion.
- ◆ Space requirements and plans for long-term storage of archives.
- ◆ Computerized records retention system to track location of materials for future audits.

☐ **STEP 21: Prepare a final report of program activities and results.**

- ◆ May be required for FEMA reimbursement.
- ◆ Allows jurisdiction to evaluate program success and areas for improvement.
- ◆ Crucial for future disaster debris planning purposes.
- ◆ Examples of types of information to include in report:
 - ◆ program goals;
 - ◆ operational approach;
 - ◆ recycling and disposal facilities used;
 - ◆ program monitoring;
 - ◆ recycling rates;
 - ◆ program costs for tipping fees;
 - ◆ landfill space savings;
 - ◆ tonnage and percentage of materials sent to source separated and mixed waste facilities;
 - ◆ tonnage and percentage of materials recycled and disposed of;

Checklist

Debris Management Programs

- ◆ recycling rates by material type;
- ◆ programs costs by ton (recycling vs. disposal;
- ◆ demonstrated program effectiveness; and
- ◆ lessons learned and areas for improvement.