

Public Assistance Debris Monitoring Guide

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FEMA



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Purpose

When a disaster or emergency that generates large amounts of debris occurs, the Federal Emergency Management Agency (FEMA), through its Public Assistance (PA) program, may reimburse eligible PA Applicants, including State, local, tribal, and territorial (SLTT) governments and certain Private Nonprofit (PNP) organizations, for costs associated with debris removal operations.

This *Debris Monitoring Guide* provides PA Applicants and Recipients (States, Territories, or Tribes that are the pass-through entity between the Applicant and FEMA) with guidance on monitoring debris removal operations and eligibility requirements associated with necessary work and reasonable costs to carry out a debris monitoring program.

Executive Summary

Effective coordination is required between the Applicant, the Recipient, and FEMA to ensure that debris removal operations are efficient, effective, and eligible for FEMA PA grant funding. Applicants must monitor their debris removal operations and document work and costs that may be eligible for reimbursement through the PA grant program. Monitoring debris removal operations requires observation and documentation of all work from the point of debris collection to final disposal. This is to ensure that all work performed is in accordance with PA guidelines and all applicable Federal and SLTT laws and regulations. Failure to properly monitor debris removal operations may jeopardize PA funding.

In monitoring all aspects of its debris removal operations, including activities at all loading, staging, and disposal sites, the Applicant can use its own staff (force account labor) or procure a contract for these services. Applicants are required to use competitive contract bidding procedures when procuring these services, unless circumstances only allow for a noncompetitive method of procurement. Contracting out debris monitoring services does not absolve the Applicant of their responsibility to supervise the performance of the contract. The Applicant should provide clear direction, direct supervision, and a system of control and verification of the performance of debris monitoring contract services. Overall, Applicants are strongly encouraged to work with SLTT emergency management staff and FEMA to ensure compliance with the provisions of the PA program.

While the Applicant has the primary responsibility for daily monitoring operations, the Recipient is responsible for verifying that those monitoring activities are implemented. The primary role of FEMA is to provide technical assistance and debris monitoring guidance to ensure that PA grant requirements and eligibility criteria are met by the Applicant in all areas of the debris operation. FEMA will evaluate the level of effort of debris monitoring operations for reasonableness when determining the eligibility of debris monitoring costs. The level of effort for debris monitoring operations should be proportionate with the magnitude of the disaster, the types and quantities of debris to be removed, and the scope of the debris removal operation.

A good debris monitoring program should ensure accurate documentation of debris removal and disposal operations and associated costs. This documentation serves as the basis for PA Project Worksheets (PWs), which document work and costs eligible for reimbursement from FEMA. Debris monitoring documentation is critical to verify that debris operations are eligible for reimbursement, costs are reasonable, debris quantities are accurate, debris is tracked to its final disposition, and all work and costs comply with regulatory requirements.

Pursuant to FEMA Directive 112-12, this guidance will have a review cycle of no greater than three years. The FEMA PA Division will be responsible for any updates and changes to this guidance.

Chapter 1: General Eligibility Requirements

In order for debris removal activities to be eligible for PA program funding, debris must be generated by a Presidentially declared disaster; be located within the designated disaster area; be the legal responsibility of an eligible Applicant to remove; and present an immediate threat to life, improved property, or public health and safety. Applicants should consult FEMA's *Public Assistance Program and Policy Guide*¹ (PAPPG), which provides comprehensive information regarding FEMA assistance and the requirements that Applicants must meet in order to receive assistance for debris removal activities.

A. Eligible Debris Monitoring Work and Costs

The Applicant is responsible for monitoring debris operations to ensure that debris removal activities claimed to the FEMA PA program for reimbursement are completed in accordance with contract specifications and other supplemental guidance, PA program eligibility criteria, and applicable Federal and SLTT laws, regulations and other requirements. FEMA PA personnel will determine eligibility based on the defined scope of work (SOW) of the debris removal operation, field observations, documentation, and reasonable costs. Eligible activities should be clearly documented on loading tickets and the summary of debris totals.

Reasonable costs associated with the following debris monitoring activities may be eligible for PA funding:

- Labor and material costs associated with debris monitoring staff such as field supervisors, loading and tower/site monitors, and staff needed to complete documentation as necessary to substantiate PA grant funding;
- Data compilation of load tickets and field debris monitoring reports to verify eligible work and costs invoiced by the debris removal contractor (if under contract);
- Training of debris monitors on debris removal operations, debris monitoring and documentation processes, and FEMA eligibility (FEMA can provide training to Applicant debris monitors upon request); and/or
- Use of electronic load ticket system or automated debris monitoring system (ADMS) to document debris quantities and eligibility. The Applicant should demonstrate through a cost analysis that the use of the system is cost effective and the cost is reasonable.

B. Reasonable Cost Guidance

Costs associated with debris monitoring must be reasonable and necessary.² Competitively bid debris monitoring contracts that comply with Federal and SLTT procurement regulations and procedures will help to establish reasonableness for debris monitoring costs. Federal procurement standards are found in Title 2 Part 200 of the *Code of Federal Regulations*.³

¹ *Public Assistance Program and Policy Guide* (PAPPG) Version 4 located at: www.fema.gov/sites/default/files/2020-06/fema_public-assistance-program-and-policy-guide_v4_6-1-2020.pdf

² 2 Code of Federal Regulations (C.F.R.) Part 200, Subparts D and E.

³ 2 C.F.R. §§ 200.317 - 200.327.

In determining if costs are reasonable, FEMA performs a preliminary review of the documentation to assess the complexity of the project and expertise required to conduct the work. Specific to debris monitoring, FEMA determines reasonableness⁴ by evaluating:

- **Labor:** Are labor rates, labor classifications, and number of proposed labor hours reasonable for the proposed SOW? The labor rates should be commensurate with the skill level required by the job function. Professional engineers and those with similar qualifications are not required to perform debris monitoring duties.
- **Materials and Supplies:** Are costs necessary and reasonable for the materials and supplies, considering the type of work being performed.
- **Profit:** Was profit negotiated as a separate element of the contract price?⁵

Project Management and Design Services

Costs which are considered project management and/or design services⁶ differ from eligible debris monitoring costs. Project management and design services are expenses for the initial design and oversight of work performed related to an eligible project from the design phase (when necessary) to the completion of work. These costs should be documented and claimed separately. The eligibility of this work and its cost will be evaluated on a case-by-case basis.

Such project management and/or design services may include costs associated with direct management and oversight of the debris removal operation by an Applicant's force account labor or by a consulting firm retained to analyze, design, and oversee the debris removal operation. These costs may also include labor costs associated with project management services for the debris removal operation, developing reports to establish contractor performance measures, and evaluating operational efficiency. These costs are separate and distinct from costs related to management and administration of PA awards and subawards.⁷

⁴ Chapter 6:I.A. Reasonable Cost Analysis of the PAPPG (V4).

⁵ 2 C.F.R. § 200.323(b).

⁶ Chapter 6:XV. Project Management and Design Services of the PAPPG (V4).

⁷ Chapter 6:XVI. Grant Management and Administration of the PAPPG (V4).

Chapter 2: Debris Monitoring Roles and Responsibilities

The Applicant has the primary responsibility for monitoring its debris removal operations. The Recipient, as a pass-through entity, is responsible for ensuring that Applicants comply with grant conditions and monitoring the activities of the Applicant. FEMA provides guidance and technical assistance and makes final eligibility determinations related to debris-related work and costs.

A. Applicant's Role and Responsibilities

Applicants are required to maintain oversight to ensure that contractors perform in accordance with the terms, conditions, and specifications of their contracts or purchase orders.⁸ Debris monitors serve as the Applicant's field representatives. They ensure that the terms and specific monitoring and documentation requirements of debris removal contracts are adhered to and met. Having a debris monitor does not relieve Applicants of the obligation to maintain oversight over both the debris monitoring and debris removal costs.

FEMA recommends that Applicants clearly outline their debris monitoring requirements in their debris management plan, requests for proposals (RFPs), and debris removal contracts. These documents should include instructions on actions the Applicant needs to take to document and correct non-compliance issues. If an Applicant undertakes work that is ineligible for FEMA funding, a methodology should also be established to separate ineligible work from eligible work. Optimally, this methodology should be discussed with the Recipient and FEMA prior to implementation to ascertain compliance. Refer to Appendix B: Sample Debris Monitoring Plan and Monitoring Forms for a sample debris monitoring plan, including monitoring forms and refer to Appendix C: Monitoring Contract Process/Documents for Contract documents.

B. Recipient's Role and Responsibilities

While the Applicant has the primary responsibility for daily monitoring operations, the Recipient is responsible for verifying that those monitoring activities are implemented. As Recipient, the State or Tribe are the pass-through entity between the Applicant and FEMA. The Recipient should ensure that the Applicant is complying with all grant requirements and is performing adequate monitoring. The Recipient may conduct random monitoring at loading and disposal sites to ensure compliance with PA grant requirements. Refer to Appendix A: Field Reference Guides for more information.

⁸ 2 C.F.R. § 200.318(b).

C. FEMA Public Assistance Role and Responsibilities

The primary role of FEMA is to provide technical and debris monitoring guidance to ensure that PA grant requirements and work and costs in all areas of the debris operation meet PA eligibility criteria. FEMA may also conduct random, periodic checks of debris loading, staging, reduction, and disposal sites. FEMA is responsible for:

- Determining whether the debris removal activities are eligible;
- Verifying compliance with all environmental and historic preservation laws and executive orders; and
- Reporting any noncompliance, misconduct, or other issues for resolution with the Recipient and Applicant.

In disasters where the estimated amount of debris is 200,000 cubic yards (CY) or greater, the Federal Coordinating Officer (FCO) may provide technical expertise and advise to the Recipient or Applicant on debris monitoring through a mission assignment with the U.S. Army Corps of Engineers (USACE).

FEMA does not direct field operations on behalf of the Applicant. FEMA is not a party to the Applicant's contract and will not resolve disputes. The Applicant is responsible for implementing and managing its debris removal and monitoring activities. Refer to Appendix A: Field Reference Guides for additional information.

Chapter 3: Debris Monitoring Resources and Duties

A. Force Account Resources

Applicants are encouraged to use their own employees (force account labor) to monitor debris removal operations.⁹ An Applicant's own employees are the most familiar with the jurisdiction and know the priorities of the Applicant's debris management plan.

Other benefits of using force account labor for debris monitoring include:

- The local workforce may be able to respond immediately after the disaster.
- Standard timesheet and equipment documentation procedures are typically adequate for documentation purposes.

B. Contractor Resources

An Applicant may hire contractors to provide debris monitoring services. Debris monitoring contractors should not be employed by or affiliated with the debris removal contractor.

Applicants are required to use competitive contract bidding procedures when procuring these services, unless they can justify sole sourcing.¹⁰ If the Applicant, in compliance with SLTT law, wants to issue a sole source contract rather than conduct a sealed bidding process, the Applicant would have to demonstrate that there are "exigent circumstances" necessitating procurement by non-competitive methods and use of a sealed bidding process would cause an unacceptable delay. Applicants are also required to maintain proper oversight of these contracts to ensure compliance with contract terms.¹¹ The Applicant must include in the contract a termination date for the non-competitively procured contract and justify in writing why the period of performance is reasonable under the prevailing circumstances.¹² More information on debris monitoring contracts is found in Chapter 4: Debris Monitoring Contract Provisions and Methods.

C. General Debris Monitor Qualifications

Applicant debris monitors should:

- Fully understand their responsibilities in accordance with the terms of the debris removal contract and other specific guidance provided by the Applicant;
- Possess the capability to estimate debris quantities accurately and objectively;
- Understand all phases of debris management operations, including loading sites, debris management sites (DMSs), and final disposition locations;
- Be able to differentiate between debris types;
- Be able to complete load tickets properly;
- Understand site safety procedures;
- Communicate effectively and efficiently; and
- Possess previous construction site experience (preferred).

⁹ 44 C.F.R. § 206.228.

¹⁰ 2 C.F.R. § 200.320(f) or analogous state obligations if procurement under 2 C.F.R. § 200.317 auspices.

¹¹ 2 C.F.R. § 200.318(b).

¹² See generally 2 C.F.R. § 200.320(f).

- Have general knowledge pertaining to the operation of large construction machinery (preferred).

Debris monitors do not need to be registered professional engineers.

In addition to the general qualifications for debris monitors, field supervisors need to:

- Possess the ability to communicate with field staff as well as management;
- Be able to resolve conflicts and issues in the field; and
- Understand when to elevate issues to the Applicant's management.

D. Types of Debris Monitors

Applicants need to monitor all aspects of the debris removal operation, including activities at all loading, staging, and disposal sites. Debris monitors may have different roles and responsibilities at different stages or components of a debris removal operation; an individual may assume the role of each monitor type at various stages of the disaster. Debris monitors report directly to the field supervisor regarding their daily oversight. All logs and load tickets are submitted daily to the field supervisor. See Appendix A: Field Reference Guides for lists of debris monitoring duties by type of debris monitor.

Loading Site Monitors

Loading site monitors perform on-site, street-level debris monitoring at all loading sites to verify debris eligibility based on contract requirements, and initiate debris removal documentation using load tickets. Loading site debris monitors' primary duties are:

- Estimating load volumes and issuing load tickets at the load sites, retaining a copy of the ticket (for detailed description of load ticket chain-of-custody, refer to Appendix B: Sample Debris Monitoring Plan and Monitoring Forms); and
- Maintaining logs of daily subcontractor performance, eligibility, or other activities as required.
- Can be a roving monitor who follows a truck around throughout the day or checks-in on multiple loading trucks. Produces roving monitor report.

Tower/Site Monitors

Debris monitors at a DMS are often referred to as "tower" or "site" monitors." Tower/site monitors' primary duties are:

- Accurately measuring and documenting load hauling compartments prior to debris hauling operations (and recertifying on regular basis);
- Collecting and physically controlling load tickets;
- Ensuring that all debris is removed from trucks at DMSs;
- Monitoring DMS development and restoration; and
- Overseeing debris reduction (grinding, burning, chipping, etc.).

Field Supervisor

The Applicant's field supervisor resolves field operational, eligibility, and safety issues, and communicates these issues to the Applicant. They may also coordinate daily activities with FEMA, the Recipient, and Applicant field personnel. The field supervisors' primary duties are:

- Scheduling and deploying the loading and tower/site debris monitors and overseeing their daily activities at loading sites and disposal and staging sites;
- Conducting or overseeing truck certifications, load measurements, and photo-documentation as required; and
- Collecting daily logs from the debris monitors and tabulating truck load data for the daily report.

E. Reasonable Level of Effort Guidance

All costs must be associated with a reasonable level of effort, including appropriate numbers of debris monitoring personnel and clerical staff related to the scope of the debris removal operation. FEMA will evaluate the level of effort of debris monitoring operations for reasonableness when determining the eligibility of debris monitoring costs. The level of effort for debris monitoring operations should be proportionate with the magnitude of the disaster, the types and quantities of debris to be removed, and the scope of the debris removal operation. Historical data for debris monitoring operations suggests the following level of effort may be appropriate for field efforts.

Level of Effort for Debris Loading Sites

- **Rural areas:** One loading monitor may be provided for each loading device/location in order to properly observe all debris loading activity. The number of loading monitors can be amended to allow one monitor to oversee two or three contractor loading sites, if the loading activity can be properly observed from a single controlled location and the collected debris can be documented and verified as eligible or ineligible.
- **Urbanized or higher-density areas:** One loading monitor may be provided for each loading site. One loading monitor may be provided for every three to four loading sites if the loading monitor can monitor the sites via line-of-sight or a controlled access point.

Level of Effort for Debris Management Sites

- **Tower/site monitors:** Tower/site monitors are required at DMSs regardless of if the site is a temporary or a permanent one. Depending on the set-up of the DMS, a minimum of one tower/site monitor is required to document load quantities and verify that trucks are emptied. Additional tower/site monitors may be needed at exit locations to verify that trucks are emptied, or at reduction (grinding burning, chipping, etc.) locations to document and verify production rates.
- **Field supervisors:** If multiple DMSs are in operation, one field supervisor may be added for every 10 debris load site monitors, or as needed for exceptionally large and unique operations to ensure adequate management of operations.
- **Clerical/data entry support:** Typically, one or two data entry personnel can accommodate the daily data amassed when debris operations use load tickets for

documentation. Larger or faster operations with a multitude of reports may require additional clerical support. The number of clerical/data entry personnel should be adjusted to the needs of the Applicant. The use of automated debris monitoring documentation systems may significantly reduce the required level of effort for data entry support.

Chapter 4: Debris Monitoring Contract Provisions and Methods

When procuring contracts for debris removal operations and monitoring services, Applicants must use their standard procurement processes and practices that conform to SLTT procurement policies and regulations, as well as those required by Federal regulations.¹³ Failure to adequately follow procurement requirements may result in the deobligation of all or some of an Applicant's PA funding. If a Federal requirement is different than the SLTT requirements, or the Applicant's own requirements, it must use the more restrictive requirement.¹⁴

Applicants are strongly encouraged to work with SLTT emergency management staff and FEMA to ensure compliance with the provisions of the PA program, as well as other applicable statutes and regulations, if they intend to seek PA grant funding. Upon request, FEMA PA program personnel will review an Applicant's procurement process to highlight potential instances of non-compliance with the federal procurement rules.¹⁵ FEMA can also provide high-level reviews of contracts to highlight potential instances of non-compliance with the federal procurement rules.

A. General Procurement and Contract Oversight

Applicants are strongly encouraged to consider, and/or comply with, the following guidance when procuring and overseeing contracts for debris monitoring services:

Procurement Process

- Use competitive bidding procedures to meet procurement requirements for Federal grants.¹⁶
- Use abbreviated emergency procurement procedures that include an expedited competitive bid process only if time does not allow for more stringent procedures and if they are allowed under SLTT and Federal laws, codes, or ordinances.
- Maintain records regarding the history of the procurement¹⁷ and document procedures used to obtain/award contracts (procurement information, bid requests, and tabulations, etc.).
- Seek legal review of the contract from Applicant's legal counsel and the process used to procure it, to ensure compliance with all applicable Federal and SLTT requirements.

Scope of Work

- Verify that all requests for proposals, bids, and contracts have a well-defined SOW, specified costs, basis of payment, performance schedule, and descriptions of the type of service provided by each labor category and skill class.

¹³ 2 C.F.R. § 200.318(a).

¹⁴ Chapter 6:VIII.B. Procurement and Contracting Requirements for Tribal and Local Government Agencies and Private Nonprofits of the PAPPG (V4).

¹⁵ 2 C.F.R. §§ 200.317 - 200.327.

¹⁶ 2 C.F.R. § 200.319.

¹⁷ 2 C.F.R. § 200.318(i).

- Ensure that labor rates are commensurate with the skill level required by the debris monitoring job function. Professional engineers and other similar qualifications are not required to perform monitoring duties.
- Use a load ticket system (paper or electronic) to record with specificity where debris is picked up (e.g., street address) and the amount picked up, hauled, reduced, and disposed of.
- Ensure that the level of effort provided by the monitoring contractor and the contract terms is reasonable.

Reasonable Costs

- Ensure that debris monitoring contract costs are reasonable and necessary.¹⁸ Competitively bid contracts that comply with Federal and SLTT procurement regulations and procedures will help to establish reasonable costs for the work.
- The Applicant must perform a price/cost analysis for all contractors or contract modifications over the simplified acquisition threshold currently set at \$250,000.¹⁹ Additionally, profit must be negotiated as a separate element when performing a cost analysis and for each contract when there is no price competition.²⁰

Contract Requirements

- Award contracts to responsible bidders who are reputable and qualified contractors.
 - Conduct reference checks on contractors' performance history with the State's contractor licensing board and with previous clients before awarding contracts.
 - Verify that potential contractors are not on a State's "Debarred Contractor" listing.²¹
 - Check SAM.gov to verify that potential contractors have not been suspended or debarred from performing work funded by the federal government.
- Require the contractor to provide a safe working environment, including properly constructed monitoring towers.
- Ensure that complete and accurate records are kept of contractor activities and costs to include in reimbursement requests.

B. Basis of Payment

The basis of payment and the payment process must be clearly outlined in the contract. Contractor payments should be based upon verification of completed work, and the required information for the payment request should be included within the provisions of the contract.

The SOW and costs for the service are key factors in analyzing reasonable costs. When determining if a cost for debris monitoring is reasonable, FEMA considers the level of effort required for the monitoring services, supervision, and support services to perform the job requirements effectively and efficiently. Debris monitoring services should be tailored to the scale of the debris operations, the schedule requirements, and the Applicant's overall concept of

¹⁸ 2 C.F.R. Part 200, subpart E.

¹⁹ The simplified acquisition threshold is set by the Federal Acquisition Regulation at 48 C.F.R. § 2.101. The threshold is adjusted periodically for inflation.

²⁰ 2 C.F.R. § 200.324(b).

²¹ 2 C.F.R. § 200.318(h).

operations. This includes planning for the number of DMSs and final disposition sites, acceptable travel distances, truck routes, neighborhood safety issues, personnel planning, and documentation requirements.

The debris monitoring contract must include the applicable contract provisions addressing payment, contract duration, performance measures, termination for convenience, termination for cause, and a conflict resolution process, and any other required contract provisions.²² The Applicant should:

- Consider using a progress payment method for contract services. This method requires specific documentation from the contractor to verify and validate the completed work and support the contractor's invoices.
- Provide supervision and oversight of the debris monitoring operations to ensure that only approved and necessary hours are applied to the debris monitoring contract. Applicants are required to maintain contractor oversight to ensure that contractors perform in accordance with the terms, conditions, and specifications of their contracts or purchase orders.²³
- Confer with the contractor to determine the deployment of monitors, daily schedules, and the number of personnel, supervisors, and clerical/data support assigned at any given time.

Generally, documentation for debris monitoring reimbursement includes:

- Personnel assignments, duties, and responsibilities
- Timesheets
- Debris monitoring reports
- Debris totals (CY and tonnage)
- DMS reports
- Exception reports (when debris monitoring reveals problems with debris operations)
- Truck/Trailer Certification reports
- Geographic information system (GIS) planning and progress reports
- Debris progress reports
- Safety reports

C. Duration of Contract

Debris removal and monitoring services contracts should include specific timelines for work to be completed. The contract should clearly state the duration and the scheduled milestones. By doing so, the Applicant sets clear expectations for the contractor. Moreover, the contractor can effectively manage resources and schedule work to meet the Applicant's requirements. The Applicant should determine the contractor's mobilization requirements (e.g., whether debris monitors are required during the debris clearance phase).

²² 2 C.F.R. § 200.327.

²³ 2 C.F.R. § 200.318(b).

D. Performance Measures and Termination Clause

The contract should include performance measures that specify how performance will be evaluated and measured, including the size and number of monitoring crews, the number of truckloads monitored each day by the monitoring crews, the number of truckloads arriving at each DMS or final disposition site, the processing rate for a reduction site, and the number of monitoring crews in relation to the debris removal crews. Additionally, all contracts in excess of \$10,000 must address termination for cause and for convenience by the non-Federal entity, including the manner by which termination will be effected and the basis for settlement. This clause should describe probable reasons for termination.

E. Conflict Resolution Process

The conflict resolution process should be well defined in the contract. The process should include alternatives for mediation in case an issue proves difficult to resolve. Contracts in excess of \$250,000 must include a remedies clause that addresses administrative, contractual, or legal remedies in instances where contractors violate or breach contract terms and provide for such sanctions and penalties as appropriate.²⁴

F. Types of Debris Removal Contracts

There are several types of debris removal contracts and each type of debris removal contract has variables that can dictate adaptations to the necessary debris monitoring activities to protect the Applicant's interests. The different types of contracts, specific contract provisions, monitoring efforts, and documentation requirements are described in this discussion and summarized in Table 1 at the end of Section 6. The most common types of debris removal contracts are unit price, lump-sum, and time-and-materials (refer to Appendix A: Field Reference Guides).

Unit Price

Unit price contracts are used when the individual work tasks are known, but the total amount of work cannot be known in advance. Units of work can be measured in terms of weight, volume, or any other quantifiable measure (Figure 1). The contractor uses estimated quantities to establish a total contract price.

²⁴ 2 C.F.R. § 200.327.

Since a unit price contract is initiated based on an estimate of debris quantities, documentation of the location, eligibility, and quantities of debris (CY or tonnage) during the debris processing is essential.

- Debris monitoring is essential during pick up, transportation, eligibility determination, segregation, staging, reduction, and final disposition.
- The Applicant should manage the measurement of the trucks/trailers used to haul the debris. The volume of each truck should be measured and certified before being allowed into service.



Figure 1: Debris Monitors Determine Type and Quantity of Debris

Lump-Sum

Lump-sum contracts are used when the SOW can be identified and quantified. Bid requests for lump-sum contracts include a set of specifications that have a well-defined SOW for a finite amount of time.

The advantage of a lump-sum contract is that the total price for the specified work is known at the time the contract is awarded. For example, 250 tons of mulched debris hauled from 1000 N. Debris Road to the county landfill at 3450 S. Main Street will equal \$XX,XXX.

Loading monitors are required to validate that only contract-identified debris is collected. These quantities should match the quantities identified in the debris removal contract.

- The DMS site/tower monitors should carefully review the processing of materials, especially the quantities of materials collected for processing (grinding, burning, chipping, etc.), and the quantities at the back end of the processing.
- Documentation of truckloads and debris volumes are still needed if the final tally of debris quantities vary significantly from the original contract estimates; change orders may be necessary to adjust the contract price. This documentation is essential to establish final debris volumes.
- When applicable, the debris quantities entering a DMS should be compared with the debris quantities that have been processed. For example, chip piles or outbound truckloads can be measured to corroborate the debris volumes.

Time-and-Materials

A time-and-materials contract establishes hourly rates for labor and equipment that will be used to perform specific tasks. For example, backhoe with loader, X CY bucket, and operator = \$XX/hour. The contractor is paid based on the sum of the actual cost of materials and the direct

labor hours charged at a fixed hourly rate that reflect wages, general and administrative expense, and profit.²⁵

Applicants should work closely with the SLTT and FEMA when awarding such contracts to ensure PA eligibility requirements are met. The following requirements apply to time-and-materials contracts and must be memorialized:

- Use only after determining that no other contract type is suitable;
- Time-and-materials contract must contain a not-to-exceed clause;²⁶
- The contract must include a ceiling price which the contractor exceeds at its own risk;
- The Applicant must maintain a high degree of contractor oversight to avoid any unnecessary cost overruns; and
- Once the scope of work becomes clear, the Applicant must transition to a more suitable contract type.



Figure 2: Type and Duration of Equipment Used Must Be Documented

A higher level of monitoring of time-and-materials contracts is required. Debris monitors should produce daily inspection reports that clearly quantify the amount of work accomplished each day, including:

- The number of hours worked (scheduled work hours/crew size).
- The type and quantity of each type of truck/trailer/equipment used (Figure 2).
- Verification of equipment hours. Only active work hours should be submitted for FEMA reimbursement.
- Standby time is not eligible for FEMA reimbursement.
- Verification of labor hours as compared to equipment hours. Intermittent use of equipment may result in a crew having more equipment hours than labor hours; this type of discrepancy needs to be verified by the debris monitors.
- The weather conditions as they affect daily work.
- Production rates for each staging and reduction site.
- Quantities of debris hauled (CY or per ton). If debris is hauled based on CY, load tickets may be used as a way of checking contractor efficiency.

²⁵ 2 C.F.R. § 200.318(j)(1).

²⁶ 2 C.F.R. § 200.318(j).

Table 1 outlines the monitoring requirements for each type of contract.

Table 1: Monitoring Requirements by Contract Type

Contract Type	Scope of Work	Monitoring Required					Comments
		Crew Efficiency	Collection Site	DWSS	Disposal Site	Compliance	
Lump-Sum	Defined debris quantities and reasonable costs. Estimate is basis for contract costs.		✓		✓		<ul style="list-style-type: none"> Assess debris eligibility at collection site Quantities are required to determine reasonable costs and establish change orders Ensure ONLY debris from within contract limits is processed
Unit Price – CY	Based on eligible debris listed on load tickets.	✓	✓	✓	✓	✓	<ul style="list-style-type: none"> Assess debris eligibility at collection site Document debris quantities Verify debris processing volumes
Unit Price – Ton	Based on actual weight measurements of eligible debris listed on load tickets.	✓	✓	✓	✓	✓	<ul style="list-style-type: none"> Assess debris eligibility at collection site Document debris quantities Verify debris processing weights Verify calibration of scales
Time-and-Materials	Based on labor, equipment, and materials records. Reasonable costs evaluated by determining costs per unit.	✓	✓		✓	✓	<ul style="list-style-type: none"> Assess debris eligibility at collection site Typically used for road clearance activities during the Response Phase Supervising and monitoring every work crew is required Tracking debris removal quantities is still required to determine reasonable costs

Chapter 5: Debris Monitoring by Debris Type

Debris monitoring considerations and responsibilities may vary depending on the type of debris being removed. Debris monitoring considerations for each of the primary debris types are described below. Refer to Appendix A: Field Reference Guides for additional debris monitoring recommendations.

A. Vegetative Debris

Vegetative debris may consist of whole trees, tree stumps, tree branches, tree trunks, and other leafy material. Depending on the size of the debris, the collection of vegetative debris may require the use of flatbed trucks, dump trucks, and grapple loaders. For consideration:

- Hand-loaded trucks/trailers are graded at 50 percent of a load because of the low compaction achieved by hand-loading.²⁷
- This type of debris may be recyclable or have salvage value. Document separation and salvage operations when implemented.
- For special vegetative debris considerations, refer to the PAPPG.²⁸



Figure 3: Hand-Loaded Truck

B. Construction and Demolition Debris

Construction and demolition (C&D) debris can be defined as damaged components of buildings and structures, such as lumber and wood, gypsum wallboard, glass, metal, roofing material, tile, carpeting and floor coverings, window coverings, pipe, concrete,²⁹ fully cured asphalt, equipment, furnishings, and fixtures. The definition of C&D debris may vary between jurisdictions and what is included in one jurisdiction may be excluded in another. When monitoring, consider that the C&D debris must be disaster-generated (i.e., eligible C&D debris cannot be the result of an Applicant's rebuilding efforts) and must present an immediate threat to be considered for FEMA eligibility.

C. Hazardous Waste

The Applicant must comply with Federal and SLTT environmental requirements for handling hazardous waste. Acceptable FEMA reimbursable activities related to hazardous materials are described in the PAPPG.³⁰ Hazardous waste is regulated under the Resource Conservation and Recovery Act (RCRA) and contains properties that make it potentially harmful to human health or the environment. In regulatory terms, a RCRA hazardous waste is a waste that appears on one of the four hazardous waste lists³¹ or exhibits at least one of the following four characteristics:

²⁷ Chapter 7:I.E.3. Hand-Loaded Trucks and Trailers of the PAPPG (V4).

²⁸ Chapter 7:I.B. Hazardous Limbs, Trees, and Stumps of the PAPPG (V4).

²⁹ Chapter 7:II.U.4. Ineligible Work of the PAPPG (V4).

³⁰ Chapter 7:II.K. Hazardous Materials of the PAPPG (V4).

³¹ 40 C.F.R. Part 261.

- Ignitability
- Corrosivity
- Reactivity
- Toxicity

When monitoring, consider:

- Hazardous wastes may require segregation and special handling (Figure 4).
- Improper segregation of the hazardous waste debris should be documented.
- If unsafe practices are observed during the handling and disposal of hazardous materials, the appropriate authorities should be notified.
- Safety precautions will vary depending upon the circumstances and type of hazardous materials encountered, but they may include personal protective equipment, decontamination stations, closed and secured containers, and covered trucks or specialized containers.
- Monitor hazardous material processing carefully and regularly to verify that proper precautions are taken and that the chain-of-custody is maintained.
- Verify that hazardous materials are delivered to an appropriate DMS since hazardous wastes typically require special handling, transportation, and final disposition that are significantly more costly than typical waste disposal.



Figure 4: Segregation of Hazardous Debris

D. Household Hazardous Waste

Household Hazardous Waste (HHW) refers to hazardous products and materials that are used and disposed of by residential consumers, rather than commercial or industrial consumers. HHW include, but are not limited to, some paints, stains, varnishes, solvents, pesticides, and other products or materials containing volatile chemicals that catch fire, react, or explode under certain circumstances, or that are corrosive or toxic. When monitoring:

- Verify and document that HHW is picked up and handled by specialists licensed by the Recipient's Department of Environmental Quality (DEQ) and managed in designated areas within the DMS.
- Verify and document that the chain-of-custody is maintained throughout the collection, handling, transport, and disposal of HHW.

E. Electronic Waste

Electronic waste (e-waste) refers to electronics that contain hazardous materials, such as cathode ray tubes. Examples of e-waste include, but are not limited to, computer monitors and

televisions.³² Typically, these products contain minerals and chemicals that require specific disposal methods. When monitoring ensure that:

- E-waste is removed intact, collected, and stored at the DMS for later processing;
- E-waste complies with state e-waste requirements where applicable;
- Separation and salvage activities are implemented and documented as this type of debris may be recyclable or have salvage value; and
- E-waste is segregated (in wildfire events, white goods and E-waste may not be able to be segregated and therefore should be documented as one).

F. White Goods

White goods are defined as discarded household appliances such as refrigerators, freezers, air conditioners, heat pumps, ovens, ranges, washing machines, clothes dryers, and water heaters. Many white goods contain ozone-depleting refrigerants, mercury, or compressor oils that must be removed and processed following environmental protocols and procedures before the white goods can be further processed for disposal and recycling. When monitoring:

- Document that white goods are collected separately, cleaned, and processed to remove putrescent debris inside and to remove all oils, solvents, and refrigerants (Figure 5).
- If white goods are to be collected without being cleaned, verify and document that the DMS includes ample space for processing the collected white goods.
- This type of debris may be recyclable or have salvage value. Document separation and salvage activities that are implemented.



Figure 5: White Goods Being Staged

G. Soil, Mud, and Sand

Floods, landslides, winds, wildfires, and storm surges often result in soil, mud, and sand debris on improved public property and public rights-of-way. Facilities commonly affected by this type of debris include streets, sidewalks, storm and sanitary sewers, water treatment facilities, drainage canals and basins, parks, and public swimming pools. When monitoring:

- Document that only the disaster-generated silt and soils are removed. This requires an understanding of pre-disaster conditions as well as the documented maintenance of the affected area.
- Contaminated soils may require special handling depending on the contaminant. Document any contaminated soil issues to ensure proper handling, processing, and disposition.
- Verify that any contaminated disaster-generated soils are addressed by specialists from the State's DEQ and/or U.S. Department of Environmental Protection (EPA) and managed appropriately in designated areas.

³² 40 C.F.R. Part 261.

H. Vehicles and Vessels

Vehicles and vessels may be damaged, destroyed, displaced, or lost as a result of a disaster (Figure 6). These vehicles and vessels may eventually be abandoned because of the damage incurred or because the original owners have relocated. Vehicles and vessels may be classified as debris if they block public access and critical facilities and are abandoned.³³ When monitoring:

- Verify that each vehicle or vessel identification number is documented and processed appropriately according to applicable municipal, state, or coastal law.
- Verify that collected vehicles and vessels are transported to a collection area where they are secured and protected. Depending on the ownership, the vehicles or vessels can be returned, salvaged, or destroyed.
- Verify that all vehicles and vessels have all minerals and fluids removed before processing or destruction.
- This type of debris may be recyclable or have salvage value. Document separation and salvage activities that are implemented.



Figure 6: Boat and Vessel Debris

I. Putrescent Debris

Putrescent debris is any debris that will decompose or rot, such as animal carcasses and other fleshy organic matter. Handling of putrescent debris must comply with applicable Federal and SLTT requirements. When monitoring:

- Document that putrescent debris is collected in accordance with contract specifications or other specific requirements.
- Document the volume of putrescent debris. The volume of putrescent materials cannot be determined based solely on the volume of the originally inventoried materials because the spoiled materials may have lost a significant portion of their volume. The actual volume at the time of removal needs to be documented.

J. Infectious Waste

Infectious waste is waste capable of causing infections in humans and can include contaminated animal waste, human blood and blood products, medical waste, pathological waste, and discarded sharps (needles, scalpels, or broken medical instruments). Clearance, removal, and disposal of infectious waste may be under the authority of another Federal agency (the Centers for Disease Control and Prevention, EPA, etc.) or applicable state agency. Upon review of applicable Federal statutes, regulations, and policies governing infectious waste, FEMA will determine eligibility on a case-by-case basis. When monitoring:

³³ Chapter 7:I.D. Privately Owned Vehicles and Vessels on Public Property of the PAPPG (V4).

- Document that the disaster-related infectious waste is collected and separated in accordance with prescribed safety and medical practices. SLTT or Federal health officials may dictate the collection process, including collection containers, protective gear, decontamination requirements, and disposal methods.
- The collection method and the volume of debris should be documented.
- Verify that chains-of-custody of the collected materials are maintained. Based on the condition and type of materials, this debris may require special handling, containerization, and disposal, including incineration.

K. Chemical, Biological, Radiological, and Nuclear-Contaminated Debris

Chemical, biological, radiological, and nuclear (CBRN)-contaminated debris is any debris contaminated by chemical, biological, radiological, or nuclear materials as a result of a natural or man-made disaster, such as a weapon of mass destruction event. The clearance, removal, and disposal of CBRN-contaminated debris should be performed in accordance with applicable Federal statutes, regulations, policies, and other guidance documents. When monitoring:

- Man-made disasters may create debris that is considered evidence as part of a crime scene. Law enforcement officials may need to clear the activities before debris operations can begin. Monitors should ensure the CBRN-contaminated debris is cleared by law enforcement officials before removal so as not to undermine the integrity of the crime scene. Debris operations may also proceed concurrently with incident investigations.
- Be aware of the types of evidentiary material being sought in case CBRN-contaminated debris is encountered outside the identified crime scene area.
- CBRN-contaminated debris may be either disposed of or taken to a special collection area for further processing. Verify and document that separation, processing, and disposal follow the prescribed procedures.

Type of Waste	Examples
Hazardous Waste	Any debris containing any of the characteristics of ignitability, corrosivity, reactivity, or toxicity
Household Hazardous Waste	Any hazardous debris disposed of by resident consumers (some paints, stains, varnishes, solvents, and pesticides)
Infectious Waste	Any debris that can cause infections in humans (animal waste, human blood and blood products, medical waste, pathological waste, and discarded sharps (needles, scalpels, or broken medical instruments))
Chemical, Biological, Radiological, and Nuclear-Contaminated Debris	Any debris contaminated by chemical, biological, radiological, or nuclear materials (weapons of mass destruction)

Chapter 6: Documenting Eligible Work and Costs

With proper documentation, an Applicant may fully account for debris clearance and removal costs incurred as a result of a Presidentially declared disaster. A load ticket provides the most comprehensive information and a paper trail for FEMA PA program reimbursement. To support the documentation provided by the load tickets, monitors should use tower-monitoring logs, roving monitor reports, daily issue logs, and truck certification forms as part of their reporting process. Samples of these forms are included in Appendix B: Sample Debris Monitoring Plan and Monitoring Forms. When ADMS technology is used, the data generated should clearly display loading monitor and tower/site monitor names, load times, and locations so that an individual's daily activities can be easily reviewed.

The following describes the types of documentation that should be provided to FEMA PA to substantiate eligible work performed and associated costs for grant funding.

A. Documenting Force Account Debris Operation Costs

When an Applicant uses its own force account resources to perform debris removal and disposal work, requests for reimbursement should be supported by documentation of the labor and equipment charges incurred in the operation. This includes:

- Payroll records of full-time and temporary employees working debris removal operations.
- Records of Applicant-owned equipment used in debris removal operations, including a record of equipment hours in service, associated equipment rates, and operator name.
- Invoices of rental equipment used in the debris removal operation.
- Documentation from permitted final disposal locations including:
 - Temporary disposal permits from State DEQ if temp site is utilized and Municipal Solid Waste Permit number for final disposition.
 - Invoices of disposal tipping fees.
 - Quantities of debris disposed.
- Documentation of the location of the debris removal activities demonstrating FEMA debris eligibility and/or documentation certifying that FEMA-eligible debris work was performed.

B. Documenting Contractor Debris Operation Costs

The debris operation, if completed by contract, should have adequate controls in place to ensure contract terms are adhered to, that only specified debris is removed, and proper documentation is collected and compiled for payment purposes. Applicants should monitor the performance of their contractors and ensure that they comply with their contract terms and conditions.³⁴

When an Applicant has hired a contractor to perform debris removal work, documentation should correspond with the invoiced costs and line item prices of the debris removal contract. This documentation will be provided on monitoring forms and reports (refer to Appendix B:

³⁴ Refer to PDAT resources when procuring with Federal grant awards: www.fema.gov/procurement-disaster-assistance-team.

Sample Debris Monitoring Plan and Monitoring Forms), including load tickets and tower logs, which will provide information on:

- Locations of debris removal.
- Type of debris removed.
- FEMA debris removal eligibility determination.
- Debris quantities (volume or weight determined at inspection site).
- Identification of debris hauling truck/trailer and contractor.
- Location of permitted final debris disposal site.
- Documentation of labor, equipment, and materials charges including hours of service and associated charges (for time and materials contracts).
- Documentation of quantities of debris reduced or recycled at DMSs and associated detailed charges.
- Invoices of disposal tipping fees.

In addition to the load tickets, summaries of the information included in the load tickets are typically provided in support of an Applicant's PA funding request. FEMA and the Recipient may also request to see all backup supporting documentation and reports, including truck certification forms, tower logs, roving monitor reports, and daily issue logs used to substantiate claimed costs (refer to Appendix B: Sample Debris Monitoring Plan and Monitoring Forms).

C. Monitoring Reports

Applicants should have debris monitors submit daily reports on operational issues, including DMS operations and safety issues, to promote situational awareness and help identify and resolve issues. Regular reporting promotes quality assurance and provides the Applicant with a consistent accounting of operations, issues, and costs in the field. This information is included in reports such as tower monitor logs, roving monitor reports, and daily issue logs.

D. Electronic Load Tickets and Automated Reporting

Historically, debris monitoring operations have used the four-part paper load ticket system. Depending on the size of the event, the manual process of filling out load tickets, transferring copies, and entering data for reporting and data compilation purposes can be labor and time intensive, and can result in human error.

Automated debris management tracking systems provide real-time and automated tracking and reporting. Electronic load tickets, computer tablets, and systems employing electronic contractor ID cards allow for instant data tracking, verification, and reporting. Some systems also incorporate truck tracking systems, global positioning system (GPS) capability, and enhanced analytical capabilities of debris monitoring data.

FEMA embraces technological advancements and recognizes the potential benefits of these automated systems. As discussed in **Chapter 1: General Eligibility Requirements**, reasonable costs associated with the use of electronic load ticket systems and other automated debris monitoring systems may be eligible for PA funding.

Appendix A: Field References Guides

DEBRIS MONITOR DUTIES AND RESPONSIBILITIES		
FEMA	Applicant Debris Monitor	Applicant Field Supervisor
Safety		
<ul style="list-style-type: none"> Verify safety by identifying possible health/safety risks and requiring proper field safety gear. 	<ul style="list-style-type: none"> Ensure contractor is complying with public and employee safety standards. Ensure safety requirements on State highways and roads are observed during debris operations (load limits, truck covers, etc.). 	<ul style="list-style-type: none"> Be familiar with and maintain/ implement all safety requirements.
Eligibility		
<ul style="list-style-type: none"> Verify compliance with FEMA PA program requirements (i.e., provide eligibility guidance, timeframe requirements, and documentation and reporting requirements). 	<ul style="list-style-type: none"> Verify compliance with FEMA PA program requirements. Ensure only eligible debris is removed. Notify the field supervisor of any ineligible debris removal. 	<ul style="list-style-type: none"> Ensure that a reasonable level of effort is applied to the monitoring process, commensurate with the debris operations and the schedule. Ensure only eligible debris is noted on tickets. Ensure any ineligible activities are noted and the associated tickets are not recommended for invoicing.
Compliance		
<ul style="list-style-type: none"> Spot check debris loading, staging, reduction, and disposal sites to ensure compliance with eligibility requirements. Report any noncompliance, misconduct, or other negative actions to the assigned FEMA staff for appropriate coordination and resolution with State/Tribal and Applicant officials. 	<ul style="list-style-type: none"> Ensure all work complies with local ordinances and SLTT and Federal regulations. Monitor environmental compliance on all debris management sites (DMSs). Monitor preservation of places and buildings pertaining to the State's historic and archaeological treasures. 	<ul style="list-style-type: none"> Obtain and become familiar with the requirements outlined in all debris removal and disposal contracts to ensure the contract requirements are implemented correctly. Make unannounced visits to all loading and disposal sites in an assigned area. Take photographs of all trucks and trailers used in the debris operation, to establish a baseline inventory of equipment.

DEBRIS MONITOR DUTIES AND RESPONSIBILITIES		
FEMA	Applicant Debris Monitor	Applicant Field Supervisor
Debris Operations		
<ul style="list-style-type: none"> • Validate certification of trucks and trailers. • Evaluate operational efficiency. • Oversee documentation requirements. 	<ul style="list-style-type: none"> • Ensure trucks are measured, certified, and operated properly. • Ensure trucks are loaded properly and loads are accurately evaluated. • Verify load tickets are properly completed and controlled. 	<ul style="list-style-type: none"> • Ensure only debris from approved public areas is removed. • Assist in measuring all debris hauling trucks and trailers for truck certification. Coordinate with the appropriate contractor representatives, if applicable, to confirm certification completion.
Management and Oversight		
<ul style="list-style-type: none"> • Not Applicable 	<ul style="list-style-type: none"> • Ensure debris sites are properly mobilized and administered. • Ensure accurate recordkeeping and appropriate documentation. • Ensure contractor activities are conducted as mandated in contractor SOW. 	<ul style="list-style-type: none"> • Serve as the first line of management for debris monitors and assist with any questions or conflicts that arise. • Prepare a daily written report of all activities observed and include photographs. • Be familiar with all phases of debris management operations.

DEBRIS MONITOR DUTIES AND RESPONSIBILITIES	
Applicant Debris Loading Monitor	
Safety	
<ul style="list-style-type: none"> • Check area for safety considerations, such as downed power lines, children playing in the area, traffic control needs, and safe operation of trucks and equipment. • Implement all safety requirements. • Before work begins, inspect areas to identify covered utility meters, transformers, fire hydrants, mailboxes, etc. (as a baseline to account for any damage as a result of the debris removal operations). • Ensure that debris loads are contained properly before leaving the loading area. 	
Eligibility	
<ul style="list-style-type: none"> • Determine whether each load is to be claimed for reimbursement based on established eligibility criteria, and mark load tickets, if ineligible, for FEMA reimbursement. • Validate eligible hazardous trees, including hangers, leaners, and stumps. • Verify global positioning system (GPS) readings or an address/location for leaning trees, trees with hanging limbs, and uprooted/exposed stumps that constitute an immediate threat; a separate ticket should be written for these items if required in the contract. • Do not issue tickets for trucks that arrive at pick-up sites already loaded or partially loaded. • Ensure that force account labor and debris contractor work is within the assigned SOW. 	
Compliance	
<ul style="list-style-type: none"> • Obtain and become familiar with the requirements outlined in all debris removal and disposal contracts to ensure the contract requirements are implemented correctly. • Report to field supervisor if debris removal work does not comply with all local ordinances as well as SLTT and Federal regulations (i.e., improper disposal of hazardous wastes). 	
Debris Operations	
<ul style="list-style-type: none"> • Ensure that hazardous wastes are not mixed into loads. • Record the types of equipment used (for time-and-materials contracts). • Record the hours equipment was used, including down time of each piece of equipment by day (for time-and-materials contracts). • Ensure that only debris specified by the Applicant is collected for loading and hauling. • Ensure only debris from approved public areas is removed. • Ensure the work area is clear of debris before equipment is moved to a new loading area. • Prepare complete and accurate load tickets. • Issue load tickets for each debris load to the truck driver. • Evaluate and record performance and productivity of debris removal crews. 	
Communication	
<ul style="list-style-type: none"> • Remain in constant contact with debris management/dispatch center or field supervisor. • Report issues (such as safety concerns, contractor non-compliance, and improper equipment use) to field supervisor. • Maintain a log of debris operations issues. • Photograph and provide written documentation of any damage to utility components, driveways, road surfaces, private property, vehicles, etc. • Perform other duties as directed by designated debris management personnel. 	

DEBRIS MONITOR DUTIES AND RESPONSIBILITIES	
Applicant Debris Tower/Site Monitor	
Safety	
<ul style="list-style-type: none"> • Check area for safety considerations, such as downed power lines, children playing in the area, traffic control needs, and safe operation of trucks and equipment. • Implement all safety requirements. 	
Compliance	
<ul style="list-style-type: none"> • Obtain and become familiar with the requirements outlined in all debris removal and disposal contracts to ensure the contract requirements are implemented correctly. • Report to field supervisor if debris removal work does not comply with all local ordinances as well as SLTT and Federal regulations (i.e., improper disposal of hazardous wastes). • Coordinate with management to ensure and verify that DMSs are properly permitted for the debris reduction methods utilized. 	
Debris Operations	
<ul style="list-style-type: none"> • Ensure that hazardous wastes are not mixed into loads. • Record the types of equipment used (for time-and-materials contracts). • Record the hours equipment was used, including down time of each piece of equipment by day (for time-and-materials contracts). • Accurately measure and document load hauling compartments for trucks and trailers to compute volume capacity in CY for each truck and trailer prior to its commencement of debris hauling operations (recertify on regular basis). • Recertify and re-measure truck capacities on a regular basis. • Ensure that truck loads are accurately credited. <ul style="list-style-type: none"> ○ Estimate the percentage of full capacity for each truck or trailer load. ○ Ensure trucks are not artificially loaded (e.g., debris is wetted, fluffed, or not compacted). • Verify the origination of debris and the destination either through load tickets or electronic monitoring (ADMS). • Physically control load tickets. • Ensure that all debris is removed from trucks at DMSs. • Monitor site development and restoration of DMSs. • Oversee debris reduction (grinding, burning, chipping, etc.). 	
Communication	
<ul style="list-style-type: none"> • Remain in constant contact with debris management/dispatch center or field supervisor. • Report issues (such as safety concerns, contractor non-compliance, and improper equipment use) to field supervisor. 	

GENERAL DEBRIS MONITORING TIPS AND CONSIDERATIONS

Equipment

- The most common unit of measurement for vegetative and C&D debris is the CY. Debris trucks are evaluated for capacity at the DMS or final disposal sites. Applicants should require contractors to use appropriate equipment to load debris efficiently so that the maximum level of compaction can be achieved to facilitate expeditious removal of debris from the public rights-of-way.
- All trucks and trailers will be measured and placarded with the measured capacity of the vehicle. The Applicant should photograph all trucks/trailers to ensure that the capacity is not reduced by removing sideboards or tailgates on the truck as the debris removal operation unfolds.
- Equipment limitations affect the maximum loading capacity of some vehicles.
- **Hand-loaded trucks and trailers** cannot achieve compaction levels comparable to mechanically loaded vehicles. This effectively reduces the capacity of the hand-loaded truck or trailer compared to a truck or trailer that is loaded mechanically. Therefore, FEMA only reimburses 50 percent of the debris monitor's observed capacity for a hand-loaded truck or trailer. Example: If a hand-loaded truck or trailer appears to be 100 percent full, that load should be recorded at 50 percent. Hand-loading debris in trucks or trailers does not achieve maximum compaction, and as a result, debris removal operations take longer to complete. A hand-loaded truck hauls less debris by weight per CY than a mechanically loaded truck.³⁵
- **A truck with no tailgate or no solid tailgate** cannot be compacted to its full capacity; therefore, FEMA would automatically apply a 15 percent reduction to the total quantity and only considers a maximum of 85 percent of the certified truck capacity for reimbursement purposes.

Debris Challenges

- **Vegetative Debris Challenges:** Hazardous leaners, stumps, and hangers can be difficult to measure consistently (particularly because monitors must determine if leaners are leaning at least 30 degrees and eligible to be cut). Debris monitors should have a map of all roads and work with the Applicant's public works department to determine the length and location of the public right-of-way.
- **Construction and Demolition Debris Challenges:** Debris generated from prior construction work may be comingled with disaster-generated C&D debris by citizens. Some citizens may claim that remodeling or renovation work is C&D material too. Many people will choose to remodel a house after a storm instead of demolishing it. The materials from the remodeling are not eligible; these are notable because they look like new materials instead of disaster-damaged materials. A rule of thumb is that no bricks or foundation material would be hauled or considered eligible for FEMA PA reimbursement.
- **Hazardous Waste Challenges:** Health issues, such as headaches and vomiting, can arise at a burning site if the debris stream includes mixed debris and hazardous chemicals. Soil and air contamination can occur at the pick-up location, along the transit route, and at the DMS. Appropriate precautionary measures should be implemented when hazardous materials are identified. Further, the Applicant should implement proactive measures to ensure that all hazardous materials are identified.
- **White Goods Challenges:** When debris removal is extended beyond 90-180 days, some residents will try to discard their current appliance for free by claiming it is storm debris. The disposal requirements for white goods should include instruction on how to prepare the white goods, ensuring the materials on the curb do not present a safety hazard.
- **Animal and/or Plant Pest and Noxious Weeds Challenges:** When debris is generated from within a regulated area to suppress and control an animal/plant pest, such as the Asian Longhorn Beetle, it becomes important to ensure that the movement of debris does not allow the spread of said pest outside of the area of containment. It will be important to follow proper biosecurity measures and environmental

³⁵ Chapter 7.I.E.3 of the PAPPG.

GENERAL DEBRIS MONITORING TIPS AND CONSIDERATIONS

assessments, plus coordination with State and Federal regulators, prior to removal of debris from a containment area and similar approvals to move them to another area, especially across local/tribal/state lines.³⁶

Monitoring Tips

Monitors should be aware of situations that could impact an Applicant's reimbursement under the PA program. They should look for:

- ***Inaccurate Truck Capacities:*** Trucks should be measured before operating and load capacities should be documented by truck number. Periodically, the Applicant should pull trucks out of operation and re-measure.
- ***Trucks Not Fully Loaded:*** Do not accept the contention that loads are higher in the middle and if leveled would fill the truck. Monitors should check to see if that statement is valid.
- ***Trucks Lightly Loaded:*** Trucks may arrive loaded with treetops (or a treetop) with extensive voids in the load. Trucks need to be loaded to their full capacity with front-end loaders or other similar equipment to compress the debris materials and remove any voids.
- ***Trucks Overloaded:*** Trucks cannot receive credit for more than the measured capacity of the truck or trailer bed, even if material is above the sideboards. If a truck is measured to carry 18 CY, it cannot receive credit for more than 18 CY. However, it can receive credit for less if not fully loaded or lightly loaded as described above.
- ***Changing Truck Numbers:*** Typically, trucks are listed by an assigned vehicle number and capacity. There have been occasions where truck or trailer numbers with a smaller carrying capacity have been changed to one with a larger capacity. For instance, a 20 CY truck may have a number for a truck that can carry 30 CY. This can be detected if the Applicant periodically re-measures the trucks or records actual license plate numbers in addition to a description of the truck. Maintaining truck and trailer certifications with attached photographs at the DMS tower can assist in eliminating such activities.
- ***Reduced Truck Capacity or Increased Truck Weight:*** On some occasions, trucks have had heavy steel grating welded 2 to 3 feet above the bed after being measured, thus reducing the capacity or inflating the weight of a load. This can be detected by periodically re-measuring the truck bed or recertifying the truck tare weight.
- ***Wet Debris When Paid by Weight:*** Excessive water added to debris increases the weight of the load. This can be detected during monitoring if there is excessive water dripping from the truck bed or by inspecting the truck bed immediately after unloading. The Applicant should periodically recertify the truck tare weight.
- ***Multiple Counting of the Same Load:*** To prevent reentry with the same load, trucks should not exit the disposal site without unloading. This can be prevented by observing the time of departure and time of arrival recorded on the driver's load ticket. This check may also indicate problems with the Applicant's debris monitors at the loading or unloading site. Tower monitors should ensure the load ticket is checked in and compared to the tower log-in sheet to determine if the truck's round-trip time is appropriate.

³⁶ Please refer to this website for current operations: <https://www.aphis.usda.gov/aphis/ourfocus/planthealth/plant-pest-and-disease-programs/pests-and-diseases>.

GENERAL DEBRIS MONITORING TIPS AND CONSIDERATIONS

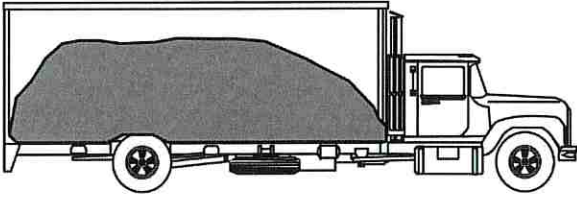
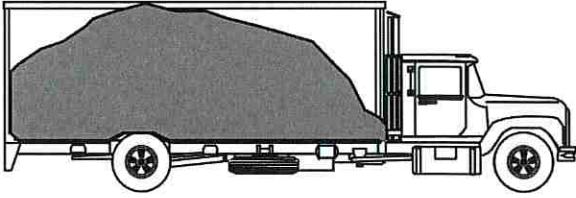
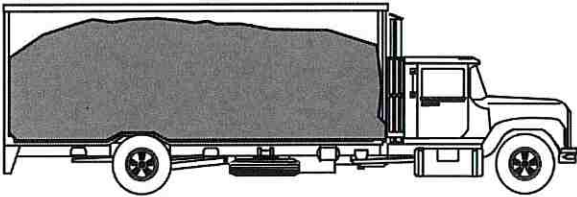
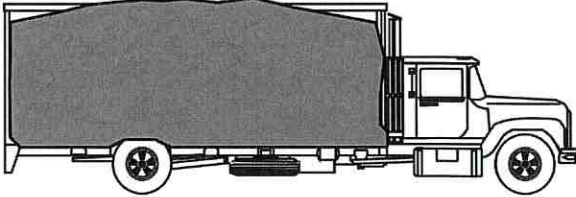
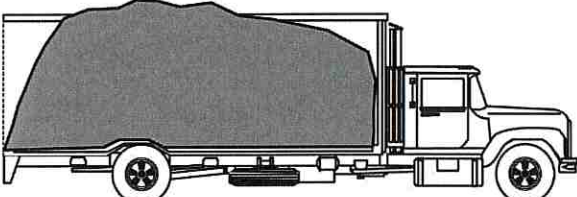
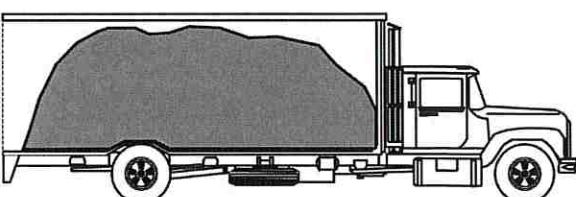
- **Picking up Ineligible Debris:** Debris monitors should be present at loading sites. Monitors should have a good understanding of eligible debris and any time limits imposed on picking up specific types of debris. Examples of ineligible debris activities include sweeping areas for abandoned cars and white goods; cleaning up illegal dump sites; removing cut trees from subdivisions under development; removing debris from private property; and removing/cutting trees from off rights-of-way in rural areas.

DEBRIS MONITOR GUIDELINES FOR ESTIMATING QUANTITIES

Monitoring Debris Trucks – Guideline for Estimating Loads in Trucks

- Check the truck number on the placard.
- Check that the capacity (size) of the truck written on the ticket matches the size marked on the side of the truck.
- Observe the truck load from the tower. Make sure that the truck is loaded with disaster debris. Ensure that the truck is not falsely loaded.
- When the truck leaves, make sure it is completely empty.
- If there is no tailgate on a truck, the truck is not full. The maximum estimate of the capacity of the load is 85 percent full. However, the monitor must use good judgment to determine if the load is really 85 percent. It is more likely that the truck is between 40 percent and 60 percent full.
- There are other percentage variations of how a truck can be filled (see illustrations and photographs that follow).
- If there is a handloaded truck, there is an automatic 50 percent reduction.

Note: It is difficult, though not impossible, for a truck to be 100 percent loaded because woody debris, trees, branches, and rubble cannot be placed in a truck without having air holes. Applicant debris monitors typically record estimated volumes in 5 percent increments. FEMA will allow a truck to be recorded as 100 percent full if debris volumes can reasonably (and safely) be estimated to meet or exceed certified truck container capacities.

DEBRIS MONITOR GUIDELINES FOR ESTIMATING QUANTITIES	
	
<p>60 Percent Debris Load in Truck</p> <p>If truck bed measured 20 cubic yards (CY), this 60 percent load would be 12 CY.</p>	<p>75 Percent Debris Load in Truck</p> <p>If truck bed measured 20 CY, this 75 percent load would be 15 CY.</p>
	
<p>85 Percent Debris Load in Truck</p> <p>If truck bed measured 20 CY, this 85 percent load would be 17 CY.</p>	<p>95 Percent Debris Load in Truck</p> <p>If truck bed measured 20 CY, this 95 percent load would be 19 CY.</p>
	
<p>85 Percent Debris Load in Truck w/ No Tailgate</p> <p>This truck has no structural tailgate—the capacity would automatically be reduced from 20 CY to 17 CY (15 percent reduction). Then the debris load itself is 85 percent of fully loaded—14.5 CY.</p>	<p>75 Percent Debris Load in Truck w/ No Tailgate</p> <p>This truck has no structural tailgate—the capacity would automatically be reduced from 20 CY to 17 CY (15 percent reduction). Then the debris load itself is 75 percent of fully loaded—12.8 CY.</p>

DEBRIS MONITOR GUIDELINES FOR ESTIMATING QUANTITIES	
	
Truck without a structural tailgate. Its maximum load is automatically reduced to 85 percent of the rated truck size.	Truck without a tailgate. Its load capacity is automatically reduced to 85 percent. Slat-sided trucks may not be capable of being mechanically compacted. This means the truck capacity should be further reduced.
	
Truck without a tailgate. Its maximum load capacity is reduced to 85 percent. This truck is claimed to be 'fully loaded' with branches sticking above the top and beyond the back of the truck bed—the actual load is only 75 percent.	Truck with branches extending above the top of the truck sides. Although claiming to be 'fully loaded,' the load is filled with air pockets and the actual load is only 70 percent of the rated load capacity.
	
This 20-CY roll-off container has a tailgate (in open position). The load appears to be near top of truck sides and was estimated at 85 percent. The assessment was done from the ground; no monitor tower was used at this DMS (see next photograph).	This is the actual load from the 20-CY container truck shown on left. It measures approximately 4 CY when on the ground.

TYPES OF DEBRIS AND MONITORING CONSIDERATIONS		
Type of Debris	Description of Debris	Considerations for Monitoring Operations
Vegetative	Includes whole trees, tree stumps, tree branches, tree trunks, and other leafy material.	<ul style="list-style-type: none"> Verify that only eligible debris is counted for reimbursement purposes; keep a map of all roads and rights-of-way for area. Ineligible debris should be identified accordingly. Evaluate the loaded capacities of the trucks/trailers to determine the percentage of the rated capacity. Hand-loaded trucks/trailers are graded at 50 percent of a load because of the low compaction achieved by hand-loading.³⁷ This type of debris may be recyclable or have salvage value; document separation and salvage operations when implemented. For special vegetative debris considerations, please refer to the PAPPG.³⁸
Construction and Demolition (C&D)	Includes, but is not limited to, damaged components of buildings and structures, such as lumber and wood, gypsum wallboard, glass, metal, roofing material, tile, carpeting and floor coverings, pipe, concrete, fully cured asphalt, equipment, furnishings, and fixtures.	<ul style="list-style-type: none"> To be eligible for PA funding, C&D debris must present an immediate threat. Must be disaster-generated.
Hazardous Waste	<p>Waste that is potentially harmful to human health or the environment that exhibits at least one of the following four characteristics:</p> <ul style="list-style-type: none"> Ignitability Corrosivity Reactivity Toxicity 	<ul style="list-style-type: none"> Hazardous wastes may require segregation and special handling. Document improper segregation. Notify appropriate authorities if unsafe practices are observed during handling and disposal (know required safety procedures for the circumstances). Monitor processing carefully and regularly to verify the proper precautions are taken and the chain-of-custody is maintained. Verify that hazardous wastes are delivered to an appropriate DMS, as they can require special handling, transportation, and final disposition.
Household Hazardous Waste (HHW)	Includes hazardous products and materials used and disposed of by residential consumers, such as some paints, stains, varnishes, solvents, pesticides, and other products or materials containing volatile chemicals that catch fire, react, or explode under certain circumstances or are corrosive or toxic.	<ul style="list-style-type: none"> Verify and document that HHW is picked up and handled by specialists from the State's DEQ and/or the EPA and managed in designated areas within the DMS. Verify and document that the chain-of-custody is maintained throughout the collection, handling, transport, and disposal of HHW.
Electronic Waste (e-waste)	Includes electronics such as cathode ray tubes (computer monitors and televisions) that contain hazardous materials.	<ul style="list-style-type: none"> Ensure e-waste is segregated. Ensure e-waste is removed intact, collected, and stored at the DMS for later processing. Document separation and salvage activities.

³⁷ Chapter 7.I.E.3 of the PAPPG.³⁸ Chapter 7.I.B of the PAPPG.

TYPES OF DEBRIS AND MONITORING CONSIDERATIONS		
Type of Debris	Description of Debris	Considerations for Monitoring Operations
White Goods	Includes discarded household appliances such as refrigerators, freezers, air conditioners, heat pumps, ovens, ranges, washing machines, clothes dryers, and water heaters.	<ul style="list-style-type: none"> Document that white goods are collected separately, cleaned, and processed to remove putrescent debris inside and to remove all oils, solvents, and refrigerants. Verify and document that the DMS has adequate space for processing white goods if collected without being cleaned. Document separation and salvage activities.
Soil, Mud, and Sand	Can be deposited on streets, sidewalks, storm and sanitary sewers, water treatment facilities, drainage canals and basins, parks, and public swimming pools.	<ul style="list-style-type: none"> Document that only disaster-generated silt and soils are removed (must know pre-disaster condition and documented maintenance). Document any contaminated soil issues to ensure proper handling, processing, and disposition. Verify that any contaminated disaster-generated soils are addressed by specialists from the State's DEQ and/or the EPA and managed appropriately in designated areas.
Vehicles and Vessels	Includes vehicles and vessels meeting one of the following criteria: <ul style="list-style-type: none"> Presents a hazard or immediate threat that blocks ingress/egress within a public use area. It is abandoned. Applicant followed local ordinance and SLTT and Federal laws in securing possession. Applicant has verified chain-of-custody for the vehicle or vessel. 	<ul style="list-style-type: none"> Verify that each vehicle or vessel identification number is documented and processed appropriately. Verify that collected vehicles and vessels are transported to a secure collection area. Verify that vehicles are processed to remove all minerals and fluids before processing or destruction. Document separation and salvage activities that are implemented.
Putrescent Debris	Includes debris that will decompose or rot, such as animal carcasses.	<ul style="list-style-type: none"> Document that collection is in accordance with contract specifications or other requirements. Document actual volume of putrescent debris.
Infectious Waste	Waste capable of causing infection in humans including contaminated animal waste, human blood and blood products, medical waste, pathological waste, and discarded sharps.	<ul style="list-style-type: none"> Document that collection and separation is in accordance with prescribed safety and medical practices. Document volume of debris. Verify that infectious waste debris quantities are well documented, and chains-of-custody are maintained. Special handling, containerization, and disposal may be required.
Chemical, Biological, Radiological, and Nuclear (CBRN)-Contaminated Debris	Includes debris contaminated by CBRN sources.	<ul style="list-style-type: none"> Ensure CBRN-contaminated debris is cleared by law enforcement officials before removal so as not to undermine integrity of the crime scene (as from a man-made disaster). Be aware of the types of evidentiary material being sought in case debris is located outside of the identified crime scene. Verify and document the separation, processing, and disposal to ensure it follows the prescribed procedures.

DEBRIS MONITOR RESPONSIBILITIES FOR LOAD TICKETS

Load Ticket Information	Monitor Load Ticket Responsibilities	
	Loading Monitor	Tower/Site Monitor
Preprinted ticket number	Not Applicable	Not Applicable
Contract number	Contracts may be identified by a number or name	
Prime contractor's name		
Date	X	
Truck number	X	
Truck driver's name	X	
Vegetation	X	
Construction and Demolition Debris	X	
White Goods	X	
Household Hazardous Waste	X	
Other (required to be described applicable)	X	
Load location	X (GPS or address preferred)	
Loading date/time (departure from collection location)	X	
Loading Site Monitor name/signature	X	
Truck capacity in cubic yards or tons		X
Load size, either cubic yards (percent of capacity) or tons		X
Unloading location		X
Unloading date/time (arrival at disposal site)		X
Tower/Site Monitor name/signature		X

TYPES OF DEBRIS REMOVAL CONTRACTS AND MONITORING CONSIDERATIONS		
Contract Type	Description of Contract	Considerations for Monitoring Operations
Unit Price Contract	<ul style="list-style-type: none"> Used when individual work tasks are known but the total amount of work cannot be verified. Units of work can be measured in terms of weight, volume, or any other quantifiable measure. 	<ul style="list-style-type: none"> Documentation of the location, eligibility, and quantities of debris is essential because the unit price contract is based on an estimate of debris quantities. Closely monitor pick up, transportation, eligibility determination, segregation, staging, reduction, and final disposition. Maintain management of truck/trailer measurements; certify all trucks before use.
Lump-Sum Contract	<ul style="list-style-type: none"> Used when the SOW can be identified and quantified; use for a well-defined SOW with a finite contract period. 	<ul style="list-style-type: none"> Loading monitors must validate that only contract-identified debris is collected. Debris should only be obtained from eligible sources. DMS site monitors should carefully review processing of materials (quantities collected for processing and quantities post-processing). Document truckloads and debris volumes to make sure final volume matches contract.
Time-and-Materials Contract	<ul style="list-style-type: none"> Used when the SOW necessary to achieve an outcome is unknown contractor is paid for actual time, equipment usage based on hourly rates, and materials used (a ceiling prices is required). 	<ul style="list-style-type: none"> Monitoring must be thorough. Inspection reports should be produced every day and should include the following information: <ul style="list-style-type: none"> Number of hours worked Type and quantity of each type of truck/trailer/equipment used Verification of equipment hours—document active work hours only; “stand-by” time is not eligible for FEMA funding Verification of labor hours compared to equipment hours Document weather conditions as they might affect daily work Monitor production rates for each staging and reduction site Monitor performance Check quantities of debris hauled (CY) Load tickets can be used as a way of checking contractor efficiency if debris is hauled based on CY

Appendix B: Sample Debris Monitoring Plan and Monitoring Forms

Sample Forms and Tables
are intended as guidance and
should be modified to meet
SLTT procurement rules and
regulations.

1.0 General

The _____ has entered into a contract with _____ for the purpose of:

- Removing storm-generated debris from _____ rights-of-way and hauling the debris to a temporary debris management site (DMS) for volume reduction and/or to a final disposal site
- Setting up and operating _____ () DMS located at _____
- Hauling chips/mulch from the debris volume reduction site(s) to a location of the Debris Manager's choosing

The Debris Manager will be responsible for monitoring the contractor's debris removal and disposal activities using debris monitoring contractor personnel to prepare debris load tickets and oversee the debris removal and disposal contractor's operations.

2.0 Purpose

The purpose of this plan is to outline the debris monitoring responsibilities of the debris monitoring contractor's personnel. This plan is subject to revision based on changing conditions.

3.0 Monitoring Operations

The debris removal and disposal contractor will be responsible for removing all eligible debris from maintained street rights-of-way and hauling the debris to designated DMSs.

Contractor debris monitoring activities will be controlled by the Contractor's Project Manager located at _____. Phone number is _____.

The debris monitor's workday is expected to be from 7 a.m. to 6 p.m., or a maximum of 10 hours per day, 7 days per week.

Debris monitors will be responsible for initiating debris load tickets at contractor debris loading sites and estimating and recording the quantity of debris, in cubic yards (CY) on debris load tickets of *all* vehicles entering temporary DMSs (Figure B-1).

3.1 Loading Site Monitors

The loading site monitor is responsible for completing the debris load ticket, the Daily Loading Site Monitor Log, and the Daily Debris Issue Log. Each of these is described below.

Sample Debris Load Ticket

The loading site monitor will complete Section 1 of the load ticket (Figure B-1) for all contractor debris-hauling vehicles. The monitor will keep one copy and give the original and remaining copies to the truck driver. The monitor's copy will be submitted to the debris monitoring

Appendix B: Sample Debris Monitoring Plan and Monitoring Forms

contractor's Data Entry Supervisor or designated representative on a daily basis. Load ticket information will be entered into a database by the monitoring contractor's data entry staff.

Load Ticket		Ticket No. 0012345	
Municipality (Applicant)		Prime Contractor	
		Sub-Contractor	
Truck Information			
Truck No		Capacity	
Truck Driver (print legibly)			
Loading Information			
Loading	Time	Date	Inspector/Monitor
Location (Address or Cross Streets)			
When Using GPS Coordinates use Decimal Degrees (N xx.xxxxx)			
N		W	
Unloading Information			
Debris Classification		Estimated %, CYs, or Actual Weight	
<input type="checkbox"/> Vegetation <input type="checkbox"/> C&D <input type="checkbox"/> White Goods <input type="checkbox"/> HHW <input type="checkbox"/> Other* See Below			
Unloading	Time	Date	Inspector/Monitor
DMS Name and Location			
*Other Debris Explanation		Original: _____ Copy 1: _____ Copy 2: _____ Copy 3: _____	

Figure B-1: Sample Debris Load Ticket

The loading site monitor should be responsible for initiating load tickets (Figure B-1) where trucks are loaded and verifying the estimated amount of debris hauled at the temporary storage area or landfill. The Applicant monitors must provide a list of the measured truck capacities in CY and license plate number of all trucks to be used to move debris upon award of the debris removal contract.

Once a truck is loaded with debris at the loading site, the loading site monitor should fill out a load ticket. The load tickets issued by the loading site monitors are the basis for debris contractor payment. Each item in the load ticket must be completed or the load ticket will not be considered valid.

Sample Daily Debris Loading Site Monitor Log

The Daily Debris Loading Site Monitor Log (Figure B-2) is used by the Applicant and/or FEMA debris loading site monitor to collect data at the debris pick-up sites. The loading site monitor

Appendix B: Sample Debris Monitoring Plan and Monitoring Forms

monitors the removal and disposal crews at several loading sites. The number of crews monitored will depend on the geographical area and volume of debris.

It is important for the debris loading site monitor to document the pick-up site locations (using addresses, mile-markers, or GPS readings) to ensure that debris being picked up is eligible and contractors are working where they were assigned. When issues arise, they should be documented on the Daily Issues Log (see next section). Each loading site monitor should provide his or her name and company name on the form. The loading site monitor should record any issues noted for that day and provide comments concerning that day's operation; photographs should also be provided as needed. Photographs should be taken of any safety violations or other unusual events affecting the debris operation. The debris loading site monitor should document the type of debris being removed.

Time	Ticket Number	Truck Number	Full Truck Rated Capacity (CY)	Pickup Location	Vegetative Debris	C&D Debris	White Goods/ Metals	Other	Issues or Comments/ Pictures Disc

Figure B-2: Debris Loading Site Monitor Log

Sample Daily Issue Log

The Daily Issue Log (Figure B-3) is used by the Applicant and/or FEMA debris loading site monitor to collect data at the location where any issue of significance should be recorded. When documenting information on the Daily Issue Log, the location, monitoring personnel, truck identification data, and details of the issue being resolved should be recorded. For any eligibility or capacity issues, photographs (identified by corresponding numbers on the log sheet) should accompany this log.

Issue No.	Truck No.	Load Ticket	Pick-Up Location	Contractor/ Sub-contractor	Applicant Monitor	Photo/ Disc	Issue/Resolution

Figure B-3: Daily Issue Log

3.2 Debris Disposal Tower/Site Monitors

Disposal tower/site monitors will be located at the entrance to the DMS or landfill where the inspection tower is located. They will be responsible for estimating and recording the CY of debris in appropriate location on the lower portion of the load ticket (Figure B-1) for *all* incoming debris-hauling vehicles. The following procedures will be followed:

- The tower/site monitor will be stationed in the inspection tower and estimate the quantity of debris contained in the truck or trailer in CY. Each truck or trailer will have the measured hauling capacity in CY recorded on the side of the truck or trailer. That number should be validated with the quantity stated in appropriate location on the upper portion of the load ticket (Figure B-1).
- The tower/site monitor will record the name and the arrival time of the truck and confirm the type of debris in the truck.
- The tower/site monitor will record the estimated volume of debris contained within the bed of the truck or trailer, in CY, under “Unloading Information” on the load ticket. The monitor must print and sign his/her name in the designated block on the load ticket.

The tower/site monitor may find it useful to use an estimating table such as shown in Table B-1 and should also refer to the job aid presented in Appendix A: Field Reference Guides - Debris Monitor Guidelines for Estimating Quantities.

Table B-1: Estimating Truck/Trailer Capacity

Truck/Trailer Size - CY	100% CY	90% CY	85% CY	80% CY	75% CY

Note: Truck/trailer without a tailgate is rated at 85 percent of capacity to start.

- The tower/site monitor will retain the original of the load ticket and give the remaining copies to the truck driver. The original load ticket will be submitted to the monitoring contractor’s Data Entry Supervisor or designated representative on a daily basis. Load ticket information will be entered into a database by the monitoring contractor’s data entry staff. Load tickets are controlled forms and cannot be lost since they will be used to verify the amount of money paid to the debris reduction site contractor and to the debris hauling contractor.

Sample Daily Debris Site/Monitoring Tower Log

The Daily Debris Tower Log (Figure B-4) on the following page can be used by the Applicant and/or FEMA tower/site monitor to record the truck data, document estimates of the load volumes, and describe what types of debris are being brought into the DMS or landfill. Documenting the tower and pick-up site locations is important so that debris can be correlated and tracked. Each tower/site monitor should provide his or her name and company name on the form. The tower/site monitor should record any issues noted for that day and provide comments concerning that day's operation; photographs should also be provided as needed. Photographs should be taken of any safety violations or other unusual things affecting the debris operation.

Time	Ticket Number	Truck Number	Full Truck Rated Capacity (CY)	Applicant QA Eligible Capacity (% CY/Weight(Wt))	FEMA Eligible Capacity (% CY/Wt)	Vegetative Debris	C&D Debris	White Goods/ Metals	Other	Issues or Comments/ Pictures Disc

Figure B-4: Daily Debris Tower/Site Monitoring Log

4.0 Truck Certification Form

The Applicant should ensure that every truck and trailer to be used in debris removal operations is measured and documented on a Truck Certification Form (Figure B-5). Knowing the hauling capacity of each truck is necessary because debris, specifically vegetative debris, is often hauled and billed by volume. Accurately capturing all the truck capacity information and driver profile information is important; having a FEMA PA representative present when certifying debris trucks is recommended.

Truck documentation should include all trucks to be used, including City/County trucks and trailers. A Truck Certification Form allows the debris monitor to identify the truck itself and its hauling capacity in a standardized manner. The following information should be documented:

- Capacity of hauling bed (CY)
- License plate number
- Truck identification number assigned by the owner
- Brief physical description of the truck
- Photographs

Determining an accurate capacity for each truck is important. Refer to Truck Certification Form Calculation Instructions (on page B-12) for additional information.

Appendix B: Sample Debris Monitoring Plan and Monitoring Forms

The information on the Truck Certification Form should be entered into a database by the data entry staff. Copies of the Truck Certification Form should be on file with the Applicant and kept in the truck throughout the operational period.

Debris monitors may need to be trained to measure truck capacities for certification purposes. Recertification of the hauling trucks on a random and periodic basis should be implemented for contract compliance and reimbursement considerations.

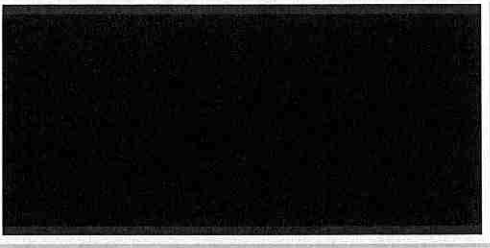
Truck Information			
Make: _____	Year: _____	Color: _____	License: _____
Truck Measurements			
Performed By: _____	Date: _____		
Volume Calculated By: _____	Date: _____		
Both Checked By: _____	Date: _____		
Driver Information			
Name: _____			
Address: _____		Phone Number: _____	
Owner Information			
Name: _____			
Address: _____		Phone Number: _____	
Truck Identification: _____		Truck Capacity: _____	
			
Photo			

Figure B-5: Truck Certification Form

Truck Certification Form Calculation Instructions

Instructions to take the necessary dimensions of corner wedge (refer to Figure B-6):

“a”: Along the side of the bed, measure the distance from the point where the rounded part of the bed starts, to the front corner of the bed.

“b”: Equal to “a.”

“c” and “d”: Along the side of the bed, mark the point where the rounded part of the bed starts, and along the front of the bed, also mark the point where the rounded part of the bed ends. Run a string between the two points and measure the distance between them; half of that distance is “c” and half of the distance is “d” (“c” and “d” are equal).

“e”: Measure the distance from the mid-point of the string that was stretched from the side to the front of the bed in the previous step to the rounded part of the bed.

Extra trailer: The volume calculations for the extra trailer would be simply length x width x height if the extra trailer has a rectangular bed. However, if the extra trailer also has round corners at the front, the volume calculation would be the same as explained above.

Instructions to take the necessary dimensions of round bottom truck (refer to Figure B-6):

“a”: The width of the bed.

“b”: The depth of the vertical portion (the side) of the bed.

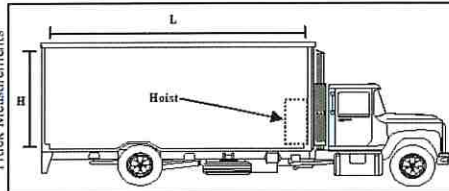
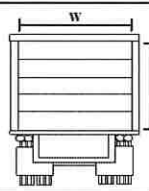
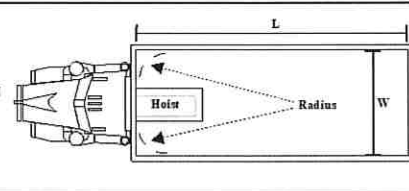
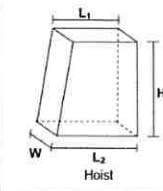
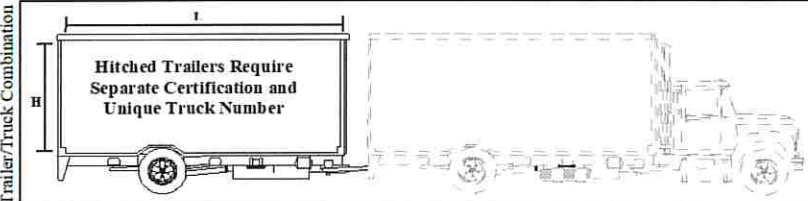
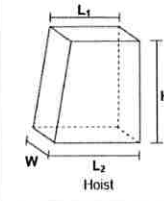
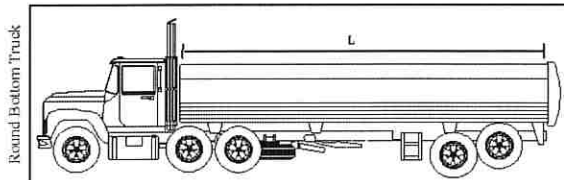
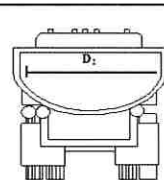
“c” and “d”: Both are equal to half the width of the bed.

“e”: Run a string between the lower ends of the vertical portions of the bed (the sides) and measure the distance from the mid-point of the string to the bottom of the bed.

NOTE: All dimensions used in the above formulas must be in feet, with inches converted to fractions of feet, using the following conversions (for example, 8 feet, 5 inches should be written as 8.42 feet):

1 inch = .08 foot	7 inches = .58 foot
2 inches = .17 foot	8 inches = .67 foot
3 inches = .25 foot	9 inches = .75 foot
4 inches = .33 foot	10 inches = .83 foot
5 inches = .42 foot	11 inches = .92 foot
6 inches = .50 foot	

Appendix B: Sample Debris Monitoring Plan and Monitoring Forms

DUMP TRUCK			
Measurements			
Truck Measurements	Length (L) = <input style="width: 80%;" type="text"/>	Width (W) ft = <input style="width: 80%;" type="text"/>	Height (H) ft = <input style="width: 80%;" type="text"/>
Hoist Measurement	Length ₁ (L ₁) ft = <input style="width: 80%;" type="text"/>	Width _H (W _H) ft = <input style="width: 80%;" type="text"/>	Height _H (H _H) ft = <input style="width: 80%;" type="text"/>
	Length ₂ (L ₂) ft = <input style="width: 80%;" type="text"/>		
Radius	Radius ft = <input style="width: 80%;" type="text"/>	Height (H) = <input style="width: 80%;" type="text"/>	
Calculations			
Bed Volume (Basic)	$(L \times W \times H) / 27 =$	<input style="width: 80%;" type="text"/>	<div style="border: 1px solid black; height: 100px; width: 100%;"></div> <p>Cubic Yards</p>
Hoist Volume	$((L_1 + L_2) / 2 \times W_H \times H_H) / 27 =$	<input style="width: 80%;" type="text"/>	
Radius Volume	$(3.14 \times R^2 \times H) / 27 =$	<input style="width: 80%;" type="text"/>	
Total =		<input style="width: 80%;" type="text"/>	
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>			
EXTRA TRAILER			
Measurements			
Truck Measurements (Basic)	Length (L) = <input style="width: 80%;" type="text"/>	Width (W) ft = <input style="width: 80%;" type="text"/>	Height (H) ft = <input style="width: 80%;" type="text"/>
Hoist Measurement	Length ₁ (L ₁) ft = <input style="width: 80%;" type="text"/>	Width _H (W _H) ft = <input style="width: 80%;" type="text"/>	Height _H (H _H) ft = <input style="width: 80%;" type="text"/>
	Length ₂ (L ₂) ft = <input style="width: 80%;" type="text"/>		
Radius	Radius ft = <input style="width: 80%;" type="text"/>	Height (H) = <input style="width: 80%;" type="text"/>	
Calculations			
Bed Volume (Basic)	$(L \times W \times H) / 27 =$	<input style="width: 80%;" type="text"/>	<div style="border: 1px solid black; height: 100px; width: 100%;"></div> <p>Cubic Yards</p>
Hoist Volume	$((L_1 + L_2) / 2 \times W_H \times H_H) / 27 =$	<input style="width: 80%;" type="text"/>	
Radius Volume	$(3.14 \times R^2 \times H) / 27 =$	<input style="width: 80%;" type="text"/>	
Total =		<input style="width: 80%;" type="text"/>	
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>			
ROUND BOTTOM TRUCK			
Measurements			
Truck Measurements	Length (L) ft = <input style="width: 80%;" type="text"/>	Diameter (D) ft = <input style="width: 80%;" type="text"/>	
Calculations			
Approx. Volume $(3.14 \times (D/2)^2 \times L) / 27 =$		<input style="width: 80%;" type="text"/>	cyd (round bottom portion only)
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <div style="text-align: center; margin-top: 20px;"> <div style="border: 1px solid black; height: 100px; width: 100%;"></div> <p>Cubic Yards</p> </div>			

5.0 Sample Debris Collection Summary Spreadsheet

The Debris Collection Summary Spreadsheet (Figure B-7) is used to capture the total amount and types of debris removed and disposed of, as well as the cost for each. This information may also be helpful to FEMA to validate any debris prediction models that are run, as well as establishing reasonable costs for debris removal.

CY	Unit Price \$	CY	Unit Price \$	CY	Unit Price \$	CY	Unit Price \$	Average Haul Distance	Primary Disposal Method	CY to Landfill
Vegetative		C&D		HHW		White Goods				

Figure B-7: Debris Data Collection Summary Spreadsheet

Appendix C: Monitoring Contract Process/Documents

Sample documents are intended as guidance and should be modified to meet applicable SLTT procurement rules and regulations.