Okaloosa County
Debris Management Plan
July 2013

Okaloosa County Debris Management Plan

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INTRODUCTION:
This plan is to implement the timely and thorough removal of debris from the County in a systematic way that ensures the return of critical services and promotes public safety.

PURPOSE:
To provide policies and guidance to the contracted Debris Management Company for the removal and disposition of debris caused by a major disaster. To facilitate and coordinate the management of debris following a disaster in order to mitigate against any potential threat to the lives, health, safety, and welfare of the impacted citizens, expedite recovery efforts in the impacted area, and address any threat of significant damage to improved public or private property.

I. Staff Roles and Responsibilities

A. Staffing Organizational Chart
Lead role in debris management is held by the County Public Works Department, with support roles being provided by the below listed personnel and agencies.

B. Roles and Responsibilities

1. Staffing Assignments and Duties – are described below

2. Administration – The Director of Public Works will decide if work will be performed by Public Works personnel or Consultant/Contractor with support from other County agencies as required.

3. Contracting and Procurement- will be handled by the County Purchasing Department.

4. Legal – will be addressed by the County attorney.

5. Operations – will be performed by contract company, monitored by Consultant/Contractor, with oversight by the County Public Works Department.

   a. The County Debris Project Manager responsible for all contracts and for oversight of the operational aspect of this Debris Management Plan is Jim Reece, 850-609-6168, from the Department of Public Works.
   b. At the time of this plan's implementation, the County Debris Project Manager will designate County employees to perform oversight of and spot checks on all contracted work within the County as he/she sees fit, or as required by the Public Works Director.

6. Planning - will be conducted by the County Environmental Services Division or Consultant/Contractor, as required. The following are tasks that may be completed:
   - Forecast debris volume based on assumed disaster type.
   - Develop an estimating strategy for post-disaster debris quantities.
   - Strategize and map debris haul routes.
   - Select debris management sites and design the site layout.
   - Determine reduction and recycling means and methods.
   - Identify and coordinate environmental issues.
   - Develop the debris collection strategy.
   - Write contract scopes of work, conditions, and specifications.
   - Coordinate with other local and State jurisdictions for road clearance and operations.

7. Record-keeping and Auditing Procedures – The Applicant is responsible for retaining records for up to five (5) years after the close of the grant according to FL Statute Chapter 119 and 257. The Clerk's Contracts and Grants Office will be responsible for approving payment of all invoices and will be the repository for all pay and reimbursement documents for audit purposes.

C. Emergency Communications Plan

Okaloosa County utilizes Southern LINC direct connect radios and telephone service as the primary means of communication between County employees and with our debris monitoring firm and debris management firm field personnel. The County's Road Department also has VHF radios permanently mounted in most vehicles; and has a supply of hand held units for supervisory staff. The VHF radios are supported by several repeater towers located throughout the County. The towers are maintained by the County's Department of Emergency Management.

D. Health and Safety Plan and Procedures

Debris will be managed in accordance with the following FEMA guidance:

1. Eligible Public Debris: Disaster-related vegetative materials, construction and demolition materials, household goods, and other materials deposited (either by the event or a property owner) on *public* property (including public rights-of-way), and which present an immediate health and safety threat to the general public.

2. Eligible Private Debris: Disaster related vegetative materials, construction and demolition materials, household goods, and other materials deposited (by the event) on *private* (personal or commercial) property, and which present an immediate health and safety threat to the general public. *Debris on private property does not typically present an immediate health and safety threat to the general public, so removal is not normally eligible for reimbursement.* However, the Federal Coordinating Officer is authorized to approve the removal of debris from private property when he determines that such debris does present an immediate health and safety threat to the general public, and such removal would be in the public interest (Recovery Strategy, Page 1, Section VI. A.)

3. Additional Health and Safety measures can be found in Appendix J

E. Training Schedule

Training schedules are left to the individual contracted participants to develop.

F. DMP Review/Update

The Debris Management Plan will be reviewed and updated (if necessary) annually.

II. Situation and Assumptions

Okaloosa County has contracted with three debris disposal companies as the only allowable debris removal contractors in the event of an incident requiring debris management services. From this point forward the company tasked to perform debris management services will be referred to as the Debris Management Company (DMC). The County may task one or all three companies depending on the magnitude of the situation. See APPENDIX C for list of approved contractors.

HDR Engineering is the approved debris management monitoring company at this time.

A. Design Disaster Event

Assumptions

- A natural disaster that requires the removal of debris from public or private lands and waters could occur at any time.
- The amount of debris resulting from an event or disaster could exceed the local government's ability to dispose of it.
- Natural and manmade disasters precipitate a variety of debris that include, but are not limited to, such things as trees, sand, gravel, building construction material, vehicles, personal property, and hazardous materials.
- The quantity and type of debris generated from any particular disaster will be a function of the location and kind of event experienced, as well as its magnitude, duration, and intensity.
- The quantity and type of debris generated, its location, and the size of the area over which it is dispersed will have a direct impact on the type of collection and disposal methods utilized to address the debris problem, associated costs incurred, and how quickly the problem can be addressed.

- In a major or catastrophic disaster, many state agencies and local governments may have difficulty in locating staff, equipment, and funds to devote to debris removal, in the short-term as well as the long term.
- If the natural disaster requires, the Governor would declare a state of emergency that authorizes the use of State resources to assist in the removal and disposal of debris. In the event Federal resources are required, the Governor would request through FEMA a Presidential Disaster Declaration.
- Private contractors will play a significant role in the debris removal, collection, reduction and disposal process.
- The debris management program implemented by the local government will be based on the waste management approach of reduction, reuse, reclamation, resource recovery, incineration and landfilling.

A. Forecasted Debris

1. Forecasted Types
   Natural disasters such as hurricanes, tornadoes and floods are expected to generate a variety of debris including but not limited to: vegetative material, building materials, vehicles, personal property, soil, and hazardous substances. For most natural disasters, vegetative debris is expected to be produced in greater volumes than all other categories combined. Forecasting will be in accordance to the formulas listed in APPENDIX G or those utilized by the selected Debris Management Company.

2. Forecasted Locations
   The southern one-third of the County is expected to generate more debris during wide spread disasters than the rest of the County (with the exception of tornadoes, which can occur anywhere in the County). During a hurricane, the coastal areas are not only subjected to the harshest winds, the area is also at greater risk of flooding due to storm surges and river and creek flooding.

III. Debris Collection Plan

A. Priorities
Critical facilities will be identified on a case by case basis as determined by the nature of the incident and its severity. Some standard critical infrastructures are:

1. Hospitals
2. Nursing homes/Adult living facilities
3. Fire and EMS stations
4. Major thoroughfares in the County
5. Public and private utilities

B. Response Operations
Upon identifying need for debris removal, the County will contact DMCs in order of selection as shown in Appendix C to activate the contract. Joint operations with the County Public Works Department Debris Management Monitor Company (DMMC) and DMC to implement debris removal strategy, will commence under the direction of the County Public Works Director. Primary efforts initially will be to clear access to critical facilities and clear major thoroughfares and choke points.

C. Recovery Operations

1. Estimating staff, procedures and assignments

   a. The Debris Project Manager has overall responsibility for the operations, planning, logistics, and cost of the debris management operations. The Debris Project Manager assigns tasks to team members and tracks the completion of tasks to ensure quick implementation of the debris removal operations. (Debris Management Plan)
   b. County Public Works employees will be tasked with overseeing DMMC as well as overseeing the DMC to ensure proper adherence of our contractors operations with FEMA guidelines and requirements. It is estimated that three (3) to four (4) Public Works and Contracts and Grants (from Clerk's Office) employees will be heavily involved in the overseeing operation.

Assignments will include interfacing with FEMA personnel, coordination of meetings, conflict resolutions, identification of critical pick-up locations, clarification of public verses private rights of way issues, progress reports, handling of pay requests, and processing of load tickets. Numerous other County employees will be involved in non-primary rolls too numerous to mention.

2. Collection method

   a. Curbside Collection
   Curbside collection on public rights of way will be utilized for the majority of the debris removal operation. Deadlines for the placement of materials along the curbside, and the number of passes for collection of the materials, will be determined by the BCC and applicable FEMA guidelines. The DMC will be responsible and liable for any damage caused by them to public or private property during the collection process in accordance with existing contract provisions. Curbside collection of debris on rights of way not maintained by the County will be addressed by the BCC on an event by event basis. Because FEMA has only reimbursed expenditures to remove debris from public properties, DMC forces have been utilized in the past to remove debris from non-public rights of way. In these cases, the costs for the removal of debris from non-public rights of way were funded by the County.

   b. Collection Centers
   The County's Wright Landfill and Old Keyser Mill Pit will be public collection centers for storm related debris. Normal tipping fees may be waived or modified by the BCC if it is deemed to be in the public's best interest.

3. Collecting Hazardous Waste and White Goods
   The two most common types of debris that will need special handling are hazardous waste and white goods. Regardless of which collection method is used, the planning staff needs to understand the effects this collection can have on the overall debris clearance, removal, and disposal mission. The DMC will be responsible for the proper collection and disposal of all hazardous waste and white goods.

   a. Household Hazardous Waste (HHW)
   HHW mixed with other debris types will contaminate the entire load, which necessitates special disposal methods such as storage in a particular part of a landfill. Typically, the landfill requires special liners and a more intense permit standard due to the hazardous waste. The disposal cost of HHW is generally higher than the disposal of other waste; therefore, the overall cost of debris disposal can escalate quickly if the HHW collection and disposal is not planned and executed with care.

   b. White Goods
   Refrigerants and other machine fluids are normally regulated by the State environmental agency and can only be reclaimed by certified technicians and disposed of at a permitted facility. To avoid releases of refrigerants or oils, the collection of white goods should be accomplished carefully by manually placing the appliance on trucks or by using lifting equipment that will not damage the elements that contain the refrigerants or oils. Also at issue is the placement of refrigerators and freezers at the curb with rotting food in them. Care must be taken to avoid attracting vermin and rodents in the process This will be addressed in public service announcements. Having contracts or agreements in place prior to a disaster expedites the recovery efforts. Recycling scrap metals and parts from white goods presents an opportunity for applicants to offset the collection and disposal costs. This also reduces the amount of waste going to a landfill. The collection and disposition of all White goods will be the responsibility of the DMC.

4. Monitoring Staff and assignments
   HDR Engineering is the approved debris management monitoring company at this time. HDR will utilize its own staff and Standard Operating Procedures (SOPs) to accomplish the monitoring mission.

HDR will be responsible for ensuring the debris monitoring follows the guidelines of the FEMA Debris Monitoring Fact Sheet 9580.203

The specific responsibilities and duties of individual debris monitors in the field are the same for both force account and contracted debris monitoring operations. They are:

- Report issues to their direct supervisor which require action (such as safety concerns, contractor non-compliance and equipment use)
- Accurately measure and certify truck capacities (recertify on a regular basis)
- Properly and accurately complete and physically control load tickets (in tower and field)
- Ensure that trucks are accurately credited for their load
- Ensure that trucks are not artificially loaded (ex: debris is wetted, debris is fluffed-not compacted)
- Validate hazardous trees, including hangers, leaners, and stumps
- Ensure that hazardous wastes are not mixed in loads
- Ensure that all debris is removed from trucks at Debris Management Sites (DMS)
- Report if improper equipment is mobilized and used
- Report if contractor personnel safety standards are not followed
- Report if general public safety standards are not followed
- Report if completion schedules are not on target
- Ensure that only debris specified in the contract is collected (and is identified as eligible or ineligible)
- Assure that force account labor and/or debris contractor work is within the assigned scope of work
- Monitor site development and restoration of DMSs
- Report to supervisor if debris removal work does not comply with all local ordinances as well as State and Federal regulations (i.e., proper disposal of hazardous wastes)
- Record the types of equipment used (Time & Materials contract)
- Record the hours equipment was used, include downtime of each piece of equipment by day (Time & Materials contract). (Debris Monitoring Fact Sheet)

IV. Debris Management Sites

A. Site Management

1. Site Manager
The DMC shall be responsible for providing a site manager for all temporary debris management sites utilized by them. The site manager will be responsible for the establishment and maintenance of appropriate facilities at the site to accommodate the anticipated work force and site goals. The facilities may include but not be limited to: proper ingress and egress, monitoring towers, haul road maintenance, dust control, debris storage locations, reduction facilities, safety and security, shelter, and sanitary facilities. The site manager shall ensure that the appropriate and required information relative to the site is provided to the DMC for transfer to the County and FEMA.

2. Monitoring Staff and Assignments
DMMC shall be responsible for staffing all required monitoring positions with trained monitors. Monitoring shall be continuous during all periods that debris is being collected in the field and/or received at the site. All necessary and appropriate load tickets, truck size verification documentation, inspection reports, environmental guidelines, and monitoring reports and other required documentation shall be maintained by the monitoring staff. DMMC shall also provide FEMA personnel with accommodations for joint monitoring operations at all sites.

3. Safety Personnel
The DMC site manager shall be responsible for the daily inspection of the debris management site for safety issues. Emergency contact information and a first aid kit shall be kept onsite during all operating periods. The site manager shall be responsible to insure that only properly trained personnel are allowed to work in or around the debris site. Access to the site shall be restricted to authorized personnel and signage shall be maintained by the site manager. Travel ways and dumping locations shall be clearly designated for the proper and controlled flow of traffic.

Reduction operation areas shall be clearly identified and appropriately restricted. Limited fire fighting apparatus shall be available and maintained onsite.

B. Establishment and Operations Plan

1. Permits
Each site used as a temporary storage and disposal site must be approved and permitted by FDEP. The County also maintains two permitted landfills, the Wright Landfill and the Baker Landfill, in accordance with Rule 62-701 of the Florida Administrative Code that are available for use as Temporary Disposal, Storage, and Reduction Sites (TDSRSs). Final disposal must also be approved by FDEP.

2. Locations
Baseline data for each location
The identified debris disposal sites are as follows:
- Wright Landfill
- Old Keyser Mill Pit
- Niceville Pit
- Fort Walton Beach Fairgrounds
- Crestview Pit
- Destin Pit

Private land clearing or C&D pits available for potential use are:
- Coyote C&D Landfill
- Pointe Center C&D Landfill
- Arena Road C&D Landfill
- Waste Recyclers C&D Landfill

3. Site layouts
See Appendix I

4. Site Preparation
None typically required, but if required it is the responsibility of the DMC.

5. Volume Reduction and Disposal Methods
The DMC shall be responsible for the appropriate reduction of all debris collected by them prior to disposal. All reduction and disposal methodology shall be in accordance with environmental and other regulatory guidelines and permitting. The DMC site manager shall be responsible to insure that only properly trained personnel are allowed to conduct reduction operations.

a. Incineration
Incineration of vegetative matter will be conducted in accordance with state and local regulations. Air quality criteria shall be monitored throughout the incineration process. If air quality standards are not being met, the incineration operations shall be adjusted or terminated, until air quality standards are achieved. The site manager shall be responsible to insure that only properly trained personnel are allowed to operate the incineration equipment. Limited fire fighting apparatus shall be available and maintained onsite. Disposal of ash from the incineration operation will be conducted in accordance with regulatory requirements and may include: agricultural land application, landfill cover application, and burying onsite, as allowed. Responsible environmental recycling will be encouraged.

b. Grinding and Chipping
Grinding and chipping operations of vegetative matter shall be monitored at all times for possible safety hazards. The site manager shall be responsible to insure that only properly trained personnel are allowed to operate grinding and chipping equipment. There are significant differences in volume reduction between chipping and grinding and incineration. Incineration reduces the volume by approximately 95 percent, leaving only ash residue for disposal. Chipping and grinding reduces the volume by 75 percent. Since 25 percent of the

volume remains from chipping and grinding, the benefit of this reduction method can be increased by identifying alternate uses of the residual material. The ability to use recycled wood chips as mulch for agricultural purposes, fuel for industrial heating, or in a cogeneration plant helps to offset the cost of the chipping and grinding operation. Final disposal of the ground and chipped vegetated debris shall be done in accordance with applicable regulatory guidelines and may include: disposal in a methane generating landfill, landfill cover, landscaping mulch, conversion to fuel pellets, erosion control, surface land applications or be stored at an appropriate location to biodegrade into soil. Disposal is the responsibility of the DMC.

6. Recycling
   a. Reducing and/or recycling disaster-related debris has financial and environmental advantages. These operations can decrease the overall cost of a debris removal operation by reducing the amount of material that is taken to a landfill. This diminishes the cost of final disposition in the form of tipping fees. In the case of recycling, potential end-use products for specific markets may offset the cost of operations even more. In many communities, recycling operations are an important component of the community public policy and are a priority. Recycling will be left to the discretion of DMC to perform. All monetary benefits will be retained by the DMC as an incentive to perform recycling.

   b. Common Recyclable Materials
      - Metals- Hurricanes and tornadoes can cause extensive damage to mobile homes, sun porches, and green houses. Most of the nonferrous and ferrous metal debris is suitable for recycling. Metal maulers and shredders can be used to shred trailer frames, trailer parts, appliances, and other metal items. Ferrous and nonferrous metals are separated using an electromagnet and then sold to metal recycling firms.
      - Soil - Debris removal operations may include transporting large amounts of soil to the DMS. At the DMS, it may be combined with other organic materials that will decompose over time. This procedure can produce significant amounts of soil that can be sold, recycled back into the agricultural community, or stored onsite to be used as cover.
      - Concrete, Asphalt, and Masonry Debris - Concrete, asphalt, and masonry products can be crushed and used as base material for certain road construction products or as a trench backfill. Debris targeted for base materials needs to meet certain size specifications as determined by the end user.

7. Environmental Monitoring Program
   Each site used as a temporary storage and disposal site must be approved by FDEP. FDEP approval of the temporary sites includes appropriate environmental monitoring requirements for each site.

8. Site Closure
   Site closure, as a responsibility of the DMC, will be conducted on all temporary pits in accordance with the issued permits, after the reduction, removal, and disposal of the debris is finalized.

V. Contracted Services

A. Emergency Contracting/Procurement Procedures

1. Emergency contracting and procurement procedures are established by the Board of County Commissioners in accordance with State Statutes and County Policies, and may vary depending on the severity and urgency of the disaster.
2. The primary role of the Purchasing Department is to have approved contractors in place prior to the event. This portion of the plan needs to be updated as the jurisdiction's procurement procedures and contracts may expire and change over time. Contracting and Procurement planning includes the following tasks:
   - Develop contract requirements.

- Establish contractor qualifications.
- Distribute instructions to bidders.
- Advertise bids.
- Establish a pre-disaster list of approved contractors.
- Establish a post-disaster contracting procedure if necessary.

B. Debris Operations to be Outsourced – Any debris operation deemed beyond the capabilities of the County's work force will be considered for outsourcing to a pre-selected contractor post disaster.

C. General Contract Provisions
General contract provisions include the removal, reduction and disposal of all disaster generated debris from County rights of way and other public property within Okaloosa County. The contract will cover handling, processing and disposal of vegetative and construction and demolition debris from curbside to final disposal.

D. Qualification Requirements
Okaloosa County has pre-approved three (3) very experienced and reputable companies to provide competitive bids on debris removal and disposal, should the need arise. The companies were selected on the basis of related experience, knowledge of governing regulations and procedures, availability or adequate resources, management capabilities, and other factors. See APPENDIX H for Emergency Debris Removal (Standby Contract).

E. Solicitation of Contractors
The solicitation of contractors was conducted in accordance with State requirements and in accordance within the normal procurement procedures of the County. The contractors were selected on the basis of qualifications and on bid prices. In the event that a contractor is required for debris removal and disposal, the County will contract from the pre-approved contractors in the order listed in Appendix C depending on the severity of the event and/or the availability of the contractor(s).

VI. Private property Demolition and Debris Removal

A. Condemnation Criteria and Procedures
Growth Management has established procedures for building damage assessment and condemnation as shown in APPENDIX E.

1. Dangerous structures are the responsibility of the owner to demolish in order to protect the health and safety of adjacent residents. However, experience has shown that unsafe structures will remain because of the lack of insurance or absentee landlords. Consequently, demolition of these structures may become the responsibility of the DMC under the authority of the County Public Works Director. According to FEMA Recovery Strategy RS-2006-2 "**Eligible Private Debris:** Disaster related vegetative materials, construction and demolition materials, household goods, and other materials deposited (by the event) on *private* (personal or commercial) property, and which present an immediate health and safety threat to the general public. ***Debris on private property does not typically present an immediate health and safety threat to the general public, so removal is not normally eligible for reimbursement.*** However, the Federal Coordinating Officer is authorized to approve the removal of debris from private property when he determines that such debris does present an immediate health and safety threat to the general public, and such removal would be in the public interest." (Recovery Strategy, Page 1, VI. B.)

2. Legal Documentation- all such activities will be annotated and photographed before and after demolition.
In addition to advising the debris management planning staff, the following tasks should also be performed by the legal department:
   - Review all contracts.
   - Review all insurance policies.

- Ensure environmental and historic preservation compliance before, during, and after operations.
- Review and/or establish a building condemnation processes.
- Review and/or establish a legal process for private property demolition and debris removal.
- Review right-of-entry and hold harmless agreements.

3. Demolition Permitting – all permitting will be done in accordance with County Ordinances

4. Inspections – Private property will be assessed as dangerous or unsafe by the County Growth Management Department

B. Mobile Home Park Procedures
Mobile home procedures will be the same as for houses.

C. Navigation Hazard Removal Procedures
Okaloosa County will cooperate with the FDEP, U.S. Army Corps of Engineers, U.S. Coast Guard, Florida Marine Patrol, and other agencies having regulatory authority over Waters of the State, for the removal of debris that may cause a hazard to navigation within the geographic boundary of Okaloosa County. The extent of the County's participation may be limited to allowing other regulatory agencies and private entities, to place marine construction debris in our rights of way. The County's DMC would then remove and dispose of the navigational hazards along with other eligible debris.

VII. Public Information Plan

A. Public Information Officer
The Public Information Officer, a member of the command staff, is responsible for the collection and release of information about the incident to the news media and other appropriate agencies and organizations.

B. Pre-Scripted information
No pre-scripted information specific to debris management is in place because levels of service offered will depend on the event. Templates for distribution of information have been created so specific information can be easily added at the time of an event tailored to employees, residents and the media.

DATE	Media
Normal Operations	Include Media distribution information about procedures in times of normal operation.
	Let citizens know the county has a Debris Removal Plan in the event of a Disaster, whenever possible.
Post-Catastrophe	Advise citizens about clean-up crews and areas of operation on a weekly basis.
	Advise citizens about drop off points with instructions for handling various types of debris that the public can access directly.
	Inform public of debris removal guidelines required by state/federal/county governments.
	Advise citizens as necessary of dates, times & locations service is provided.
Post Clean-up	As temporary land fills and drop off points reach closing dates, begin advertising those dates as soon as possible.

	Follow up on a weekly basis in all media.
Media Outlets	County Web Site; Northwest Florida Daily News, Bay Beacon & Crestview Bulletin, local newspapers
	All Area Radio Stations in Escambia, Okaloosa & Walton Counties.
	WEAR TV 3 and Cox Communications

C. Distribution Plan- Information will be distributed to the media via e-mail in a press release format as it becomes available. Press conferences will be held up to three times a day. Fliers will be distributed to employees at the end of each shift. In the event major communication is lost, informational fliers will be distributed to residents at Points of Distribution (PODS) once a day. All current event information will be on the county's home page and updated as it becomes available.

Publication	Deadline	Publish Date	Contact Info	PH/FAX/EMAIL
Bay Beacon		Wkly-	Del Lessard	678-1080; 729-3225 fax
Crestview News Leader		Bi-Wkly:		682-6525; 2246fax
Destin Log		Bi-Wkly: Sat & Wed		837-2828; 654-5982fax
NWFL Daily News		Daily	see attach.	863-1111; 7834
Chambers of Commerce				
Crestview Focus	10th ea. Mo.		La'Terica Clark	850-682-3212; 7413fax;lclark@crestviewchamber.com
Destin Progress	1st Friday		Elizabeth Spies	837-6241; espies@destinchamber.com
FWB Coastlines	1st Friday		Carol Magmer	244-8191; 1935fax; carolmagmer@fwbchamber.org
Niceville/ValP Business Connect.	15th ea. Mo.		Willey Hart	678-2323;info@nicevillechamber.com
Radio				
WAAZ/WJSB PO Box 267 Crestview, FL 32536			Cal Zethmeyer 682-3040	
Cumulus /Radio People 225 Hollywood Blvd., NW Fort Walton Beach, FL 32548				243-7676; 243-6836; 6806
WFTW			Ken Walsh	
Cumulus / COAST 100			Aimee Schaffer	
Cumulus / Z96				664-0965
99ROCK			Scratch	243-3699
Country 105.5				
Seabreeze 106				267-3279;231-1775
WAVE 102				654-5102; fax: 5385 ; 6510fax
WTJT-Baker				537-2009; 4663
WUWF			682-5903	474-2980; 800-239-9893; 474-3283
WEAR 3-TV				862-3000, 456-3333;862-3001; 455-8972 fax fwb, P

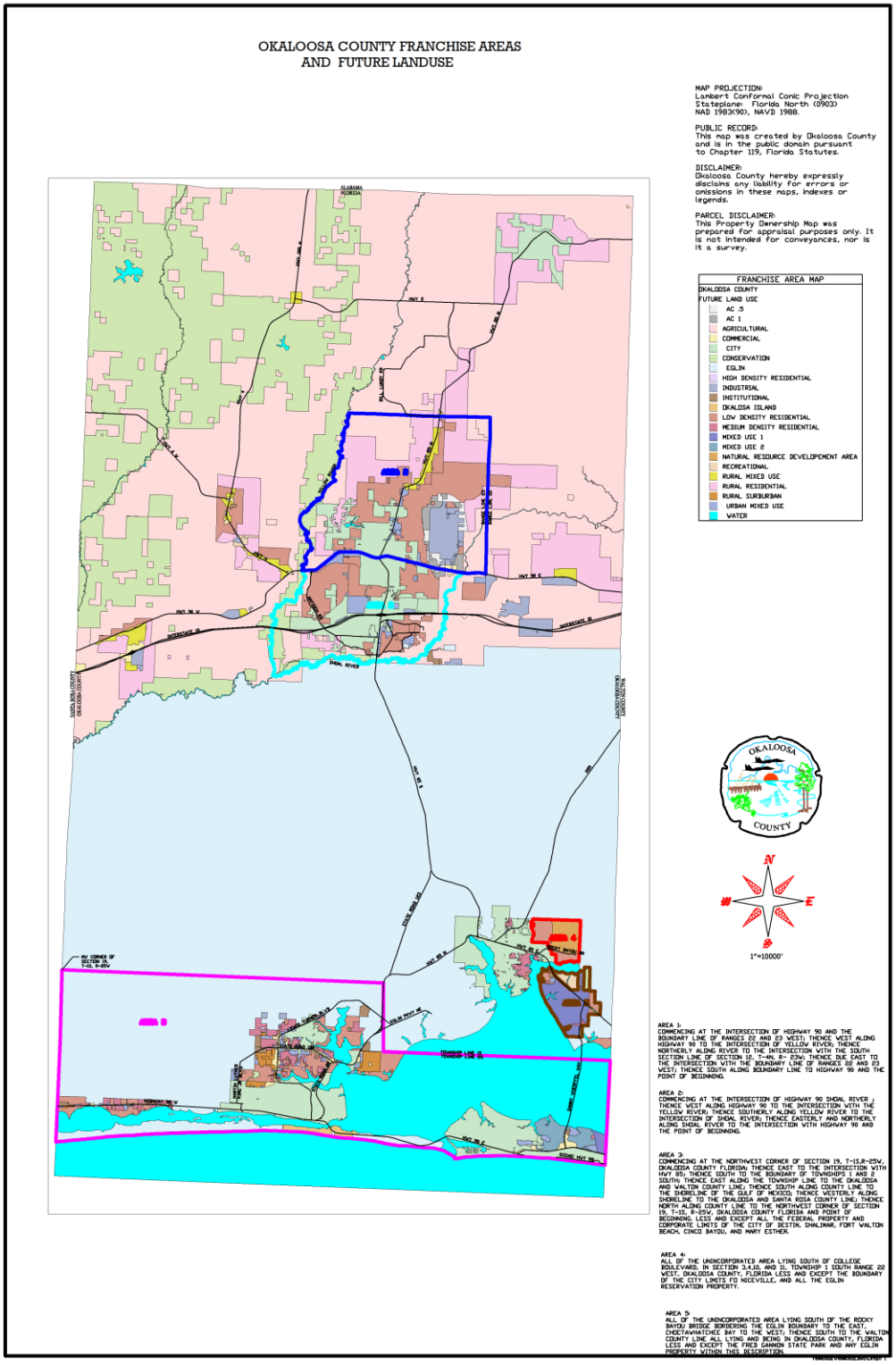
COX				862-4142; 1708
Military Bases				
Eglin PA			Shirley Piggott	882-3931, x484; 882-4894
Hurlburt Field PA			Amy Oliver	884-3065;
TWC Hurricane Team			Rebecca Moulton	hurricaneteam@weather.com
Emerald Coast.com				622-0327; 0562

Appendices

A. Maps of jurisdiction and priorities
B. Priorities of Debris Removal
C. List of Pre Qualified Contractors
D. Load Ticket
E. Building Damage Assessment and Condemnation Criteria
F. Truck Certification Procedures
G. Forecast Formula
H. RFQ
I. Site Layouts
J. Health and Safety

APPENDIX A (Maps of jurisdiction and priorities)

Okaloosa County is responsible for the collection and disposal of curbside debris for all of the unincorporated areas of the County. The Cities of Fort Walton Beach, Niceville, Destin, Shalimar, Cinco Bayou, Mary Esther, Crestview, Valparaiso, and Laurel Hill have established debris management plans that are independent of the County's plan. Debris removal priorities will be established on a case by case basis, based on the greatest perceived threats to the public's health and safety.



APPENDIX B (Priorities of Debris Removal)

The Debris removal process must be initiated promptly and conducted in an orderly, effective manner in order to protect public health and safety following a major or catastrophic event. To achieve this objective, the first priority will be to clear debris from key roads in order to provide access for emergency vehicles and resources into the impacted area. Key roads in Okaloosa County which will be cleared by the Florida Department of Transportation are as follows:

1. U.S. 98
2. U.S. 90
3. U.S. 85
4. HWY 189
5. HWY 397
6. HWY 4
7. HWY 20
8. I-10
9. SR 123
10. SR285

The need and demand for critical services will be increased significantly following a disaster. Therefore, the first priority in Okaloosa County that debris removal resources will be assigned as needed providing access to critical facilities pre-identified by State and Local governments are as follows:

KEY ROADS OKALOOSA COUNTY WILL CLEAR:

NORTH COUNTY DISTRICT 1 PRIORITIES	**SOUTH COUNTY DISTRICT SOUTH PRIORITIES**	**SOUTH COUNTY DISTRICT SOUTH PRIORITIES**
PJ ADAMS	**DISTRICT 2**	**DISTRICT 4**
ANTIOCH ROAD	4TH AVENUE - SHALIMAR	POCAHONTAS AVENUE
OLD ANTIOCH ROAD	MEIGS DRIVE	JAMES LEE ROAD
AIRPORT ROAD	COUNTRY CLUB ROAD	NEWCASTLE DRIVE
GARDEN CITY ROAD	12TH STREET - SHALIMAR	BOB SIKES BLVD
AUBURN ROAD	POQUITO ROAD	SOUTH AVENUE
POVERTY CREEK ROAD	HOLLY AVENUE	MONAHAN DRIVE
LAKE SILVER ROAD	SUNSET LANE	WOODHAM AVENUE
BILL LUNDY ROAD	SHERWOOD DRIVE	EMERALD POINTE AVENUE
CR 2	LONGWOOD DRIVE	PARRISH POINT ROAD
CR 602	12TH AVENUE - SHALIMAR	WOODLAND AVENUE
CR 393		CARMEL DR
OLD EBENEZER ROAD		MAYFLOWER AVE
NEW EBENEZER ROAD		WOODHAM CT
OLD BETHEL ROAD		BEACH DR
		SKYLARK DR
DISTRICT 3	**DISTRICT 3 SOUTH**	**DISTRICT 5**
OLD RIVER ROAD	FOREST HEIGHTS ROAD	SANTA ROSA BLVD
MELTON ROAD	HOSPITAL DRIVE	BLUEWATER BAY BLVD
POPLAR HEAD CHURCH ROAD	MARWALT DRIVE	BAY DRIVE

GALLIVER CUTOFF ROAD	GREEN ACRES ROAD	RANGE ROAD
BUCK WARD ROAD	GREEN ACRES BLVD	REDWOOD AVENUE
SHERMAN KENNEDY ROAD	MEADOW LANE	VALPARISO BLVD
LOG LAKE ROAD	NORTH BEAL EXTENSION	BLUE PINE VILLAGE
WILKERSON BLUFF ROAD	NORTHERN PINES BLVD	CAT-MAR STREET
KELLY MILL ROAD	WILLOW BEND BLVD	EDGETREE DRIVE
YELLOW RIVER BAPTIST CH RD	ELDRIDGE ROAD	RAINTREE BLVD
LEE COOK ROAD	MOONEY ROAD	COUNTY LINE ROAD
RATTLESNAKE BLUFF ROAD	COLLEGE BLVD	RANGE ROAD
	DONALD BROOK BLVD	REDWOOD AVENUE
	GREEN ACRES ROAD	VALPARISO BLVD
	GREEN ACRES BLVD	BLUE PINE VILLAGE
	MEADOW LANE	
	NORTH BEAL EXTENSION	
	NORTHERN PINES BLVD	

APPENDIX C (List of Pre Qualified Contractors)
Okaloosa County has identified three debris disposal companies as the only allowable bidders in the event of an incident requiring debris management services. The companies were selected through a competitive bid process utilizing a selection committee that interviewed applicants before making a final selection. Selection was based on pricing as well as prior experience in the field of debris removal. These three companies are:

PRIMARY
DRC Emergency Services LLC
Mark Stafford
740 Museum Drive
Mobile, Al 36608
251-343-3581

1st ALTERNATE
Storm Reconstruction Services, Inc.
Carol Patton
1442 W. I-65 Service Road South
Mobile, AL 36693
866-556-0049

2nd ALTERNATE
BAMACO, Inc.
Robert Mitchell
6869 Hwy. 100 West
Bunnell, FL 32110
386-586-3656

APPENDIX D (Load Ticket-Sample)

LOAD TICKET

B. LOAD TICKET		
TICKET NUMBER:		
CONTRACT NUMBER		
CONTRACTOR		
DATE:		
DEBRIS QUANTITY		
Truck No:	**Capacity (CY):**	
Load Size (CY):	**Tons:**	
Truck Driver:		
DEBRIS CLASSIFICATION		
	Burnable	
	Non-Burnable	
	Mixed	
	Other	
LOCATION		
Section/Area:	**Dumpsite**	
	Time	**Inspector**
Loading		
Dumping		
Eligibility (Y/N):	Original: [County] [City] [State] Yellow: Contractor Pink: Driver Gold: FEMA	

APPENDIX E (Building Damage Assessment and Condemnation Criteria)

See Section 102.2.1 of Exhibit A of Ordinance 07-33 and Sections 108 through 110 of the 2003 International Property Maintenance Code attached.

APPENDIX F (Truck Certification Procedure)

FEMA Truck Measurement Form

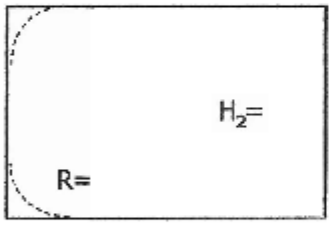
Truck Number	

Applicant: **FEMA Monitor:**

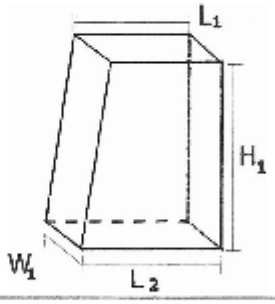
Contractor: **Date:**

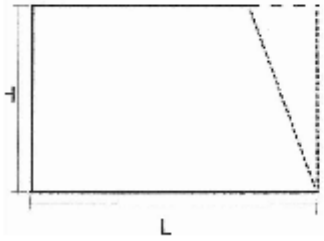
Declaration Number: **Applicant Monitor**

Truck Make:	Year:	Bob:	Trailer:	State License:
Trailer Make:	State License		Color:	
Measured By:	Date:			Drivers Name
Calculated By	Date:			Owners Name
Checked By:	Date:			Owners Address
TRAILER	Length:		Width	Height:
HOIST Length 1 (L1):	Length 2 (L2):		Width 1 (W1):	Height 1 (H1):
RADIUS			Radius (R):	Height 2 (H2):
ROUND BOTTOM TRAIL	Length 3 (L3):		Radius (R2):	

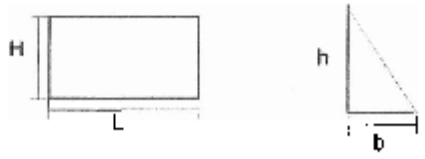


L_1=
L_2=
H_1=
W_1





Triangle in bottom of bed (L=total length of ⌐ for sides and front as applicable)



Bed Volume: (LWH)	Inches/Feet		Grand Total (GT)	
Radius 3.14(R)² (H2)/2	Inches/Feet		To Convert Cubic Inches to Cubic Feet	÷ 1728
Hoist: (L1+L2)/2 (W1)(H1)	Inches/Feet		To Convert Cubic Feet to Cubic Yards	÷ 27
Round Bottom 3.14 (R2) (L3)	Inches/Feet			
Grand Total (GT)			Total Cubic Yards	

APPENDIX G (Forecasting Formula)

Forecasting Methods

After the disaster parameters and geographic extent is established, specific debris volumes can be quantified by using historical information or forecasting models.

Historical records provide a basis for forecasting disaster-generated debris and can be used for planning purposes. Previous contracts for debris removal, recycling activities, volume-reduction processing, and landfill disposal records should be reviewed thoroughly to determine the quantity of disaster debris that was generated for a particular disaster event.

If previous disaster data is not available, assumptions may be made from neighboring jurisdictions' experience, or from USACE modeling. USACE emergency management staff has developed a modeling methodology designed to forecast potential amounts of hurricane-generated debris. Based on data from Hurricanes Frederic (1979), Hugo (1989) and Andrew (1992), the methodology has a predicted accuracy of plus/minus 30 percent. USACE mathematical modeling forecasts the quantity of debris specifically generated by hurricanes and is available in Appendix B*, USACE Hurricane Debris Estimating Model*.

Buildings

Several basic techniques have been established to forecast destroyed building debris quantities. These techniques can be used to forecast debris quantities prior to an event or estimate quantities after a disaster.

Residential buildings

A formula for estimating the debris quantities from a demolished single-family home and associated debris is:

L' x W' x S x 0.20 x VCM / 27 =___ cubic yards of debris

Where:
L = length of building in feet
W = width of building in feet
S = height of building expressed in stories
VCM = Vegetative Cover Multiplier

The vegetative cover multiplier is a measure of the amount of debris within a subdivision or neighborhood. The descriptions and multipliers are described as:

- **Light** (1.1 multiplier) includes new home developments where more ground is visible than trees. These areas will have sparse canopy cover.
- **Medium** (1.3 multiplier) generally has a uniform pattern of open space and tree canopy cover. This is the most common description for vegetative cover.
- **Heavy** (1.5 multiplier) is found in mature neighborhoods and woodlots where the ground or houses cannot be seen due to the tree canopy cover.

The table below can be used to forecast debris quantities for totally destroyed single-family, single-story homes in the applicable vegetative cover category.

The amount of personal property within an average flooded single-family home has been found to be:

- 25-30 cy for homes without a basement
- 45-50 cy for homes with a basement

Mobile homes have less wasted space due to their construction and use. The walls are narrower, and the units contain more storage space. Therefore, the typical mobile home generates more debris by volume than a single-family home. Historically, the volume of debris from mobile homes has been found to be:

- 290 cy of debris for a single-wide mobile home
- 415 cy of debris for a double-wide mobile home

Outbuildings

All other building volumes may be calculated by using the following formula:

$$\frac{L' \times W' \times H' \times 0.33}{27} = \_\_\_ \text{ cubic yards of debris}$$

Where:
L = length of building in feet
W = width of building in feet
H = height of building expressed in feet
0.33 is a constant to account for the "air space" in the building
27 is the conversion factor from cubic feet to cubic yards

Vegetation

Vegetation is the most difficult to estimate due to the random sizes and shapes of trees and shrubbery. Based on historical events, USACE has established a few rules of thumb in forecasting and estimating vegetative debris.

- Treat debris piles as a cube, not a cone, when estimating
- 15 trees, 8 inches in diameter = 40 cy (average)
- One acre of debris, 3.33 yards high = 16,117 cy

Volume – Weight Conversion Factors

These factors to convert woody debris from cubic yards to tons are considered reasonable and were developed by USACE.

Softwoods	6 cubic yards = 1 ton
Hardwoods	4 cubic yards = 1 ton
Mixed debris	4 cubic yards = 1 ton
C&D	2 cubic yards = 1 ton

To verify these conversion factors in the field, several truckloads may be tested. Trucks should be well loaded, contain woody debris typical of that being removed, and truck capacities should be verified. It is recommended that testing be performed with all affected parties present.

Cubic Yardage Estimate--EXAMPLE

Estimated 2005 Households	30,000
Storm Category	1
Vegetation Characteristic	Medium
Commercial/Industrial Density	Light
Storm Precipitation Characteristic	Medium

Q=H (C)(V)(B)(S) where

Q= quantity of debris in cubic yards	101,400
H= number of households	30,000
C=storm category factor in cubic yards	2
V=vegetation characteristic multiplier	1.3
B=commercial/business/industrial multiplier	1
S=storm precipitation characteristic multiplier	1.3
Clean Woody Debris	67,900
Mixed C&D Debris	33,500
Total Debris	101,400

Cost Estimate

Clean Woody Debris Volume	67,900
Clean Woody Debris Rate	$15.32
Clean Woody Debris Cost Estimate	$1,040,228
Mixed C&D Debris Volume	33,500
Mixed C&D Debris Rate	$15.32
Mixed C&D Debris Cost Estimate	$513,220
Total Debris Removal Cost Estimate	$1,553,448

Cubic Yardage Estimate--EXAMPLE

Estimated 2005 Households	30,000
Storm Category	2
Vegetation Characteristic	Medium
Commercial/Industrial Density	Light
Storm Precipitation Characteristic	Medium

Q=H (C)(V)(B)(S) where

Q= quantity of debris in cubic yards	405,600
H= number of households	30,000
C=storm category factor in cubic yards	8
V=vegetation characteristic multiplier	1.30
B=commercial/business/industrial multiplier	1.00
S=storm precipitation characteristic multiplier	1.3
Clean Woody Debris	271,700
Mixed C&D Debris	133,900
Total Debris	405,600

Cost Estimate

Clean Woody Debris Volume	271,700
Clean Woody Debris Rate	$15.32
Clean Woody Debris Cost Estimate	$4,162,444
Mixed C&D Debris Volume	133,900
Mixed C&D Debris Rate	$15.32
Mixed C&D Debris Cost Estimate	$2,051,348
Total Debris Removal Cost Estimate	$6,213,792

Cubic Yardage Estimate--EXAMPLE

Estimated 2005 Households	30,000
Storm Category	3
Vegetation Characteristic	Medium
Commercial/Industrial Density	Light
Storm Precipitation Characteristic	Medium

Q=H (C)(V)(B)(S) where

Q= quantity of debris in cubic yards	1,318,200
H= number of households	30,000
C=storm category factor in cubic yards	26
V=vegetation characteristic multiplier	1.30
B=commercial/business/industrial multiplier	1.00
S=storm precipitation characteristic multiplier	1.3
Clean Woody Debris	883,200
Mixed C&D Debris	435,000
Total Debris	1,318,200

Cost Estimate

Clean Woody Debris Volume	883,200
Clean Woody Debris Rate	$15.32
Clean Woody Debris Cost Estimate	$13,530,624
Mixed C&D Debris Volume	435,000
Mixed C&D Debris Rate	$15.32
Mixed C&D Debris Cost Estimate	$6,664,200
Total Debris Removal Cost Estimate	$20,629,824

Cubic Yardage Estimate--EXAMPLE

Estimated 2005 Households	30,000
Storm Category	4
Vegetation Characteristic	Medium
Commercial/Industrial Density	Light
Storm Precipitation Characteristic	Medium

Q=H (C)(V)(B)(S) where

Q= quantity of debris in cubic yards	2,535,000
H= number of households	30,000
C=storm category factor in cubic yards	50
V=vegetation characteristic multiplier	1.30
B=commercial/business/industrial multiplier	1.00
S=storm precipitation characteristic multiplier	1.3
Clean Woody Debris	1,267,500
Mixed C&D Debris	1,267,500
Total Debris	2,535,000

Cost Estimate

Clean Woody Debris Volume	1,267,500
Clean Woody Debris Rate	$15.32
Clean Woody Debris Cost Estimate	$19,418,100
Mixed C&D Debris Volume	1,267,500
Mixed C&D Debris Rate	$15.32
Mixed C&D Debris Cost Estimate	$19,418,100
Total Debris Removal Cost Estimate	$38,836,200

Cubic Yardage Estimate--EXAMPLE

Estimated 2005 Households	30,000
Storm Category	5
Vegetation Characteristic	Medium
Commercial/Industrial Density	Light
Storm Precipitation Characteristic	Medium

Q=H (C)(V)(B)(S) where

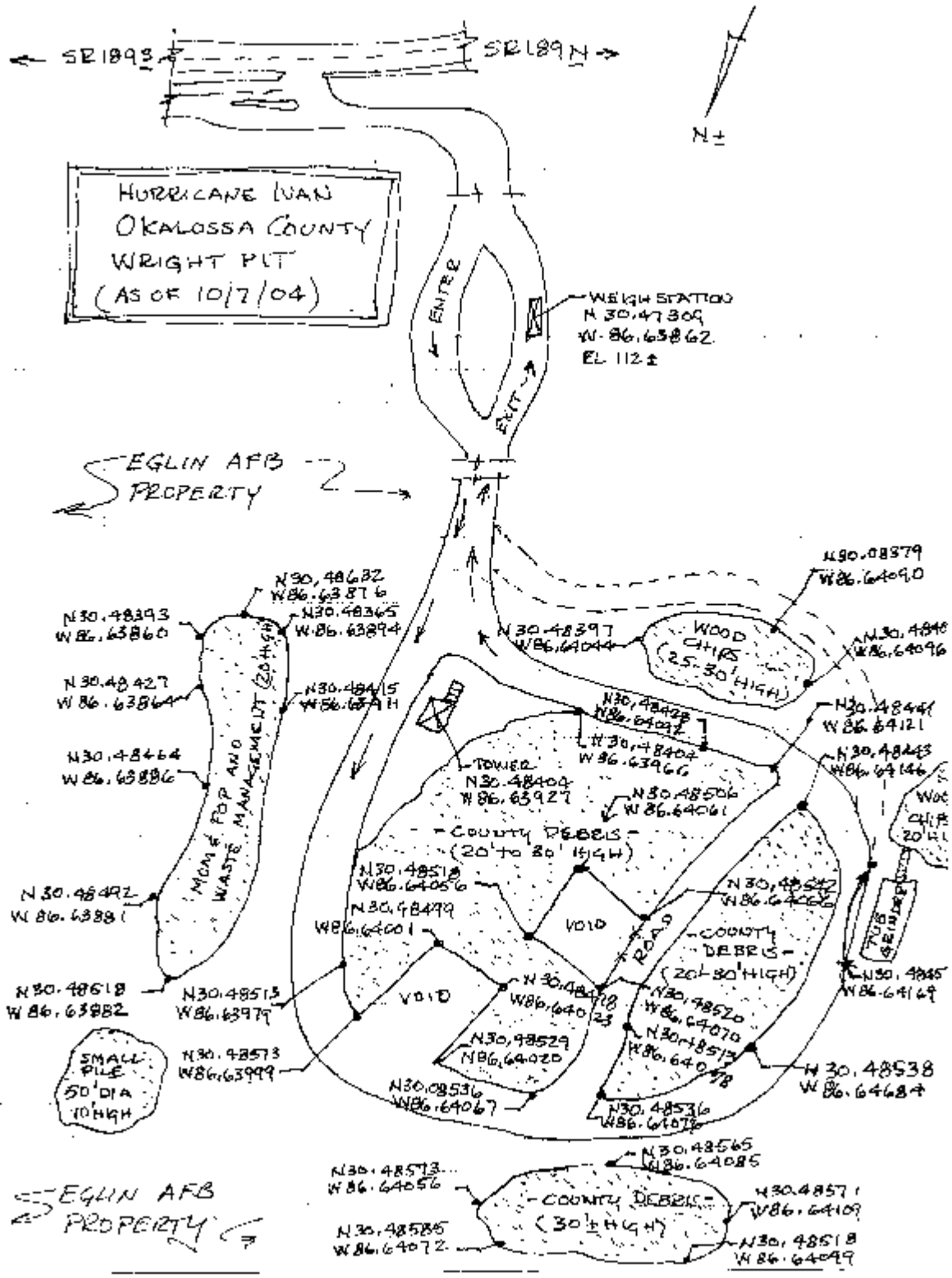
Q= quantity of debris in cubic yards	4,056,000
H= number of households	30,000
C=storm category factor in cubic yards	80
V=vegetation characteristic multiplier	1.30
B=commercial/business/industrial multiplier	1.00
S=storm precipitation characteristic multiplier	1.3
Clean Woody Debris	2,028,000
Mixed C&D Debris	2,028,000
Total Debris	4,056,000

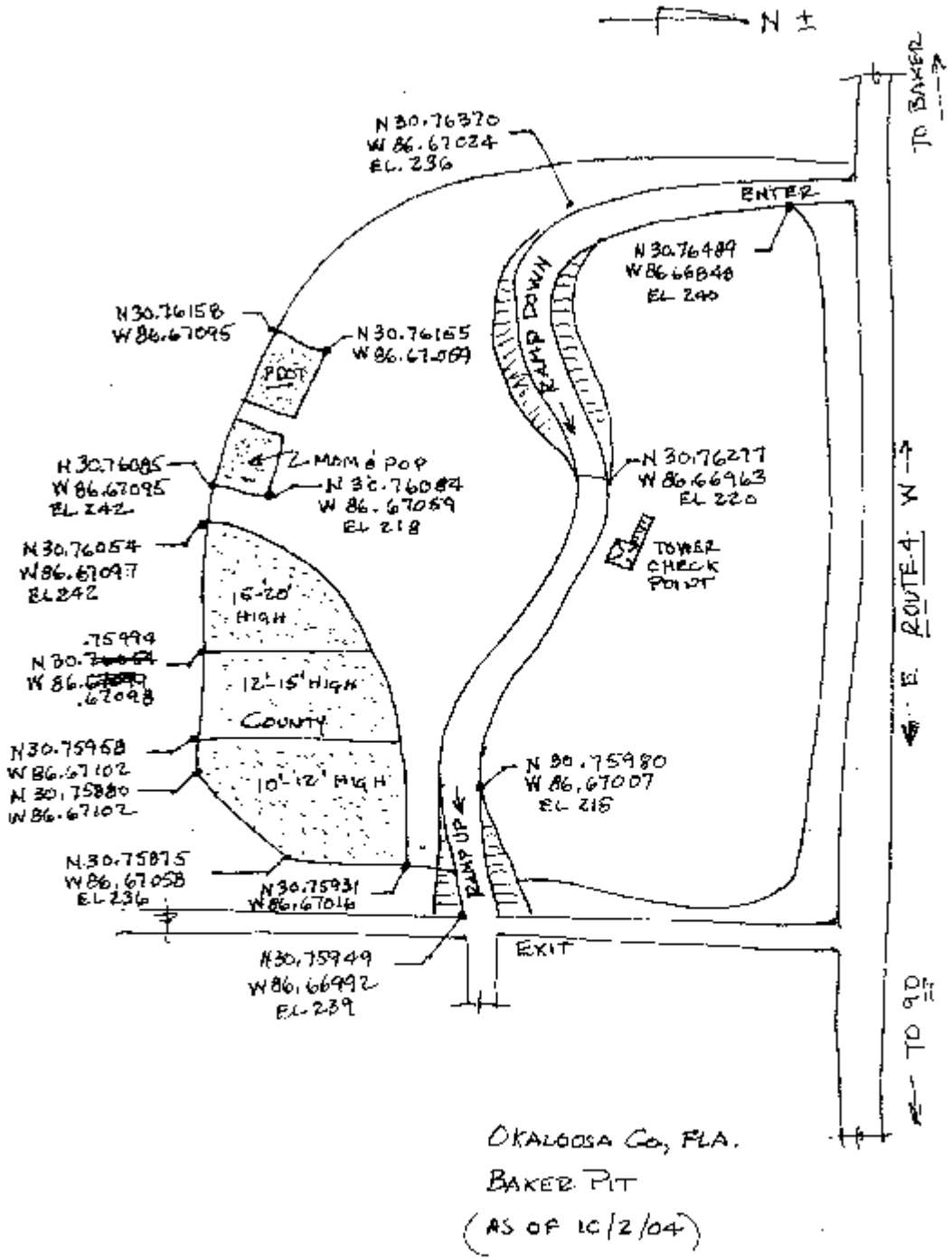
Cost Estimate

Clean Woody Debris Volume	2,028,000
Clean Woody Debris Rate	$15.32
Clean Woody Debris Cost Estimate	$31,068,960
Mixed C&D Debris Volume	2,028,000
Mixed C&D Debris Rate	$15.32
Mixed C&D Debris Cost Estimate	$31,068,960
Total Debris Removal Cost Estimate	$64,165,920

APPENDIX H (Emergency Debris Removal—Standby Contract)

APPENDIX I (Site Layouts)

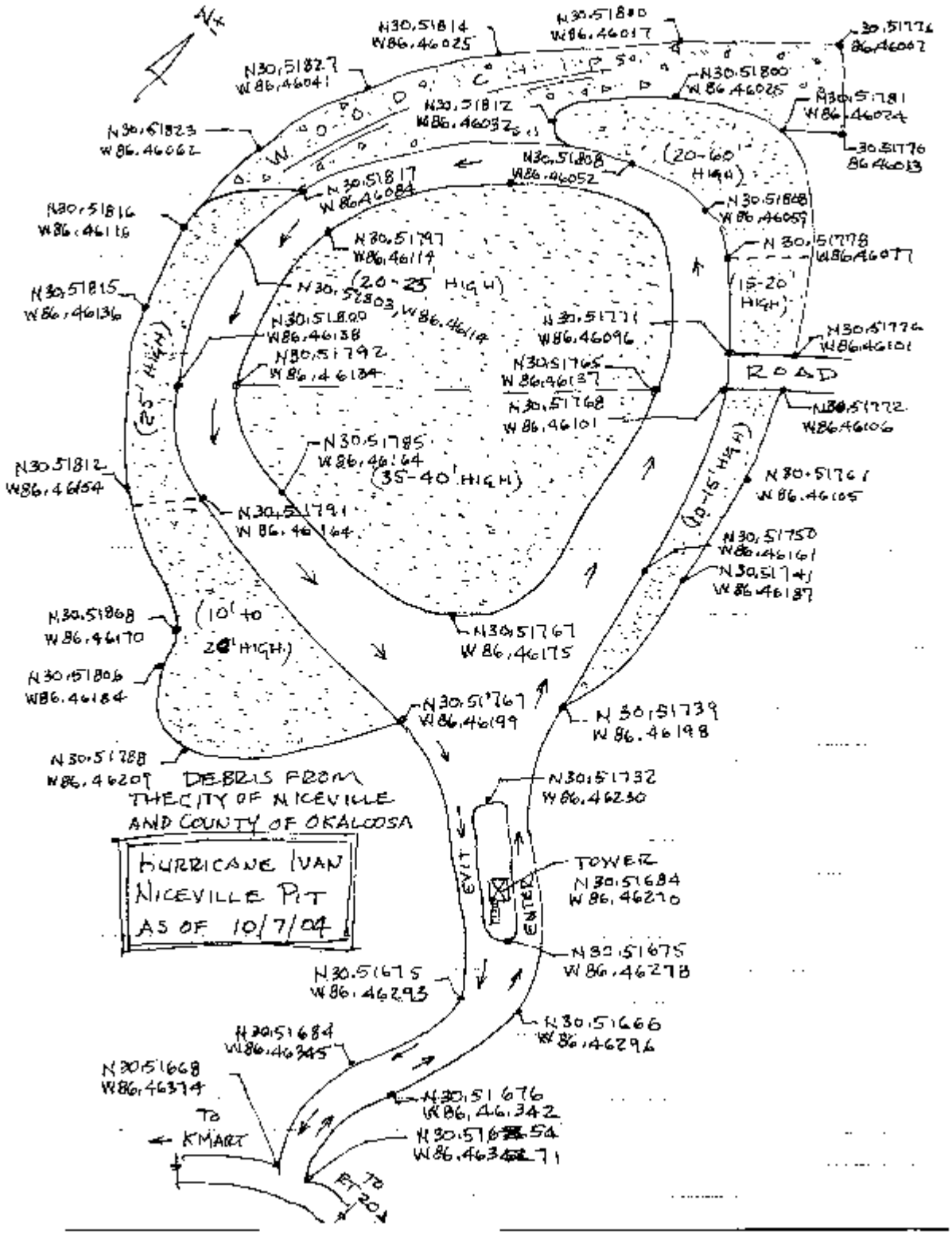


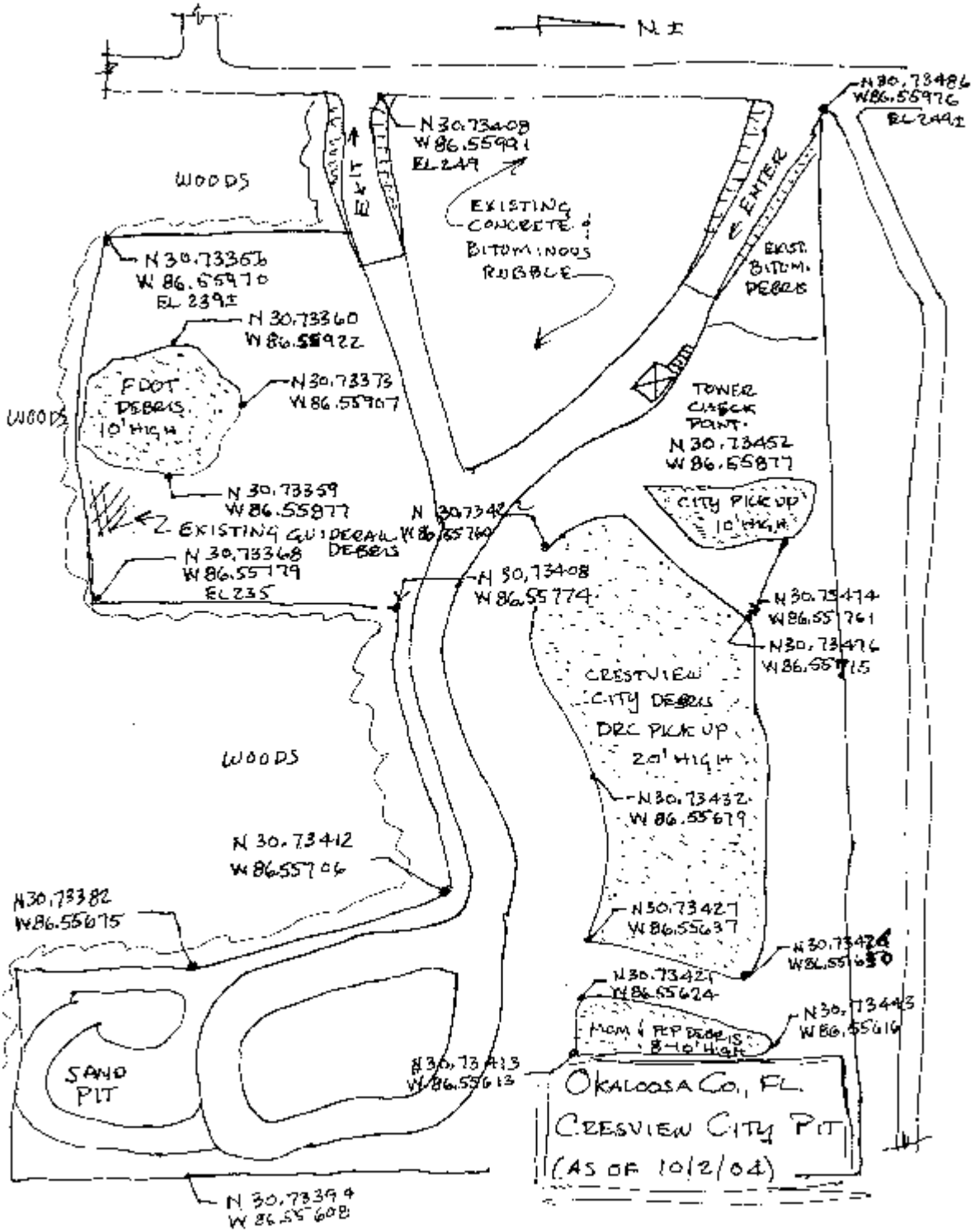


OKALOOSA CO, FLA.

BAKER PIT

(AS OF 10/2/04)


N
N30.51814 W86.46025
N30.51800 W86.46017
30.51774 86.46007
N30.51827 W86.46041
N30.51800 W86.46025
N30.51781 W86.46024
N30.51817 W86.46032
N30.51823 W86.46062
30.51776 86.46013
(20-60' HIGH)
N30.51808 W86.46052
N30.51817 W86.46084
N30.51808 W86.46059
N30.51816 W86.46118
N30.51797 W86.46114
N30.51778 W86.46077
(20-25' HIGH)
N30.51815 W86.46136
N30.51803, W86.46119
(15-20' HIGH)
N30.51800 W86.46138
N30.51771 W86.46096
N30.51774 W86.46101
N30.51792 W86.46134
N30.51765 W86.46137
ROAD
N30.51768 W86.46101
N30.51772 W86.46106
(25' HIGH)
N30.51785 W86.46164 (35-40' HIGH)
N30.51812 W86.46154
N30.51791 W86.46164
N30.51761 W86.46105
(10-15' HIGH)
N30.51750 W86.46161
N30.51741 W86.46187
N30.51868 W86.46170
(10' to 20' HIGH)
N30.51767 W86.46175
N30.51806 W86.46184
N30.51767 W86.46199
N30.51739 W86.46198
N30.51788 W86.46209
DEBRIS FROM THE CITY OF NICEVILLE AND COUNTY OF OKALOOSA
HURRICANE IVAN NICEVILLE PIT AS OF 10/7/04
N30.51732 W86.46230
EXIT
ENTER
TOWER N30.51684 W86.46270
N30.51675 W86.46278
N30.51675 W86.46293
N30.51666 W86.46296
N30.51684 W86.46345
N30.51668 W86.46374
N30.51676 W86.46342
To KMART
To I-10


N ±
N30.73486
W86.55976
EL 249±
N30.73408
W86.55991
EL 249
EXIT
ENTER
WOODS
EXISTING
CONCRETE &
BITUMINOUS
RUBBLE
EXIST.
BITUM.
DEBRIS
N30.73366
W86.55970
EL 239±
N30.73360
W86.55922
FDOT
DEBRIS
10' HIGH
N30.73373
W86.55907
WOODS
TOWER
CHECK
POINT
N30.73452
W86.55877
CITY PICK UP
10' HIGH
N30.73359
W86.55877
EXISTING GUARDRAIL
DEBRIS
N30.73368
W86.55779
EL 235
N30.73408
W86.55774
N30.73474
W86.55761
N30.73476
W86.55715
CRESTVIEW
CITY DEBRIS
DRC PICK UP
20' HIGH
WOODS
N30.73432
W86.55679
N30.73412
W86.55706
N30.73382
W86.55675
N30.73427
W86.55637
N30.73426
W86.55650
N30.73421
W86.55624
N30.73443
W86.55616
MOM & POP DEBRIS
8-10' HIGH
N30.73413
W86.55613
SAND
PIT
OKALOOSA CO., FL.
CRESVIEW CITY PIT
(AS OF 10/2/04)
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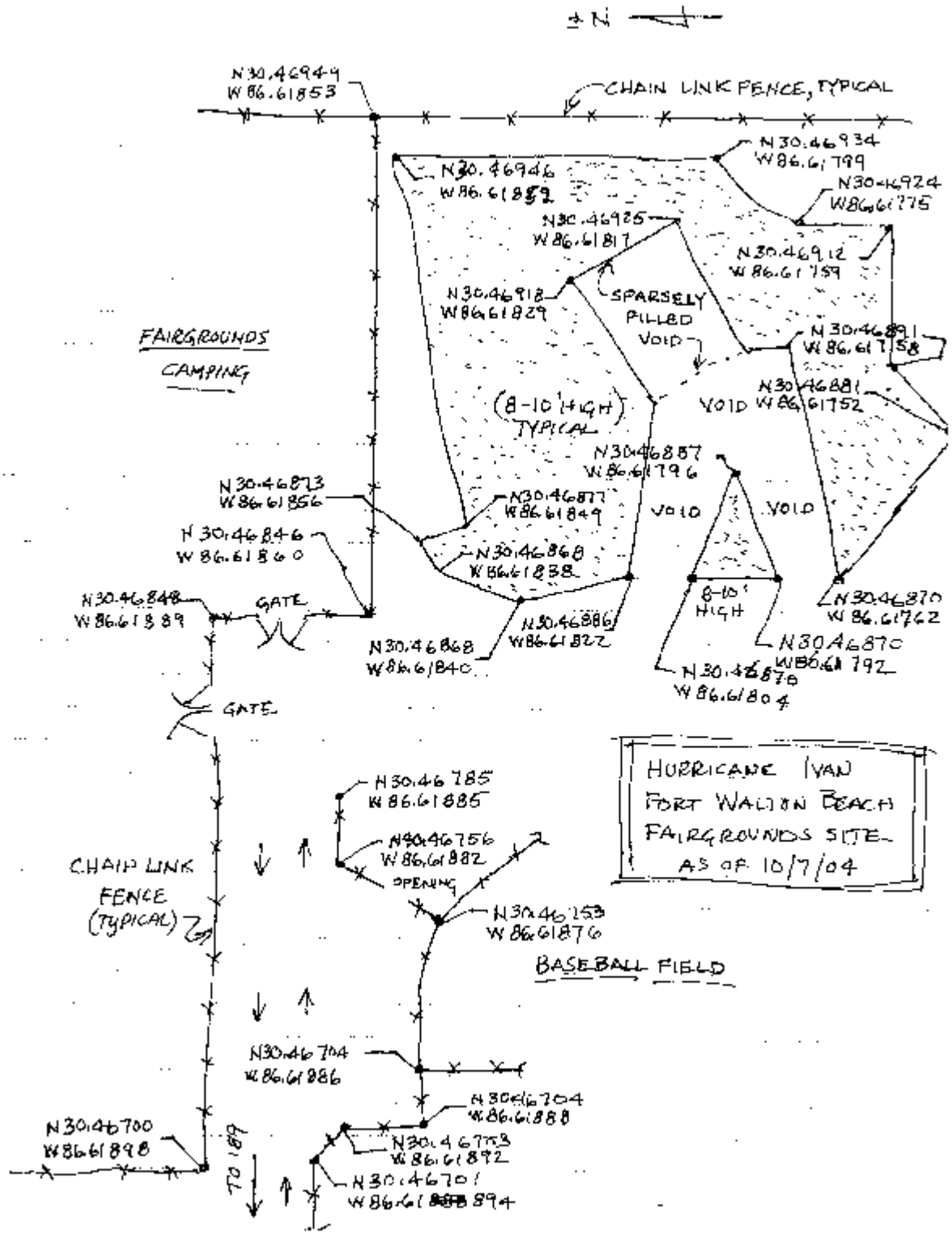
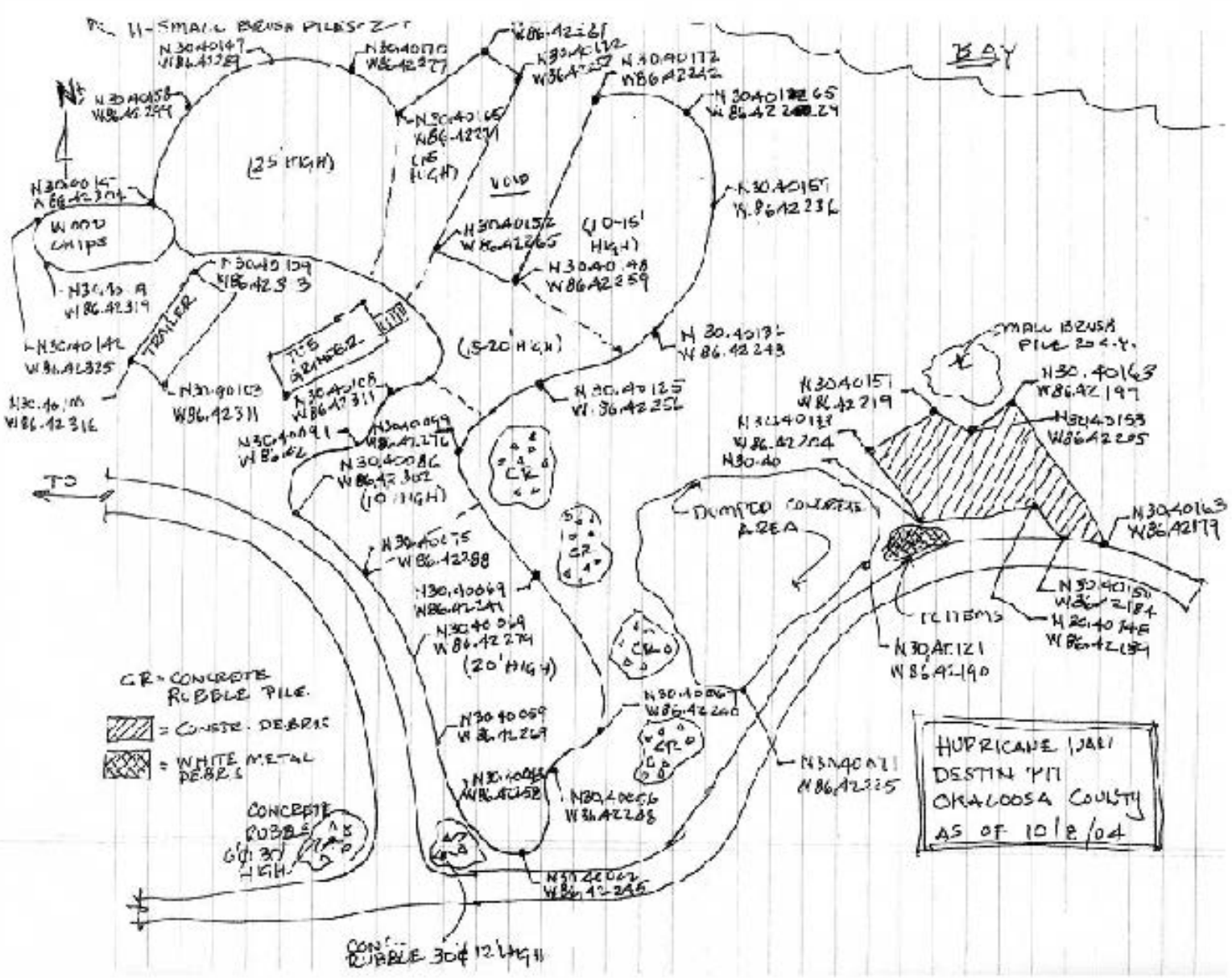
W86.55608


± N
N30.46944
W86.61853
CHAIN LINK FENCE, TYPICAL
N30.46934
W86.61799
N30.46946
W86.61852
N30.46924
W86.61775
N30.46985
W86.61817
N30.46912
W86.61759
N30.46918
W86.61829
SPARSELY
PILLED
VOID
FAIRGROUNDS
CAMPING
N30.46891
W86.61758
(8-10' HIGH)
TYPICAL
VOID
N30.46881
W86.61752
N30.46857
W86.61796
N30.46873
W86.61856
N30.46877
W86.61849
VOID
VOID
N30.46846
W86.61860
N30.46868
W86.61838
8-10'
HIGH
N30.46870
W86.61762
N30.46848
W86.61889
GATE
N30.46886
W86.61822
N30.46868
W86.61840
N30.46870
W86.61792
N30.46870
W86.61804
GATE
HURRICANE IVAN
FORT WALTON BEACH
FAIRGROUNDS SITE
AS OF 10/7/04
N30.46785
W86.61885
N30.46756
W86.61882
CHAIN LINK
FENCE
(TYPICAL)
OPENING
N30.46753
W86.61876
BASEBALL FIELD
N30.46704
W86.61886
N30.46704
W86.61888
N30.46700
W86.61898
N30.46703
W86.61892
TO 189
N30.46701
W86.61894


BAY
(25' HIGH)
VOID
(10-15' HIGH)
(15-20' HIGH)
TRAILER
TO
CR = CONCRETE RUBBLE PILE.
= CONSTR. DEBRIS
= WHITE METAL DEBRIS
DUMPED CONCRETE AREA
HURRICANE IVAN
DESTIN PIT
OKALOOSA COUNTY
AS OF 10/8/04

Appendix J (Health and Safety Strategy)

Purpose
The purpose of this Health and Safety Strategy is to support the existing Okaloosa County Safety Manual with regards to debris removal activities. These are recommended baseline safety provisions. Ultimately, health and safety is the responsibility of the contracted parties involved in debris removal activities. This document will outline some of the general steps necessary to provide a safe work environment for debris removal and monitoring employees. In addition, this document will identify some representative work hazards and the appropriate measures to reduce risk of injury.

Dissemination of Information
The debris removal contractor and monitoring firm project managers will be provided with this document and will be expected to disseminate the information and guidelines to their respective personnel. A copy of the document should be available for consultation.

Compliance
The debris removal contractor and monitoring firm project managers are responsible for health and safety compliance of their respective personnel and subcontractors. Any crews or individuals that are not compliant shall be suspended from debris removal activities until the situation is remedied. Frequent offenders of safety policies and procedures will be dismissed from the project entirely.

Job Hazard Assessment
Though debris removal activities are fairly similar among events, assessing the particular hazards of each disaster is an important part of maintaining health and safety for the debris removal workers. At a minimum, the following areas of focus should be considered as part of job hazard assessment:

 Disaster Debris – Disasters that result in property damage typically generate large quantities of debris which must be collected and transported for disposal.
The type of debris varies depending on the characteristics of the region (e.g. terrain, climate, dwelling and building types, population, etc.) and the debris generating event (e.g. type, event strength, duration, etc.). In addition, the disaster debris produces a host of uneven surfaces, which must be negotiated.

 Debris Removal – Often the removal of disaster debris involves working with splintered, sharp edges of vegetative or construction material debris. Many disasters involve heavy rains or flooding. Consequently, disaster debris is damp and heavier than usual. As weights increase, so does the risk of injury.

 Removal Equipment – In most disasters, debris must be removed from the public Right-of-Way (ROW) to provide access for emergency vehicles and subsequent recovery efforts. Debris collection and removal requires the use of heavy equipment and power tools to trim, separate and clear disaster debris.

 Traffic Safety – The ROW is located primarily on publicly-maintained roads. As a result, much of the debris removal process takes place in traffic of varying levels of congestion. In addition, disasters often damage road signs, challenging safety on the road.

 Wildlife Awareness – Disasters are traumatic events for people as well as wildlife. Displaced animals, reptiles and insects pose a hazard to debris removal workers.

 Debris Disposal – After disaster debris is collected it is often transported to a temporary disposal, storage and reduction site (TDSRS). Upon entry to a TDSRS, the monitoring firm will assess the volume of disaster debris being transported. The collection vehicle will then dispose of the disaster debris and the debris will be reduced either through a chipping, grinding operation or incineration. The TDSRS is a common area for injury. Response and recovery workers in this environment are more likely to be exposed to falling debris, heavy construction traffic, high noise levels, dust and airborne particles from the reduction process.

 Climate – Debris-generating disasters often occur in areas or seasons with extreme weather conditions. The effects of temperature and humidity on physical labor must be monitored, and proper work-rest intervals must be assessed.

Administrative and Engineering Controls
The use of administrative and engineering controls can greatly reduce the threats to public health and safety in debris removal activities. Some common administrative and engineering controls used in the debris removal process are:

Collection Operations
- Conduct debris removal operations during daylight hours only.
- Limit clean-up operations to one side of the road at a time.

HEALTH AND SAFETY STRATEGY
- Limit collection work under overhead lines.
- Inspect piles before using heavy equipment to remove them to ensure that there are no hazardous obstructions or materials.
- Make sure that all collection vehicles have properly functioning lights, horns and back-up alarms.
- Load collection vehicles properly (not overloaded or unbalanced).
- Cover and secure loads
- When monitoring the collection process, stay alert in traffic and use safe driving techniques.

Power Tools
- Inspect all power tools before use.
- Do not use damaged or defective equipment.
- Use power tools for their intended purpose.
- Avoid using power tools in wet areas.

Debris Reducing Machinery (Grinders/Wood Chippers)
- Do not wear loose-fitting clothing.
- Follow the manufacturer's guidelines and safety instructions.
- Guard the feed and discharge ports.
- Do not open access doors while equipment is running.
- Always chock the trailer wheels to restrict rolling.
- Maintain safe distances.
- Never reach into operating equipment.
- Use lock out/tag out protocol when maintaining equipment.

TDSRS/Disposal Operations
- Use jersey barriers and cones to properly mark traffic patterns.
- Use proper flagging techniques for directing traffic.
- Monitor towers must not exit into traffic and should have hand and guard rails to reduce trips and falls.
- Monitor towers must have properly constructed access stairways with proper treads and risers and proper ascent angle (4:1 height/width ratio).
- Monitor towers must be surrounded by jersey barriers which protect the tower and monitors from being struck by inbound or outbound collection vehicles.
- Monitor towers should be located upwind from dust- and particulate generating activities.
- A water truck should spray the site daily to control airborne dust and debris.

Personal Protective Equipment
Personal Protective Equipment (PPE) is the last resort to providing a safe working environment for workers. PPE does not eliminate or even reduce hazards as administrative and engineering controls do. PPE works to reduce the risk of injury by creating a protective barrier between the individuals and work place hazards. Proper use of PPE includes using PPE for its intended purpose. For example, using the wrong type of respirator might expose the worker to carcinogenic particulates. Properly fitting the equipment to the user may require examination by a medical professional. PPE that does not fit well will not provide maximum protection and will decrease the likelihood of the individual continuing to use the equipment. In addition, improper use may result in serious injury or death. The proper use of the equipment is outlined in detail in the manufacturer's instructions. The following PPE may be applicable in standard ROW, Right-of-Entry (ROE), and vegetative and construction & demolition debris removal activities:

- **Head Protection** – Equipment designed to provide protection for an individual's head against hazards such as falling objects or the possibility of striking one's head against low hanging objects. PPE used to protect the head must comply with ANSI Z89.1-1986, "American National Standard for Personnel Protection - Protective Headwear for Industrial Workers – Requirements."

 Foot Protection – Equipment designed to provide protection for an individual's feet and toes against hazards such as falling or rolling objects, objects that may pierce the sole or upper section of the foot, etc. PPE used to protect the feet and toes must comply with ANSI Z-41-1991, "American National Standard for Personal Protection-Protective Footwear."

 Hand Protection – Equipment designed to provide protection for an individual's hands against hazards such as sharp or abrasive surfaces. The proper hand protection necessary is dependent upon the situation and characteristics of the gloves. For instance, specific gloves would be used for protection against electrical hazards while the same gloves may not be appropriate in dealing with sharp or abrasive surfaces.

 Vision/Face Protection – Equipment designed to provide protection for an individual's eyes or face against hazards such as flying objects. PPE used to protect eyes and face must comply with ANSI Z87.1-1989, "American National Standard Practice for Occupational and Educational Eye and Face Protection." Again, the proper eye/face protection necessary is dependent upon the situation and characteristics of the equipment. For instance, eye and face protection used by individuals who are welding may not be appropriate for individuals operating a wood chipper.

 Hearing Protection – Equipment designed to provide protection for an individual's hearing against prolonged exposure to high noise levels. According to OSHA, the permissible level of sound is an average of 90 decibels over the course of an eight (8) hour work day. Above the sound exposure level, hearing protection is required. PPE used to protect hearing must comply with ANSI S3.19-1974, "American National Standard Practice for Personal Protection-Hearing Protection."

 Respiratory Protection – Equipment designed to provide protection for an individual's respiratory system against breathing air contaminated with hazardous gases, vapors, airborne particles, etc. PPE used to the respiratory system must comply with ANSI Z88.2-1992. In addition, the use of respiratory protection requires a qualitative fit test and in some cases a pulmonary fit test by a licensed medical professional.

PPE Debris Removal Activity
PPE requirements are made based upon the results of the job hazards assessment. The following list of PPE is organized by debris removal activity and is meant to be a representative list. Specific PPE requirements vary from location to location. In general, individuals involved in the debris removal process should personally monitor water consumption to avoid dehydration and use appropriate skin protection (breathable clothes, light colors, sunscreen, etc.). Ultimately, the selection of PPE is the responsibility of the debris removal contractor and monitoring firm project managers.

Debris Collection Monitoring
The hazards of disaster debris collection monitoring include, but are not limited to: struck by vehicles, falls or trips on uneven surfaces, cuts, abrasions or punctures from vegetative or C&D sharps, or exposure to poison ivy and other skin irritants as well as insect, reptile, and animal bites. PPE requirements include:

- Reflective vest;
- Foot protection (rugged shoes or boots, steel toe and shank if required);
- Long pants and long sleeves; and
- Vision and hearing protection
- Gloves

Debris Disposal Monitoring
The hazards of disaster debris disposal monitoring include, but are not limited to: struck by or caught in/between vehicles, falls or trips on stairs or uneven surfaces, cuts, abrasions or punctures from vegetative or C&D sharps and struck by falling disaster debris, or exposure to poison ivy and other skin irritants as well as insect, reptile, and animal bites. Monitor towers must be equipped with a first aid kit. PPE requirements include:

- Reflective vest;
- Foot protection (rugged shoes or boots, steel toe if required);
- Long pants and long sleeves;
- Hard Hat; and
- Vision and hearing protection
- Gloves

Debris Removal
The hazards of disaster debris removal include, but are not limited to: struck by vehicles, falls or trips on uneven surfaces, cuts, abrasions or punctures from vegetative or C&D sharps and airborne debris, or exposure to poison ivy and other skin irritants as well as insect, reptile, and animal bites. In addition, PPE requirements include:

- Reflective vest;
- Vision and hearing protection;
- Foot protection (rugged shoes or boots, steel toe and shank if required); and
- Long pants and long sleeves
- Gloves

Debris Disposal and Reduction
The hazards of disaster debris disposal and reduction include, but are not limited to: struck by or caught in/between vehicles, falls or trips on uneven surfaces, cuts, abrasions or punctures from vegetative or C&D sharps, struck by falling disaster debris and airborne particles, or exposure to poison ivy and other skin irritants as well as insect, reptile, and animal bites. PPE requirements include:

- Reflective Vest;
- Foot protection (rugged shoes or boots, steel toe if required);
- Vision and hearing protection;
- Long pants and long sleeves;
- Gloves;
- Hard Hat; and
- Respiration protection

Debris Cutting and Trim Work
The hazards of disaster debris cutting and trimming work include, but are not limited to: struck by or caught in/between vehicles, falls or trips on uneven surfaces, cuts, abrasions or punctures from power tools, vegetative or C&D sharps, struck by falling disaster debris and airborne particles, or exposure to poison ivy and other skin irritants as well as insect, reptile, and animal bites. PPE requirements include:

- Reflective Vest;
- Hand and Foot protection (rugged shoes or boots, steel toe if required);
- Vision and hearing protection
- Long pants and chaps if required
- Hard Hat
- Gloves

For additional information regarding health and safety requirements, please contact OSHA.

Health and Safety Contact Information
Occupational Safety & Health Administration 1-800-321-6742

References:

Debris Monitoring Fact Sheet
http://www.fema.gov/government/grant/pa/9580_203.shtm

Debris Management Plan. FEMA 305. July 2007
http://www.fema.gov/government/grant/pa/demagde.shtm#4

Recovery Strategy RS-2006-2. Debris Removal Operations. July 24, 2006