



2007- 08 HURRICANE SEASON DEBRIS MANAGEMENT PLAN

City of Chesapeake
Public Works, DCS
DATE: July 13, 2007

PURPOSE

- To provide policies and guidance to Chesapeake Public Works Department for the removal and disposition of debris caused by a natural disaster
- This plan is based on the assumption that the natural disaster is typical of the damage expected with a light precipitation category 3 or less hurricane at which recovery is managed by the City of Chesapeake. It is anticipated that an event exceeding this level will require the City to seek State or Federal management teams to aide in the recovery.
- To outline the actions necessary to facilitate and coordinate the debris management activities in order to resume normal City operations

INTRODUCTION and BACKGROUND

The City of Chesapeake is located in southeastern Virginia. The eastern boundary is approximately 8 miles from the Atlantic Ocean and City Hall is an additional 10 miles from the boundary. Many tributaries to the Elizabeth River/James River flow through Chesapeake and provide drainage outfalls to the northern half of the City. The southern half of the City drains to the Northwest River and Currituck Sound in North Carolina. Water levels in the southern half of the City are largely determined by prevailing winds and the resultant effects (water levels) on/in the Currituck Sound. The northern half of the City is directly affected by tidal fluctuations from the tributaries to the Chesapeake Bay.

The City covers approximately 353 square miles. Eighty square miles are part of the Great Dismal Swamp National Wildlife Refuge. The northern section of the city is heavily developed, while the southern section of the city remains largely undeveloped, with large wooded lots and farm land. Chesapeake is home to 218,000 citizens.

Chesapeake has experienced two storms in recent history that generated quantities of debris necessitating contract assistance. In 1998 Hurricane Bonnie generated approximately 350,000 CY of woody debris. In 2003 Hurricane Isabel generated approximately 1,000,000 CY of woody debris. Hurricane Bonnie and Isabel were minimum category 1, dry storms.

In 1999, Chesapeake experienced record-breaking rainfalls with hurricanes Dennis, Floyd, and Irene. While causing severe flooding, very little debris was generated.

In response to Hurricane Bonnie, Chesapeake hired independent contractors to assist the Solid Waste Division of Public Works in collecting, reducing and disposing of the woody debris. For Isabel, the city contracted with one of the established regional debris contractors. In addition, Chesapeake developed an emergency contract with an additional contractor to collect, reduce, and dispose of the woody debris. Chesapeake also enacted an emergency contract with an engineering firm to assist in debris management including but not limited to providing field monitors to manage collection, reduction, and debris site management.

Several debris disposal sites were activated and utilized for Isabel. The goal was to maximize contractor efficiency and minimize costs by reducing to maximum extent practicable the travel distances from pick-up to the sites.

Debris generated by Isabel was primarily reduced by grinding, although two debris sites utilized air-curtain incinerators. The resultant mulch was disposed at a local privately-owned landfill which is permitted by the Virginia Department of Environmental Quality (DEQ). Some of the mulch was sold by the contractor to US and foreign entities to be used as fuel. Selling of the mulch for use as alternative fuel source saved the City the cost of the tipping fee at a landfill.

An intensive effort was made to document all contractor costs. All original invoices, truck tickets, landfill tipping fees, etc. were copied and scanned. A DVD was prepared by our engineering consultant of the total debris program costs. In addition a data base was developed which allows auditors to review and search in a digital format while the originals were maintained as back-up.

Hurricane Isabel generated large numbers of leaning trees and hanging limbs which posed a danger to the public rights-of-way. FEMA was closely consulted and their directions were followed to ensure reimbursement.

The following is based on the suggested FEMA Student Manual for "Debris Management Cycle".

I. Normal Operations: per City Concept of operation and contract management

- A. Verification of the Right-of-Way agreements for Temporary Debris Storage and Reduction Sites (TDSRS) shall be identified and placed on the City's Site Activation Map. The actual debris quantity shall determine the number and location of TDSRS to be activated. The City has established a contract with a private, permitted landfill in Suffolk, Va. This site shall be the first TDSRS to be used for debris disposal. If the severity of the storm/quantity of debris warrants, additional TDSRS sites will be activated. Each of the pre-determined TDSRS shall be:

1. Located on the City's Site Activation and Debris Zone Maps
 2. Have a detailed site plan prepared on an aerial photograph (see Appendix A)
 3. Have an agreement with the owners which allows the City to use the site
 4. Have an estimate to determine the quantities necessary to prepare the site for use as a TDSRS
 5. Reviewed annually in the pre-storm condition to ensure site is still viable
- B. The Site Activation Map delineates three separate areas for debris collection. Each area is managed by a project manager in DCS (member of the Debris Management Task Force, DMTF)
- C. Debris Management Task Force, DMTF is listed below:

PROGRAM MANAGER: Robert P Morrisette, Jr. P.E.
 Office (757) 382 – 6272; Cell (757) 373 – 4960
 e-mail, bmorrisette@cityofchesapeake.net

Contract Coordinator: Scott Frechem
 Office (757) 382 – 6319; Cell (757) 615 – 9268
 e-mail, sfrechem@cityofchesapeake.net

Area 1	WESTERN BRANCH / DEEP CREEK	
<u>Project Manager</u> Kevin Lundgren, P.E.	Office (757) 382 – 6383; Cell (757) 620 – 4566	klundgrn@cityofchesapeake.net
<u>Inspection Supervisor</u> Jeff Andleton	Cell (757) 382 – 9273	jandleton@cityofchesapeake.net
<u>Contractor</u> Phillips & Jordan Dudley Orr or Cecil Patterson	Cell (828) 735 – 0947 Cell (215) 633 –3540	
Area 2	SOUTH NORFOLK / GREENBRIER	
<u>Project Manager</u> Paul Dunn, P.E.	Office (757) 382 – 6129; Cell (757) 615 – 9252	pdunn@cityofchesapeake.net
<u>Inspection Supervisor</u> Harvey Thornton	Cell (757) 615 – 9251	hthorton@cityofchesapeake.net
<u>Contractor</u> Phillips & Jordan Dudley Orr or Cecil Patterson	Cell (828) 735 – 0947 Cell (215) 633 –3540	

Area 3	SOUTH CHESAPEAKE	
<u>Project Manager</u> Rob Matkins	Office (757) 382 – 6479; Cell (757) 615 – 9250	rmatkins@mail.cityofchesapeake.net
<u>Inspection Supervisor</u> Ron Kelvin	Cell (757) 615 – 9269	rkelvin@mail.cityofchesapeake.net
<u>Contractor</u> Crowder Gulf Kelly Pridgen	Cell (252) 903 – 8504	kellypridgen@mindspring.com

- D. Contract standing (re-establish or extend open end contracts)
- E. Update personnel availability for EOC and assessment plans
- F. Concept of Operations -The Design Construction Services section of the Engineering Division of Public Works will determine its actions based on the “Storm Conditions” noted below as defined in *Public Works Emergency Operations Plan*.
 1. **Pre-Storm (December – May)** - This period will be used for updating the Debris Management Plan, training of Engineering staff, and procuring contractors for use if an emergency is declared.
 2. **Condition I-Advisory (June-November)** - Personnel in DCS who comprise the DMTF will meet regularly to discuss the Debris Management Plan and current tropical storms. DMTF will also meet with representatives of established contracts/contractors.
 3. **Condition 2-Alert (72 Hours prior to landfall)** - DMTF will meet daily (or as needed) to establish plans for the most likely post storm scenario. (IE: determine number of sites to activate following declaration based on storm category prediction, refer to Saffir-Simpson Scale, Appendix B). **See section II, Increased Readiness Plan.**
 4. **Condition 3- Watch (48 hours prior to landfall)** - DMTF will meet daily (or as needed) to establish plans for the most likely post storm scenario. (IE: determine number of sites to activate following declaration based on storm category prediction). DMTF will contact established contractors to confirm probable/possible activation of contracts. Refine plans and estimates based on storm predictions. **See section II, Increased Readiness Plan.**
 5. **Condition 4- Warning (24 hours prior to landfall)** - DMTF will meet two-three times daily (or as needed) to establish plans for the most likely post storm scenario. (IE: determine number of sites to activate

following declaration) DMTF will contact established contractors to confirm probable/possible activation of contracts. PBS & J have indicated they will be pre-positioned and meet with the City prior to the event to set-up the required logistics. Refine plans and estimates based on storm predictions. **See section II, Increased Readiness Plan.**

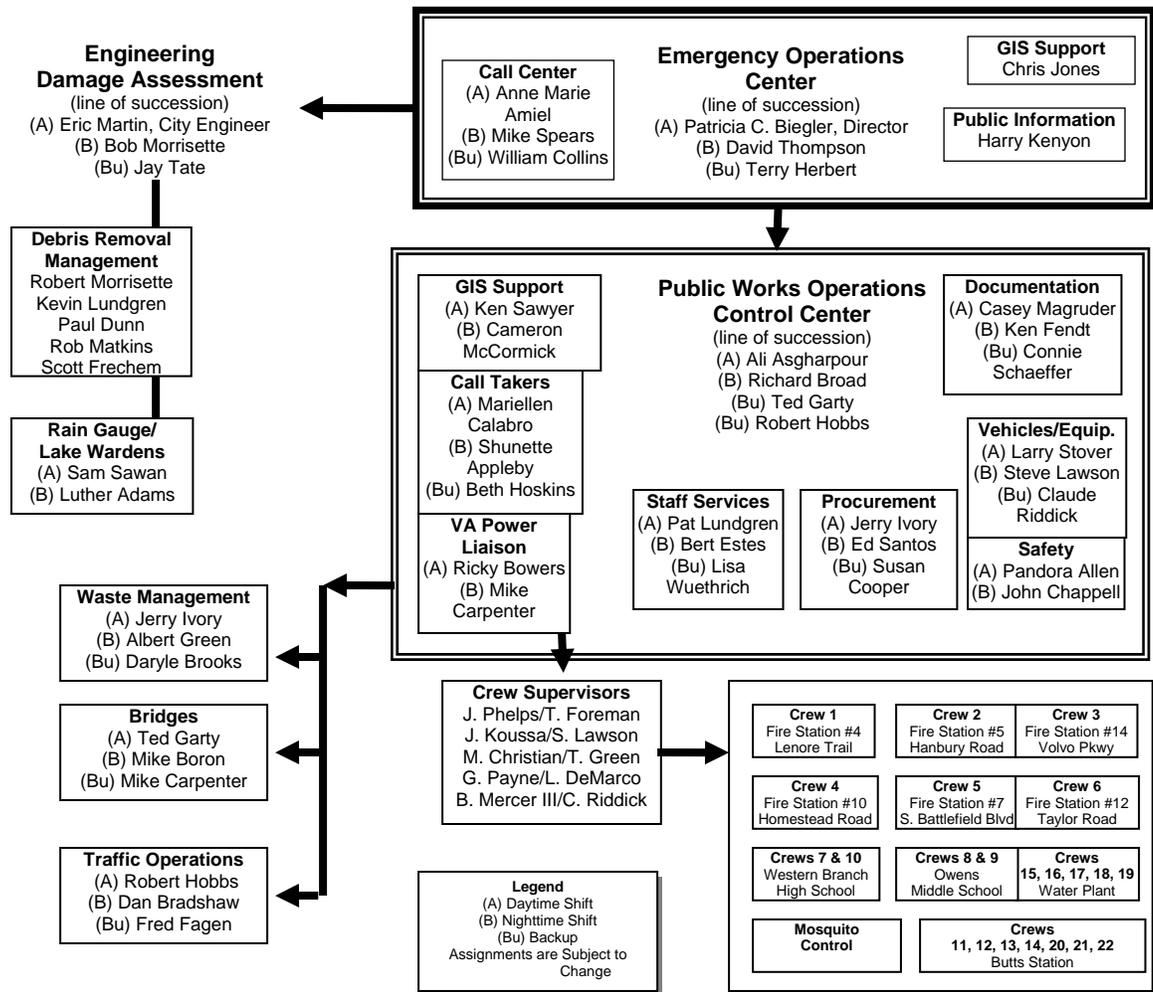
6. **Condition 5-Storm** - No Activity
7. **Condition 6- Response (Short term recovery 3 days or less)** - DMTF will activate established Emergency Site Prep & First Response contract if declaration of emergency has been made. The PWOCC Main Routes and PWOCC Secondary Routes Maps will be used as a guide to determine priority of road clearing (See Appendix C). Also, based on the actual severity of the storm, DMTF will decide on the number and location of TDSRS to activate. Continue meeting with the pre-established consultant (PBS & J) for the field monitoring and establish level of assistance required. TDSRS preparation and debris collection. **See section III, Response Plan**
8. **Condition 7-Recovery (Long-term recovery greater than 3 days)** - DMTF will meet daily with Field-monitoring contractor until all roads have been cleared, all TDSRS have been prepared, and one complete sweep of the City for debris collection has been completed. Daily status maps of debris collection will be prepared and made available to DPW Public Information Officer, DPW Citizen's Advocate Manager, and FEMA and VDEM representative as requested/necessary. City representative collection of daily truck tickets for debris collection. **See section V, Recovery Plan**
9. **Post Storm** - All records will be clearly organized for review by FEMA, etc.

II. Increased Readiness Plan - per City Emergency Operation management services

- A. Right-of-way notifications
- B. Staff notifications
- C. Initial contractor notifications
- D. Ensure assessment teams have photo and video documentation equipment (coordinate with Engineering Technician Supervisor, currently Dave Dombroski)
- E. Review following EOC org chart for compliance

(complete chart on following page)

PUBLIC WORKS 2006 EOC ORG CHART



III. Response Plan:

- A. Ensure if there has been a declared disaster (determines if strict adherence to FEMA guidelines are required)
- B. Requests for support assistance will be from the local EOC and then to the State EOC. Requests for Federal assistance will be made by the State EOC through established procedures, as outlined in the Federal Response Plan.
- C. Assessment by City; Coordinate with the Engineering Technician Supervisor, currently Dave Dombroski, in order for the DMTF to determine first response/roadway clearing priorities. (Utilize Main & Secondary Route Maps located in DCS or refer to Appendix C)
- D. Estimating The Type and Quantity of Debris - As part of the debris plan, DMTF personnel have used the Manual USACE Model to determine the type and quantity of debris for hurricanes from category 1 through category 5. Quantities are determined for light, medium, and heavy rainfall amounts. *Additional information obtained from aerial reconnaissance*

and/or windshield surveys will be considered if available after the storm.
 (See Appendix D for debris quantities calculated per census area)

Debris Estimates Chart							
Storm Category	Precipitation	Debris Types (cy)					City Totals (cy)
		30% Clean woody debris	70% Mixed C&D				
			42% Sorted & reduced	5% Soil	15% Metals		
I	Light	68,222.5	66,857.8	7,959.3	23,877.8	60,490.4	227,407.8
	Heavy	88,689.1	86,915.3	10,347.1	31,041.3	78,637.5	295,630.3
II	Light	272,888.9	267,431.1	31,837.1	95,511.1	241,961.6	909,629.8
	Heavy	354,755.8	347,660.6	41,388.1	124,164.4	314,550.1	1,182,519.0
III	Light	886,889.3	869,151.5	103,470.4	310,411.3	786,375.1	2,956,297.6
	Heavy	1,152,955.9	1,129,896.8	134,511.6	403,534.6	1,022,287.6	3,843,186.5
IV	Light	1,705,556.4	1,671,444.9	198,981.6	596,944.5	1,512,259.8	5,685,187.2
	Heavy	2,217,223.1	2,172,878.7	258,676.0	776,028.1	1,965,937.7	7,390,743.6
V	Light	2,522,218.1	2,471,773.7	294,258.7	882,776.3	2,236,366.8	8,407,393.6
	Heavy	3,547,556.8	3,476,605.7	413,881.7	1,241,645.0	3,145,500.4	11,825,189.6

E. Project Managers to evaluate TDSRS required from zone maps (see Appendix E) and damage assessments

- F. Contract activation (if necessary) (notify SPSA) (port-a-johns/ fencing etc...) see Contract Notebook for available additional contracts
- G. First response contract (clear roads, EMS access and site prep) Debris is simply pushed to the shoulders of the roadway during the emergency opening of key routes. The initial objective is to provide for the safe movement of emergency and support vehicles into and out of the disaster area.
 - 1. Emergency Site Prep & First Response Contract
 - a) Phase I - consists of clearing roads identified on the PWOCC Main Routes
 - b) Phase 2 - consists of clearing roads identified on the PWOCC Secondary Routes map
 - Phase 1 & Phase 2 shall not exceed 70 hours of contract time following a declaration.
 - Requests by the City's EOC shall also be used in coordinating priorities of Phase 1 & Phase 2 clearing.
 - Phase 1 & Phase 2 work is intended to clear the roads to allow passage of vehicular traffic. No debris shall be removed more than 1 mile on Federal Aide roadways.
 - Crews equipped with chain saws may be required to cut up downed trees prior to clearing. Appropriate safety precautions should be followed.
 - Special care must be taken to avoid the danger of downed-live electrical lines. Work crews should coordinate with Dominion Virginia Power to de-energize power lines.
 - c) Phase III –TDSRS preparation (per the site plan of the specific site)
 - 2. Holland Contract - debris removal and disposal site
 - a) Contact J. C. Holland for notification of intended extent of contract activation.
 - 3. PBS & J Contract – monitoring and documentation of the emergency debris efforts
 - a) Contact PBS & J for notification of intended extent of contract activation
 - b) Coordinate daily meetings
 - c) Coordinate debris quantity daily reports
 - d) Coordinate priority listing and location of work forces
 - 4. SPSA Contracts – Phillips & Jordan and Crowder Gulf; debris removal, site management, debris reduction, reduction material removal and site restoration.
 - a) Contact contract holders necessary for activation
 - b) Coordinate with SPSA notification of contract activation
 - c) Coordinate location and chain of command for work
- H. Coordinate the environmental requirements and documentation with staff environmental engineer, currently Dave Mergen (make sure any baseline testing is completed to ensure a benchmark is set for TDSRS closure procedure)
- I. Coordinate GIS mapping of debris areas

- J. Verify communication and its capabilities.
- K. Inventory repair – determine the necessary infra-structure damage and if repair contracts are required. (streets, drainage etc...)

IV. Record Keeping: Permanent records must be maintained in one central location and include, all procurements, correspondence, log books, meeting minutes, invoicing, reimbursement commitments etc... (ensure permanent photo/video is logged-in documentation)

V. Recovery Plan:

- A. Schedule and deploy resources
- B. Coordination with City Emergency Management, VDEM and FEMA
- C. FEMA response team meetings (assist or coordinate in writing the FEMA project worksheets “PW’s”, Appendix F)
- D. Notifications and reports to City Manager’s office (Appendix G)
- E. Notify Budget, Purchasing and Public Works accounting, all storm related cost/ invoices shall be tagged/ stamped or marked as “Hurricane (name)”
- F. Daily record keeping. Timesheet record keeping (Appendix H)
- G. FEMA Debris Site Daily Summary (Appendix I)
- H. Documentation of evaluations and decisions
- I. Coordinate Public Notices if necessary (Harry Kenyon). The Public Information personnel should be prepared to respond to questions pertaining to debris removal from the press and local residents. The following questions are likely to be asked:
 - 1. *What is the pick-up system?*
 - 2. *When will the contractor be in my area?*
 - 3. *Who are the city representatives and how can I contact them?*
 - 4. *Should I separate the different debris materials and how?*
 - 5. *How do I handle Household Hazardous Waste?*
 - 6. *What if I am elderly?*
- J. Notify citizens of debris segregation requirements and location for debris pick-up
- K. Debris Removal
 - 1. Phase 1 - Set debris removal priority (coordinate with Public Works’, Solid Waste’s, and Streets & Highways’ efforts)
 - 2. Phase 2 - Execute debris removal activities
 - 3. Phase 3 - Ensure debris removal monitoring
 - 4. Phase 4 - Daily reporting to DMTF
 - 5. Phase 5 - Record keeping maintained daily
 - 6. Phase 6 - FEMA PW’s to be written with FEMA representative
 - 7. Hazardous household waste (HHW) generated as a result of a major natural disaster may consist of common household chemicals, propane tanks, oxygen bottles, batteries, and industrial and agricultural chemicals. These items will be mixed into the debris stream and will be required to be segregated, contained and disposed per the SPSA contract and coordinated with the environmental personnel. This requires designated hazardous material containment site with liner etc... to be in place per state and federal requirements (refer to item I

8. The contractor must determine and disclose the method proposed for debris reduction. There are several methods including landfill, "selling" of the chipped material or incineration. All methods must follow the SPSA contract guidelines and federal, state and local permitting/ laws.
9. Grinding and chipping woody debris is a viable reduction method and the resulting product, mulch, can be recycled, in other locations it may become a landfill product.
 - a) Grinding and chipping woody debris reduces the large amounts of vegetative debris (approximately 4:1 ratio) and results in substantially lower haul cost. Each site defines the set-back requirements for the set-up of the grinding operations.
 - b) The DMTF should work closely with local groups to determine if there is a market for mulch. Another source for disposal of ground woody debris may be as an alternative fuel for use in a cogeneration plant.
 - c) There are requirements for grinder setbacks that must be adhered to and noted on each TDSRS site plan (keep at least 1,000 feet between the incineration area and the nearest roadway or structure).
 - d) If recycling is opted for, contaminants (materials other than wood products) will need to be removed for the mulch to be acceptable. The contractor is responsible for the system of debris collection utilized to obtain the required reduced material product.
10. Environmental controls are essential for all incineration methods, and the following should be considered:
 - a) A setback of at least 1,000 feet should be maintained between the debris piles and the incineration area (keep at least 1,000 feet between the incineration area and the nearest roadway or structure). Contractors should use fencing and warning signs to keep the public away from the incineration area.
 - b) The fire should be extinguished approximately two hours before anticipated removal of the ash mound. The ash mound should be removed when it reaches 2 feet below the lip of the incineration pit.
 - c) The incineration area should be placed in an above ground or below ground pit that is no wider than 8 feet and between 9 and 14 feet deep. (Portable units still meet same setbacks and local/federal permit requirements)
 - d) The incineration pits should be constructed with limestone and reinforced with earth anchors or wire mesh to support the weight of the loaders. There should be a 1-foot impervious layer of clay or limestone on the bottom of the pit to seal the ash from the aquifer.
 - e) The ends of the pits should be sealed with dirt or ash to a height of 4 feet.
 - f) A 12-inch dirt seal should be placed on the lip of the incineration pit area to seal the blower nozzle. The nozzle should be 3 to 6 inches from the end of the pit.

- g) There should be 1-foot high, warning stops along the edge of the pit's length to prevent the loader from damaging the lip of the incineration pit.
 - h) Hazardous or contaminated ignitable material should not be placed in the pit. This is to prevent contained explosions.
 - i) The airflow should hit the wall of the pit about 2 feet below the top edge of the pit, and the debris should not break the path of the airflow except during dumping.
 - j) The pit should be no longer than the length of the blower system, and the pit should be loaded uniformly along the length
11. TDSRS Close-out Procedures
- a) Each TDSRS will eventually be emptied of all material and be restored to its previous condition and use. The contractor should be required to remove and dispose of all mixed debris, construction and demolition debris, and debris residue to approved landfills. Inspectors should monitor all closeout and disposal activities to ensure that contractors complied with contract specifications.
 - b) The contractor must assure the DMTF that all sites are properly remediated. Site remediation will go smoothly if baseline data collection and site operation procedures are followed.
 - c) The basic close-out steps are to remove all debris from the site; conduct an environmental audit or assessment; develop a remediation or restoration plan approved by the appropriate environmental agency; acceptance from the landowner; and complete lease payments, if applicable.
 - d) Environmental Restoration. Stockpiled debris may be a mix of woody vegetation, construction material, household items, and yard waste segregated and removed during reduction. Contamination may occur from petroleum spills at staging and reduction sites or runoff from the debris piles, incineration sites, and ash piles.
 - e) **Site Remediation.** During the debris removal process and after the material has been removed from each of the debris sites, environmental monitoring will be needed to close each of the sites.
 - f) Monitoring of the incinerator ash should consist of chemical testing to determine the suitability of the material for landfilling.
 - g) Monitoring of the soils should be by portable methods to determine if any of the soils are contaminated by volatile hydrocarbons. The contractors shall do this if it is determined that hazardous material, such as oil or diesel fuel, was spilled on the site. This phase of the monitoring should be done after the stockpiles are removed from the site.
 - h) The environmental monitoring should be completed by the staff environmental engineer, currently Dave Mergen.
12. Ensure the following steps are taken to closeout a temporary staging and reduction site(s).
- a) The contractor should be responsible for environmental restoration of both public and leased sites.

- b) Contractors will also be required to remove all debris from sites for final disposal at landfills prior to closure.
- c) Reference appropriate and applicable environmental regulations.
- d) Prioritize site closures.
- e) Schedule closeout activities.