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The Trusted Integrator for Sustainable Solutions

Environmental Solutions | Property Redevelopment | Design/Build Construction | Green Buildings | Clean Energy

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an employee-owned company

Green Demolition

Federal Environmental Symposium-West

17-19 June

Big Sky, Montana

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WESTON SOLUTIONS

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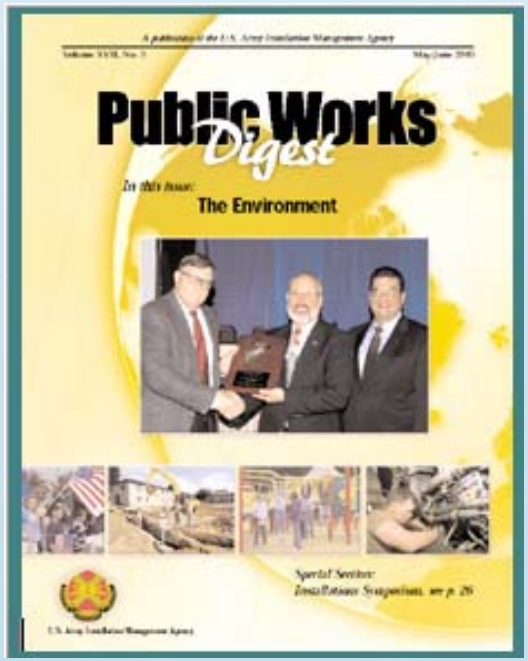
Objectives

- Discuss Weston's experience and lesson's learned associated with recent "green demolition" projects.
- Identify items for consideration before moving forward with a "green demolition" project.
- Touch on the difference between "green demolition" and "green deconstruction".



Green Demolition

"…Considering the holistic benefits associated with demolition activities".

"…It is much more than knock it down and sort the materials".

"…ensuring integrated non-hazardous solid waste management programs provide an economic benefit when compared with disposal using landfilling and incineration alone."

Andrews AFB Project

- Officers Club Complex
- Slab on grade plus basements
- Dining Rooms
- Kitchen area
- Ballroom
- Mechanical Room
- Rathskellar

Air Force Drivers for Demolition

"Reduce the amount of the Air Force physical plant that we spend money on by 20% by the year 2020."

- Eliminate obsolete and/or excess facilities
  - Decrease overall facility operations costs
  - Achieve O&M cost avoidance
  - Reduce/save on energy expenditures
  - Redevelopment of site
  - Facility "Zero Net" policy
- Maximum demolition - least total cost per square foot
- Rapid re-use of property
- Solid waste diversion rate goals
- >85% of all material to be reused/recycled

Identify "Green" Programs Early

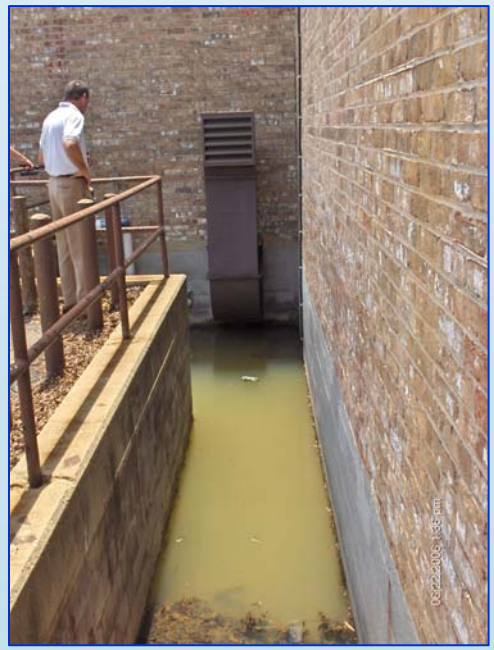
- Identify "required" and "desirable" program compliance during the project planning phase (pre-bid or estimate)
- Green "Demolition" vs. "Deconstruction"
- Build the elements into project approach
  - Discuss with client and base stakeholders
  - Determine desired goals
  - Discuss impact on cost, schedule, operations
  - Capture procedures in quality and work plans
- **Documentation is critical**
  - Can not be done after the fact

Goals of Green Demolition

- Divert demolition materials from landfills
- Maximize recovery of bulk demo materials for reuse (first) and recycling (second)
- Reduce costs associated with transportation and disposal
- Reduce or eliminate cost and transportation for “clean” fill
- Save energy associated with new materials
- Compliance with, or Credit under various “Green” programs
- Minimize impacts on the surrounding environment and land use

Hazardous Materials Verification Survey

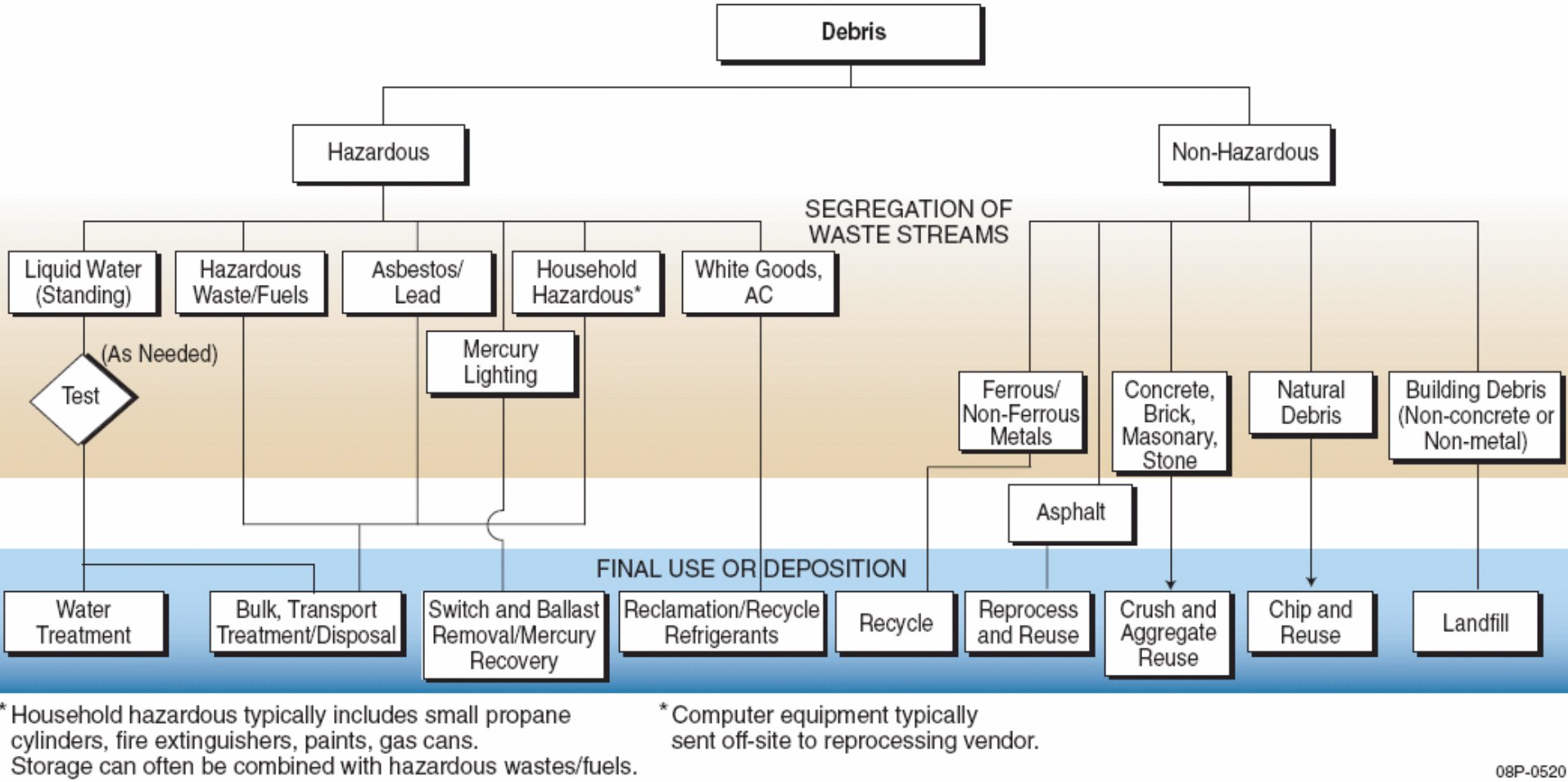
- Historical Data Review
  - Past building usage
  - Waste management practices
- Physical Verification Survey
  - Asbestos containing material (ACM)
  - Lead-based paint (LBP)
  - Light ballasts (PCBs)
  - Lights and switches (mercury)
  - Water in basements and sumps



Building Walk-Through

- Ensure building is safe
- Conduct a walk-through with stakeholders to identify items for salvage:
  - Sinks and plumbing
  - Doors
  - Replacement/spare parts
  - Fire detection system
  - Electrical Distribution Equipment
  - HVAC Equipment
  - Office Equipment
  - Historical and icon items

Demolition Material Recovery and Reuse



* Household hazardous typically includes small propane cylinders, fire extinguishers, paints, gas cans. Storage can often be combined with hazardous wastes/fuels.

* Computer equipment typically sent off-site to reprocessing vendor.

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Alternate Reuse Activities

Best Suited to Deconstruction Activities

- Identify local markets for old lumber (framing members, beams, siding)
- Sort all metals in building (copper and steel)
- Separate architectural materials – (brick, slate, tile)
- Establish local combustion to energy programs for organic building debris
- Identify interested groups that accept a wide range of materials
- "Garage sales" – deconstruction contractors arrange for resale (e.g., windows, plumbing pieces)
- Resale of building construction material (e.g., Craig's List)
  - Big HVAC equipment to old framing timber

Summary of Recycled/Reused Material (84.3% by weight)

Material	Weight	Final Usage
Concrete	6849 tons	Compacted Fill
Ferrous Metals	690 tons	Recycled
Non-Ferrous Metals	40 tons	Recycled
Computer Equipment	4 tons	Recycled
Oil/Refrigerants	3 tons	Recycled
Construction Debris	1417 tons	Landfill

Using Recycled Concrete Aggregate (RCA)

Benefits

- Limits T&D cost to landfill
- Reduces or eliminates cost for new fill or base material

Challenges

- End-use selection in advance
- Proper sizing
- Physical properties (e.g., permeability, swelling)
- Dust control

Recycled Concrete Aggregate (RCA)

Material sizing during crushing operations

- < 2 inch
  - Achieved >95% compaction
  - Suitable for new building construction, roads, storage yards
  - Low water permeability
- < 6 inch
  - Suitable for fill
  - Good drainage

Benefits

- Achieve “green” goals and compliance with applicable sustainability programs and other agency directives
- Obtain “green” or LEED credits
- Save money on the actual demolition project
  - Transportation and disposal
- Save money on site prep for new development
  - Beneficial reuse
  - Fill and base material cost and transportation
- Supply other facility departments with needed materials
- Minimize local environmental and social impacts
- Support local recycling and sustainability related businesses
- Achieve holistic embodied energy savings

Special Thanks

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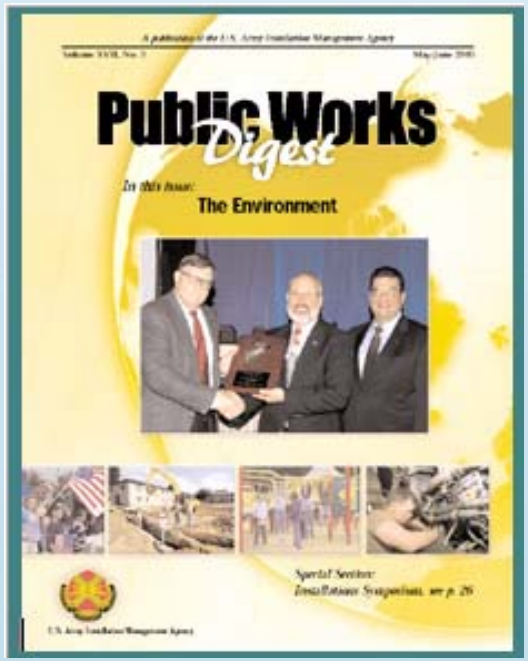

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