

Subcommittee: Construction and Demolition Waste Management

(Abstracted from State Solid Waste Management Plan, Amended December 2006; Objective 4 – Management of Special Wastes and Other Types of Solid Waste)

Maximize source reduction, recycling, and beneficial use of special waste and other types of solid waste (construction and demolition wastes) in a manner that protects human health and the environment and also assure that waste that requires disposal is disposed in compliance with the State's solid waste management hierarchy in facilities that meet all regulatory standards for protectiveness of human health and safety, natural resources, and the environment.

Overview of C&D Waste

C&D waste is the waste stream generated as a result of activities such as construction, renovation, repair, and demolition of buildings, dams, piers, bridges, and paved surfaces such as roads, highways, and parking lots. C&D waste typically consists of larger sized material and varies widely depending on activity type. It includes asphalt, concrete, brick, soils, wood, metal, wallboard, roofing, insulation materials, plastics, cardboard, glass, packaging and miscellaneous trash. Although Connecticut categorizes and regulates construction waste as a distinct type of MSW and demolition waste as a type of "bulky waste", C&D waste is discussed in this Plan as its own waste category because it is managed as a single waste type. Although clean fill (asphalt, brick, concrete, etc.) is part of the waste stream generated by construction and demolition activities, the CT DEP does not regulate areas/facilities used solely for the processing and disposal of clean fill. Connecticut solid waste regulations define clean fill as natural soil, rock, brick, ceramics, concrete, and asphalt paving fragments which are virtually inert and pose neither a pollution threat to ground or surface waters nor a fire hazard. There are different categories of C&D waste based on the source and/or the management of the waste: i.e. demolition debris from buildings and other structures, construction waste from buildings and other structures, and construction and demolition waste from road and highway. Table 4-6 provides a listing of the types of waste, their respective legal classification per Connecticut statutes, and examples of that type of waste.

Connecticut must manage C&D waste in keeping with the hierarchy mandated by state statute, CGS Section 22a-228(b). Currently, most of the Connecticut C&D waste is disposed and only about 7 percent is reported recycled. These figures are only reflective of the waste which passes through Connecticut permitted solid waste facilities and is reported to the CT DEP and does not include most of the clean fill generated and reused or recycled, which are not reported to the CT DEP. The low recycling rate of what is reported is coupled with a severe lack of disposal capacity in Connecticut for C&D related waste, resulting in most of Connecticut's C&D waste being disposed of in out-of-state landfills. In FY2004, in-state C&D volume reduction facilities (VRF) and transfer stations (TS) reported sending approximately 909,000 tons of Connecticut generated C&D waste to out-of-state landfills for disposal.

This Plan presents actions to increase source reduction, reuse, recycling, composting, and beneficial use of various components of the C&D waste stream as well as disposal for that waste that cannot be managed in such a manner. However, not all C&D related waste can be reclaimed, and those portions will require other management options. Those other management options could include: the use of clean wood derived from C&D waste in clean or renewable energy applications, the burning of some types of processed C&D waste at

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Connecticut resource recovery facilities or waste-to-energy facilities, the continued export to out-of-state landfills, and disposal at newly developed in-state lined bulky waste landfills.

Current C&D waste management practices

C& D waste is generated from the following two activities:

- C&D waste from building construction, renovation, and demolition; and
- C&D waste from highway/road construction and demolition.

C&D waste from building construction, renovation, and demolition

U.S. EPA national data cited in this section is from *Characterization of Building-Related Construction and Demolition Debris in the United States, June 1998* and was prepared for U.S. EPA by Franklin Associates. EPA estimates that 136 million tons of building-related C&D debris was generated in the United States in 1996, representing about 25 percent to 30 percent of all solid waste generated. Table 4-7 provides EPA estimates that in 1996, building demolitions accounted for 48 percent of the C&D waste stream, renovations accounted for 44 percent, and construction accounted for 8 percent of the waste generated. The table also provides estimated tons generated annually in Connecticut. EPA estimated that the per capita generation rate for building-related C&D debris in 1996 was 2.8 pounds per person per day. Applying that per capita rate to Connecticut would give an estimate of 1.78 million tons annually of building related C&D debris generated in Connecticut, based on Connecticut estimated population for July 2003. The amount of C&D waste captured in the FY 2004 solid waste facility reporting to the CT DEP indicated an annual C&D waste generation rate of 1.1 million tons. The amount of clean fill that is generated in-state and which is not reported to the DEP would add to the Connecticut reported amounts. It needs to be noted that the amount of C&D waste generated in any year is dependent on variables such as storm activity and economic conditions, and therefore the amount generated year-to-year can be highly variable.

The composition of C&D debris also varies significantly, depending on the type of project from which it is being generated. Building related construction activities generally produce cleaner materials than building demolition activities, where waste materials might be bonded together or contaminated with hazardous materials, such as asbestos or lead paint. Waste produced by renovation projects can include both construction and demolition type wastes. Table 4-8 provides estimates of the overall percentage of materials in C&D debris generated by building related activities as determined by EPA.

Currently, Connecticut building related C&D waste is managed in a number of ways. It can: go directly to a landfill; be volume reduced at Connecticut C&D VRFs before being disposed at a landfill or resource recovery facility; or go to a transfer station where it is transferred to a landfill. The majority of this waste is ultimately transferred to out-of-state landfills. Very little of the building related C&D waste is recovered for recycling at C&D VRFs. Although data regarding clean fill is not generally reported to the CT DEP, it is assumed that most of the brick, concrete and mixed rubble generated as a result of demolition activity is reused or recycled at one of a dozen or so aggregate recycling facilities in the state; there are no good estimates for this material that is reused. For FY2004, Connecticut C&D waste and oversized MSW managed by Connecticut permitted solid waste facilities is summarized below:

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Table 4-6 C&D Waste		
Activity	Legal Classification in Connecticut of Waste Produced by Activity	Examples of the Types of Waste
Building Demolition	Bulky waste, clean fill	Wood, brick, plaster, roofing materials, wallboard, metals, carpeting, insulation, ceramics, concrete, siding, asphalt.
Building Construction	MSW, clean fill	Pallets, wood scraps, brick, clean wallboard, siding and roofing scraps, packaging (such as cardboard), partially used paints and stains, scraps of new carpeting, foam padding, and insulation.
Highway construction and demolition	Bulky waste, MSW, clean fill	Asphalt, concrete, steel, related construction and demolition wastes, utility poles, railroad ties.
<p>Clean Fill is defined by Connecticut solid waste regulations as natural soil, rock, brick, ceramics, concrete, and asphalt paving fragments which are virtually inert and pose neither a pollution threat to ground or surface waters nor a fire hazard. Asphalt millings are not considered as clean fill, that is asphalt pieces that are smaller than 4 inches (millings, shavings, dust and the like). The CT DEP does not regulate areas/facilities used solely for the processing and disposal of clean fill.</p>		

Table 4-7 Estimated Building Related C&D Debris Generation ⁽¹⁾		
Source	EPA Estimated % of C&D Waste Generated Nationally in 1996	Estimated Tons Generated Annually in CT (based on EPA per capita generation and CT population of 3,483,390 as of 7/03)
Building Related Construction	8%	142,400
Building Related Renovation (can include construction and demolition type wastes)	44%	783,200
Building Related Demolition	48%	854,400
<p>(1) Amounts of C&D waste managed on-site are unknown and may or may not be included; roadway, bridge, and land clearing debris not included.</p>		

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Table 4-8 EPA Estimated Percentage of Materials in Building Related C&D Debris ⁽¹⁾	
Material Type	% of C&D Waste Generated EPA Estimates
Concrete and mixed rubble	40-50%
Wood	20-30%
Drywall	5-15%
Asphalt roofing	1-10%
Metals	1-5%
Bricks	1-5%
Plastics	1-5%
(1) Source: EPA - http://www.epa.gov/epaoswer/non-hw/debris-new/basic.htm	

- 64 percent or 717,773 tons of C&D waste/oversized MSW was disposed at out-of-state disposal facilities after processing at Connecticut C&D VRFs;
- 17 percent or 193,530 tons of C&D waste/oversized MSW (reported as “bulky waste”) was transferred to out-of-state disposal facilities by Connecticut TSS;
- 12 percent or 140,295 tons of C&D waste/oversized MSW (reported as “bulky waste”) was disposed in Connecticut landfills and RRFs either directly from generation sites or after processing at Connecticut C&D VRFs; and
- 7 percent or 76,751 tons of C&D waste was recycled; this amount excludes clean fill but includes some material reused or recycled by the CT DOT.

The following provides more information with regard to the management of building related C&D waste:

- **Volume Reduction Facilities (VRFs):** The diminishing in-state bulky waste landfill capacity and the rising cost of transporting such waste has led to increased emphasis on the processing of C&D waste material to reduce its volume for transport and disposal. As a result, much of Connecticut’s C&D waste from building related activities is delivered to in-state VRFs, where a small amount of the C&D waste is sorted out for recycling purposes but most is reduced in volume. The ultimate fate of C&D waste processed through Connecticut VRFs includes:
 - Landfills. Most of the C&D waste that is volume reduced at permitted VRFs is sent out-of-state and disposed at out-of-state C&D landfills, most of which are unlined. Lesser amounts of the VRF processed Connecticut C&D waste are disposed at Connecticut landfills, also unlined. It is not uncommon for some VRFs (those which are also permitted to transfer MSW) to mix MSW with C&D waste before transferring the waste to disposal facilities. Such mixed waste loads may be categorized as MSW

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by some states, which import this waste for disposal and in those states that waste may be disposed of in lined MSW landfills.

- Resource Recovery Facilities (RRFs) and other Waste-to-Energy Facilities. A small amount of wood separated from C&D waste at in-state C&D volume reduction facilities is sent to in-state resource recovery facilities where it is burned for energy recovery. In addition, the potential to use processed C&D untreated wood waste in gasification projects to produce clean or renewable energy is being actively considered in Connecticut.
- Recycling Facilities. Small amounts of recyclables, such as scrap metal, clean fill, and untreated wood, are recovered from mixed C&D waste received at in-state VRFs and are recycled or reused.
- **Transfer Stations:** Many transfer stations receive bulky waste (which can include construction and demolition, oversized MSW, and land clearing debris) and transfer it to bulky waste landfills, both in-state and out-of-state. These transfer stations do not process the waste and act only as aggregators of the waste.
- **Direct Haul for Disposal from Site of Generation:** Some unprocessed C&D waste generated at building construction and demolition sites is hauled directly to both in-state and/or out-of-state landfills.
- **Used Building Material Stores and other Reuse Programs:** Some materials from construction, demolition, and renovation projects are recovered for reuse. Currently there are two reconstruction centers in Connecticut that accept donations of used building materials for resale and re-use.
- **Concrete, Brick, Aggregate:** It is assumed that a high percentage of the inert concrete, brick, and aggregate generated as a result of building related construction and demolition activities is either crushed and used as clean fill on or off site or is reused in some other way.

C&D Waste from activities related to highway/road construction and demolition

A significant amount of highway construction and demolition waste, much of which consists of aggregate material, is reused or recycled. For FY2003, the CT Department of Transportation (CT DOT) reported reusing 393,984 tons of aggregate such as concrete and bituminous asphalt as clean fill, reusing 7,352 tons of wood from posts and structures, and recycling 2,547 tons of steel from rebar, sheeting, and building structures. Depending on the type of contract and which division of the CT DOT administers the contract, milled material generated by CT DOT asphalt milling projects may or may not become the property of the contractor. Either way the material is reused. If CT DOT takes ownership of the millings, it uses them in road construction applications such as in shoulders along roadways, as base materials at maintenance facilities and storage areas, for access roadways, or for other uses. Contractors do, however, acquire a major portion of the millings produced each year. C&D waste from road and highway construction that is not recovered is disposed in landfills.

Barriers to Management of Construction and Demolition Wastes

- **Possible toxicity of some components of the demolition waste stream.** Some components of the C&D waste stream can contain material contaminated with potentially hazardous substances such as asbestos or lead. Any management options pursued for this waste stream must take this into consideration.

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- **Limited markets for waste associated with C&D activities.** In general, the State has not supported research and development of C&D waste recycling options and market development. In addition, markets have been stifled by misconceptions about building materials made with recycled content and building codes and architectural/engineering specifications that have excluded the use of building materials with recycled content. Markets have historically existed for some components of C&D waste such as clean fill, clean wood, scrap metal, and cardboard, while viable markets for other components have not been readily available. However, with green building becoming increasingly popular, the private sector is developing markets in close enough proximity to Connecticut to make some recycling cost effective for materials such as dry wall and asphalt roofing shingles. In addition, there have been increased efforts recently in Connecticut to recover usable building components, such as doors, windows, cabinets, and plumbing fixtures for reuse. Existing markets for recoverable components of the C&D waste stream need to be promoted and supported, and new markets need to be identified and supported.
- **Lack of incentives to reduce waste associated with C&D activities.** Even though Connecticut's mandated solid waste management hierarchy prioritizes source reduction and recycling, there are only minimal efforts being made in Connecticut to recover C&D waste for reuse and recycling. Historically, recycling efforts in Connecticut and other states focused on the traditional MSW recyclables and not on C&D waste recycling. Funding and other resources dedicated to the promotion of C&D waste source reduction and recycling has been minimal at best. With the exception of cardboard and scrap metal, Connecticut has no other mandates or incentives for volume reduction facilities, haulers, contractors, developers, demolition companies, or other generators or handlers of C&D related waste to generate less waste and/or to recover more material for recycling or reuse. Source separation of reusable or recyclable materials at C&D waste generation sites may be perceived to be difficult due to space, cost, and logistical barriers. It is easier and more convenient to throw everything in one container, compact or grind it to reduce the volume, and send it to an out-of-state landfill for disposal. This is the current method by which much of Connecticut's C&D waste is being handled. There is generally little awareness or concern regarding the environmental costs of generating and disposing of C&D waste in this manner and no incentive to change. The State has not yet focused outreach programs to try and change these entrenched practices for dealing with C&D waste. In addition, the State's beneficial reuse policies do not appear to facilitate innovative C&D waste recovery alternatives.
- **Lack of in-state disposal capacity for C&D related waste.** There will always be components of the C&D related waste stream that cannot be source reduced or recovered for reuse, recycling, or composting, and these components will need to be disposed of or otherwise managed. Available disposal space in Connecticut for C&D waste is minimal and none of Connecticut's bulky waste landfills are lined. There has not been a new landfill sited in Connecticut in many years. This can be attributed to various factors, which can include the State's siting requirements, as well as public opposition to the siting of such a disposal facility. Some components of the C&D waste stream can contain material contaminated with potentially hazardous substances and as reuse and recycling divert some of the less hazardous material from disposal, the remaining hazardous components can represent a greater percentage of the disposal stream. Landfills that receive this waste will need to be lined to help ensure protection of the state's environment and the public health.
- **Incomplete data regarding the amount and types of C&D wastes generated.** Planning for C&D related waste management is further complicated by the lack of complete data.

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Any Connecticut C&D waste which is managed on site, or is collected and hauled directly out-of- state or to an end user, without first passing through a Connecticut permitted solid waste facility, is not reported to the CT DEP. In addition, the tonnage of C&D generated waste consisting of aggregate, which is virtually inert and does not pose a pollution threat or fire hazard and is considered *clean fill*, generally is not included in reports submitted to the CT DEP by solid waste facilities.

- **State definitions.** Connecticut categories and definitions related to this type of waste are confusing, overlap, and often do not reflect current or potential management options for those wastes. The regulated community utilizes definitions of certain waste types, such as bulky waste, that differ from the definitions provided in Connecticut's General Statutes and Solid Waste Regulations and this causes unnecessary confusion and miscommunication between regulators and the regulated community.

Priorities for Managing C&D Wastes

- Promote the adoption of C&D waste prevention strategies by builders, developers, architects, demolition companies, and other generators of C&D waste;
- Maximize reuse, recycling, and beneficial use of C&D waste in a manner that protects human health and the environment;
- Improve markets for products manufactured from recycling or beneficial use of C&D waste;
- Explore new renewable/clean energy technologies for recovering energy from that portion of the C&D related waste stream that cannot be source reduced, reused, or recycled;
- Maintain a C&D waste management infrastructure that meets all regulatory standards for protection of human health and safety, natural resources and the environment; and
- Use existing solid waste facilities as efficiently as possible for recovery and disposal of C&D waste.
- Develop in-state lined bulky waste landfills.

Land Clearing Debris

Land clearing debris, which includes brush and stumps, is clean wood, sometimes intermingled with soil and rocks, that is a byproduct of such activities as land clearing for construction, landscaping, forest harvesting, storm clean-up, and maintaining corridors for roadways, transmission lines, railroad tracks, etc. Currently in Connecticut, land clearing debris is managed as follows: chipped or ground and then used for mulch or as a component in compost; milled for lumber or processed into firewood; left on site to decay; illegally buried on site; burned legally on-site pursuant to CGS Section 22a-174(f) or RCSA 22a-174-17; dumped illegally on remote sites; historically, some was chipped and sent out of state for use in boiler-fuel applications and it is unclear if this is still being practiced; very little if any is buried at in-state bulky waste landfills; and very little is burned at in-state RRFs. The potential to use land clearing wood waste in gasification projects to produce renewable/clean energy is being explored with the support of Connecticut Clean Energy Fund and by the private sector in Connecticut. Since some land clearing debris generated in Connecticut never passes through a solid waste facility, CT DEP does not get complete data on the amount generated annually nor a complete description of the management techniques used.

Oversized MSW

Oversized MSW is a waste category used by Connecticut regulators to include large or bulky components of the MSW stream such as furniture, carpeting, and mattresses. It is generally handled with C&D waste because of its large size. Current waste management practices in the state include: processing at VRFs with C&D waste and then transferred to out-of-state landfills; transfer through in-state transfer stations to landfills, both in-state and out-of-state; burned at in-state RRFs; and reused through various programs such as swap programs at municipal transfer stations, on-line waste exchanges, building material reuse centers, charitable organizations, and consignment shops. Although reuse of some types of oversized MSW (e.g. usable furniture) is a viable option, there are few opportunities to recycle other types of oversized MSW. An industry product stewardship program to recycle carpeting is beginning to develop nationally and there are some mattress recycling (dismantling) programs located in other states. However there are currently no such facilities in Connecticut. Those options need to be explored especially in the context of product stewardship with greater producer responsibility for the management of some of these products at the end of their useful lives.

Table 4-9 provides a summary of the current and recommended management of demolition and construction waste from buildings, highway construction and demolition waste, land clearing debris, and oversized MSW.

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**Table 4-9
Current and Recommended Management of Certain Wastes**

Types of Waste	Current Management	Estimated Generation (Tons per year)	Recommended Management
Demolition and construction waste (from buildings)	<p>Processed at VRFs (very little recycled, most material is volume reduced by shredding or grinding and then disposed).</p> <p>Most disposed in out-of-state landfills.</p> <p>Some disposed in Connecticut landfills or RRF's (requires special waste authorization from the CTDEP for disposal at the RRF's)</p> <p>Small amounts are reused through building reconstruction centers.</p> <p>Most inert concrete, brick, and aggregate are either crushed and used as clean fill or reused.</p>	<p>Approximately 1.1 million tons of C&D waste (includes some oversized MSW) passing through CT solid waste facilities in FY2004.</p> <p>Actual generation higher due when include unreported aggregate generated by C&D related activities and waste not passing through a CT solid waste facility.</p>	<p><u>Demolition waste:</u></p> <p>Reduce the amount of demolition waste generated by supporting programs such as building preservation.</p> <p>Maximize the amount of demolition waste, recovered for reuse or recycling through more effective processing at VRFs and/or salvage and separation at site of generation. Explore feasibility of renewable and clean energy options and resource recovery for clean demolition wood that cannot be reused.</p> <p>Waste not recycled/composted/reused should be disposed in landfills, preferably lined.</p> <hr/> <p><u>Construction Waste:</u> Focus efforts on source reduction.</p> <p>Construction waste generated should ideally be separated or salvaged at the site of generation to maximize recovery and reuse of material and the rest should be processed at VRFs which maximize material recovered for reuse or recycling and minimize contamination of materials.</p> <p>Goal is to reuse and recycle as much as possible (cardboard, metal, non-treated wood, rubble, dry wall, etc); explore options for renewable/ clean energy or burning at in-state resource recovery facilities for that portion remaining.</p> <p>Residue will require disposal at landfills, preferably lined.</p>
Highway construction and demolition waste	<p>Reuse as clean fill.</p> <p>Processed for recycling (wood waste, metal, and other).</p> <p>Disposed in BW and MSW landfills.</p>	<p>840,000 tons/year (estimate taken from proposed 1999 CT SWMP)</p>	<p>Process most for reuse or recycling. The remaining waste, if not appropriate for waste-to-energy applications, will require disposal at landfills, preferably lined.</p>

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Table 4-9 Current and Recommended Management of Certain Wastes			
Types of Waste	Current Management	Estimated Generation (Tons per year)	Recommended Management
Land clearing debris	Chipped for landscaping use or mulch. Very little disposed in CT landfills or RRF's. Some is buried or burned at site of generation.	Little or no data exists.	Recycle by chipping for reuse (as soil amendment, compost, bulking agent) or clean renewable energy use. Prohibit disposal at landfills (LFs) and eliminate open burning (except after natural disaster).
Oversized MSW	Disposed at bulky waste or MSW landfills, either directly hauled from point of generation or after passing through transfer stations or VRFs. Small amounts, if reduced in size, are disposed at RRFs. Some limited reuse and recycling.	131,000 tpy (estimate taken from proposed 1999 CT SWMP)	Repair and reuse as much as possible (e.g., furniture). Dispose at RRFs (with volume reduction first, where necessary).

Strategies for Managing C&D Waste

Strategy 4-1. The Agency's Solid Waste Management Advisory Committee will be requested to discuss and identify opportunities to source reduce, reuse, and recycle building related C&D waste.

The Advisory Committee will look for ways to: (1) support efforts and programs that reduce the amount of C&D waste generated from building related activities; (2) support efforts and programs to reuse and recycle C&D waste from building related activities; and (3) support the development of recycling markets for separated C&D waste from building related activities. Embracing principals of green building will contribute a great deal towards reducing C&D waste generated and disposed, and increasing the reuse and recycling of this material. Following are the types of efforts that the Advisory Committee should evaluate.

- Support efforts and programs that *reduce the amount of C&D waste generated* from building related activities.

Source reduction is the highest priority for solid waste management and the most environmentally preferable option. For construction projects, source reduction practices can include: the use of composite lumber; architectural design that minimizes; renovation of old buildings for reuse; the reuse of salvageable contents from old buildings; the minimization of packaging; and constructing buildings that are more durable and adaptable to different uses over time. Opportunities for source reduction should include:

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- Partnering with design organizations like the Connecticut Chapter of the American Institute of Architects and the Connecticut Chapter of the American Society of Landscape Architects, and similar chapters for civil engineers, and interior designers, to convince designers to make a commitment to waste prevention in their work.
 - Promotion of economic and zoning incentives to promote building preservation and reuse, thereby reducing demolition debris.
 - Education and building code reform to qualify used materials for incorporation into new designs. Building codes should be reformed to rely as much as possible on clear performance objectives or standards, and not on materials standards, and then accept testing results that follow certain approved protocols.
 - The use of education and incentives to promote and support reuse stores and waste exchanges, including on-line waste exchanges that provide opportunities for reuse of salvageable building materials.
- Support efforts and programs to *recycle C&D waste* from building related activities. Improved recycling of C&D waste can result from the following activities:
- Promote through education and incentives on-site source separation and recycling of construction waste and some demolition waste for which markets are identified.
 - CT DEP will work with other State agencies to develop incentives for on-site source separation and recycling of construction waste, and those demolition wastes for which markets are identified, on large state-funded projects
 - Propose legislation that requires the development of waste management plans for large publicly funded demolition and construction projects. The CT DEP will draft model waste management plans that can be used for this purpose.
 - Develop model land use and building regulations that would optimize source separation and recycling of specific waste streams on construction and demolition projects and then work with municipalities to promote voluntary adoption of such regulations.
 - Partner with the CT Green Building Council, the US Green Building Council, the CT Construction Industries Association, and the Construction Institute to provide more education to the design and construction industry regarding the inclusion of source separation of C&D waste as a sustainable building practice, and include source separation in construction specifications, clearly stating recycling goals, materials to be source-separated/recycled, and planning, reporting, and record keeping requirements.
 - Explore options for requiring source separation of major items such as aggregate materials (brick, block, concrete, stone), scrap metal, treated wood, asphalt roofing shingles, etc. at demolition projects.
 - Improve the effectiveness of C&D waste processing. Volume reduction facilities (VRFs) vary greatly according to the types of waste processed, processing techniques (manual versus mechanical), and the nature of the end processed material. The State needs to promote the development of new C&D VRFs in Connecticut and/or the improvement of existing C&D VRFs to more effectively sort and process construction and demolition waste in a manner that will minimize contamination of recyclable materials and maximize the quantity of materials that

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meet standards for reuse and/or specifications for use in recycling markets. This would include the processing of construction and demolition wood to make it suitable for use in clean energy technologies or for incineration at existing RRFs if deemed feasible and appropriate. The CT DEP will work with the appropriate state partners to develop and implement incentives (e.g., low cost loans) to encourage this type of activity.

- Consider banning unprocessed C&D waste from: being disposed at Connecticut disposal facilities, going to Connecticut transfer stations that are transferring C&D waste to disposal facilities, or being taken directly from point of generation to out-of-state disposal facilities.
- Encourage separation of C&D waste at municipal transfer stations by recommending amendments to CGS Section 22a-208a(d) to allow such limited separation without requiring a full permit modification. Such changes could be authorized through a letter of approval, general permit, or minor permit amendment.
- Develop a pilot program with several municipalities around the state to develop a C&D debris recycling ordinance where each building and demolition permit applicant will pay a deposit based on type and size of the applicants' project, that is then refunded based on how much material is recycled or source reduced. Those companies that can verify that a designated percentage of the debris has been recycled or avoided through source reduction techniques will get a full refund.
- Propose legislation to require all new construction and demolition projects over a certain square footage to submit a C&D waste recycling plan as part of municipal planning and zoning approval applications. The CT DEP will draft a model of such a plan.
- Work with public and private entities to develop collection facilities/transfer stations for segregated gypsum wallboard from construction activities and, possibly in the future, from renovation and demolition activities. Look to leverage the work of other jurisdictions such as Massachusetts' program with Gypsum Recycle America.
- Support the development of *recycling markets* for separated C&D waste from building related activities. The following activities will support the development of recycling markets:
 - Appropriate state agencies must identify, develop, and promote markets that can economically use separated Connecticut generated C&D waste and must develop partnerships to share and disseminate that C&D waste market information among Connecticut C&D waste stakeholders. Research needs to be conducted for recycling market opportunities for difficult to recycle C&D waste materials such as plate glass, gypsum wallboard from demolition projects, and adulterated (treated) wood.
 - The CT DEP will work with the appropriate state agencies to propose legislation implementing incentives for the development or expansion of: (1) businesses that recycle C&D waste; (2) businesses that reuse C&D waste or use recycled C&D waste to make new products; and (3) technologies, including clean energy technologies, that use or reuse C&D wastes.
 - CT DEP will propose to amend the Connecticut general statutes to allow for limited temporary demonstrations of technologies to reuse or recycle C&D wastes without a permit.

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- Encourage CT DOT, municipalities, and the paving industry to adopt or amend specifications for asphalt to allow for the use of asphalt shingles in asphalt used for specific paving jobs.
- CT DEP will re-examine and, where necessary, amend the process for allowing for the beneficial reuse of categories of source separated and processed C&D waste to make the process more efficient and effective.
- Appropriate state agencies will examine the ability to provide for financial incentives, tax incentives, or other preferences for buying used construction materials or construction materials made of recycled material, especially for buildings certified as *green* by the LEED rating system or other recognized rating system.
- CT DEP will work with appropriate state agencies to establish additional specifications for the reuse of salvaged material, use of materials with recycled content, and beneficial use of appropriate wastes on state-funded projects.

Strategy 4-2. Revise the statutory and regulatory definitions of solid wastes and solid waste categories to more accurately reflect the character and management of these wastes.

The CT DEP will seek legislative and regulatory changes to address these definitional issues.

Strategy 4-3. Manage building related C&D waste that cannot be reduced, reused, recycled, or composted, in a manner that ensures protection of land, air, and water resources and the public health, in compliance with the state hierarchy for managing solid waste.

For C&D waste that requires disposal (i.e. C&D waste that cannot be source reduced, reused, recycled, or composted), the CT DEP seeks to divert such waste from disposal in landfills to use in clean energy technologies or incineration at existing RRFs, if it is deemed appropriate under the pertinent regulatory requirements. For waste that cannot be used for waste-to-energy, the CT DEP will require that all new Connecticut special waste landfills be lined. These landfills will be designated for the disposal of construction and demolition waste and other special waste. The CT DEP will consider banning C&D waste which has (1) not been separated at the site of generation to recover material for reuse or recycling or has not been processed off-site to recover recyclable and reusable material and (2) which has not been volume reduced through chipping or shredding from disposal at any expansion of an existing landfill or from any new landfill built in Connecticut. The Department will evaluate the continued operation of existing unlined C&D landfills to determine if any restrictions are appropriate, in addition to the existing recommendation allowing disposal of only processed C&D waste in the future. As appropriate, this ban will be phased in for existing in-state landfills.

Strategy 4-4. Support reuse and recycling of highway/road C&D waste, and dispose of that portion that cannot be reduced, reused, recycled, or composted, in a manner that ensures protection of land, air, and water resources and the public health in compliance with the state hierarchy for managing solid waste.

- The CT DEP supports continued processing of highway construction and demolition debris at its site of generation, and the reuse of asphalt, masonry, and concrete debris from state and municipal road projects and will provide priority review of applications for specific types of facilities critical to implementation of this strategy.

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- CT DEP will work with municipalities to develop a model plan or ordinance to explore the possibility of promoting consistency among municipalities regarding permits for concrete crushing facilities so that concrete can be recycled and reused by contractors on location. Few communities in Connecticut allow for small concrete crushing facilities on site (these allow a contractor to take unused concrete and crush it down to be reused). While recognizing this is a local issue, regional sites around the state could be set up to accommodate and encourage concrete recycling.
- CT DEP will recommend that road and highway C&D waste that cannot be reused, recycled, composted, used in clean energy technologies, or incinerated at RRFs to be directed to landfills, preferably lined.

Strategies for Land Clearing Debris

Strategy 4-5. Increase the recycling, composting, and beneficial use of land clearing debris.

- CT DEP will seek funding to support chipping of land clearing debris by municipal and state facilities. This could include funds for the purchase of wood chipping equipment to be shared by municipalities on a regional basis.
- CT DEP will develop a model plan and promote the amendment of municipal land use regulations to require a plan for proper management of land clearing debris from land development.
- CT DEP will work with the appropriate state agencies to promote the development of markets for recycled organic material, including clean wood chips, by drafting state procurement specifications for recycled organic material and developing a program to require the use of recycled organic materials from authorized recycling or composting facilities in state-funded projects.
- CT DEP will promote the establishment of a web based “clean wood chip exchange” so that those who need chips can locate sources of wood chips and vice versa.
- CT DEP, in conjunction with the appropriate state agencies, will promote appropriate uses and markets for the use of woodchips from land clearing debris to support composting and their use as a bulking agent.
- CT DEP will re-evaluate its permitting requirements related to land clearing debris. A review will be conducted to determine whether permitting requirements can be reduced for facilities that process this waste and whether oversight of wood grinding operations could be delegated to the municipalities.
- CT DEP will recommend that CGS Section 22a-174(f) be amended to prohibit open burning and CGS Section 22a-208x be amended to prohibit the disposal of land clearing debris at landfills, however these prohibitions may be exempted in the event of a natural disaster. In all cases, landclearing debris would be required to be chipped before being disposed at the landfill.

Strategies for Oversized MSW

Strategy 4-6. Increase the reuse and recycling of oversized MSW.

CT DEP, regional solid waste and recycling entities, and municipalities need to increase the reuse and/or recycling of usable oversized MSW (e.g. furniture, mattresses, pallets, spools, and carpets) by:

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- Supporting municipal efforts to promote the reuse of oversized MSW through local swaps located at municipal transfer stations, recycling drop-off facilities, etc.;
- Supporting and promoting the use of material exchanges and other reuse programs such as the Institutional Recycling Network, charitable organizations, pallet reuse programs, consignment shops, etc. to increase the reuse of furniture and other usable oversized items;
- Partnering with groups such as the Product Stewardship Institute to promote producer responsibility for hard to manage oversized MSW such as mattresses;
- Working with Carpet America Recovery Efforts, (CARE) and/or other regional or national programs and non-governmental organizations to increase the recovery of old carpet for recycling in Connecticut; and
- Explore new technology and options for implementing recycling programs for oversized MSW such as technologies for recycling durable plastic products.

Strategy 4-7. Manage oversized MSW that cannot be reused or recycled in a manner that ensures protection of land, air, and water resources and the public health in compliance with the state hierarchy for managing solid waste.

The untreated wood portion of oversized MSW that cannot be reused or recycled should be deconstructed for use in clean energy technologies and the rest should be properly disposed in accordance with the solid waste management hierarchy.