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**Proposed Amendment to Oregon Reach Code –
Material Resource Conservation and Efficiency**

Submitted by Shawn Wood, City of Portland, Bureau of Planning and Sustainability

Introduction:

The City of Portland, Bureau of Planning and Sustainability (BPS) appreciates the opportunity to comment on the draft Oregon Reach Code. The Reach Code represents an exciting opportunity to advance sustainable building techniques and technologies. The City looks forward to its development and ultimate implementation. While many building elements are worthy of inclusion in a sustainable building code, the City recognizes the Reach Code Committee’s charge to provide an alternative building code centered around energy. With respect to this charge, we would like to propose an amendment for your consideration. Below is a description of the proposed amendment including an explanation of the nexus between the amendment and energy, associated fiscal and economic impacts, as well as environmental benefits. It should be noted that the majority of research and available documentation regarding construction, renovation and demolition waste has been in the residential sector. As such, this narrative relies heavily on residential statistics; however in all phases of construction (new, renovations, and demolition) commercial waste is significantly greater than residential waste, primarily due to the larger size of commercial structures and typical scope of alterations (tenant improvements).

Proposal:

Currently, the draft Reach Code indicates that portions of Chapter 5, Material Resource Conservation and Efficiency, will be removed. The amendment being proposed for consideration would include/preserve portions of Chapter 5 associated with construction waste landfill diversion as a new appendix (Appendix E, Material Resource Conservation and Efficiency). Requirements for diversion of demolition and land-clearing debris (Sections 1007.2 and 402.3.6 respectively) would also be relocated to the new appendix. As with other appendices, Appendix E, would not be mandatory unless adopted by local jurisdiction ordinance. Jurisdictions choosing to adopt the requirements of Appendix E could do so if their existing markets and infrastructure for recycling and reuse would support such requirements.

Within the IGCC/draft Reach Code language, the diversion rate for construction waste can be optionally increased from the minimum 35% to an enhanced diversion rate of either 50% or 65%. The proposed amendment would replace the minimum and enhanced rates with a single minimum 75% diversion requirement. The 75% rate would be consistent with existing City of Portland regulations as well as the U.S. Green Building Council’s Leadership in Energy and Environmental Design (LEED) point structure. Two LEED points are awarded for a recycling rate of 75%. As with construction and renovation, demolition or deconstruction would have a proposed minimum diversion rate of 75% (50% in IGCC/Draft Reach Code). Land-clearing debris would have a proposed minimum diversion rate of 75% as well (no change from IGCC/Draft Reach Code). Table 1 below summarizes diversion rates currently found in the IGCC/Draft Reach Code and those proposed under this amendment.

Table 1. Minimum Required Diversion Rates

Activity	IGCC/Draft Reach Code Diversion Rate			Proposed Diversion Rate
	Minimum Requirement	Enhanced Option 1	Enhanced Option 2	Minimum Requirement
Construction (new and additions/alterations)	35%	50%	65%	75%
Land Clearing	75%	NA	NA	75%
Demolition/Deconstruction	50%	NA	NA	75%

Energy Nexus:

Construction, renovation, and demolition debris accounts for anywhere between 20 and 30 percent of landfill disposal. Based on Metro statistics for 2008, this equates to approximately 200,000+ tons/year in the Portland metro area alone. This debris is composed of excess building materials that contain valuable resources and embodied energy. Once materials have been disposed of in landfills, these resources are virtually impossible to recover.

Embodied Energy

Every building represents a significant investment in energy, which includes energy consumed to extract raw materials, process the materials, and transport the materials to a job site. Energy is also consumed during construction and maintenance by equipment and tools. A recent study by the Oregon Department of Environmental Quality (DEQ) found that an average newly constructed home in Oregon that lasts for 70 years and is built to the 2008 state energy code, contains just over 3 billion BTUs of energy in the production and transportation of all original and replacement materials over the life of the home. This represents 25% of the total energy consumption over the building's lifecycle, while the other 75% is attributed to operating the building (heating and electricity)¹. As our buildings become more efficient, the relative contribution of materials-related energy consumption will become even greater. So, while reducing operational energy is a first priority, the embodied energy of materials plays a significant and increasingly important role.

Energy Conservation

Waste construction materials can be reused within the building and other industries and materials such as metal and wood can be recycled into new products and fuel. As such, the proposed regulations would put less pressure on extracting and processing raw materials for building or other uses, thereby saving energy. Processing waste material into new products (i.e., recycling) uses significantly less energy than processing raw materials into new products. As stated in the *Portland Recycles! Plan*, it takes 95 percent less energy to recycle aluminum than it does to make it from raw ore. Making recycled steel saves 60 percent; recycled newspaper 40 percent; recycled plastics 70 percent and recycled glass 40 percent². While avoiding landfill disposal has important benefits, avoiding extraction and processing of virgin materials has even greater environmental benefits, most notably energy conservation.

The opportunity for energy savings through material recovery is already recognized by the State of Oregon. DEQ's annual material recovery survey indicates that in 2009, recycling in Oregon saved approximately 27 trillion BTUs of energy – the equivalent of 216,000,000 gallons of gasoline, or roughly 2.4 percent of total energy used (2009) by all sectors of the economy in Oregon³. The recycling of construction, renovation, and demolition debris contributed significantly to the total energy savings, and as this proposal sets forth, can provide an even greater benefit for energy savings through enhanced reuse and recycling targets.

Energy Recovery

The proposed amendment would also foster the generation of energy. According to ORS 459.015(2), the State's Waste Management Hierarchy, wood that cannot be reused, recycled, or composted can be used as fuel to create energy. Energy from shredded wood (hogged fuel, or hog fuel for short) is used to power numerous facilities throughout Oregon which saves money and pollution by displacing the use of traditional fossil fuels. The proposed amendment will result in increased availability of this fuel, thereby increasing energy recovery from materials that might otherwise be disposed.

¹ Table 8, *A Life Cycle Approach to Prioritizing Methods of Preventing Waste from the Residential Construction Sector in the State of Oregon*. Oregon Department of Environmental Quality, October 2010.
<http://www.deq.state.or.us/lq/sw/wasteprevention/greenbuilding.htm>

² City of Portland - Bureau of Planning and Sustainability, *Portland Recycles! Plan*, August 2007.
<http://www.portlandonline.com/bps/index.cfm?c=46646&a=230043>

³ Oregon Department of Environmental Quality, *Material Recovery and Waste Generation Report*, 2009.
<http://www.deq.state.or.us/lq/pubs/docs/sw/2009MRWGRatesReport.pdf>

Fiscal and Economic Impacts:

The proposed amendment would increase the diversion rate of construction waste; relying on contractors to choose how to best deal with waste materials. Donating materials for reuse often does not cost a contractor anything and recycling fees are generally lower than disposal fees. Additionally, donating materials to nonprofits that specialize in salvaged items may result in tax deductions. Reusing materials on site can have benefits that offset possible associated costs (i.e., de-nailing, grinding, etc.), when compared to otherwise disposing of the waste material and purchasing new material. Some waste materials have well-developed markets and processors may actually pay contractors for materials. As such, the proposed amendment would further support existing small businesses in the waste management industry and potentially foster new ones as demand for recycled-content materials continues to increase.

It is not anticipated that developing programs at the local level to implement/enforce the requirements would have an adverse impact. Plan review and inspections associated with the proposed amendment could be accomplished along with other review/inspection tasks, thereby reducing implementation costs. Additionally, since the requirements in the proposed amendment would be optional for local jurisdictions, if the financial burden on jurisdictions is perceived as too great to implement, the jurisdiction could opt out of the requirements.

Emerging Technologies

The proposed code amendment would support a growing waste management industry. Grinders are available to process on-site construction debris (e.g., drywall, concrete, and wood) into small particles that can then be applied to the site as soil amendments, base material, or mulching. Designing for Disassembly (DfD) is an emerging building design process that allows for the easy recovery of products, parts and materials when a building is disassembled or renovated. Deconstruction (systematic disassembly of an existing building), as opposed to demolition, is also a method that can be used to increase the reuse potential of building materials such as flooring or timbers. Portable saw mills can be used on site to mill dimensional lumber/timbers from trees harvested from the site. These methods and techniques all contribute to reducing emissions, saving energy, and creating jobs.

Employment

Recycling provides a large number of jobs that generally pay above the national average wage. As stated in the *Portland Recycles! Plan*, sending 10,000 tons of waste to the landfill supports six jobs, while recycling the same amount supports 36 jobs. In the Portland area, more than 1,000 people work in the recycling industry. Demand for recycled materials has never been greater and, in many cases, exceeds the supply currently provided by the public. New business and product opportunities associated with recycled materials will add to the growth of the sustainable industries sector of our local economy⁴.

Support/Incentives

In Portland and across the nation, developers have become increasingly interested in having their projects meet sustainability goals and achieve green building certification levels (e.g., LEED). As a result, the City of Portland has implemented several measures to assist in achieving these goals and certifications. These measures would be available to support the proposed code amendment and the Reach Code in general. Technical assistance is provided to projects targeting LEED certification through the *devTeam Portland* process management group. This group would similarly be available to assist in projects using the Reach Code. An Alternative Technology Advisory Committee has been established to evaluate new, innovative sustainable building products or construction practices against building code requirements (this approach could be applied at the state level to support the Reach Code). Both the City of Portland and Metro also currently offer technical assistance and resources specifically targeting construction and demolition waste. The City of Portland will continue to develop and implement ideas to incentivize use of the Reach Code.

⁴ City of Portland - Bureau of Planning and Sustainability, *Portland Recycles! Plan*, August 2007.
<http://www.portlandonline.com/bps/index.cfm?c=46646&a=230043>

Numerous financial incentives are available for waste-to-energy proposals including project development, installations, and operation. The proposed amendment would result in increased material available for biomass energy production. Some of the possible sources of incentives for businesses associated with biomass energy include:

- Energy Trust of Oregon
- Oregon Business Energy Tax Credits
- Federal Business Energy Investment Tax Credit (ITC)
- Federal Renewable Electricity Production Tax Credit (PTC)
- Federal Renewable Energy Production Incentive (REPI)

Environmental Benefits:

State law (ORS 459.015(2)) establishes a solid waste management hierarchy in the interest of public health, safety and welfare and in order to conserve energy and natural resources. The hierarchy follows:

- First prevent;
- Then reuse;
- Then recycle;
- Then compost;
- Then recover for energy;
- Then dispose in landfills.

The proposed code amendment would require waste management plans and mandate specific diversion rates. If approved, the resulting regulations would directly support the State's policy to improve the environment and conserve resources.

Emissions

Greenhouse gas emissions along with other emissions to the land, water, and air are emitted through the extraction, production, transportation, use, and disposal of building materials. Once a material is considered a waste, both reuse and recycling have significant greenhouse gas reduction benefits due to the reduced need to extract and process virgin materials. Avoiding the use of virgin materials yields the largest emissions reduction and avoiding landfill disposal also has emissions reduction benefits. Certain waste materials, when landfilled, contribute to landfill methane production; a potent greenhouse gas. According to the City of Portland's *Climate Action Plan*, in 2008 waste disposal accounted for 17,708 Metric Tons of carbon emissions in Multnomah County alone. Approximately 20 to 30 percent of which was construction-related waste⁵. Reducing this waste and associated emissions will have direct benefits on the health and environment of Oregonians.

Oregon DEQ reports, that for the average Oregon home, current recycling efforts in Oregon reduce the lifecycle greenhouse gas emissions related to material production and transportation by approximately 30%⁶. This benefit is real and has the potential for greater emissions reduction through this proposal.

Conservation

Construction waste and demolition debris from existing buildings represents a significant source of reusable/recyclable materials. As previously mentioned, this puts less pressure on raw material extraction. According to the Deconstruction Institute the demolition of an average 2,000 square foot house produces 127 tons of debris; the deconstruction of a typical 2,000 square foot wood frame home can yield 6,000 board feet of reusable lumber. This is equivalent to 33 mature trees, or the yearly output of 10 acres of planted pine (7 football fields)⁷. In addition to conserving raw materials, recycling or reusing waste material conserves energy, water, and reduces carbon emissions.

⁵ City of Portland – Bureau of Planning and Sustainability, *Climate Action Plan 2009*. <http://www.portlandonline.com/bps/index.cfm?c=49989&a=268612>

⁶ *A Life Cycle Approach to Prioritizing Methods of Preventing Waste from the Residential Construction Sector in the State of Oregon*. Oregon Department of Environmental Quality, October 2010. <http://www.deq.state.or.us/lq/sw/wasteprevention/greenbuilding.htm>

⁷ Deconstruction Institute, Benefit Calculator, <http://www.deconstructioninstitute.com/calc2.php>

Conclusion:

The proposed amendment establishes what may seem like ambitious waste and debris diversion rates for construction, land clearing, and demolition (75 percent); however these rates are easily attainable in most of the more populated areas of Oregon. Projects seeking LEED certification routinely divert a minimum of 75 percent of waste from landfills and often achieve much higher diversion percentage rates in the 90s. Examples of diversion rates achieved in Oregon projects include:

- Rosa Parks Elementary School, Portland, OR (New Construction) – 97% of construction waste diverted from landfill
- Jean Vollum Natural Capital Center/Ecotrust, Portland, OR (Alteration/Addition) – 98% of construction waste diverted from landfill
- State of Oregon North Mall Office Building, Salem, OR (New Construction) – 75% of construction waste diverted from landfill
- Kendall Toyota of Eugene, Eugene, OR (New Construction) – 99% of construction waste diverted from landfill

Providing requirements for waste and debris diversion within the Oregon Reach Code will go a long way to support and strengthen diversion efforts by local jurisdictions. A recent report to Metro by the Tabor Consulting Group interviewed numerous building code officials in order to identify opportunities to increase recycling, salvage, and reuse of building materials from construction and demolition projects. A key finding of the report found that many building code officials agreed that mandating/codifying recycling, salvage and reuse would be the most effective way to change behavior. Building code officials also stated that they did not have the authority to enforce or administer programs that are not included in the building code⁸. As such, placing these requirements in the Reach Code would provide building code officials with the means necessary to advance local, regional, and state diversion goals.

As outlined in this narrative, the proposed amendment yields many benefits in terms of energy, resources, emissions, and economics. The effort and cost to comply with the proposed regulations is minimal and is otherwise greatly outweighed by the benefits. As energy used to operate buildings is reduced through energy efficiency measures (such as those considered under the Oregon Reach Code), embodied energy will represent an increasingly larger and significant percentage of the total energy consumed by buildings. The Reach Code along with this material conservation amendment proposal moves towards addressing both components of energy usage - the operating and the embodied - thereby comprehensively addressing the significant amount of energy consumed by buildings.

The City of Portland, Bureau of Planning and Sustainability encourages you to strongly consider this amendment and appreciates your dedication to the Reach Code effort.

⁸ Metro project to research cooperative program opportunities with local building code officials to increase recycling, salvage, and reuse of building materials from permitted construction and demolition projects, June 30, 2010, Prepared for Metro by Tabor Consulting Group.

Proposed Amendment to Oregon Reach Code – Material Resource Conservation and Efficiency

Submitted by Shawn Wood, City of Portland, Bureau of Planning and Sustainability,

Proposed Code Language

The proposed code language amends these sections:

Section 302.1
Table 302.1
Table 303.1
Section 402.3.6
Section 1007.2

The proposed code language adds a new appendix:

Appendix E (New) – Relocation of Section 302.1.4.1, section 402.3.6, portions of Chapter 5, and 1007.2.

Commentary is provided on even numbered pages and proposed code language is provided on the facing odd numbered pages.

SECTION 302 JURISDICTIONAL REQUIREMENTS

302.1 Requirements determined by the jurisdiction.

1-4. [No Change]

4.1 This section is removed from Chapter 3 and requirements for material conservation and efficiency would be located in the new Appendix E (formerly Ch. 5).

4.2-4.5 [No change other than renumbering]

PROPOSED REACH CODE LANGUAGE

Language to be **added** is **underlined and bolded**
Language to be **deleted** is shown in ~~strike through~~

**SECTION 302
JURISDICTIONAL REQUIREMENTS**

302.1 Requirements determined by the jurisdiction. The *jurisdiction* shall indicate the following information in Table 302.1 for inclusion in its code adopting ordinance:

1-4. [No Change]

~~4.1~~ Where “Yes” is selected for enhanced construction material and waste management in Table 302.1, the *jurisdiction* shall indicate the minimum percentage of construction waste that is required to be recycled in accordance with Section 502.1 by checking the box in Table 302.1 corresponding to 50% or 65%.

~~4.2-4.5~~ **4.1-4.4** [No Change other than renumbering]

~~4.4.1-4.4.4~~ **4.3.1 - 4.3.4** [No Change other than renumbering]

~~4.54~~ [No Change other than renumbering]

**TABLE 302.1
REQUIREMENTS DETERMINED BY THE JURISDICTION**

502.1 The provisions under this section allow jurisdictions to choose a higher diversion rate. The base is 35%; however jurisdictions can choose to increase the diversion rate to 50% or 65%. These provisions have been removed from this table and minimum diversion rate of 75% is required in Appendix E.

1007.2 This section is called out as mandatory in section 1007.1. It should therefore not be located in the table.

1007.3 This section is called out as mandatory in section 1007.1. It should therefore not be located in the table.

Appendix E. Currently, the draft Reach Code indicates that Chapter 5, Material Resource Conservation and Efficiency will be removed. The proposed Appendix E would include/preserve many of the requirements of Chapter 5 as well as other material conservation provisions. As with other appendices, Material Resource Conservation and Efficiency would not be mandatory unless adopted by local jurisdictional ordinance.

PROPOSED REACH CODE LANGUAGE

Language to be **added** is **underlined and bolded**
 Language to be **deleted** is shown in ~~strickthrough~~

**TABLE 302.1
 REQUIREMENTS DETERMINED BY THE JURISDICTION**

Section	Section Title or Description and Directives	Jurisdictional Requirements	
CH 1. ADMINISTRATION [NO CHANGE]			
CH 3. JURISDICTIONAL REQUIREMENTS AND PROJECT ELECTIVES [NO CHANGE]			
CH 4. SITE DEVELOPMENT AND LAND USE [NO CHANGE]			
CH 5. MATERIAL RESOURCE CONSERVATION AND EFFICIENCY			
502.1	Enhanced construction material and waste management	<input type="checkbox"/> Yes	<input type="checkbox"/> No
502.1	Minimum percentage of waste material diverted from landfills - Select a percentage only where Yes is selected in the previous row.	<input type="checkbox"/> 50%	<input type="checkbox"/> 65%
CH 6. ENERGY CONSERVATION AND EARTH ATMOSPHERIC QUALITY [NO CHANGE]			
CH 7. WATER RESOURCE CONSERVATION AND EFFICIENCY [NO CHANGE]			
CH 9. COMMISSIONING, OPERATION AND MAINTENANCE [NO CHANGE]			
CH 10. EXISTING BUILDINGS			
1007.2	Demolition	<input type="checkbox"/> Yes	<input type="checkbox"/> No
1007.3	Sale of existing buildings and tenant spaces	<input type="checkbox"/> Yes	<input type="checkbox"/> No
1007.4	Evaluation of existing buildings	<input type="checkbox"/> Yes	<input type="checkbox"/> No
APPENDICES			
Appendix B	[No Change]		
Appendix C	[No Change]		
Appendix D	[No Change]		
<u>Appendix E</u>	<u>MATERIAL RESOURCE CONSERVATION AND EFFICIENCY</u>	<input type="checkbox"/> <u>Yes</u>	<input type="checkbox"/> <u>No</u>

**TABLE 303.1
PROJECT ELECTIVES CHECKLIST**

Table 303.1 has been modified to remove code sections that have been removed in Chapter 5 of the draft Reach Code prior to this proposal.

PROPOSED REACH CODE LANGUAGE

Language to be **added** is **underlined and bolded**
 Language to be **deleted** is shown in ~~strickthrough~~

**TABLE 303.1
PROJECT ELECTIVES CHECKLIST**

Section	Description	Check the corresponding box to indicate each <i>project elective</i> selected.
CH 3. JURISDICTIONAL REQUIREMENTS AND PROJECT ELECTIVES [NO CHANGE]		
CH 4. SITE DEVELOPMENT AND LAND USE [NO CHANGE]		
CH 5. MATERIAL RESOURCE CONSERVATION AND EFFICIENCY		
507.2	Waste management (502.1 + 20%)	<input type="checkbox"/>
507.3(1)	Reused, recycled content, recyclable, bio-based and indigenous materials (50%)	<input type="checkbox"/>
507.3(2)	Reused, recycled content, recyclable, bio-based and indigenous materials (80%)	<input type="checkbox"/> (2 Electives)
507.4(1)	Multi-story building – footprint reduced by at least 45%	<input type="checkbox"/>
507.4(2)	Multi-story buildings – footprint reduced by at least 70%	<input type="checkbox"/> (2 Electives)
507.5	Reduced building volume	<input type="checkbox"/>
507.6.1	Service life – 100-year design service life category	<input type="checkbox"/>
507.6.1	Service life – 200-year design service life category	<input type="checkbox"/> (2 Electives)
507.6.2	Interior adaptability	<input type="checkbox"/>
507.7	Moisture control	<input type="checkbox"/>

402.3.6 Building site waste management plan.

The draft Reach Code section indicates that this section will be removed. It is shown in strikethrough here as well; however portions of this section are proposed to be moved to the new Appendix E.

PROPOSED REACH CODE LANGUAGE

Language to be added is **underlined and bolded**
Language to be deleted is shown in ~~strikethrough~~

402.3.6 Building site waste management plan. ~~A *building site* waste management plan shall be developed and implemented to recycle or salvage not less than 75 percent of the land-clearing debris and excavated soils. Land-clearing debris includes rock, trees, stumps and associated vegetation. The plan shall include provisions that address all of the following:~~

- ~~1. Materials to be diverted from disposal by efficient usage, recycling or reuse on the *building site* shall be specified.~~
- ~~2. Diverted materials shall not be sent to sites that are agricultural land, *floodplain* areas or greenfield sites where development is prohibited by Section 402.2.~~
- ~~3. The removal and disposal off site of *invasive plant* species.~~
- ~~4. Where contaminated soils are removed, the methods of removal and location where the soils are to be treated and disposed.~~
- ~~5. The amount of materials to be diverted shall be specified and shall be calculated by weight or volume, but not both.~~

~~Construction materials and waste and *hardscape* materials removed during site preparation shall be managed in accordance with Section 502.1.~~

**SECTION 1007
JURISDICTIONAL REQUIREMENTS**

1007.1 General. [No change]

1007.2 Demolition.

The requirements for demolition would be relocated to the new Appendix E. They are therefore removed from this section.

PROPOSED REACH CODE LANGUAGE

Language to be added is **underlined and bolded**
Language to be deleted is shown in ~~strikethrough~~

SECTION 1007 JURISDICTIONAL REQUIREMENTS

1007.1 General. Sections 1007.2 and 1007.3 shall be mandatory and Section 1007.4 shall be enforced only where specifically indicated by the *jurisdiction* in Table 302.1.

1007.2 Demolition. Where *buildings, structures* or portions thereof are ~~*deconstructed*~~ or demolished, a minimum of 50 percent of materials shall be diverted from landfills and incineration. Documentation of the total materials in *buildings, structures* and portions thereof to be ~~*deconstructed*~~ or demolished and materials to be diverted, and evidence of diversion, shall be provided. Material quantities shall be indicated and calculated by weight or volume, but not by both.

APPENDIX E

MATERIAL RESOURCE CONSERVATION AND EFFICIENCY

Sections 402.3.6, 501.1, 502.1, and 1007.2 have been removed from their respective locations and introduced as a new Appendix E, Material Resource Conservation and Efficiency. By locating these sections in Appendix E, waste management requirements for land clearing, construction, and demolition are housed in one location instead of three. Additionally, as an appendix, the provisions can be locally adopted if markets and infrastructure exist for meeting minimum diversion rates.

E101.1 Scope. No change in language from 501.1 other than the term *building site* is added to capture materials associated with land clearing.

E101.2 Intent. This section has been added and is not found in Chapter 5. It provides the intent for the new chapter and establishes the waste management hierarchy that should be followed for diversion of waste and debris associated with construction, land clearing, and demolition. This hierarchy is established by state law (ORS 459.015(2)).

This is a new section, for clarity it has not been underlined

APPENDIX E

MATERIAL RESOURCE CONSERVATION AND EFFICIENCY

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION E101 GENERAL

E101.1 Scope. The provisions of this chapter shall govern matters related to *building* and *building site* material conservation and resource efficiency.

E101.2 Intent. The intent of this chapter is to limit landfill disposal of waste and debris generated by construction, land clearing, and demolition activities. This chapter shall regulate the minimum diversion rates and Construction and Waste Management Plan requirements. For the purposes of this chapter, it is intended that diversion will follow the waste management hierarchy established in ORS 459.015(2) as follows:

1. First, to reduce the amount of solid waste generated;
2. Second, to reuse material for the purpose for which it was originally intended;
3. Third, to recycle material that cannot be reused;
4. Fourth, to compost material that cannot be reused or recycled; and
5. Fifth, to recover energy from solid waste that cannot be reused, recycled or composted.

Commentary

E102.1 Construction material and waste management plan. No change in language from 502.1 other than the minimum diversion rate is increased to 75% with no enhanced diversion rates. The diversion rate of 75% is consistent with existing City of Portland requirements as well as U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) requirements (2 points). Language has been added that requires documentation of diversion and the ability of the code official to request such documentation.

This is a new section, for clarity it has not been underlined

**SECTION E102
MATERIAL AND WASTE MANAGEMENT**

E102.1 Construction material and waste management plan. Not less than 75 percent of non-hazardous construction waste shall be diverted from landfills. A Construction Material and Waste Management Plan shall be developed and implemented to recycle or salvage construction materials and waste. The Construction Material and Waste Management Plan shall comply with all of the following:

1. The location where the collection, separation and storage of recyclable construction waste materials such as wood, paper, plastic, aluminum, steel, iron, gypsum board, glass and concrete, shall be indicated.
2. Total waste materials and materials to be diverted from disposal by efficient usage, recycling, reuse on the project, or salvage for future use or sale shall be specified.
3. The amount of total materials and materials to be diverted shall be specified and shall be calculated by weight or volume, but not both.
4. Receipts or other documentation related to diversion shall be maintained through the course of construction. Evidence of diversion, may be requested by the *code official*.

For the purpose of this section, construction and waste materials shall not include land clearing debris, excavated soils and fill and base materials such as, but not limited to, *topsoil*, sand and gravel. Land-clearing debris shall include trees, stumps, rocks, and vegetation. Excavated soil, fill material and land-clearing debris shall be managed in accordance with Section E102.2.

E102.2 Building site waste management plan. No change is proposed from the language in 502.1 with the exception of removing language relating to areas of the code previously designated for removal (i.e., agricultural, floodplain, greenfield sites and invasive species).

E102.3 Demolition. This language has been relocated from section 1007.2. The minimum diversion rate in 1007.2 is 50%. The proposed amendment would require a 75% diversion rate. Evidence of diversion has been changed from "shall be required" to "may be requested." This allows individual jurisdictions to choose how this requirement is implemented. Jurisdictions may choose to request this information at random based on their resources. The format has been changed to reflect the format of both construction and land-clearing debris sections.

This is a new section, for clarity it has not been underlined

E102.2 Building site waste management plan. A *building site* waste management plan shall be developed and implemented to recycle or salvage not less than 75 percent of the land-clearing debris and excavated soils. Land-clearing debris includes rock, trees, stumps and associated vegetation. The plan shall include provisions that address all of the following:

1. Total waste materials and materials to be diverted from disposal by efficient usage, recycling or reuse on the *building site* shall be specified.
2. Where contaminated soils are removed, the methods of removal and location where the soils are to be treated and disposed.
3. The amount of total materials and materials to be diverted shall be specified and shall be calculated by weight or volume, but not both.
4. Receipts or other documentation related to diversion shall be maintained through the course of construction. Evidence of diversion, may be requested by the *code official*.

Construction materials and waste and *hardscape* materials removed during site preparation shall be managed in accordance with Section E102.1.

E102.3 Demolition or deconstruction. Where buildings, structures or portions thereof are deconstructed or demolished, not less than 75 percent of non-hazardous materials shall be diverted from landfills and incineration. A demolition or *deconstruction* waste management plan shall be developed and shall include provisions that address all of the following:

1. Documentation of the total materials in buildings, structures and portions thereof to be deconstructed or demolished and materials to be diverted shall be required.
2. The amount of total materials and materials to be diverted shall be specified and shall be calculated by weight or volume, but not both.
3. Receipts or other documentation related to diversion shall be maintained through the course of construction. Evidence of diversion, may be requested by the *code official*.