



# **CORR Protocol and Certification of Real Rates: A Method for the Verification of Reuse and Recycling Rates of Building Materials Reuse and Recycling Facilities**

CORR Edition 1.9  
Copyright July 28, 2011

ALL RIGHTS RESERVED

USE OF THIS DOCUMENT AND ITS PRINCIPLES WITHOUT PERMISSION OF THE  
INSTITUTE IS LIABLE FOR PROSECUTION

## ***Disclaimer***

The Recycling Certification Institute does not make any warranties (expressed or implied) or assume any liability or responsibility to the user, reader or other third party, for the accuracy, completeness, use of, or reliance on, any information contained within this program, or any injuries, losses or damages (including without limitation, equitable relief) arising out of such use or reliance.

## Table of Contents

1.0	Introduction .....	1
1.1	Objectives.....	1
1.2	Use .....	2
1.3	Definitions.....	2
1.4	Scope.....	5
2.0	Calculation of Facility Average Annual Materials Output.....	6
Table 1.....		6
3.0	Stockpiles .....	7
4.0	Application Process.....	7
5.0	Certification Types .....	8
5.1	Conditional Certification .....	8
5.1.1	Conditional Certification Reporting Schedule.....	9
5.2	Certification.....	9
5.2.1	Certification Reporting Schedule .....	9
5.3	Facility Operational Reporting .....	10
5.3.1	Changes in Operational Structure.....	10
5.3.2	Documentation .....	10
5.4	Certification and Conformance.....	11
5.5	Certification Format.....	11
Table 2.....		12
Table 3.....		12
5.6	Recertification and Revocation.....	12
6.0	Complaints, Appeals, Disputes.....	13
APPENDIX A	Preliminary Application .....	14
APPENDIX B	Facility Mass Balance Accounting.....	17
APPENDIX C	Bulk Pile Volume Calculations .....	18
APPENDIX D	Conversion of Weight per Volume for Major Bulk Materials.....	19
APPENDIX E	Key Stakeholders/Reviewers/Contributors .....	20
Reference Documents.....		21





## **1.0 Introduction**

The Construction and Demolition (C&D) materials recycling industry has grown in recent years, with many businesses either starting up to receive and process the material, or waste transfer stations and landfills beginning to add recycling to their operations. This is due in part to recycling becoming more economically feasible, the desire by the general public and local government officials, the recognition that C&D is an important element of sustainability and Green Building programs, and the desire to reduce Green House Gas emissions. With this growth in the industry and related government and environmental standards came a need for the development of a standard to measure and verify that recycling of C&D materials was actually occurring at the claimed levels.

This standard was prepared by a stakeholder group organized by the Construction Materials Recycling Association (CMRA, now CDRA). Guidance in the stakeholder engagement and consensus decision-making process for the development of this ISO-level national standard was provided by the United States Green Building Council. These stakeholders included representatives from government, waste hauling, recycling, architectural, construction, and other appropriate industries. A list of key stakeholders and representation can be found in Appendix E. Oversight of the standard is provided by the Recycling Certification Institute (Institute).

This standard is the property of the Institute and is intended to verify C&D material reuse and recycling rates by facilities providing those services. It may apply to: reused building materials resale stores or yards, transfer stations, material recovery facilities, mixed-C&D recycling facilities, and single-material recycling facilities. The standard does not apply to recycling of municipal solid waste (MSW), Electronic Waste, Organic Waste or Commercial Waste. It may apply to a C&D material reuse or recycling facility that also recycles MSW as a separate process.

### **1.1 Objectives**

The objectives of this standard are to provide:

- a procedure for accounting for the materials inputs and outputs of a facility over a specified period of time;
- an objective, transparent, and reasonably priced process for eligible entities seeking to communicate their reporting of C&D materials reuse/recycling rates conforms to an established standard; and,
- users of certified facilities an assurance that the procedures and declarations are consistently applied and verified.

## 1.2 Use

Any governmental agency, for-profit business, and non-profit organization may use this standard under agreement with the Recycling Certification Institute. This standard does not in any way serve as a substitute for any applicable Federal, State or local legal requirements for operating a business engaged in C&D material reuse and recycling or the legally required reporting of facility operations. There is no limit on the physical size, capacity or throughput of a facility to be eligible for this certification. A facility that is not currently in compliance with applicable regulations for its operation is not eligible for certification. The certification program operator reserves the right to revoke certification if a facility is a repeated violator of regulations pertaining to its operation, or becomes non-compliant with regulations of the authority having jurisdiction over the facility.

## 1.3 Definitions

The definitions used here are established by the standard organization using best practice such as those from ISO, FTC, ASTM to serve as a guide in reading and applying this standard, and for uniformity in calculating recycling/recovery rates among all facilities. The definitions are not intended to supersede any other legal or regulatory definition and are used for the purposes of this standard only.

**Alternative daily cover (ADC):** Materials used as a product in the market-place for daily overlay on the exposed faces of landfills, and includes landfill road-building, grading and shaping (sometimes called beneficial reuse), etc. used within permitted airspace. ADC may or may not be considered diverted or recycled materials based on local regulations; therefore it is categorized separately for the use of this standard in different regions.

**Bio-fuel:** Organic materials to be processed into a fuel, such as clean wood recovered from C&D activities or processing facilities. Biofuel excludes MSW.

**Certification Organization:** The entity responsible for oversight of facility Evaluations and final Certification and/or Re-certification of facilities. The Institute is responsible for updating and maintaining the standard. See Standards Organization.

**Commercial waste:** Waste from premises of commercial businesses and not including C&D materials, agricultural, single-family residential or industrial waste.

**Construction and demolition (C&D) materials:** Building materials from the construction, renovation or demolition of building structures (excluding land clearing, grubbing, and excavation materials).

**Disposal:** The deposit of waste materials in landfills, or incineration of waste materials for the purpose of destruction and reduction to ash, without energy recovery.

**End-market:** An entity that receives processed or unprocessed recyclable material and uses it as a finished product or as raw material for a manufacturing process.

**Evaluation:** The process used to ensure that a given participant has met a minimum quality standard and complied with the Institute's procedures and protocols for calculating and reporting recovery/recycling data.

**Evaluator:** An independent third-party who, using the Institute's evaluation process, verifies the accuracy and reliability of the recovery/recycling rates reported by a facility. An Evaluator may include the Certification Organization, a firm or team of firms, and/or refer to a single employee within an Institute-approved firm who conducts the evaluation activities.

**Gate-to-gate:** Examines one value-added process in a production chain. Gate-to-gate analyses may be linked in the production chain to extend an analysis to multiple phases in the life-cycle of a material flow.

**Material recovery facility (MRF):** Permitted facility where sorting and processing of materials takes place for the purpose of recycling and recovery.

**Mixed C&D materials, aka 'commingled':** Materials received at a MRF that are not homogeneous and are mixed together and will require sorting and processing to become an end-product.

**Processing facility:** Single or combination of exterior and interior structure or enclosed space used for the collection and processing of recyclable materials for shipment, or to an end-user's specifications, by such means as baling, briquetting, cleaning, compacting, crushing, flattening, grinding, mechanical and manual sorting, re-manufacturing and shredding.

**Recycle:** Materials processed physically, chemically or biologically into materials for the purpose of sale as feedstock for the processing or manufacture into end-products, including mulch, compost and biofuel.

**Reuse:** Materials sold for use as received, without chemical or mechanical alteration in the same or a different use from the original.

**Single-material recycler:** Processing facility that accepts only homogeneous stream of materials.

**Source-separation:** The separation of recyclable materials from mixed waste at the source of generation.

**Standard Organization:** The Recycling Certification Institute is recognized as the Standard Organization and is responsible for updating and maintaining the standard. The Standard Organization may also serve as a Certification Organization.

**Transfer station:** Facility where waste materials are transferred from collection vehicles to larger trucks or rail cars for longer distance transport.

## 1.4 Scope

Determinations of legal and environmental regulatory compliance by a facility are outside the scope of this certification. However, facilities that are not in regulatory compliance at the time they request Certification will not be Certified. Proprietary process information required for the certification procedure(s) will be held strictly confidential by the certifying organization and its contractors. The direct physical scope of the reuse and recycling facility evaluation is “gate-to-gate” of the reuse or recycling facility. The gate-to-gate is from the point at which the C&D material enters a facility “gate” to the point where the processed material leaves the facility “gate” for direct use, secondary processing, or product manufacture. A certified facility also takes responsibility to account for the end-market disposition or disposal of the reused or recycled materials streams that pass through its gates.

Materials from a specific building project can only be counted once for calculating the recycling percentages of multiple entities in a recycling process if the materials are transferred from one certified facility to another. Facilities must account for, and may only take ‘credit’ for the reuse or recycling of materials that have been processed (as appropriate) by themselves. For example, a single material product of the certified facility that is provided directly to an end-market is considered to be 100% reuse, recycled, bio-fuel, ADC, disposal, etc. as applicable, with verification of the end-market receipt of the materials.

The outputs of a facility may include:

- a wholesale or retail material product of the processor, i.e. the processor is the end-market;
- a material feedstock sold to a secondary processor or manufacturer for further processing into final products, i.e. end-markets;
- as ADC or other materials sold to be used in the formation of landfills;
- sold as a fuel source sold to end-markets; or,
- as disposal

A facility must document reused, recycled, bio-fuel, ADC, or disposal materials leaving its exit gate to the next stage in the supply chain either as a product in its final usable form, or as an input to a secondary recycling process “refiner”, or a manufacturing process, or landfill. Documentation of transfer of type of material, use-type, amount, date and receiver, such as receipt or weight ticket shall be used. Materials retained by the facility itself can be accounted for as reuse, recycling, bio-fuel, ADC, stockpiled, or



disposal as applicable. It will include follow up with end-markets to ensure that a facility has sent product as claimed.

The only acceptable metric for documenting materials flow is weight. A building materials reuse facility dealing in non-bulk materials and using item counts, may use standard product unit conversions provided in this standard, or direct measurement via a scale.

## 2.0 Calculation of Facility Average Annual Materials Output

The basis for a declaration of material throughput is derived from a balance of inputs and outputs over time. In order to check and balance the mass flow of materials, the input and output materials must be accounted for by mass on a monthly basis to produce a summary annual report. An annual report review requires a previous one-year's monthly reports. Certified facilities' annual reports are reviewed by an agent of the Certification Organization for certification renewal.

**Table 1**  
**Facility Annual Mass Balance**  
All numbers in tons

Material	INPUT	OUTPUT				
		Reuse	Recycle	Bio-Fuel	ADC	Disposal
Mixed C&D	1,400		400		1,000	
Concrete/masonry	1,000		800		200	
Wood	200			100		100
Asphalt						
Cardboard						
Metals						
Drywall	200		100			100
Other						
<b>Total</b>	<b>2,800</b>	<b>0</b>	<b>1,300</b>	<b>100</b>	<b>1,200</b>	<b>200</b>
<b>Percentage</b>		<b>0%</b>	<b>46.43%</b>	<b>3.57%</b>	<b>42.85%</b>	<b>7.14%</b>

Note: For purposes of this example, "Other" represents an expanded list of material types not included here.

The facility average annual mass balance is:

$$\text{Total Input Weight} = \text{Total Output Weight}$$

$$\text{Total Output Weight} = \text{Reuse} + \text{Recycling} + \text{Bio-Fuel} + \text{ADC} + \text{disposal}$$

Facility annual mass balance declaration is reported in the categories by input and output material types and final disposition, as shown in Table 1, above.

### 3.0 Stockpiles

Stockpile volumes will be estimated by weight (See Appendix D for method of weight calculation for bulk piles) at the beginning and end of the Certification or reporting period and facility throughput is to be calculated as follows:

$W_1$  = the weight of material in inventory (pile) at the beginning of the reporting period;

$W_2$  = weight of material in inventory (pile) at the end of the reporting period;

$I$  = the inputs to inventory (pile) over the reporting period; and,

$T$  = the facility throughput over the reporting period

For example if we assume that a facility has 1000 tons of processed material in stockpile at the beginning of a reporting period, processes 10,000 tons of the same material to the stockpile and at the end of the reporting period there are 500 tons of material in the pile, the facility-specific throughput for the material is:

$$T = W_1 + I - W_2$$

Or 1000 tons +10,000 tons -500 tons = 10,500 tons of Throughput

For each subsequent certification data period, the beginning stockpile or inventory is the ending stockpile from the previous certification data period.

### 4.0 Application Process

The CORR program is administered by the Institute or any certification organization licensed or permitted to administer the CORR certifications by the Institute. All application inquiries can be made to a Certifying Organization. All facilities must first be Registered with the Institute before they can apply for Certification. Being Registered means that a facility has been approved to upload and “Self-Report” its facility data. That information will be used to establish a preliminary and un-audited re-use, recycling, and recovery rating for the facility. Following Registration, the facility will be contacted

by RCI to review initial terms necessary to start the Certification process. The preliminary application for certification will be based upon provision of the information in Appendix A.

The purpose of the preliminary application is to:

- allow for review of the facility's operations;
- verify that the entity has sufficient capacity to provide a monthly accounting of materials flow through the facility by the weight of inputs and outputs to produce an annual report.

The period of preliminary application review shall not be more than thirty (30) working days from receipt of the preliminary application. If the facility meets preliminary approval, a site visit and review of the facility's monthly accounting of materials throughput will be conducted for purposes of awarding certification with the calculated rates of output by material category listed in the table in Section 2.0.

## **5.0 Certification Types**

There are two forms of certification available to a facility. These are a Conditional or Provisional Certification and a Full Certification (herein referred to simply as "Certification").

### **5.1 Conditional Certification**

Facilities that do not have a previous one-year's facility operation data in the necessary format for certification may apply for a conditional certification with six (6) months of data that accounts for inputs and outputs in the necessary format. To prepare this reporting the facility may request the reporting format and requirements from the certification organization, which will be posted on the certification organization website. Upon approval of a conditional certification, a facility will provide monthly reports to the certification organization for an additional six (6) months to receive an annual certification. Conditional certification will be given based upon:

- Review and verification of the preliminary application information, including a site visit;
- Verification that the organization has sufficiently accounted for its mass balance in the manner required; and,

- Six (6) months of input and output data in the format required.

The certification will be conditional until one-year of data has been acquired to provide the facility annual report. After the first year the certification can be renewed on an annual basis. The transition from conditional to full certification data reporting schedules are as follows:

### **5.1.1 Conditional Certification Reporting Schedule**

Month One = conditional certification monthly report

Month Two = conditional certification report

Month Three = conditional certification report

Month Four = conditional certification report

Month Five = conditional certification report

**Month Six = annual certification report**

Verification of submittals will be completed within 30 days of transmittal.

## **5.2 Certification**

Certification can be issued after satisfactory submittal and verification of:

- Review and verification of the preliminary application information, including a site visit;
- Verification that the organization has sufficiently accounted for its mass balance in the manner required;
- Twelve (12) months of input and output data in the format required; and,
- An annual certification report that is comprised of twelve (12) monthly reports.

### **5.2.1 Certification Reporting Schedule**

Verification of submittals will be completed within 30 days of transmittal. After the initial certification site visit, site visits will be no more than once every two (2) years apart at recertification date, with additional visits as deemed necessary by the certification organization.

## 5.3 Facility Operational Reporting

### 5.3.1 Changes in Operational Structure

If any major change in operations is made to the facility, a statement of the changes must be filed within 30 days. Reports will identify the major changes in the C&D materials handling operations for the facility and the effect of those changes on the throughput rate. If changes to the operation are made during the six (6) months of a conditional certification, then these changes are reported in the monthly reports and do not require a separate report. A change is considered to be major when either: new processing equipment is installed, or the facility increases or decreases its capacity or operations in a manner that changes its total throughput or recycling rate by more than 10%.

A facility change does not include seasonal fluctuations of materials inputs. This also does not include maintenance or replacement of existing equipment or facilities that do not produce a change in facility capacity or recycling rate(s). The purpose of this reporting is to ensure that the certification of recycling rates for the facility can be adjusted to be accurate and timely.

### 5.3.2 Documentation

Certification is dependent upon not only reporting the necessary input and output information. In addition the facility must be able to provide the receipts, weight tickets, invoices, etc. to reconcile the total annual input with the total annual output within 5%.

Example:

#### Certification A

Documented annual input = 10,000 units

Documented annual output = 9,000 units

Percent margin of error =  $(10,000 - 9,000)/10,000 = 0.1$

$0.1 \times 100 = 10\% \text{ error (fail)}$

#### Certification B

Documented annual input = 10,000 units

Documented annual output = 9,900 units

Percent margin of error =  $(1 - 9,900/10,000) \times 100 = (10,000 - 9,900)/10,000 = 0.01$

$0.01 \times 100 = 1\% \text{ error (pass)}$

## **5.4 Certification and Conformance**

As the Standard Organization, the Institute is responsible for updating and maintaining the certification standard. Issuance of certifications and recertifications are by a certification organization that has been authorized by the Institute. The Institute may also issue certifications and recertifications.

The certification organization oversees the process of review of the certification applications and the competency of the evaluators and methods used by the evaluators. The certification organization also administers the gathering and review of facility mass balance reports to ensure compliance with the certification. The certification organization will meet the requirements of “ISO/IEC Guide 17065:2012 Conformity assessment – Requirements for bodies certifying products, processes and services”.

The evaluators are charged with facility reviews and ensuring that the preliminary application process is met, and for ensuring on-going facility information is gathered, however they are not responsible for the determination of conditional or final certification. The determinations of conditional and final certification, and recertifications, are conducted by the certification organization and by persons other than the evaluator.

## **5.5 Certification Format**

The CORR certification will be authorized for use by those facilities that have completed the certification process. The CORR certification organization will issue a standard document for this certification.

To comply with the recycling percentage calculation and documentation requirements, the facility should communicate to generators or haulers of C&D materials to their facility the necessity of, and types of, information required from them. This may include information such as the origins of the materials and the project type. The facility will be required to track all loads into the facility and provide weights.

The CORR certification to be issued in electronic form to a certified facility will provide the following information:

<b>Table 2</b>	
<b>Example Table for Applications</b>	
Recycle	40%
Bio-Fuel	20%
Alternative Daily Cover	20%
Disposal	20%
<b>TOTAL*</b>	<b>100%</b>

\*must sum to 100%

The facility will maintain a record of the breakdown of material outputs within each major category by material or product type, which will be required for the facility reports and certification, and to be available to the public, for example:

<b>Table 3</b>		
<b>ABC Facility Annual Outputs</b>		
	<b>% of Inputs</b>	<b>Example</b>
Reuse	X%	0%
concrete/masonry		–
Recycle	X%	40%
asphalt		–
metals		–
cardboard		–
concrete/masonry		–
Bio-Fuel	X%	20%
Alternative Daily Cover	X%	20%
Disposal	X%	20%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>

This breakdown of ‘end-markets’ by materials type will be documented for the certification organization by receipts, weight tickets, invoices, as applicable.

The certification organization will maintain on their respective websites a directory of all CORR certified facilities. Certified facilities may opt to have their certification summary listed in this on-line directory

## 5.6 Recertification and Revocation

The facility must file an application for re-certification at the end of each one (1) year certification period no later than 30 days before the end of the current certification period. It may also be required to apply for a revised certification within 30 days of a

significant change in the operation of the facility, see Section 5.3. The application for recertification will require information only about changes which have occurred in the operation since the last certification and the previous year's input and output materials flow accounting. If a facility fails to receive a certification, it may reapply after six (6) months for conditional certification. If a facility has its certification revoked for failure to comply with reporting requirements, for a failure to document a mass balance of materials, misreporting or falsifying documentation, or other for reasons determined within this standard or the certification organization, it may reapply for conditional certification after twelve (12) months.

## **6.0 Complaints, Appeals, Disputes**

General information regarding due process, time periods, etc. for appealing denial or revocation of a certification, such as complaints about a company's certification rate, must be provided in this standard. This may also include disputes about the facility mass balance accounting or any other matter of dispute between an applicant and the standard or certification organizations.



## **APPENDIX A - Preliminary Application**

A written statement must be provided by the authorized officer of the company that the company is in compliance with legal, permitting, and environmental health and safety requirements for the operation of the facility and makes copies of any permits available for review by the certification organization.

A written agreement must be provided by an authorized officer of the company to allow the certification organization to review all necessary materials tracking records on-site and to make site visit(s) as necessary for verification of submittals and operational capacity.

Each of the above may be provided by electronic submittal via the Institute's website application process.

The owner or operator of the facility must have a certified scale in place to track by weight the input of C&D material and the output of reused or recycled products, respectively. An exception may be granted to building materials reuse facilities with demonstration of an adequate means to track incoming and outgoing materials such as through receipts, invoices, inventories, point-of-sale accounting systems, and methods for accounting of unit counts to weight.

All the following information, other than which the applicant has submitted via the Institute's publicly viewable Registration web page, will be kept confidential by the Administrator of the Institute. Registering the facility constitutes agreement to publicly display that information.

The facility must provide:

- Name of Primary Contact
- Ownership of facility
- Name of Facility / Address Information
- Date Opened
- Operational Size (covered / uncovered)
- Certified Scale (Y/N)
- Operating hours / days
- Facility Type (private delivery / public drop)
- Type of Commercial Haul (Self-haul only / open to other haulers)
- Permitted Capacity (tons per month)

- Personnel on a FTE (Full-time/Part-time/Volunteer)
- Materials types accepted and processing lines (select applicable, each line must be able to be tracked.
  - Single-stream C&D
  - Source-separated C&D and specific type(s)
  - Reusable materials
- Materials not accepted

The facility must provide an example of a receipt provided to all customers indicating certification of the scale, job and container / load tracking, the weight of materials received.

Provide a general site plan identifying the areas allocated to the different types of materials management operations including:

- Scale house weighing
- Unloading
- Inspection
- Separation
- Screening
- Storage
- Processing
- Stockpiles
- Deposition of residuals
- Loading-out disposal
- Loading-out products

Generally describe major equipment. For example:

- Scale
- Trucks
- Loaders
- Grinders
- Separation equipment
- Conveyors
- Containers, etc.
- Buildings

Generally describe each major processing activity using a flow diagram that illustrates:

- Incoming materials streams
- Their routing,

- Equipment processing by activity and input material stream,
- Personnel processes by activity and material production,
- Outputs by type and destination including fines, MSW and other non-recyclables
- Describes markets and end-uses for each of the output products of the operation including the composition of the products.

Provide the current categories of reused or recycled materials generated by the facility including as applicable and not limited to:

- Reused materials
- Final recycled-content materials produced by the facility
- Feedstock materials to secondary processors or manufacturers of recycled-content products
- Bio-fuel
- ADC
- Disposal

## APPENDIX B - Facility Mass Balance Accounting

Submittals are to be made either in a format provided by the certification organization, or in a facility-specific format approved by the certification organization.

- All input loads are tracked via a receipt/invoice.
- The weight of each input load is recorded.
- The input materials classes to be recorded as applicable include:
  - Mixed C&D
  - Asphalt, brick, concrete
  - Clean wood
  - Gypsum drywall
  - Metals (ferrous and non-ferrous)
  - Cardboard
  - Salvage
  - Miscellaneous (MSW, etc.)
- The mass of output materials per type and quantity are accounted for on a monthly basis and divided by the total input mass to the facility per month.
- The sum of input materials will be reconciled against the total output of materials including recycling and disposal on a monthly basis for the average performance of that month.
- A yearly average will be calculated based on the sum of monthly reports.
- For materials stored on site, these are counted as disposal until they are either used on-site or transferred off-site by sale to others as a product of disposal.
- Output materials are recorded by load: type of material, quantity in weight, date, receiver of the materials (name, location, type of company or use of the material)
- The output materials classes to be recorded as applicable include:
  - Reuse
  - Recycle (includes compost, mulch)
  - Energy Recovery (includes biofuel)<sup>2</sup>
  - Alternative Daily Cover
  - Disposal

## APPENDIX C - Bulk Pile Volume Calculations

Material	Angle of Repose
Asphalt (crushed)	40°
Bark (wood refuse)	45°
Cullet	40°
Earth	40°
Gravel (loose dry)	40°
Gravel (natural w/ sand)	30°
Limestone (broken)	40°
Sand (dry)	34°
Sand (water filled)	25°
Sand (wet)	45°

The height of the cone-shaped pile = h (ex. 50')

The angle of repose A = use 40° on average

$\tan A = \sin A / \cos A$

$r = h / \tan 40^\circ = 50' / 1.11721493 = 44.75'$

Volume of the 50' high pile =  $hr^2/3 = (50' * 3.1416 * 44.75' * 44.75')/3 = 104,854.17 \text{ ft}^3 / (27 \text{ ft}^3 / \text{CY}) = \underline{3,883.49\text{CY}}$

Concrete at 1,500 lbs per CY = 3,883.49 CY x (1,500 lbs / CY) = 2,912.6 tons

## APPENDIX D - Conversion of Weight per Volume for Major Bulk Materials

<b>Material</b>	<b>LBS/CY</b>	<b>CY/TON</b>
Asphalt roofing	500	4
Carpet	100	20
Concrete	1,500	1.3
Corrugated cardboard	100	20
Gypsum Board	400	5
Wood	300	6.7
Mixed C&D	500	4

## APPENDIX E - Key Stakeholders/Reviewers/Contributors

<u>Name</u>	<u>Representing</u>	<u>Sector</u>
Bantillo, Stephen M		Recyclers, local/state govt
Cochran, Kim	USEPA	Federal govt
Deane, Michael	Turner Construction	Construction/architectural
DeFeo, Wayne	DeFeo and Associates	Consulting
Deller, Kinley	King County (WA)	Local govt
Gross, Michael	Zanker Road Resource Management	Hauling/recycling/disposal
Guy, Brad	USGBC	Green Building/LEED
Halter, Jim	Waste Management	Hauling/recycling/disposal
Haus, Jason	Dem-Con	Hauling/recycling/disposal
Kunde, Jenna	WasteCap (WI)	Non-profit recycling
Miller, Chaz	NSWMA	Industry org
Mockros, Karl	Waste Management	Hauling/recycling/disposal
O’Gara, Ryan	SKB (Waste Connections)	Hauling/recycling/disposal
Soll, Meri	ACWMA – StopWaste.Org (CA)	Local govt
Turley, William	CDRA	C&D Industry
Uhlar-Heffner, Gabriella	City of Seattle (WA)	Local govt

### Additional Reviewers/Contributors

Ghirardelli, Dave	Sacramento County (CA)	Local govt
Grogan, Scott	Turner Construction	Construction/LEED
Gupta, Ashok	NRDC	Industry/Environment org
Horne-Brine, Preston	Clean Washington Center	Business assistance/recycling
Landreneu, Anica	HOK	Construction
Mc Cauliffe, Dan	United Recycling	Hauling/recycling
Sullens, Wes	ACWMA – StopWaste.Org (CA)	USGBC/LEED
TRY Recycling	Delaware, Ontario, Canada	Hauling, recycling
Vierling, Craig	CDL Recycle	Recycling

## Reference Documents

- City of San Jose Recycling Facility Certification Process
- City of Los Angeles Processor Certification Program
- City of San Diego Certification of Mixed Construction and Demolition Processing Facilities
- ISO 19011:2002
- ISO 14024 Type I environmental claim – third-party guidelines
- ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations principles and procedures
- ISO 21930:2007 Sustainability in building construction – environmental declaration of building products
- Scientific Certifications Systems – Material reclamation & recycling program or facility standard
- Federal Trade Commission Part 260 – Guides for the Use of Environmental Marketing Claims
- ISO/IEC Guide 65:1996(E) - General requirements for bodies operating product certification systems
- ISO/IEC Guide 17065:2012 - Conformity assessment – Requirements for bodies certifying products, processes and services
- Common Reuse, Recycling or Disposal Materials Weight to Volume Conversions  
<http://your.kingcounty.gov/solidwaste/business/documents/Conversions.pdf>