



**2012 Recycled Asphalt Shingles (RAS) Specification
Guidelines**

**For Contracting Agencies specifying RAS to be used
in Hot Mix Asphalt**

DISCLAIMER

The 2012 Recycled Asphalt Shingles (RAS) Specification Guidelines is for general dissemination and use to guide the production of RAS for its use in hot mix asphalt (HMA) paving applications. The 2012 RAS Specification Guidelines reflects key lessons learned about RAS quality assurance and quality control from King County's 2009 Paving Demonstration to test the use of RAS in HMA as well as several 2011 King County Solid Waste Division paving contracts that included RAS. These Guidelines provide the next best iteration of procedures for producing RAS for HMA paving applications.

King County accepts no responsibility or liability for actual use of RAS in a paving project regardless of the use of this document. Contracting Agencies are encouraged to utilize the resources identified in this document and on the following websites for additional guidance and information:

King County LinkUp's Shingles in Paving Project:

<http://your.kingcounty.gov/solidwaste/linkup/shingles/resources.asp>

Construction Materials Recycling Association's shingles recycling online resource:

<http://www.shinglerecycling.org/>

TABLE OF CONTENTS

1.	RAS Specification Guidelines Overview	5
2.	Material Quality Requirements	6
2.1	Asphalt Shingle Supply	6
2.1.1	Requirements for Separation of Non-Shingle Debris.....	6
2.1.2	Roofing Felt Should Be Removed.....	6
2.1.3	Requirements for Separation of Potential Asbestos Containing Material	6
2.2	Asbestos Management	6
2.2.1	Visual Inspection of Incoming Loads by AHERA-Accredited Building Inspector	7
2.2.1	Requirements for Loads with Potential Asbestos Containing Material.....	7
2.2.2	Sampling Requirements for Incoming Roofing Material.....	7
2.2.3	Selected Loads Must Be Quarantined.....	7
2.2.4	Polarized Light Microscopy Asbestos Testing	7
2.2.5	Submit IAATL Reports	7
2.2.6	Loads Containing Whole Shingles That Test Positive for Asbestos Containing Material Shall be Rejected	7
2.3	Specifications for RAS	8
2.3.1	Gradation	8
2.3.2	Extraneous Waste Materials	8
2.3.3	Moisture Content.....	8
2.4	Sampling and Testing of RAS.....	8
2.4.1	Random RAS Samples	8
2.4.2	Minimum Weight	9
2.4.3	RAS Testing.....	9
2.4.4	Contracting Agency Retains All Rights for Additional Testing	10
2.4.5	Contracting Agency Determines which Test Results Shall Govern	10
3.	Operator and Facility Requirements.....	11
3.1	Compliance with Solid Waste Regulations.....	11
3.2	Accident Prevention Program Requirement.....	12
3.3	Engineer Access Permitted	12
3.4	Certification of Ability to Meet Standards	12

4. List of Appendices 13

Appendix A: Definitions 14

Appendix B: Acronyms and Abbreviations..... 16

Appendix C: Shingle Recycling Operator Certification Form 17

Appendix D: Selected Test Methods From WSDOT’s Materials Manual 18

Appendix E: Description of Relevant Washington State Regulatory Agencies 19

Appendix F: Asbestos Information Resources 20

1. RAS SPECIFICATION GUIDELINES OVERVIEW

The 2012 RAS Specification Guidelines provides material quality and Shingle Recycling Operator and Recycling Facility requirements for inspecting, sorting, sampling, testing, stockpiling, and processing tear-off asphalt shingles. It outlines material engineering standards for producing RAS for HMA as well as sampling, testing, and storage requirements for the RAS product. Requirements related to worker health and safety and environmental regulations but may not be fully inclusive of all legal requirements. Therefore, it is up to each Shingle Recycling Operator to be aware of and follow any and all regulatory requirements that may not be covered in these Specification Guidelines.

The 2012 RAS Specification Guidelines requires that the Shingle Recycling Operator and its Shingle Recycling Facility meet the following requirements and standards:

- Secure a supply of tear-off asphalt shingles. Receive and visually inspect loads of acceptable roofing material and submit documentation that asbestos surveys and/or incoming load inspections were completed by trained persons or staff. Once a final RAS product is produced, sample, test, and stockpile the RAS product until such time it is accepted by the Contracting Agency for use in HMA.
- Provide verification that incoming loads of whole shingles and the RAS stockpile do not include ACM as per local, state, and federal regulations.
- Meet RAS material quality standards as specified to help ensure optimum performance when used in HMA.
- Comply with jurisdictional comprehensive solid waste management plans, and any additional local solid waste handling regulations or requirements. For firms in Washington State this includes Chapter 173-350 WAC Solid Waste Handling Standards. Firms in Washington State must either be permitted as a solid waste handling facility or have properly notified both the Washington State Department of Ecology and local health department of the intent to operate under the exemption option.
- Have the required plans in place for protecting worker health and safety and the environment as required by OSHA Safety and Health Regulations for Construction, EPA NESHAP regulations, and agencies such as the Washington State Department of Labor & Industries, the Clean Air Authority, and local health departments.
- Provide the Contracting Agency safe access to the Recycling Facility to observe the shingle recycling operations and collect samples as deemed necessary by the Contracting Agency.

The material quality and Shingle Recycling Operator and Recycling Facility requirements are described in greater detail in the remainder of the 2012 RAS Specification Guidelines.

2. MATERIAL QUALITY REQUIREMENTS

The material quality requirements are designed to ensure that the RAS product can be successfully incorporated into HMA. To this end, the Shingle Recycling Operator and Recycling Facility must meet the following standards, including those meant to ensure that the RAS is free of ACM.

2.1 ASPHALT SHINGLE SUPPLY

Only asphalt shingles are acceptable for producing the RAS product. Other asphalt roofing products (e.g., built-up roofing, rolled or sheet roofing, etc.) are not permissible.

2.1.1 Requirements for Separation of Non-Shingle Debris

Only minor, incidental amounts of debris from other roofing materials are allowed in the incoming loads to the Shingle Recycling Operator. Manual separation of non-shingle debris prior to grinding may be needed for the final RAS product to be in compliance with extraneous waste materials limits as defined in Section 2.3.2.

2.1.2 Roofing Felt Should Be Removed

Roofing contractors supplying to the Shingle Recycling Facility shall be strongly encouraged to make a good faith effort at separating shingles from roofing felt and delivering clean, asphalt shingles only for recycling. If shingles are received with roofing felt, the Shingle Recycling Operator shall make every reasonable effort to remove roofing felt from the shingles before grinding.

2.1.3 Requirements for Separation of Potential Asbestos Containing Material

Any material identified as potential ACM through visual inspection shall be removed from incoming loads. This material shall be presumed ACM and handled in accordance with local, state, and federal regulations unless tested by an independent accredited asbestos testing laboratory (IAATL) and found to be non-detect for ACM. See Section 2.2 for detailed procedures on inspecting, sorting, sampling, and testing incoming roofing loads for ACM.

2.2 ASBESTOS MANAGEMENT

Asbestos management of shingles and other roofing material is required to protect worker health and safety and ensure that the whole shingles and final RAS product are free of ACM. While the risk of finding asbestos in asphalt shingles is low, the Shingle Recycling Operator shall employ measures to mitigate any asbestos risk. According to local asbestos regulations, an asbestos survey is required **prior to a renovation** of a building to determine if ACM is present. Depending on the building type and ownership, an Asbestos Hazard Emergency Response Act (AHERA)-accredited building inspector may be required to conduct the survey and complete a written report. This specification strongly encourages the Shingle Recycling Operator to request such written documentation for incoming

loads of shingles. For additional instruction on asbestos survey requirements of roofing materials, refer to Appendix F: Asbestos Information Resources.

2.2.1 Visual Inspection of Incoming Loads by AHERA-Accredited Building Inspector

Each incoming load of roofing material shall be inspected by an AHERA-accredited building inspector at the time of unloading at the Shingle Recycling Operator's Recycling Facility. Proof of accreditation of staff or contractors utilized for this purpose shall be submitted to the Contracting Agency prior to grinding the clean whole shingles into the final RAS product.

2.2.1 Requirements for Loads with Potential Asbestos Containing Material

If potential ACM material is identified in the load, the Shingle Recycling Operator shall either 1) reject the load and handle the material according to local, state, and federal regulations, or 2) employ aggressive sorting procedures with staff trained in accordance with local, state, and federal asbestos regulations to remove potential ACM from the load.

2.2.2 Sampling Requirements for Incoming Roofing Material

One load for every 50 tons of incoming roofing material shall be selected and quarantined for asbestos sampling and testing. Non-shingle roofing material shall be sorted and removed prior to sampling. Within the selected load for testing, each type of whole asphalt shingles (and any attached backing) from each distinct roofing layer shall be randomly sampled and sent to an IAATL for ACM testing.

2.2.3 Selected Loads Must Be Quarantined

The loads selected for sampling and testing shall be quarantined and kept isolated from other materials until asbestos test results indicate a non-detect for ACM.

2.2.4 Polarized Light Microscopy Asbestos Testing

The samples of whole shingles shall be analyzed for asbestos by polarized light microscopy (PLM) as specified in EPA regulations 40 CFR Part 763, Subpart E by an IAATL.

2.2.5 Submit IAATL Reports

The Shingle Recycling Operator shall provide original lab data reports of an IAATL for any load tested to the Contracting Agency.

2.2.6 Loads Containing Whole Shingles That Test Positive for Asbestos Containing Material Shall be Rejected

If ACM is confirmed through asbestos testing of any of the samples, the Contracting Agency must be notified immediately and the entire load shall be rejected and handled in accordance with local, state, and federal regulations at no expense to the Contracting Agency.

2.3 SPECIFICATIONS FOR RAS

The Shingle Recycling Operator shall provide to the Contracting Agency test results to verify that the RAS product meets the following requirements.

2.3.1 Gradation

The final RAS product shall be processed so that 100 percent passes the 12.5-mm (1/2 inch) sieve and a minimum of 95 percent passes the 9.5-mm (3/8 inch) sieve when tested in accordance with WSDOT FOP for WAQTC/AASHTO T 27/11. (See Appendix D.)

2.3.2 Extraneous Waste Materials

The final RAS product to be used in the HMA shall be substantially free of extraneous waste materials and entirely free of whole, intact nails. Lighter extraneous material such as paper, wood and plastic shall not exceed 1.5 percent by mass as determined on material retained on the 4.75-mm (No. 4) sieve. Total extraneous materials including metals, glass, rubber, nails, soil, brick, tars, paper, wood and plastic shall not exceed 3.0 percent by mass as determined on material retained on the 4.75-mm (No. 4) sieve. The method of sampling and testing shall be in accordance with WSDOT FOP for AASHTO T 2 and FOP for WAQTC/AASHTO T 27/11. (See Appendix D.)

2.3.3 Moisture Content

The Shingle Recycling Operator shall take all necessary steps to ensure excessive moisture is not introduced or retained in the RAS stockpiles. Moisture levels considered excessive would be those that negatively impact specified HMA moisture limits.

2.4 SAMPLING AND TESTING OF RAS

The Shingle Recycling Operator shall collect and test samples of the RAS product to be utilized in the HMA to verify that the final RAS product meets the requirements outlined in Section 2.3 (above), that it is free of ACM, and to determine the asphalt content of the RAS material. All field, laboratory, and material testing shall be performed in accordance with WSDOT, ASTM or AASHTO standard test procedures (as defined in Appendix D.) using qualified testing personnel and calibrated, verified equipment.

2.4.1 Random RAS Samples

The Shingle Recycling Operator shall collect random samples of the final RAS product (after grinding and other finishing processes are complete) per WSDOT "FOP for AASHTO T 2 Standard Practice for Sampling Aggregates." (See Appendix D.) The Shingle Recycling Operator shall provide the Contracting Agency with a written sampling plan for the RAS. At a minimum, the final RAS product shall be sampled according to the following schedule:

- Once per the first 50 tons of final RAS produced; and then

- Once per every 250 tons of final RAS produced thereafter.

The Shingle Recycling Operator may sample and test more frequently, but must provide all results of any and all tests performed to the Contracting Agency. Duplicate samples shall be retained for 90 days by the Shingle Recycling Operator. The Contracting Agency shall be permitted to observe sampling of the final RAS product at the Recycling Facility.

2.4.2 Minimum Weight

Each random sample of RAS shall be a minimum of 25 pounds.

2.4.3 RAS Testing

Quality control and verification testing shall be conducted on the RAS samples by an independent laboratory in accordance with the standard test procedures specified herein to verify that the final RAS product meets the material specifications and to determine the asphalt content of the RAS. The Shingle Recycling Operator shall submit original lab data and test results to the Contracting Agency to verify the following requirements.

2.4.3.1 Specifications for RAS – Gradation, Extraneous Waste Materials, Moisture Content

The RAS samples shall be tested for gradation, extraneous materials, and moisture content in accordance with the methods described in Section 2.3.

2.4.3.2 Asphalt Content

The Shingle Recycling Operator shall determine the asphalt content of the RAS in accordance with either or both of the following test methods:

- “WSDOT FOP for AASHTO T 308 Determining the Asphalt Binder Content of Hot Mix Asphalt (HMA) by the Ignition Method.” (See Appendix D.)
- AASHTO T – 164, “Quantified Extraction of Asphalt Binder for Hot Mix Asphalt”. (Also in ASTM D2172-05. “Standard Test Methods for Quantitative Extraction of Bitumen from Bituminous Paving Mixtures.” See <http://www.astm.org/Standards/D2172.htm> for ordering information.

The Shingle Recycling Operator shall provide original lab data reports that include a description of the method used to determine asphalt content of the RAS sample to the Contracting Agency.

2.4.3.3 Asbestos Containing Materials (ACM)

Asbestos testing shall occur on the finished RAS product after grinding, screening or other finishing processes are complete. The RAS sample(s) shall be sent to an IAATL to be analyzed by polarized light microscopy as specified in EPA regulations 40 CFR Part 763, Subpart E. The Shingle Recycling Operator shall provide the Contractor copies of all

original asbestos laboratory reports for submittal to the Contracting Agency. If ACM is found in the RAS product stockpile, the Contractor and Contracting Agency must be notified within 2 hours, and the entire stockpile shall not be used for the project and shall be disposed of in accordance with applicable legal requirements governing such disposal at no expense to the Contracting Agency.

2.4.4 Contracting Agency Retains All Rights for Additional Testing

The Contracting Agency reserves the right to secure additional samples from the Shingle Recycling Operator for the project. The additional samples may be taken at the sole discretion of the Contracting Agency whenever deemed necessary to achieve the goals of the project. These samples shall be provided at no additional costs to the Contracting Agency. In addition, the Contracting Agency reserves the right to conduct testing in order to verify any and all of the independent test results conducted by the Shingle Recycling Operator.

2.4.5 Contracting Agency Determines which Test Results Shall Govern

In any circumstances where the Contracting Agency's results differ from that of the Shingle Recycling Operator's and a reconciliation of test results cannot be achieved by the Contracting Agency, the Contracting Agency shall determine which test results govern this Contract.

3. OPERATOR AND FACILITY REQUIREMENTS

The Shingle Recycling Operator shall certify that it and its Recycling Facility meet all relevant safety, health and environmental regulations and standards, including, but not limited to, the requirements outlined below. The Shingle Recycling Operator shall submit all required documentation to the Contracting Agency.

3.1 COMPLIANCE WITH SOLID WASTE REGULATIONS

Currently in Washington State, whole shingles and RAS are both regulated solid wastes. The agencies that enforce these regulations within counties are the local health departments and the Washington State Department of Ecology. The Codes of the local solid waste management authority (e.g., county) contain the regulations that apply to solid waste management in the specific county where the shingles or RAS is recycled (processed) and stored. Given the solid waste status of whole shingles and RAS (in Washington State), the Shingle Recycling Operator must be permitted as a solid waste handling facility or have properly notified both the Department of Ecology and the local health department of the intent to operate under the exemption option. The Operator is required to reduce risk to human health and the environment by complying with the Washington state solid waste regulations WAC 173-350-040 Performance standards, which state that the owner or operator of all solid waste facilities, subject to these standards, shall:

- 1. Design, construct, operate, and close all facilities in a manner that does not pose a threat to human health or the environment.**
- 2. Comply with chapter 90.48 RCW, Water pollution control and implementing regulations, including chapter 173-200 WAC, Water quality standards for ground waters of the state of Washington.**
- 3. Conform to the approved local comprehensive solid waste management plan prepared in accordance with chapter 70.95 RCW, Solid waste management – Reduction and recycling, and/or the local hazardous waste management plan prepared in accordance with chapter 70.105 RCW, Hazardous waste management.**
- 4. Not cause any violation of emission standards or ambient air quality standards at the property boundary of any facility and comply with chapter 70.94 RCW, Washington Clean Air Act.**
- 5. Comply with all other applicable local, state, and federal laws and regulations.**

Though the Shingle Recycling Operator is solely responsible for complying with these performance standards (WAC 173-350-040), representatives of the Contracting Agency and the local health department will be available, including for site visits, to provide information and suggestions on how the Shingle Recycling Operator can achieve compliance. An initial site visit will be offered to the Shingle Recycling Operator to assess the site and discuss RAS material storage methods/practices for

successful compliance with the state performance standards. The Shingle Recycling Operator may elect to use the methods/practices listed below or other methods/practices at their discretion, as long as it is in compliance with the referenced solid waste regulations. The primary environmental exposures that are of concern are to ground and surface water, and air quality.

- 1. To eliminate stormwater run-on and run-off, the RAS pile may be stored 1) inside a building, 2) on a concrete pad that drains to the sewer, 3) under a tarp in an area where surface water cannot flow through the base of the pile, or 4) in some other manner that is protective of ground and surface water standards.**
- 2. To eliminate fugitive dust, the RAS pile may be 1) covered with a tarp, or 2) use some other approved method that is protective of air quality standards.**

If deemed necessary, the Shingle Recycling Operator shall permit access by the local health department representative and the representative of the Washington State Department of Ecology to inspect the whole shingle and/or final RAS product piles for the purpose of determining compliance with WAC 173-350-040 Performance standards. Inspections may be conducted by the local health department at random times at a minimum of once every month during the time the whole shingles and/or final RAS product are at the Shingle Recycling Facility. It is not anticipated that more frequent inspections will be conducted unless the WAC 173-350-040 Performance standards are not being met. The goal of inspections is to assist the Shingle Recycling Operator in meeting these standards.

3.2 ACCIDENT PREVENTION PROGRAM REQUIREMENT

Have in place a workplace accident prevention program that addresses workplace hazards in accordance with local and state regulations. For firms located in Washington State, this includes WAC 296-800-140 Accident Prevention Program. The plan must address asbestos hazards.

3.3 ENGINEER ACCESS PERMITTED

The Engineer of the Contracting Agency shall be allowed access to all process components at all times of operation. These process components may include, but are not limited to: whole shingle receiving, whole shingle stockpiling, shingle processing (grinding and screening), and RAS storage. The Contracting Agency shall have reasonable access to all facility process components for ascertaining whether the materials and work, as performed, are in accordance with the requirements and intent of the 2012 RAS Specification Guidelines.

3.4 CERTIFICATION OF ABILITY TO MEET STANDARDS

The Shingle Recycling Operator must submit a completed and signed form that certifies the Shingle Recycling Operator and Recycling Facility meet the requirements and standards of the 2012 RAS Specification Guidelines. (See Appendix C: Shingle Recycling Operator Certification Form.)

4. LIST OF APPENDICES

Appendix A: Definitions

Appendix B: Acronyms and Abbreviations

Appendix C: Shingle Recycling Operator Certification Form

Appendix D: Selected Test Methods from WSDOT's Materials Manual

Appendix E: Summary of Relevant Washington State Regulatory Agencies

Appendix F: Asbestos Information Resources

APPENDIX A: DEFINITIONS

For the purposes of this Specification, the following definitions apply:

Asbestos containing material (ACM): Any material containing more than 1 percent asbestos as defined by WAC 296-62-07703 and U.S. EPA's National Emissions Standards for Hazardous Air Pollutants (NESHAP) rules (CFR Part 61, Subpart M).

ACM - Potential: Any roofing material or other building products that the building owner, roofing contractor, Shingle Recycling Operator, agent of the Contracting Agency, or regulatory agency deems may be a candidate for ACM based on informed and reasonable visual inspection. Potential ACM includes Suspect ACM materials as defined by various regulatory agencies but may also include additional materials not highlighted on Suspect lists such as coatings and mastics used on asphalt shingles (e.g., aluminum coatings, plastic roofing cement, other patching materials, etc.).

ACM - Suspect: Term used by the regulatory community for material that is known to have historically contained asbestos including, but not limited to, fireproofing materials, ACM thermal insulation, built-up roofing, slate or cement shingles and siding, fire barriers, gaskets, asphalt flooring, other flooring mastic material, and vinyl floor tile.

Asbestos Hazard Emergency Response Act (AHERA)-accredited building inspector: A person who has successfully completed the training requirements for a building inspector established by EPA Asbestos Model Accreditation Plan; Interim Final Rule (40 CFR Part 763, Appendix C) and whose accreditation is current.

Asbestos survey: An inspection by a competent person to assess the potential for ACM. According to local asbestos regulations – WAC 296-62-07721(2)(b)(ii) and Puget Sound Clean Air Agency Regulation III, Article 4.02(a) – an asbestos survey is required prior to a renovation of a building to determine whether materials or structures to be worked on, renovated, removed, or demolished contain asbestos. Depending on the building type and ownership structure, an Asbestos Hazard Emergency Response Act (AHERA)-accredited building inspector may be required to conduct the survey and complete a written report. This survey is sometimes referred to as a “Good Faith Inspection”.

Asbestos survey documentation: A signed, written report describing an asbestos survey.

Clean Air Authority: Agency responsible for air quality in a defined region. For example, in Washington State, the Puget Sound Clean Air Agency has authority in Snohomish, King, Kitsap and Pierce Counties.

Contracting Agency: Agency of Government that is responsible for the execution and administration of the contract.

Engineer: The Contracting Agency’s representative who administers the construction program for the Contracting Agency.

Hot mix asphalt (HMA): Mixture of aggregate and liquid asphalt heated in a mixing plant and transported and installed on a road surface before cooling.

Hot mix asphalt producer: Company that manufactures HMA from aggregates and asphaltic materials.

Independent accredited asbestos testing laboratory (IAATL): Testing laboratory with proficiency demonstrated by current successful participation in a nationally recognized testing program such as the National Voluntary Laboratory Accreditation Program (NVLAP) of the National Institute for Standards and Technology (NIST) or the Round Robin for bulk samples administered by the American Industrial Hygiene Associate (AIHA), or an equivalent nationally recognized Round Robin testing program.

Mixed roofing material (MRM) or mixed roofing loads: Loads of roofing debris that include a mixture of tear-off shingles and other roofing materials, such as wood, metal, tar paper/roofing felt, and mastic.

Recycled asphalt shingles (RAS): The final product derived from crushing, grinding, screening and otherwise processing tear-off asphalt shingles. RAS is most often processed into a form ready for use in HMA.

Roofing material - documented (or documented roofing material): Roofing material received by the Shingle Recycling Operator that is accompanied by asbestos survey documentation as per local, state, and federal regulations.

Roofing material - non-documented (or non-documented roofing material): Roofing material received by the Shingle Recycling Operator that is not accompanied by asbestos survey documentation. This may include (but is not be limited to) roofing material from owner occupied, single family homes.

Shingle Recycling Facility: The physical plant (or plants) where tear-off asphalt shingles are received, processed into a final RAS product, tested and stockpiled. This may include separate transfer locations. Sometimes referred to as “Recycling Facility”.

Shingle Recycling Operator: The company, or companies, that receive tear-off asphalt shingles and transform it into a final RAS product for use in HMA.

Tear-off asphalt shingles: Previously used asphalt shingles derived primarily from re-roofing projects whereby the old shingle layers are removed to prepare the roof surface for new shingles and/or other roofing materials. Sometimes referred to as “tear-off asphalt shingles scrap”.

Whole shingles: Shingles that have been inspected and sorted, but have not yet been ground into RAS for use in a new material or product, such as HMA.

APPENDIX B: ACRONYMS AND ABBREVIATIONS

Acronym	Term
AASHTO	American Associations of State Highway and Transportation Officials
AC	Asphalt content
ACM	Asbestos Containing Material as defined by EPA National Emission Standards for Hazardous Air Pollutants regulations.
AHERA	Asbestos Hazard Emergency Response Act
C&D	Construction and demolition
EPA	U.S. Environmental Protection Agency
IAATL	Independent Accredited Asbestos Testing Laboratory
KCRSD	King County Road Services Division
KCSWD	King County Solid Waste Division
L&I	Washington State Labor and Industries
NAPA	National Asphalt Pavement Association
NESHAP	National Emission Standards for Hazardous Air Pollutants
OSHA	U.S. Occupational Safety and Health Administration
PLM	Polarized light microscopy
WSDOT	Washington State Department of Transportation

APPENDIX C: SHINGLE RECYCLING OPERATOR CERTIFICATION FORM

The Shingle Recycling Operator must complete the information below to certify that it and its Recycling Facility are able to meet the standards of the 2012 RAS Specification Guidelines.

Shingle Recycling Operator

Company name _____

Address _____

Website _____

Recycling Facility Address
(if different from Company Address) _____

Contact Name _____

Phone number _____

Email _____

CERTIFICATION

We the undersigned will meet and adhere to the 2012 RAS Specification Guidelines. In addition, we certify the following:

We currently have the equipment and operations in place to meet the outlined standards and requirements for producing the necessary quantity of RAS.

We agree to openly communicate about the production of the final RAS product and to respond to specific requests from the Contracting Agency.

We agree to utilize Asbestos Hazard Emergency Response Act (AHERA)-accredited staff or contractors to inspect incoming loads tear-off asphalt shingles and other asbestos management requirements of the 2012 RAS Specification Guidelines.

We agree to submit all necessary documentation, including but not limited to sampling and testing instructions to IAATL, laboratory reports, asbestos assessment reports, proof of AHERA-accreditation of staff or contractors, as required by the 2012 RAS Specification Guidelines.

Print Name _____ Title _____

Signature _____ Date _____

APPENDIX D: SELECTED TEST METHODS FROM WSDOT'S MATERIALS MANUAL

The following is a summary of relevant test methods from WSDOT's Materials Manual (January 2010), which reflects the continual policy of adopting consensus standards across AASHTO, ASTM, WAQTC, and WSDOT test methods wherever possible.¹

The full Materials Manual can be accessed online at <http://www.wsdot.wa.gov/publications/manuals/fulltext/M46-01/Materials.pdf> as described on the WSDOT web page: <http://www.wsdot.wa.gov/Publications/Manuals/M46-01.htm>

The Contracting Agency team members, working with WSDOT, will provide informational technical assistance on these procedures to the Shingle Recycling Operator proposed to supply the RAS product for this specified project.

<u>Procedure</u>	<u>Number</u>	<u>Owner</u>	<u>Test Method (January 2010)</u>
T	27/11	WSDOT	FOP for WAQTC/AASHTO for Sieve Analysis of Fine and Coarse Aggregates
T	308	WSDOT	FOP for AASHTO for Determining the Asphalt Binder Content of Hot Mix Asphalt (HMA) by the Ignition Method
T	2	WSDOT	FOP for AASHTO for Standard Practice for Sampling Aggregates

¹ WSDOT annually publishes an updated version of its Materials Manual every January.

APPENDIX E: DESCRIPTION OF RELEVANT WASHINGTON STATE REGULATORY AGENCIES

Local Health Department: Washington has 35 local health departments/districts to serve 39 counties. Local health departments have a broad range of regulatory authority and carry out a variety of programs to promote healthy communities. Specifically related to the 2012 RAS Specification Guidelines, local health departments issue and enforce solid waste handling permits that may include operations plans for processing tear-off asphalt shingles. The health departments also review permit exemptions for approval. They ensure that any facility that processes tear-off asphalt shingles is in compliance with WAC 173-350-040 Performance standards.

Washington State Department of Labor & Industries (L&I): L&I is a state agency dedicated to protecting worker health and safety and is among the framework of agencies that regulate asbestos in Washington State. The Division of Occupational Safety & Health (DOSH) is responsible for administering the Washington Industrial Safety & Health Act (WISHA), a state run OSHA program. Both WISHA and portions of the Safety and Health Core Rules (WAC 296-800) such as Accident Prevention Program, First Aid, and Worker Right-to-Know will apply to shingles processors.

Clean Air Authority: Air quality in Washington State is protected in most areas by Clean Air Agencies. These agencies are part of the framework in Washington State that regulates asbestos. The Puget Sound Clean Air Agency, for example, has authority to protect air quality in Snohomish, King, Kitsap, and Pierce Counties. Tribal governments or the Washington State Department of Ecology have authority in the areas not managed by Clean Air Agencies. For Shingles Recycling Operators and Shingle Recycling Facilities, the Clean Air Authority enforces the standards and protocols associated with asbestos control standards and testing.

Washington State Department of Ecology (Ecology): Ecology's mission is to protect, preserve and enhance the state's environment. They develop and enforce rules in support of Washington's environmental laws. Under the heading of managing and reducing waste, Ecology administers and enforces solid waste rules and regulations. In this role, Ecology requires that recycling facilities comply with Washington's solid waste handling regulations (Chapter 173-350 WAC).

APPENDIX F: ASBESTOS INFORMATION RESOURCES

The following resources provide additional information about asbestos management and regulations. These resources are for reference and educational purposes only.² For more in-depth information, please contact the asbestos regulatory agency in your region. Most of these resources are specific to Puget Sound and the State of Washington. Others are national in scope.

Puget Sound Clean Air Agency (PSCAA)

“Asbestos & Demolition” www.pscleanair.org/regulated/asbestos/default.aspx

“Asbestos Survey Guidance” www.pscleanair.org/regulated/asbestos/66-149%20Asbestos%20Survey%20Guidance.pdf (Internet Explorer only).

“Dealing with Asbestos: Information for General Contractors Doing Renovations”
www.pscleanair.org/regulated/asbestos/contractors/renovations.aspx

“Dealing with Asbestos: Information about Multiple-Unit Structures”
www.pscleanair.org/regulated/asbestos/contractors/multiple-unit.aspx

“How to Dispose of Asbestos-Containing Waste”
www.pscleanair.org/regulated/asbestos/disposal.aspx

“Asbestos Forms & Resources” www.pscleanair.org/regulated/asbestos/forms.aspx

“Frequently Asked Questions about Asbestos Removal & Demolition”
www.pscleanair.org/regulated/asbestos/asbestos_faqs.aspx

Washington State Department of Labor and Industry (L&I) information fact sheets:

“Asbestos Removal Requirements”
www.lni.wa.gov/TradesLicensing/LicensingReq/Asbestos/default.asp

“General Occupational Health Standards: Asbestos, Tremolite, Anthophyllite, and Actinolite”
www.lni.wa.gov/wisha/rules/generaloccupationalhealth/HTML/62I-1_2.htm#WAC296-62-07721

“Asbestos Removal - Building Owners’ Responsibilities”
www.lni.wa.gov/TradesLicensing/LicensingReq/Asbestos/default.asp#2

“Asbestos Removal - Contractors’ Responsibilities”
www.lni.wa.gov/TradesLicensing/LicensingReq/Asbestos/default.asp#3

² The contents of these external private resources do not necessarily reflect the views or policies of King County. The mention of private trade names, individual companies, commercial products, or inclusion of web links to private websites describing such materials or services is provided for information exchange and educational purposes only. Such mention does not constitute an endorsement, recommendation for use, or any form of implied warranty.

“Contractor Information Asbestos in Construction” and “Building Owner Information Asbestos in Construction” www.lni.wa.gov/WISHA/p-ts/Asbestos/AsbestosSurveys.pdf

“Asbestos Removal – Licensing and Registration”
www.lni.wa.gov/TradesLicensing/LicensingReq/Asbestos/#4

Washington State Department of Ecology:

“Asbestos in Demolition Debris Summary”
www.ecy.wa.gov/programs/hwtr/demodebris/pages2/asbsummary.html

“Banned Asbestos Building Products”
www.ecy.wa.gov/programs/hwtr/demodebris/pages2/bannedasb.html

“State Asbestos Regulations and Guidance”
<http://www.ecy.wa.gov/programs/hwtr/demodebris/pages2/asbregsstate.html>

“Local Clean Air Agencies”
<http://www.ecy.wa.gov/programs/air/local.html>

Construction Materials Recycling Association (CMRA) – www.ShingleRecycling.org:

Recycling Tear-Off Asphalt Shingles: Best Practices Guide (Oct. 2007)
www.shinglerecycling.org/sites/www.shinglerecycling.org/files/shingle_PDF/ShingleRecycling-BPG-DFK-3-22-2010.pdf.

Environmental Issues Associated with Asphalt Shingle Recycling
www.shinglerecycling.org/sites/www.shinglerecycling.org/files/shingle_PDF/EPA%20Shingle%20Report_Final.pdf

The CMRA [ShingleRecycling.org](http://www.ShingleRecycling.org) website has a good library of asbestos management advisory documents on the web page: *“Asbestos in Asphalt Shingles”* www.shinglerecycling.org/content/asbestos-asphalt-shingles.