Declaration Owner
All American Asphalt

Asphalt Plant:
AAA Corona
1776 All American Way
Corona, CA 92878
www.allamericanasphalt.com | +1.951.736.7600

Products
Asphalt/Rubber Hot Mix Asphalt
UNSPSC Code 30111509

Declared Unit
The declared unit is one short ton of hot mix asphalt.

EPD Number and Period of Validity
SCS-EPD-06404
EPD Valid September 11, 2020 through September 10, 2025
Version: October 13, 2020

Product Category Rule
Product Category Rules (PCR) For Asphalt Mixtures. Version 1.0.
National Asphalt Pavement Association. January 31, 2017

Program Operator
SCS Global Services
2000 Powell Street, Ste. 600, Emeryville, CA 94608
+1.510.452.8000 | www.SCSglobalServices.com

Declaration Owner:	All American Asphalt
Address:	1776 All American Way, Corona, CA 92878
Declaration Number:	SCS-EPD-06404
Declaration Validity Period:	EPD Valid September 11, 2020 through September 10, 2025
Version:	October 13, 2020
Program Operator:	SCS Global Services
Declaration URL Link:	https://www.scsglobalservices.com/certified-green-products-guide
LCA Practitioner:	Gerard Mansell, SCS Global Services
LCA Software:	openLCA v1.10 and USLCI database
Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071	☒ internal ☐ external
LCA Reviewer:	Tess Garvey, Ph.D., SCS Global Services
Product Category Rule:	Product Category Rules (PCR) For Asphalt Mixtures. Version 1.0. National Asphalt Pavement Association. January 31, 2017
PCR Review conducted by:	Joep Meijer, theRightenvironment (Review Chair)
Independent verification of the declaration and data, according to ISO 14025 and the PCR	☐ internal ☒ external
EPD Verifier:	Thomas Gloria, Ph.D., Industrial Ecology Consultants
Declaration Contents:	

Disclaimers: *This EPD conforms to ISO 14025, 14040 and 14044.*

Scope of Results Reported: *The PCR requirements limit the scope of the LCA metrics such that the results exclude environmental and social performance benchmarks and thresholds, and exclude impacts from the depletion of natural resources, land use ecological impacts, ocean impacts related to greenhouse gas emissions, risks from hazardous wastes and impacts linked to hazardous chemical emissions.*

Accuracy of Results: *Due to PCR constraints, this EPD provides estimations of potential impacts that are inherently limited in terms of accuracy.*

Comparability: *The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled.*

All American Asphalt

All American Asphalt (AAA) is an asphalt concrete producer and general contractor. AAA owns one quarry that supplies our six asphalt plants. AAA is a leader in the Industry in the utilization of recycled products. Our plants are equipped with the best available technology for asphalt concrete production as well as safety and environmental standards.

Product

PRODUCT DESCRIPTION

The product system includes the cradle-to-gate impacts of All American Asphalt's asphalt/rubber hot mix asphalt product, described below. The product is produced from coarse aggregates mixed and reacted with asphalt binders and other additives including post-consumer recycled rubber material. Blend of 80% PG 64-16 Binder and 20% crumb (scrap tire) mixed and reacted for 45 minutes at the production facility. The "Asphalt Rubber Binder" is blended with a Gap Graded aggregate Blend at approximately 7.5% of the total mix. The Rubberized Asphalt Concrete is used in overlay applications as a way to reduce reflective cracking.

The reference flow for the product system is defined as one short ton of asphalt mixture.

The hot mix asphalt product is manufactured at All American Asphalt's facility in Corona, California using components materials from multiple suppliers. The products are produced from coarse aggregates mixed and reacted with asphalt binders and other additives including post-consumer recycled rubber material. Aggregate materials are sourced on-site while other materials are sourced regionally. Manufacturing data, including electricity and resource use, at the production facility were provided for calendar year 2019.

PRODUCT CHARACTERISTICS

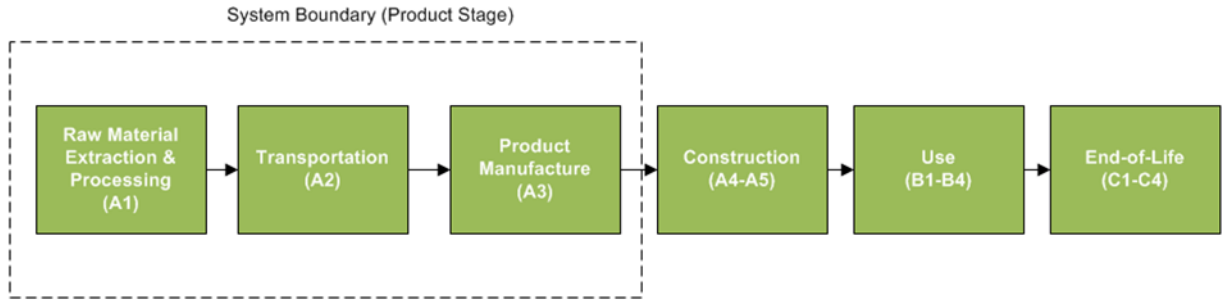
The product is manufactured at a temperature range of 149 C (300 F) to 163 C (325 F).

PRODUCT APPLICATION

All American's asphalt mixtures are used in various road paving and surfacing applications

PRODUCT FLOW DIAGRAM

A flow diagram illustrating the production processes and life cycle phases included in the scope of the EPD is provided below.



MATERIAL CONTENT

Table 1. *Material component summary for the asphalt/rubber hot mix asphalt products as a percentage of total mass (per declared unit).*

Material	Percentage
Aggregate	92.5%
Asphalt Binder	6.0%
Crumb Rubber	1.5%
Total	**100%**

Life Cycle Assessment Stages and Reported EPD Information

The EPD represents the potential environmental impacts from the production of the asphalt mixtures (i.e., cradle-to-gate). The production stage of the product life cycle includes:

- A1 – The extraction and processing of raw materials and the manufacture of material components (e.g., aggregate, asphalt binder).
- A2 – The transportation of raw materials from source to manufacturing site.
- A3 – The manufacturing of hot mix asphalt.

An overview of the life cycle stages included is shown in the figure below.

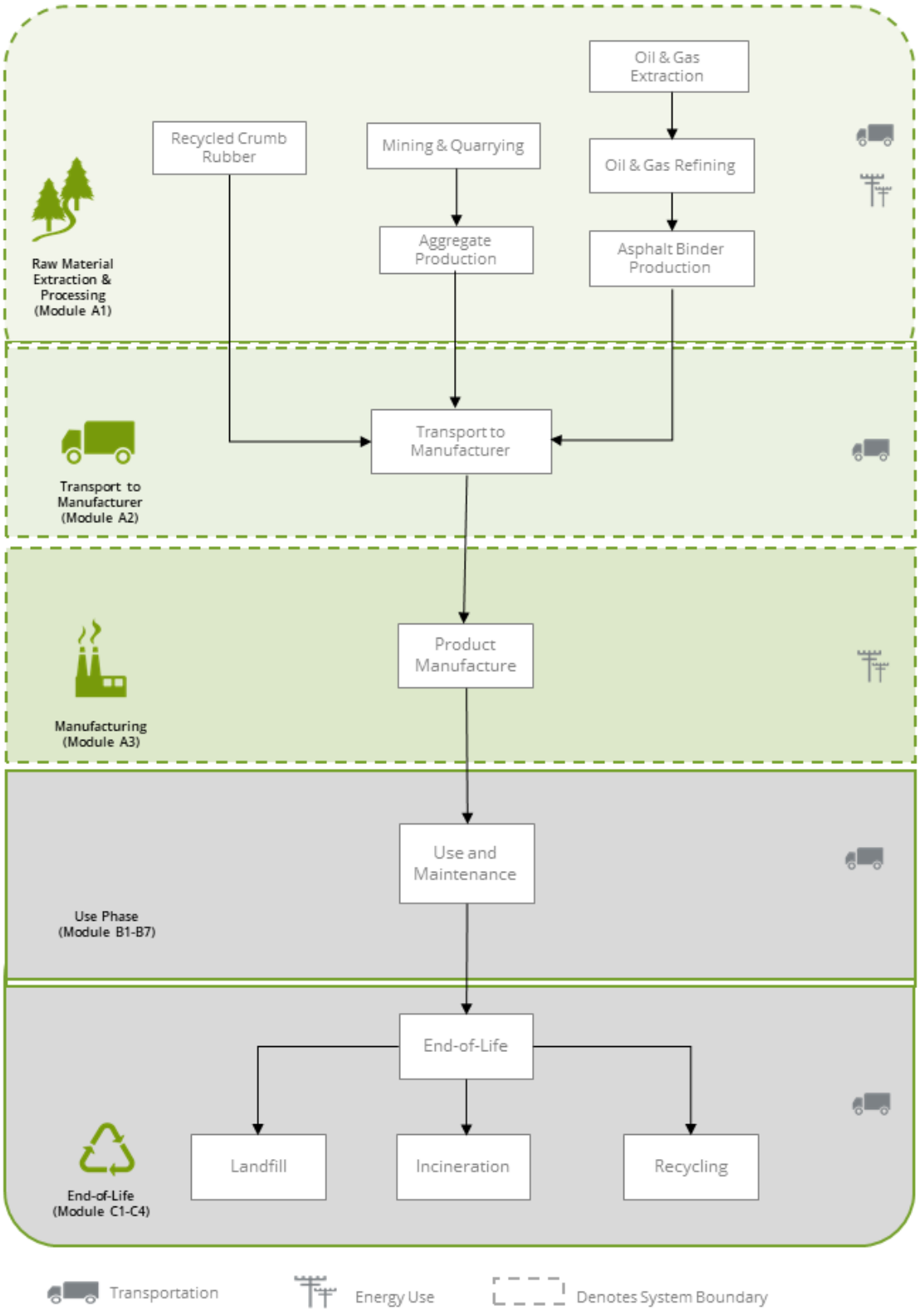


Figure 1. *Flow diagram representing the major processes in the production stage of the asphalt/rubber hot mix asphalt product. Processes within the dotted lines (A1, A2 and A3) are included in the system boundaries.*

Life Cycle Inventory

In accordance with the PCR, the following aggregated inventory flows are included in the LCA:

- *Use of renewable primary energy excluding renewable primary energy resources used as raw materials (RPR_E).* Since there are no renewable energy resources used as raw materials, this parameter equals the total consumption of renewable primary energy resources.
- *Use of renewable primary energy resources used as raw materials (RPR_M).* Although no classification scheme is available in openLCA for this parameter, based on the material content of the product, there are no renewable energy resources used as raw materials in the product system.
- *Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials ($NRPR_E$).* While no classification scheme is available in openLCA for energy resources used as raw materials, since the non-renewable primary energy resources used as raw materials are negligible, this parameter is equal to the total primary non-renewable resources used in the product system.
- *Use of non-renewable primary energy resources used as raw materials ($NRPR_M$).* Although no classification scheme is available in openLCA for energy resources used as raw materials, based on the component materials, there are negligible non-renewable primary energy resources used as raw materials.
- *Use of secondary material (SM).* The products contain recycled materials and this parameter is reported as the secondary material used in the product system.
- *Use of renewable and nonrenewable secondary fuels (RSF/NRSF).* The main consumption of any secondary fuel in the product system is the combustion of municipal solid waste, used to generate electricity in some regions. This parameter is assumed negligible for the current assessment.
- *Net use of fresh water (FW).* There are insufficient data in the US LCI life cycle inventories to quantify this parameter for upstream processes. There is no water consumption at the production facility. *Indicator not assessed for upstream processes*.
- *Hazardous waste disposed (HWD).* There are insufficient data in the US LCI life cycle inventories to quantify this parameter for upstream processes. There is no hazardous waste disposed at the production facility. *Indicator not assessed for upstream processes*.
- *Non-hazardous waste disposed (NHWD).* This includes all wastes produced across all life cycle stages included in the study scope. Flows of non-hazardous waste included in the full LCI were aggregated into a single result for total non-hazardous waste disposal.
- *Radioactive wastes disposed (HLRW/ILLRW).* There are insufficient data in the US LCI life cycle inventories to quantify this parameter. *Indicator not assessed*.
- *Components for re-use (CRU).* There are no components of the product which can be reused, or recycled, at the end-of-life and this parameter is reported as zero.
- *Materials for recycling (MR).* The product end-of-life is not considered as the product system scope is cradle-to-gate. *Indicator not assessed*.
- *Materials for energy recovery (MER). T*he production of materials for energy recovery crossing the system boundaries is negligible.
- *Recovered energy (RE).* The recovered energy crossing the system boundaries is negligible.

- *Exported energy (EE).* The exported energy crossing the system boundaries is negligible.

All results are calculated using the OpenLCA v1.10 model using primary and secondary inventory data, as prescribed by the PCR.

Table 2. *Results for resource use, wastes, and output flows for the declared unit for the Asphalt/Rubber mix product.*

Impact Category	Units	Total	Raw Material Extraction & Processing	Transportation of Raw Materials	Manufacturing of the Product
Resources					
Renewable primary resources used as energy carrier (RPR_E)	MJ	0.136	$2.15x10^{-2}$	$7.93x10^{-2}$	$3.51x10^{-2}$
	%	100%	16%	58%	26%
Renewable primary resources with energy content used as material (RPR_M)	MJ	0.00	0.00	0.00	0.00
Non-renewable primary resources used as an energy carrier ($NRPR_E$)	MJ	3,490	2,980	232	278
	%	100%	85%	6.6%	8.0%
Non-renewable primary resources with energy content used as material ($NRPR_M$)	MJ	Neg.	Neg.	Neg.	Neg.
Secondary materials (SM)	kg	13.6	13.6	0.00	0.00
	%	100%	100%	0%	0%
Renewable / Non-renewable secondary fuels (RSF/NRSF)	MJ	0.00	0.00	0.00	0.00
Recovered energy (RE)	MJ	0.00	0.00	0.00	0.00
Total water	gallons	INA	INA	INA	0.00
Wastes					
Hazardous waste disposed (HWD)	kg	INA	INA	INA	0.00
Non-hazardous waste disposed (NHWD)	kg	0.392	$6.30x10^{-2}$	0.181	0.149
	%	100%	16%	46%	38%
High-level radioactive waste, conditioned, to final repository (HLRW)	kg	INA	INA	INA	INA
Intermediate- and low-level radioactive waste, conditioned, to final repository (ILLRW)	kg	INA	INA	INA	INA
Components for re-use (CRU)	kg	0.00	0.00	0.00	0.00
Materials for recycling (MR)	Kg	INA	INA	INA	INA
Materials for energy recovery (MER)	kg	Neg.	Neg.	Neg.	Neg.
Recovered energy exported from the product system (EE)	MJ	Neg.	Neg.	Neg.	Neg.

INA = Indicator not assessed | Neg. = Negligible

Life Cycle Impact Assessment

Life cycle impact assessment is the process of converting the life cycle inventory results into a representation of environmental and human health impacts. For example, emissions such as carbon dioxide, methane, and nitrous oxide (inventory) together contribute to climate change (impact assessment). The impact assessment for the EPD is conducted in accordance with requirements of the PCR. Impact category indicators are estimated using the Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI version 2.1). The LCIA and inventory flow results are calculated using OpenLCA v1.10 software.

Table 3. *Life Cycle Impact Assessment (LCIA) results for the Asphalt/Rubber mix product. Percent contribution of each information module to the total cradle-to-gate life cycle result for each impact category also shown. Values may not sum to the exact totals due to rounding.*

Impact Category	Units	Total	Raw Material Extraction and Processing	Transportation of Raw Materials	Manufacturing of the Product
Global Warming	kg CO_2 eq	48.2	29.3	3.68	15.2
	%	100%	61%	7.6%	32%
Acidification	kg SO_2 eq	0.418	0.383	$1.50x10^{-2}$	$1.99x10^{-2}$
	%	100%	92%	3.6%	4.8%
Eutrophication	kg N eq	$1.84x10^{-2}$	$1.70x10^{-2}$	$7.87x10^{-4}$	$6.18x10^{-4}$
	%	100%	92%	4.3%	3.4%
Smog Formation	kg O_3 eq	5.12	4.42	0.368	0.333
	%	100%	86%	7.2%	6.5%
Ozone Depletion	kg CFC-11 eq	$1.55x10^{-7}$	$3.50x10^{-8}$	$1.06x10^{-7}$	$1.35x10^{-8}$
	%	100%	23%	69%	8.7%
Resource depletion - fossil fuels	MJ surplus	480	409	31.8	38.8
	%	100%	85%	6.6%	8.1%

Note: The life cycle impact assessment results are relative expressions and do not predict actual impacts on category endpoints, the exceeding of thresholds, safety margins, or risks.

Supporting Technical Information

Data sources

Unit processes are developed with OpenLCA v1.10 software, drawing upon data from multiple sources. Primary data were provided by All American Asphalt for their manufacturing processes. The primary sources of secondary LCI data are from the USLCI Life-Cycle Inventory Database and the Portland Cement Association, as prescribed by the PCR.

Table 4. *Data sources used for the LCA.*

Component	Dataset	Data Source	Publication Date
Product			
Aggregate	Coarse aggregate	US LCI; Portland Cement Assoc.	2013; 2017
Asphalt Binder	Petroleum refining, at refinery; Bitumen, at refinery	US LCI	2011
Crumb Rubber	n/a	n/a	n/a
Transport			
Road transport	Transport, combination truck, diesel powered	US LCI	2013
Resources			
Grid electricity	Electricity, at eGrid, CAMX, 2018	US LCI; GREET	2018; 2019
Heat – Natural gas	Natural gas, combusted in industrial boiler	US LCI	2015
Heat – Diesel	Diesel, combusted in industrial equipment	US LCI	2015

Data Quality

Table 5. *Data quality assessment of Life Cycle Inventory.*

Data Quality Parameter	Data Quality Discussion
Time-Related Coverage: Age of data and the minimum length of time over which data is collected	The secondary data and databases are prescribed by the PCR. Typically, these data are less than 5 years old (typically 2016). All of the data used represented an average of at least one year's worth of data collection, and up to three years in some cases. Manufacturer-supplied data (primary data) are based on annual production for 2019.
Geographical Coverage: Geographical area from which data for unit processes is collected to satisfy the goal of the study	The data used in the analysis provide the best possible representation available with current data. Actual processes for upstream operations are primarily North American. Surrogate data used in the assessment are representative of North American operations.
Technology Coverage: Specific technology or technology mix	For the most part, data are representative of the actual technologies used for processing, transportation, and manufacturing operations.
Precision: Measure of the variability of the data values for each data expressed	Precision of results are not quantified due to a lack of data. Data collected for operations were typically averaged for one or more years and over multiple operations, which is expected to reduce the variability of results.
Completeness: Percentage of flow that is measured or estimated	The LCA model included all known mass and energy flows for production of the hot mix asphalt products. In some instances, surrogate data used to represent upstream operations may be missing some data which is propagated in the model. No known processes or activities contributing to more than 1% of the total environmental impact for each indicator are excluded.
Representativeness: Qualitative assessment of the degree to which the data set reflects the true population of interest	Data used in the assessment represent typical or average processes as currently reported from multiple data sources and are therefore generally representative of the range of actual processes and technologies for production of these materials. Considerable deviation may exist among actual processes on a site-specific basis; however, such a determination would require detailed data collection throughout the supply chain back to resource extraction.
Consistency: Qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis	The consistency of the assessment is considered to be high. Data sources of similar quality and age are used. Different portions of the product life cycle are equally considered based on typical practices in the United States.
Reproducibility: Qualitative assessment of the extent to which information about the methodology and data values would allow an independent practitioner to reproduce the results reported in the study	Based on the description of data and assumptions used, this assessment would be reproducible by other practitioners. All assumptions, models, and data sources are documented.
Sources of the Data: Description of all primary and secondary data sources	Data representing energy use at the All American Asphalt manufacturing facility represent an annual average and are considered of high quality due to the length of time over which these data are collected, as compared to a snapshot that may not accurately reflect fluctuations in production. For secondary LCI data the USLCI databases are used.
Uncertainty of the Information: Uncertainty related to data, models, and assumptions	Uncertainty related to materials in the asphalt products is low. Primary data for upstream processes were not available; as such, the study relied upon use of existing representative datasets for these cases, as specified by the PCR. Uncertainty related to the impact assessment methods used in the study are relatively high. The impact assessment method includes impact potentials that lack characterization of providing and receiving environments or tipping points.

Allocation

Annual facility-level electricity and natural gas and water use data were provided by the manufacturer for calendar year 2019 for their facilities in Corona, CA. Resource use was allocated to the product based on mass of product as a fraction of the total facility production volume as provided by the manufacturer.

Impacts from transportation were allocated based on the mass of material and distance transported.

Cut-off criteria

According to the PCR, processes contributing greater than 1% of the total environmental impact indicator for each impact must be included in the inventory. In the present study, except as noted, all known materials and processes were included in the life cycle inventory.

References

1. Life Cycle Assessment of Asphalt Mixtures. October 2020.
2. ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and Procedures.
3. ISO 14040: 2006 Environmental Management – Life cycle assessment – Principles and Framework
4. ISO 14044: 2006 Environmental Management – Life cycle assessment – Requirements and Guidelines.
5. Product Category Rules (PCR) For Asphalt Mixtures. Version 1.0. National Asphalt Pavement Association. January 31, 2017.
6. SCS Type III Environmental Declaration Program: Program Operator Manual. V10.0 April 2019. SCS Global Services.
7. Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI). Dr. Bare, J., http://www.epa.gov/nrmrl/std/traci/traci.html
8. U.S. Life Cycle Inventory Database." (2012). National Renewable Energy Laboratory, 2012. https://www.lcacommons.gov/nrel/search
9. Marceau, Medgar L., Nisbet, Michael A., and VanGeem, Martha G. *Life Cycle Inventory of Portland Cement Concrete*, SN3011, Portland Cement Association, Skokie, Illinois, PCA, 2007

For more information, contact:

All American Asphalt
1776 All American Way
Corona, CA 92878
allamericanasphalt.com | +1.951.736.7600

SCS Global Services
2000 Powell Street, Ste. 600, Emeryville, CA 94608 USA
Main +1.510.452.8000 | fax +1.510.452.8001